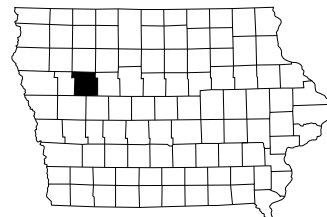


SAC COUNTY

LETTING DATE



PROJECT DIRECTORY NAME: 81020020A98



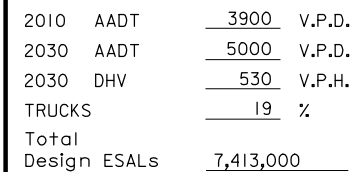
THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2009, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.



Pages or sheets covered by this seal: SHEETS 4,5,6,62,63,& 64 OF 128

Pages or sheets covered by this seal: SHEETS 1 THRU 118 OF 128

REVISIONS



		TOTAL SHEETS
		128
PROJECT NUMBER		
NHSX-020-2 (84)--3H-81		
R.O.W. PROJECT NUMBER		
PROJECT IDENTIFICATION NUMBER		
98-81-020-020		

INDEX OF SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 410
2-118	DESIGN 410
SPS.1-SPS.5	SOIL PROFILE SHEET
C.1	ESTIMATE SHEET FOR ROADWAY
C.1-J.1	ROADWAY SHEETS

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
I	KAREN B. KONTOS	STRUCTURAL DESIGN
I	WILLIAM L. KAUFMAN	HYDRAULIC DESIGN
SPS. I	ROBERT L. STANLEY	GEOTECHNICAL DESIGN
C.I	PAUL FLATTERY	ROADWAY DESIGN

ESTIMATED BRIDGE QUANTITIES					
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2402-2720000	EXCAVATION, CLASS 20	CY	3,890	
2	2402-2721000	EXCAVATION, CLASS 21	CY	1,690	
3	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	5,106.9	
4	2404-7775000	REINFORCING STEEL	LB	420,135	
5	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	571,418	
6	2407-0551485	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, D85	EACH	24	
7	2407-0551510	BEAMS, PRETENSIONED PRESTRESSED CONCRETE, D110	EACH	60	
8	2408-7800000	STRUCTURAL STEEL	LB	35,228	
9	2413-1200000	STEEL EXTRUSION JOINT WITH NEOPRENE	LF	174.0	
10	2413-1200100	NEOPRENE GLAND INSTALLATION AND TESTING	LF	174	
11	2414-6424110	CONCRETE BARRIER RAILING	LF	3,034.2	
12	2501-0201057	PILES, STEEL, HP 10 X 57	LF	5,440	
13	2501-0201473	PILES, STEEL, HP 14 X 73	LF	18,320	
14	2507-3250005	ENGINEERING FABRIC	SY	758.0	
15	2507-6800061	REVETMENT, CLASS E	TON	597.0	
16	2533-4980005	MOBILIZATION	LS	1.00	

GENERAL NOTES :

IT IS THE INTENT OF THESE PLANS TO CONSTRUCT A DUAL 729'-0" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE ON RELOCATED U.S. 20, SAC COUNTY OVER NORTH RACCOON RIVER.

THIS BRIDGE IS DESIGNED FOR HL-93 LOADING PLUS 20 LBS. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

THE BRIDGE CONTRACTOR IS TO INSTALL SUBDRAINS BEHIND THE ABUTMENTS AS DETAILED. THE SUBDRAINS SHALL BE 4" DIA. PERFORATED SUBDRAIN (POLYETHYLENE CORRUGATED TUBING). THE SUBDRAIN OUTLET WILL CONSIST OF A 6' LENGTH OF PIPE WITH A REMOVABLE ROBERT GUARD AS DETAILED IN THESE PLANS.

UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE STARTING DATE.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATION MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

THE APPROACH FILLS AS SHOWN ARE NOT A PART OF THIS CONTRACT, BUT ARE TO BE IN PLACE BEFORE ABUTMENT PILES ARE DRIVEN. THE BRIDGE CONTRACTOR IS TO LEVEL OFF AND SHAPE THE BERMS TO THE ELEVATIONS AND DIMENSIONS SHOWN. DRESSING OF SLOPES OUTSIDE THE BRIDGE AREA NOT DISTURBED BY THE BRIDGE CONTRACTOR SHALL BE PAID FOR AS EXTRA WORK.

CLASS 20 EXCAVATION QUANTITIES ARE BASED ON THE ASSUMPTION THAT THE CHANNEL EXCAVATION IS COMPLETED PRIOR TO STARTING CONSTRUCTION OF THE ABUTMENTS AND PIERS.

ABUTMENT PILES SHALL NOT BE DRIVEN FOR A MINIMUM OF 30 DAYS FOLLOWING COMPLETION OF APPROACH FILLS AT WEST ABUTMENTS AND EAST ABUTMENTS.

PIER PILES SHALL NOT BE DRIVEN FOR A MINIMUM OF 30 DAYS FOLLOWING COMPLETION OF APPROACH FILLS AT PIER 1 AND PIER 6.

THIS STRUCTURE IS BEING CONSTRUCTED ON A RELOCATION AND THE ROAD WILL NOT BE OPEN TO TRAFFIC UNTIL AFTER COMPLETION OF CONSTRUCTUON.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 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

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03.A,2 OF THE STANDARD SPECIFICATION. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

IF DECK HANGERS ARE EMBEDDED IN PRESTRESSED BEAMS, THEY SHALL BE COATED USING ONE OF THE FOLLOWING METHODS:

1. ELECTROPLATING IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION SC4, REQUIRED COATING THICKNESS OF 1.0 MIL. CLASSIFICATION AND COATING SUFFIX :Fe/Zn 25.
2. MECHANICAL GALVANIZING IN ACCORDANCE WITH ASTM B695, TYPE 1, CLASS 50. MINIMUM COATING THICKNESS SHALL BE 2 MILS.

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.

LONGITUDINAL GROOVING WILL NOT BE A PART OF THE BRIDGE PROJECT,
BUT WILL BE DONE BY OTHERS PRIOR TO OPENING THE BRIDGE TO TRAFFIC.

GUARDRAIL IS TO BE PLACED BY OTHERS.

GENERAL NOTES CONT'D.:

THE INFORMATION IN THE "BERM SLOPE LOCATION TABLE" PROVIDES THE LOCATION AND ELEVATION OF SIX POINTS WHICH CAN BE USED TO LEVEL OFF AND SHAPE THE BERMS TO THEIR FINAL DIMENSIONS. THE 'A' POINTS ARE LOCATED WHERE THE FINISHED GRADE ON THE BERM SLOPE (OR TOE OF SLOPE PROJECTION) MEETS THE EDGE OF THE OFFSET. 'A1' AND 'A3' ARE LOCATED 3' OUTSIDE OF BRIDGE SLAB. 'A2' IS ALONG CL APPROACH ROADWAYS. THE 'B' IS LOCATED AT THE POINT WHERE THE EXTENSION OF THE BERM SLOPE ALONG CL APPROACH ROADWAY INTERSECTS WITH THE TOP OF PAVEMENT AT THE CL APPROACH ROADWAY.

THIS BRIDGE HAS BEEN CONVERTED FROM METRIC TO ENGLISH FOR DESIGN AND CONSTRUCTION. METRIC VALUES OF STATIONS AND ELEVATIONS WERE MULTIPLIED BY THE CONVERSION FACTOR 3.280833333 TO OBTAIN ENGLISH VALUES. THE ROAD PLANS AND SURVEY REMAINED IN METRIC.

SPECIFICATIONS:

DESIGN: AASHTO LRFD 4th Ed, SERIES OF 2007, WITH 2009 INTERIM REVISIONS.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS
FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2009, PLUS
APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL
SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL
PROVISIONS INCLUDING DEVELOPMENTAL SPECIFICATION FOR MASS CONCRETE
CONTROL OF HEAT OF HYDRATION, SHALL APPLY TO CONSTRUCTION
WORK ON THIS PROJECT.

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,
EXCEPT PRESTRESSED BEAM CONCRETE AS NOTED.

PRESTRESSED CONCRETE BEAMS, SEE DESIGN SHEETS 49, 51, 107 AND 109.

BRIDGE DECK CONCRETE $f'_c = 3500$ PSI.

STRUCTURAL STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 6. ASTM A709 GRADE 36, GRADE 50, AND GRADE 50W (AASHTO M270 GRADE 36, GRADE 50, AND GRADE 50W).

TRAFFIC CONTROL PLAN

NOTE: THIS STRUCTURE IS BEING
CONSTRUCTED ON A RELOCATION
AND THE ROAD WILL NOT BE OPEN
TO TRAFFIC UNTIL AFTER COMPLETION
OF CONSTRUCTION.

NOTE:

POLLUTION PREVENTION PLAN SHOWN
ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

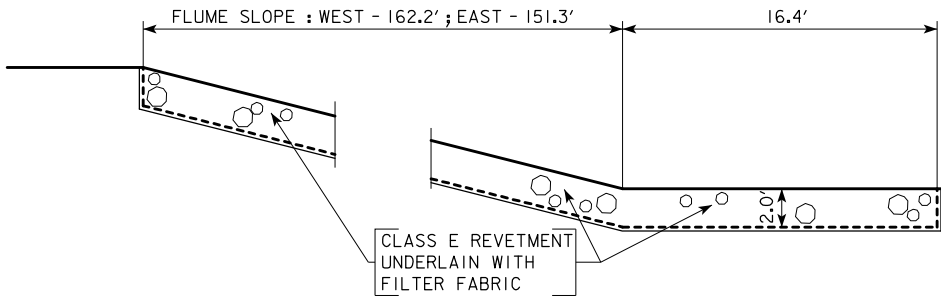
NOTES

STATION : 893+14.13 (@ RELOCATED U.S. 20) AUGUST, 2010

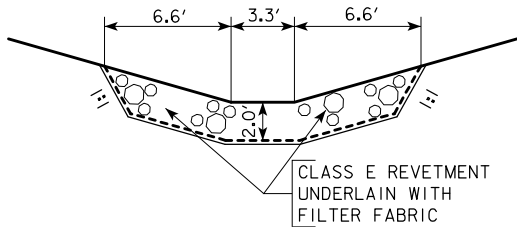
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 2 OF 117 FILE NO. 30187 DESIGN NO. 410

DESIGN TEAM	KBK/JTN/RAR/MSF	SAC COUNTY	PROJECT NUMBER	NHSX-020-2 (84)-3H-81	SHEET NUMBER	3
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SECTION ALONG ROCK FLUME / PAD

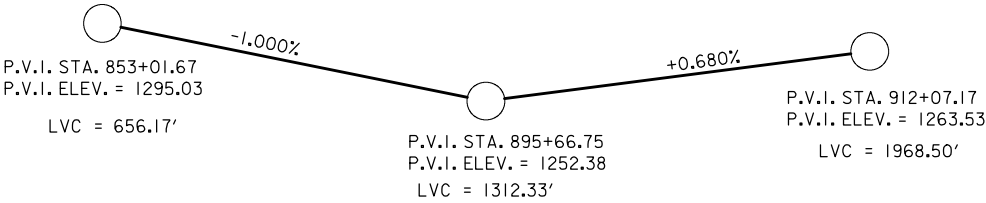


SECTION THRU
ROCK FLUME

NOTE :
SEE DESIGN SHEETS 3 & 4 FOR
LOCATION OF ROCK FLUMES.

REVETMENT QUANTITIES			
REVETMENT TYPE & LOCATION	REVETMENT CLASS E (TON)	GABIONS OR MATT. (CY)	ENGINEERING FABRIC (SY)
ROCK FLUME - MEDIAN STA. 889+37, 0.0' LT.	276	—	361
ROCK PAD STA. 891+04, 21.7' LT.	32	—	30
ROCK FLUME - MEDIAN STA. 896+91, 0.0' LT.	257	—	337
ROCK PAD STA. 895+34, 20.3' LT.	32	—	30
TOTALS	597	—	758

BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



PROPOSED GRADE ON
RELOCATED U.S. 20

CURVE DATA :
(¢ RELOCATED U.S. 20)

P.I. STA. 884+39.82
SC STA. 860+50.50
CS STA. 901+80.72
Δ = 72°07'45.54" (LT.)
T = 2389.33'
L = 4130.22'
E = 777.83'
R = 3280.83'
e = 0.056 1/1

HYDRAULIC DATA :

DRAINAGE AREA = 333.0 SQ.MI.
STREAM SLOPE = 5.30 FT./MI.

Q2 = 2100 C.F.S.
STAGE = ELEV. 1199.4
CHANNEL VELOCITY = 3.9 F.P.S.

Q50 = 9200 C.F.S.
STAGE = ELEV. 1205.3
BACKWATER = 0.20 FT.
BRIDGE VELOCITY = 3.6 F.P.S.

Q100 = 10,600 C.F.S.
STAGE = 1205.9
BACKWATER = 0.23 FT.
CALCULATED SCOUR = ELEV. 1179.3

Q500 = 14,200 C.F.S.
STAGE = ELEV. 1207.4
CALCULATED SCOUR = ELEV. 1178.5

ROADWAY OVERTOP ELEV. 1255.0
STATION 896+92

EXTREME HW STAGE = ELEV. 1201.3
DATE = JUNE 1996
AVG. LOW WATER STAGE = ELEV. 1194.4
SURVEY DATE, JUNE 1999

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1 2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

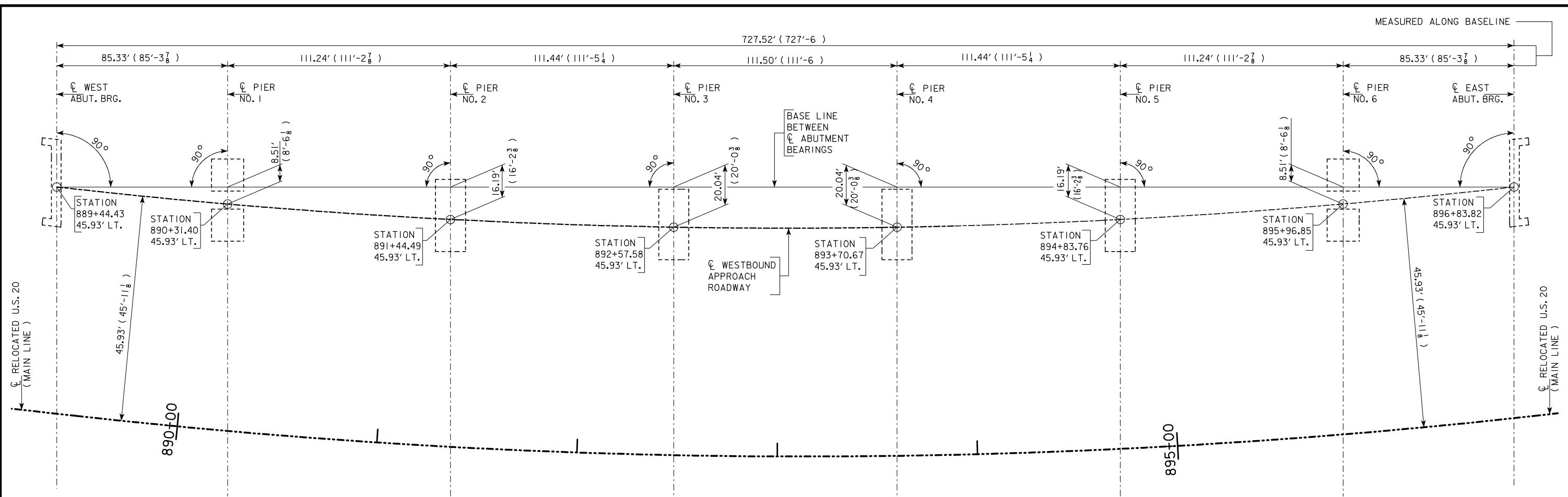
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

SITUATION PLAN INFORMATION

STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 117 FILE NO. 30187 DESIGN NO. 410



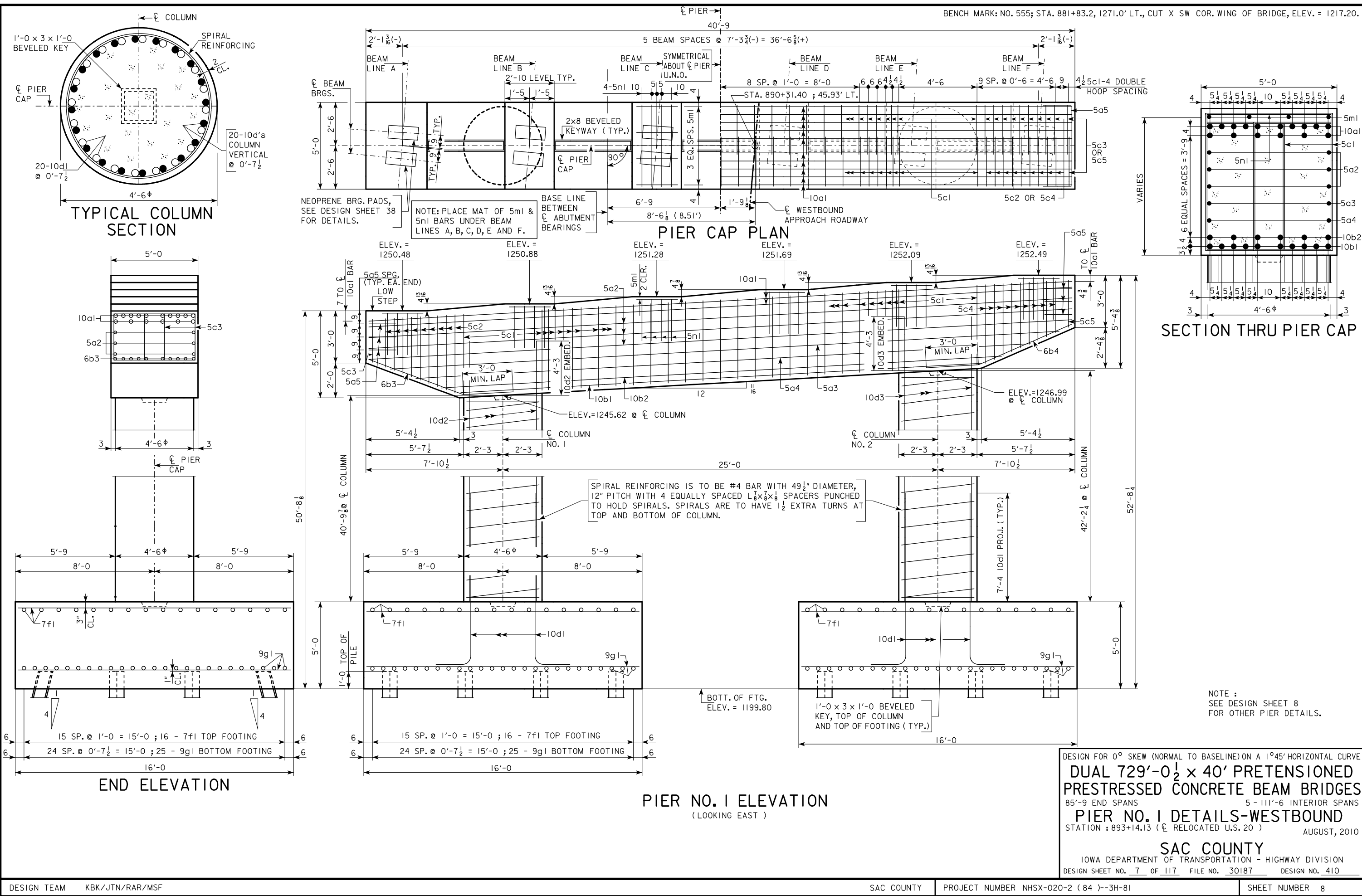
WESTBOUND STAKING DIAGRAM



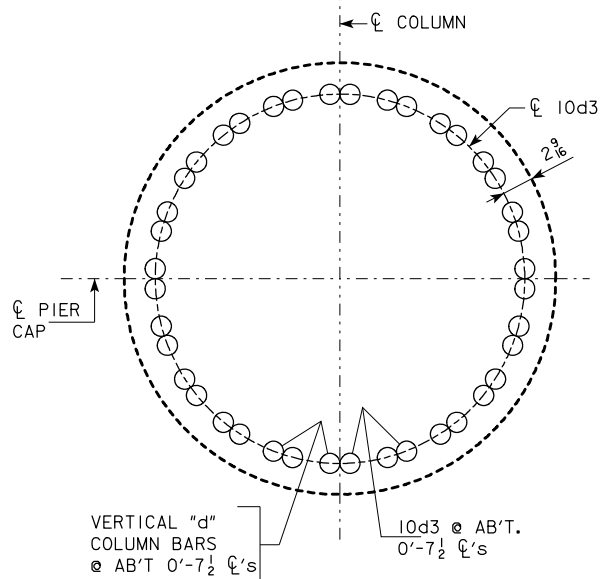
THE STAKING DIAGRAM INFORMATION DETAILED ON THIS SHEET SHOWS THE LOCATION AND ORIENTATION OF THE CENTERLINE OF SUBSTRUCTURE UNITS FROM A BASE LINE BETWEEN ϕ ABUTMENT BEARINGS. THE LOCATION OF ϕ ABUTMENT OR ϕ PIER RELATIVE TO THE BASE LINE AND ϕ WESTBOUND APPROACH ROADWAY IS SHOWN ON OTHER DESIGN SHEETS. THE FOLLOWING TABLE LISTS WHERE THIS INFORMATION IS SHOWN.

LOCATION OF ϕ ABUT. OR ϕ PIER FROM BASE LINE AND ϕ WB APPR. RDWY.	
FOR SUBSTRUCTURE UNIT:	SEE DESIGN SHEET:
W. ABUTMENT	23
PIER #1	8
PIER #2	11
PIER #3	14
PIER #4	17
PIER #5	20
PIER #6	22
E. ABUTMENT	23

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES**
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
STAKING DIAGRAM - WESTBOUND
 STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 6 OF 117 FILE NO. 30187 DESIGN NO. 410



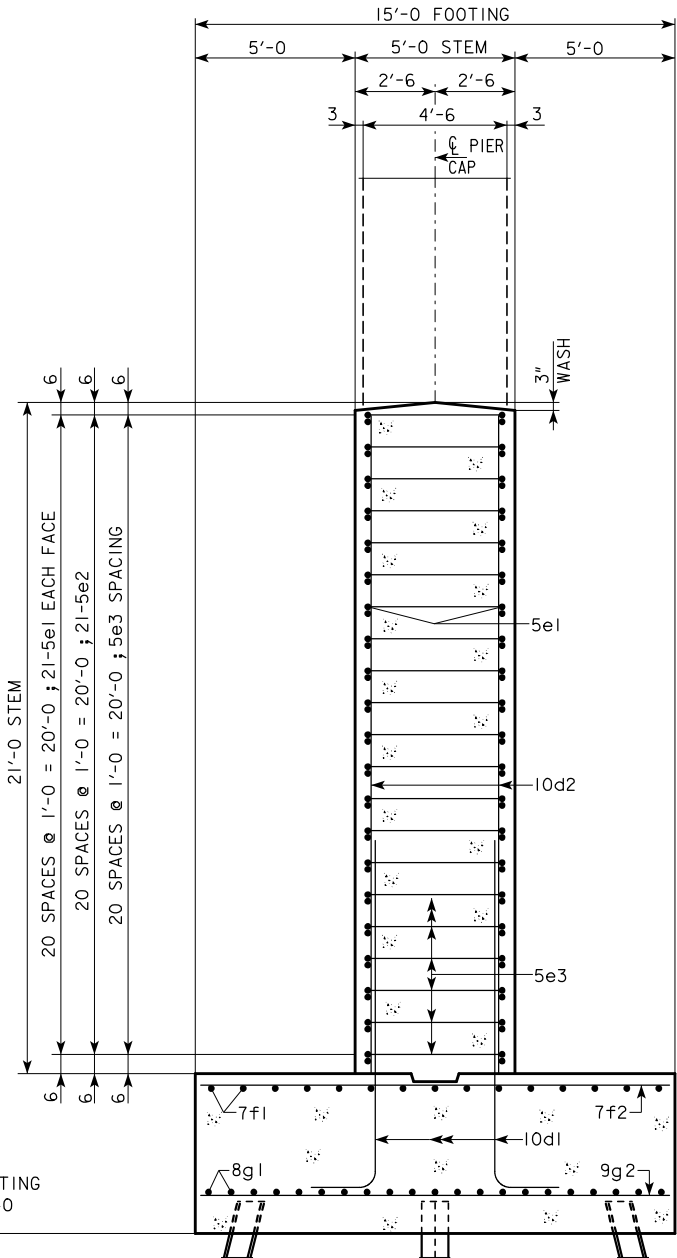
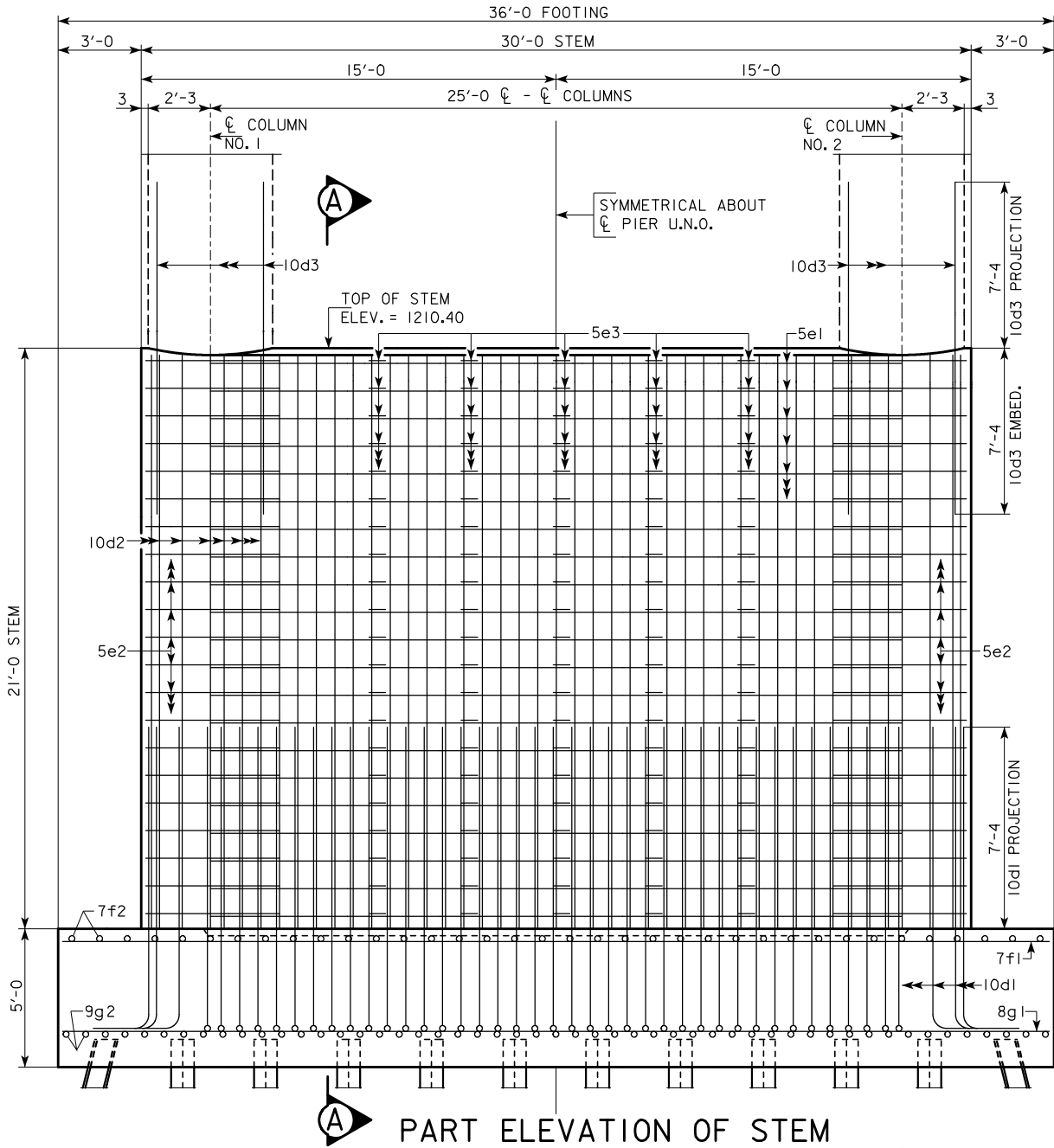
BENCH MARK: NO. 555: STA. 88|+83.2. 1271.0' LT., CUT X SW COR. WING OF BRIDGE. ELEV. = 1217.20.



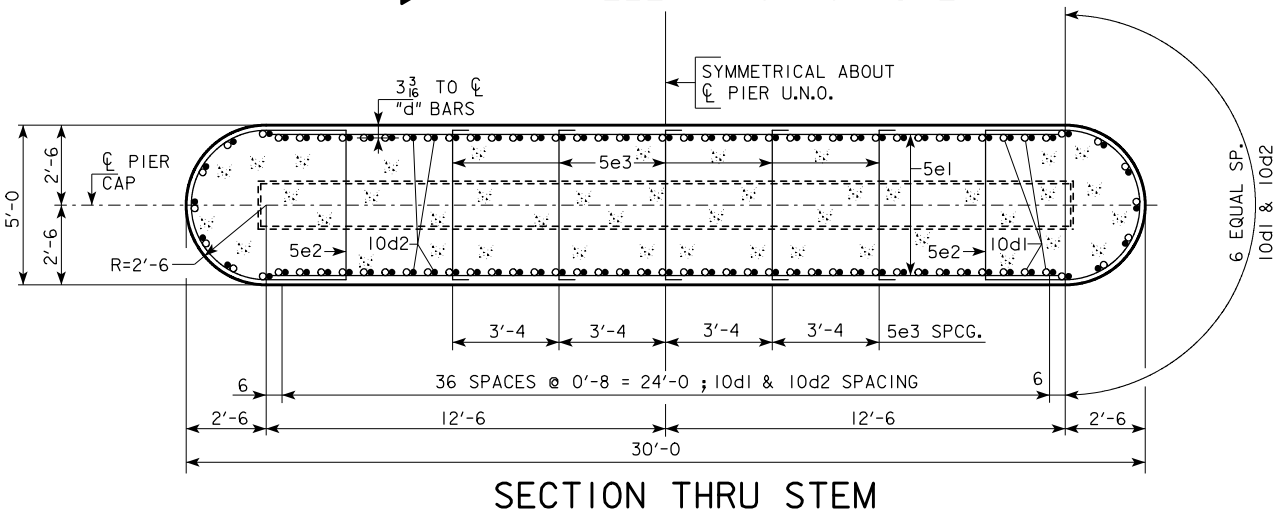
10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 9 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.



PART SECTION A-A



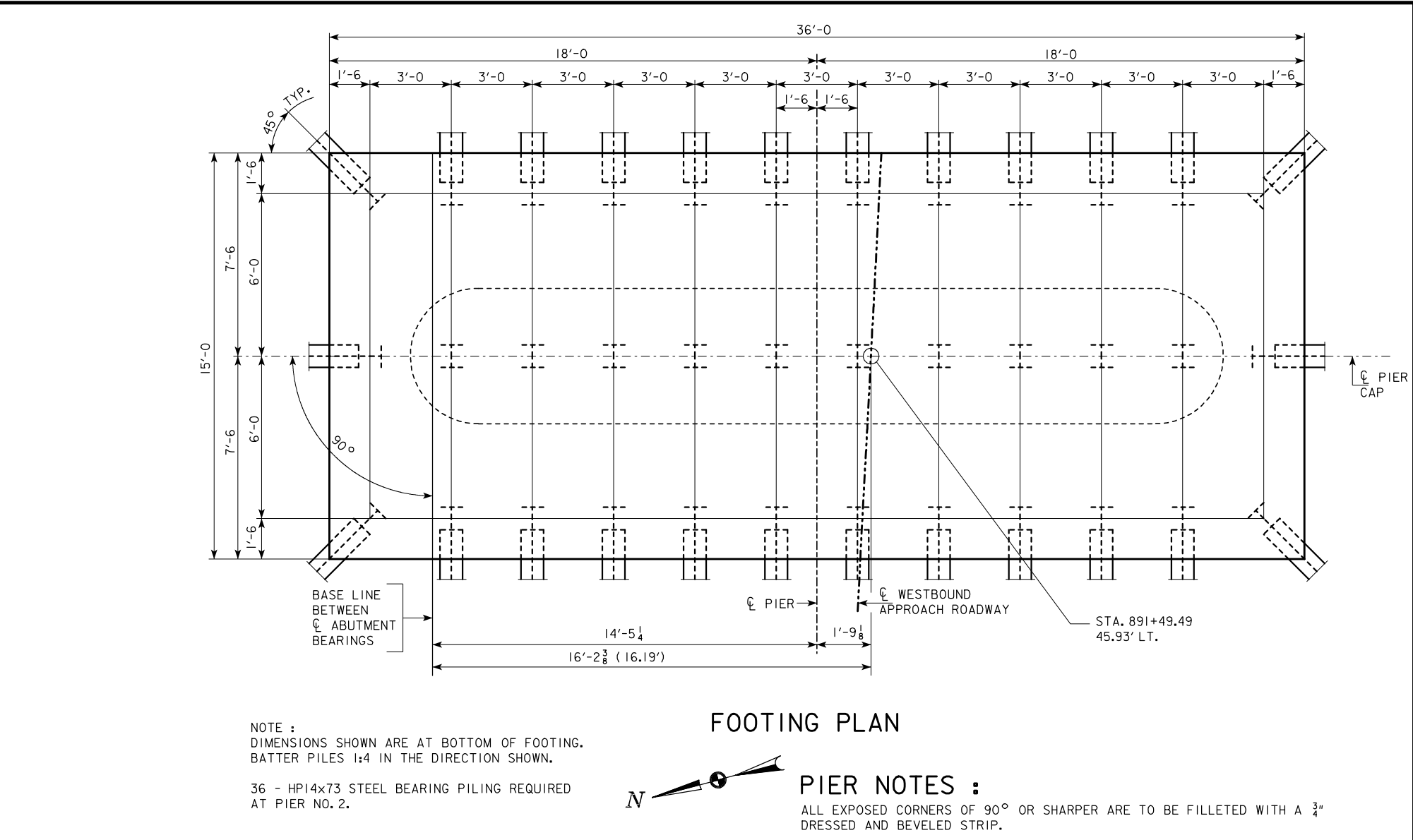
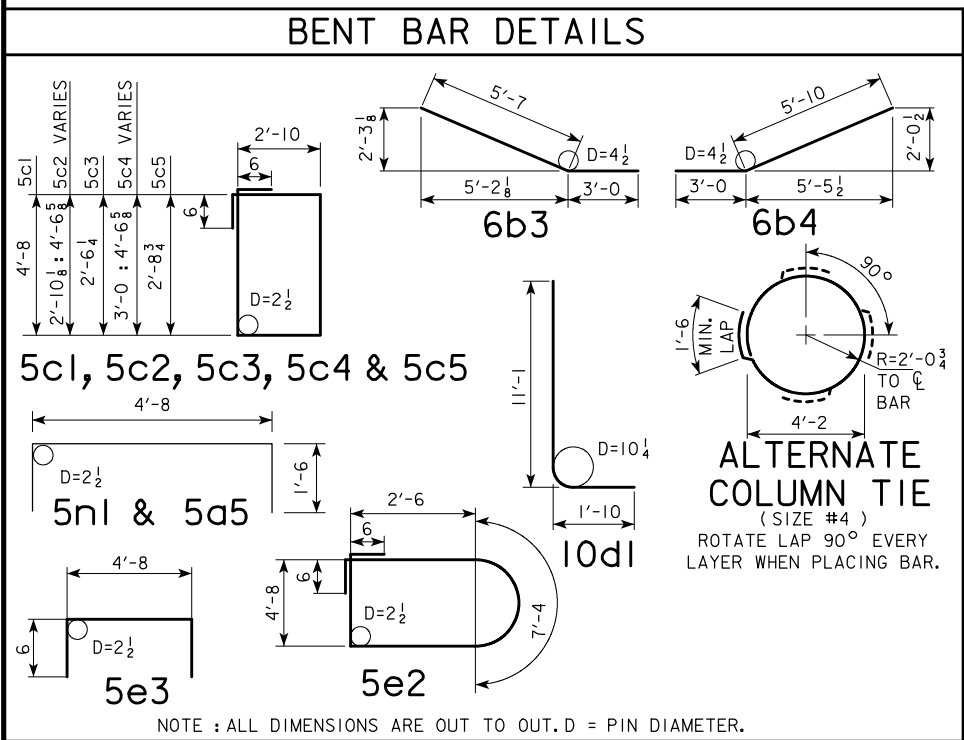
SECTION THRU STEM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
PIER NO. 2 DETAILS-WESTBOUND
 STATION : 893+14.13 ($\frac{1}{2}$ RELOCATED U.S. 20)
 AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 10 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 2					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	38'-9	3335
10d5	COLUMN NO. 2, VERTICAL		20	40'-2	3457
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	480'-6	321
#4	COLUMN NO. 2, SPIRAL		1	499'-6	334
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	34'-0	95
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	35'-5	99
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
REINFORCING STEEL TOTAL (LBS.)					39,638



CONCRETE PLACEMENT QUANTITIES - PIER NO. 2		
LOCATION	QUANTITY	
FOOTING	100.0	
STEM	111.8	
COLUMNS	41.3	
CAP & STEPS	36.9	
TOTAL - CU.YDS.		290.0

ESTIMATED QUANTITIES - PIER NO. 2		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	290.0
REINFORCING STEEL	LBS.	39,638
CLASS 20 EXCAVATION	CU.YDS.	125
CLASS 21 EXCAVATION	CU.YDS.	260
HPI4x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 2 DETAILS-WESTBOUND

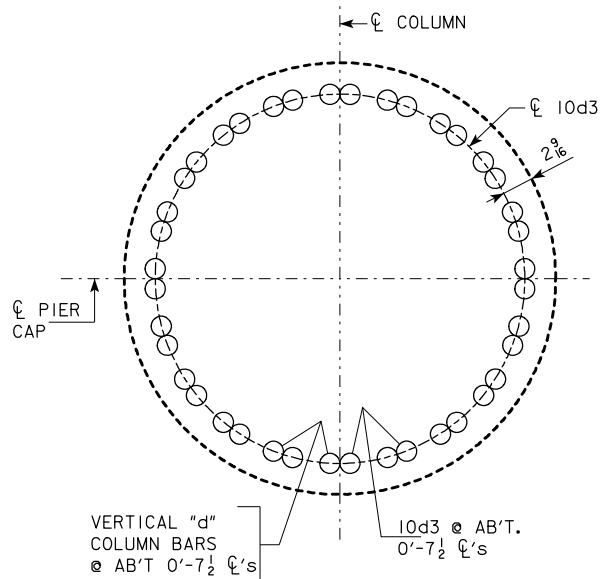
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 11 OF 117 FILE NO. 30187 DESIGN NO. 410

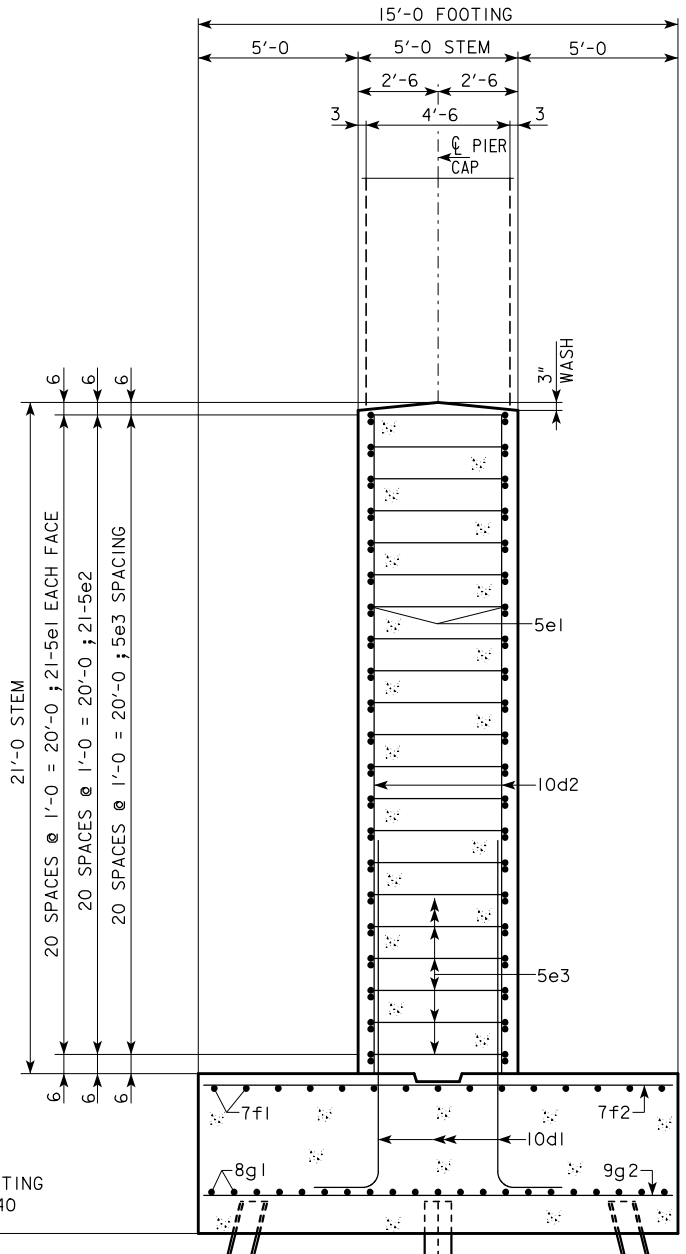
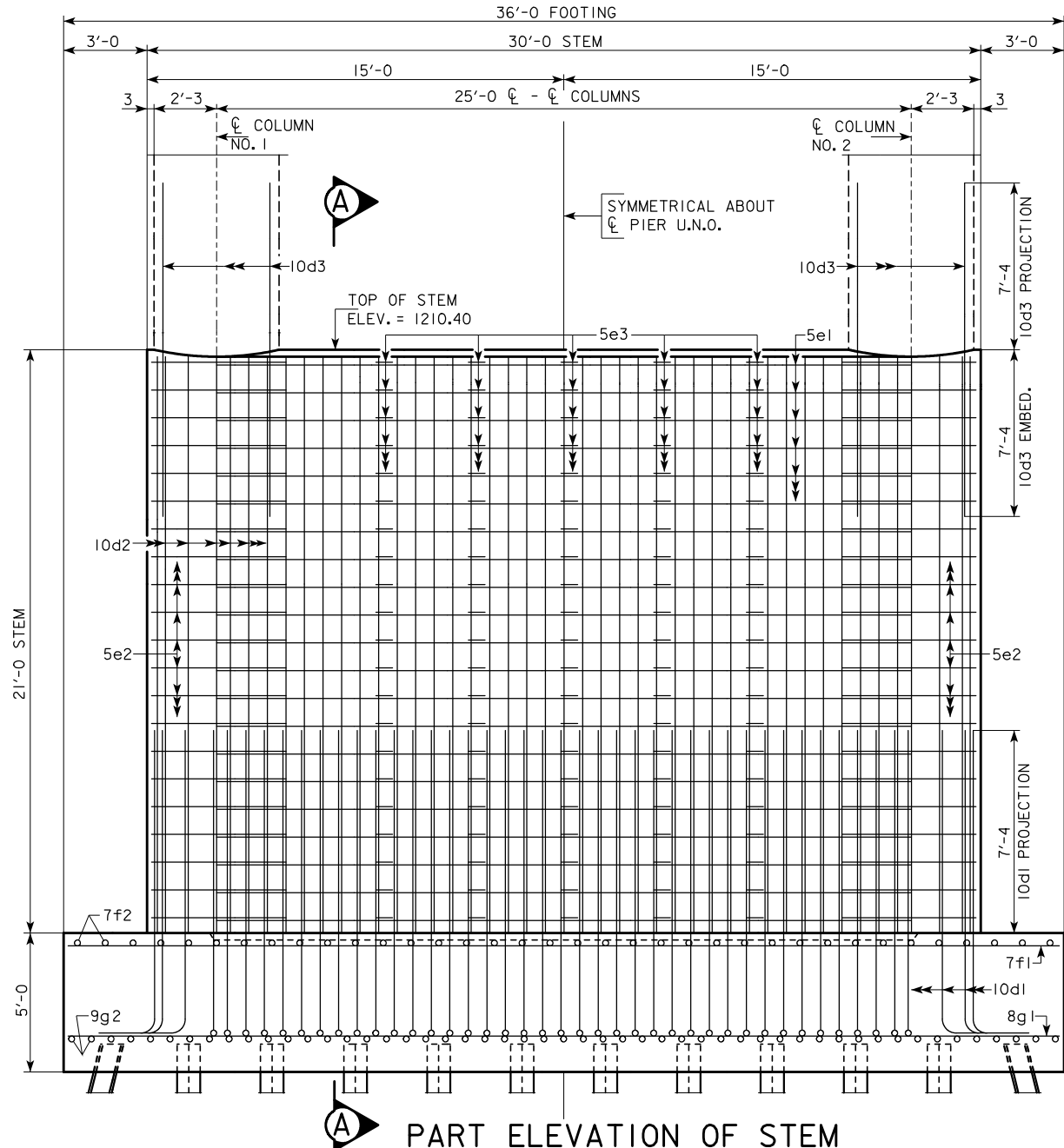
BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



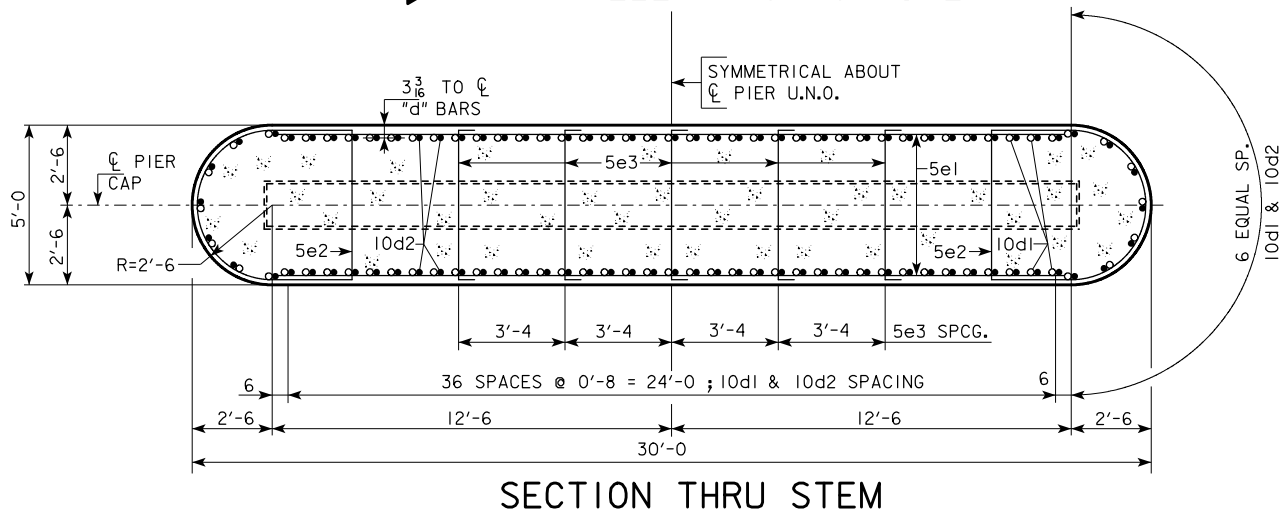
10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 12 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.



PART SECTION A-A



SECTION THRU STEM

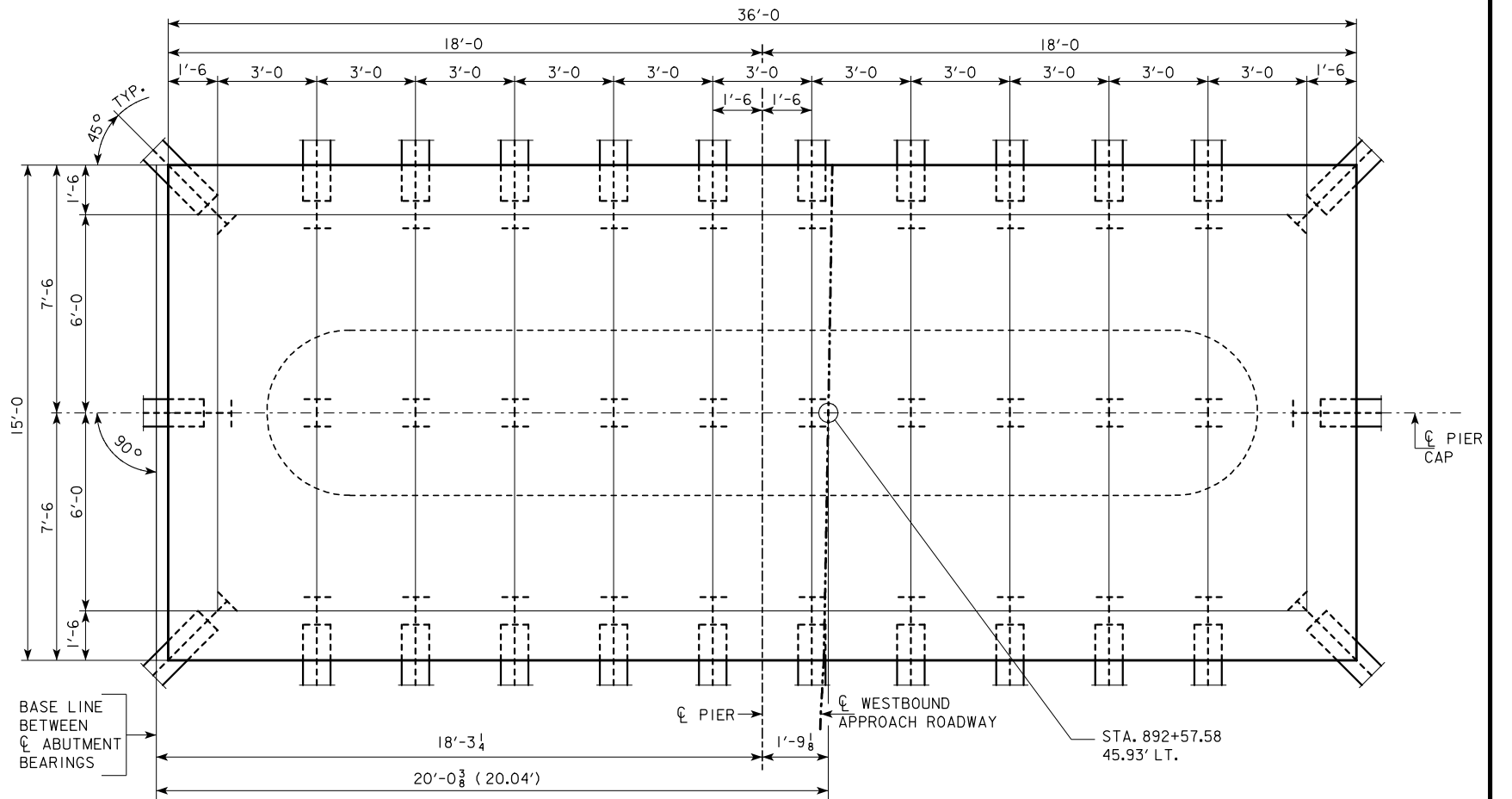
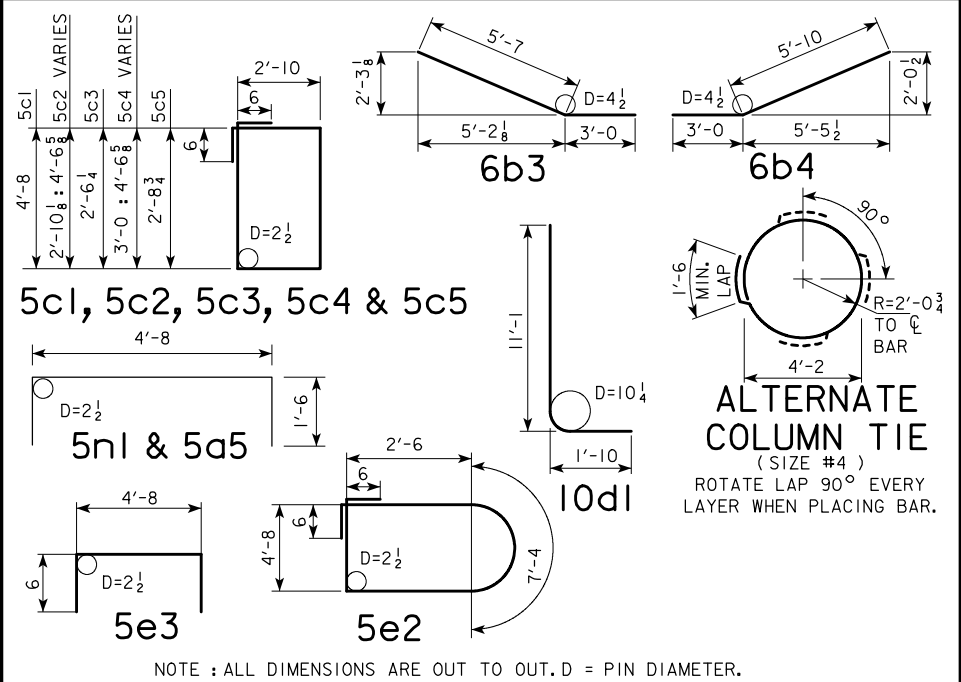
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0¹/₂ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
PIER NO. 3 DETAILS-WESTBOUND
STATION : 893+14.13 (♻ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 13 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 3					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	38'-0	3270
10d5	COLUMN NO. 2, VERTICAL		20	39'-5	3392
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	471'-4	315
#4	COLUMN NO. 2, SPIRAL		1	490'-2	327
	COL. NO. 1, SPIRAL SPACERS $L \frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ (0.7 LB./FT.)		4	33'-3	93
	COL. NO. 2, SPIRAL SPACERS $L \frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ (0.7 LB./FT.)		4	34'-8	97
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
REINFORCING STEEL TOTAL (LBS.)					39,491

BENT BAR DETAILS



36 - HP14x73 STEEL BEARING PILING REQUIRED
AT PIER NO. 3.



PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1179.3. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

CONCRETE PLACEMENT QUANTITIES - PIER NO.3	
LOCATION	QUANTITY
FOOTING	100.0
STEM	111.8
COLUMNS	40.4
CAP & STEPS	36.9
TOTAL - CU.YDS.	289.1

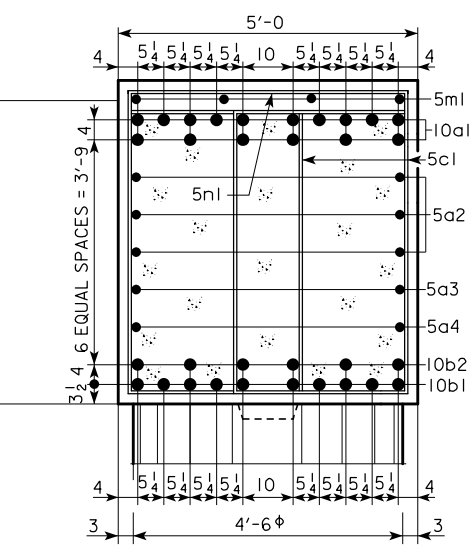
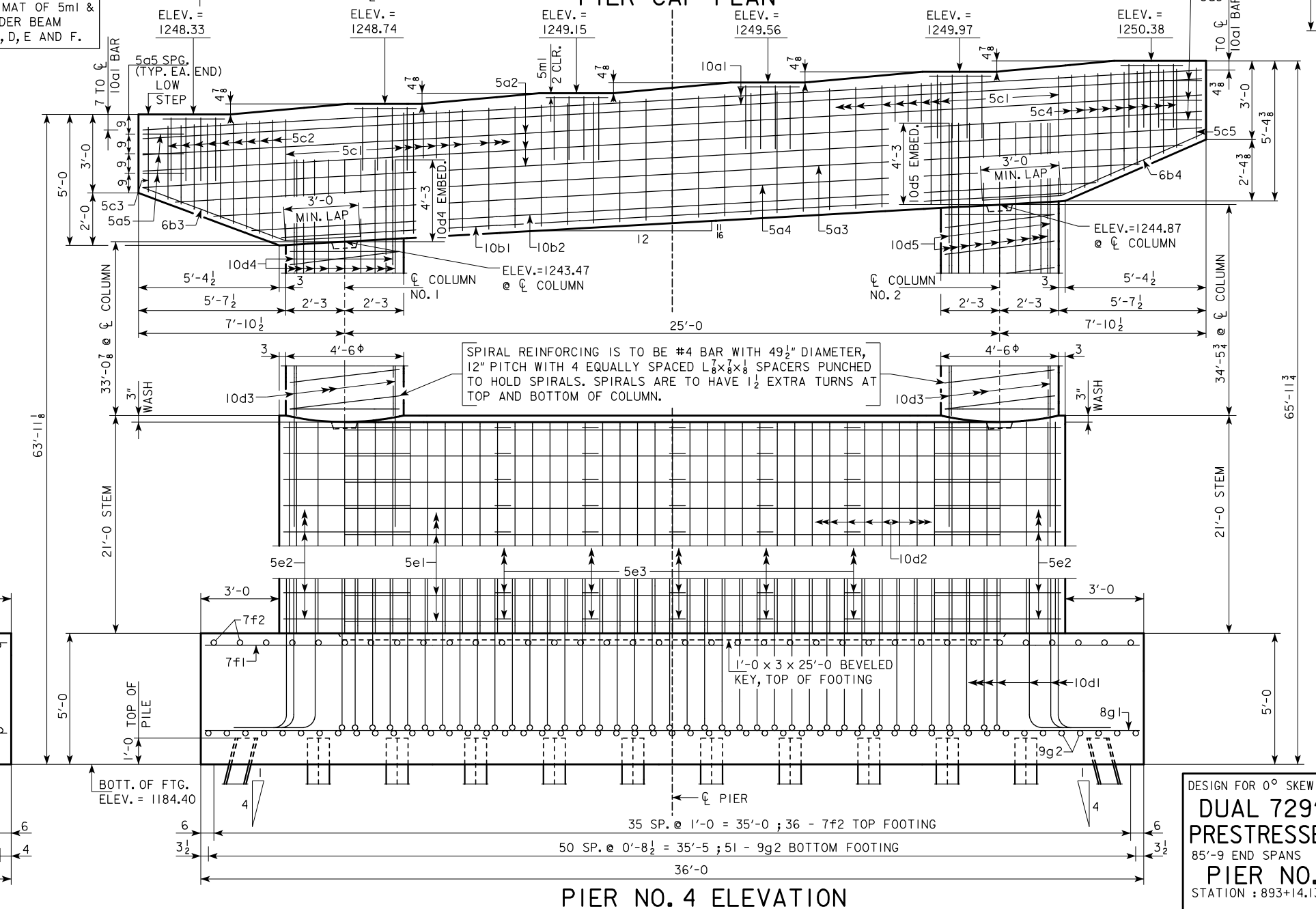
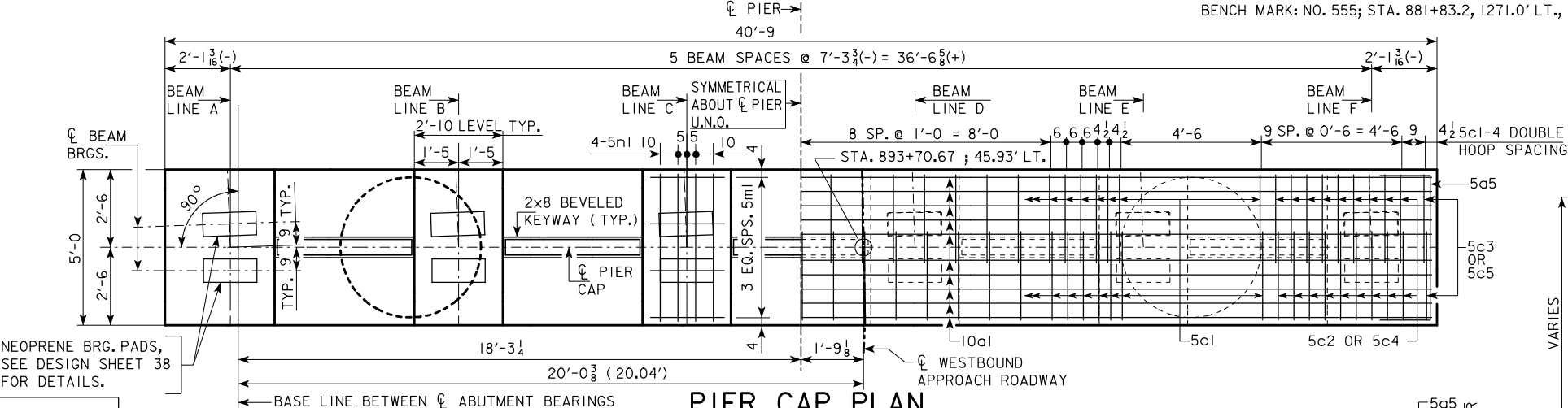
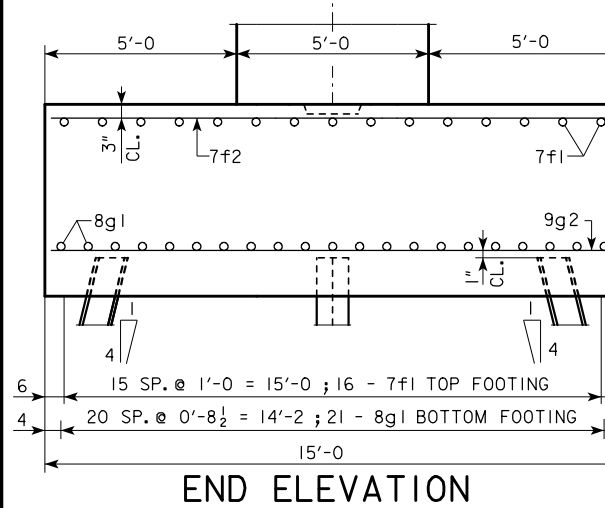
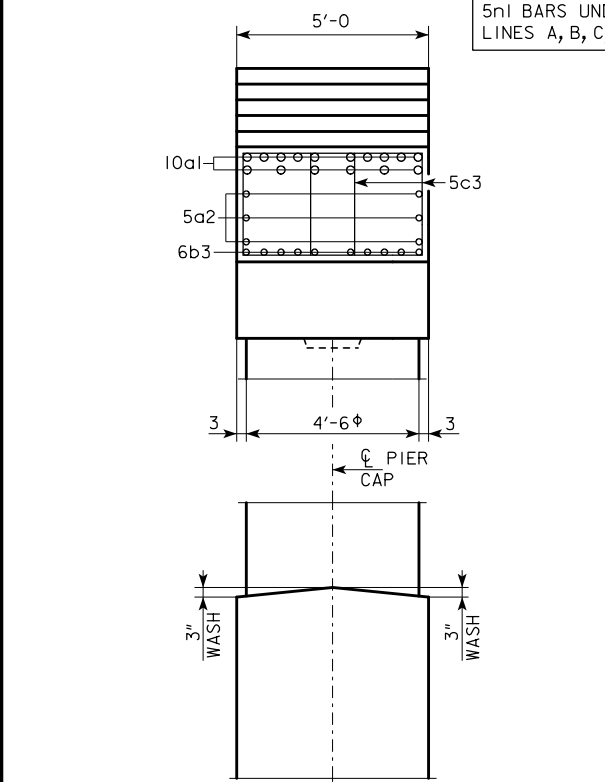
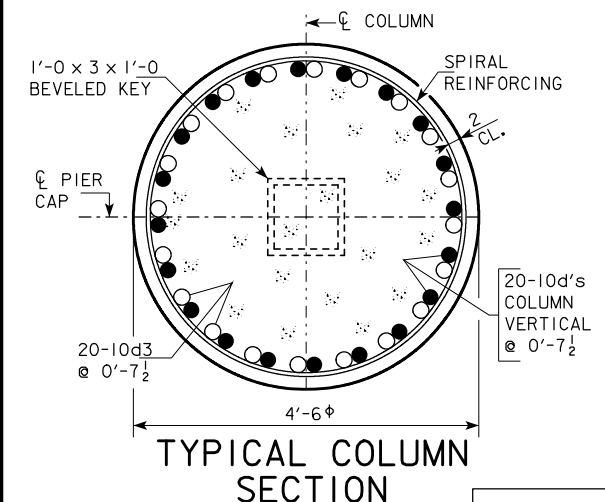
ESTIMATED QUANTITIES - PIER NO.3		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	289.1
REINFORCING STEEL	LBS.	39,491
CLASS 21 EXCAVATION	CU.YDS.	210
HPI4x73 STEEL PILE 36 @ 40.0'	LN.FT.	1440

DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED

PRESTRESSED CONCRETE BEAM BRIDGES

PIER NO. 3 DETAILS-WESTBOUND

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 14 OF 117 FILE NO. 30187 DESIGN NO. 410



SECTION THRU PIER CAP

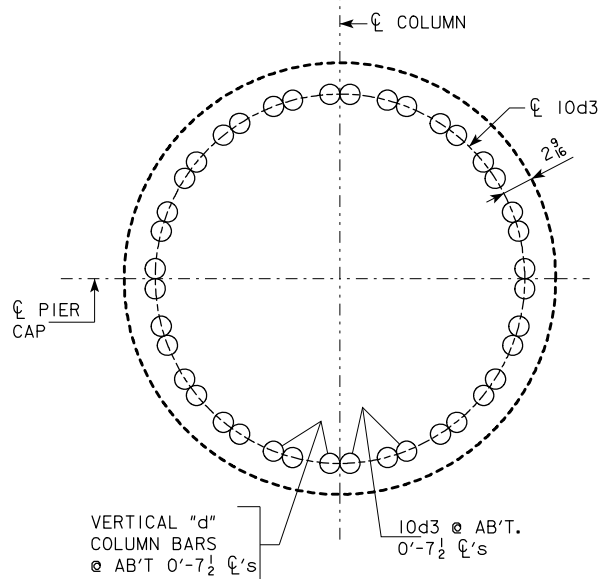
NOTE :
SEE DESIGN SHEET 17
FOR OTHER PIER DETAILS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
PIER NO. 4 DETAILS-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20)
AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 15 OF 117 FILE NO. 30187 DESIGN NO. 410

NOTE :
SEE DESIGN SHEET 16
FOR STEM DETAILS.

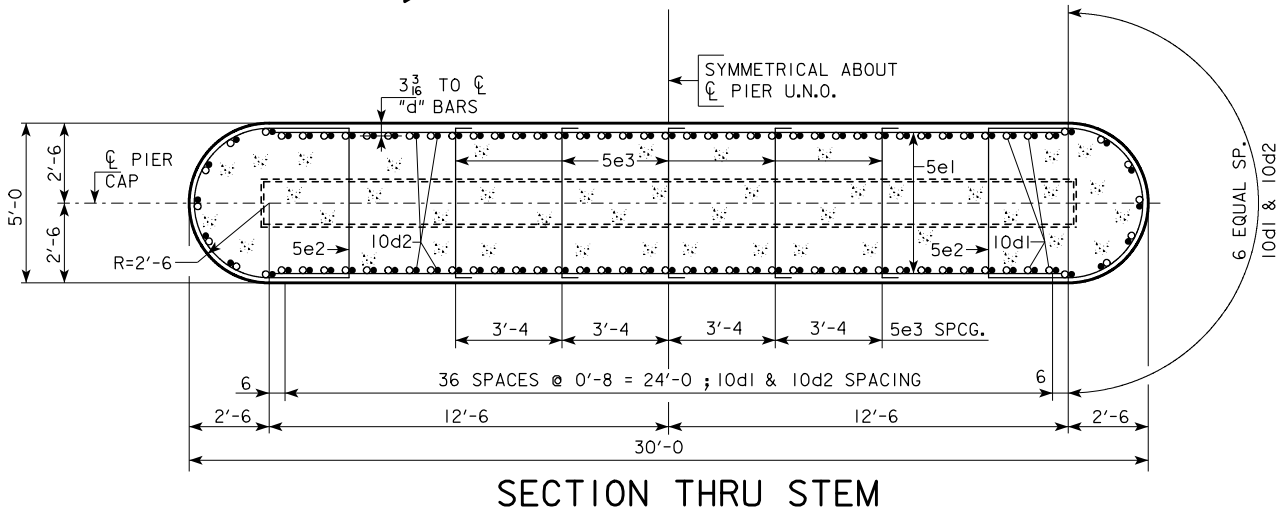
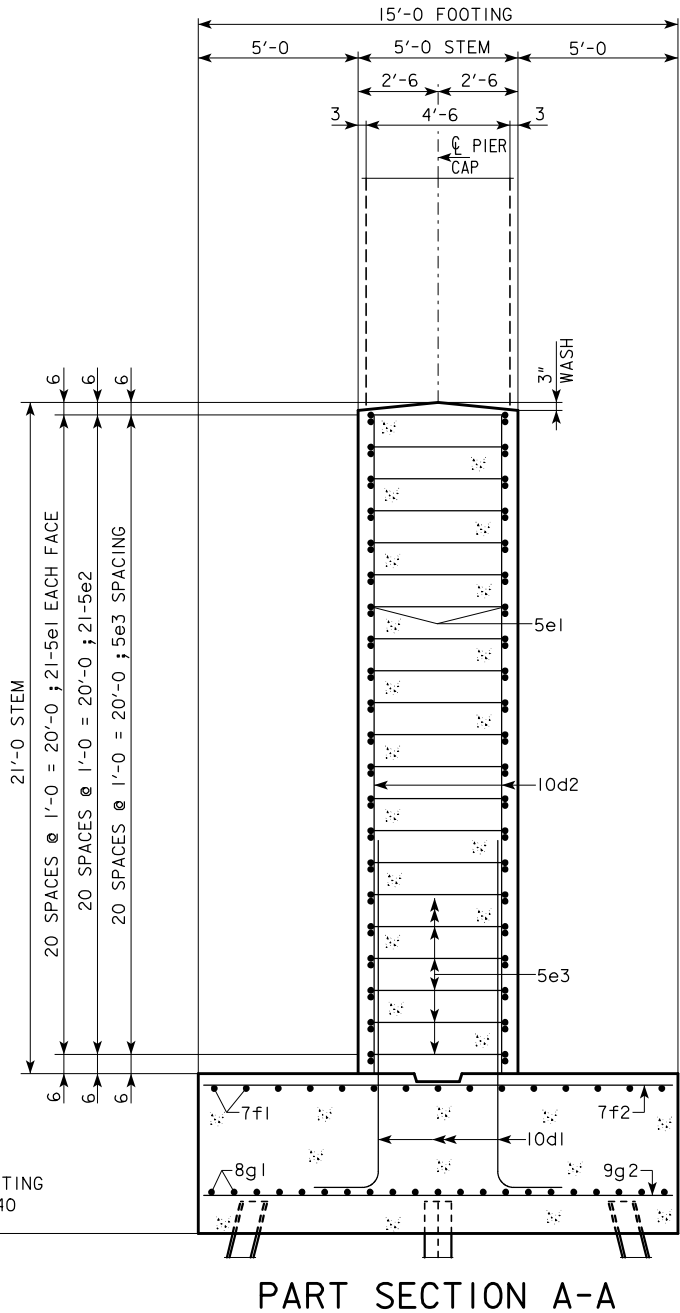
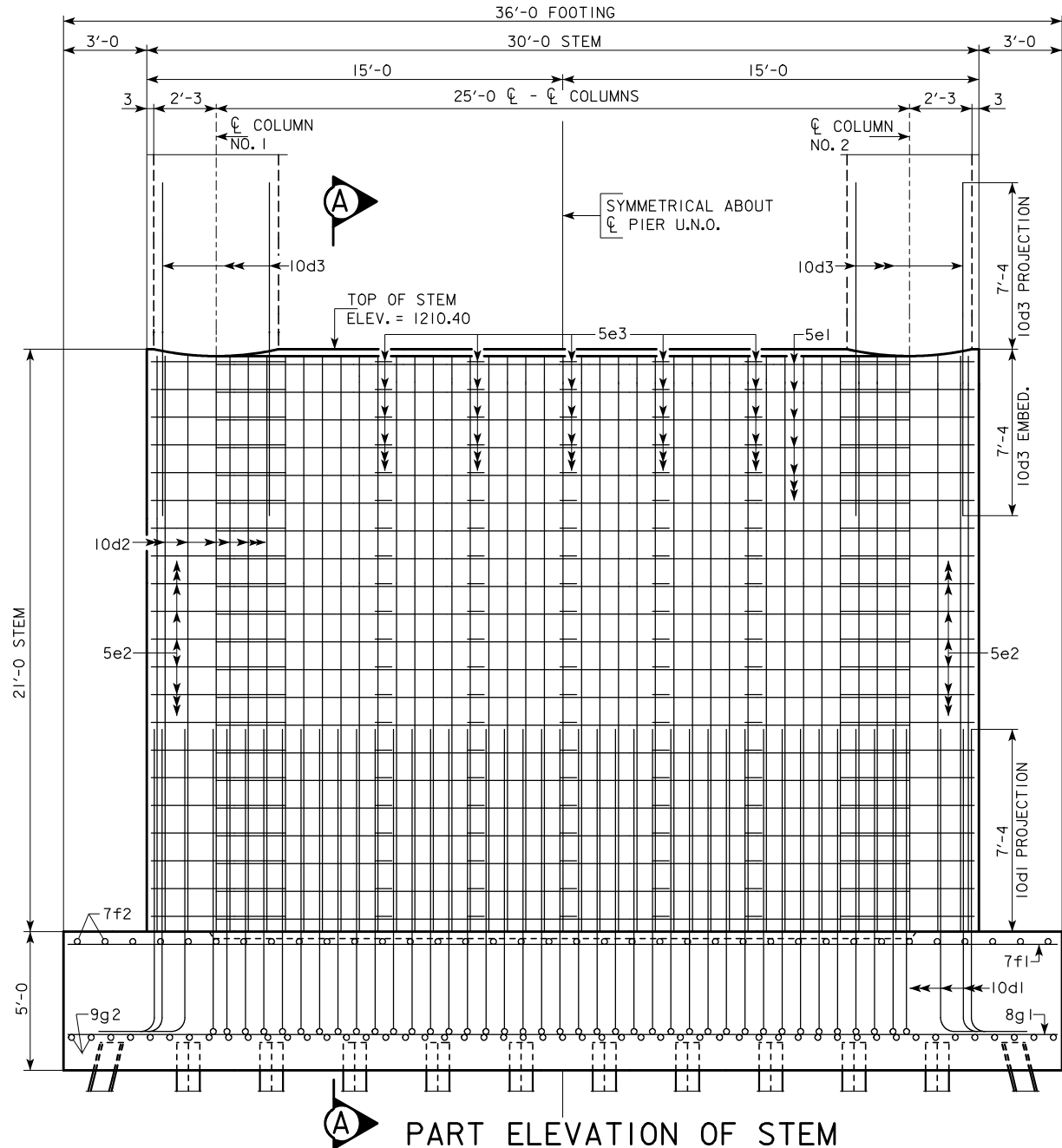
BENCH MARK: NO. 555: STA. 88|+83.2. 1271.0' LT., CUT X SW COR. WING OF BRIDGE. ELEV. = 1217.20.



10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 15 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.

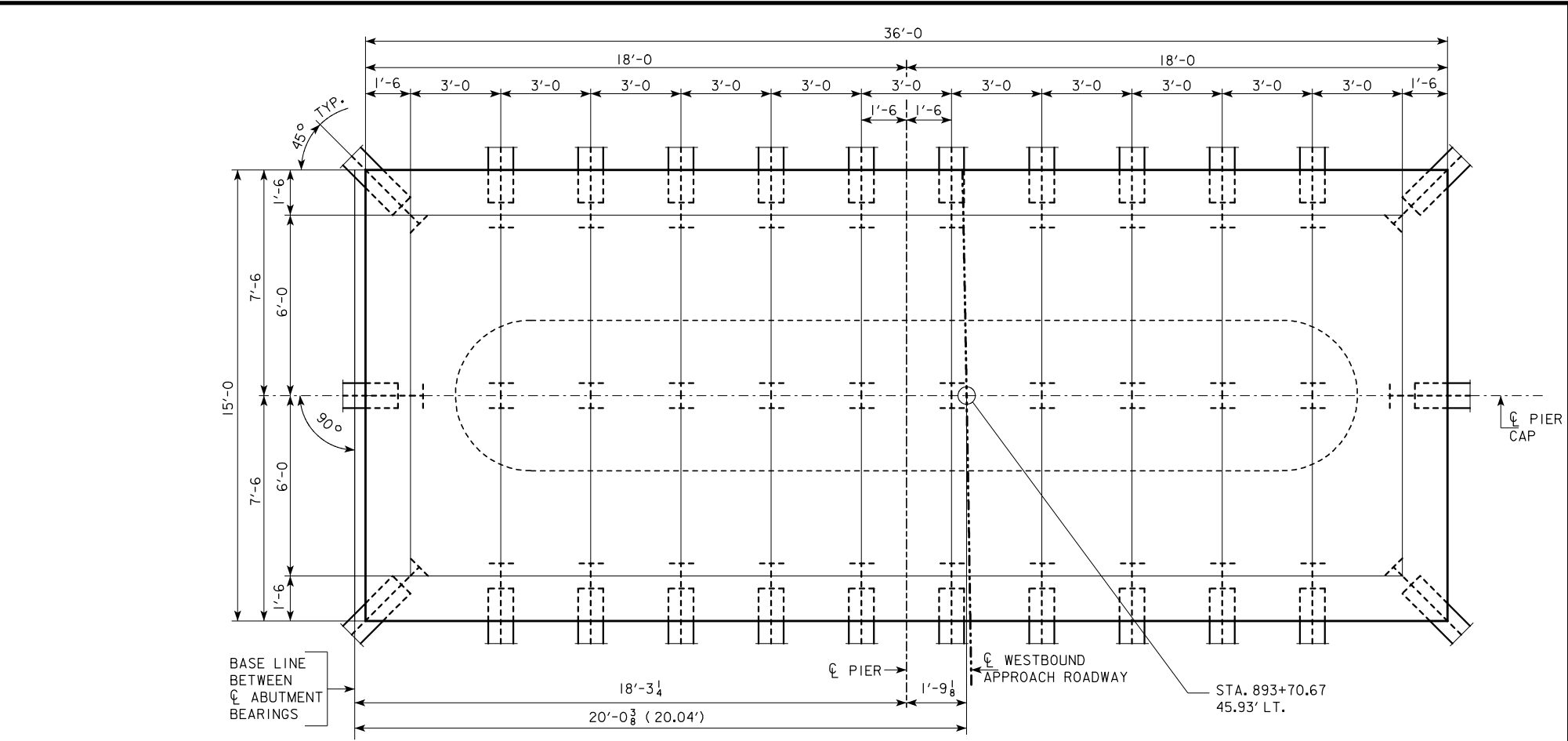
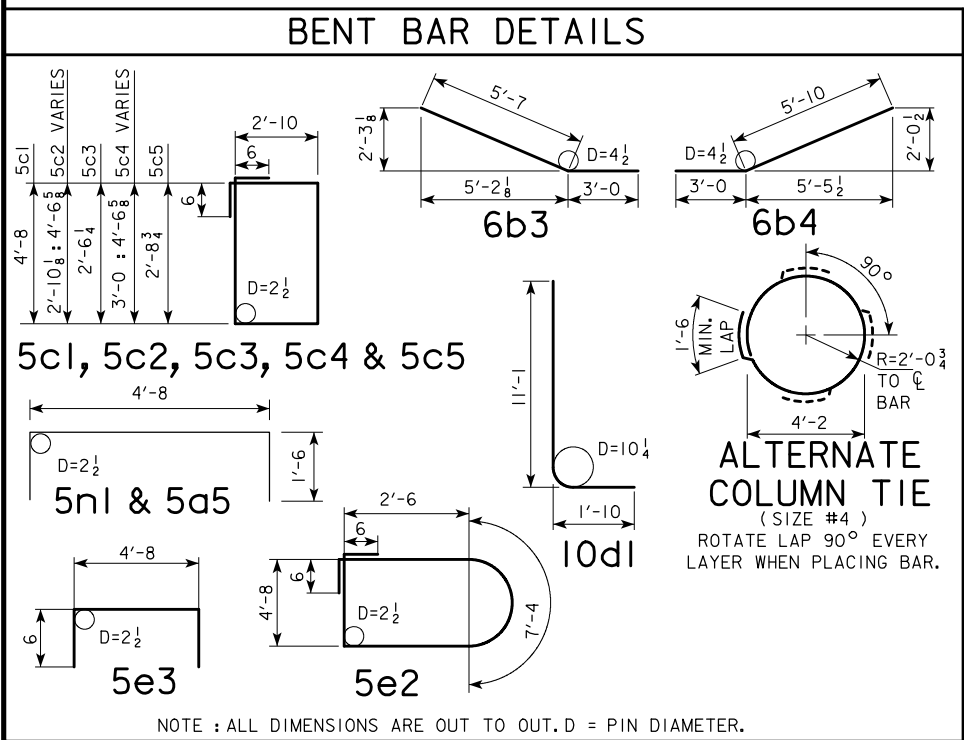


DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
PIER NO. 4 DETAILS-WESTBOUND
STATION : +93+14.13 (♻ RELOCATED U.S. 20)
AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 16 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 4					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	37'-6	3227
10d5	COLUMN NO. 2, VERTICAL		20	38'-11	3349
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	464'-5	310
#4	COLUMN NO. 2, SPIRAL		1	482'-8	322
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	32'-9	92
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	34'-3	96
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
REINFORCING STEEL TOTAL (LBS.)					39,393



FOOTING PLAN



PIER NOTES :

- ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.
- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.
- THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.
- COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.
- ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.
- PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1179.3. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

CONCRETE PLACEMENT QUANTITIES - PIER NO. 4		
LOCATION	QUANTITY	
FOOTING	100.0	
STEM	111.8	
COLUMNS	39.8	
CAP & STEPS	36.9	
TOTAL - CU.YDS.		288.5

ESTIMATED QUANTITIES - PIER NO. 4		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	288.5
REINFORCING STEEL	LBS.	39,393
CLASS 20 EXCAVATION	CU.YDS.	140
CLASS 21 EXCAVATION	CU.YDS.	260
HPI4x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

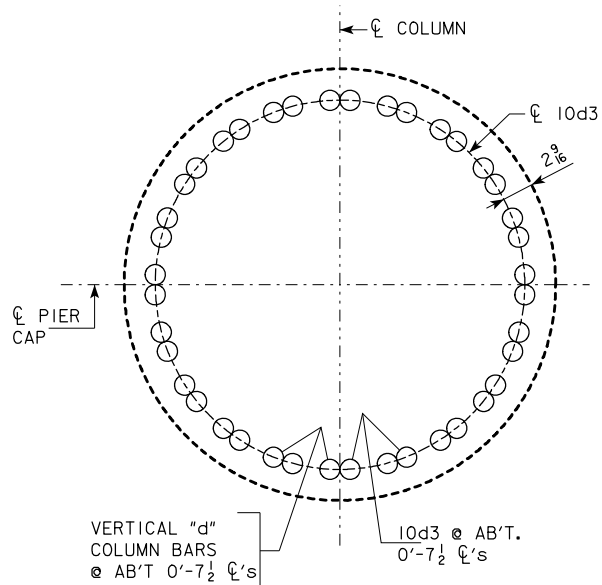
PIER NO. 4 DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

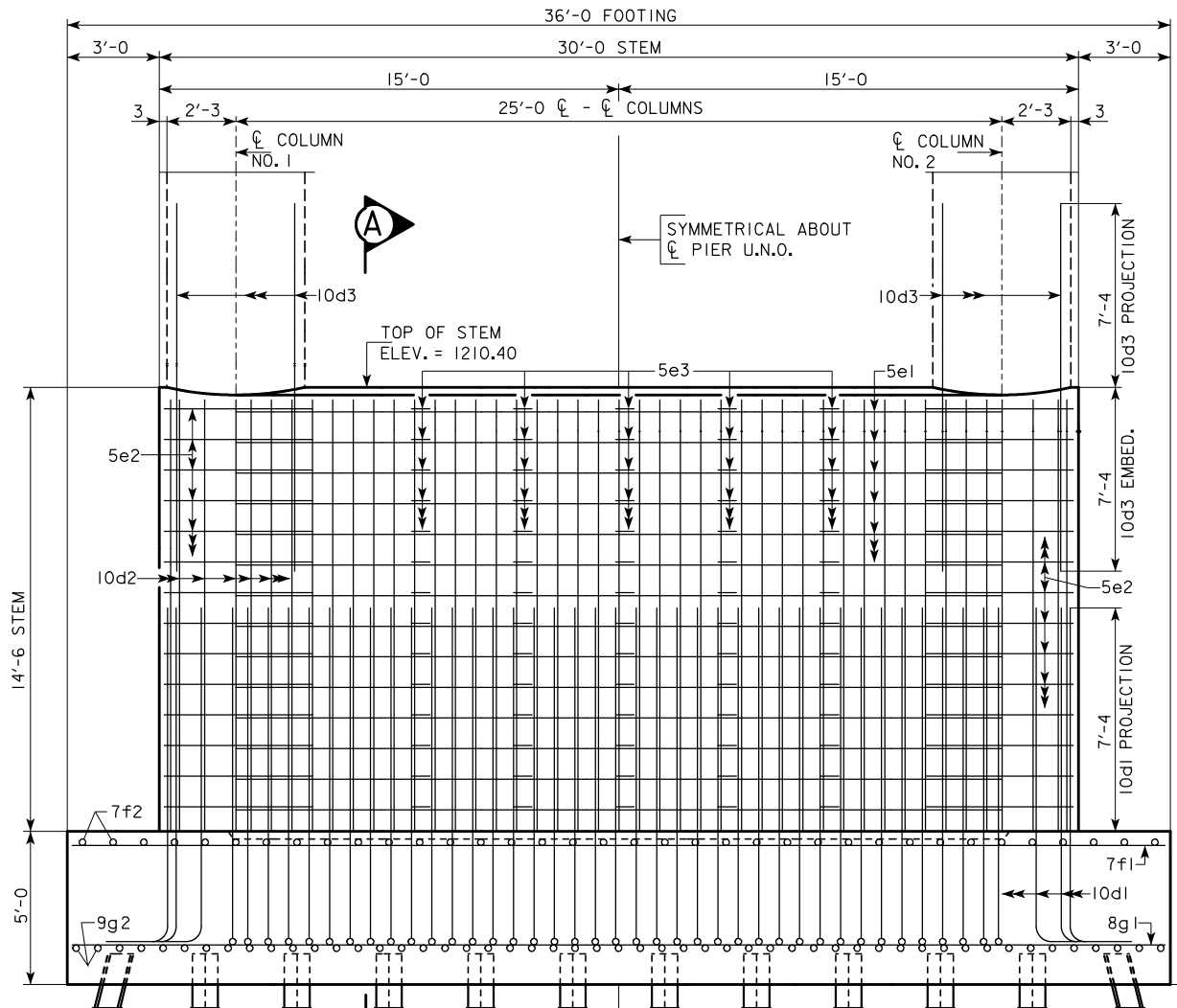
DESIGN SHEET NO. 17 OF 117 FILE NO. 30187 DESIGN NO. 410



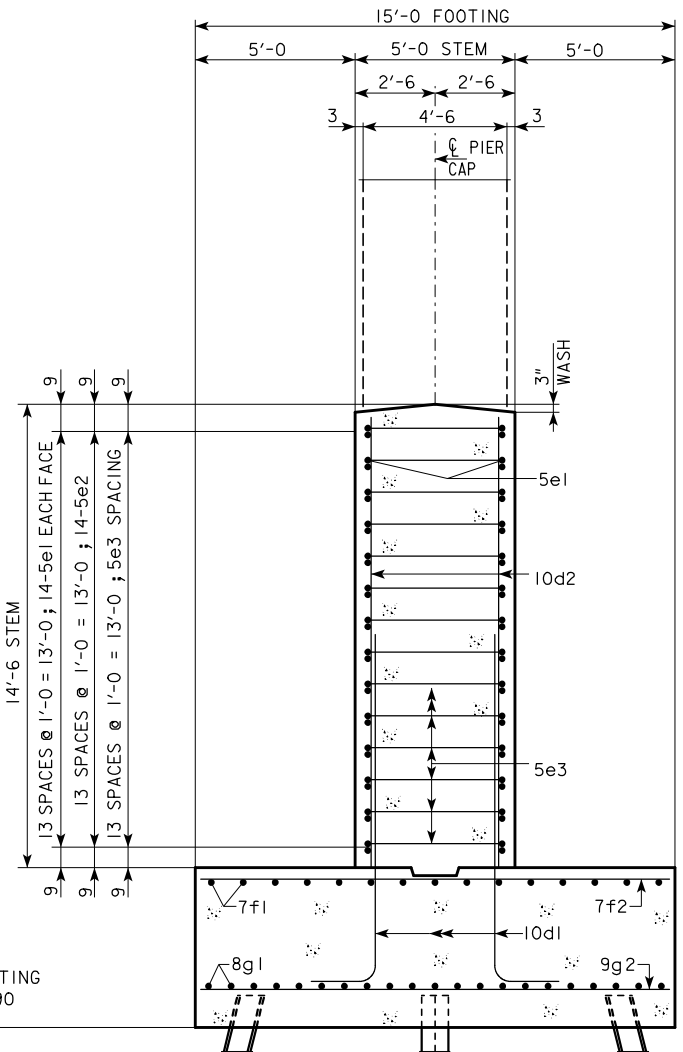
10d3 DOWEL PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE STEM CONCRETE IS PLACED.

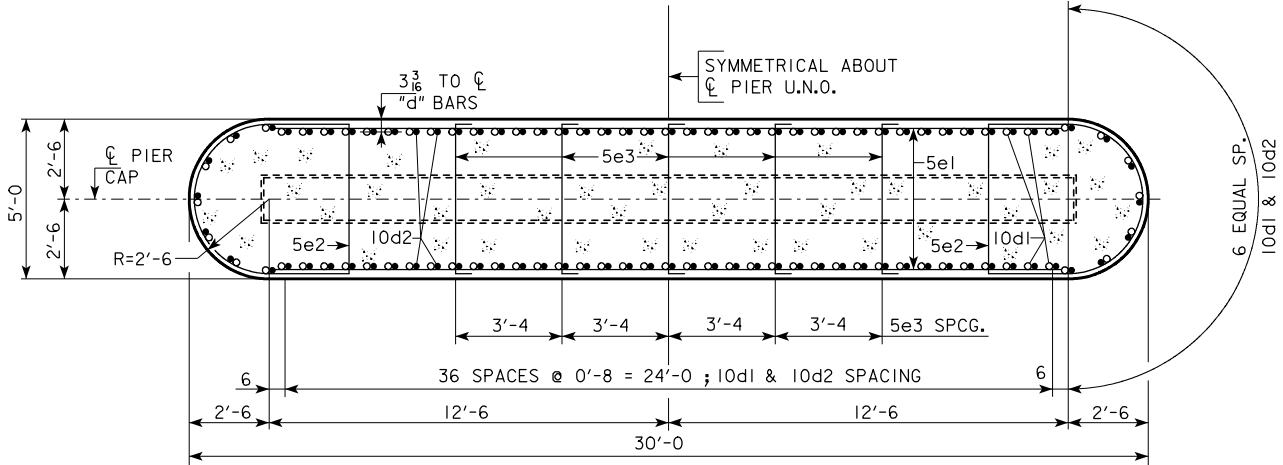
NOTE :
SEE TYPICAL COLUMN SECTION ON DESIGN SHEET 18 FOR "d" VERTICAL COLUMN BARS AND SPIRAL REINFORCING.



PART ELEVATION OF STEM



PART SECTION A-A



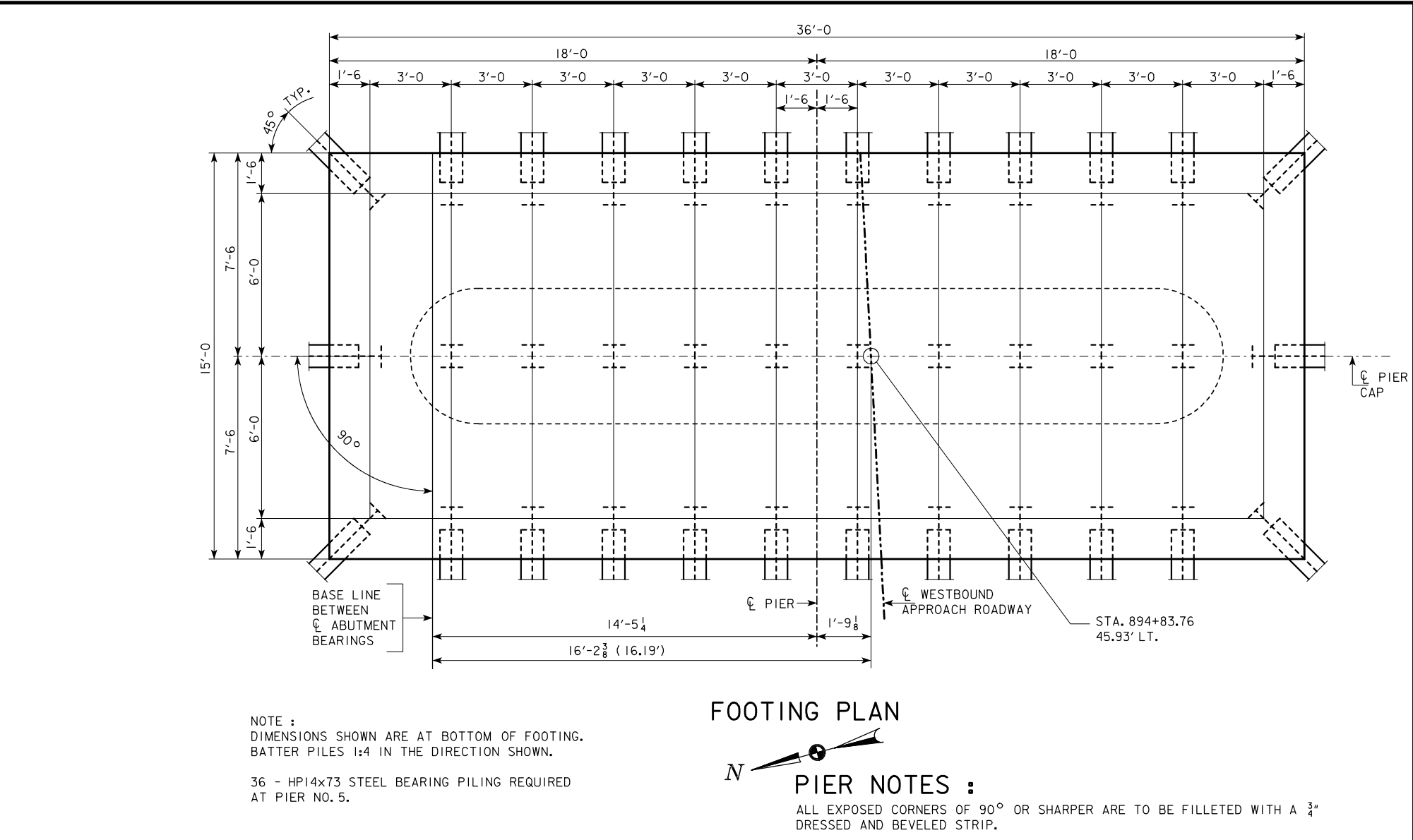
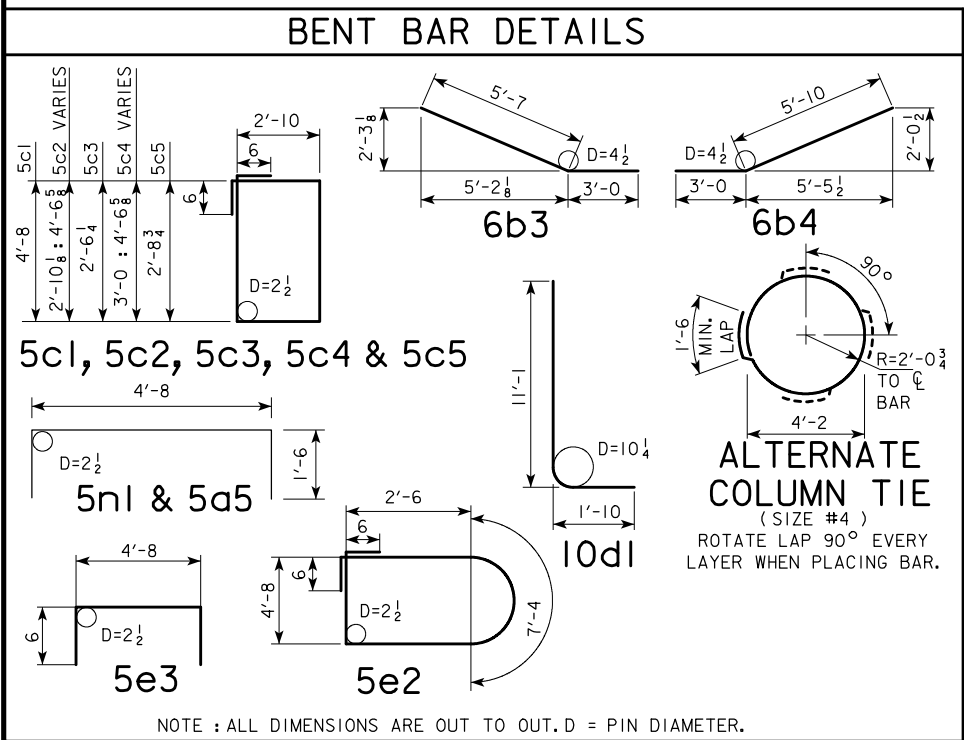
SECTION THRU STEM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2' x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
PIER NO. 5 DETAILS-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 19 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 5					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	37'-0	3184
10d5	COLUMN NO. 2, VERTICAL		20	38'-6	3313
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	459'-6	307
#4	COLUMN NO. 2, SPIRAL		1	477'-8	319
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	32'-4	91
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	33'-8	94
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
REINFORCING STEEL TOTAL (LBS.)					39,305



CONCRETE PLACEMENT QUANTITIES - PIER NO. 5		
LOCATION		QUANTITY
FOOTING		100.0
STEM		77.0
COLUMNS		39.3
CAP & STEPS		36.9
TOTAL - CU.YDS.		253.2

ESTIMATED QUANTITIES - PIER NO. 5		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	253.2
REINFORCING STEEL	LBS.	39,305
CLASS 20 EXCAVATION	CU.YDS.	140
CLASS 21 EXCAVATION	CU.YDS.	90
HPI4x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 5 DETAILS-WESTBOUND

STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

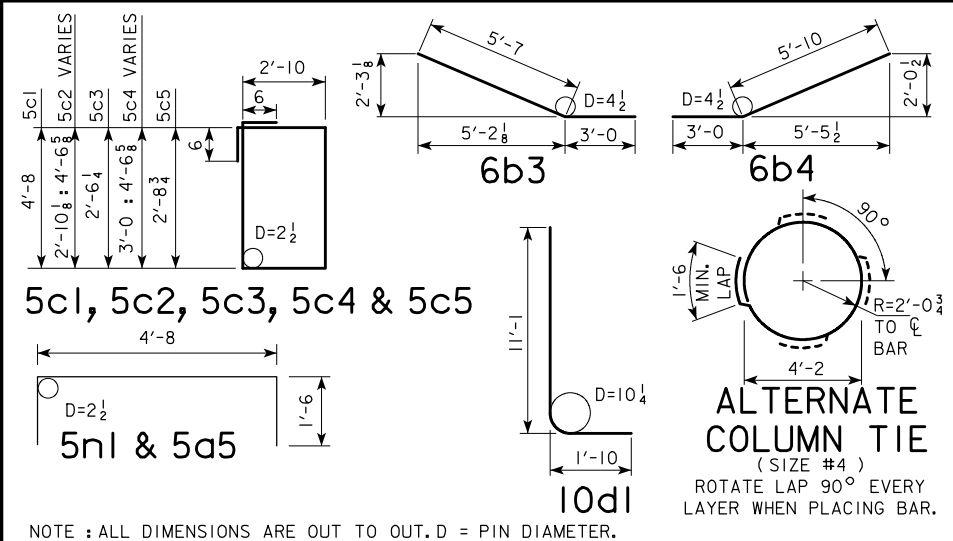
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 20 OF 117 FILE NO. 30187 DESIGN NO. 410

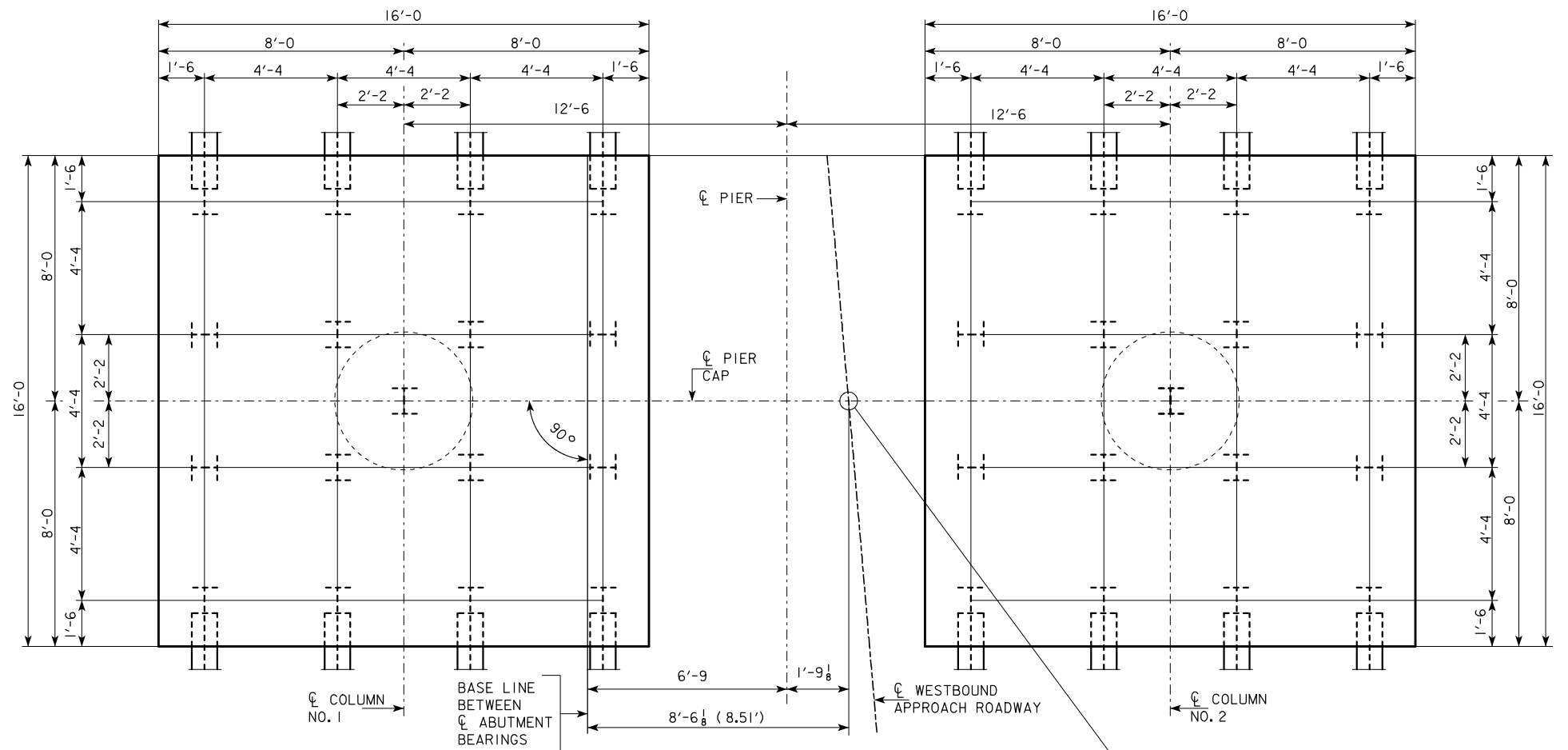
REINFORCING BAR LIST - PIER NO. 6

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO COLUMN DOWELS		40	12'-11	2223
10d2	COLUMN NO. 1, VERTICAL		20	42'-6	3658
10d3	COLUMN NO. 2, VERTICAL		20	43'-11	3779
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	529'-5	354
#4	COLUMN NO. 2, SPIRAL		1	547'-7	366
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	37'-9	106
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	39'-2	110
7f1	FOOTING, LONGIT. & TRANSV., TOP		64	15'-8	2049
9g1	FOOTING, LONGIT. & TRANSV., BOTTOM		100	15'-8	5327
REINFORCING STEEL TOTAL (LBS.)					25,404

BENT BAR DETAILS



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



NOTE :
DIMENSIONS SHOWN ARE AT BOTTOM OF FOOTING.
BATTER PILES 1:4 IN THE DIRECTION SHOWN.

34 - HP14x73 STEEL BEARING PILING REQUIRED
AT PIER NO. 6.

FOOTING PLAN



PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1191.3. PILES SHALL BE DRIVEN TO 69 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 64 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS	5 - 111'-6" INTERIOR SPANS
------------------	----------------------------

PIER NO. 6 DETAIL S-WESTBOUND

STATION : 893+14.13 (C RELOCATED U.S. 20) AUGUST 2010

SAC COUNTY

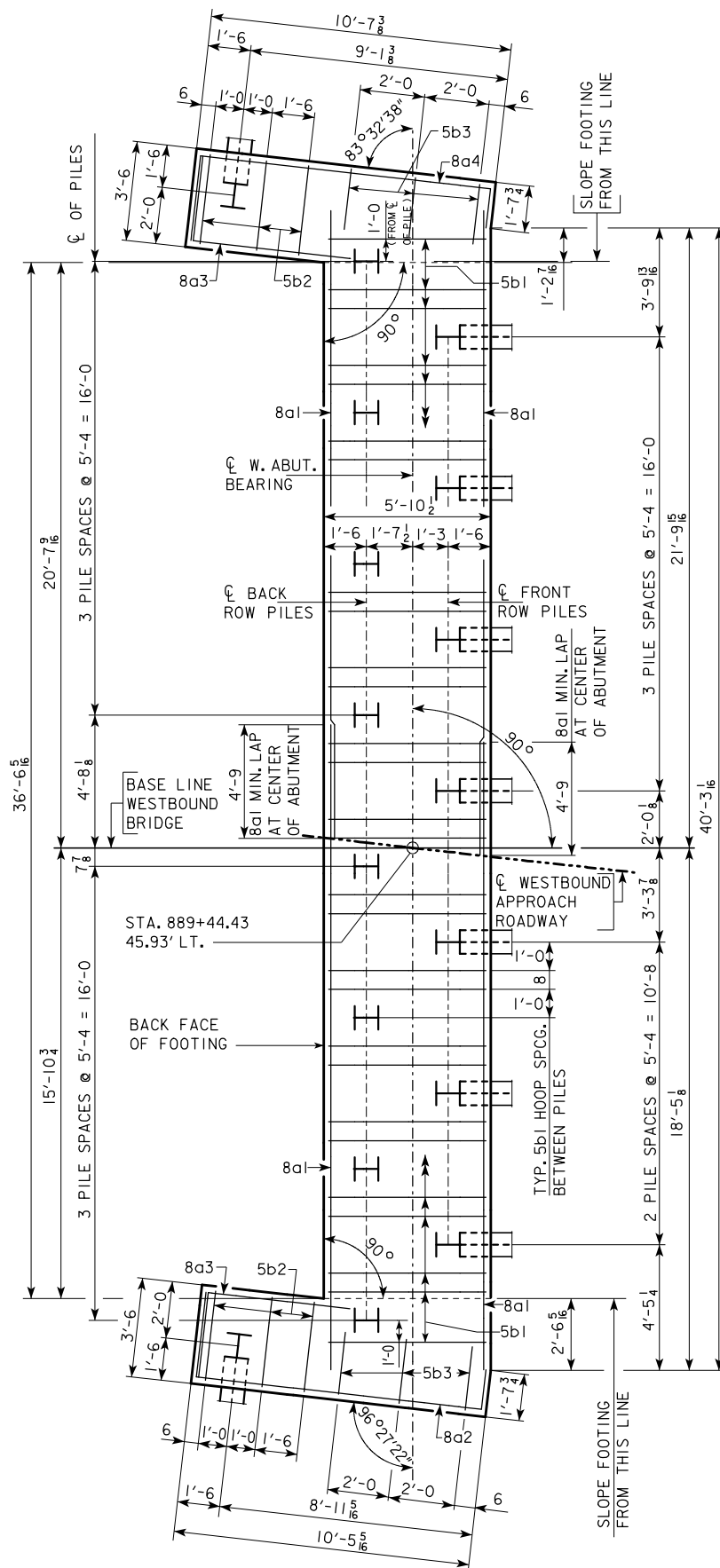
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 22 OF 117 FILE NO. 30187 DESIGN NO. 410

DESIGN TEAM KBK/JTN/RAR/MSF

SAC COUNTY

PROJECT NUMBER NHSX-020-2 (84)--3H-81

SHEET NUMBER 23

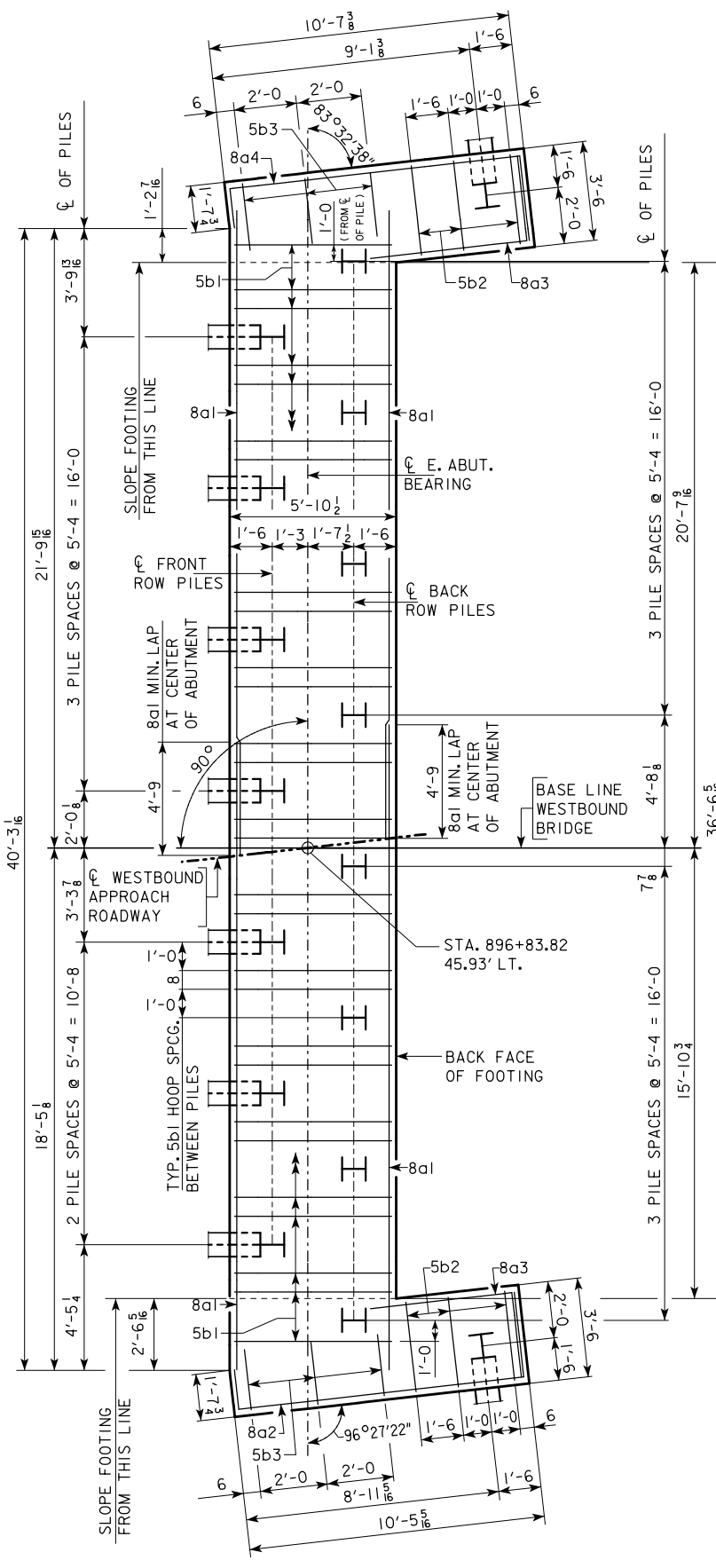


WEST ABUTMENT

17 - HP10x57 STEEL PILE REQUIRED AT WEST ABUTMENT

ABUTMENT PILE LAYOUTS

NOTE :
PILE DIMENSIONS SHOWN ARE AT BOTTOM OF FOOTING.
BATTER PILES 1:4 IN THE DIRECTION SHOWN.

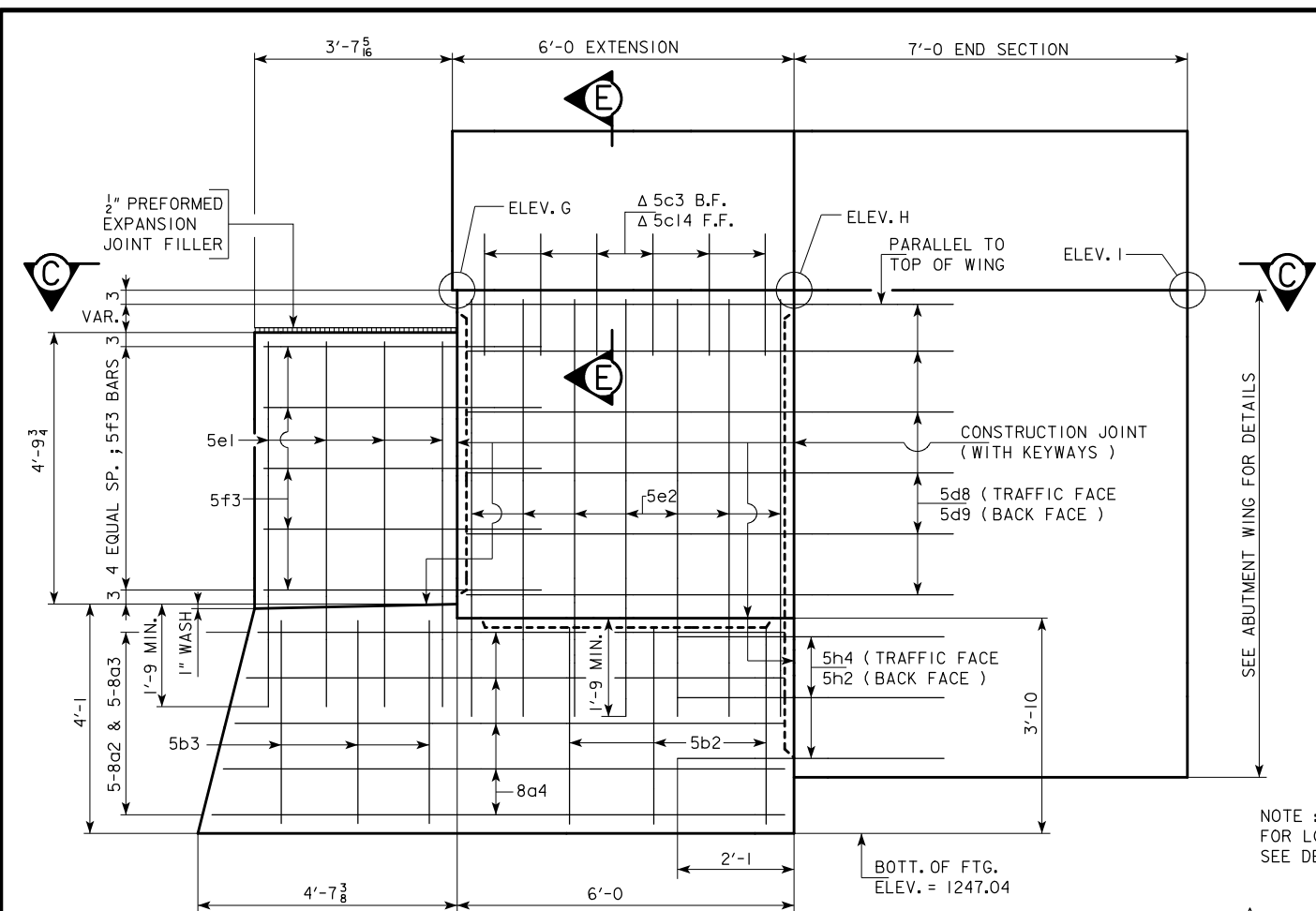


EAST ABUTMENT

17 - HP10x57 STEEL PILE REQUIRED AT EAST ABUTMENT

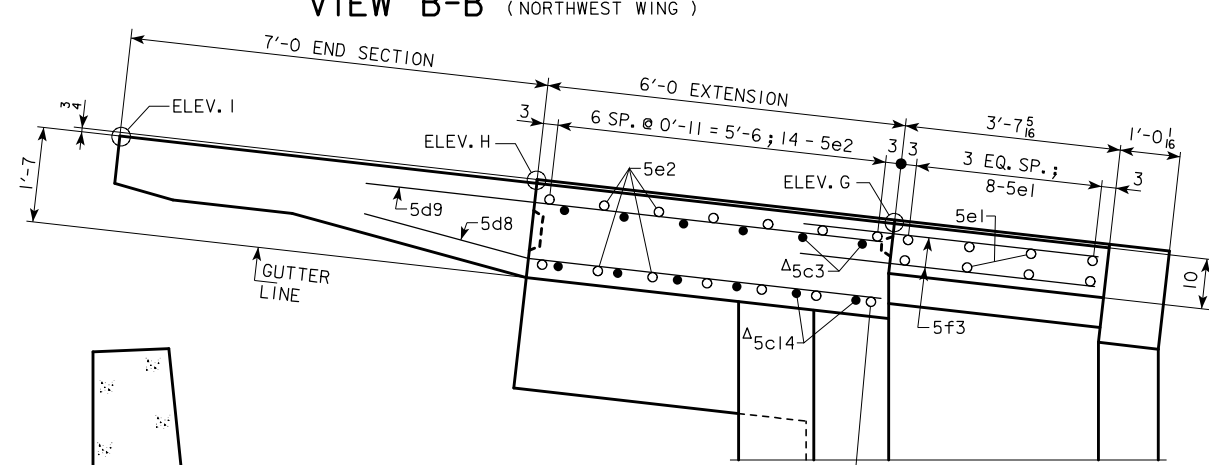
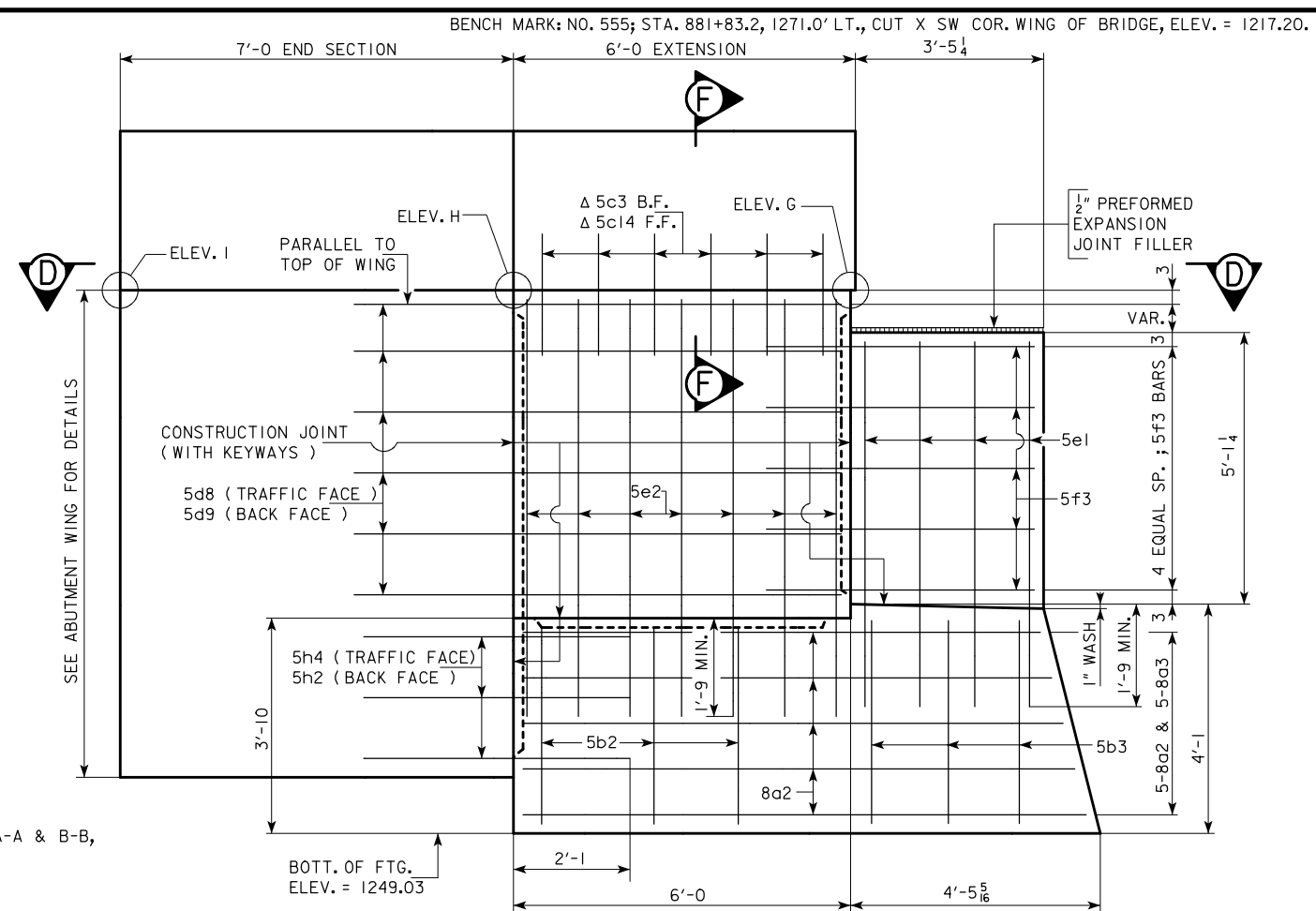
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
ABUTMENT PILE LAYOUT-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 23 OF 117 FILE NO. 30187 DESIGN NO. 410



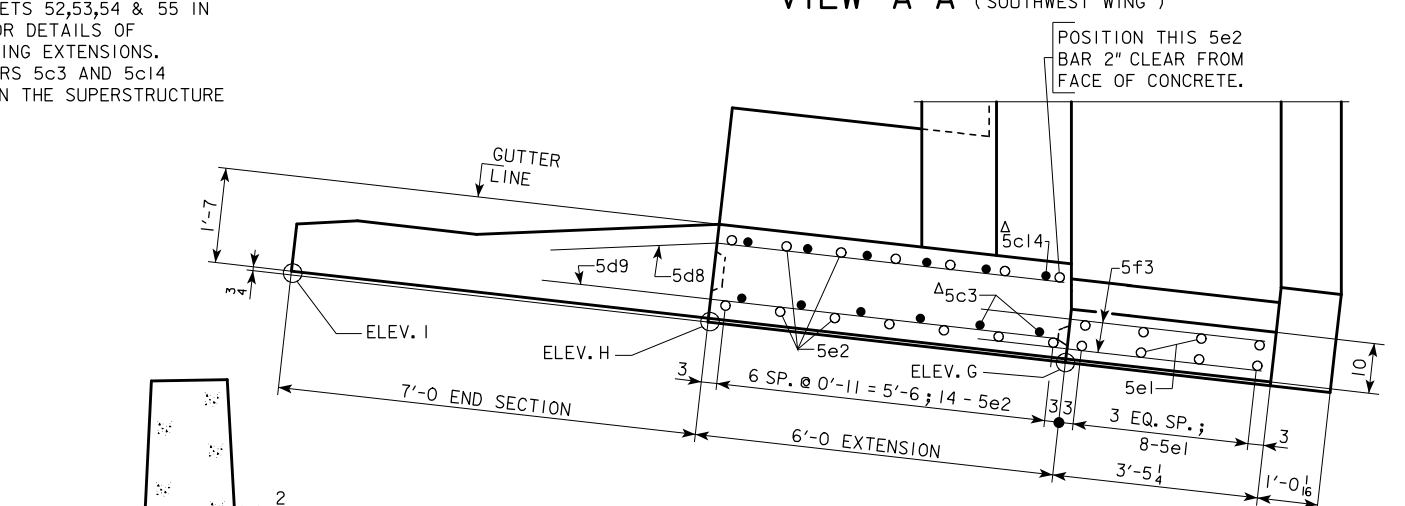
NOTE :
FOR LOCATION OF VIEWS A-A & B-B,
SEE DESIGN SHEET 24.

NOTE :
SEE DESIGN SHEETS 52,53,54 & 55 IN
THESE PLANS FOR DETAILS OF
BARRIER RAIL WING EXTENSIONS.
REINFORCING BARS 5c3 AND 5c14
ARE INCLUDED IN THE SUPERSTRUCTURE
QUANTITIES.

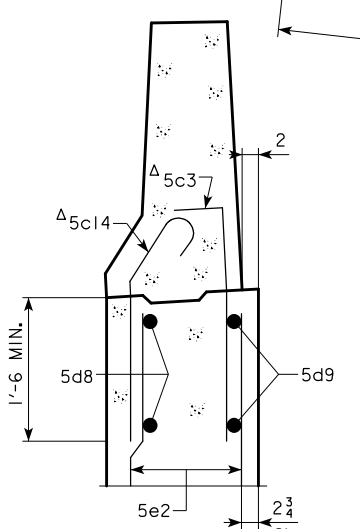


SECTION C-C
NOTE :
BARRIER RAIL NOT SHOWN.

TABLE OF WINGWALL ELEVATIONS			
LOCATION	ELEV. G	ELEV. H	ELEV. I
NW WING	1256.76	1256.82	1256.89
SW WING	1259.04	1259.10	1259.17



SECTION D-D
NOTE :
BARRIER RAIL NOT SHOWN.



PART SECTION F-F

PART SECTION E-E

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0¹/₂ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
WEST ABUTMENT DETAILS-WESTBOUND
 STATION : 893+14.13 (CL RELOCATED U.S. 20)
 AUGUST, 2010
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 26 OF 117 FILE NO. 30187 DESIGN NO. 410

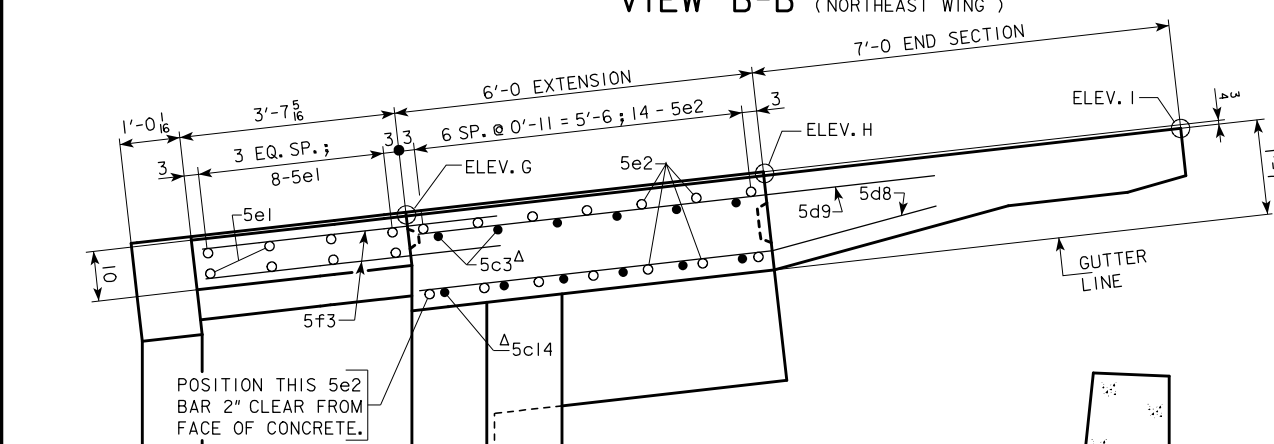
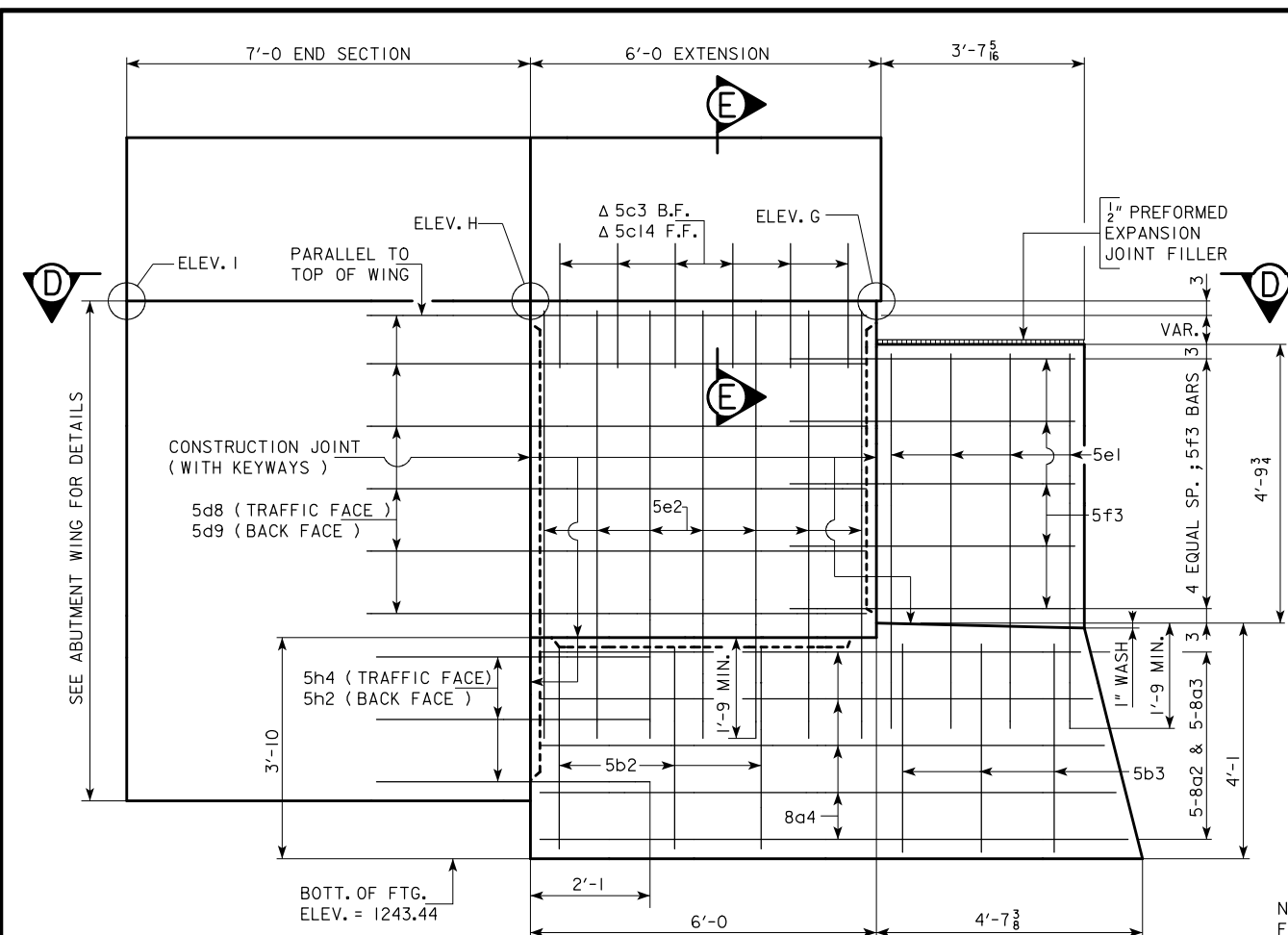
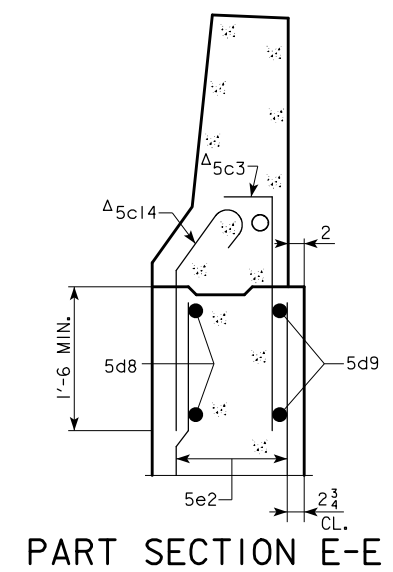
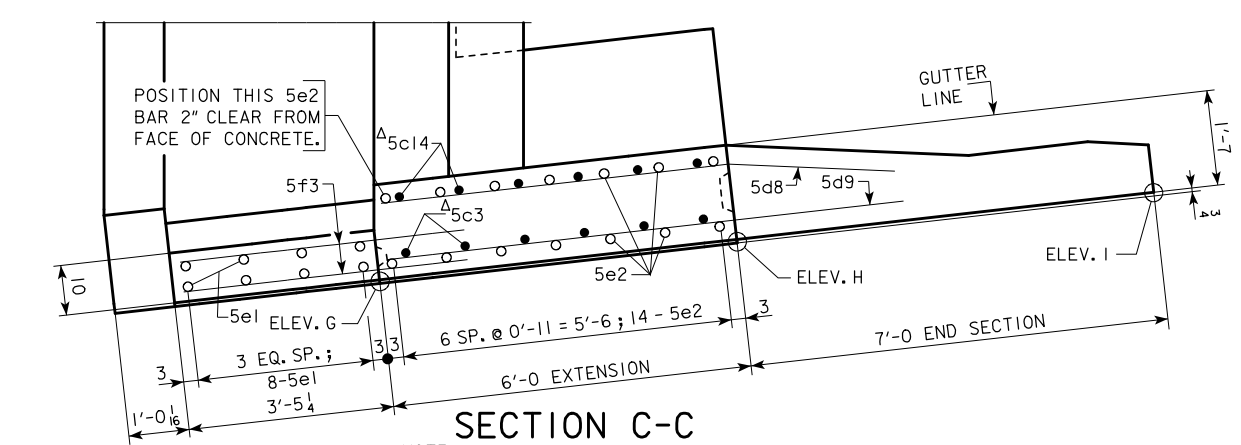
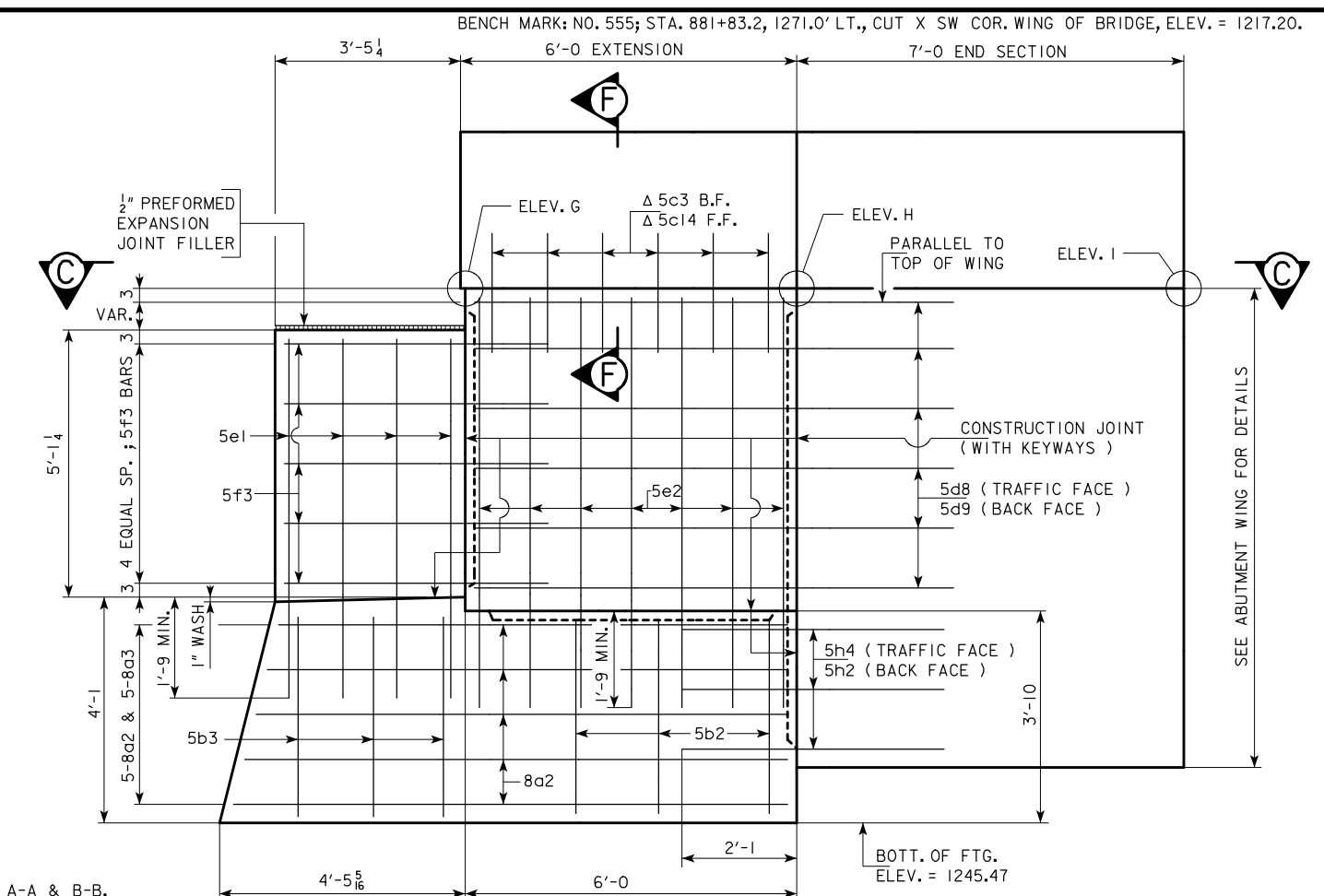
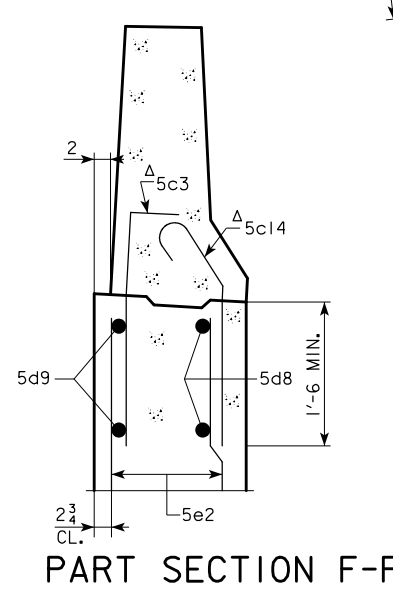


TABLE OF WINGWALL ELEVATIONS			
LOCATION	ELEV. G	ELEV. H	ELEV. I
NE WING	1253.14	1253.14	1253.14
SE WING	1255.47	1255.47	1255.47



NOTE :
FOR LOCATION OF VIEWS A-A & B-B,
SEE DESIGN SHEET 25.

Δ NOTE :
SEE DESIGN SHEETS 52,53,54 & 55 IN
THESE PLANS FOR DETAILS OF
BARRIER RAIL WING EXTENSIONS.
REINFORCING BARS 5c3 AND 5c14
ARE INCLUDED IN THE SUPERSTRUCTURE
QUANTITIES.



DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0¹/₂ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

EAST ABUTMENT DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20)

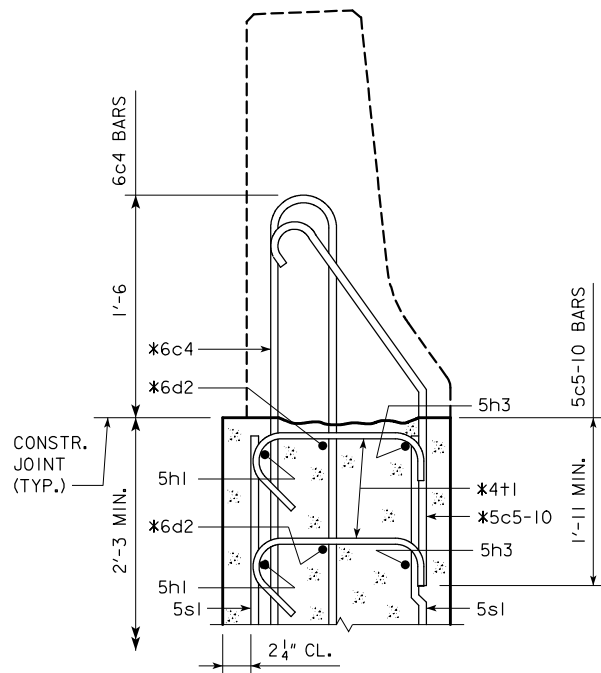
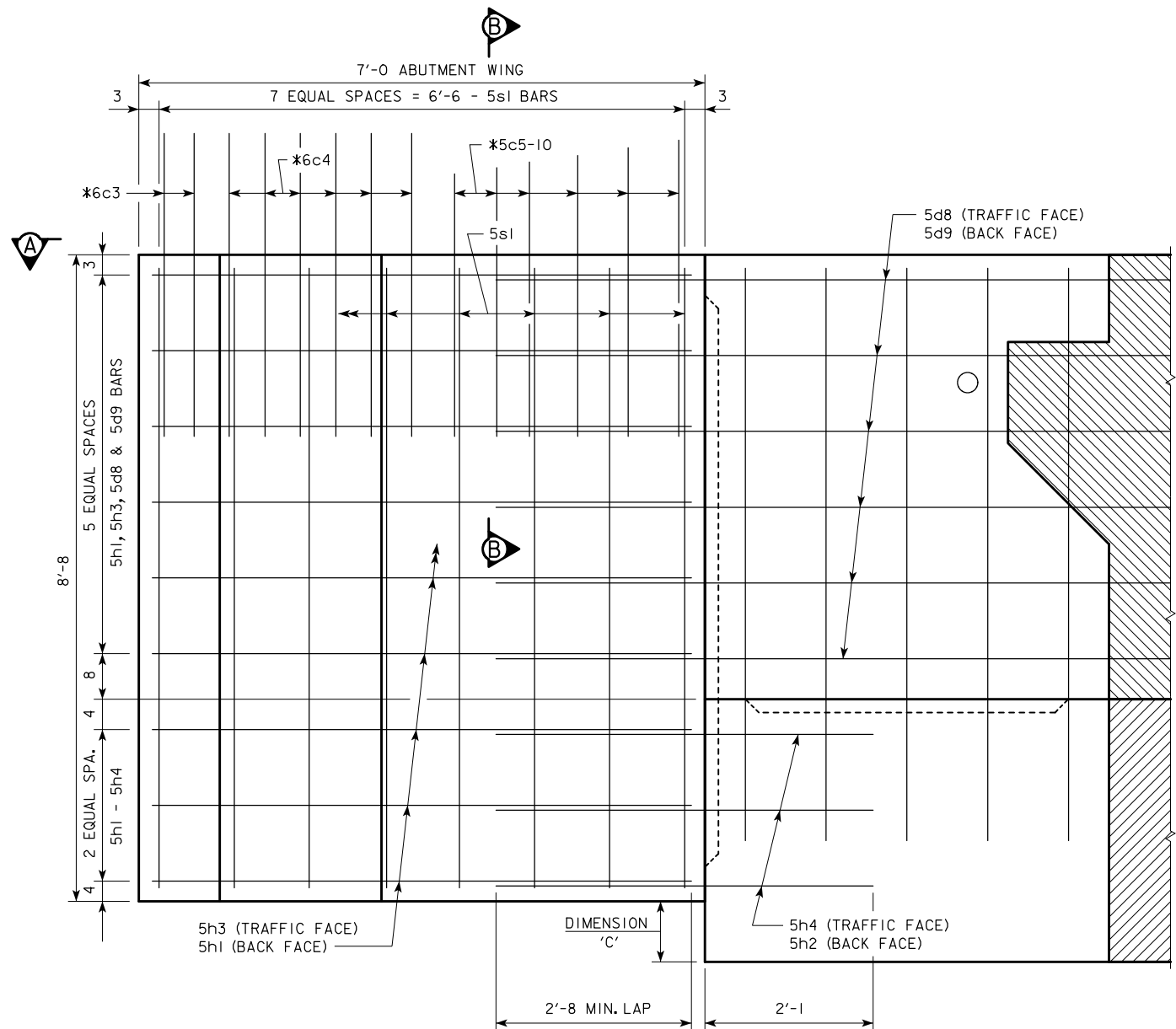
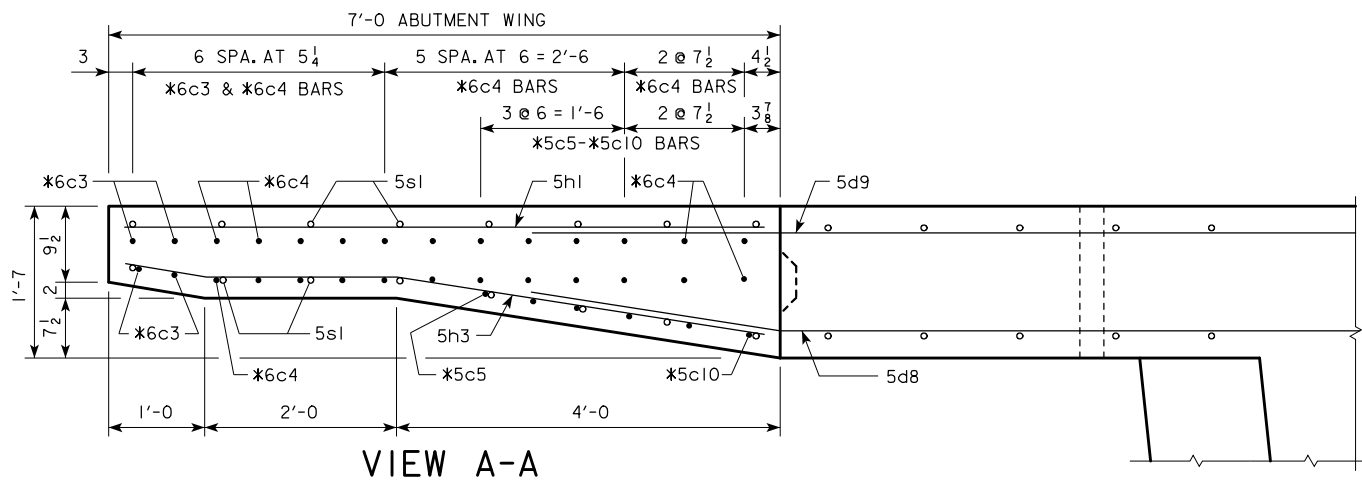
AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 27 OF 117 FILE NO. 30187 DESIGN NO. 410

ENGLISH\MISCELLANEOUS\BRIDGES.DGN - 2113-S - THIS SHEET ISSUED 02-08.



SECTION B-B

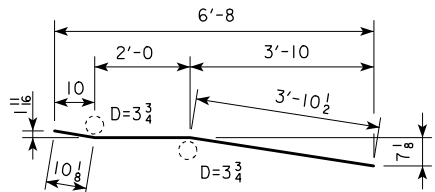
* BARRIER RAIL END SECTION BARS TO BE PLACED WITH ABUTMENT WING.

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

DIMENSION 'C'	
LOCATION	DIMENSION 'C'
NORTHWEST CORNER	1'-2 1/4
SOUTHWEST CORNER	1'-5 5/8
NORTHEAST CORNER	1'-0 3/8
SOUTHEAST CORNER	1'-4

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	8'-4	139
TOTAL (LBS.)					265



5h3

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

BENT BAR DETAILS

CONCRETE PLACEMENT SUMMARY

CONCRETE	TOTAL
ONE ABUTMENT WING	2.5
TOTAL (CU. YDS.)	2.5

NOTE:

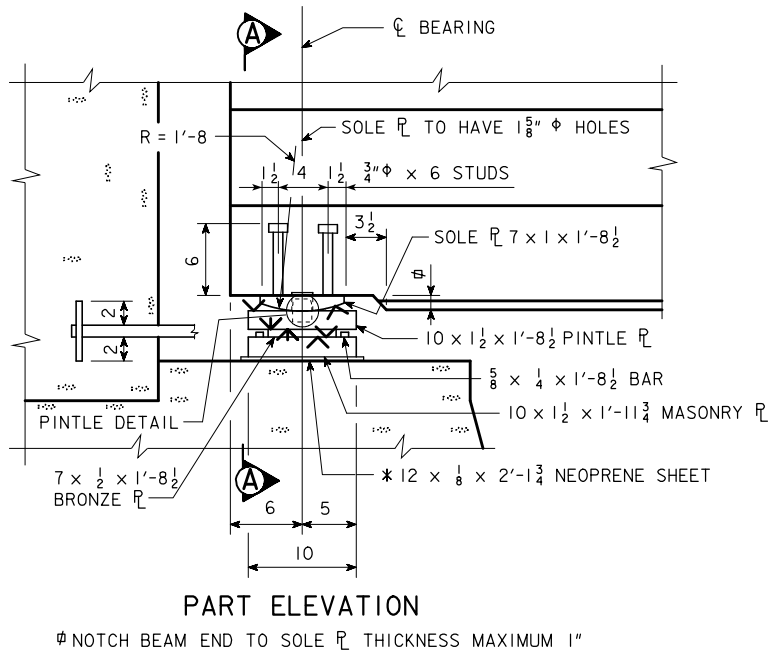
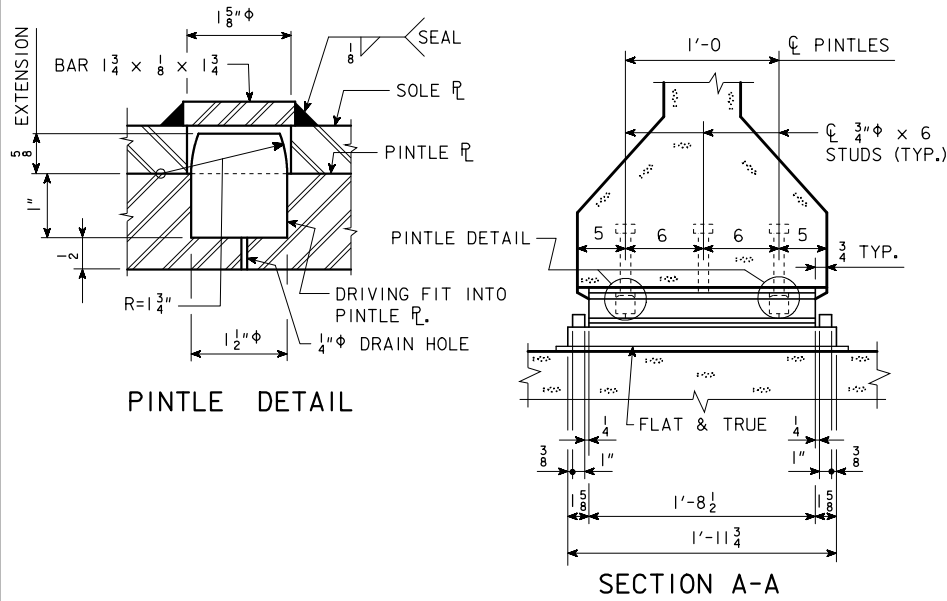
REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE ADDED TO THE ABUTMENT QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
ABUTMENT WING DETAILS-WESTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 28 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISED 07-09 - DEFINED ϕ PINTLES ON SECT. A-A. REVISED DUROMETER HARDNESS FOR $\frac{1}{8}$ " NEOPRENE.
ENGLISHBEAMS.DGN - 4541A - THIS SHEET ISSUED 03-08.



ABUTMENT BEARING NOTES:

THE SLIDING SURFACE OF THE BRONZE ϕ SHALL BE LUBRICATED IN ACCORDANCE WITH ARTICLE 4190.03, OF THE STANDARD SPECIFICATIONS AND THE BRONZE METAL SHALL BE CAST BRONZE IN ACCORDANCE WITH ARTICLE 4190.03, OF THE STANDARD SPECIFICATIONS. TOP EDGES OF BRONZE ϕ SHALL BE BEVELED $\frac{1}{8}$ ".

SURFACES MARKED "V" SHALL BE FINISHED ANSI 250 AND SURFACES MARKED "V" SHALL BE FINISHED ANSI 125.

MASONRY PLATES ARE TO BE SET ON A $\frac{1}{8}$ " NEOPRENE SHEET.

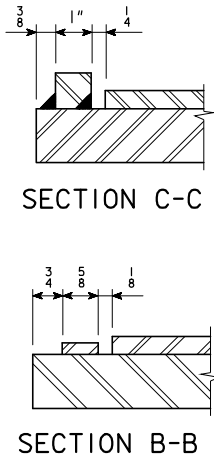
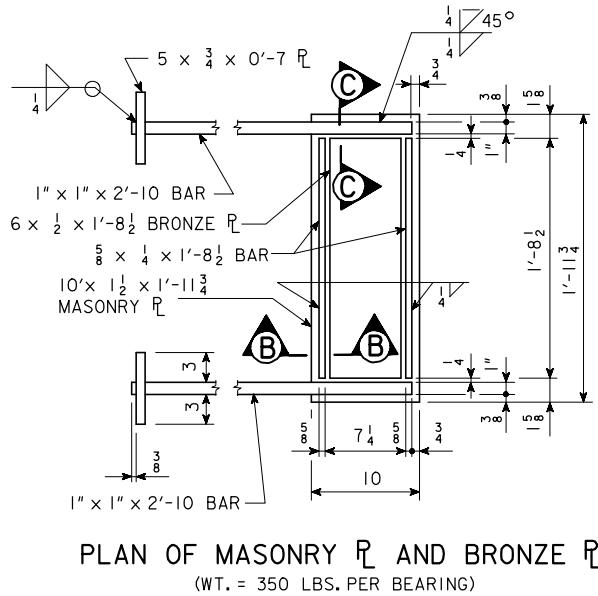
PINTLE PLATES, MASONRY PLATES, AND LUBRICATED BRONZE PLATES ARE A PART OF THE SUPERSTRUCTURE STRUCTURAL STEEL QUANTITY. UNIT PRICE BID FOR "STRUCTURAL STEEL" SHALL INCLUDE ALLOWANCE FOR COST OF BRONZE PLATES. COST OF NEOPRENE SHEETS SHALL BE CONSIDERED INCIDENTAL TO THE STRUCTURAL STEEL BID ITEM. COST OF THE ANCHORED CURVED SOLE PLATES IS TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

THE SOLE PLATE, PINTLE PLATE AND THE MASONRY PLATE SHALL BE GALVANIZED. THE SOLE PLATE AND MASONRY PLATE SHALL BE FITTED UP AND WELDED PRIOR TO GALVANIZING. THE SURFACE OF PINTLE PLATE IN CONTACT WITH BRONZE BEARING PLATE SHALL BE SMOOTH AND FREE OF PROJECTIONS DUE TO 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 SPECIFICATIONS :

- ASTM A 852
- ASTM A 514 GRADE B
- ASTM A 709 GRADE HPS 70W



PRETENSIONED PRESTRESSED CONCRETE BEAM ABUTMENT BEARING DETAILS

* THE $\frac{1}{8}$ INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
ABUTMENT BEARING DETAILS-WESTBOUND
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 30 OF 117 FILE NO. 30187 DESIGN NO. 410

DESIGN TEAM KBK/JTN/RAR/MSF

STUB ABUT. BEARING DETAILS - C & D PPCB BRIDGES

STANDARD SHEET 4541A
(MODIFIED)

SAC COUNTY

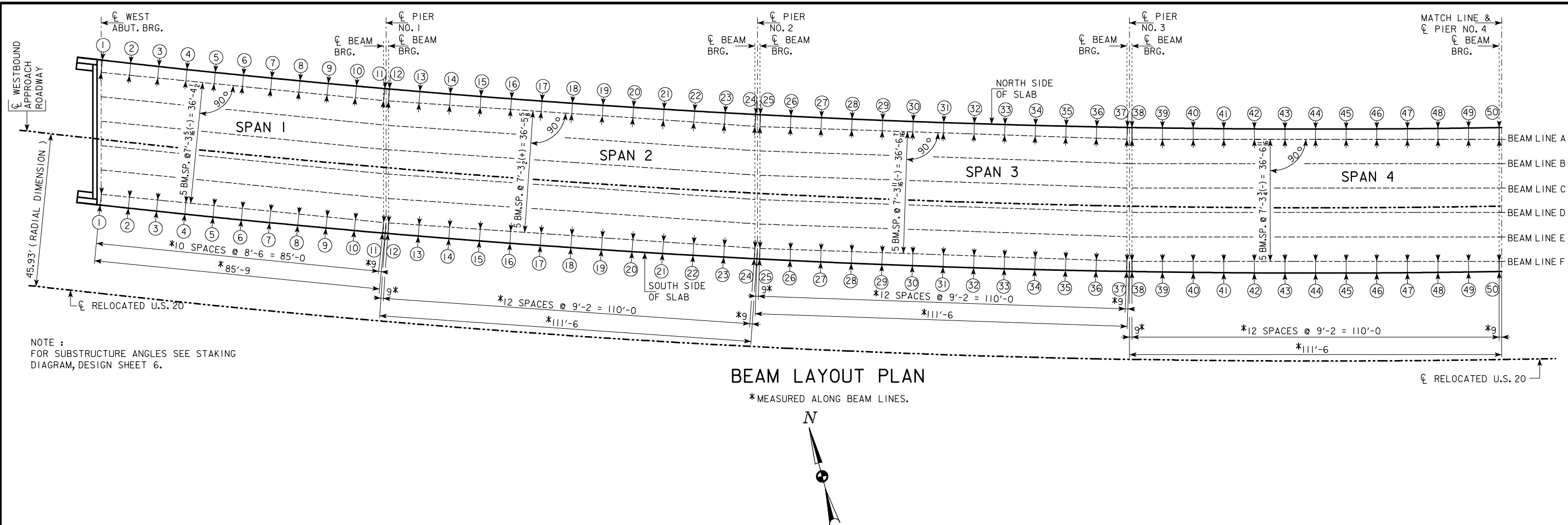
PROJECT NUMBER NHSX-020-2 (84)--3H-81

SHEET NUMBER 31

02-AUG-2010 07:09

msfish

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BEAM LAYOUT PLAN

*MEASURED ALONG BEAM LINES.

ΔΔ DISTANCE BETWEEN CL EXTERIOR BEAM AND EDGE OF SLAB

	CL W.ABUT. BEARING										CL PIER NO. 1 BEAM BEARINGS		CL PIER NO. 1 BEAM BEARINGS										CL PIER NO. 2 BEAM BEARINGS		CL PIER NO. 2 BEAM BEARINGS									
Δ POINT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
NORTH SIDE OF SLAB	3'-8 ¹ / ₈	3'-6 ⁷ / ₈	3'-5 ¹³ / ₁₆	3'-5 ¹ / ₁₆	3'-4 ⁵ / ₈	3'-4 ³ / ₈	3'-4 ⁷ / ₁₆	3'-4 ¹³ / ₁₆	3'-5 ³ / ₈	3'-6 ¹ / ₄	3'-7 ³ / ₈	3'-7 ⁵ / ₁₆	3'-5 ⁹ / ₁₆	3'-4 ¹ / ₈	3'-2 ¹⁵ / ₁₆	3'-2 ¹ / ₈	3'-1 ⁵ / ₈	3'-1 ⁷ / ₁₆	3'-1 ¹ / ₂	3'-1 ¹⁵ / ₁₆	3'-2 ¹¹ / ₁₆	3'-3 ³ / ₄	3'-5 ¹ / ₈	3'-6 ³ / ₄	3'-6 ³ / ₄	3'-5	3'-3 ⁹ / ₁₆	3'-2 ⁷ / ₁₆	3'-1 ⁵ / ₈	3'-1 ¹ / ₈	3'-1	3'-1 ¹ / ₈	3'-1 ⁹ / ₁₆	3'-2 ⁵ / ₁₆
SOUTH SIDE OF SLAB	3'-2	3'-3 ¹ / ₈	3'-4 ¹ / ₁₆	3'-4 ¹¹ / ₁₆	3'-5	3'-5 ¹ / ₈	3'-4 ¹⁵ / ₁₆	3'-4 ¹ / ₂	3'-3 ¹³ / ₁₆	3'-2 ¹³ / ₁₆	3'-1 ⁵ / ₈	3'-1 ⁵ / ₈	3'-3 ⁵ / ₁₆	3'-4 ⁵ / ₈	3'-5 ¹¹ / ₁₆	3'-6 ⁷ / ₁₆	3'-6 ⁷ / ₈	3'-6 ¹⁵ / ₁₆	3'-6 ³ / ₄	3'-6 ¹ / ₄	3'-5 ⁷ / ₁₆	3'-4 ⁵ / ₁₆	3'-2 ⁷ / ₈	3'-1 ³ / ₁₆	3'-1 ¹ / ₈	3'-2 ¹³ / ₁₆	3'-4 ³ / ₁₆	3'-5 ¹ / ₄	3'-6 ¹ / ₁₆	3'-6 ¹ / ₂	3'-6 ⁵ / ₈	3'-6 ⁷ / ₁₆	3'-5 ¹⁵ / ₁₆	3'-5 ³ / ₁₆

ΔΔ DISTANCE BETWEEN CL EXTERIOR BEAM AND EDGE OF SLAB

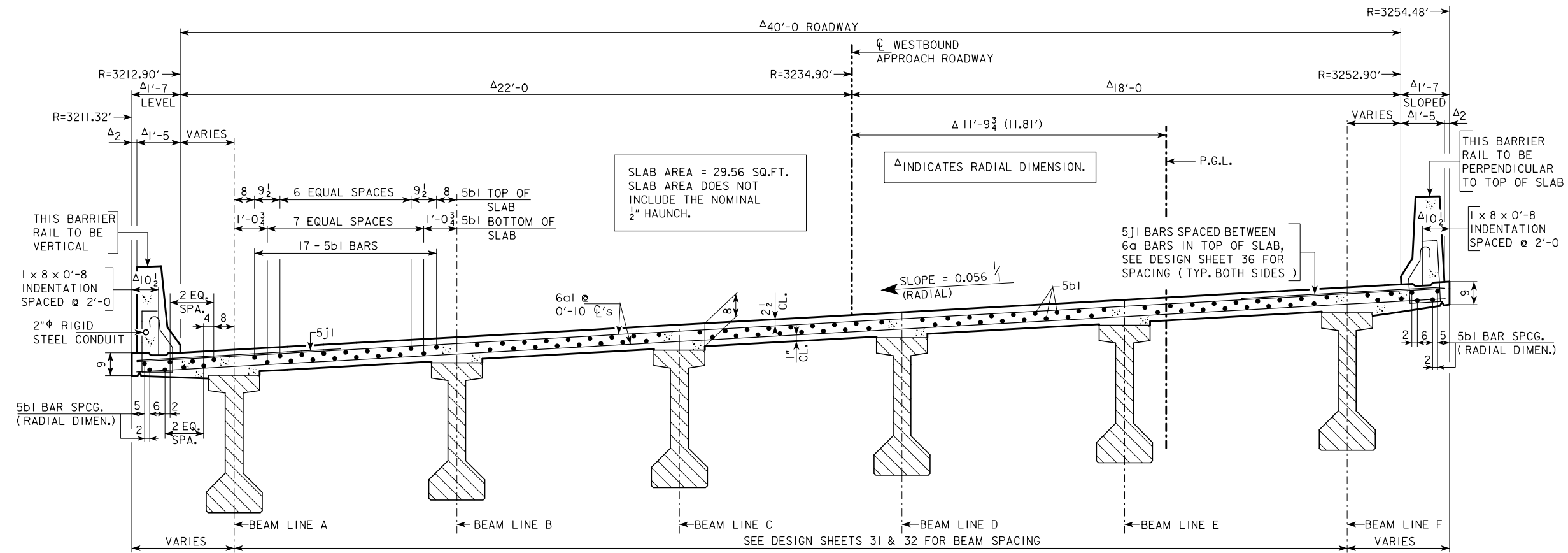
	CL PIER NO. 3 BEAM BEARINGS										CL P.NO.4 BM.BRG.									
Δ POINT	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50				
NORTH SIDE OF SLAB	3'-3 ³ / ₈	3'-4 ¹³ / ₁₆	3'-6 ¹ / ₂	3'-6 ¹ / ₂	3'-4 ³ / ₄	3'-3 ⁵ / ₁₆	3'-2 ¹ / ₄	3'-1 ⁷ / ₁₆	3'-1	3'-0 ¹³ / ₁₆	3'-1	3'-1 ⁷ / ₁₆	3'-2 ¹ / ₄	3'-3 ⁵ / ₁₆	3'-4 ³ / ₄	3'-6 ¹ / ₂				
SOUTH SIDE OF SLAB	3'-4 ¹ / ₁₆	3'-2 ⁵ / ₈	3'-0 ¹⁵ / ₁₆	3'-0 ¹⁵ / ₁₆	3'-2 ⁵ / ₈	3'-4	3'-5 ¹ / ₈	3'-5 ⁷ / ₈	3'-6 ³ / ₈	3'-6 ¹ / ₂	3'-6 ³ / ₈	3'-5 ⁷ / ₈	3'-5 ¹ / ₈	3'-4	3'-2 ⁵ / ₈	3'-0 ¹⁵ / ₁₆				

Δ LOCATION INDICATED ALONG CL EXTERIOR BEAM LINES.

ΔΔ DISTANCES SHOWN ARE MEASURED HORIZONTAL AND PERPENDICULAR TO BEAMS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0¹/₂ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
BEAM LAYOUT PLAN - WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 31 OF 117 FILE NO. 30187 DESIGN NO. 410

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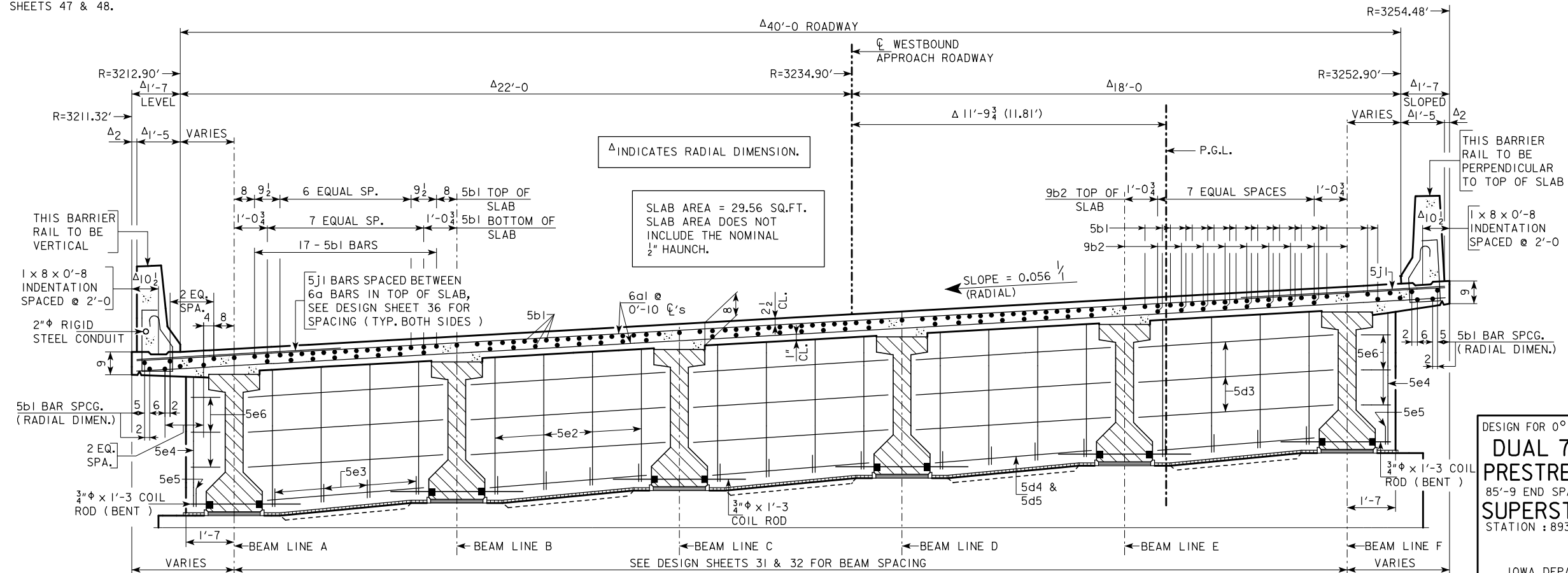
SLAB AREA = 29.56 SQ.FT.
SLAB AREA DOES NOT
INCLUDE THE NOMINAL
1/2" HAUNCH.

Δ INDICATES RADIAL DIMENSION.

TYPICAL SECTION NEAR MID SPAN (LOOKING EAST)

NOTE :
FOR DETAILS OF INTERMEDIATE
DIAPHRAGMS, SEE DESIGN
SHEETS 47 & 48.

NOTE :
FOR DETAILS OF RAIL AND RAIL
REINFORCING, SEE DESIGN SHEETS
52 & 53.



Δ INDICATES RADIAL DIMENSION.

SLAB AREA = 29.56 SQ.FT.
SLAB AREA DOES NOT
INCLUDE THE NOMINAL
1/2" HAUNCH.

SECTION NEAR PIERS (LOOKING EAST)

NOTE :
SEE DESIGN SHEET 34 FOR CROSS
SECTION NEAR EAST ABUTMENT AND
SLAB AND HAUNCH DETAILS AT INTERIOR
AND EXTERIOR BEAMS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

SUPERSTRUCTURE DETAILS-WESTBOUND

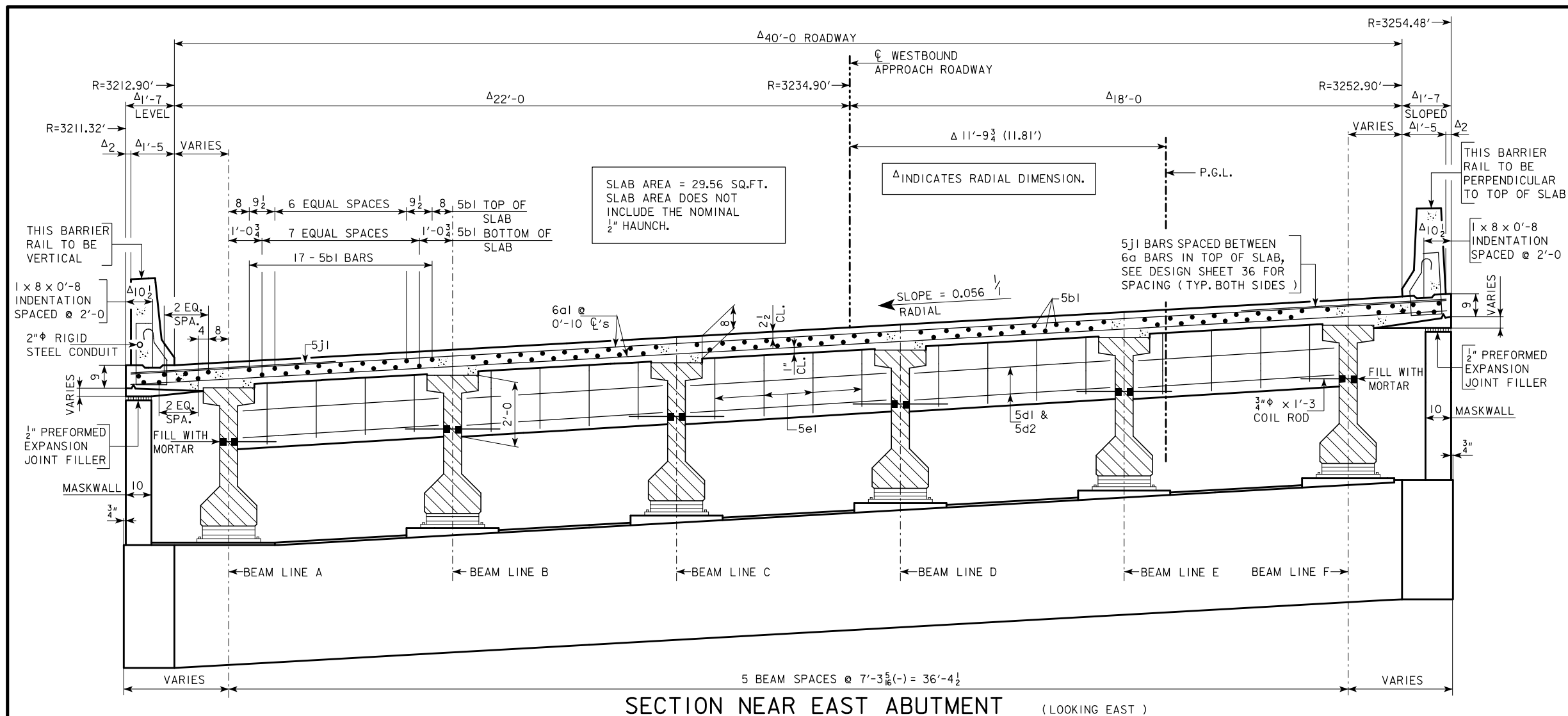
STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 33 OF 117 FILE NO. 30187 DESIGN NO. 410



NOTE :
FOR DETAILS OF RAIL AND RAIL
REINFORCING, SEE DESIGN SHEETS
52 & 53.

NOTE :
FOR DETAILS OF INTERMEDIATE
DIAPHRAGMS, SEE DESIGN
SHEETS 47 & 48.

SUPERSTRUCTURE NOTES:

THE FLOOR SLAB AS SHOWN INCLUDES $\frac{1}{2}$ " INTEGRAL WEARING SURFACE.

THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE FLOOR SLAB.

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

ALL BEAMS ARE TO BE SET VERTICAL.

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

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

ALL SLAB AND DIAPHRAGM REINFORCING IS TO BE WIRED IN PLACE AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED.

TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND $\frac{1}{2}$ " CLEAR BELOW TOP OF SLAB. BOTTOM TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF SLAB. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL EPOXY COATED METAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF EPOXY COATED METAL BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0" APART.

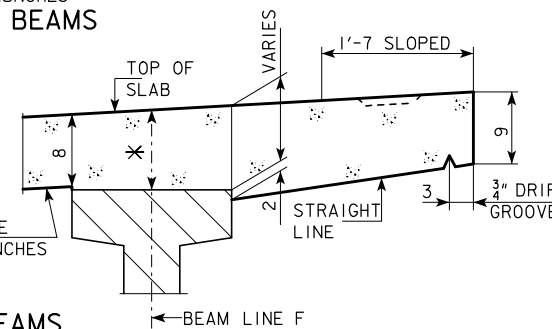
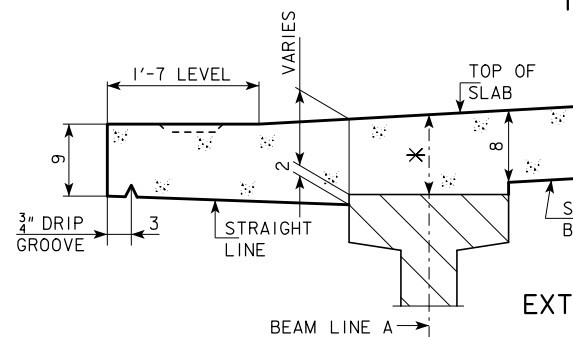
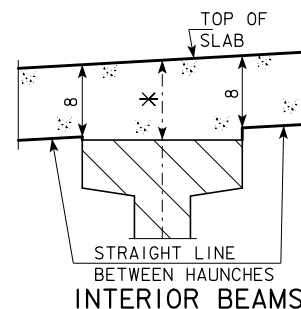
TRANSVERSE SLAB REINFORCING MAY BE SPLICED WITH ONE LAP LOCATED AS FOLLOWS:

TOP BAR - LAP MIDWAY BETWEEN BEAMS (MIN. LAP = 1'-10").

BOTTOM BARS - LAP OVER BEAMS (MIN. LAP = 1'-10").

PAYMENT FOR REINFORCING BARS SHALL BE BASED ON NO SPLICES, AND NO ALLOWANCE SHALL BE MADE FOR THE ADDITIONAL LENGTH OF BAR REQUIRED FOR THE USE OF SPLICES.

SECTION NEAR EAST ABUTMENT (LOOKING EAST)



TYPICAL SLAB AND HAUNCH DETAILS

* FOR SLAB THICKNESS OVER BEAMS SEE HAUNCH AND CAMBER DETAILS ON DESIGN SHEET 44.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

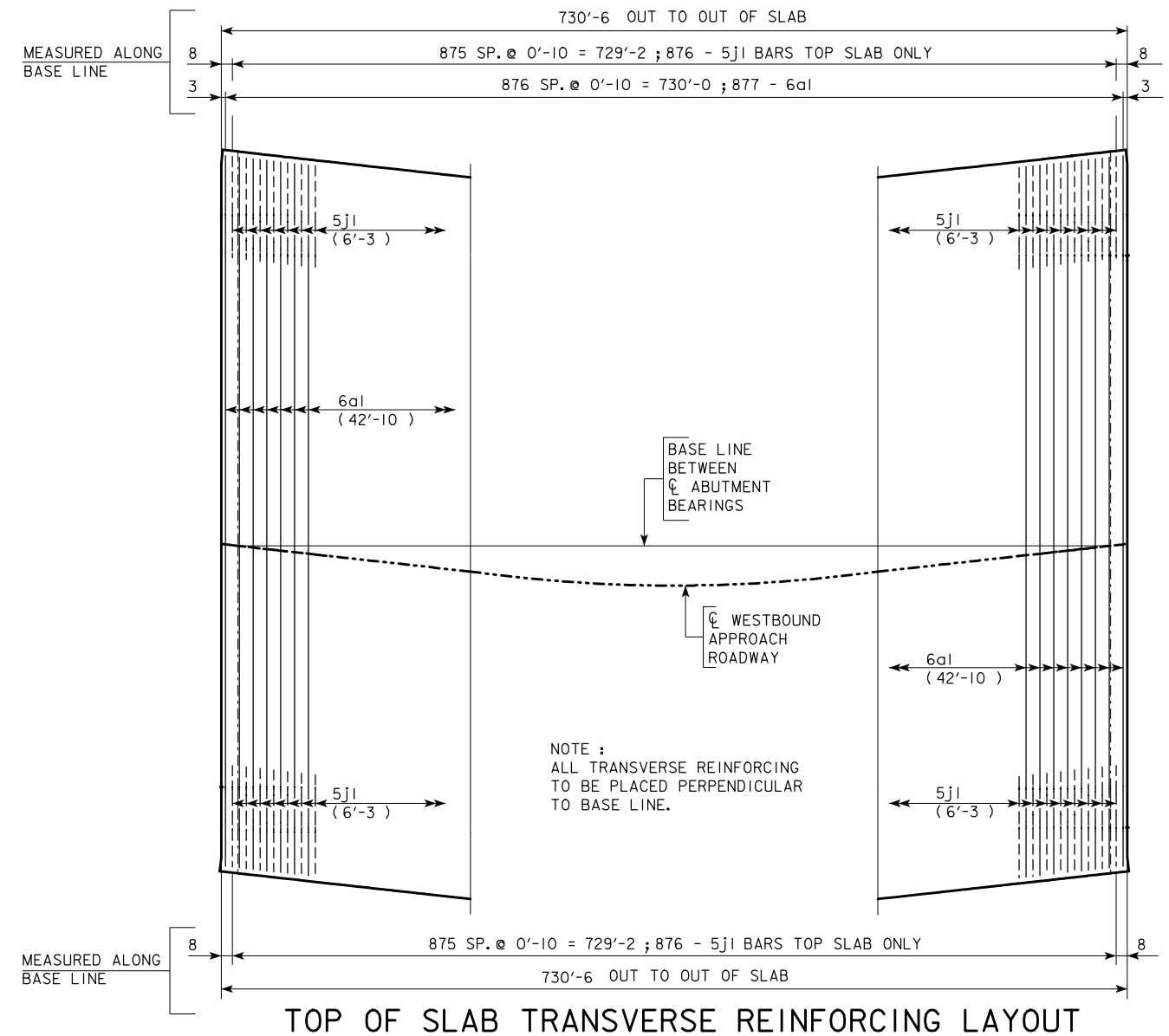
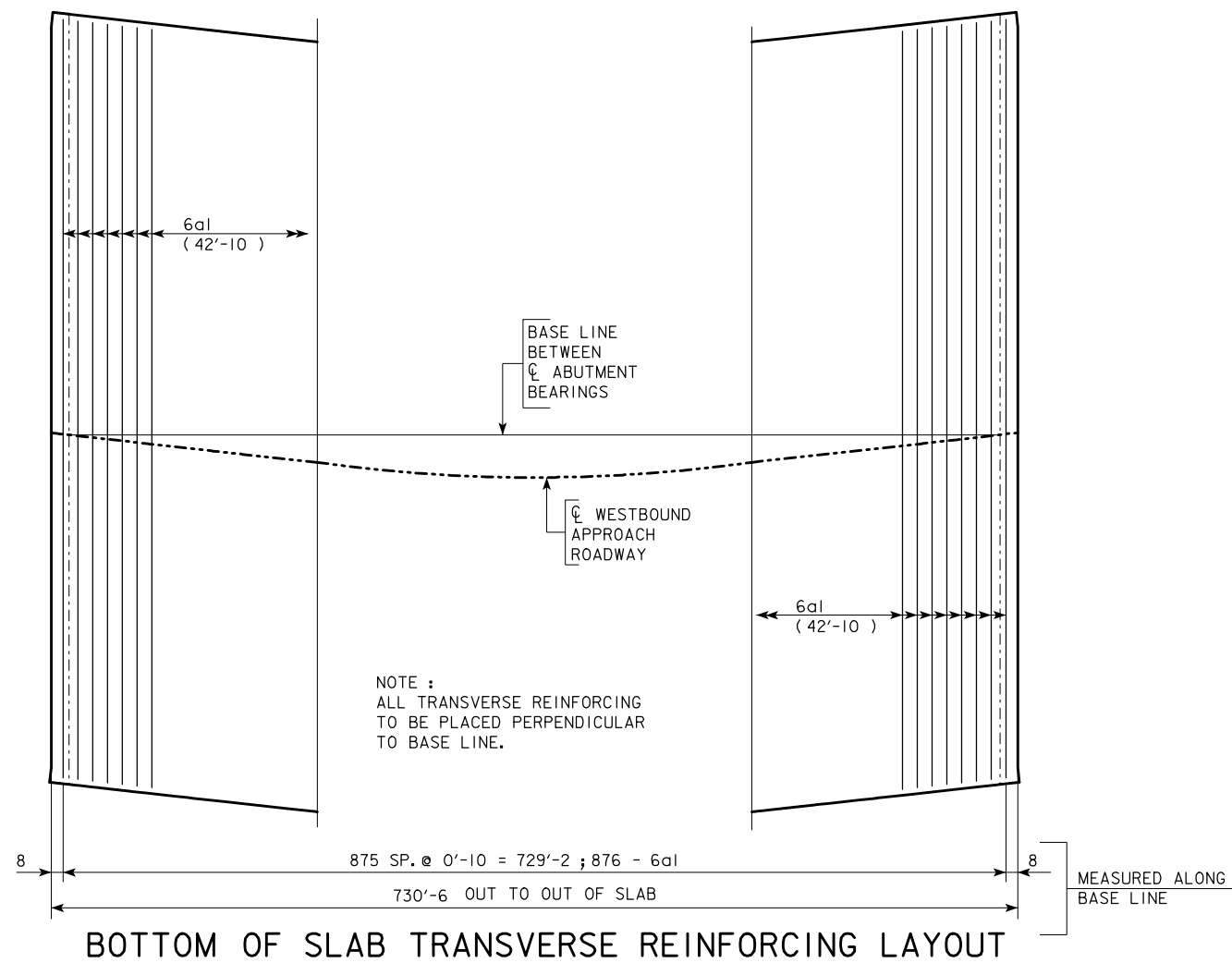
SUPERSTRUCTURE DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 34 OF 117 FILE NO. 30187 DESIGN NO. 410



DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

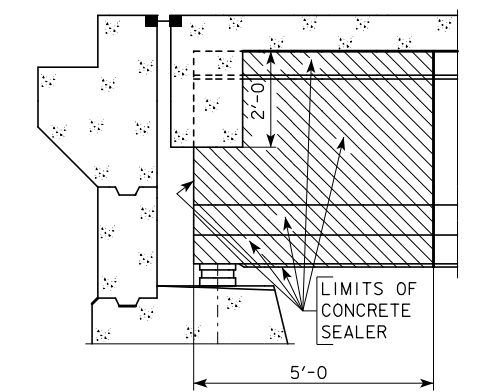
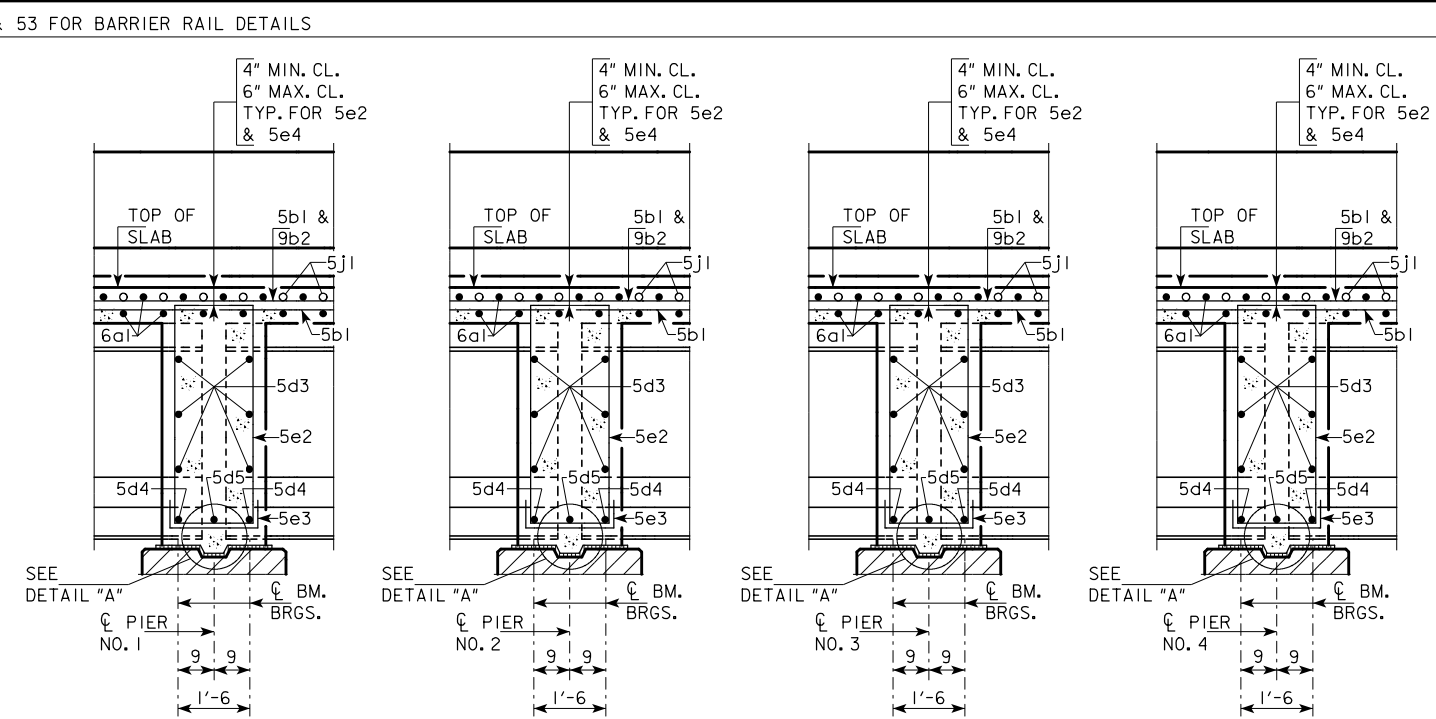
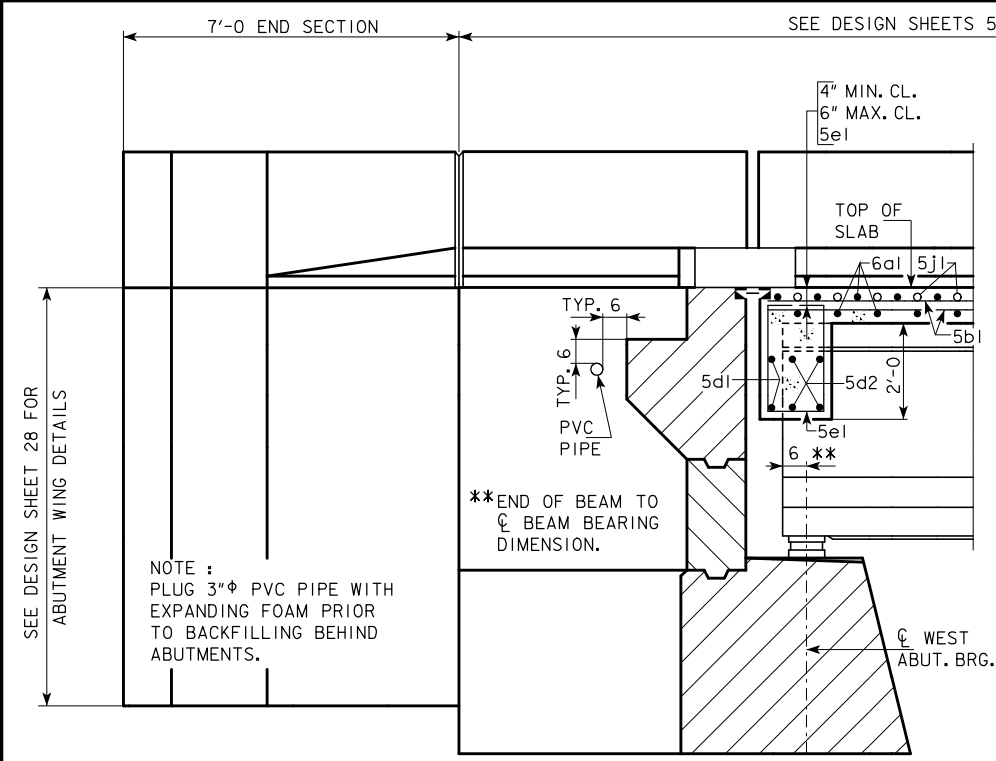
SUPERSTRUCTURE DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

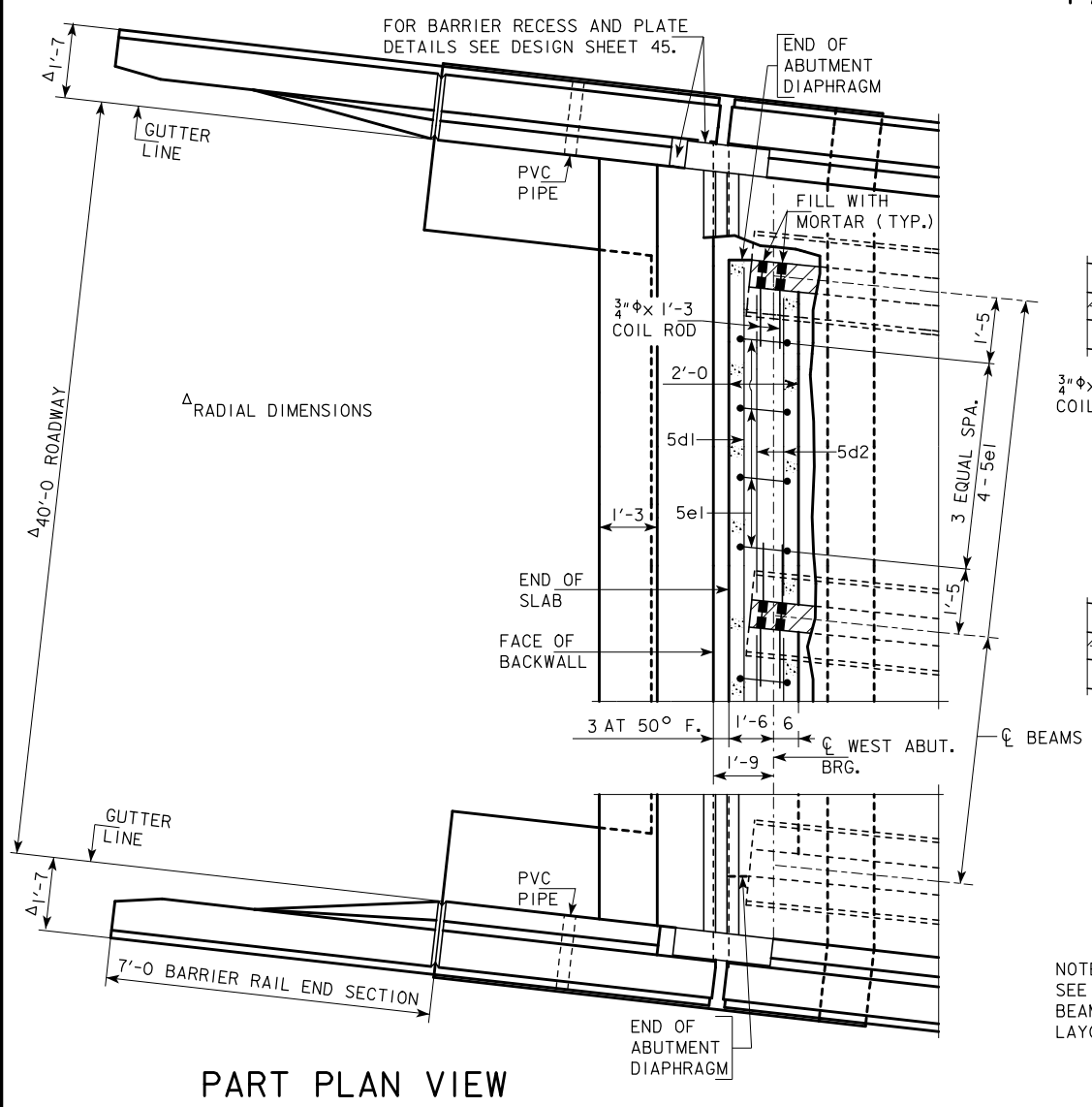
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 36 OF 117 FILE NO. 30187 DESIGN NO. 410

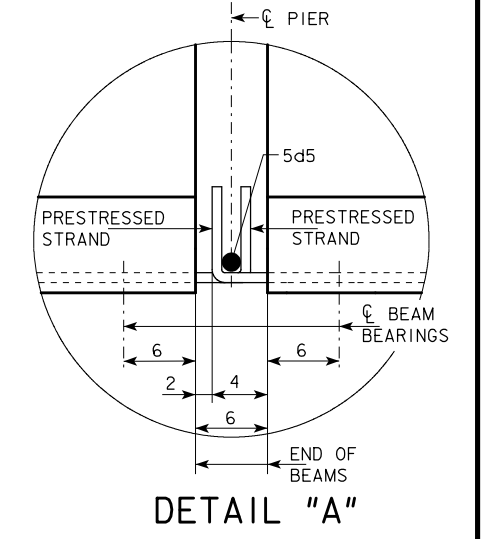
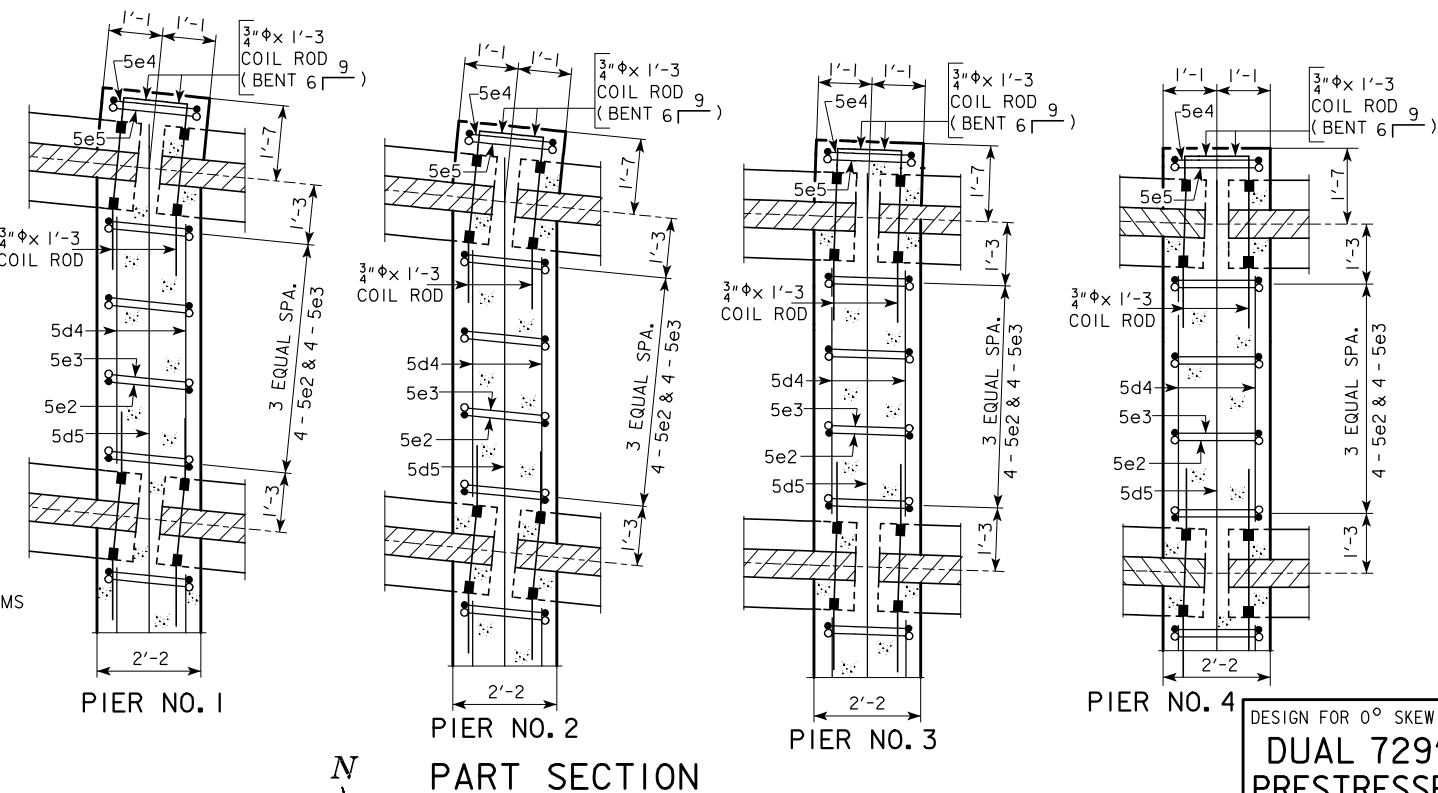


CONCRETE SEALER SHALL BE APPLIED TO THE ABUTMENT SEAT AND PRESTRESSED BEAM ENDS IN ACCORDANCE WITH STANDARD SPECIFICATION 2403.21 D. THE SEALING SHALL INCLUDE PORTIONS OF THE PRESTRESSED BEAM ENDS THAT ARE NOT EMBEDDED IN THE ABUTMENT DIAPHRAGMS AS DETAILED ON THIS SHEET.

CONCRETE SEALER LIMITS AT ABUTMENT



PART LONGITUDINAL SECTION NEAR GUTTER
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEET 47.)



NOTE :
FOR TOP OF PIER DETAILS, PART LONGITUDINAL AND PART SECTION FROM PIER NO. 4 TO EAST ABUTMENT, SEE DESIGN SHEET 38.

NOTE :
CONDUIT AND JUNCTION BOXES TO BE PLACED IN NORTH BARRIER RAIL.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

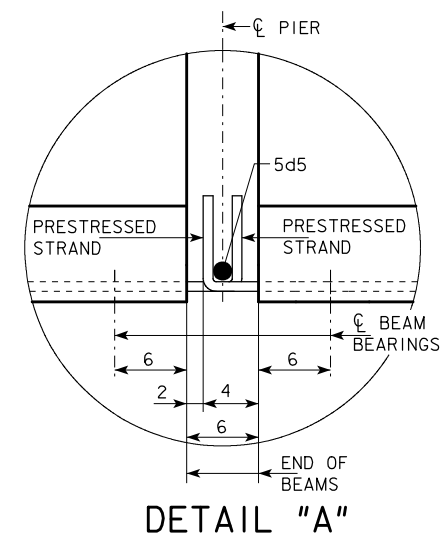
SUPERSTRUCTURE DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

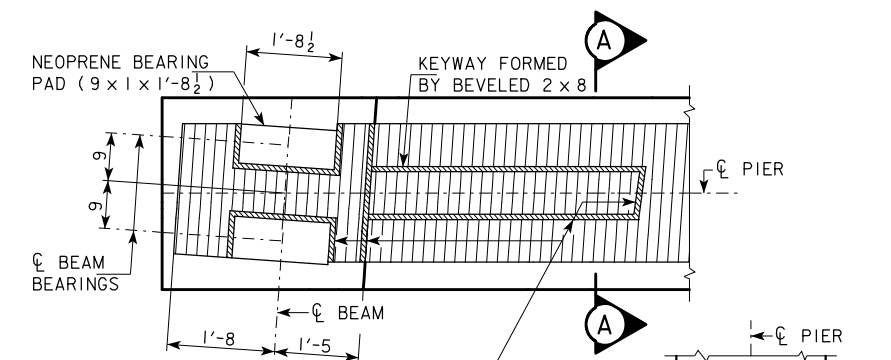
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 37 OF 117 FILE NO. 30187 DESIGN NO. 410



CONCRETE SEALER LIMITS AT ABUTMENT

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE DESIGN SHEET 47.)



1" THICK STRIPS OF PREFORMED EXPANSION
JOINT FILLER AROUND BEARINGS, FACE OF
STEPS, SIDES AND ENDS OF KEYWAYS.

NOTE :
FOR PART LONGITUDINAL AND PART SECTION FROM
WEST ABUTMENT TO PIER NO. 4, SEE DESIGN SHEET 37.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0¹/₂' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

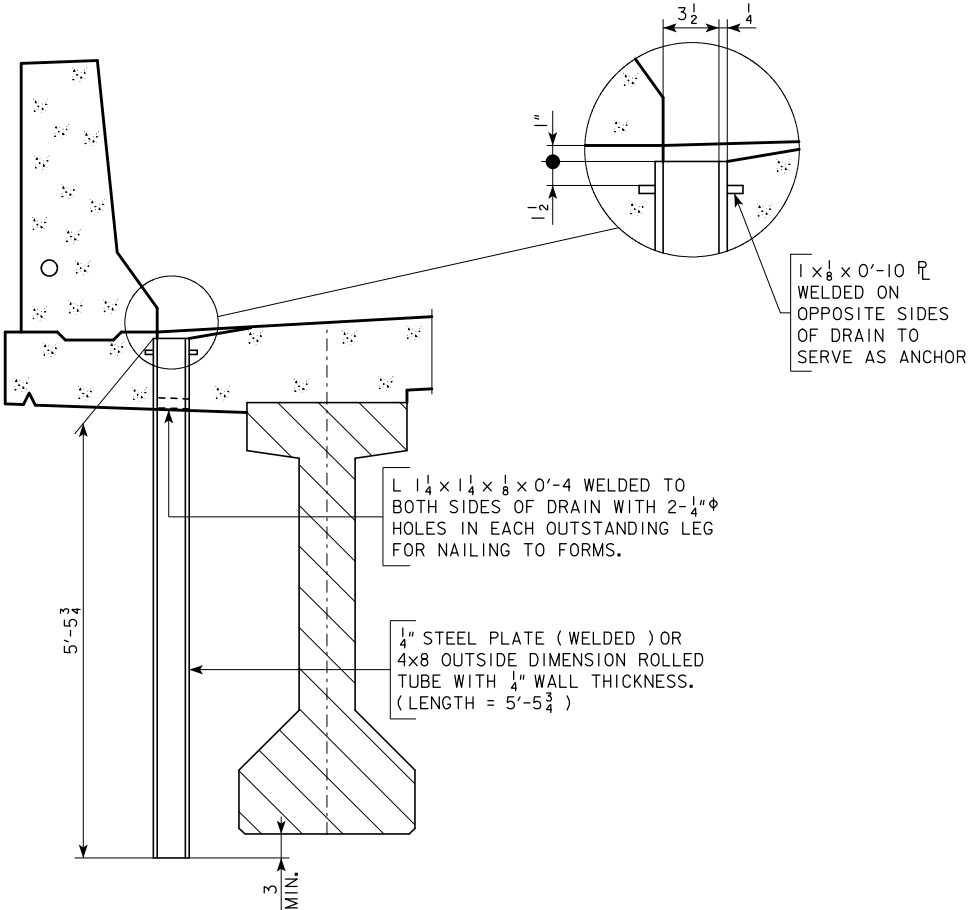
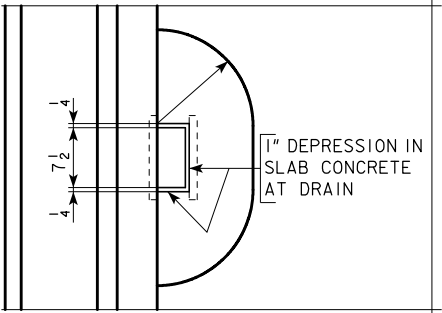
85'-9 END SPANS 5 - III'-6 INTERIOR SPANS

SUPERSTRUCTURE DETAILS-WESTBOUND

STATION : 893+14.13 (@ RELOCATED U.S. 20) AUGUST 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 38 OF 117 FILE NO. 30187 DESIGN NO. 410



DRAIN DETAILS

NOTE :
DRAINS ARE TO BE GALVANIZED. 35 DRAINS REQUIRED. SEE "SITUATION PLAN" ON DESIGN SHEETS 3 & 4 FOR LOCATION. WEIGHT OF DRAINS (106 LBS./PER DRAIN) IS INCLUDED IN THE QUANTITY FOR "STRUCTURAL STEEL". WEIGHT IS BASED ON ROLLED TUBE.

CONCRETE PLACEMENT QUANTITIES - WESTBOUND SUPERSTRUCTURE

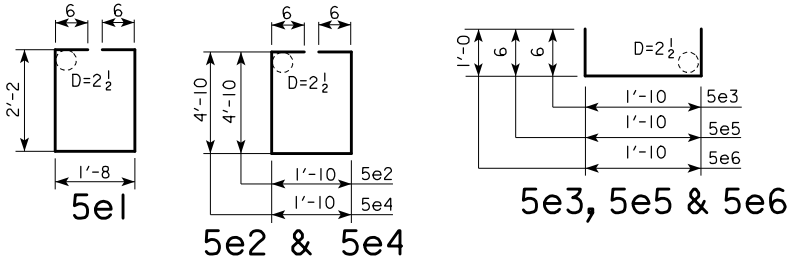
LOCATION	QUANTITY
SECTION 1 - SLAB & ABUTMENT DIAPHRAGM	88.4
SECTION 2 - SLAB	95.1
SECTION 3 - SLAB	95.3
SECTION 4 - SLAB	95.3
SECTION 5 - SLAB	95.3
SECTION 6 - SLAB	95.1
SECTION 7 - SLAB & ABUTMENT DIAPHRAGM	88.4
SECTION 8 - SLAB & PIER DIAPHRAGM	47.3
SECTION 9 - SLAB & PIER DIAPHRAGM	47.3
SECTION 10 - SLAB & PIER DIAPHRAGM	47.3
SECTION 11 - SLAB & PIER DIAPHRAGM	47.3
SECTION 12 - SLAB & PIER DIAPHRAGM	47.3
SECTION 13 - SLAB & PIER DIAPHRAGM	47.3
TOTAL - CU.YDS.	936.7

NOTE:
REFER TO DESIGN SHEET 35 FOR LOCATIONS OF SECTIONS.

EPOXY COATED REINFORCING BAR LIST - SUPERSTRUCTURE - WESTBOUND

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	SLAB, TRANSV., TOP & BOTTOM	—	1753	42'-10	112,780
5b1	SLAB, LONGIT., TOP & BOTTOM	—	2020	38'-10	81,816
9b2	SLAB, LONGIT., TOP AT PIERS	—	276	28'-0	26,275
5d1	ABUTMENT DIAPH., LONGIT.	—	4	36'-6	152
5d2	ABUTMENT DIAPH., LONGIT.	—	40	6'-4	264
5d3	PIER DIAPH., LONGIT.	—	180	6'-4	1189
5d4	PIER DIAPH., LONGIT.	—	60	5'-2	323
5d5	PIER DIAPH., LONGIT.	—	6	38'-4	240
5e1	ABUTMENT DIAPH., HOOPS	□	40	7'-0	292
5e2	PIER DIAPH., HOOPS	□	120	12'-6	1565
5e3	PIER DIAPH., HAIRPINS	└┐	120	2'-10	355
5e4	PIER DIAPH., HOOPS, ENDS	□	12	12'-6	156
5e5	PIER DIAPH., HAIRPINS, ENDS	└┐	12	2'-10	35
5e6	PIER DIAPH., TIES, ENDS	└┐	36	3'-10	144
5J1	TOP OF SLAB, TRANSV. (AT RAIL)	—	1752	6'-3	11,421
NORTH BARRIER RAIL - SEE DESIGN SHEET 52					17,538
SOUTH BARRIER RAIL - SEE DESIGN SHEET 53					17,538
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					272,083

BENT BAR DETAILS

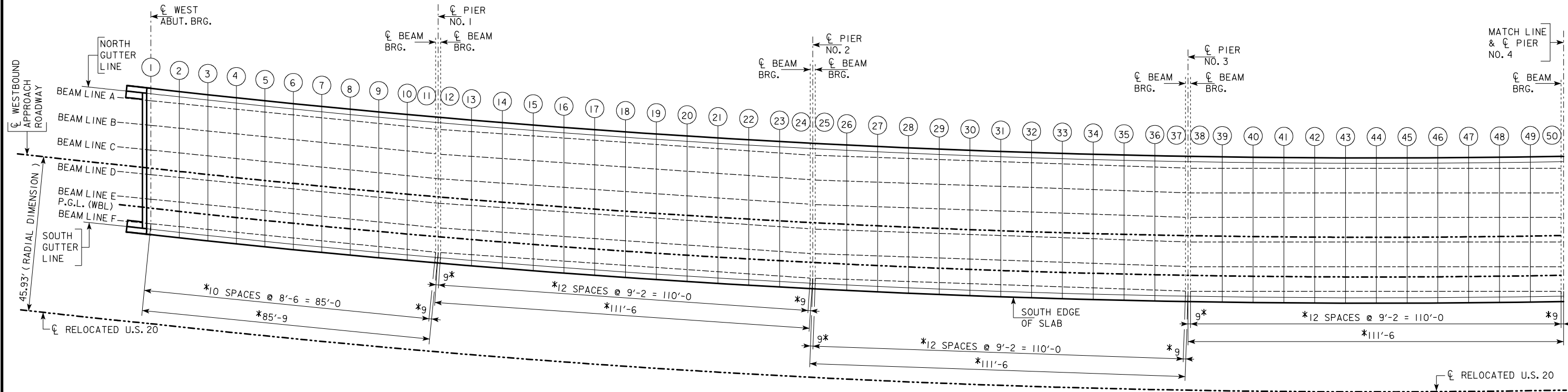


ESTIMATED QUANTITIES - SUPERSTRUCTURE - WESTBOUND

ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	936.7
REINFORCING STEEL EPOXY COATED	LBS.	272,083
STRUCTURAL STEEL	LBS.	17,614
STEEL EXTRUSION JOINT W/NEOPRENE	LIN.FT.	87
PRETENSIONED PRESTRESSED CONCRETE BEAMS	D85	EACH 12
	D110	EACH 30

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
SUPERSTRUCTURE DETAILS-WESTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 39 OF 117 FILE NO. 30187 DESIGN NO. 410



LOCATIONS FOR TOP OF SLAB ELEVATIONS

* NOTE :
ELEVATION SPACINGS AND DIMENSIONS ARE ALONG BEAM LINES.



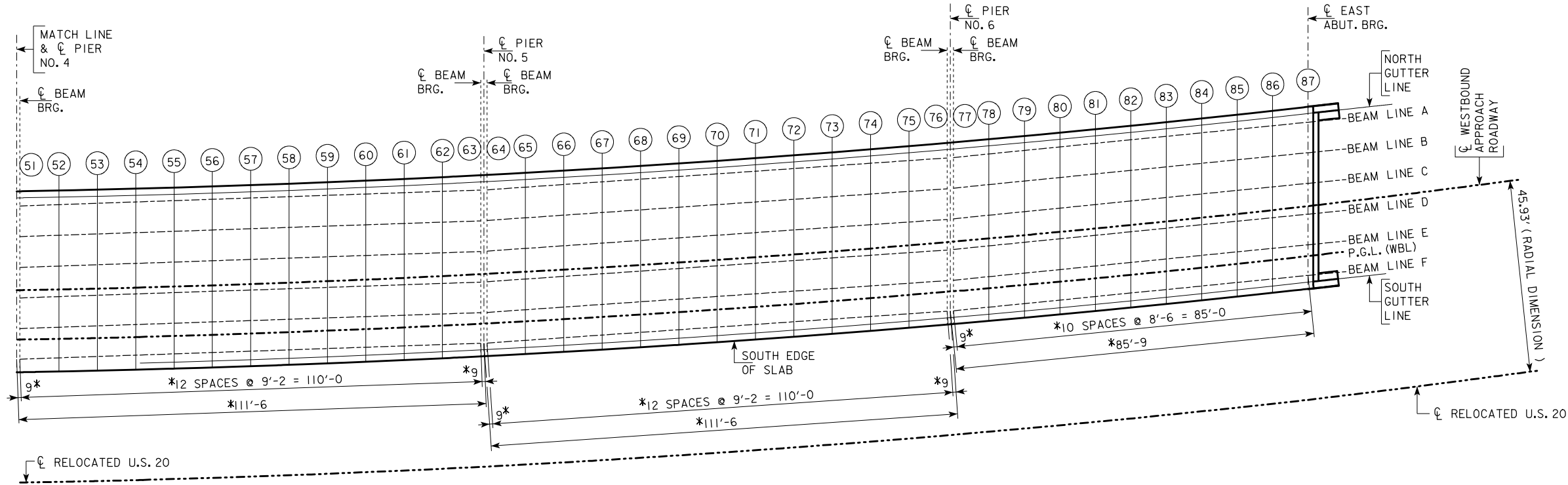
TOP OF SLAB ELEVATIONS - WESTBOUND

	W.ABUT. BEARING											PIER NO. 1 BEAM BEARINGS														PIER NO. 2 BEAM BEARINGS													
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34					
N.GUTTERLINE	1256.74	1256.66	1256.57	1256.49	1256.41	1256.33	1256.26	1256.18	1256.10	1256.03	1255.95	1255.94	1255.86	1255.78	1255.71	1255.63	1255.56	1255.48	1255.41	1255.34	1255.27	1255.20	1255.14	1255.07	1255.06	1254.99	1254.93	1254.87	1254.81	1254.74	1254.69	1254.63	1254.57	1254.51					
BEAM LINE A	1256.85	1256.76	1256.68	1256.59	1256.51	1256.43	1256.35	1256.28	1256.21	1256.13	1256.07	1256.05	1255.97	1255.88	1255.80	1255.72	1255.64	1255.57	1255.50	1255.43	1255.36	1255.30	1255.24	1255.18	1255.17	1255.10	1255.03	1254.96	1254.89	1254.83	1254.77	1254.71	1254.66	1254.60					
BEAM LINE B	1257.25	1257.16	1257.08	1256.99	1256.91	1256.83	1256.75	1256.68	1256.61	1256.54	1256.47	1256.45	1256.37	1256.28	1256.20	1256.12	1256.05	1255.97	1255.90	1255.83	1255.77	1255.70	1255.64	1255.59	1255.58	1255.50	1255.43	1255.36	1255.30	1255.24	1255.18	1255.12	1255.06	1255.01					
BEAM LINE C	1257.65	1257.56	1257.48	1257.39	1257.31	1257.23	1257.16	1257.08	1257.01	1256.94	1256.87	1256.86	1256.77	1256.69	1256.61	1256.53	1256.45	1256.38	1256.31	1256.24	1256.17	1256.11	1256.05	1255.99	1255.98	1255.91	1255.84	1255.77	1255.71	1255.64	1255.58	1255.53	1255.47	1255.42					
WB APPR.RDWAY.	1257.95	1257.86	1257.78	1257.70	1257.62	1257.55	1257.47	1257.39	1257.32	1257.24	1257.17	1257.16	1257.08	1257.00	1256.93	1256.85	1256.78	1256.70	1256.63	1256.56	1256.49	1256.43	1256.36	1256.29	1256.28	1256.22	1256.15	1256.09	1256.03	1255.97	1255.91	1255.85	1255.80	1255.74					
BEAM LINE D	1258.05	1257.96	1257.88	1257.79	1257.71	1257.63	1257.56	1257.48	1257.41	1257.34	1257.27	1257.26	1257.17	1257.09	1257.01	1256.93	1256.86	1256.78	1256.71	1256.64	1256.58	1256.52	1256.46	1256.40	1256.39	1256.32	1256.25	1256.18	1256.11	1256.05	1255.99	1255.93	1255.88	1255.83					
BEAM LINE E	1258.45	1258.36	1258.28	1258.19	1258.11	1258.03	1257.96	1257.88	1257.81	1257.74	1257.68	1257.66	1257.58	1257.49	1257.41	1257.34	1257.26	1257.19	1257.12	1257.05	1256.98	1256.92	1256.86	1256.80	1256.79	1256.72	1256.65	1256.58	1256.52	1256.46	1256.40	1256.34	1256.29	1256.24					
BEAM LINE F	1258.85	1258.76	1258.68	1258.59	1258.51	1258.44	1258.36	1258.29	1258.21	1258.14	1258.08	1258.06	1257.98	1257.90	1257.82	1257.74	1257.66	1257.59	1257.52	1257.45	1257.39	1257.33	1257.27	1257.21	1257.20	1257.13	1257.06	1256.99	1256.93	1256.87	1256.81	1256.75	1256.70	1256.64					
S.GUTTERLINE	1258.93	1258.85	1258.77	1258.69	1258.61	1258.54	1258.46	1258.38	1258.31	1258.24	1258.16	1258.15	1258.07	1258.00	1257.92	1257.85	1257.77	1257.70	1257.63	1257.56	1257.49	1257.43	1257.36	1257.29	1257.28	1257.22	1257.16	1257.10	1257.03	1256.97	1256.92	1256.86	1256.80	1256.75					
S.EDGE OF SLAB	1259.02	1258.94	1258.86	1258.78	1258.70	1258.62	1258.55	1258.47	1258.40	1258.32	1258.25	1258.24	1258.16	1258.08	1258.01	1257.94	1257.86	1257.79	1257.72	1257.65	1257.58	1257.51	1257.45	1257.38	1257.37	1257.31	1257.25	1257.18	1257.12	1257.06	1257.00	1256.95	1256.89	1256.84					

TOP OF SLAB ELEVATIONS - WESTBOUND

	PIER NO. 3 BEAM BEARINGS										PIER NO. 4 BM. BRGS.									
	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50				
N.GUTTERLINE	1254.46	1254.40	1254.35	1254.34	1254.29	1254.24	1254.19	1254.14	1254.10	1254.05	1254.01	1253.96	1253.92	1253.88	1253.84	1253.80				
BEAM LINE A	1254.55	1254.51	1254.46	1254.45	1254.39	1254.34	1254.28	1254.23	1254.18	1254.13	1254.09	1254.05	1254.01	1253.97	1253.94	1253.91				
BEAM LINE B	1254.96	1254.91	1254.87	1254.86	1254.80	1254.75	1254.69	1254.64	1254.59	1254.54	1254.50	1254.46	1254.42	1254.38	1254.35	1254.32				
BEAM LINE C	1255.37	1255.32	1255.28	1255.27	1255.21	1255.15	1255.10	1255.05	1255.00	1254.95	1254.91	1254.87	1254.83	1254.79	1254.76	1254.73				
WB APPR.RDWAY.	1255.69	1255.63	1255.58	1255.57	1255.52	1255.47	1255.42	1255.38	1255.33	1255.28	1255.24	1255.20	1255.15	1255.11	1255.07	1255.03				
BEAM LINE D	1255.78	1255.73	1255.69	1255.68	1255.62	1255.56	1255.51	1255.46	1255.41	1255.36	1255.32	1255.28	1255.24	1255.20	1255.17	1255.14				
BEAM LINE E	1256.19	1256.14	1256.10	1256.09	1256.03	1255.97	1255.92	1255.87	1255.82	1255.77	1255.73	1255.69	1255.65	1255.61	1255.58	1255.55				
BEAM LINE F	1256.60	1256.55	1256.50	1256.50	1256.44	1256.38	1256.33	1256.28	1256.23	1256.18	1256.14	1256.10	1256.06	1256.02	1255.99	1255.96				
S.GUTTERLINE	1256.69	1256.64	1256.59	1256.58	1256.53	1256.48	1256.43	1256.38	1256.34	1256.29	1256.25	1256.20	1256.16	1256.12	1256.08	1256.04				
S.EDGE OF SLAB	1256.78	1256.73	1256.68	1256.67	1256.62	1256.57	1256.52	1256.47	1256.43	1256.38	1256.34	1256.29	1256.25	1256.21	1256.17	1256.13				

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
SUPERSTRUCTURE DETAILS-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 40 OF 117 FILE NO. 30187 DESIGN NO. 410



LOCATIONS FOR TOP OF SLAB ELEVATIONS

*NOTE :
ELEVATION SPACINGS AND DIMENSIONS ARE ALONG BEAM LINES.



TOP OF SLAB ELEVATIONS - WESTBOUND

	PIER NO. 4 BM. BRGS.												PIER NO. 5 BEAM BEARINGS																PIER NO. 6 BEAM BEARINGS			
	LINE 51	LINE 52	LINE 53	LINE 54	LINE 55	LINE 56	LINE 57	LINE 58	LINE 59	LINE 60	LINE 61	LINE 62	LINE 63	LINE 64	LINE 65	LINE 66	LINE 67	LINE 68	LINE 69	LINE 70	LINE 71	LINE 72	LINE 73	LINE 74	LINE 75	LINE 76	LINE 77					
N.GUTTERLINE	1253.79	1253.76	1253.72	1253.68	1253.65	1253.62	1253.58	1253.55	1253.52	1253.49	1253.47	1253.44	1253.41	1253.41	1253.39	1253.36	1253.34	1253.32	1253.30	1253.28	1253.27	1253.25	1253.23	1253.22	1253.21	1253.20	1253.19					
BEAM LINE A	1253.90	1253.86	1253.82	1253.77	1253.74	1253.70	1253.67	1253.64	1253.61	1253.59	1253.56	1253.54	1253.53	1253.52	1253.49	1253.46	1253.43	1253.41	1253.39	1253.37	1253.35	1253.34	1253.33	1253.32	1253.31	1253.31	1253.31					
BEAM LINE B	1254.31	1254.27	1254.23	1254.18	1254.15	1254.11	1254.08	1254.05	1254.02	1254.00	1253.97	1253.95	1253.94	1253.93	1253.90	1253.87	1253.84	1253.82	1253.80	1253.78	1253.76	1253.75	1253.74	1253.73	1253.73	1253.72	1253.72					
BEAM LINE C	1254.72	1254.68	1254.64	1254.59	1254.56	1254.52	1254.49	1254.46	1254.43	1254.41	1254.38	1254.36	1254.35	1254.34	1254.31	1254.28	1254.25	1254.23	1254.21	1254.19	1254.17	1254.16	1254.15	1254.14	1254.13	1254.13	1254.12					
WB APPR.RDWY.	1255.03	1254.99	1254.95	1254.92	1254.88	1254.85	1254.82	1254.79	1254.76	1254.73	1254.70	1254.68	1254.65	1254.65	1254.62	1254.60	1254.58	1254.56	1254.54	1254.52	1254.50	1254.48	1254.47	1254.45	1254.44	1254.43	1254.43					
BEAM LINE D	1255.13	1255.09	1255.05	1255.00	1254.97	1254.93	1254.90	1254.87	1254.84	1254.82	1254.79	1254.77	1254.76	1254.75	1254.72	1254.69	1254.66	1254.64	1254.62	1254.60	1254.58	1254.57	1254.55	1254.55	1254.54	1254.54	1254.53					
BEAM LINE E	1255.54	1255.50	1255.46	1255.41	1255.38	1255.34	1255.31	1255.28	1255.25	1255.23	1255.20	1255.18	1255.17	1255.16	1255.13	1255.10	1255.07	1255.05	1255.03	1255.01	1254.99	1254.98	1254.96	1254.95	1254.95	1254.94	1254.94					
BEAM LINE F	1255.95	1255.91	1255.86	1255.82	1255.79	1255.75	1255.72	1255.69	1255.66	1255.64	1255.61	1255.59	1255.58	1255.57	1255.54	1255.51	1255.48	1255.46	1255.44	1255.42	1255.40	1255.38	1255.37	1255.36	1255.36	1255.35	1255.35					
S.GUTTERLINE	1256.04	1256.00	1255.96	1255.93	1255.89	1255.86	1255.83	1255.80	1255.77	1255.74	1255.71	1255.69	1255.66	1255.66	1255.63	1255.61	1255.59	1255.57	1255.55	1255.53	1255.51	1255.49	1255.48	1255.46	1255.45	1255.44	1255.44					
S.EDGE OF SLAB	1256.13	1256.09	1256.05	1256.02	1255.98	1255.95	1255.92	1255.89	1255.86	1255.83	1255.80	1255.77	1255.75	1255.75	1255.72	1255.70	1255.68	1255.66	1255.64	1255.62	1255.60	1255.58	1255.57	1255.55	1255.54	1255.53	1255.53					

TOP OF SLAB ELEVATIONS - WESTBOUND

											CL E.ABUT. BEARING
	LINE 78	LINE 79	LINE 80	LINE 81	LINE 82	LINE 83	LINE 84	LINE 85	LINE 86	LINE 87	
N.GUTTERLINE	1253.18	1253.17	1253.17	1253.16	1253.15	1253.15	1253.15	1253.14	1253.14	1253.14	
BEAM LINE A	1253.29	1253.28	1253.27	1253.26	1253.25	1253.25	1253.25	1253.25	1253.25	1253.26	
BEAM LINE B	1253.70	1253.69	1253.68	1253.67	1253.66	1253.66	1253.66	1253.66	1253.66	1253.66	
BEAM LINE C	1254.11	1254.10	1254.09	1254.08	1254.07	1254.07	1254.06	1254.06	1254.07	1254.07	
WB APPR.RDWY.	1254.42	1254.41	1254.40	1254.39	1254.39	1254.38	1254.38	1254.38	1254.37	1254.37	
BEAM LINE D	1254.52	1254.50	1254.49	1254.48	1254.48	1254.47	1254.47	1254.47	1254.47	1254.48	
BEAM LINE E	1254.93	1254.91	1254.90	1254.89	1254.88	1254.88	1254.88	1254.88	1254.88	1254.88	
BEAM LINE F	1255.33	1255.32	1255.31	1255.30	1255.29	1255.29	1255.29	1255.29	1255.29	1255.29	
S.GUTTERLINE	1255.43	1255.42	1255.41	1255.40	1255.40	1255.39	1255.39	1255.38	1255.38	1255.38	
S.EDGE OF SLAB	1255.52	1255.51	1255.50	1255.49	1255.49	1255.48	1255.48	1255.47	1255.47	1255.47	

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

SUPERSTRUCTURE DETAILS-WESTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 41 OF 117 FILE NO. 30187 DESIGN NO. 410

BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)																									
LOCATION	℄ W.ABUT. BRG.											PIER NO. 1 BEAM BEARINGS												PIER NO. 2 BEAM BEARINGS	
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25
BEAM LINE A	1256.19	1256.13	1256.06	1256.00	1255.92	1255.85	1255.77	1255.68	1255.59	1255.50	1255.40	1255.39	1255.35	1255.31	1255.26	1255.20	1255.14	1255.07	1254.99	1254.91	1254.82	1254.72	1254.62	1254.51	1254.50
BEAM LINE B	1256.58	1256.53	1256.46	1256.40	1256.32	1256.25	1256.17	1256.08	1255.99	1255.90	1255.80	1255.79	1255.75	1255.71	1255.66	1255.60	1255.54	1255.47	1255.40	1255.31	1255.23	1255.13	1255.03	1254.92	1254.91
BEAM LINE C	1256.98	1256.93	1256.86	1256.80	1256.72	1256.65	1256.57	1256.48	1256.40	1256.30	1256.20	1256.19	1256.15	1256.11	1256.06	1256.01	1255.94	1255.88	1255.80	1255.72	1255.63	1255.54	1255.43	1255.32	1255.31
BEAM LINE D	1257.38	1257.32	1257.26	1257.20	1257.13	1257.05	1256.97	1256.89	1256.80	1256.70	1256.61	1256.59	1256.56	1256.52	1256.47	1256.41	1256.35	1256.28	1256.21	1256.12	1256.04	1255.94	1255.84	1255.73	1255.72
BEAM LINE E	1257.78	1257.72	1257.66	1257.60	1257.53	1257.45	1257.37	1257.29	1257.20	1257.11	1257.01	1257.00	1256.96	1256.92	1256.87	1256.82	1256.75	1256.69	1256.61	1256.53	1256.44	1256.35	1256.24	1256.14	1256.13
BEAM LINE F	1258.18	1258.12	1258.06	1258.00	1257.93	1257.85	1257.77	1257.69	1257.60	1257.51	1257.41	1257.40	1257.36	1257.32	1257.27	1257.22	1257.16	1257.09	1257.01	1256.93	1256.85	1256.75	1256.65	1256.54	1256.53

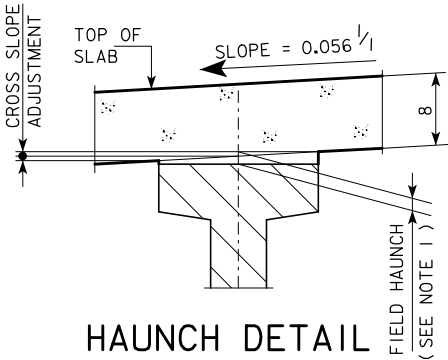
BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)																																
LOCATION												PIER NO. 3 BEAM BEARINGS																				PIER NO. 4 BM. BRGS.
	LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50							
BEAM LINE A	1254.48	1254.45	1254.41	1254.37	1254.32	1254.27	1254.20	1254.14	1254.06	1253.98	1253.89	1253.79	1253.79	1253.78	1253.76	1253.74	1253.71	1253.67	1253.63	1253.58	1253.53	1253.47	1253.40	1253.32	1253.24							
BEAM LINE B	1254.89	1254.86	1254.82	1254.78	1254.73	1254.67	1254.61	1254.54	1254.47	1254.39	1254.30	1254.20	1254.19	1254.19	1254.17	1254.15	1254.12	1254.08	1254.04	1253.99	1253.94	1253.88	1253.81	1253.73	1253.65							
BEAM LINE C	1255.29	1255.26	1255.23	1255.19	1255.14	1255.08	1255.02	1254.95	1254.88	1254.80	1254.71	1254.61	1254.60	1254.59	1254.58	1254.56	1254.53	1254.49	1254.45	1254.40	1254.35	1254.29	1254.22	1254.14	1254.06							
BEAM LINE D	1255.70	1255.67	1255.63	1255.59	1255.54	1255.49	1255.43	1255.36	1255.28	1255.20	1255.11	1255.02	1255.01	1255.00	1254.99	1254.97	1254.94	1254.90	1254.86	1254.81	1254.76	1254.70	1254.63	1254.55	1254.47							
BEAM LINE E	1256.10	1256.08	1256.04	1256.00	1255.95	1255.90	1255.84	1255.77	1255.69	1255.61	1255.52	1255.43	1255.42	1255.41	1255.40	1255.38	1255.35	1255.31	1255.27	1255.22	1255.17	1255.11	1255.04	1254.96	1254.88							
BEAM LINE F	1256.51	1256.48	1256.45	1256.41	1256.36	1256.30	1256.24	1256.18	1256.10	1256.02	1255.93	1255.84	1255.83	1255.82	1255.81	1255.78	1255.76	1255.72	1255.68	1255.63	1255.58	1255.52	1255.45	1255.37	1255.29							

MISCELLANEOUS DATA TABLE

	BEAM LINE		℄ W.ABUT. BRG.									PIER NO. 1 BEAM BEARINGS												PIER NO. 2 BEAM BEARINGS			
			LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{15}{16}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	0	0	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0	0
CROSS SLOPE ADJUSTMENTS (IN)	ALL		$\pm \frac{9}{16}$																								
ALLOWABLE FIELD HAUNCH AT ℄ BEAM (in.)	MAX.	ALL	2								3		4		3		2				3		4				
	MIN.	ALL	$\frac{1}{16}$								1		2		1		$\frac{1}{16}$				1		2				

MISCELLANEOUS DATA TABLE

	BEAM LINE													PIER NO. 3 BEAM BEARINGS														PIER NO. 4 BM. BRGS.
			LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50	
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0	0	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0	
CROSS SLOPE ADJUSTMENTS (IN)	ALL		$\pm \frac{9}{16}$																									
ALLOWABLE FIELD HAUNCH AT C BEAM (in.)	MAX.	ALL	4	3		2					3		4			3		2				3		4				
	MIN.	ALL	2	1		$\frac{1}{16}$					1		2			1		$\frac{1}{16}$				1		2				



HAUNCH DETAIL

NOTE:
BRIDGE SEAT ELEVATIONS ARE SET BASED ON THEORETICAL CAMBER AND BEAM DEFLECTIONS. THESE BRIDGE SEATS WILL PROVIDE A THEORETICAL BEAM HAUNCH WITHIN DESIGN PARAMETERS. ACTUAL HAUNCHES ARE DETERMINED USING SURVEYED TOP OF BEAM ELEVATIONS AND "BEAM LINE HAUNCH ELEVATION" DATA. ALLOWABLE MAXIMUM AND MINIMUM "FIELD HAUNCH" VALUES ARE GIVEN IN THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES FROM THE "MISCELLANEOUS DATA" TABLE WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE.

NOTE 1 :
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACINGS SHOWN ON THE "LOCATIONS FOR TOP OF SLAB ELEVATIONS" ON DESIGN SHEET 40. SUBTRACT THE SURVEYED BEAM SHOT FROM THE "BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE "FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES ADJUSTMENTS FOR SLAB THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS INDICATED IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

NOTE :
HAUNCH LOCATIONS ARE AT THE SAME LOCATIONS AS THE BEAM LINES AND ENCIRCLED NUMBERS SHOWN ON DESIGN SHEET 40.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
HAUNCH DATA DETAILS-WESTBOUND
STATION : 893+14.13 (℄ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 42 OF 117 FILE NO. 30187 DESIGN NO. 410

BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)

MISCELLANEOUS DATA TABLE

MISCELLANEOUS DATA TABLE

Diagram illustrating a haunch detail. The cross-slope adjustment is indicated by a vertical arrow labeled "CROSS-SLOPE ADJUSTMENT". The top of the slab is labeled "TOP OF SLAB". The slope is indicated by a line with a slope of $0.056 \frac{1}{1}$. The haunch is shown with a vertical dimension of 8. The field haunch is indicated by a vertical arrow labeled "FIELD HAUNCH (SEE NOTE 1)".

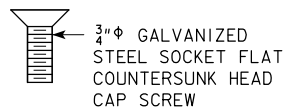
NOTE 1 :
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS
CONSISTENT WITH THE SPACINGS SHOWN ON THE "LOCATIONS FOR TOP OF SLAB
ELEVATIONS" ON DESIGN SHEET 4I. SUBTRACT THE SURVEYED BEAM SHOT FROM THE
"BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE
"FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES
ADJUSTMENTS FOR SLAB THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL
CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND
MINIMUMS INDICATED IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE
OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0¹/₂ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
HAUNCH DATA DETAILS-WESTBOUND
STATION : 893+14.13 (@ RELOCATED U.S. 20) AUGUST, 2010

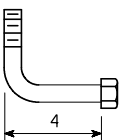
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HEX HEAD
REQUIRED

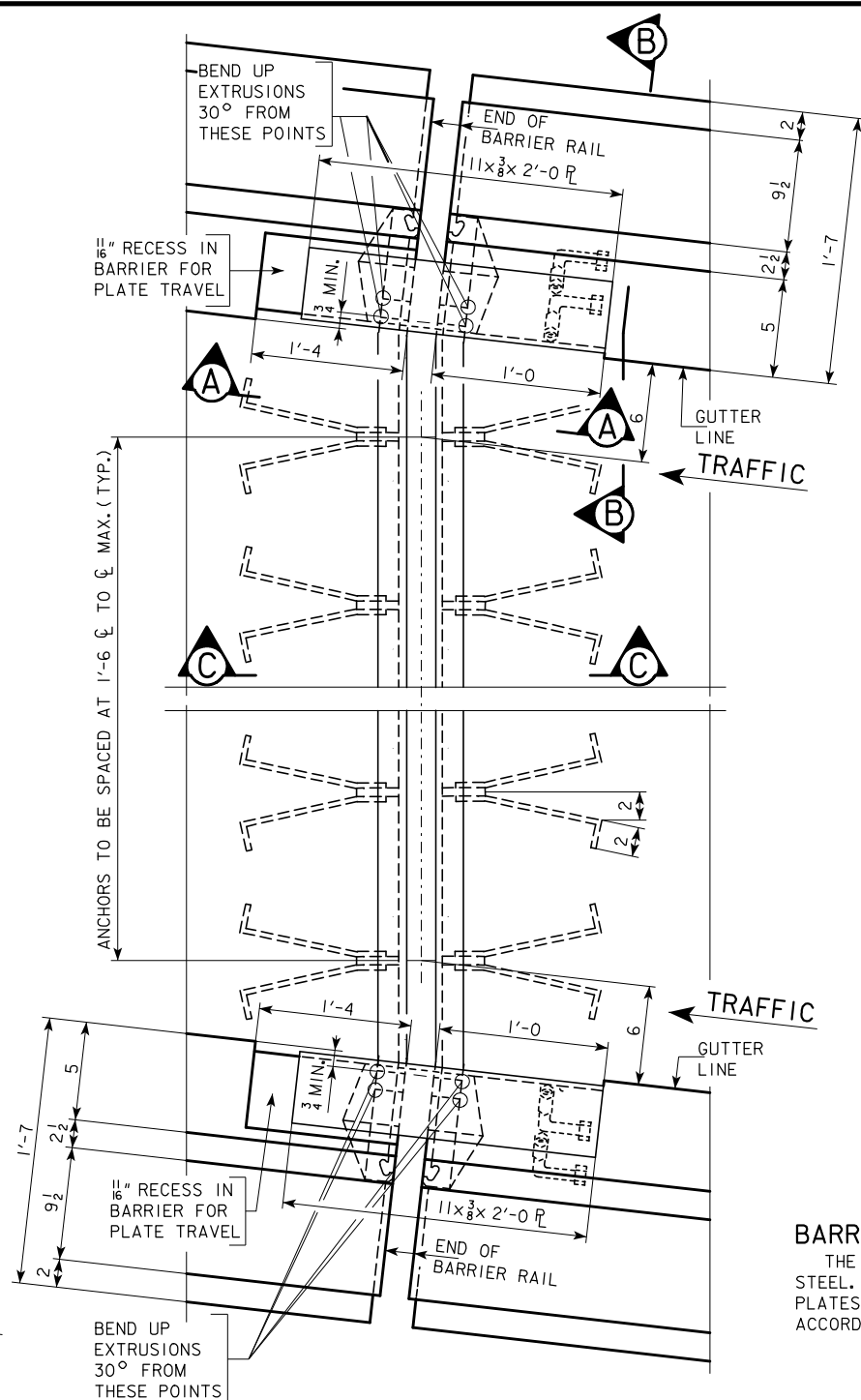
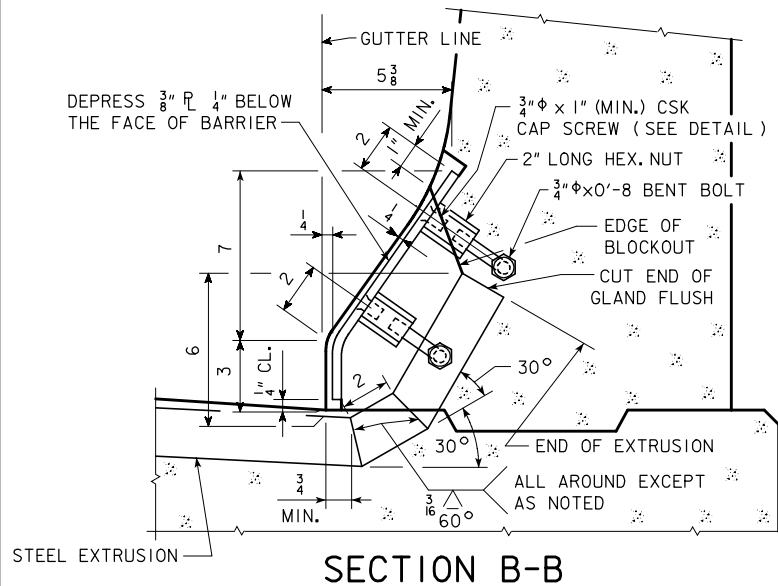


SOCKET FLAT
COUNTERSUNK
HEAD CAP
SCREW DETAIL



BENT BOLT DETAIL

NOTE: IT IS INTENDED THAT THE $\frac{11}{16}$ INCH RECESSED AREA BE FORMED SO THAT WHEN THE $\frac{3}{8}$ " BENT PLATE IS INSTALLED THE PLATE WILL BE ABLE TO MOVE FREELY IN THIS RECESSED AREA.



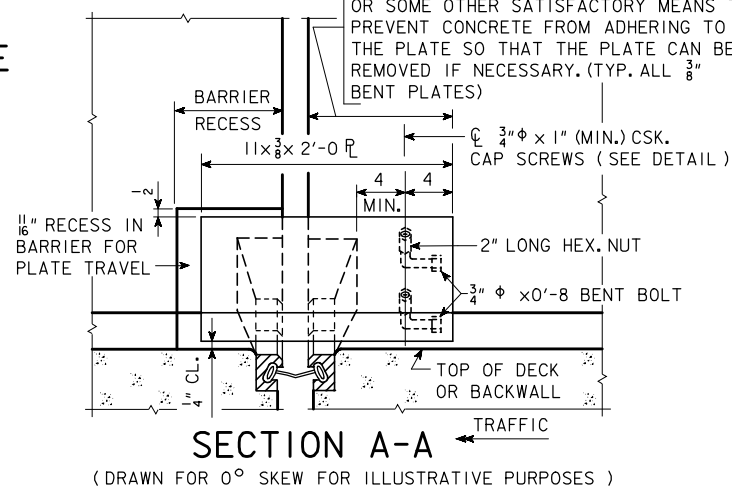
PART PLAN VIEW OF EXPANSION DEVICE

CONTRACTOR TO NOTE THAT THE CAP SCREW ANCHORAGE SYSTEM FOR THE $\frac{3}{8}$ " BARRIER PLATES ARE ALWAYS TO BE PLACED ON THE ONCOMING TRAFFIC SIDE.

BARRIER PLATE NOTE:

THE MATERIAL USED FOR THE BARRIER PLATES IS TO BE ASTM A-36 STEEL. THE BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A-307. THE PLATES, BOLTS, NUTS AND CAP SCREWS ARE TO BE GALVANIZED IN ACCORDANCE WITH ARTICLE 4100.07 OF THE STANDARD SPECIFICATIONS.

THIS PORTION OF THE $\frac{3}{8}$ " BENT PLATE IS TO BE PAINTED WITH A COLORLESS OIL, OR SOME OTHER SATISFACTORY MEANS TO PREVENT CONCRETE FROM ADHERING TO THE PLATE SO THAT THE PLATE CAN BE REMOVED IF NECESSARY. (TYP. ALL $\frac{3}{8}$ " BENT PLATES)

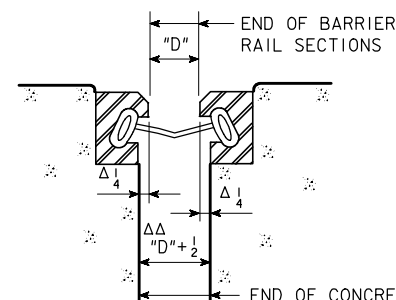


NOTE:
THE STRIP SEAL GLANDS SHALL BE INSTALLED
WHEN THE DECK TEMPERATURE IS 70° F. OR BELOW.

NOTE:
SEE DESIGN SHEET 46 FOR EXPANSION DEVICE
NOTES CONTAINING THE STEEL EXTRUSION NOTES,
NEOPRENE GLAND NOTES, AND WATERTIGHT INTEGRITY
TESTING AND REPAIR NOTES.

NOTE: JOINT SETTINGS FOR OTHER TEMPERATURES ARE PROPORTIONAL. TEMPERATURES SHOWN ARE CONCRETE DECK TEMPERATURES ON THE UNDERSIDE OR SHADED PORTION OF THE DECK.

EXPANSION JOINT SETTINGS	1 $\frac{7}{16}$ AT 90° F.
	2 AT 70° F.
	2 $\frac{1}{2}$ AT 50° F.
	3 $\frac{9}{16}$ AT 10° F.



EXPANSION OPENING DETAIL

^ΔTHIS DIMENSION MAY VARY SLIGHTLY DEPENDING ON MANUFACTURER FURNISHING THE JOINT.

ΔΔ USED FOR ALL OUT TO OUT DIMENSIONS OF SLAB.
THE DIMENSION MAY VARY SLIGHTLY DEPENDING ON
MANUFACTURER FURNISHING THE JOINT.

SECTION C-C

TABLE OF APPROVED EXPANSION DEVICES		
MANUFACTURER	TYPE OF STEEL EXTRUSION	NEOPRENE GLAND
WATSON-BOWMAN & ACME CORP.	A	SE-500
DS BROWN CO.	SS A2	AR2-XTRA
APPROVED EQUAL		

NOTE: JOINT SETTINGS ARE BASED ON SIZE OF 5" GLAND. IF LARGER NEOPRENE GLAND IS USED, MAINTAIN JOINT SETTINGS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0₂' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

EXPANSION DEVICE DETAILS-WESTBOUND

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 45 OF 117 FILE NO. 30187 DESIGN NO. 410

ENGLISHDECKRAILBRIDGES.DGN - 1026s2 - THIS SHEET ISSUED 11-08.

STEEL EXTRUSION NOTES:

THE CONTRACTOR SHALL SUBMIT FOR APPROVAL SHOP DRAWINGS OF THE EXPANSION DEVICES SHOWING LAYOUT, MATERIAL TO BE USED, AND PROVISIONS FOR HOLDING DEVICE DURING PLACEMENT OF CONCRETE.

THE EXPANSION DEVICE SHALL BE GALVANIZED AFTER WELDING.

THE EXPANSION DEVICE IS TO BE PARALLEL TO GRADE.

CAP SCREWS SHALL BE COUNTERSUNK $\frac{1}{16}$ " BELOW TOP OF THE PLATE.

THE MINIMUM GRADE OF STRUCTURAL STEEL FOR THE EXPANSION DEVICE SHALL BE ASTM A-36.

BLOCKOUT DETAILS MAY BE ALTERED FROM THOSE SHOWN PROVIDED THE GLAND MAY BE INSTALLED AND REMOVED IF NECESSARY AND THE CURB AREA REMAINS WATERTIGHT.

SHOP AND OR FIELD SPLICES OF THE STEEL EXTRUSION WILL BE PERMITTED. FIELD SPLICES OF THE STEEL EXTRUSION SHALL BE MADE AT THE STAGING JOINTS IF CONSTRUCTION IS STAGED. FIELD WELDS ON GALVANIZED ITEMS SHALL BE COATED WITH A ZINC RICH MATERIAL APPROVED BY THE ENGINEER. PIECES OF STEEL EXTRUSION IN THE 15 FT. TO 22 FT. RANGE SHALL BE USED TO FORM THE REQUIRED GUTTER TO GUTTER LENGTH. THE INDIVIDUAL LENGTH OF PIECES SHALL BE CHOSEN SO THAT A MINIMUM NUMBER OF SPLICES IS REQUIRED. ALL PIECES SHALL BE JOINED WITH A PREQUALIFIED PARTIAL PENETRATION SINGLE GROOVE WELD, AND ALL SURFACES NOT IN CONTACT WITH CONCRETE ARE TO BE GROUND FLUSH. NO WELD SHALL BE PERMITTED IN THE INTERNAL SECTION OF THE EXTRUSION WHERE THE NEOPRENE GLAND IS TO BE LOCATED.

THE NUMBER OF FEET OF STEEL EXTRUSION INSTALLED SHALL BE PAID FOR AT THE CONTRACT PRICE PER FOOT BASED ON PLAN QUANTITIES. THE PRICE BID FOR "STEEL EXTRUSION JOINT W/NEOPRENE" SHALL INCLUDE THE COST OF FURNISHING BUT NOT THE COST OF INSTALLING THE NEOPRENE GLAND. THE CONTRACT PRICE BID FOR "STEEL EXTRUSION JOINT W/NEOPRENE" SHALL BE FULL COMPENSATION FOR FURNISHING AND INSTALLING STEEL EXTRUSIONS. THIS WORK WILL CONSIST OF FURNISHING ALL REQUIRED MATERIALS, (INCLUDING THE $\frac{3}{8}$ " PLATES AT THE CURBS AND THEIR ANCHORAGE SYSTEMS), AND THE INSTALLATION AND ADJUSTMENT OF THE EXPANSION JOINTS IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER. THE FURNISHING AND INSTALLATION OF ALL NECESSARY HARDWARE AND ACCESSORIES AS SUPPLIED BY THE EXPANSION JOINT MANUFACTURER ARE TO BE INCLUDED IN THIS WORK, INCLUDING THE ANCHORAGE SYSTEM AND ANY TEMPORARY ERECTION MATERIAL. ALL WORK AND MATERIALS FOR THE INSTALLATION OF THE EXPANSION JOINTS ARE TO COMPLY WITH THE WRITTEN RECOMMENDATIONS OF THE EXPANSION JOINT MANUFACTURER.

NEOPRENE GLAND NOTES:

THE NEOPRENE GLAND IS TO BE PLACED AS ONE CONTINUOUS PIECE FROM END TO END OF THE STEEL EXTRUSION.

THE NEOPRENE GLAND SHALL CONFORM TO ASTM-2628 MODIFIED TO EXCLUDE RECOVER TEST AND COMPRESSION SET.

THE CONTRACTOR SHALL INSTALL THE GLAND ONLY WHEN THE DECK TEMPERATURE IS BETWEEN 40°F AND MAXIMUM INSTALLATION TEMPERATURE SHOWN IN THESE PLANS INCLUSIVE. THE DECK TEMPERATURE SHALL BE MEASURED BY RECORDING THE SURFACE TEMPERATURES ON THE UNDERSIDE OF THE DECK ADJACENT TO THE JOINTS. IF THE DECK TEMPERATURE DOES NOT FALL WITHIN THE SPECIFIED TEMPERATURE RANGE BEFORE THE CONTRACTOR HAS COMPLETED ALL OTHER REQUIRED WORK, IT WILL BE NECESSARY FOR THE CONTRACTOR TO RETURN TO THE PROJECT SITE TO COMPLETE INSTALLATION AND TESTING OF THE NEOPRENE GLAND. IF THE CONTRACTOR IS REQUIRED TO RETURN TO THE PROJECT SITE AFTER ALL OTHER REQUIRED WORK HAS BEEN COMPLETED, THE CONTRACTOR SHALL COMPLETE INSTALLATION AND TESTING OF NEOPRENE GLAND AT NO EXTRA CHARGE TO THE STATE.

THE NUMBER OF FEET OF NEOPRENE GLAND INSTALLED SHALL BE PAID FOR AT THE CONTRACT PRICE PER FOOT BASED ON PLAN QUANTITIES. THE PRICE FOR "NEOPRENE GLAND INSTALLATION AND TESTING" SHALL BE FULL COMPENSATION FOR INSTALLING AND TESTING OF THE NEW NEOPRENE GLAND. THIS WORK WILL CONSIST OF CLEANING THE EXTRUSION, INSTALLATION OF THE NEOPRENE GLAND AND WATER TIGHT TESTING OF THE EXPANSION JOINT SYSTEM. ALL WORK AND MATERIALS NECESSARY FOR THE INSTALLATION OF THE NEOPRENE GLAND SHALL COMPLY WITH THE RECOMMENDATIONS OF THE EXPANSION JOINT MANUFACTURER. THE PRICE BID FOR "NEOPRENE GLAND INSTALLATION AND TESTING" SHALL INCLUDE ALL WATERTIGHT INTEGRITY TESTING, LEAK REPAIRS AS DIRECTED BY THE ENGINEER, AND SUBSEQUENT WATERTIGHT TESTING UNTIL A LEAK FREE INSTALLATION IS ACHIEVED.

WATERTIGHT INTEGRITY TESTING AND REPAIR NOTES:

AFTER INSTALLATION OF EACH NEOPRENE GLAND, THE CONTRACTOR SHALL PERFORM WATERTIGHT INTEGRITY TESTS AT THE DECK LEVEL TO DETECT ANY LEAKAGE. THE TESTS ARE TO CHECK FOR LEAKAGE AT THE UPTURNED ENDS OF THE EXPANSION DEVICE AND FOR LEAKAGE ALONG THE EXPANSION DEVICE ACROSS THE DECK AND ANY MEDIANS OR SIDEWALKS. THE CONTRACTOR MAY CONDUCT A SINGLE TEST OF THE ENTIRE DEVICE INCLUDING UPTURNED ENDS OR MAY CONDUCT SEPARATE TESTS OF UPTURNED ENDS AND ONE OR MORE TESTS OF OVERLAPPING LENGTHS BETWEEN THE UPTURNED ENDS.

AT EACH UPTURNED END OF THE EXPANSION DEVICE, THE CONTRACTOR SHALL BLOCK OUT ON THE DECK AT LEAST 3 FEET OF THE EXPANSION DEVICE LEADING TO THE UPTURNED END AND FLOOD THE AREA. A MINIMUM WATER DEPTH OF 3" SHALL BE MAINTAINED AT THE GUTTERLINE FOR AT LEAST 30 MINUTES. DURING THE TEST, THE INSPECTOR SHALL OBSERVE FOR ANY OVERFLOW AT THE UPTURNED END. AT THE CONCLUSION OF THE TEST THE INSPECTOR WILL EXAMINE THE UNDERSIDE OF THE JOINT FOR LEAKAGE. THE EXPANSION DEVICE IS CONSIDERED WATERTIGHT IF THE INSPECTOR OBSERVES NO OVERFLOW DURING THE TEST AND IF NO DRIPPING WATER OR WATER DROPLETS ARE VISIBLE IN THE UNDERDECK AREAS NEAR THE UPTURNED END.

THE CONTRACTOR SHALL TEST THE EXPANSION DEVICE BETWEEN UPTURNED ENDS BY BLOCKING OUT AND COVERING THE DEVICE WITH PONDED OR FLOWING WATER TO A DEPTH OF AT LEAST 1" AT ALL POINTS, FOR AT LEAST 30 MINUTES. VERTICAL CURB SURFACES MAY BE TESTED WITH AN UNNOZZLED HOSE DELIVERING APPROXIMATELY ONE GALLON PER MINUTE DIRECTED TO FLOW OVER THE ENTIRE CURB HEIGHT FOR 30 MINUTES. AT THE CONCLUSION OF THE TEST, THE INSPECTOR WILL EXAMINE THE UNDERSIDE OF THE JOINT FOR LEAKAGE. THE EXPANSION DEVICE IS CONSIDERED WATERTIGHT IF NO DRIPPING WATER OR WATER DROPLETS ARE VISIBLE IN THE UNDERDECK AREAS ALONG THE FULL LENGTH OF THE EXPANSION JOINT. DAMP CONCRETE THAT DOES NOT SHOW DRIPPING WATER OR WATER DROPLETS IS NOT CONSIDERED A SIGN OF LEAKAGE.

IF THE EXPANSION DEVICE LEAKS AT AN UPTURNED END OR ALONG ITS LENGTH, THE CONTRACTOR SHALL LOCATE THE LEAK(S) AND TAKE REPAIR MEASURES TO STOP THE LEAKAGE. THE REPAIR MEASURES SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER PRIOR TO BEGINNING CORRECTIVE WORK.

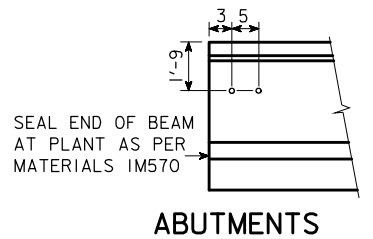
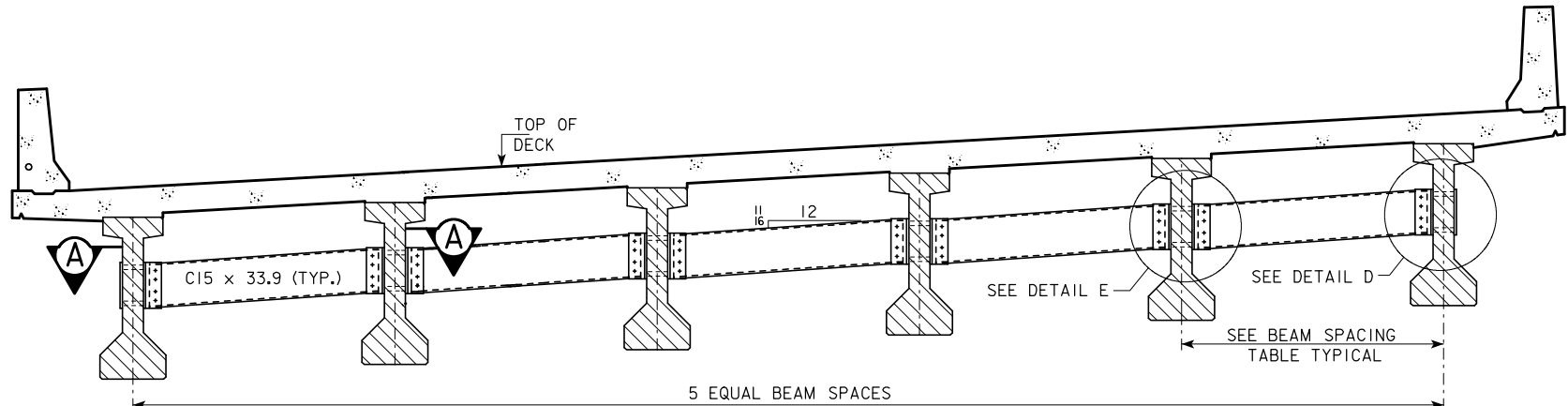
IF MEASURES TO ELIMINATE LEAKAGE ARE TAKEN, THE CONTRACTOR SHALL PERFORM SUBSEQUENT WATERTIGHT INTEGRITY TESTS SUBJECT TO THE SAME CONDITIONS AS THE ORIGINAL TEST.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
EXPANSION DEVICE NOTES-WESTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 46 OF 117 FILE NO. 30187 DESIGN NO. 410

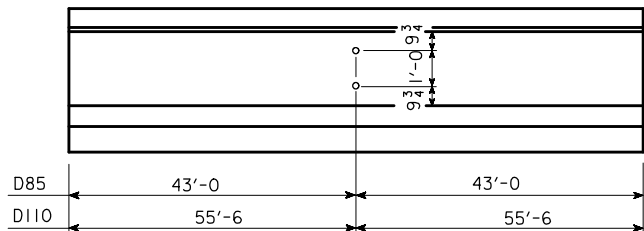
DESIGN TEAM	KBK/JTN/RAR/MSF	F-SHAPE EXPANSION DEVICE DETAILS STEEL EXTRUSION WITH NEOPRENE GLAND (2 OF 2)	STANDARD SHEET 1026s2	SAC COUNTY	PROJECT NUMBER NHSX-020-2 (84)--3H-81	SHEET NUMBER 47
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CORRECTION 01-08 - H.T.S. BOLT LABELS CHANGED TO H.S.. HEX NUTS CHANGED TO HEAVY HEX NUTS.
ENGLISH BEAMS.DGN 1036 - THIS SHEET ISSUED 9-8-88



PIERS
BEAM COIL TIE LOCATIONS

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.

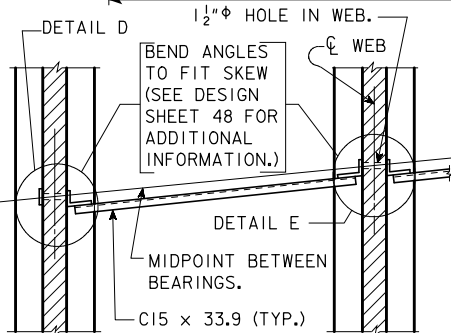


INTERMEDIATE DIAPHRAGM
BOLT LOCATIONS

NOTE :
SEE DESIGN SHEET 48 FOR
ADDITIONAL INTERMEDIATE
DIAPHRAGM DETAILS.

SECTION SHOWING INTERMEDIATE DIAPHRAGM

BEAM SPACING TABLE	
SPACING	SPAN
7'-3 5/16 (-)	SPAN 1
7'-3 1/2 (+)	SPAN 2
7'-3 11/16	SPAN 3
7'-3 3/4 (-)	SPAN 4
7'-3 11/16	SPAN 5
7'-3 1/2 (+)	SPAN 6
7'-3 5/16 (-)	SPAN 7



SECTION A-A

INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE CONNECTION DETAIL "E"				WEIGHT
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "E"	NUMBER OF DETAIL "E"	
7"	10"	4.66 LB	28	131
2 - L 6 x 4 x 1/2 x 1'-3 1/4 = 41.2 LB				28
28				1154
ONE CONNECTION DETAIL "D"				WEIGHT
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "D"	NUMBER OF DETAIL "D"	
7"	10"	4.66 LB	14	65
1 - BACKING PL 4 x 3/8 x 1'-3 1/4 = 6.5 LB				14
1 - L 6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LB				14
289				289

C15 x 33.9 DIAPHRAGMS

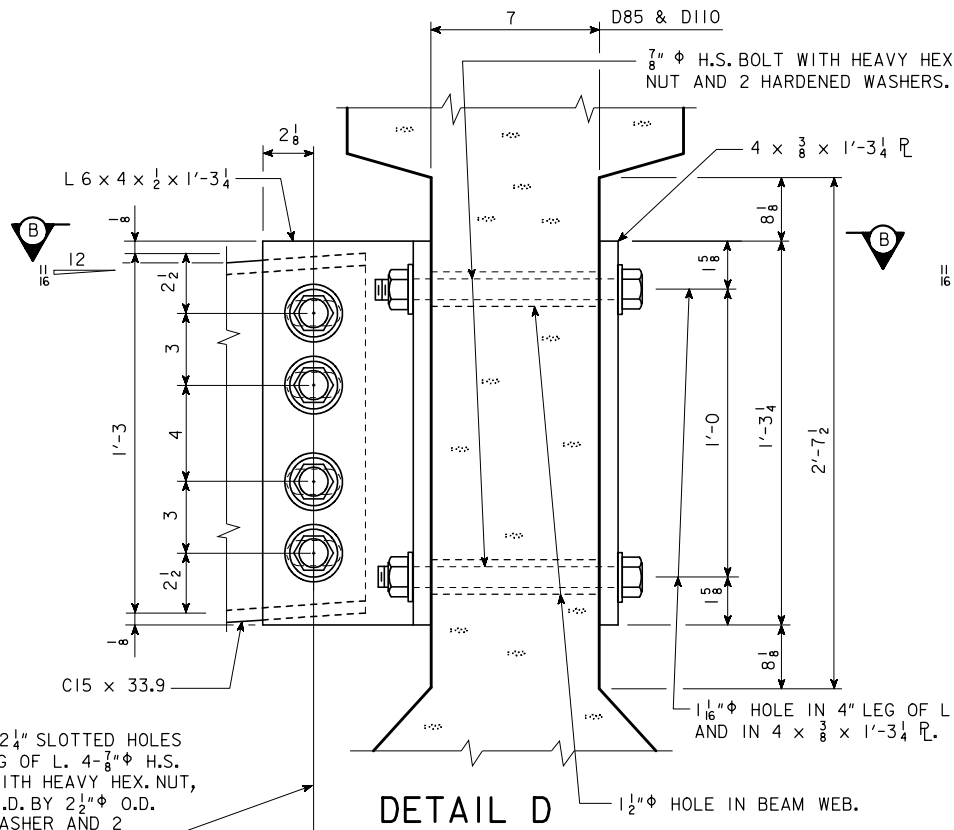
LOCATION	BEAM SPACING	DIAPHRAGM LENGTH *		
SPAN 1 & 7	7'-3 5/16 (-)	6'-4 15/16	10	2175
SPAN 2 & 6	7'-3 1/2 (+)	6'-4 15/16	10	2175
SPAN 3 & 5	7'-3 11/16	6'-4 15/16	10	2175
SPAN 4	7'-3 3/4 (-)	6'-4 15/16	5	1088

* THE LENGTH OF THE C15 X 33.9 DIAPHRAGMS SHOWN IS THE SLOPED DISTANCE BETWEEN BEAMS. THE ENDS OF THE DIAPHRAGMS ARE TO BE VERTICAL.

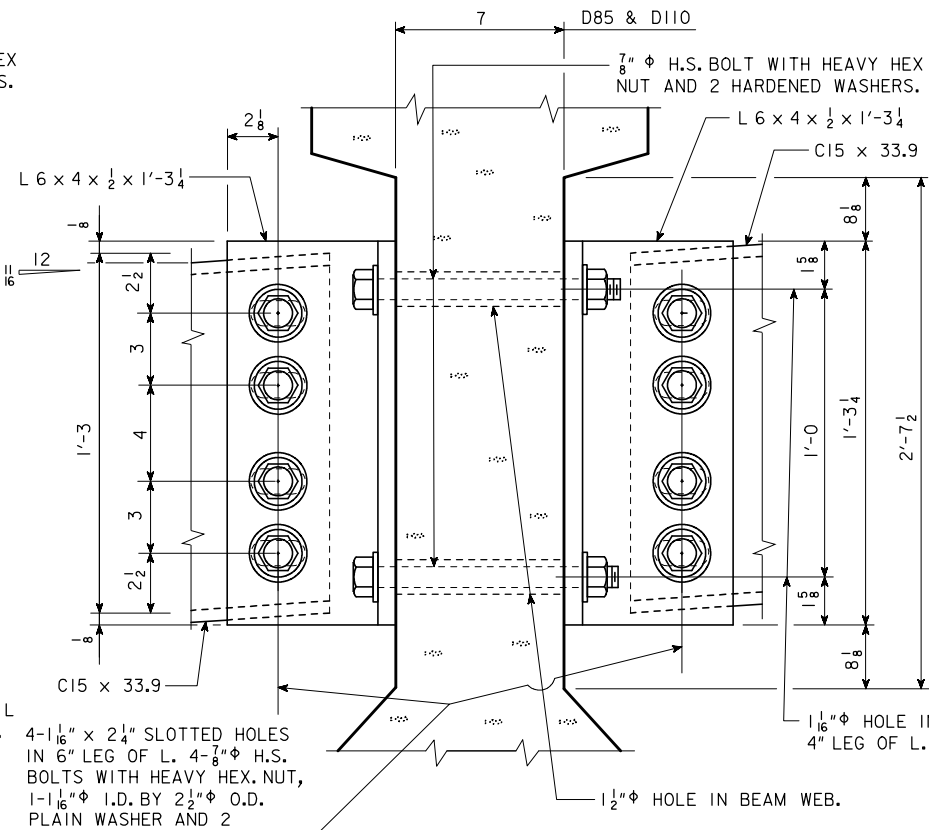
DIAPHRAGM CONNECTION
BOLTS

8 - 7/8" ϕ x 0'-2 3/4 H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM	NUMBER OF DIAPHRAGMS	
10.3 LB	35	361

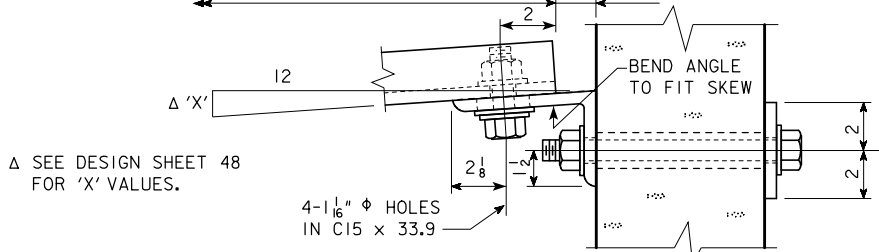
WESTBOUND BRIDGE - INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL (TOTAL LB) = 9704



DETAIL D



DETAIL E

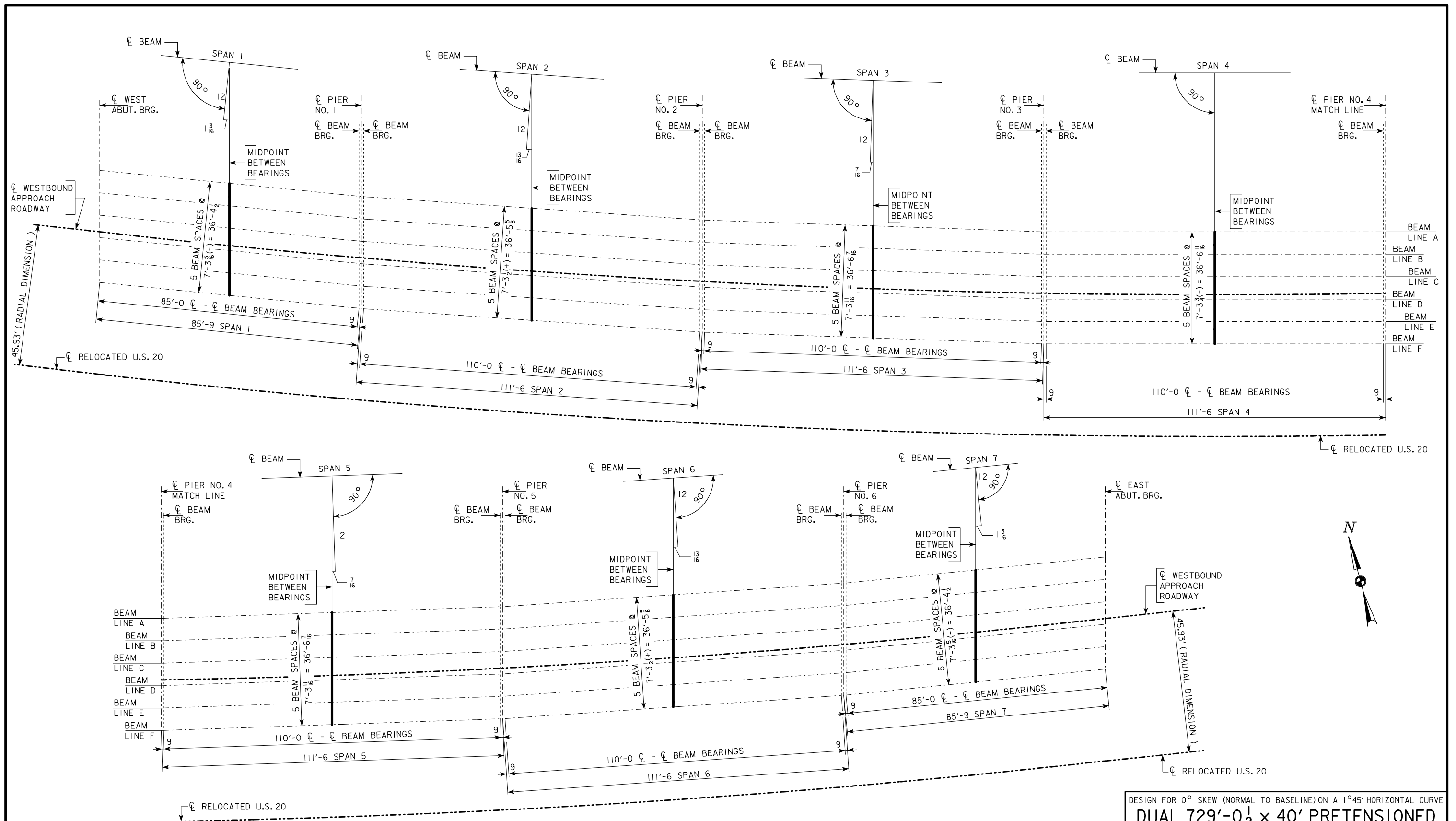


SECTION B-B

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
INTERMEDIATE DIAPHRAGM DETAILS
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 47 OF 117 FILE NO. 30187 DESIGN NO. 410



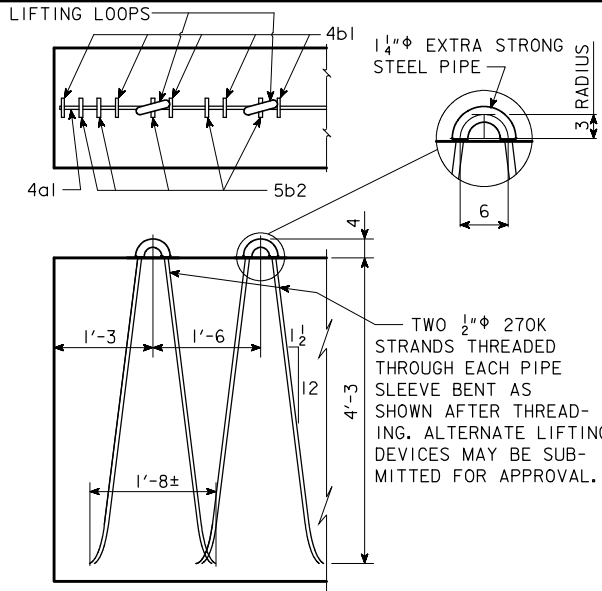
INTERMEDIATE DIAPHRAGM LAYOUT

NOTE :
SEE DESIGN SHEET 47 FOR ADDITIONAL INTERMEDIATE
DIAPHRAGM DETAILS.
SEE DESIGN SHEETS 31 & 32 FOR ADDITIONAL BEAM
LAYOUT INFORMATION.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
INTERMEDIATE DIAPHRAGM LAYOUT-WB
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

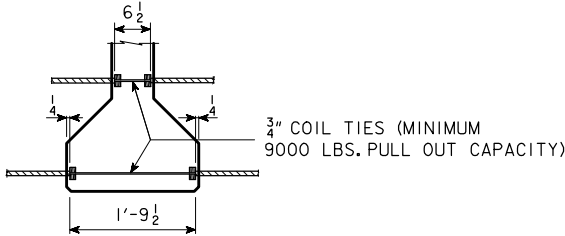
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 48 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 08-09 - SPECIFICATION REFERENCE NUMBER CHANGED, DESIGN STRESSES & SPECIFICATIONS SERIES CHANGED TO 2007. D45 BEAM NUMBER OF STRANDS CHANGED. ENGLISHBEAMS.DGN - 4630 - LRFD - THIS SHEET RE-ISSUED 09-06.



LIFTING LOOP DETAIL

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



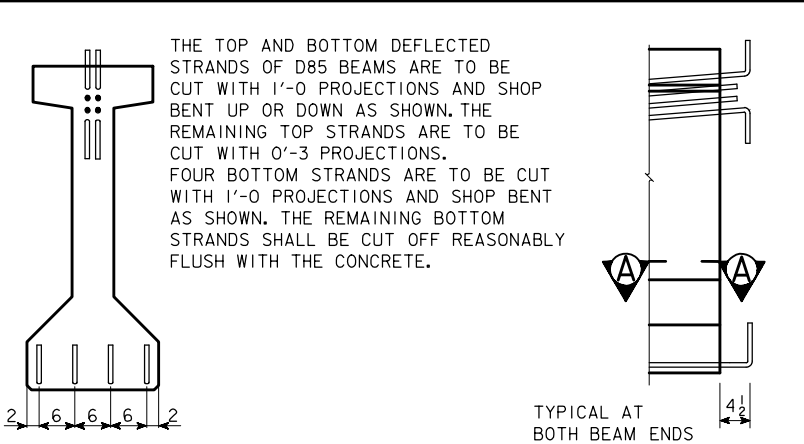
COIL TIE DETAIL

SPECIFICATIONS:

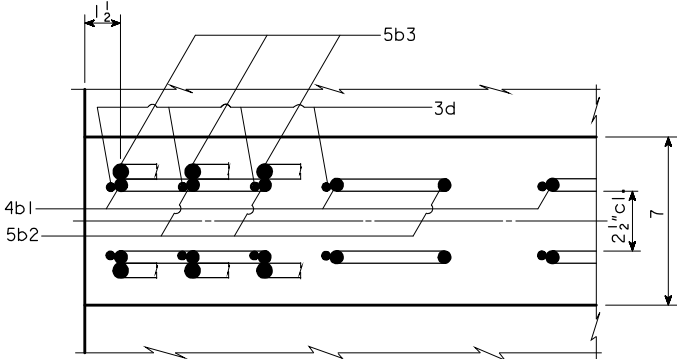
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.

ΔΔ BARS TO BE EPOXY COATED



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

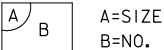


SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM

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, f'c = 5000 psi. (EXCEPT AS NOTED).
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f's = 270,000 psi.



REINFORCING BAR LIST

BEAM	SPAN	D35	D40	D45	D50	D55	D60	D65	D70	D75	D80	D85	D90	D95	D100	D105
BAR	SHAPE											NO.	LENGTH			
4a1	—											2	16'-0			
a2	—											5/4	29'-4			
a3	—											6/2	32'-0			
ΔΔ4b1	—											42	10'-4			
ΔΔ4b2	—											11	10'-6			
ΔΔ4b3	—											15	10'-8			
5b2	—											16	8'-8			
5b3	—											12	4'-4			
3c	—											68	2'-1			
3d	—											84	5'-7			
3e	—											30	2'-3			

D BEAM DATA

BEAM	SPAN LENGTH ℄-℄ 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		PERMISSIBLE SPACING			WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL - (lbs.)
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE ^① (ELASTIC) Δ _E	TIME ^② (PLASTIC) Δ _T						
															STEEL DIAPH.		
D35																	
D40																	
D45																	
D50																	
D55																	
D60																	
D65																	
D70																	
D75																	
D80																	
D85	85'-0	86'-0	0.60	14	6	851	27.3	1.27	2.24	0.87	0.22		7'-6	28.6	14.1	1166	
D90																	
D95																	
*D100																	
*D105																	

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 760 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (3191 #) OR ONE STEEL DIAPHRAGM (285 #) AT ℄ 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 ℄ OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:

(A) Δ_D = Δ_E + Δ_T FOR SIMPLE SPAN.
(B) Δ_D = Δ_E + 3/4 Δ_T FOR END SPANS OF CONTINUOUS BRIDGE.
(C) Δ_D = Δ_E + 1/2 Δ_T FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

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

* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 7500 psi. MINIMUM f'ci AT RELEASE SHALL BE 6000 psi.

NOTES: (CONTINUED)

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.

IF STUB ABUTMENTS ARE USED, ALL STRANDS AT THE ENDS OF BEAMS AT STUB ABUTMENTS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

WHEN EXPANSION JOINTS ARE USED, CONCRETE SEALER SHALL BE APPLIED TO THE PRESTRESSED BEAM END SECTIONS. THE SEALING SHALL BE IN ACCORDANCE WITH MATERIALS I.M. 570 AND 491.12.

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.

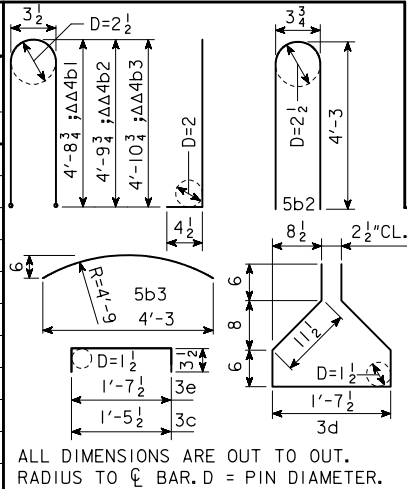
BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

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 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.

FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ARTICLE 2407.03, K, OF THE STANDARD SPECIFICATIONS, EXCEPT THE OVERHANG MAY BE INCREASED TO A MAXIMUM OF 8 FEET FOR THE D85 BEAM.

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.



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

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

BEAM DETAILS

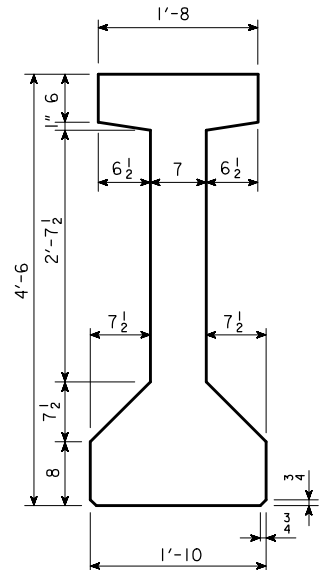
STATION : 893+14.13 (℄ RELOCATED U.S. 20)

AUGUST, 2010

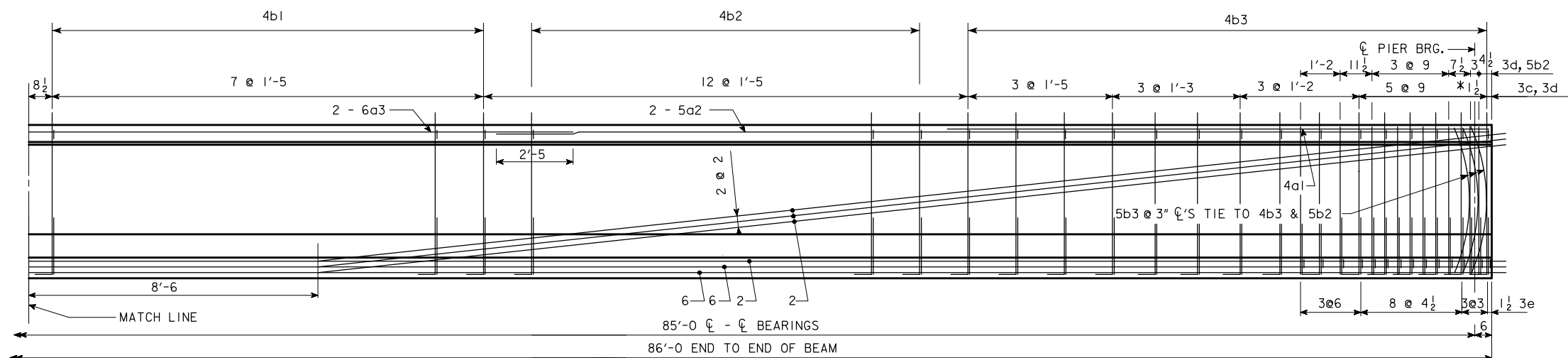
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 49 OF 117 FILE NO. 30187 DESIGN NO. 410

Technical drawing of a beam reinforcement layout. The drawing includes a longitudinal section view at the top and a cross-sectional view at the bottom. The longitudinal section shows the beam's length with dimensions: 4b1, 4b1, and 4b1. Reinforcement specifications include 3d, 5b2, 3 @ 9, 11 @ 1'-2, 3 @ 1'-3, 3 @ 1'-5, 12 @ 1'-5, 7 @ 1'-5, and 8 @ 1'-5. The cross-sectional view shows the beam's width with dimensions: 3e 1 1/2, 3 @ 3, 8 @ 4 1/2, 3 @ 6, and 6. Reinforcement specifications include 4a1, 5b3 @ 3" C'S TIE TO 4b1 & 5b2, 2 @ 2, 2 @ 2, 2 @ 6, and 2 @ 6. The drawing also indicates the location of the ABUT. BRG. (Abutment Bridge) and the MATCH LINE. The total length of the beam is 86'-0" (END TO END OF BEAM), and the distance between bearings is 85'-0" (C - C BEARINGS).

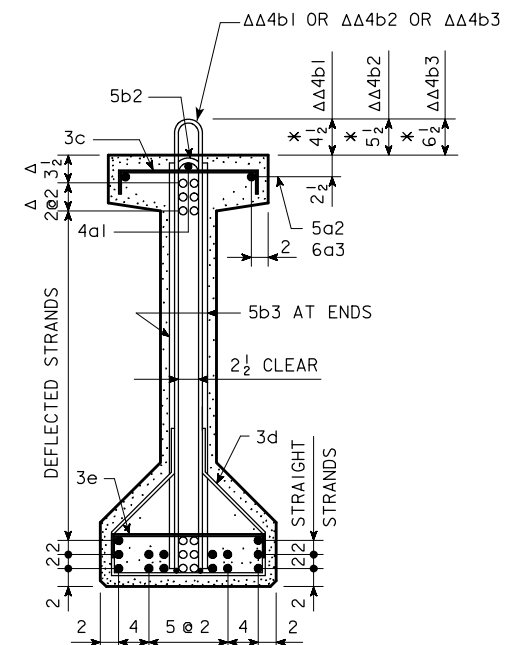


"D" BEAM
CROSS SECTION

$$\begin{aligned} \text{AREA} &= 638.75 \text{ in}^2 \\ Y_b &= 24.37 \text{ in} \\ I &= 214,974 \text{ in}^4 \end{aligned}$$


NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS
ARE AT $\frac{1}{2}$ BEAM AND END OF BEAM.

NOTE STIRRUP EXTENSIONS

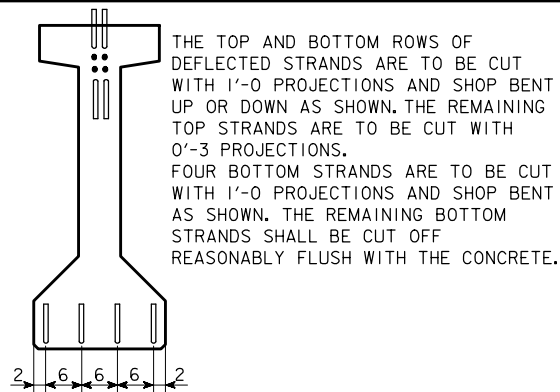


BEAM D85

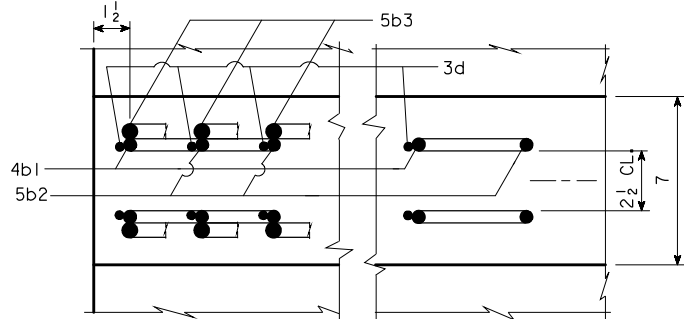
- DEFLECTED STRANDS
- * KEEP
- △△ EPOXY COATED BARS
- △ DIMENSIONS AT END OF BEAM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
BEAM DETAILS D85
STATION : 893+14.13 (℄ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 50 OF 117 FILE NO. 30187 DESIGN NO. 410

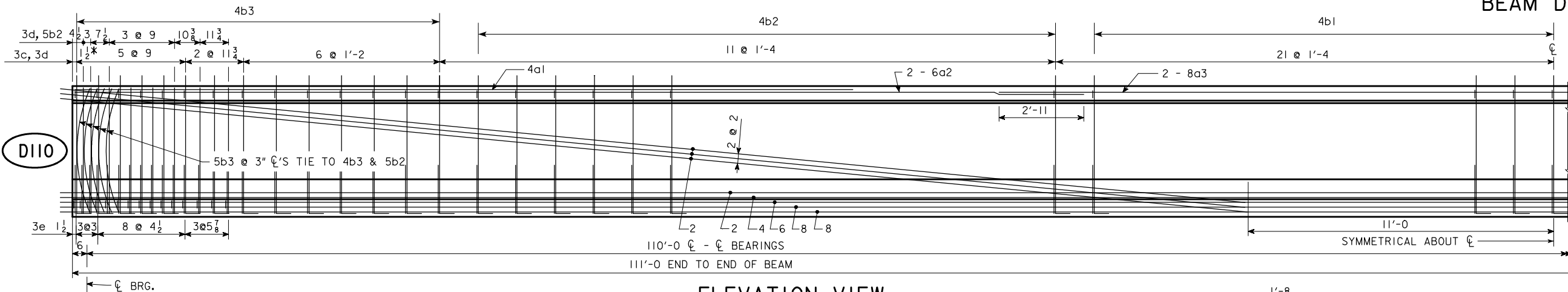
REVISION 08-09 - SPECIFICATION REFERENCE NUMBER CHANGED, DESIGN STRESSES & SPECIFICATIONS SERIES CHANGED TO 2007.
ENGLISHBEAMS.DGN - 4636 - LRFD - THIS SHEET RE-ISSUED 09-06.



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



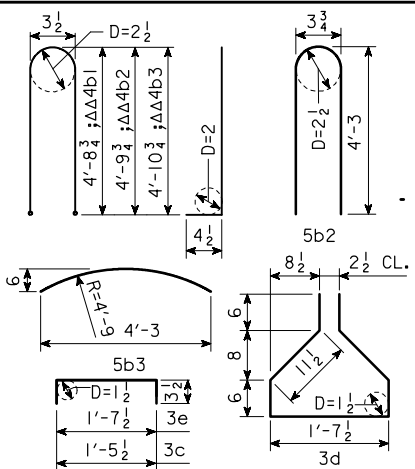
PART SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM



ELEVATION VIEW

REINFORCING BAR LIST BEAM D110

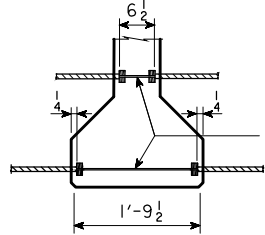
BAR	SHAPE	NO.	LENGTH
4a1		2	26'-6
6a2		4	38'-4
8a3		2	40'-0
4b1		41	10'-4
4b2		22	10'-6
4b3		28	10'-8
5b2		16	8'-8
5b3		20	4'-4
3c		91	2'-1
3d		107	5'-7
3e		30	2'-3



ALL DIMENSIONS ARE OUT TO OUT.
RADIUS TO $\bar{C}$ BAR, D = PIN DIAMETER.

NOTE STIRRUP EXTENSION

$\Delta\Delta$ BARS TO BE EPOXY COATED



COIL TIE DETAIL

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

NOTES:

- THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN BEAM DATA 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 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 2403.03, I, OF THE STANDARD SPECIFICATIONS.
ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.
FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ARTICLE 2407.03, K, OF STANDARD SPECIFICATIONS, EXCEPT THE OVERHANG MAY BE INCREASED TO 14 FEET.
THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAMS DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED.
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.

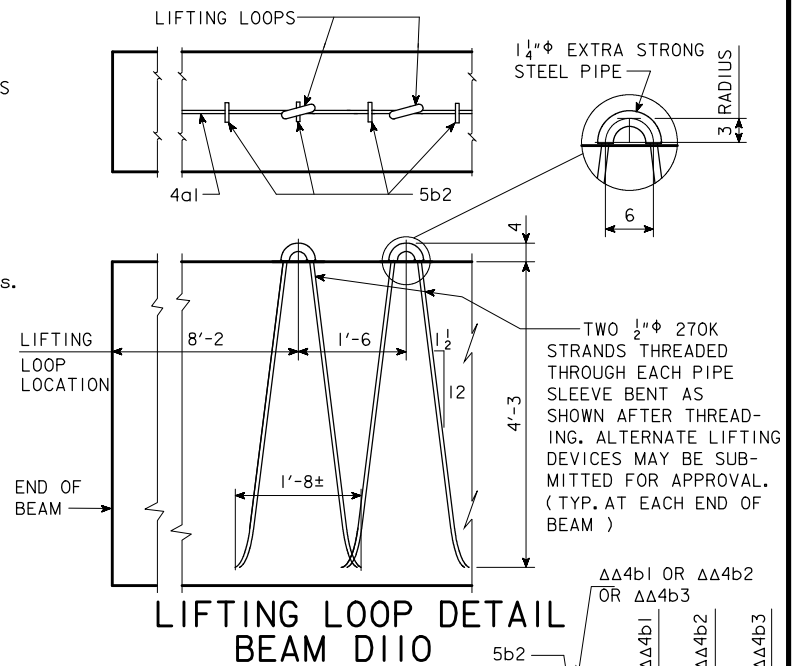
DI10 BEAM DATA

BEAM	SPAN LENGTH ℄-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS ③	HOLD DOWN FORCE-KIPS	CAMBER (in.)			DEFLECTION (in.)Δ _b				PERMISSIBLE SPACING			WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL - (lbs.)		
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE ①		TIME ②		HL93 LOADING								
										(ELASTIC) Δ _i		(PLASTIC) Δ _T										
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.							
DI10	110'-0	111'-0	0.6"	28	6	1446	21.2	2.83		4.83	1.92	1.81	0.48	0.45			7'-6	7'-6	36.9		18.2	1672

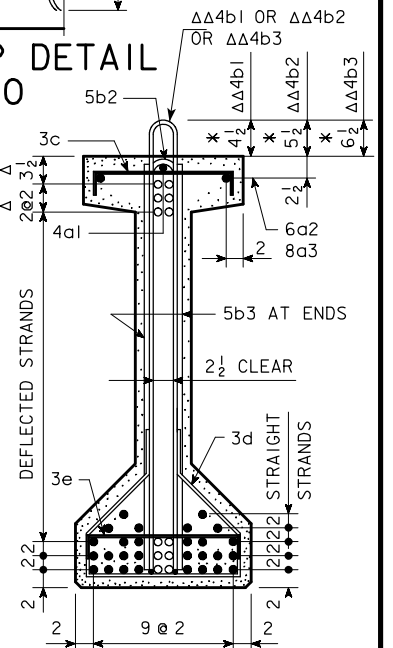
- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 760 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (3191 #) OR ONE STEEL DIAPHRAGM (285 #) AT $\bar{C}$ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL 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 $\bar{C}$ OF SPAN, Δ_b , DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) $\Delta_b = \Delta_i + \Delta_T$ FOR SIMPLE SPAN.
(B) $\Delta_b = \Delta_i + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
(C) $\Delta_b = \Delta_i + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
③ TOTAL INITIAL PRESTRESS FOR DI10 IS BASED ON 72.6% f'_s .
 $f'_s = 270$ ksi AND $A_s = 0.217$ sq. in.

NOTES: (CONTINUED)

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.



LIFTING LOOP DETAIL BEAM DI10



BEAM DI10

NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT $\bar{C}$ BEAM AND END OF BEAM.

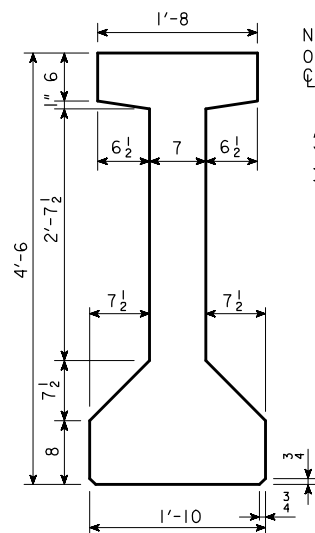
AREA = 638.75 in²
 Y_b = 24.37 in
I = 214,974 in⁴
o DEFLECTED STRANDS
* KEEP
 $\Delta\Delta$ EPOXY COATED BARS
 Δ DIMENSIONS AT END OF BEAM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
BEAM DETAILS DI10
STATION : 893+14.13 ($\bar{C}$ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 51 OF 117 FILE NO. 30187 DESIGN NO. 410

DI10 CROSS SECTION



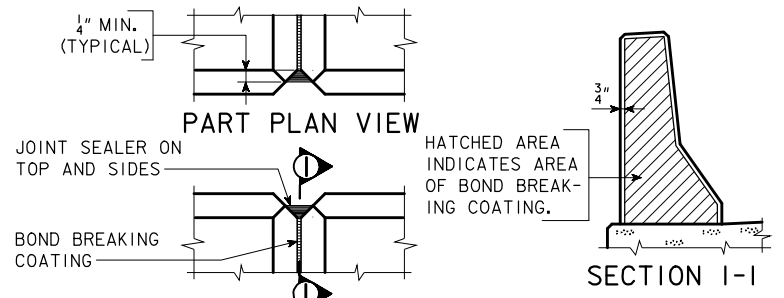
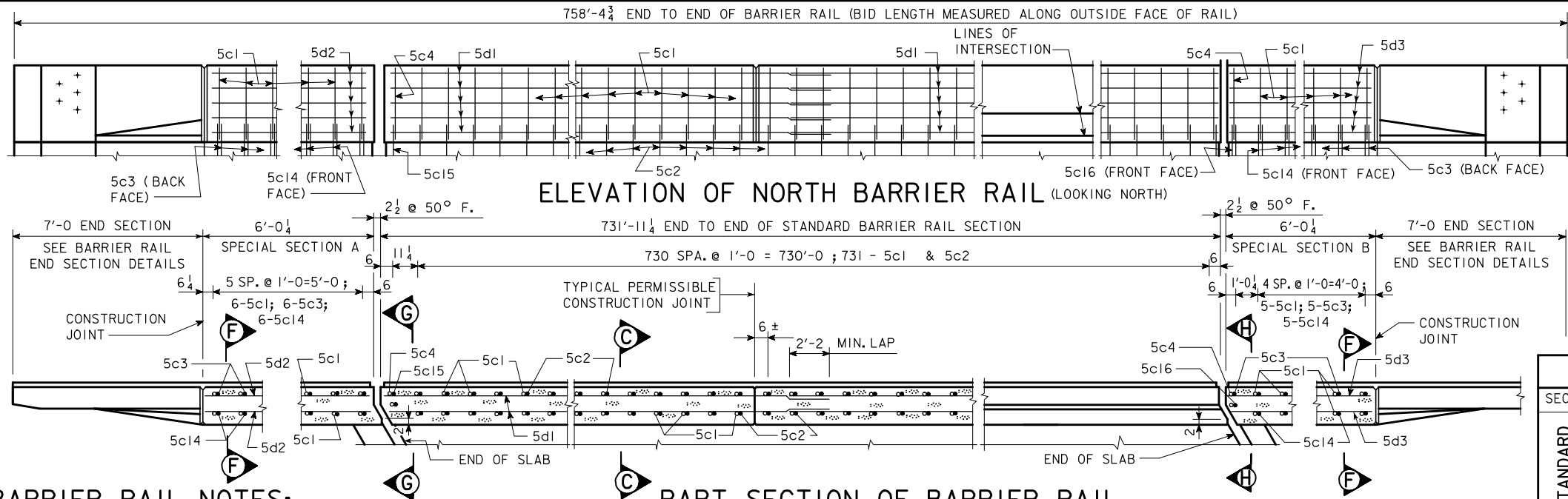
SPECIFICATIONS:

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.

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 7500 psi.
MINIMUM f'_ci AT RELEASE SHALL BE 6500 psi.
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, $f'_s = 270,000$ psi.

CORRECTION 05-08 - BARRIER RAIL END SECTION QUANTITIES CORRECTED.
ENGLISHDECKRAILBRIDGES.DGN 1018A - THIS SHEET REISSUED 09-01 FOR F-SHAPE.

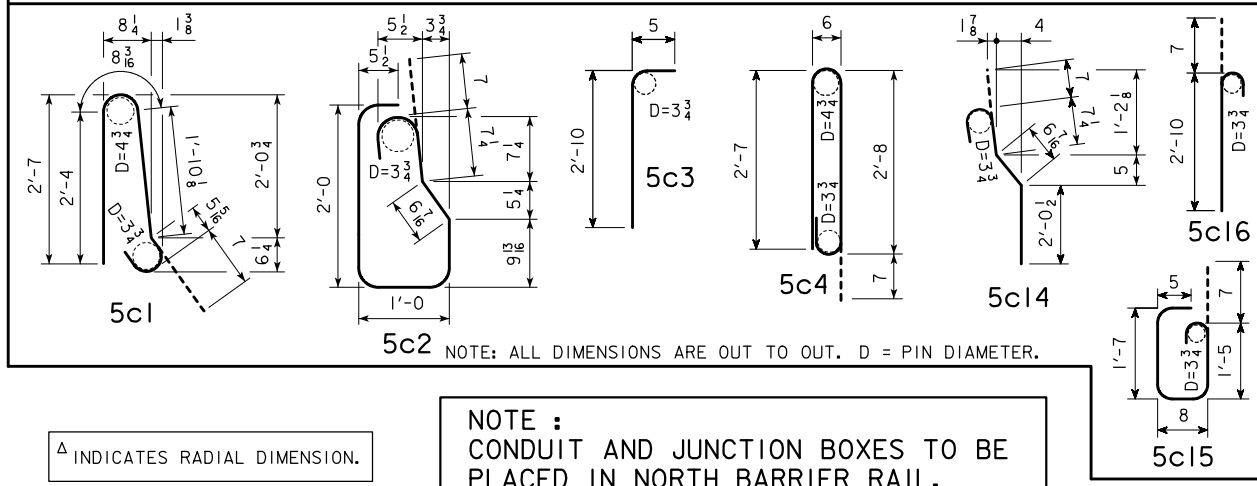


PART ELEVATION VIEW
BARRIER RAIL JOINT DETAILS

BARRIER RAIL NOTES:

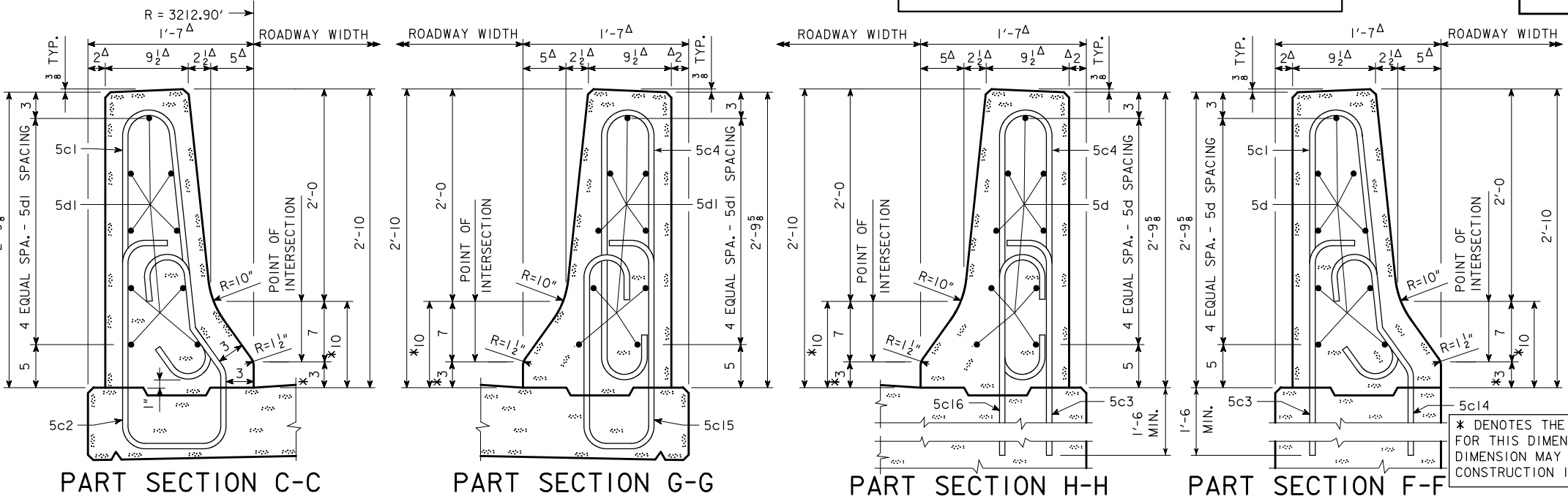
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.
COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.
ALL BARRIER RAIL REINFORCING STEEL IS TO BE EPOXY COATED.
THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS. IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.
ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.
THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETING FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.
TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL $\mathcal{C}$ GRADE.
CROSS SECTIONAL AREA OF THE STANDARD AND SPECIAL SECTIONS OF THE BARRIER RAIL = 2.84 SQUARE FEET.

PART SECTION OF BARRIER RAIL BENT BAR DETAILS



NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN NORTH BARRIER RAIL.

Δ INDICATES RADIAL DIMENSION.



EPOXY REINFORCING STEEL - NORTH RAIL

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTION	5c1	VERTICAL		731	5'-11	4511
	5c2	VERTICAL		731	6'-0	4575
	5c4	VERTICAL		1	6'-4	7
	5c15	VERTICAL		1	4'-8	5
	5d1	LONGITUDINAL		180	38'-8	7259
SPECIAL SECTION A	5c1	VERTICAL		6	5'-11	37
	5c3	VERTICAL		6	3'-3	20
	5c14	VERTICAL		6	3'-10	24
	5d2	LONGITUDINAL		9	5'-8	53
SPECIAL SECTION B	5c1	VERTICAL		5	5'-11	31
	5c3	VERTICAL		5	3'-3	17
	5c4	VERTICAL		1	6'-4	7
	5c14	VERTICAL		5	3'-10	20
	5c16	VERTICAL		1	3'-3	3
	5d3	LONGITUDINAL		9	5'-8	53
BARRIER RAIL END SECTION					2 AT 458 LBS	916
(INCLUDED WITH SUPERSTRUCTURE REINFORCING) TOTAL WEIGHT (LBS.)						17,538

CONCRETE PLACEMENT SUMMARY

SECTION		TOTAL
STANDARD SECTION	731.94' AT 0.1052 CU. YDS. PER FT.	77.0
SPECIAL SECTION A	6.0' AT 0.1052 CU. YDS. PER FT.	0.6
SPECIAL SECTION B	6.0' AT 0.1052 CU. YDS. PER FT.	0.6
BARRIER RAIL END SECTION	2 AT 0.65 CU. YDS.	1.3
TOTAL (CU. YD.)		79.5

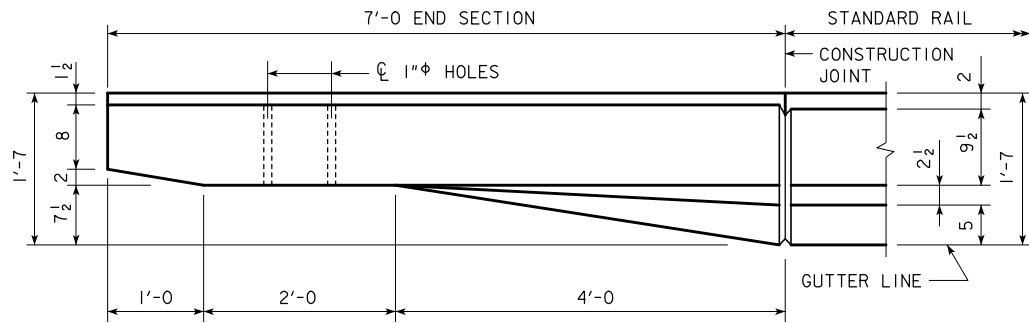
CONCRETE BARRIER RAIL QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE BARRIER RAILING	LIN. FT.	758.4

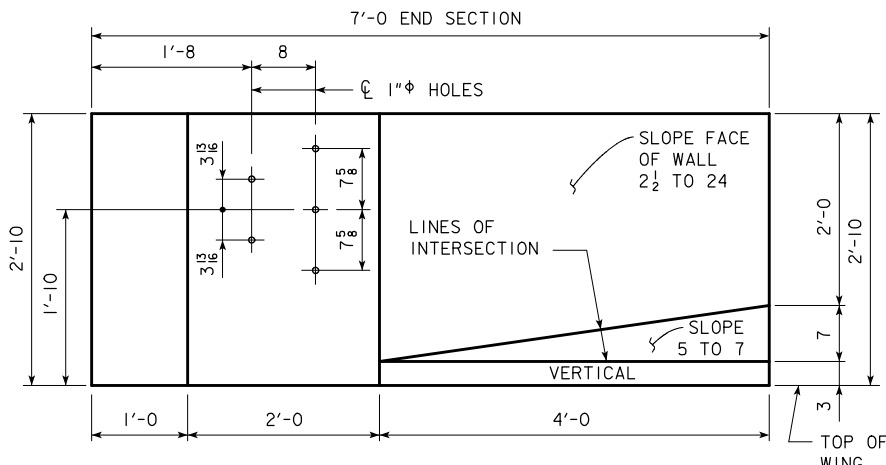
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
NORTH BARRIER RAIL DETAILS-WESTBOUND
STATION : 893+14.13 ($\mathcal{C}$ RELOCATED U.S. 20)
AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 52 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 02-08 - REINFORCING STEEL PATTERN & SIZE CHANGED AND WEIGHT ADJUSTED. CONCRETE THICKNESS WAS INCREASED 1/2" AND QUANTITY ADJUSTED. ENGLISHDECKRAILBRIDGES.DGN 1017 - THIS SHEET ISSUED 09-01

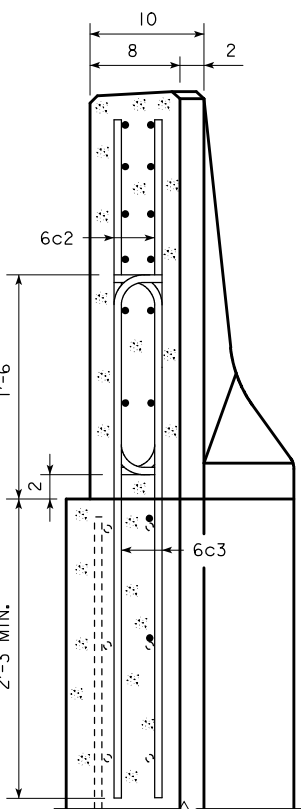


PART PLAN VIEW

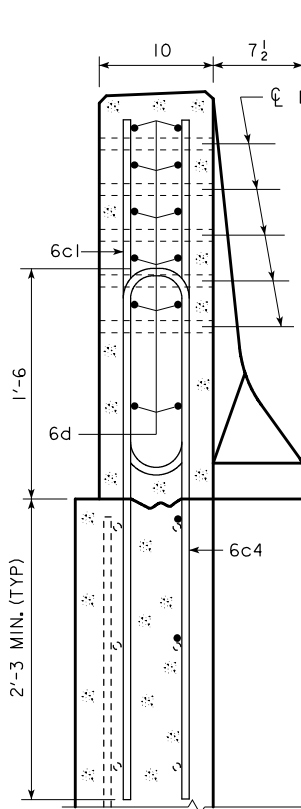


PART ELEVATION VIEW

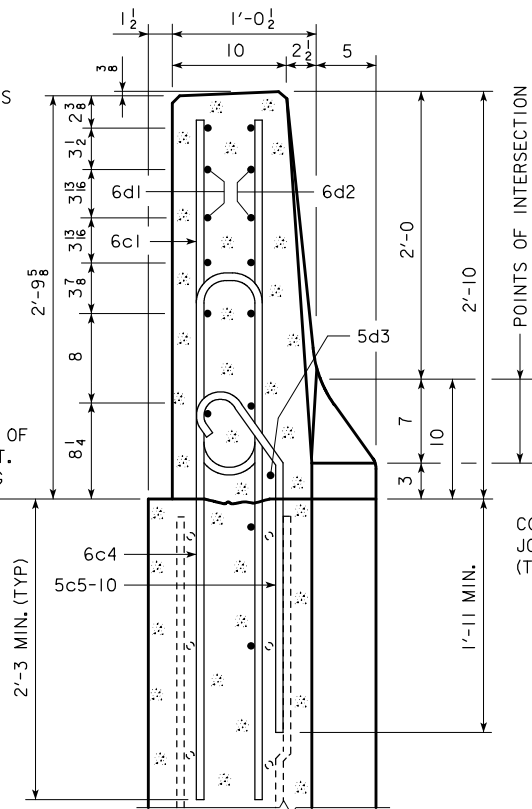
PROVIDE 5 HOLES FORMED WITH 1" PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



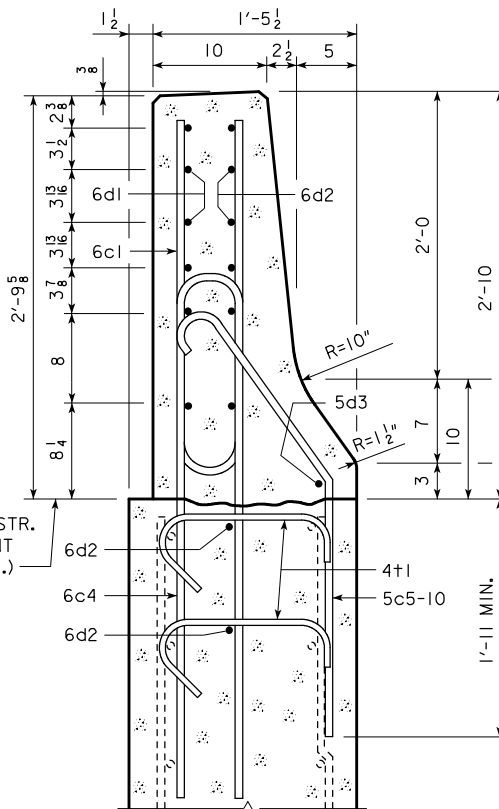
VIEW A-A



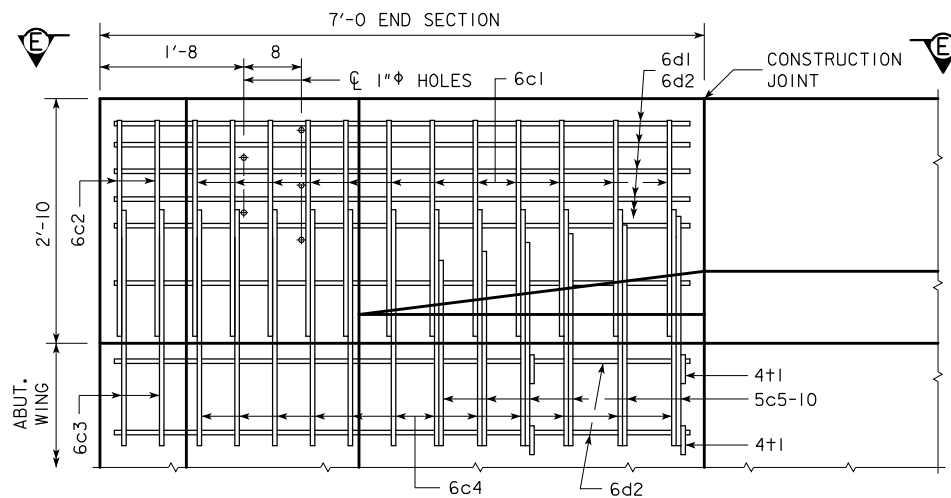
SECTION B-B



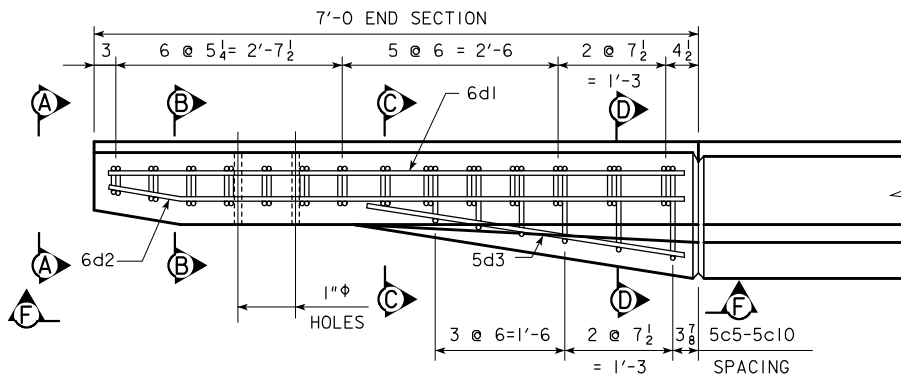
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW E-E

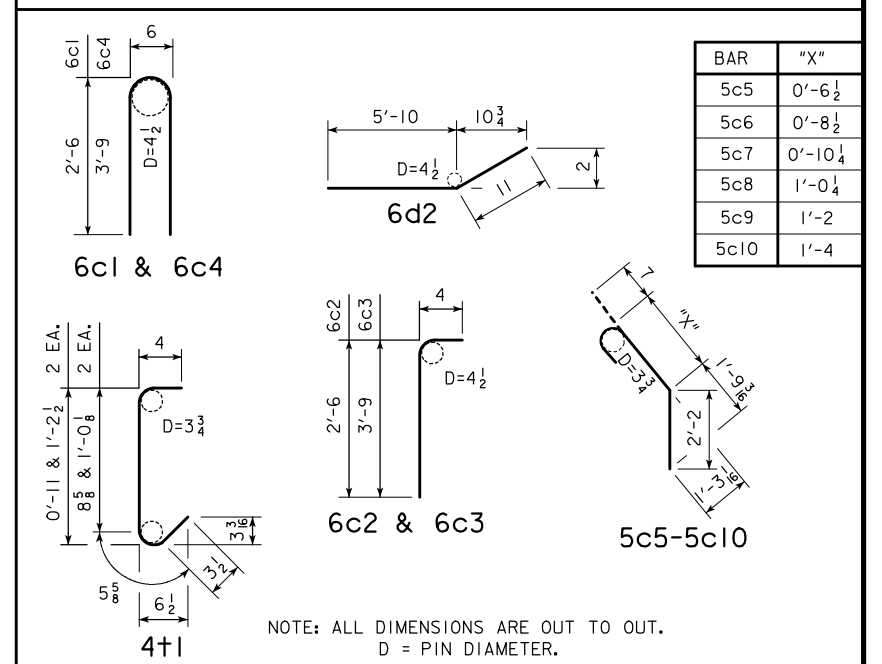
EPOXY REINFORCING STEEL - ONE END SECTION

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

CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

BENT BAR DETAILS

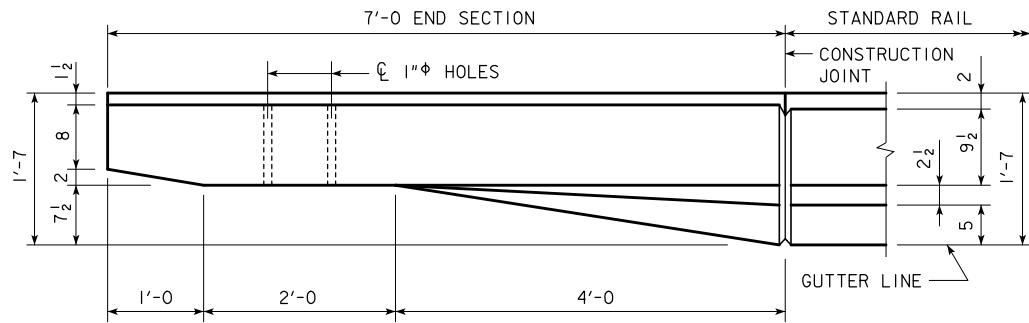


NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN NORTH BARRIER RAIL.

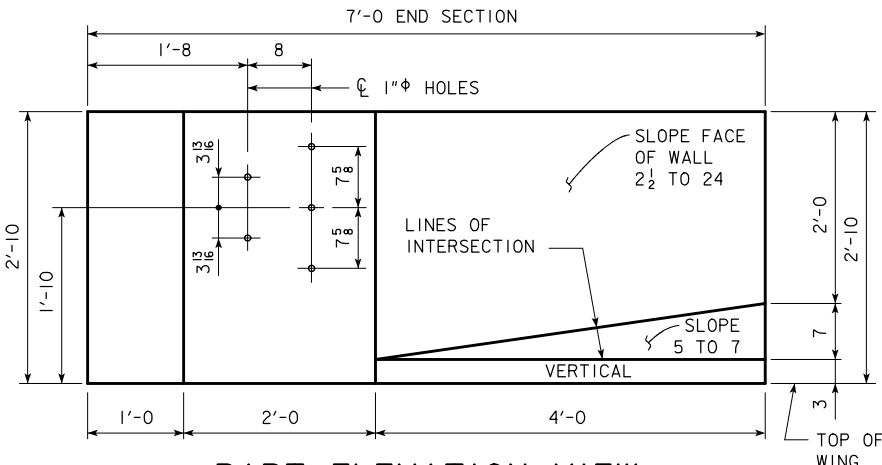
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
END SECTION DETAILS-NORTH RAIL-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 54 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 02-08 - REINFORCING STEEL PATTERN & SIZE CHANGED AND WEIGHT ADJUSTED. CONCRETE THICKNESS WAS INCREASED 1/2" AND QUANTITY ADJUSTED.
ENGLISHDECKRAILBRIDGES.DGN 1017 - THIS SHEET ISSUED 09-01

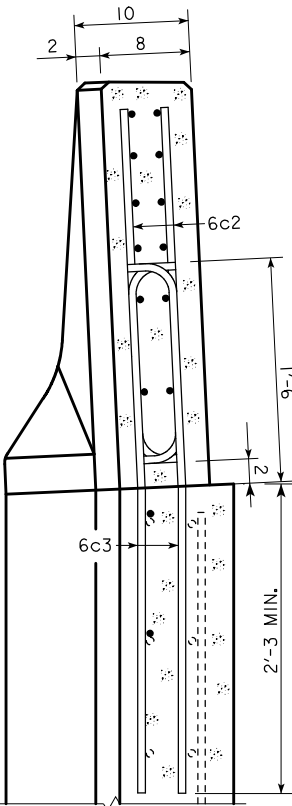


PART PLAN VIEW

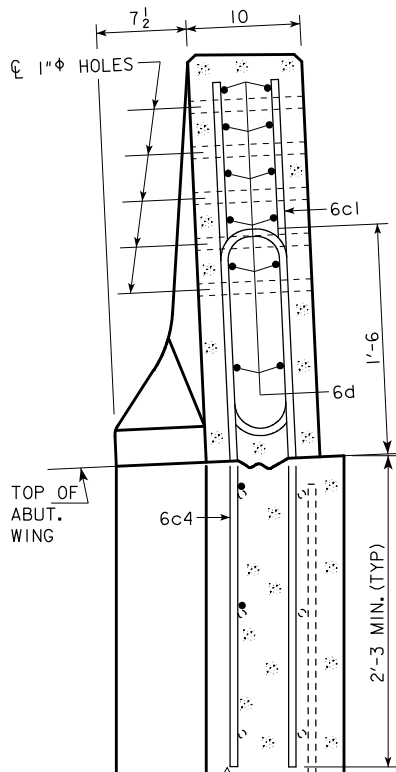


PART ELEVATION VIEW

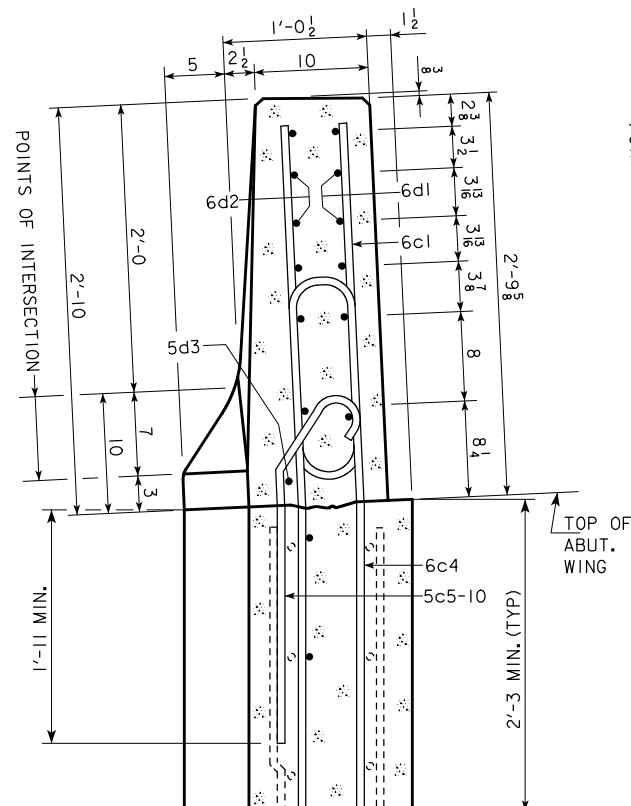
PROVIDE 5 HOLES FORMED WITH 1" PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



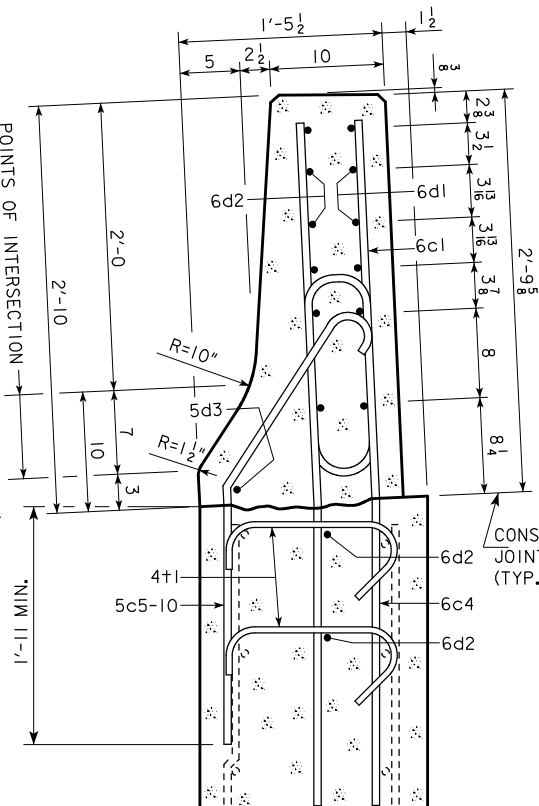
VIEW A-A



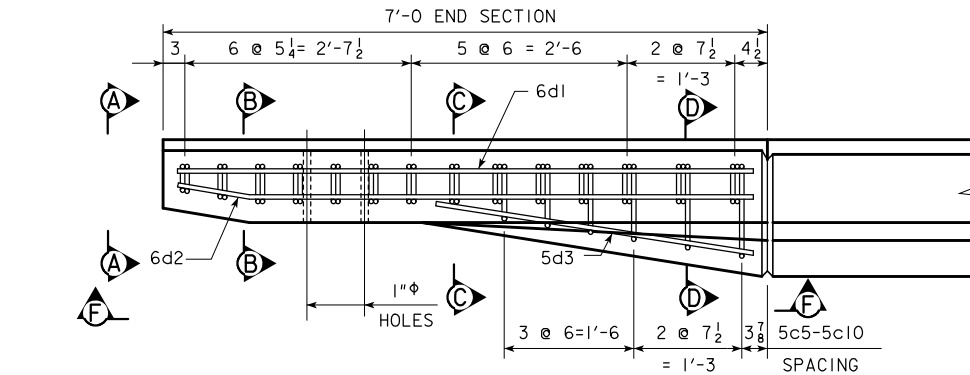
SECTION B-B



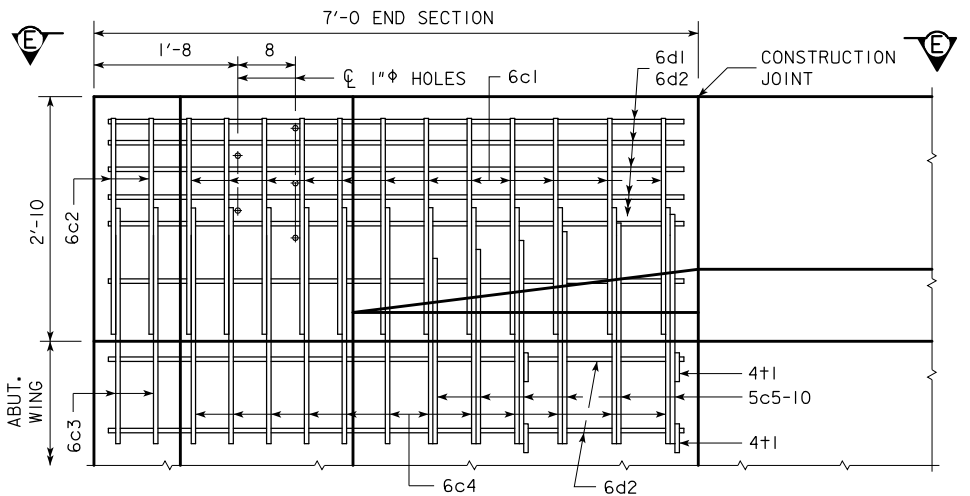
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW F-F

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

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

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

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

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

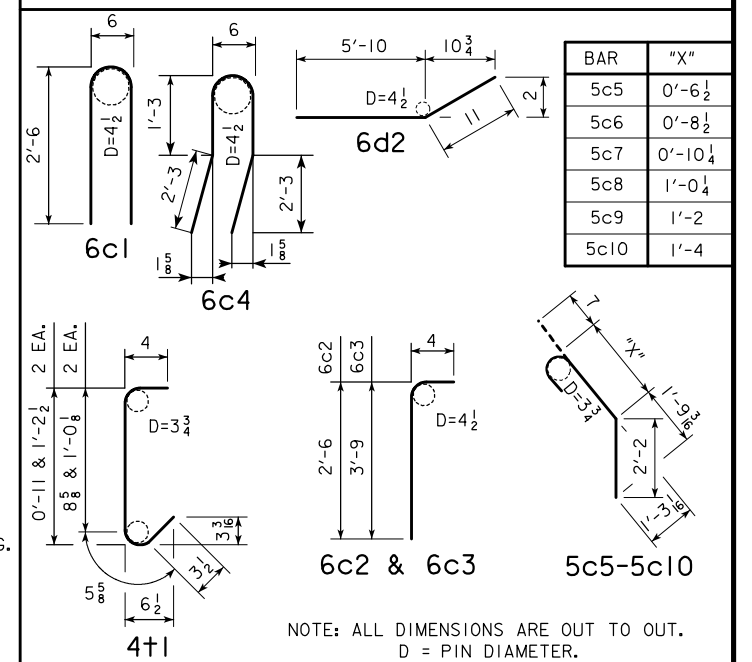
EPOXY REINFORCING STEEL - ONE END SECTION

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

CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

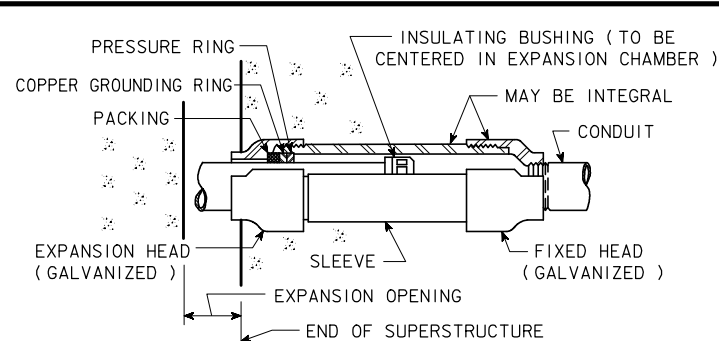
BENT BAR DETAILS



NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN NORTH BARRIER RAIL.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
END SECTION DETAILS-SOUTH RAIL-WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20)
AUGUST, 2010

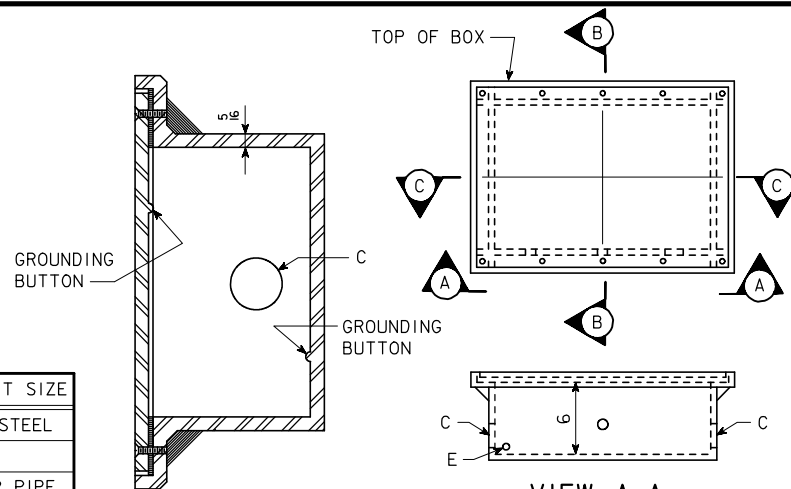
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 55 OF 117 FILE NO. 30187 DESIGN NO. 410



EXPANSION FITTING DETAIL
(2 REQUIRED)

BOSSED FOR	HOLE	FOR CONDUIT SIZE
5 THREADS	C	2" ϕ RIGID STEEL
NONE	E	1/2" ϕ COPPER PIPE

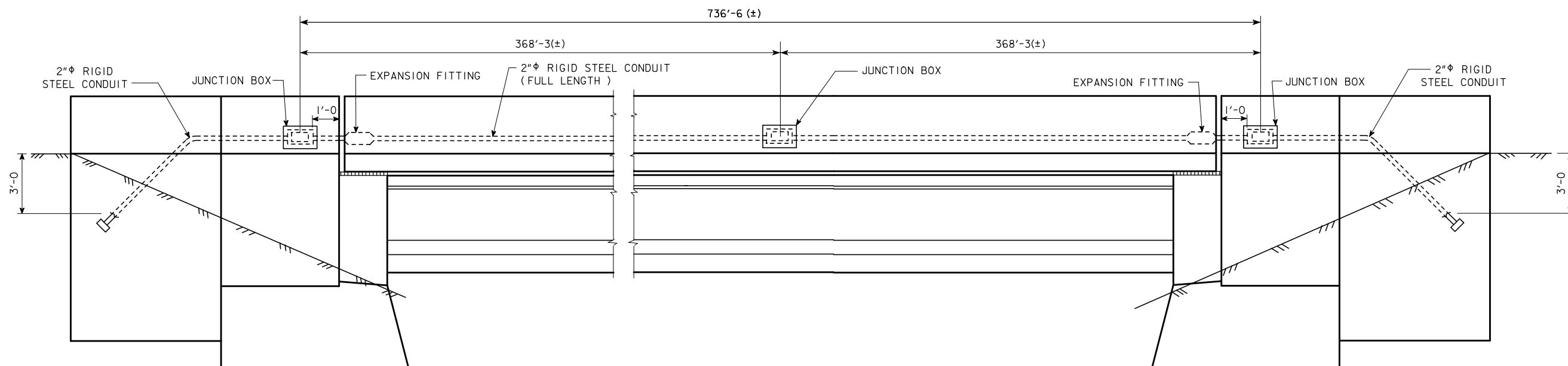
NOTE:
THE GROUNDING BUTTONS ARE TO BE BLIND DRILLED AND TAPPED FOR 3/8" ϕ x 0'-0 3/4" BOLTS.



SECTION B-B
RM-37, TYPE I JUNCTION BOX
WATERTIGHT , CAST IRON - FLUSH MOUNT

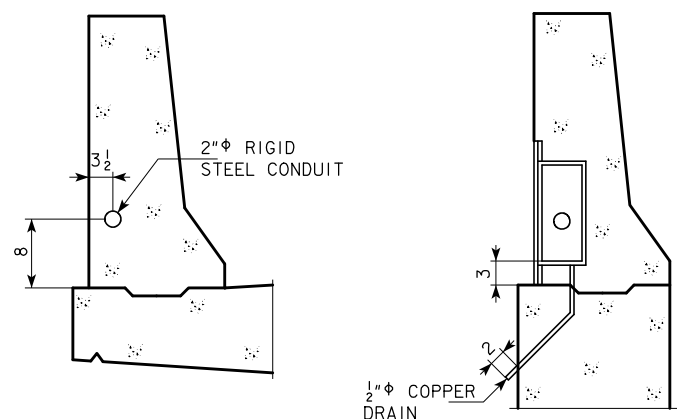
LIGHTING NOTES:

SEE RM-37 STANDARD ROAD PLAN FOR ADDITIONAL INFORMATION ON JUNCTION BOXES.
CONSTRUCTION SHALL CONFORM TO THE CURRENT IOWA D.O.T. STANDARD AND SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.
CONDUIT INSTALLATION SHALL COMPLY WITH THE ARTICLE "ELECTRICAL DUCTS", SECTION 2523.
ALL "C" ENTRANCE HOLES IN JUNCTION BOXES SHALL BE DRILLED AND TAPPED FOR THE SPECIFIED CONDUIT SIZE. ALL OTHER HOLES SHALL HAVE A CONCRETE - TIGHT SLIP FIT. CONDUIT ENDS SHALL NOT PROTRUDE INTO JUNCTION BOX MORE THAN 1/4". DRAIN PIPE END SHALL BE FLUSH WITH INSIDE SURFACE OF BOX. GROUNDING BUTTONS SHALL BE LOCATED APPROXIMATELY 3" FROM THE INSIDE SURFACE OF THE BOX WALL, AND NOT CLOSER THAN 3" TO THE EDGE OF ANY HOLE IN THE BOX FLOOR. HOLES FOR DRAIN PIPE SHALL BE PLACED IN THE LOW CORNER OF THE BOX, WITH A MINIMUM CLEARANCE OF 1" BETWEEN THE EDGE OF THE HOLE AND THE INSIDE SURFACE OF THE BOX WALL. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.
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.
EXPANSION FITTING SHALL BE AS SPECIFIED OR AS APPROVED BY THE ENGINEER. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.

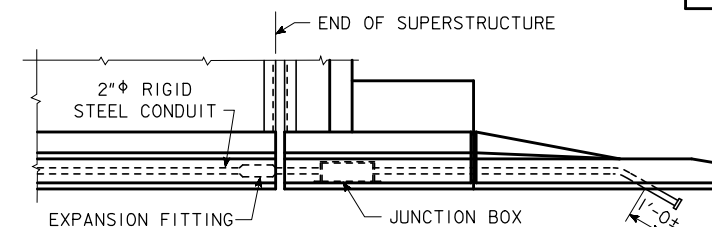


EXTERIOR ELEVATION-NORTH BARRIER RAIL-WESTBOUND BRIDGE-LOOKING SOUTH

NOTE :
CONDUIT AND JUNCTION BOXES TO BE PLACED IN NORTH BARRIER RAIL.



SECTION THRU BARRIER RAIL
SECTION THRU JUNCTION BOX
NORTH BARRIER RAIL DETAILS



PART PLAN AT WING

LIGHTING QUANTITIES

ITEM	AMOUNT
2" ϕ RIGID STEEL CONDUIT - WESTBOUND BRIDGE	736.5 LIN.FT.

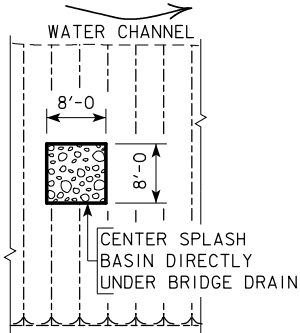
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
LIGHTING DETAILS - WESTBOUND
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 56 OF 117 FILE NO. 30187 DESIGN NO. 410

BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.

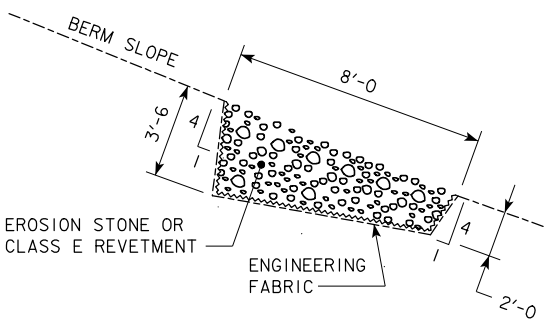
SPLASH BASIN NOTES :

THE COST OF FURNISHING AND PLACING SPLASH BASINS (INCLUDING EXCAVATION, EROSION STONE OR CLASS E REVETMENT, AND ENGINEERING FABRIC) IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

NUMBER OF SPLASH BASINS = 16 FOR WESTBOUND BRIDGE.



SPLASH BASIN PLAN VIEW
(SEE DESIGN SHEETS 3 & 4 FOR LOCATION)



SPLASH BASIN UNDER BRIDGE DRAIN
TYPICAL SECTION FOR BERM SLOPES

SUBDRAIN NOTES :

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

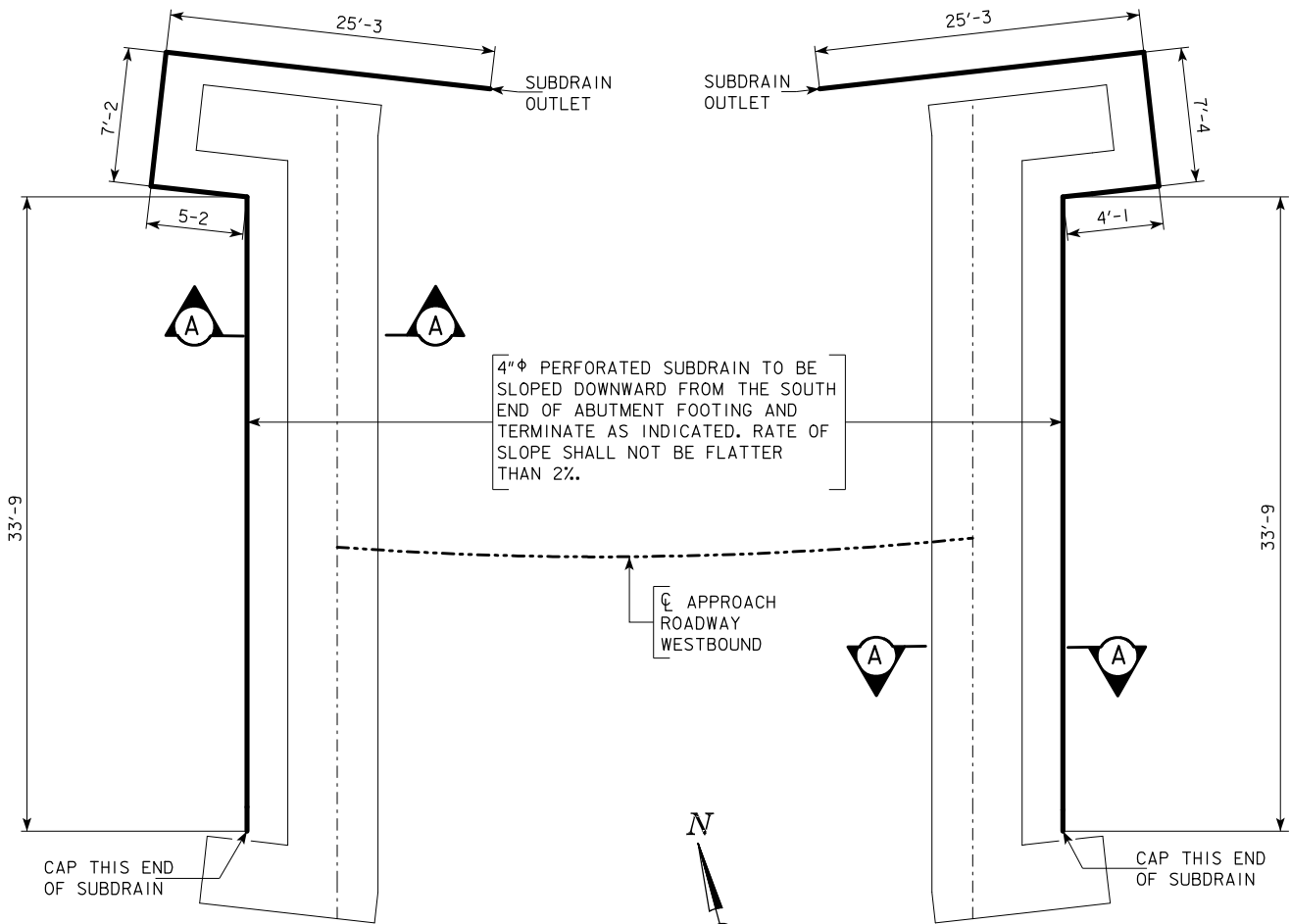
THE SUBDRAINS SHALL BE 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B OF THE CURRENT I.D.O.T. STANDARD SPECIFICATION. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0 LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET.

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.

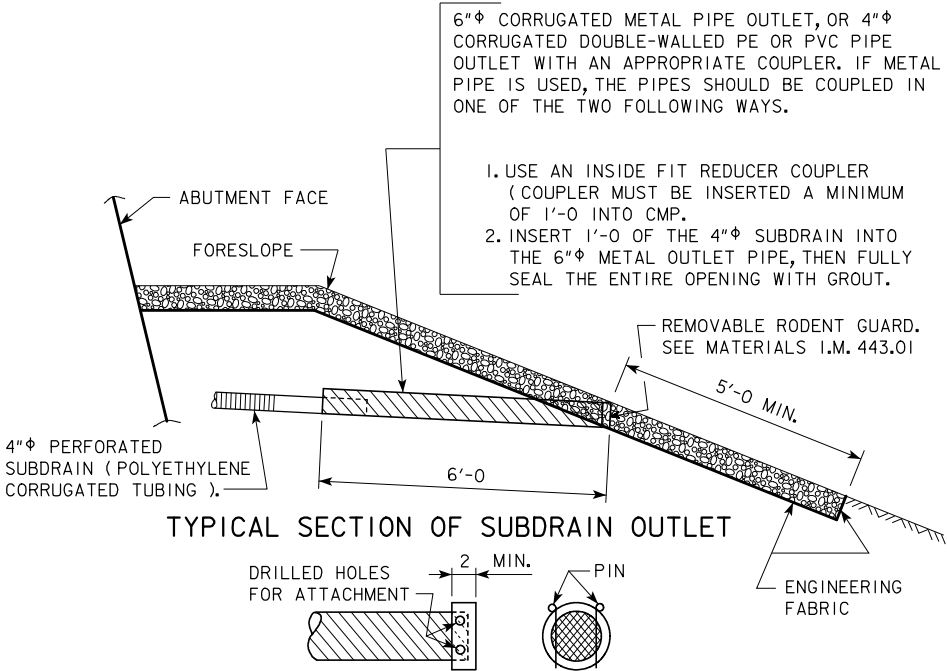
THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

SUBDRAIN OUTLET ELEVATIONS

LOCATION		ELEVATION
WESTBOUND BRIDGE	WEST ABUTMENT	1246.62
	EAST ABUTMENT	1243.02



SITUATION PLAN
(SHOWING SUBDRAIN LOCATIONS)



REMOVABLE RODENT GUARD DETAILS
OUTLET DETAILS

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
SUBDRAIN DETAILS - WESTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 57 OF 117 FILE NO. 30187 DESIGN NO. 410

NOTE:
SECTION A- A IS SHOWN ON ABUTMENT
BACKFILL DETAILS SHEET.

REVISED 04-09 - SPLASH BASIN DETAILS AND NOTES ADDED TO STANDARD.
ENGLISH FOR PROTECTION BRIDGES.DGN 1007C - THIS SHEET ISSUED 06-02 FOR WATER CROSSINGS.

DESIGN TEAM KBK/JTN/RAR/MSF

SPLASH BASIN & SUBDRAIN DETAILS (WATER CROSSING)

STANDARD SHEET 1007C

SAC COUNTY

PROJECT NUMBER NHSX-020-2 (84)--3H-81

SHEET NUMBER 58

02-AUG-2010 07:13

msfish

W:\Projects\81020020A98\BRFInal\810202084.brg 810410S057 \NTPPRTSVR2\BrgPDF

REVISION 10-09 - CHANGED PERMEABILITY DATA TO APPARENT OPENING SIZE DATA.
ENGLISHFORESLOPEPROTECTIONBRIDGES.DGN - 1007E - THIS SHEET ISSUED 08-07.

TECHNICAL DATA INFORMATION - GEOTEXTILE FABRIC

MECHANICAL PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE ROLL VALUE	
			MD	CD
TENSILE STRENGTH (AT 5% STRAIN)	ASTM D 4595	kN/m (LBS/FT)	19.8 (1356)	19.8 (1356)
APPARENT OPENING SIZE (AOS)	ASTM D 4751	mm (U.S. SIEVE)	0.43 MAX (#40)	
FLOW RATE	ASTM D 4491	L/MIN/m ² (GAL/MIN/FT ²)	733 (18)	
UV RESISTANCE (AT 500 HOURS)	ASTM D 4355	% STRENGTH RETAINED	70	

ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

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

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 3 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

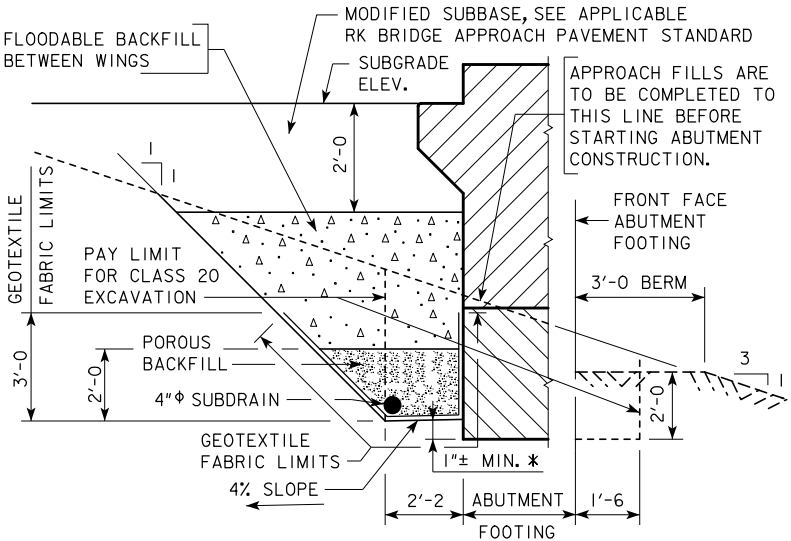
WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

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

NOTE:

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

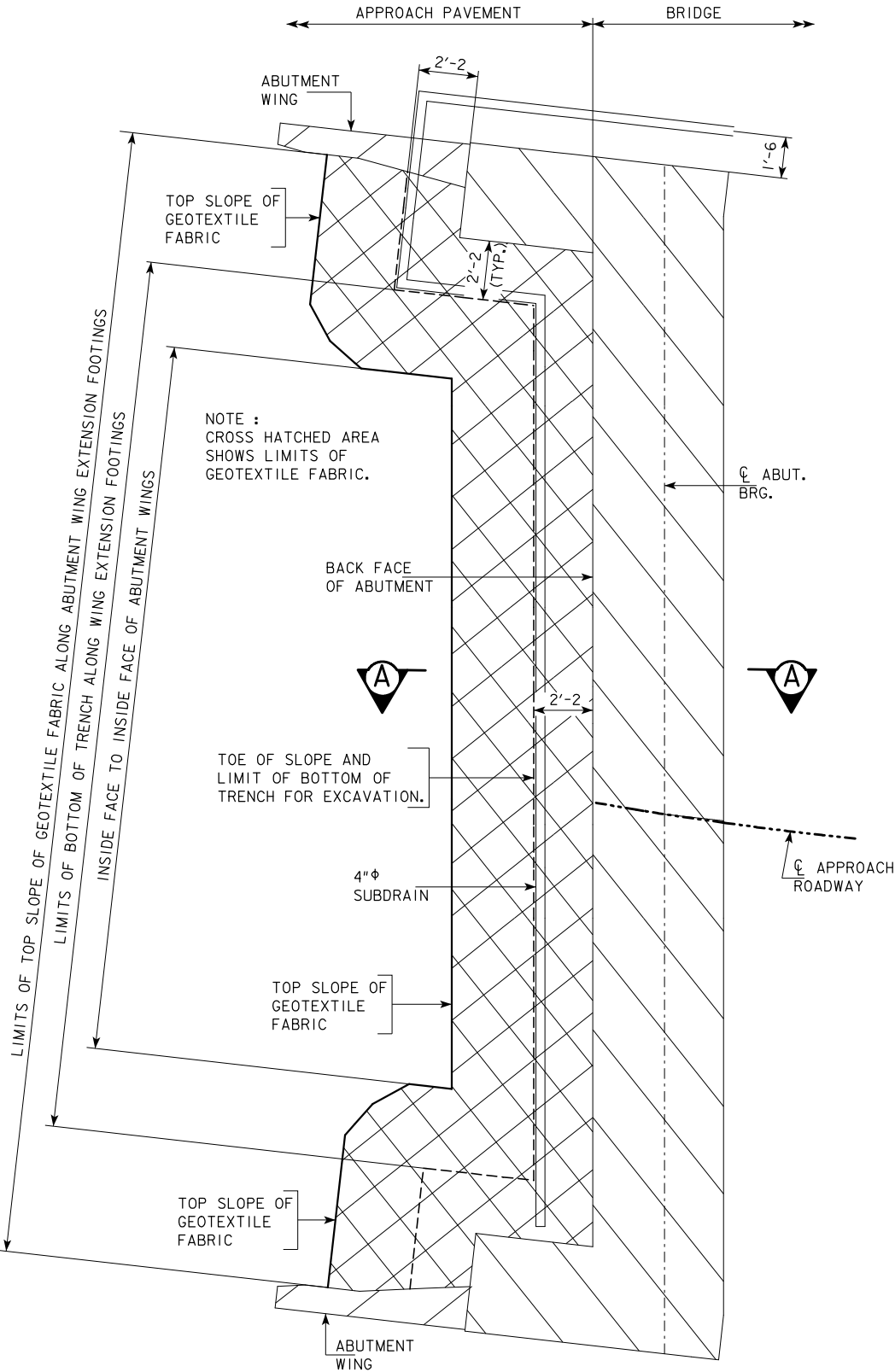
SUBDRAIN SHALL SLOPE DOWNWARD FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.



SECTION A-A
BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

* DIMENSION VARIES DUE TO SUBDRAIN SLOPE.

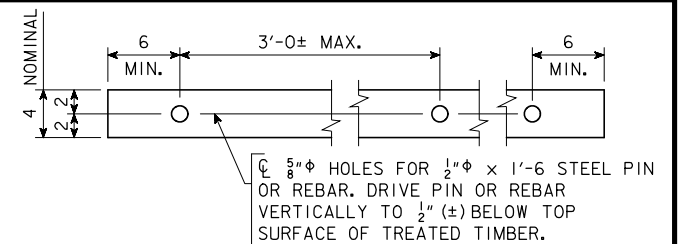
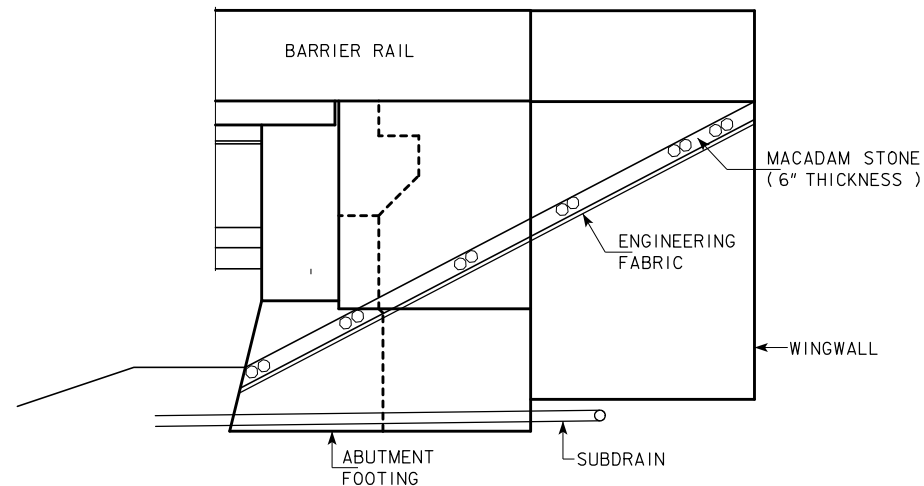
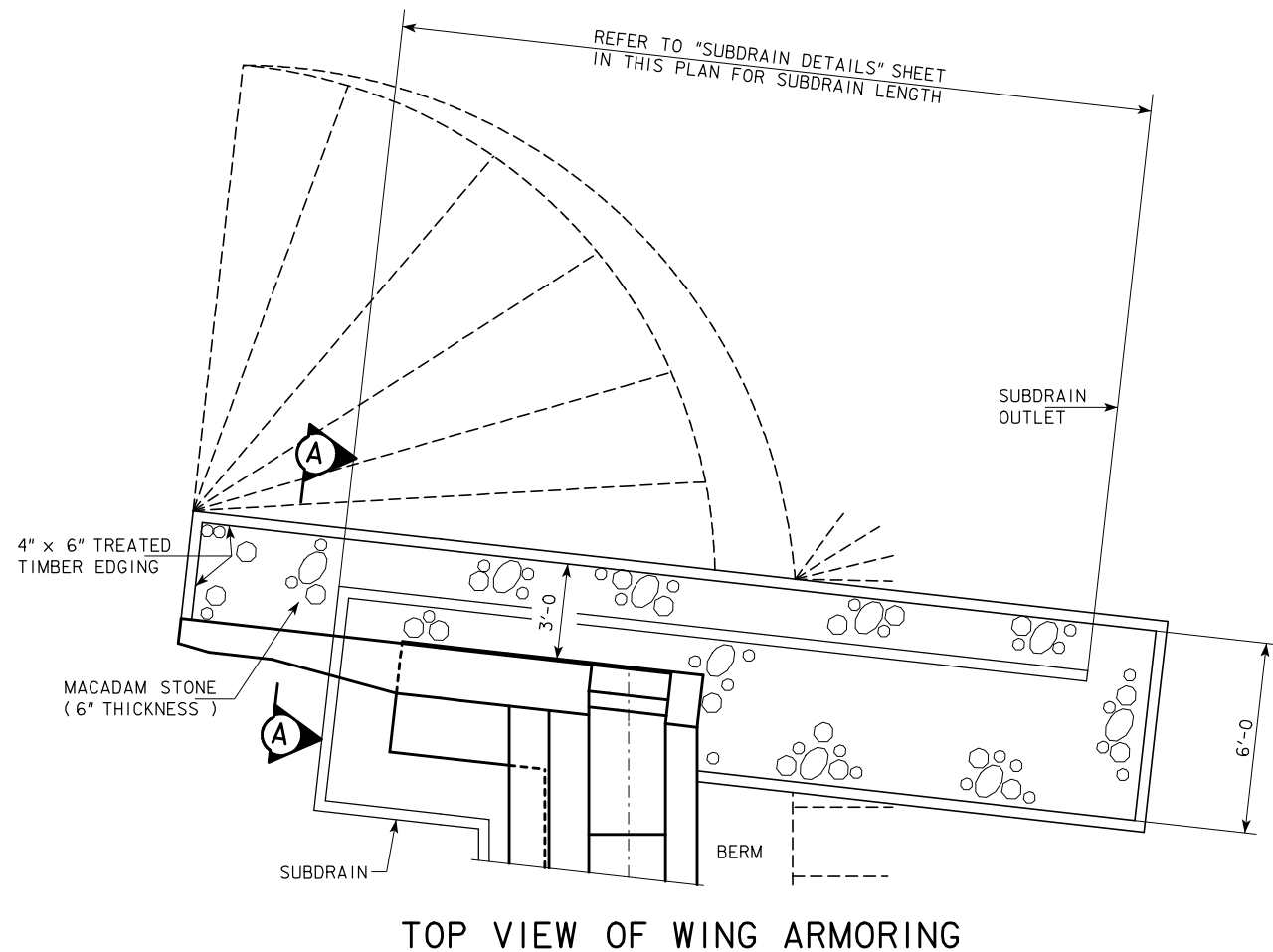


ABUTMENT PLAN VIEW

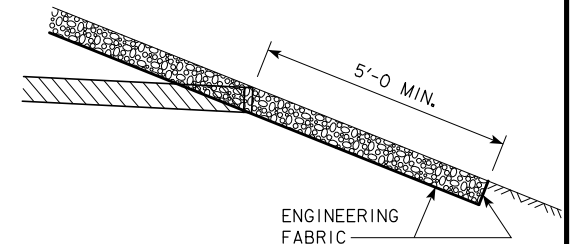
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
ABUTMENT BACKFILL DETAILS-WESTBOUND
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 58 OF 117 FILE NO. 30187 DESIGN NO. 410

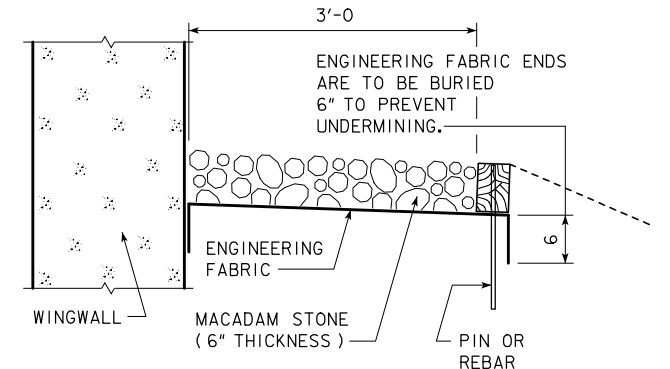
CORRECTION 03-08 - WING SHAPE CHANGED TO RECTANGULAR WING AND STUB ABUTMENT EXAMPLE OUTSIDE OF SHEET.
ENGLISHFORESLOPEPROTECTIONBRIDGES.DGN 1005A - THIS SHEET ISSUED 06-02.



4" x 6" TREATED TIMBER
EDGING DETAILS



TYPICAL SECTION
OF SUBDRAIN OUTLET



SECTION A-A

GENERAL NOTES:

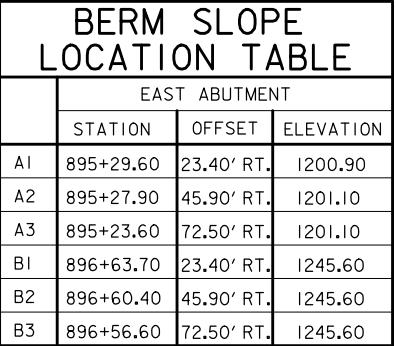
- MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC MEETING THE REQUIREMENTS OF 4196.01.B.3
- THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF 4122, 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 6" 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.

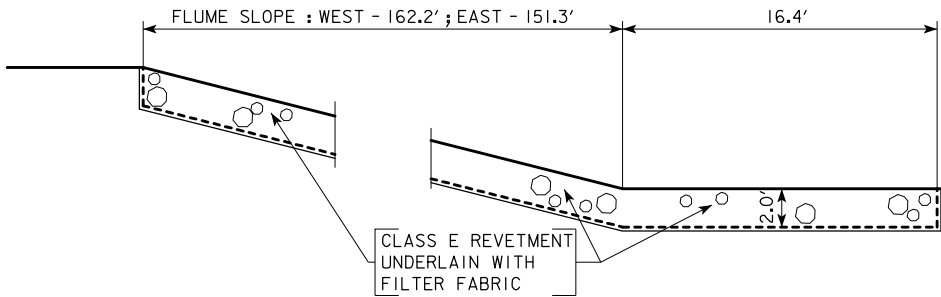
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
BRIDGE WING ARMORING - WESTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 59 OF 117 FILE NO. 30187 DESIGN NO. 410

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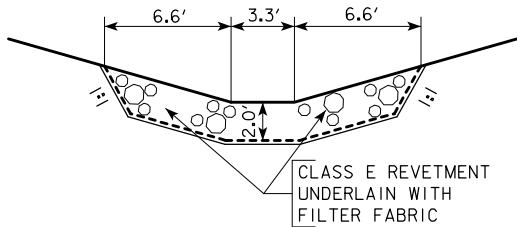
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

STATION : 893+14.13 (C RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 60 OF 117 FILE NO. 30187 DESIGN NO. 410





SECTION ALONG ROCK FLUME / PAD

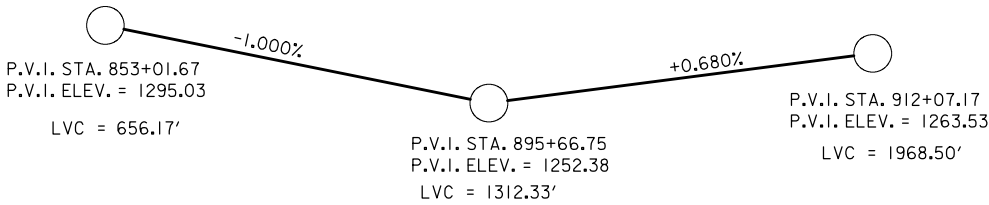


SECTION THRU
ROCK FLUME

NOTE :
SEE DESIGN SHEETS 61 & 62 FOR
LOCATION OF ROCK FLUMES.

NOTE:
SEE DESIGN SHEET 5 FOR
REVETMENT QUANTITIES.

BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



PROPOSED GRADE ON
RELOCATED U.S. 20

CURVE DATA :
(ϕ RELOCATED U.S. 20)

P.I. STA. 884+39.82
SC STA. 860+50.50
CS STA. 901+80.72
 $\Delta = 72^{\circ}07'45.54''$ (LT.)
T = 2389.33'
L = 4130.22'
E = 777.83'
R = 3280.83'
e = 0.056 1/1

HYDRAULIC DATA :

DRAINAGE AREA = 333.0 SQ.MI.
STREAM SLOPE = 5.30 FT./MI.

Q2 = 2100 C.F.S.
STAGE = ELEV. 1199.4
CHANNEL VELOCITY = 3.9 F.P.S.

Q50 = 9200 C.F.S.
STAGE = ELEV. 1205.3
BACKWATER = 0.20 FT.
BRIDGE VELOCITY = 3.6 F.P.S.

Q100 = 10,600 C.F.S.
STAGE = 1205.9
BACKWATER = 0.23 FT.
CALCULATED SCOUR = ELEV. 1179.3

Q500 = 14,200 C.F.S.
STAGE = ELEV. 1207.4
CALCULATED SCOUR = ELEV. 1178.5

ROADWAY OVERTOP ELEV. 1255.0
STATION 896+92

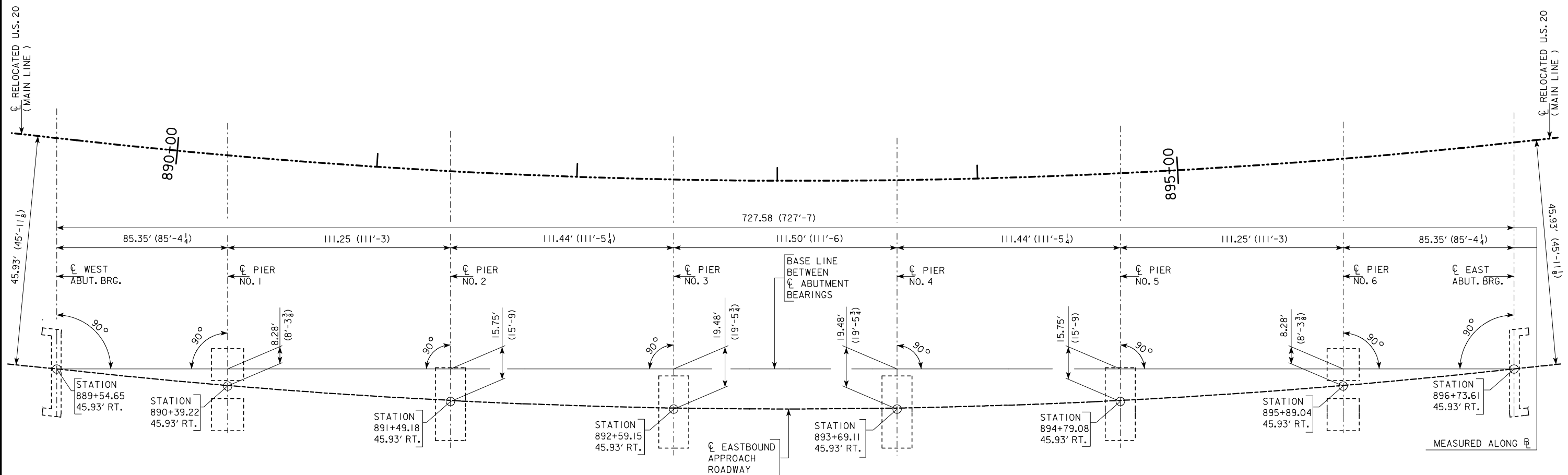
EXTREME HW STAGE = ELEV. 1201.3
DATE = JUNE 1996
AVG. LOW WATER STAGE = ELEV. 1194.4
SURVEY DATE, JUNE 1999

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0¹/₂ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

SITUATION PLAN INFORMATION
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 63 OF 117 FILE NO. 30187 DESIGN NO. 410



EASTBOUND STAKING DIAGRAM

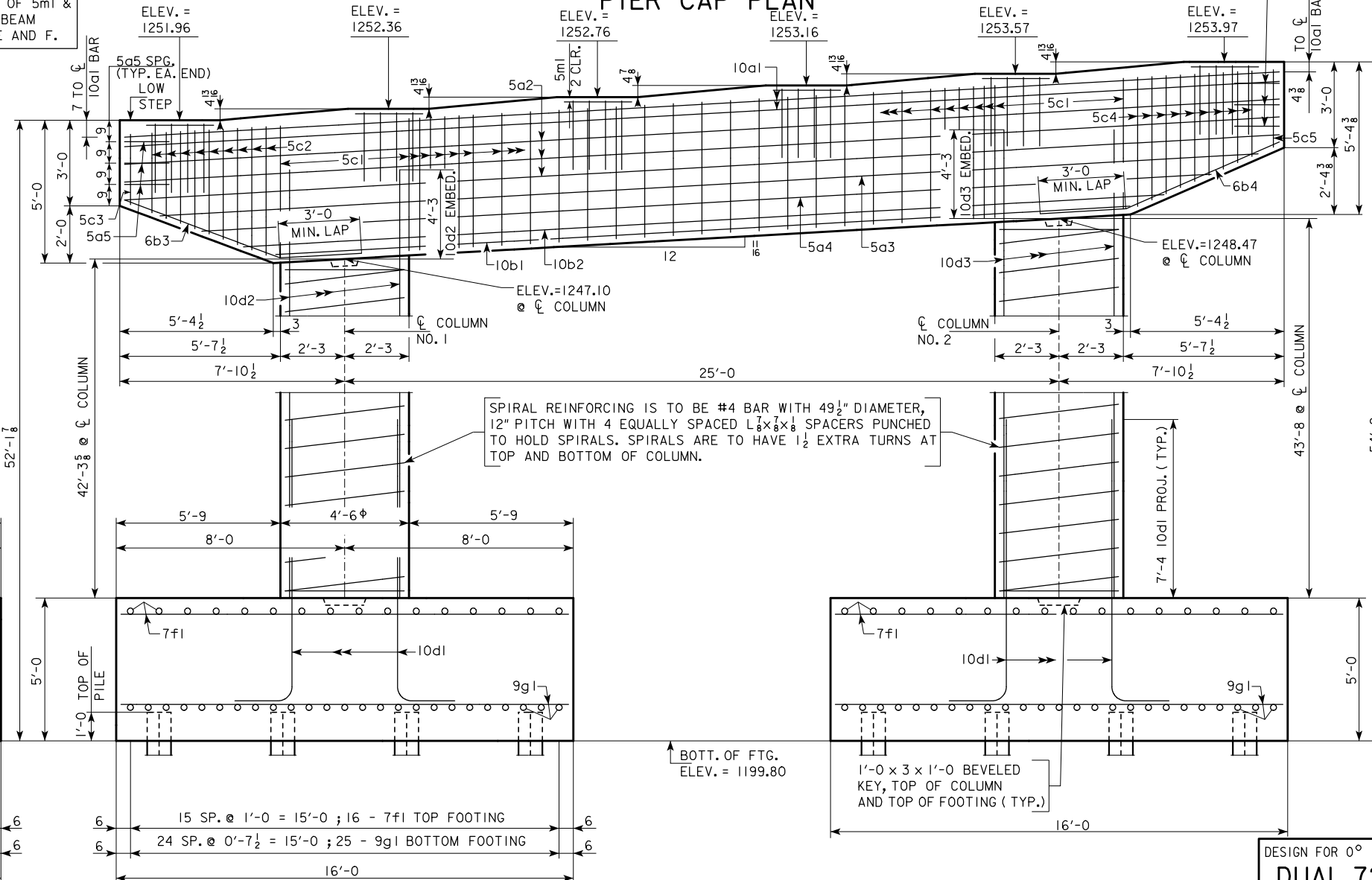
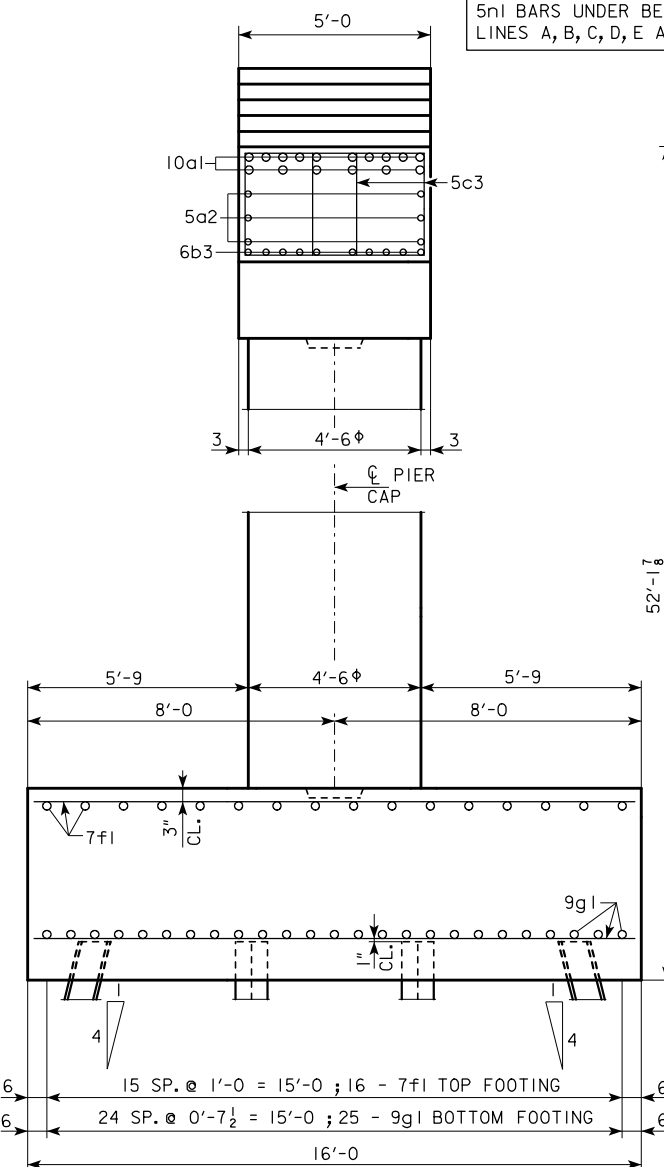
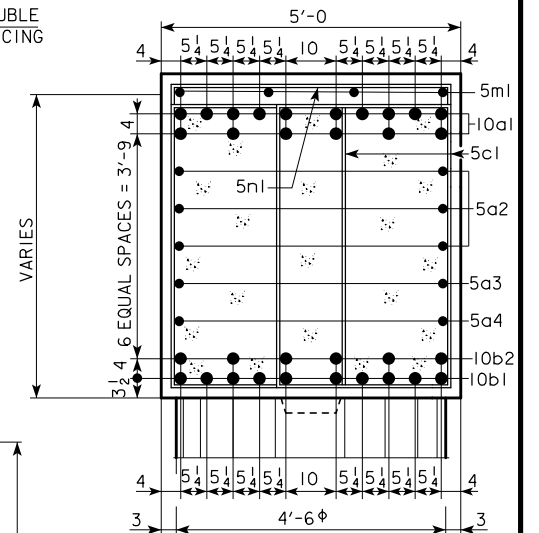
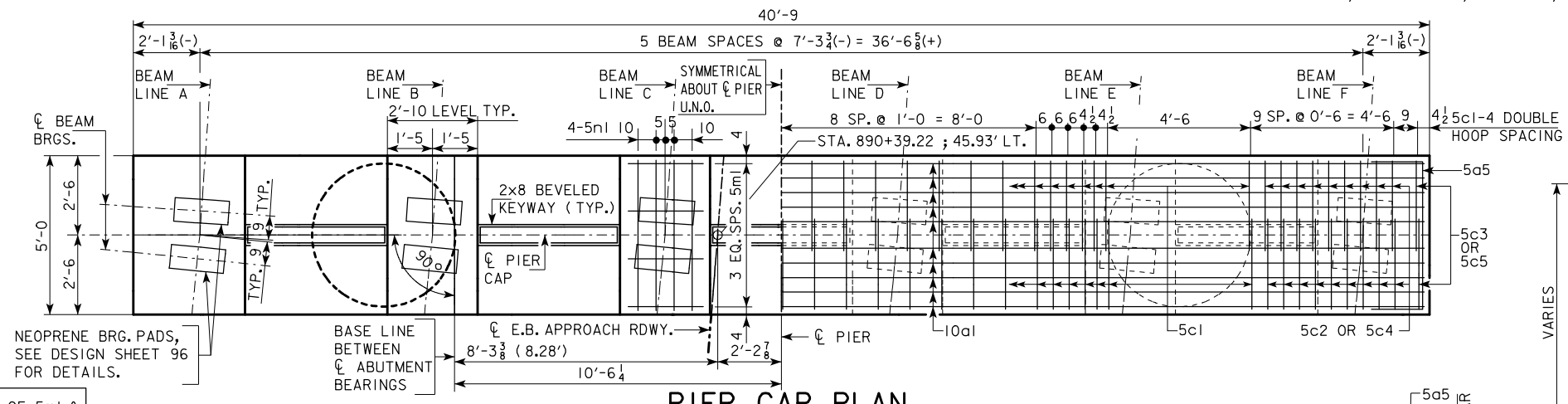
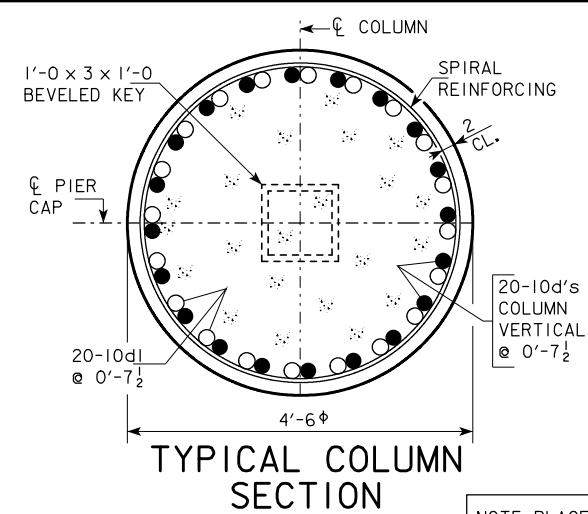


THE STAKING DIAGRAM INFORMATION DETAILED ON THIS SHEET SHOWS THE LOCATION AND ORIENTATION OF THE CENTERLINE OF SUBSTRUCTURE UNITS FROM A BASE LINE BETWEEN ϕ ABUTMENT BEARINGS. THE LOCATION OF ϕ ABUTMENT OR ϕ PIER RELATIVE TO THE BASE LINE AND ϕ EASTBOUND APPROACH ROADWAY IS SHOWN ON OTHER DESIGN SHEETS. THE FOLLOWING TABLE LISTS WHERE THIS INFORMATION IS SHOWN.

LOCATION OF ϕ ABUT. OR ϕ PIER FROM BASE LINE AND ϕ EB APPR. RDWY.	
FOR SUBSTRUCTURE UNIT:	SEE DESIGN SHEET:
W. ABUTMENT	82
PIER #1	66
PIER #2	69
PIER #3	72
PIER #4	75
PIER #5	78
PIER #6	80
E. ABUTMENT	83

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
STAKING DIAGRAM - EASTBOUND
 STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 64 OF 117 FILE NO. 30187 DESIGN NO. 410

← C COLUMN BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



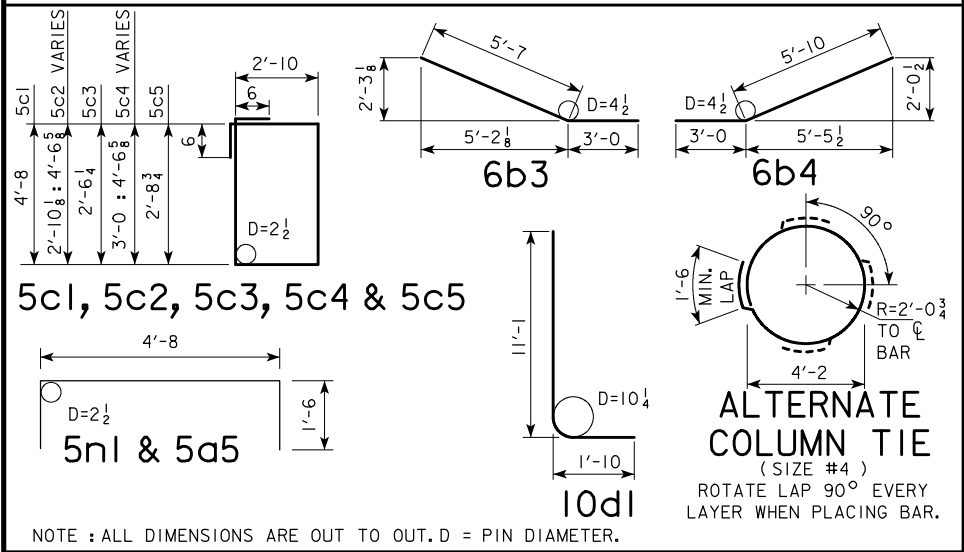
NOTE :
SEE DESIGN SHEET 66
FOR OTHER PIER DETAILS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
 DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
 PIER NO. 1 DETAILS-EASTBOUND
 STATION : 893+14.13 (@ RELOCATED U.S. 20) AUGUST, 2010

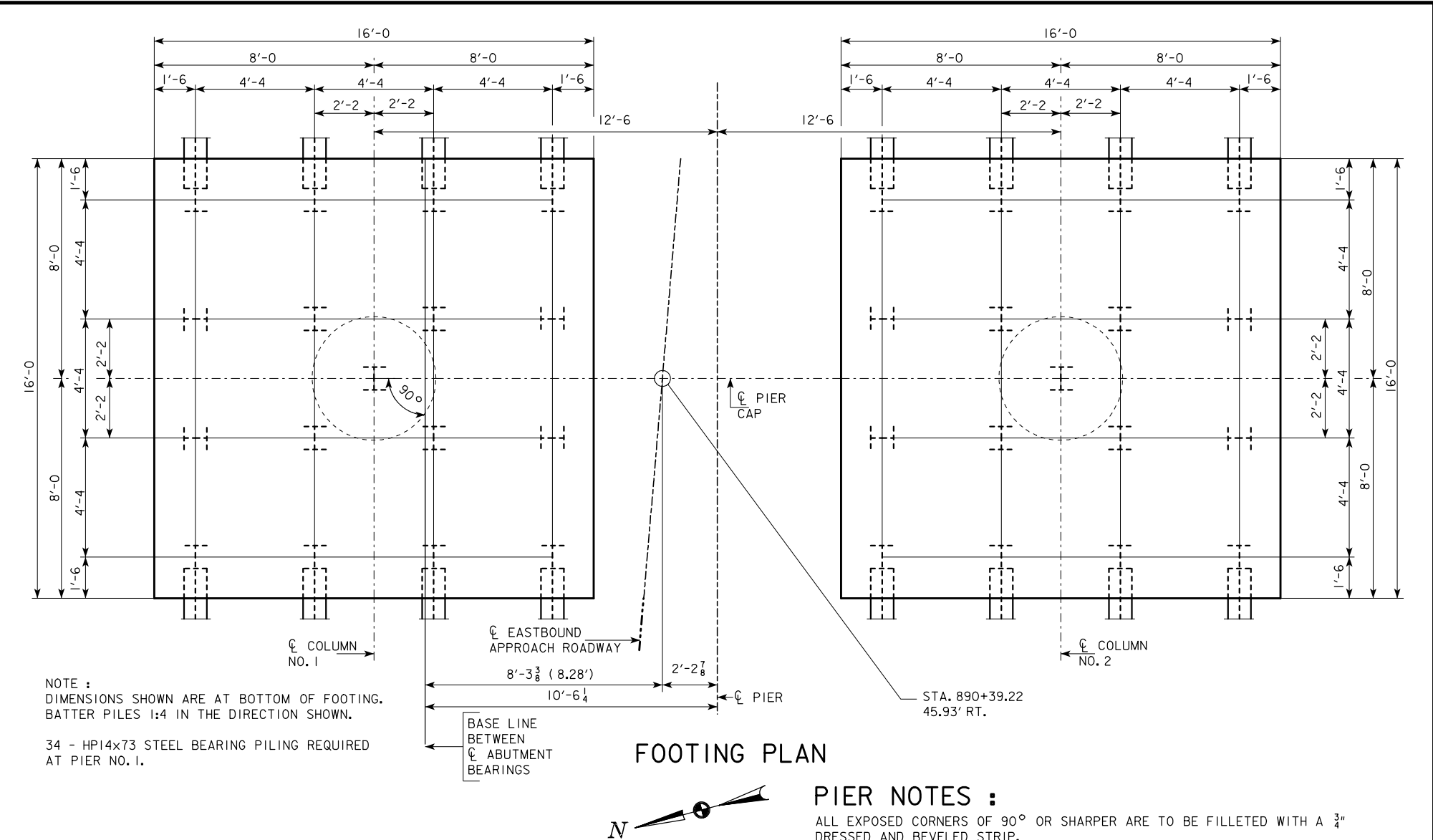
SAC COUNTY
NT OF TRANSPORTATION - HIGHWAY DIVISION
OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO.1					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO COLUMN DOWELS		40	12'-11	2223
10d2	COLUMN NO. 1, VERTICAL		20	46'-8	4016
10d3	COLUMN NO. 2, VERTICAL		20	48'-0	4131
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	584'-4	390
#4	COLUMN NO. 2, SPIRAL		1	602'-1	402
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	42'-0	118
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	43'-4	121
7f1	FOOTING, LONGIT. & TRANSV., TOP		64	15'-8	2049
9g1	FOOTING, LONGIT. & TRANSV., BOTTOM		100	15'-8	5327
REINFORCING STEEL TOTAL (LBS.)					26,209

BENT BAR DETAILS



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



CONCRETE PLACEMENT QUANTITIES - PIER NO.1	
LOCATION	QUANTITY
FOOTING	94.8
COLUMNS	50.6
CAP & STEPS	36.9
TOTAL - CU.YDS.	182.3

ESTIMATED QUANTITIES - PIER NO.1		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	182.3
REINFORCING STEEL	LBS.	26,209
CLASS 20 EXCAVATION	CU.YDS.	650
HPI4x73 STEEL PILE 34 @ 50.0'	LIN.FT.	1700

PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1191.3. PILES SHALL BE DRIVEN TO 72 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 8 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 64 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 1 DETAILS-EASTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

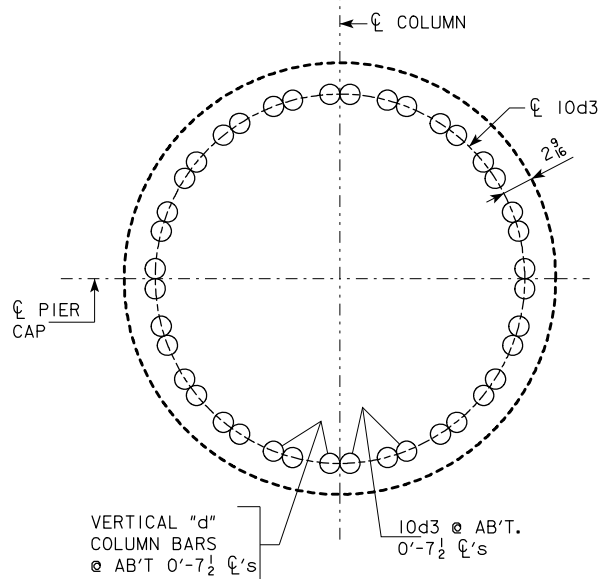
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 66 OF 117 FILE NO. 30187 DESIGN NO. 410

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IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 67 OF 117 FILE NO. 30187 DESIGN NO. 410

SHEET NUMBER 68

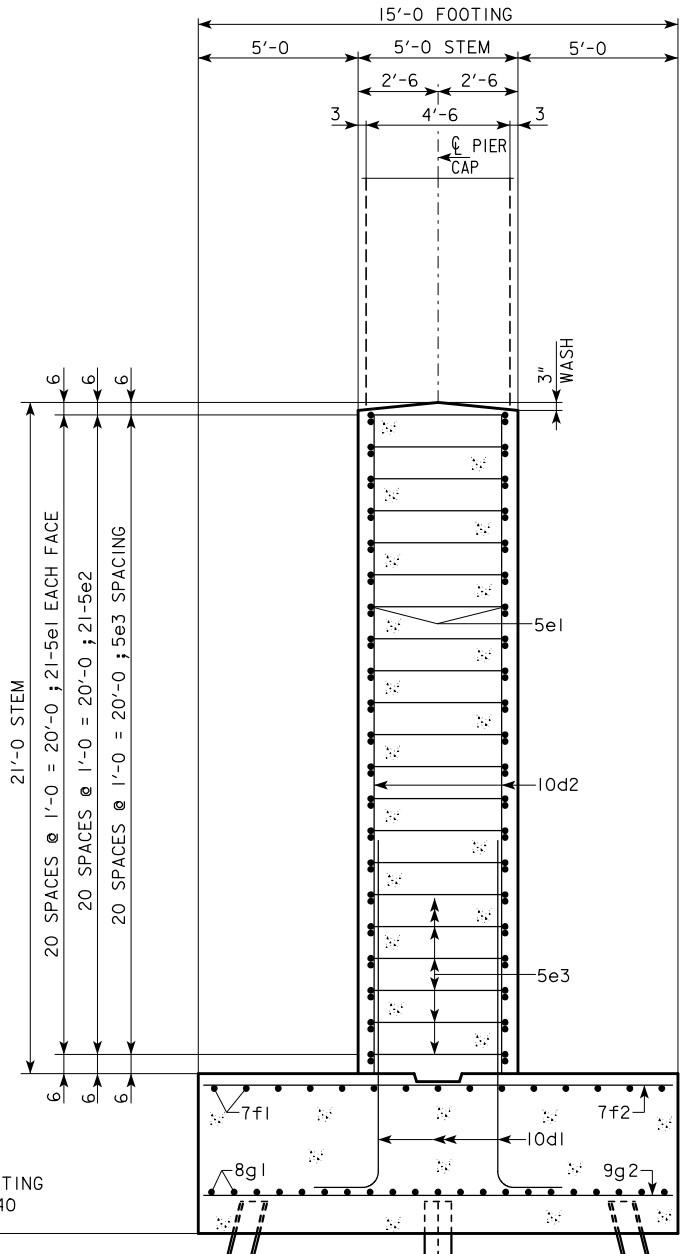
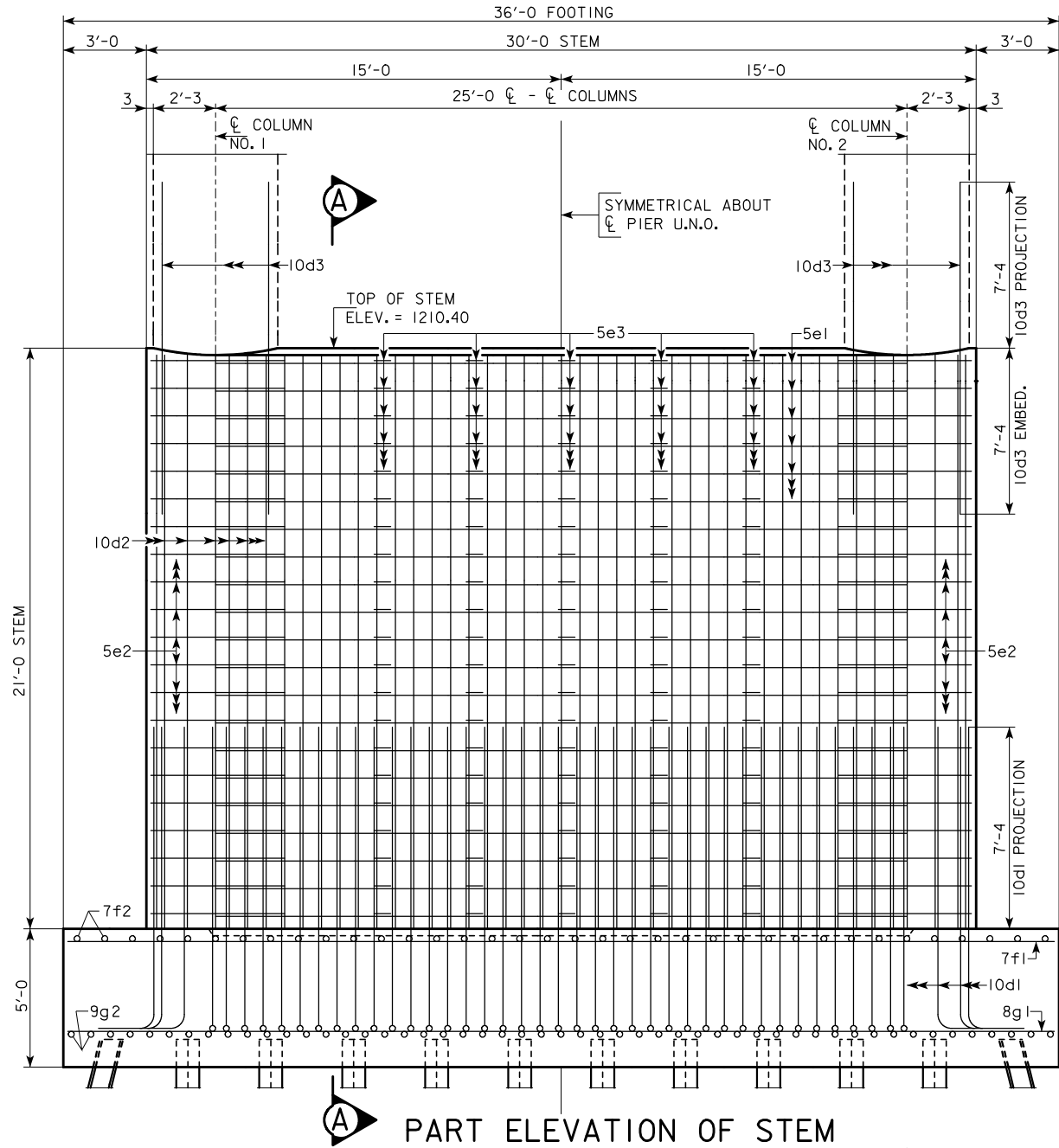
BENCH MARK: NO. 555: STA. 88|+83.2. 1271.0' LT., CUT X SW COR. WING OF BRIDGE. ELEV. = 1217.20.



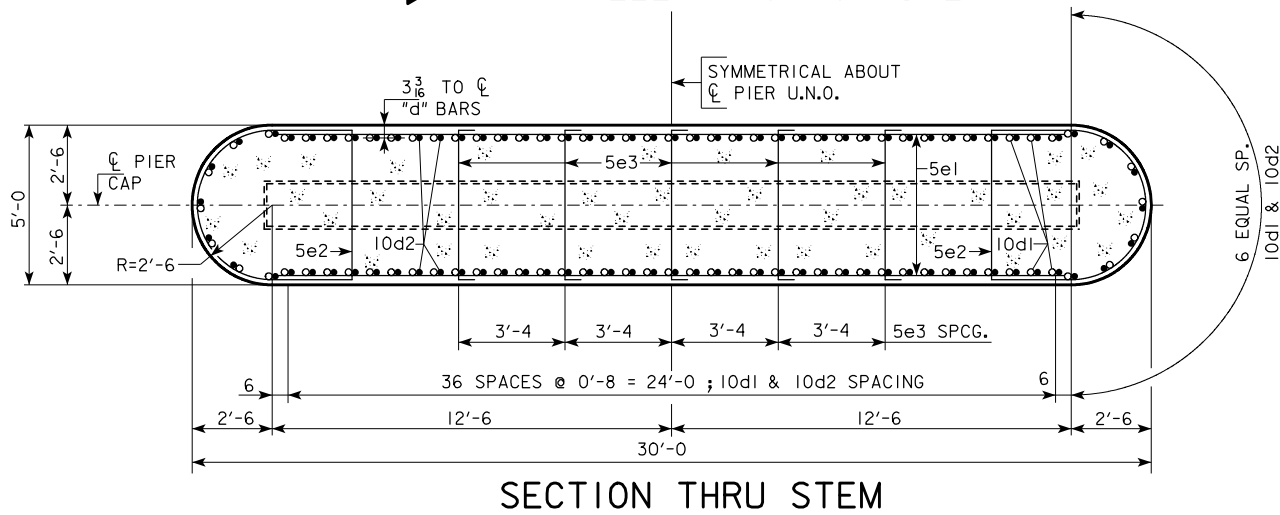
10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 67 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.



PART SECTION A-A



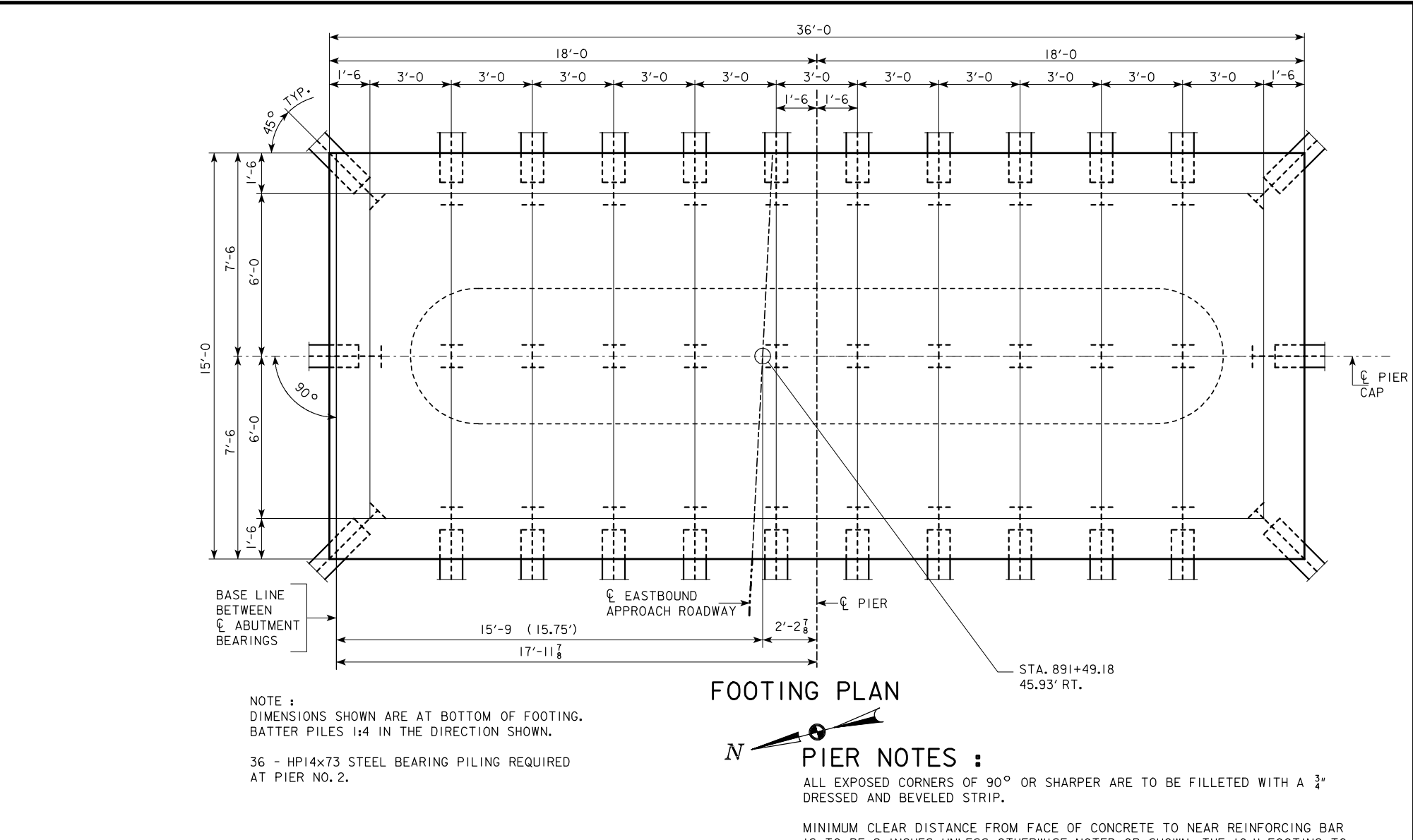
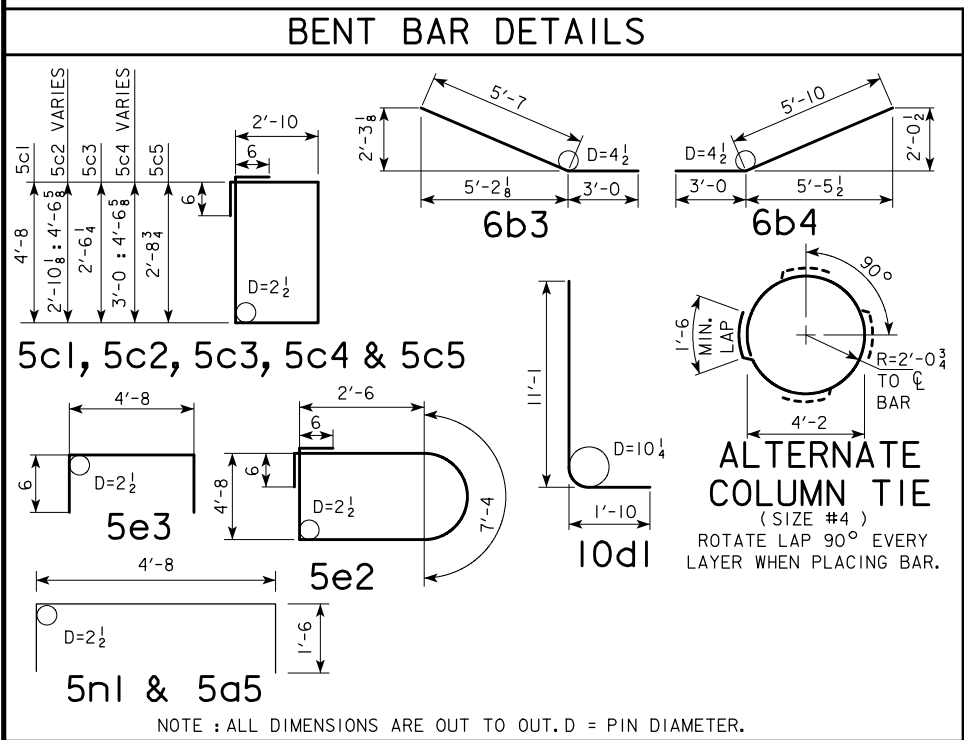
SECTION THRU STEM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
 DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
 PIER NO. 2 DETAILS-EASTBOUND
 STATION : 893+14.13 (♻ RELOCATED U.S. 20)
 AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 68 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 2					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		6	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		10	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	40'-3	3464
10d5	COLUMN NO. 2, VERTICAL		20	41'-8	3586
#4	COLUMN NO. 1, SPIRAL		1	500'-5	334
#4	COLUMN NO. 2, SPIRAL		1	518'-7	346
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	35'-6	99
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	36'-11	103
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
5m1	CAP, STEPS, LONGIT.		24	2'-8	67
5n1	CAP, STEPS, TRANSV.		24	7'-8	192
REINFORCING STEEL TOTAL (LBS.)					39,929



CONCRETE PLACEMENT QUANTITIES - PIER NO. 2	
LOCATION	QUANTITY
FOOTING	100.0
STEM	111.8
COLUMNS	43.0
CAP & STEPS	36.9
TOTAL - CU.YDS.	291.7

ESTIMATED QUANTITIES - PIER NO. 2		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	291.7
REINFORCING STEEL	LBS.	39,929
CLASS 20 EXCAVATION	CU.YDS.	100
CLASS 21 EXCAVATION	CU.YDS.	260
HPI4x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1179.3. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 2 DETAILS-EASTBOUND

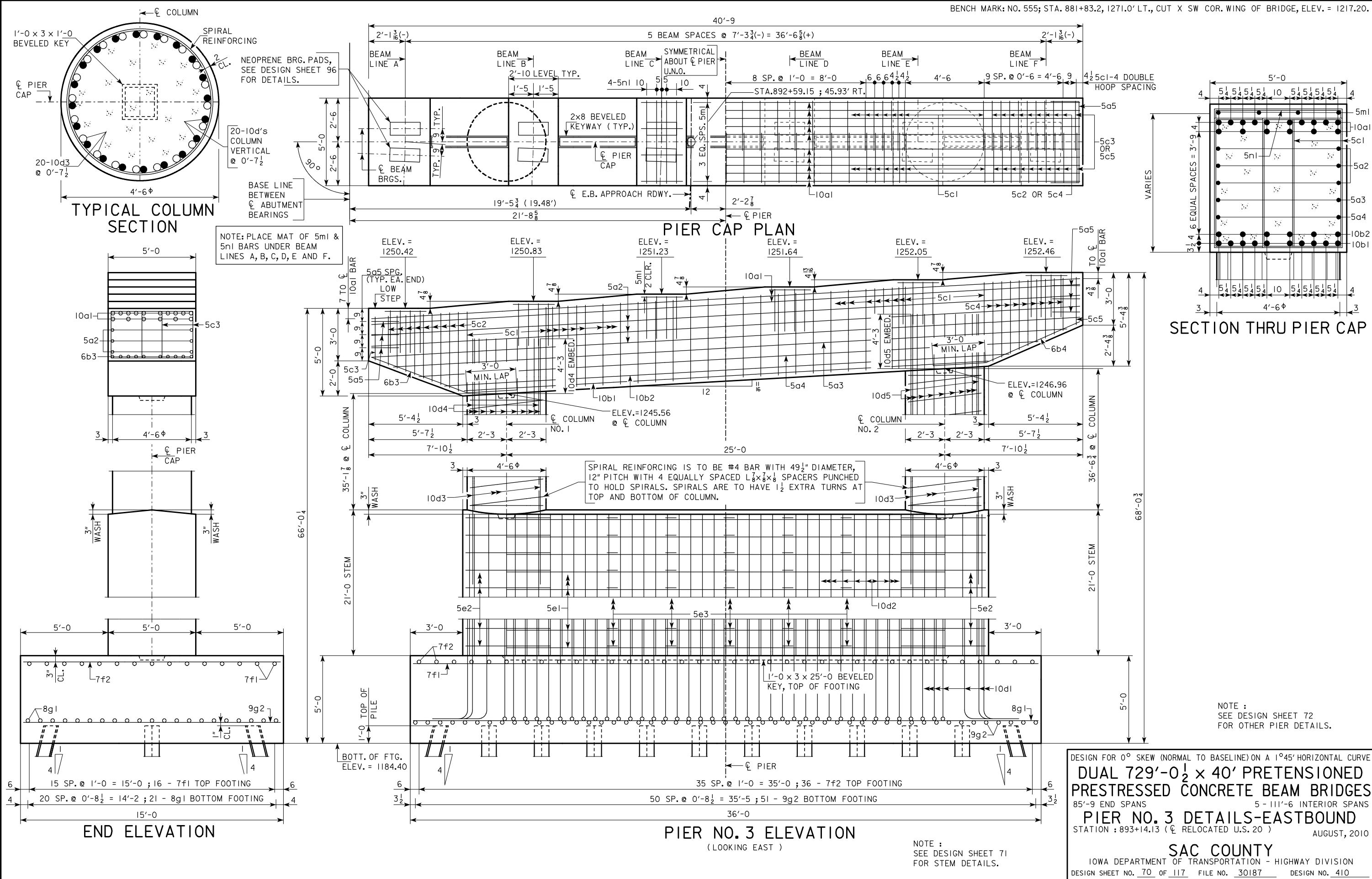
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

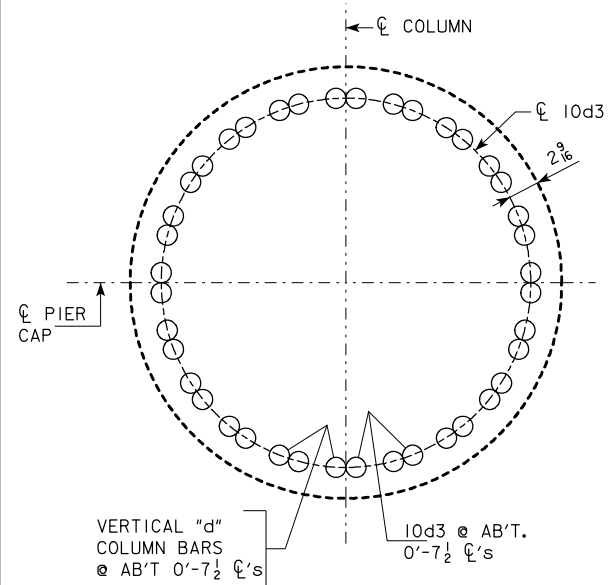
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 69 OF 117 FILE NO. 30187 DESIGN NO. 410

← C COLUMN BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



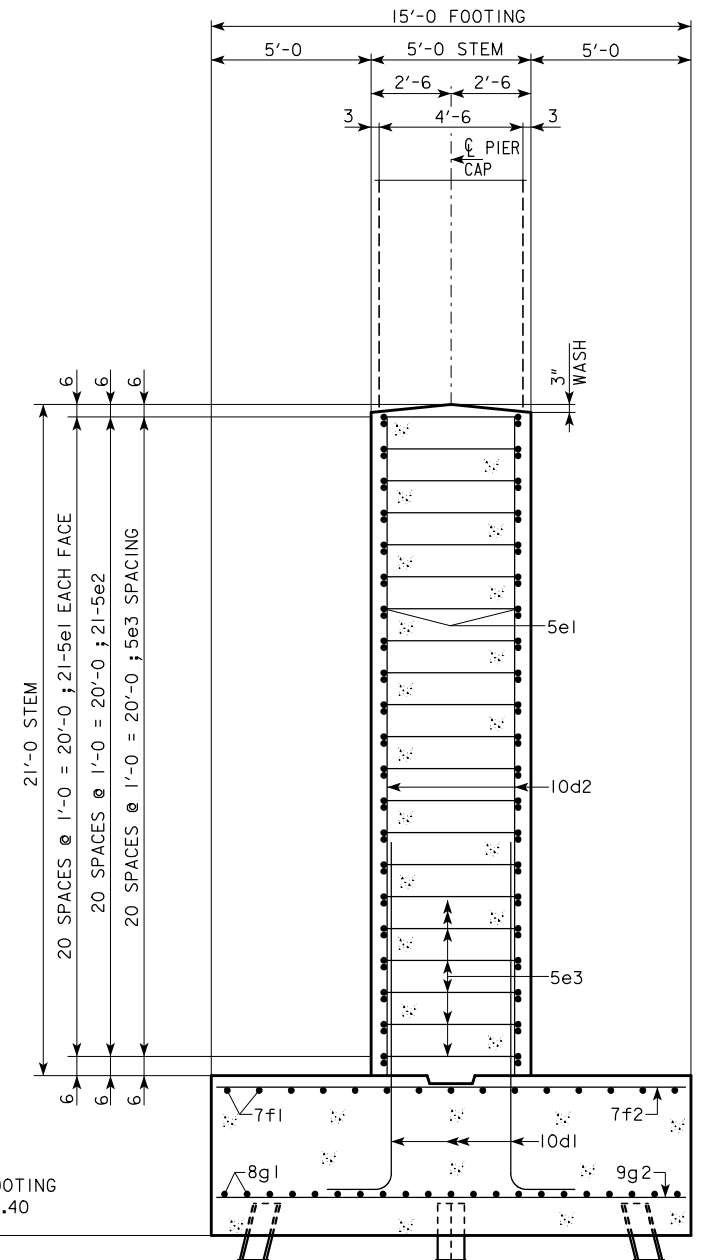
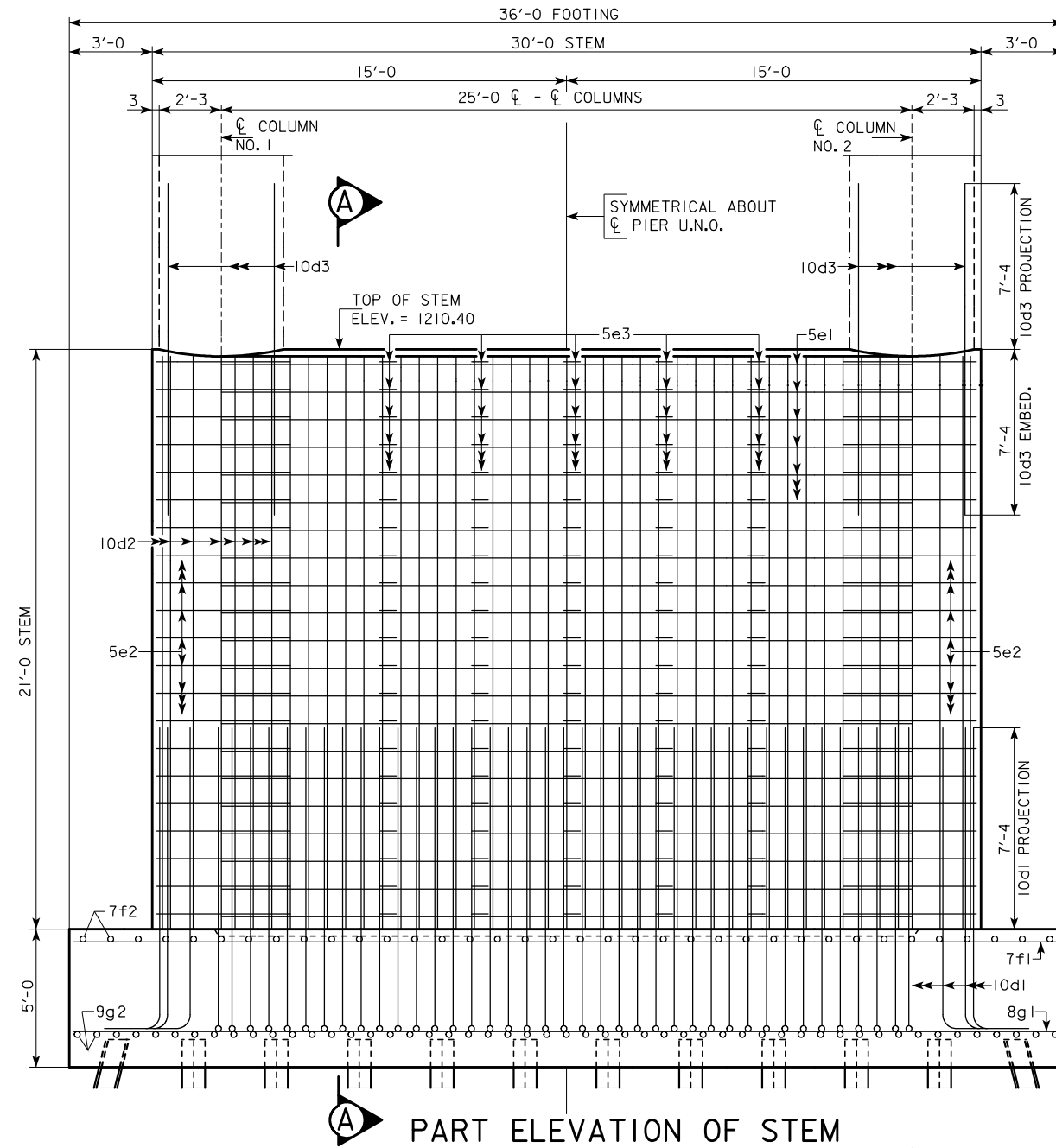
BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



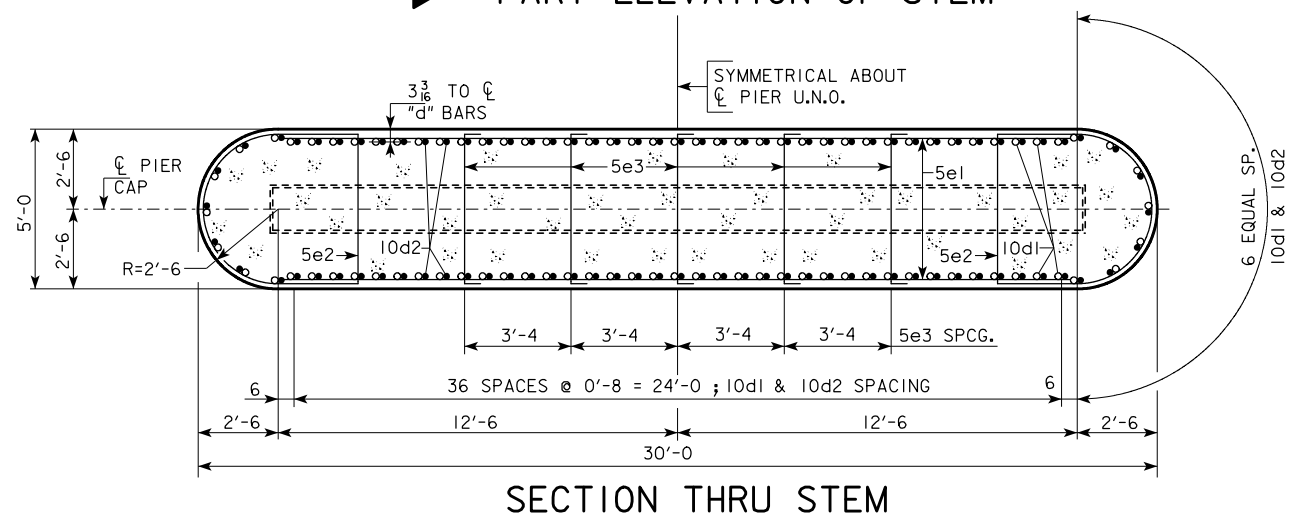
10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 70 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.



PART SECTION A-A



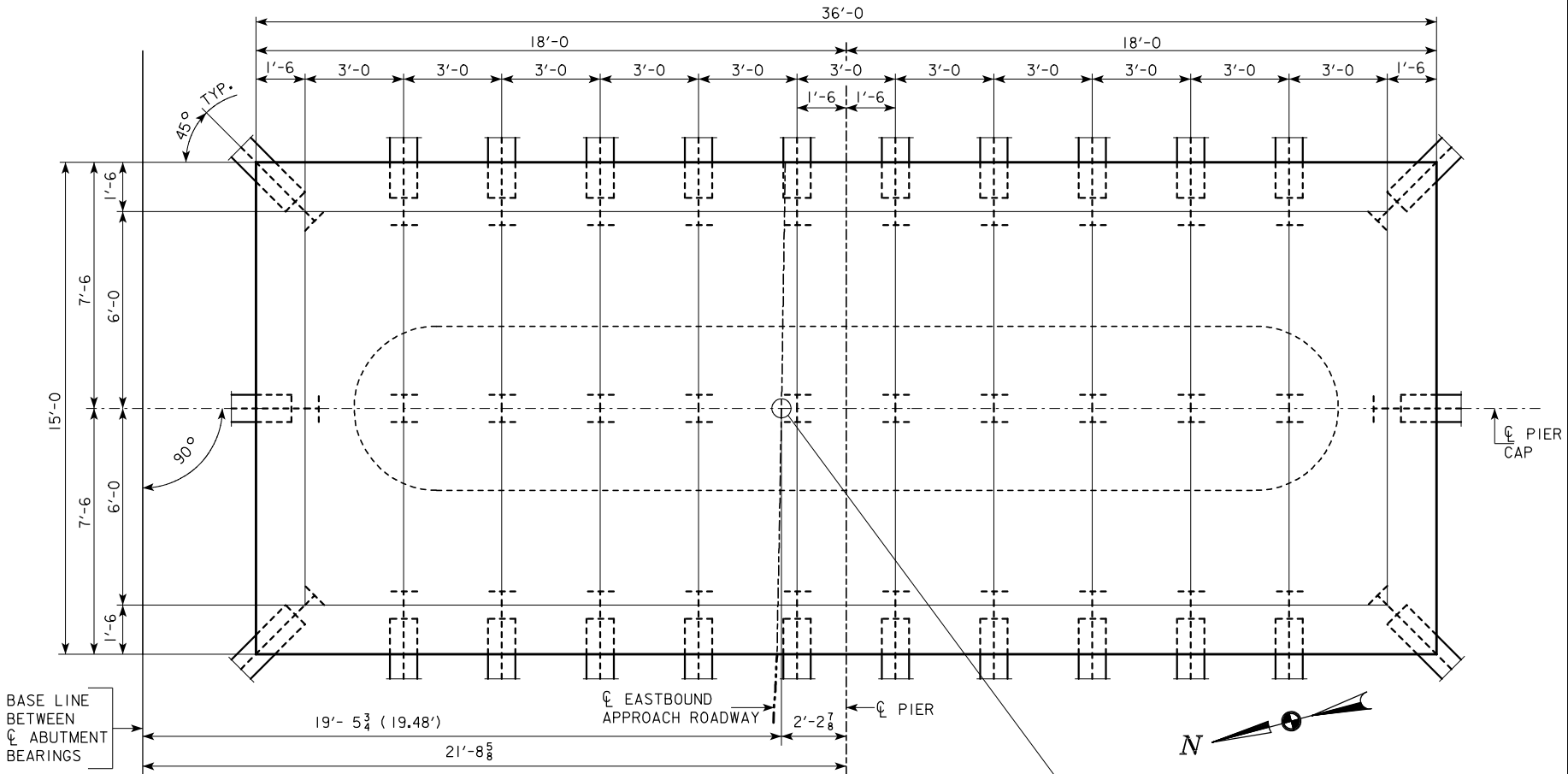
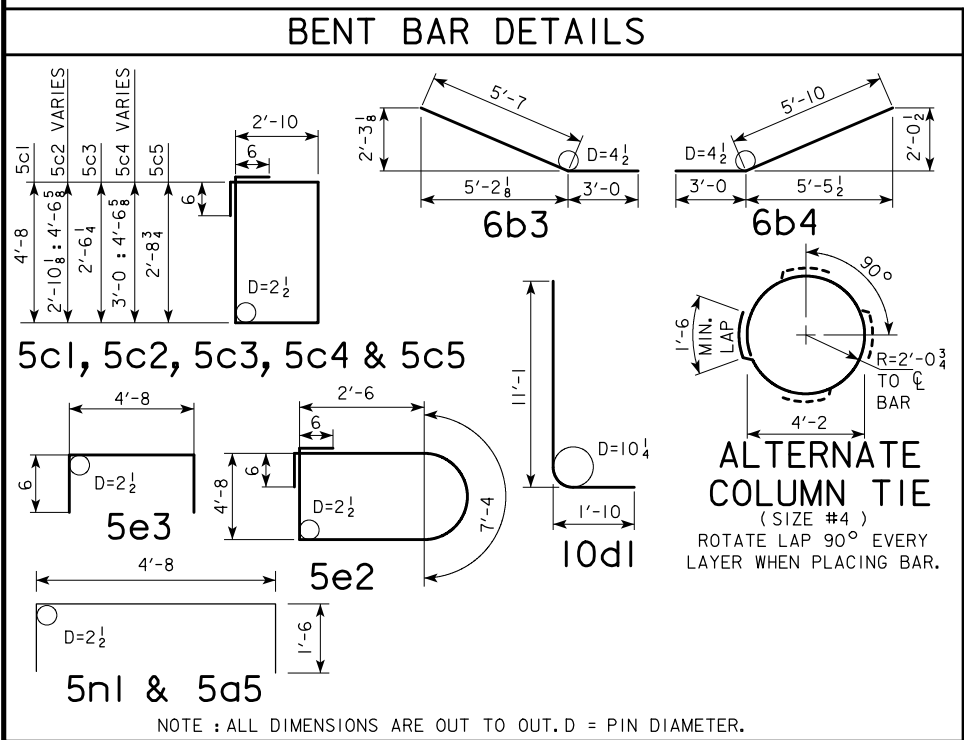
SECTION THRU STEM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
 DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
 PIER NO. 3 DETAILS-EASTBOUND
 STATION : 893+14.13 (C RELOCATED U.S. 20)
 AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 71 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 3					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	39'-7	3407
10d5	COLUMN NO. 2, VERTICAL		20	41'-0	3528
#4	COLUMN NO. 1, SPIRAL		1	491'-6	328
#4	COLUMN NO. 2, SPIRAL		1	509'-9	341
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	34'-10	98
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	36'-3	102
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
5m1	CAP, STEPS, LONGIT.		24	2'-8	67
5n1	CAP, STEPS, TRANSV.		24	7'-8	192
REINFORCING STEEL TOTAL (LBS.)					39,801



NOTE :
DIMENSIONS SHOWN ARE AT BOTTOM OF FOOTING.
BATTER PILES 1:4 IN THE DIRECTION SHOWN.

36 - HP14x73 STEEL BEARING PILING REQUIRED
AT PIER NO. 3.

FOOTING PLAN

PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1179.3. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

CONCRETE PLACEMENT QUANTITIES - PIER NO. 3		
LOCATION		QUANTITY
FOOTING		100.0
STEM		111.8
COLUMNS		42.2
CAP & STEPS		36.9
TOTAL - CU.YDS.		290.9

ESTIMATED QUANTITIES - PIER NO. 3		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	290.9
REINFORCING STEEL	LBS.	39,801
CLASS 20 EXCAVATION	CU.YDS.	110
CLASS 21 EXCAVATION	CU.YDS.	260
HP14x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

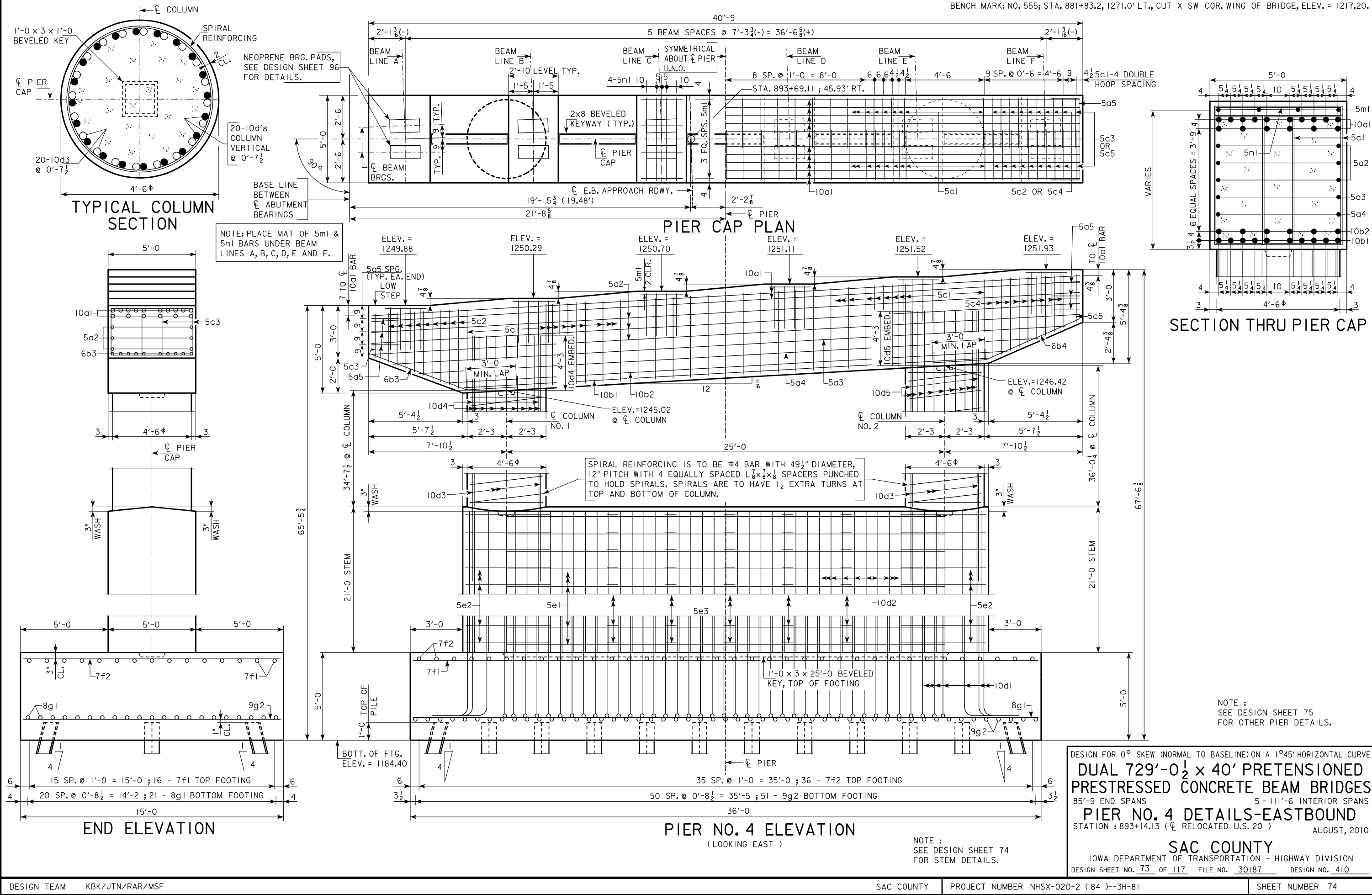
PIER NO. 3 DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

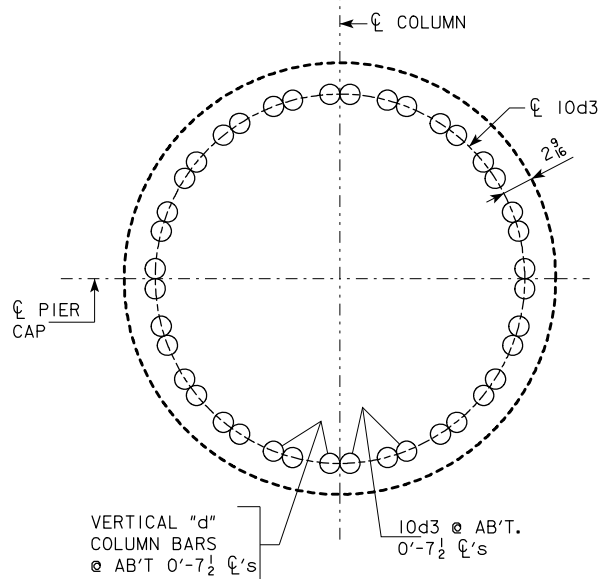
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 72 OF 117 FILE NO. 30187 DESIGN NO. 410



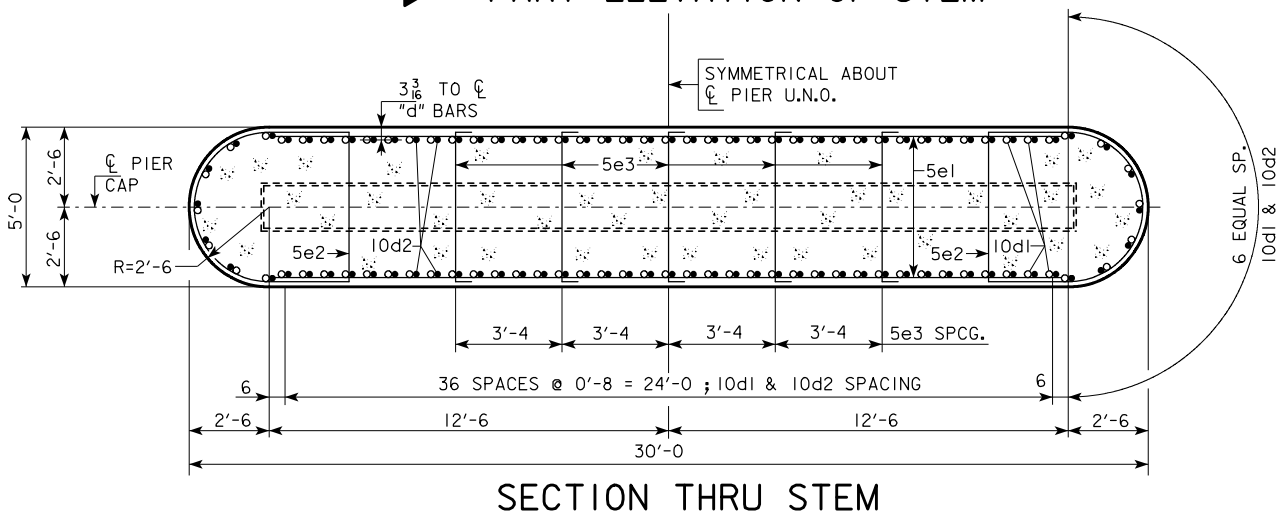
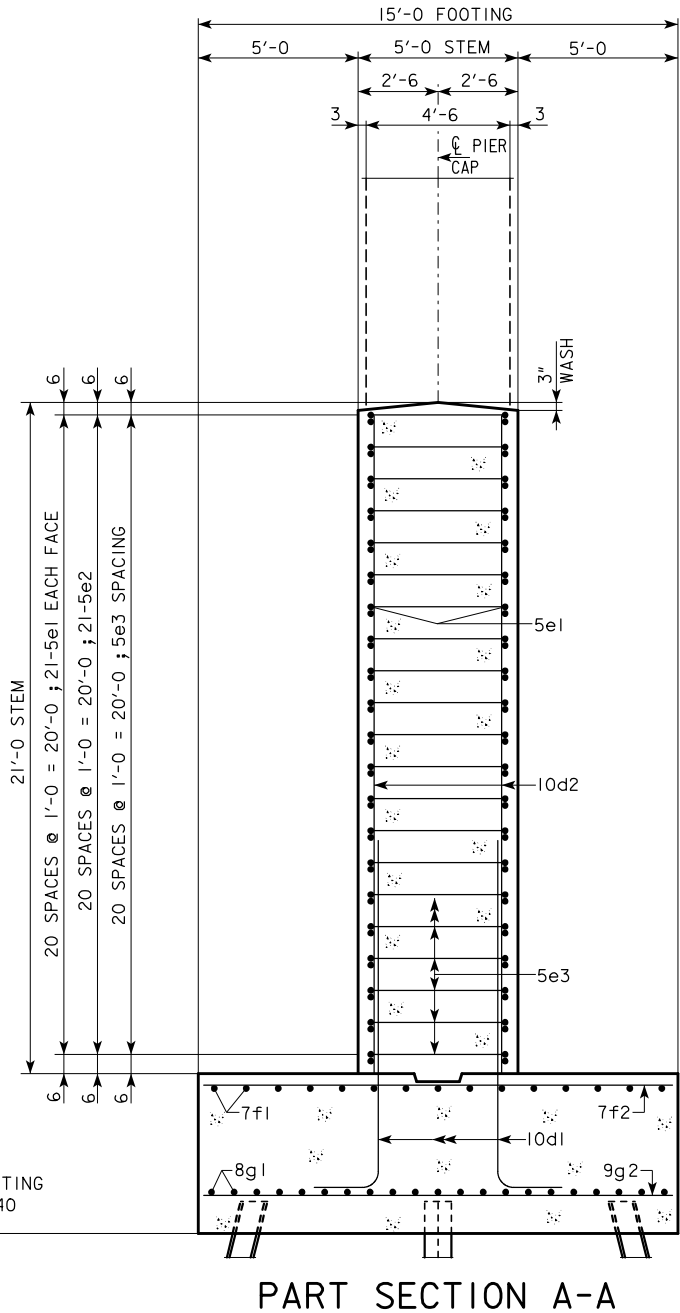
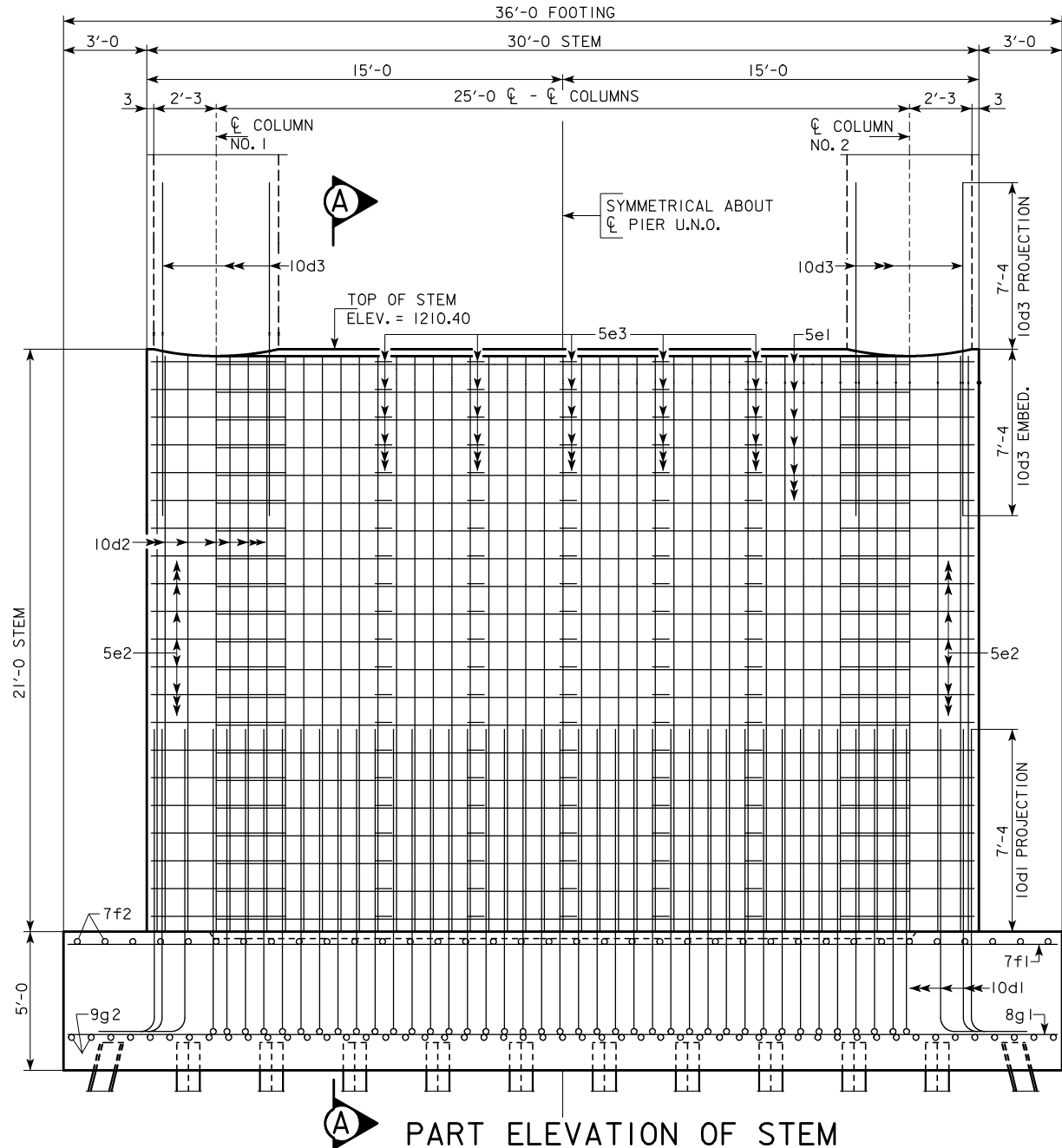
BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



10d3 DOWEL
PLACEMENT DETAIL
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 73 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.

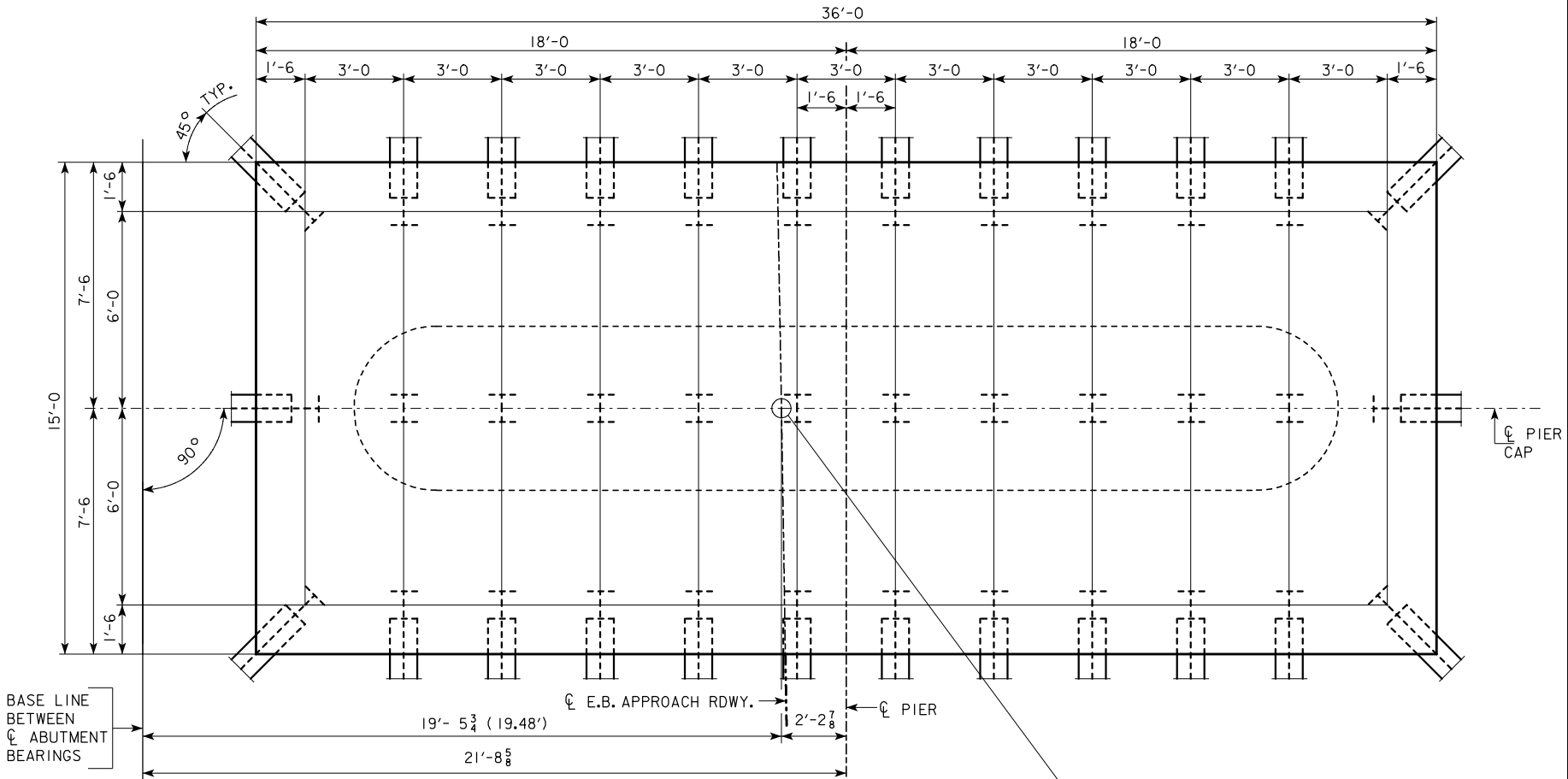
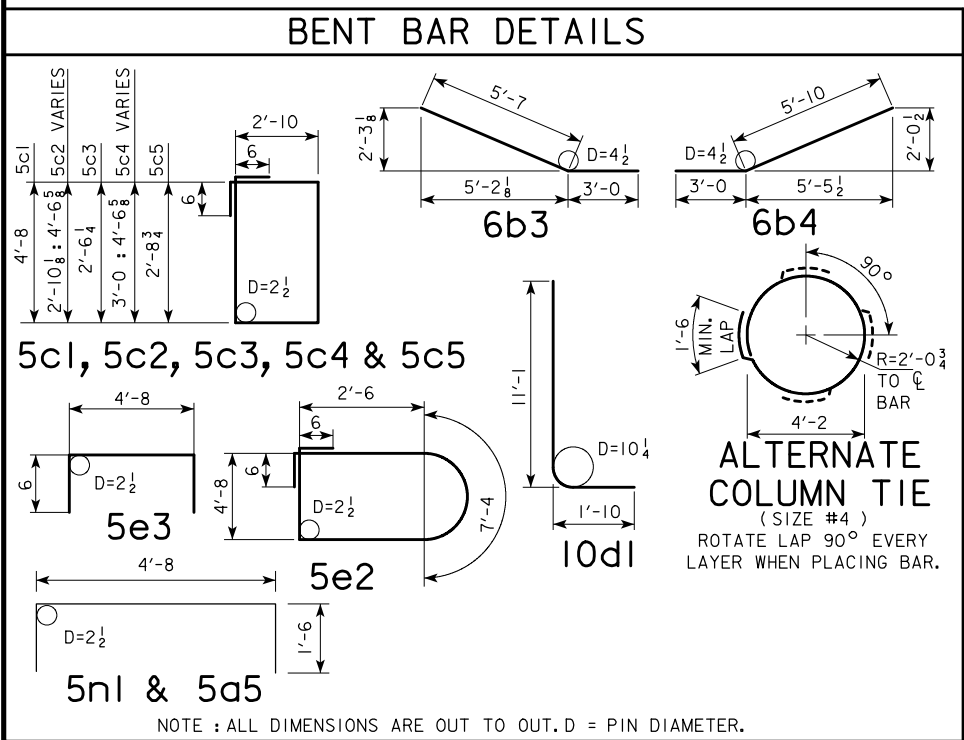


DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0¹/₂' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5-111'-6" INTERIOR SPANS
PIER NO. 4 DETAILS-EASTBOUND
STATION : 893+14.13 (C RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 74 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 4					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	39'-0	3356
10d5	COLUMN NO. 2, VERTICAL		20	40'-6	3485
#4	COLUMN NO. 1, SPIRAL		1	484'-6	324
#4	COLUMN NO. 2, SPIRAL		1	502'-9	336
	COL. NO. 1, SPIRAL SPACERS $L\frac{3}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	34'-3	96
	COL. NO. 2, SPIRAL SPACERS $L\frac{3}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	35'-8	100
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
5m1	CAP, STEPS, LONGIT.		24	2'-8	67
5n1	CAP, STEPS, TRANSV.		24	7'-8	192
REINFORCING STEEL TOTAL (LBS.)					39,694



FOOTING PLAN



PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1179.3. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

CONCRETE PLACEMENT QUANTITIES - PIER NO. 4		
LOCATION	QUANTITY	
FOOTING	100.0	
STEM	111.8	
COLUMNS	41.6	
CAP & STEPS	36.9	
TOTAL - CU.YDS.		290.3

ESTIMATED QUANTITIES - PIER NO. 4		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	290.3
REINFORCING STEEL	LBS.	39,694
CLASS 20 EXCAVATION	CU.YDS.	170
CLASS 21 EXCAVATION	CU.YDS.	260
HP14x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 4 DETAILS-EASTBOUND

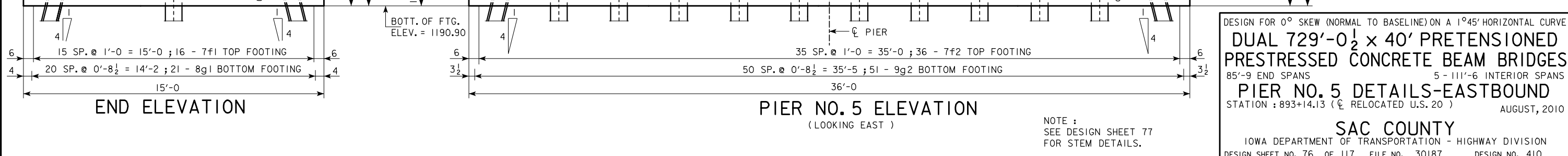
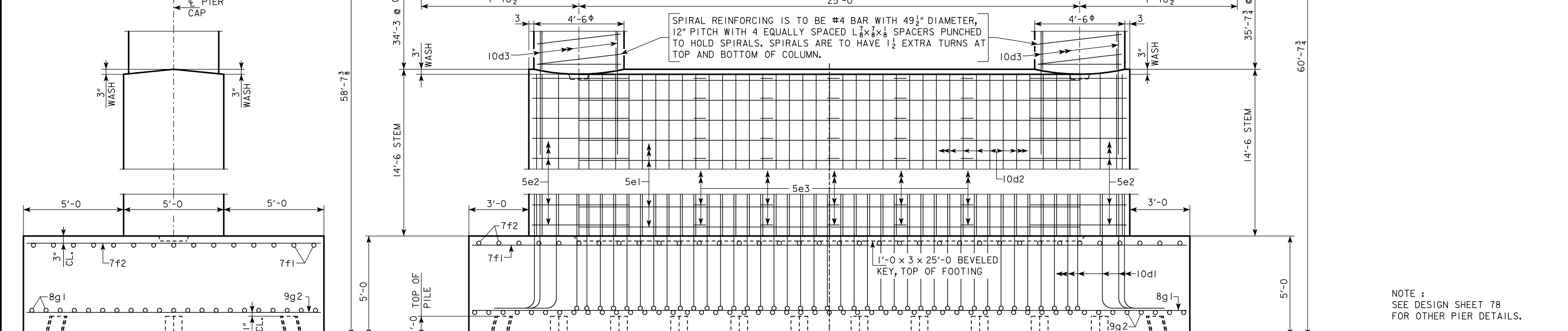
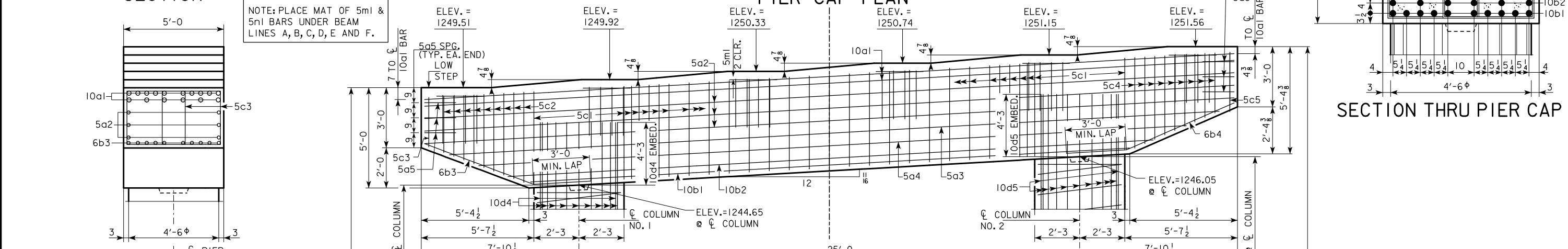
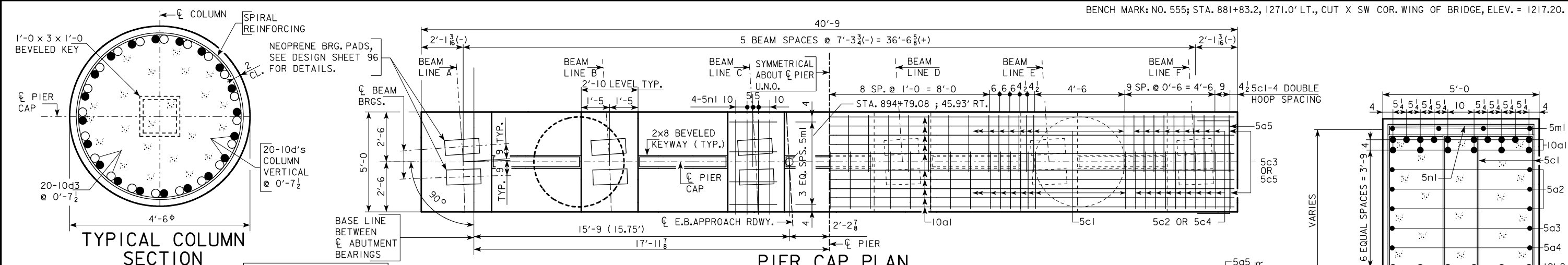
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

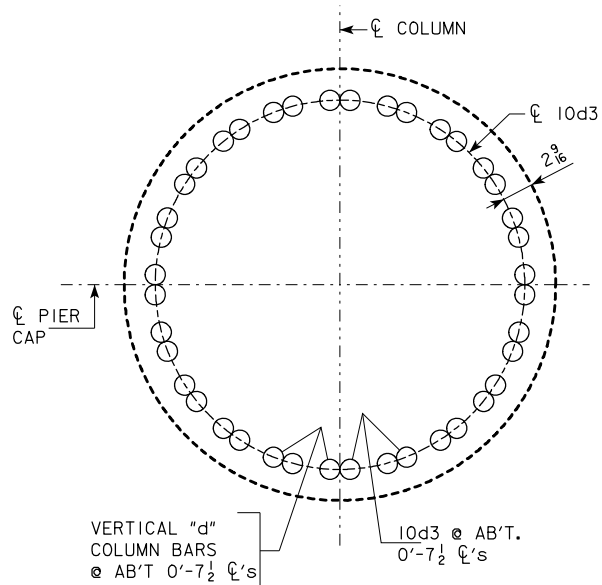
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 75 OF 117 FILE NO. 30187 DESIGN NO. 410

← COLUMN → BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



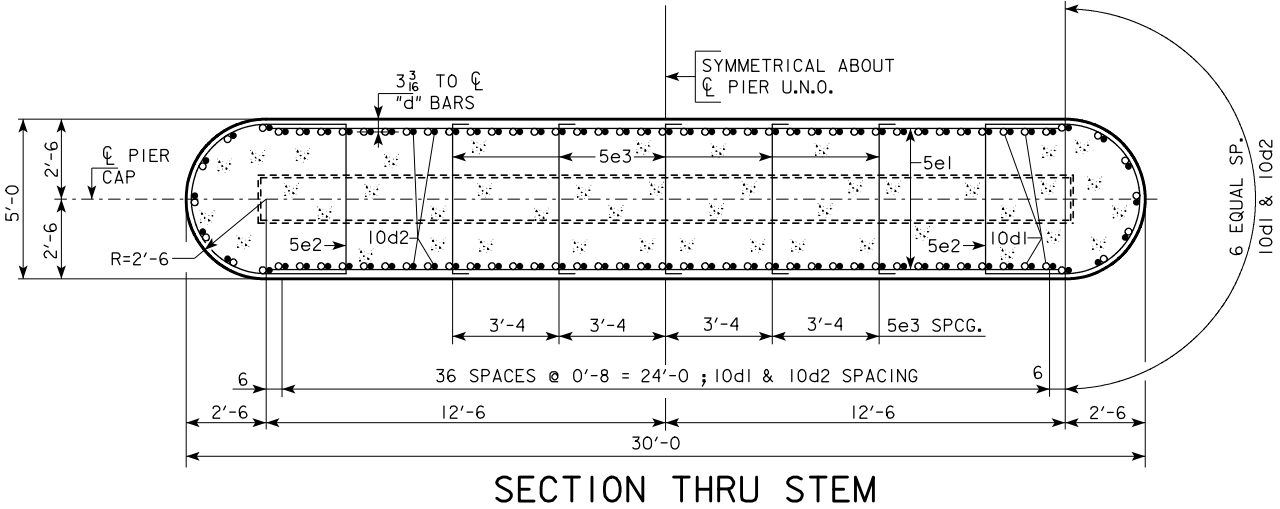
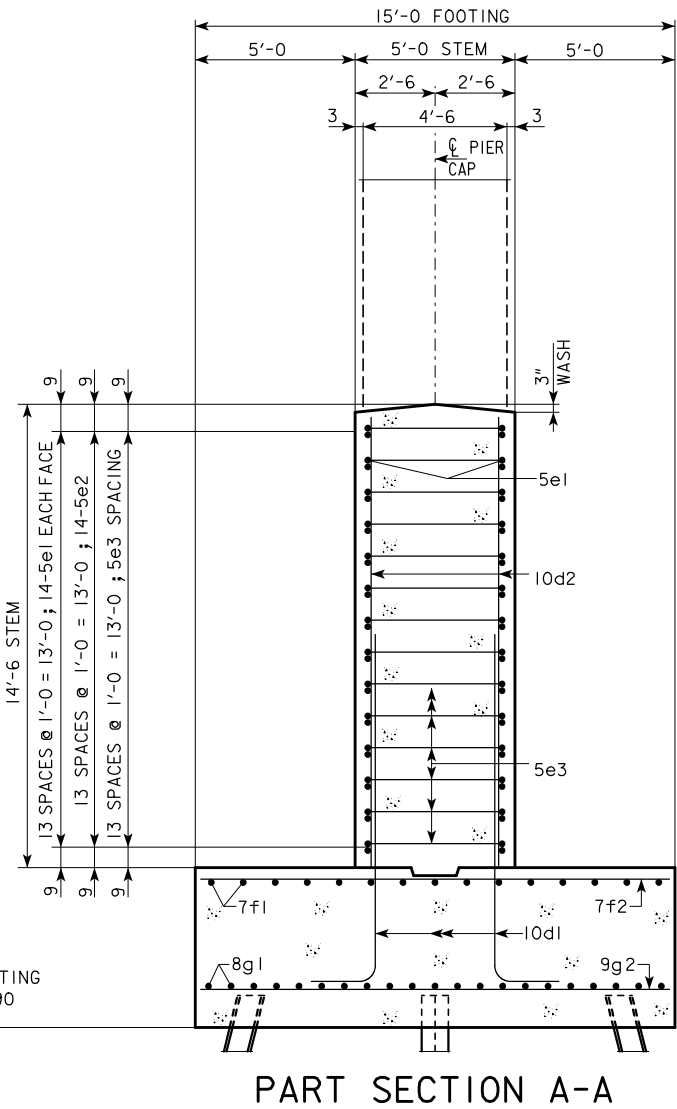
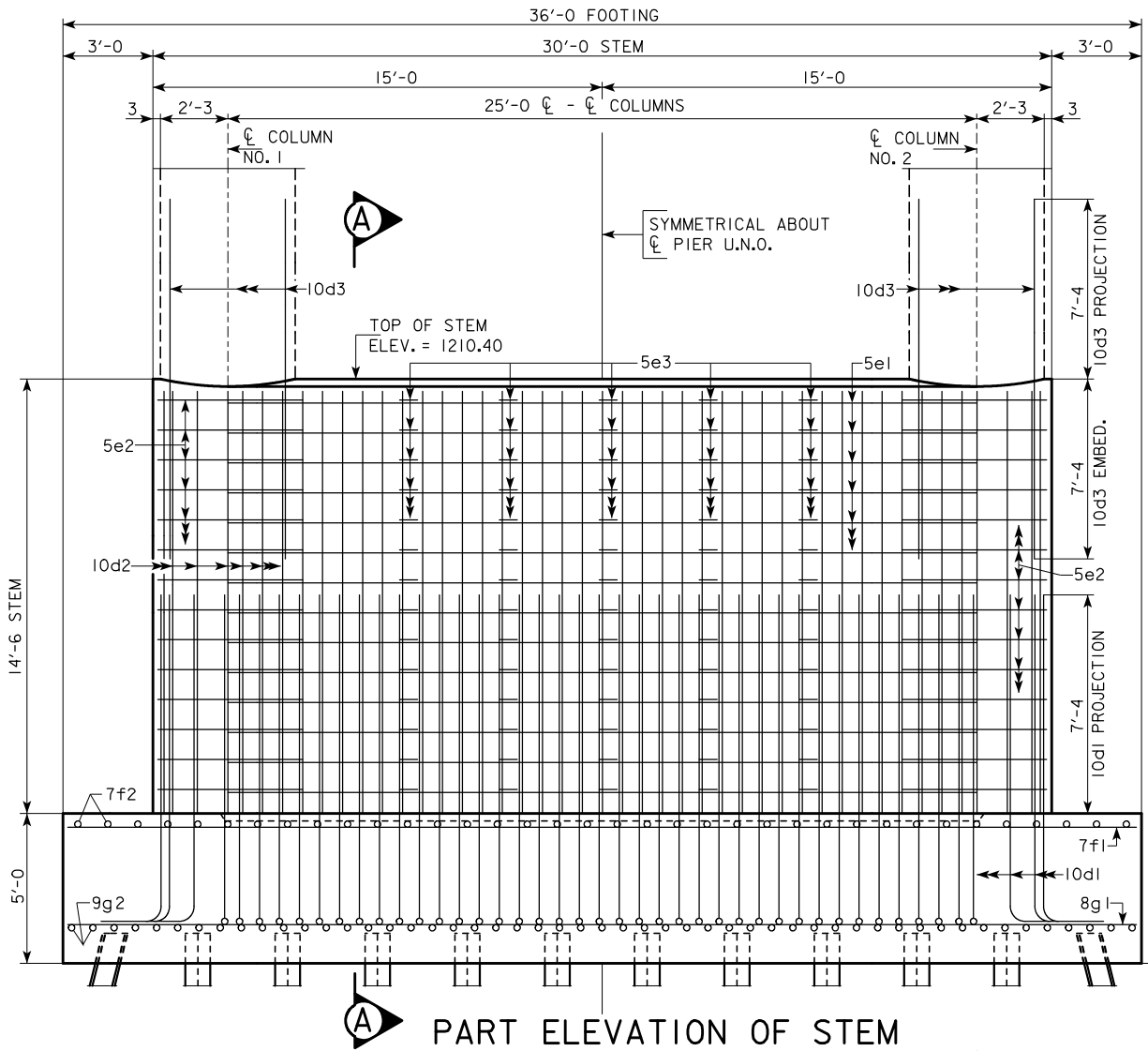
DESIGN TEAM	KBK/JTN/RAR/MSF	SAC COUNTY	PROJECT NUMBER	NHSX-020-2 (84)--3H-81	SHEET NUMBER	77
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**10d3 DOWEL
PLACEMENT DETAIL**
(TYPICAL AT EACH COLUMN)

NOTE :
10d3 STEM TO COLUMN DOWELS ARE TO BE
IN PLACE BEFORE STEM CONCRETE IS PLACED.

NOTE :
SEE TYPICAL COLUMN SECTION ON
DESIGN SHEET 76 FOR "d" VERTICAL
COLUMN BARS AND SPIRAL REINFORCING.

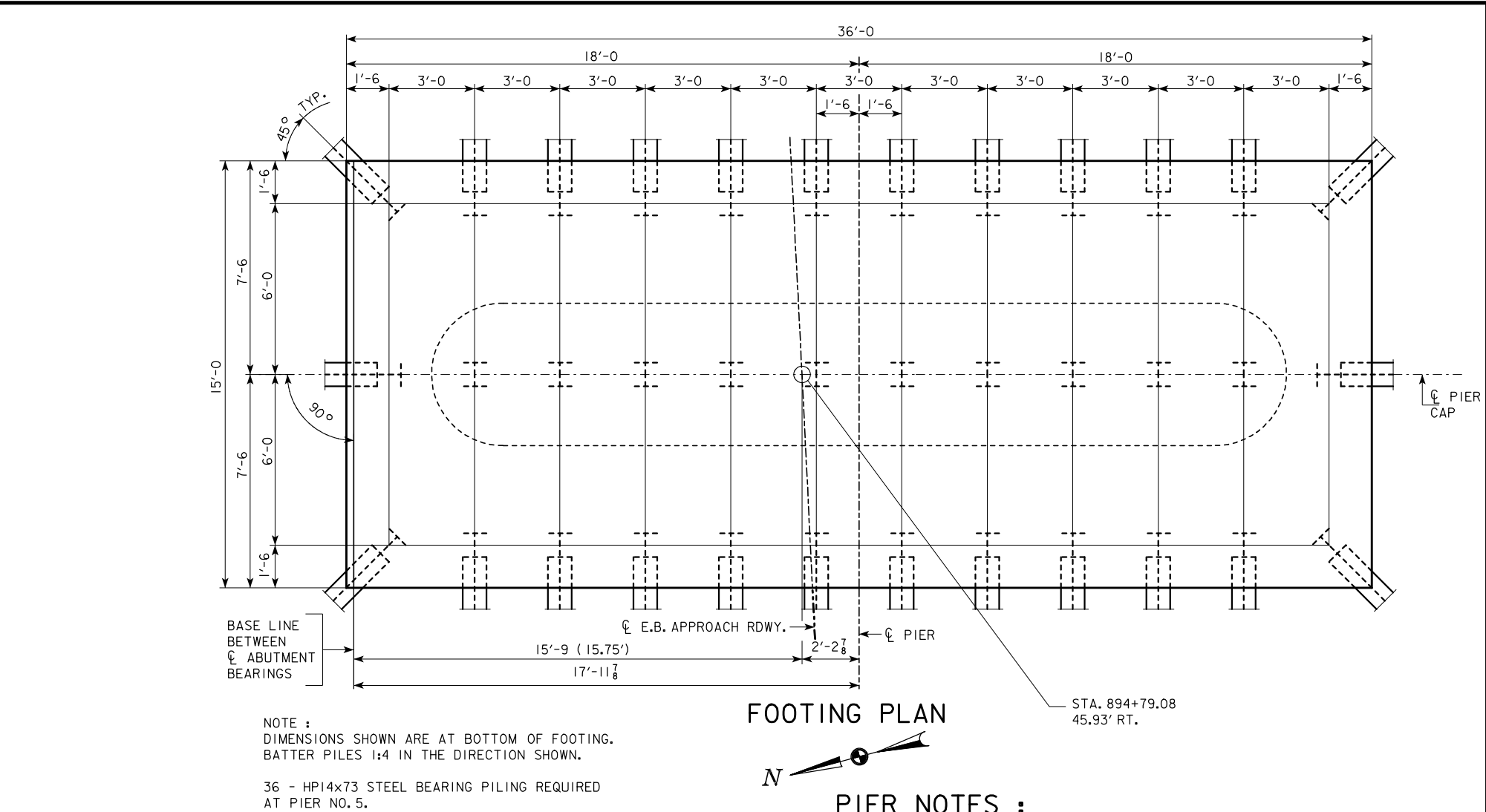
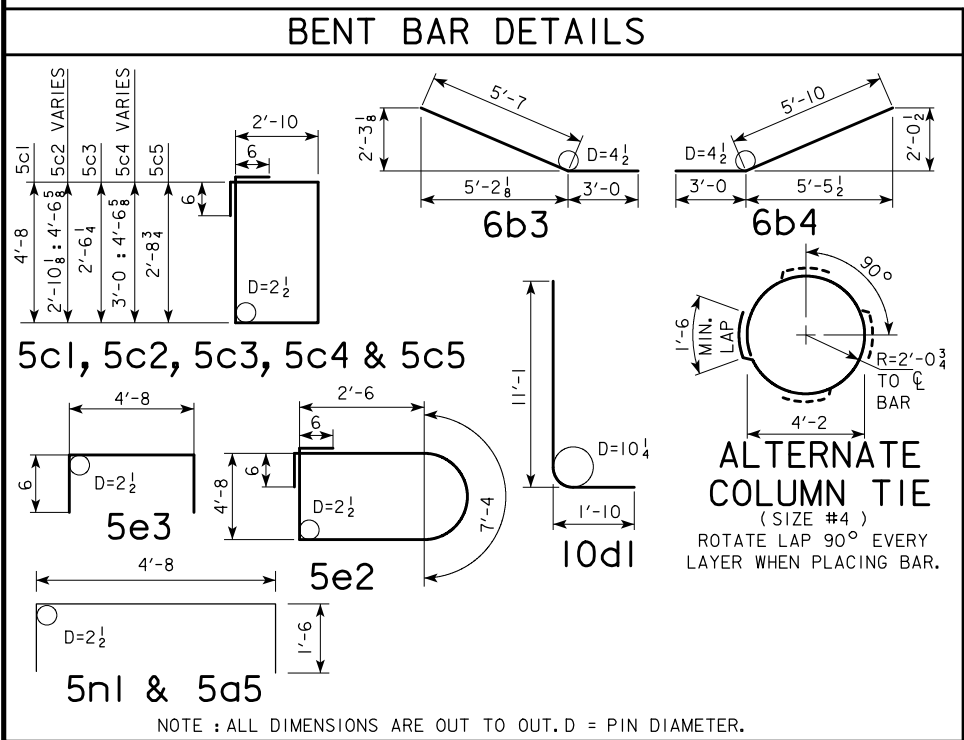


DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
PIER NO. 5 DETAILS-EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 77 OF 117 FILE NO. 30187 DESIGN NO. 410

REINFORCING BAR LIST - PIER NO. 5					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO STEM DOWELS		88	12'-11	4891
10d2	STEM VERTICAL		88	20'-9	7857
10d3	STEM TO COLUMN DOWELS		40	14'-8	2524
10d4	COLUMN NO. 1, VERTICAL		20	38'-9	3335
10d5	COLUMN NO. 2, VERTICAL		20	40'-2	3457
#4	COLUMN NO. 1, SPIRAL		1	479'-9	320
#4	COLUMN NO. 2, SPIRAL		1	497'-11	333
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	33'-11	95
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8}\times\frac{7}{8}\times\frac{1}{8}$ (0.7 LB./FT.)		4	35'-3	99
5e1	STEM HORIZONTAL		42	25'-0	1095
5e2	STEM ENDS		42	18'-0	789
5e3	STEM HAIRPINS		105	5'-8	621
7f1	FOOTING, LONGIT., TOP		16	35'-8	1166
7f2	FOOTING, TRANSV., TOP		36	14'-8	1079
8g1	FOOTING, LONGIT., BOTTOM		21	35'-8	2000
9g2	FOOTING, TRANSV., BOTTOM		51	14'-8	2543
5m1	CAP, STEPS, LONGIT.		24	2'-8	67
5n1	CAP, STEPS, TRANSV.		24	7'-8	192
REINFORCING STEEL TOTAL (LBS.)					39,636



CONCRETE PLACEMENT QUANTITIES - PIER NO. 5		
LOCATION	QUANTITY	
FOOTING	100.0	
STEM	77.0	
COLUMNS	41.2	
CAP & STEPS	36.9	
TOTAL - CU.YDS.		255.1

ESTIMATED QUANTITIES - PIER NO. 5		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	255.1
REINFORCING STEEL	LBS.	39,636
CLASS 20 EXCAVATION	CU.YDS.	170
CLASS 21 EXCAVATION	CU.YDS.	90
HP14x73 STEEL PILE 36 @ 40.0'	LIN.FT.	1440

PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO STEM DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1185.8. PILES SHALL BE DRIVEN TO 61 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 56 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

PIER NO. 5 DETAILS-EASTBOUND

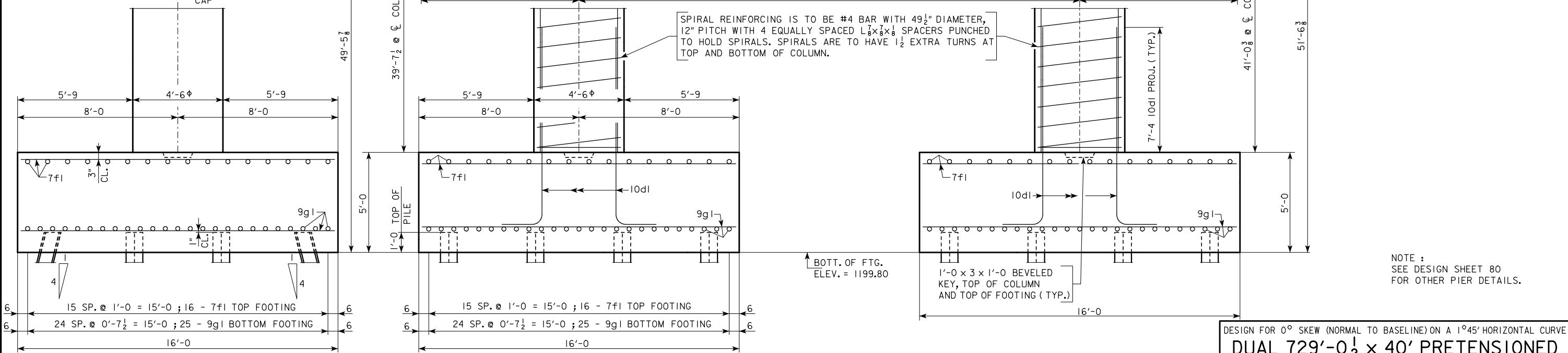
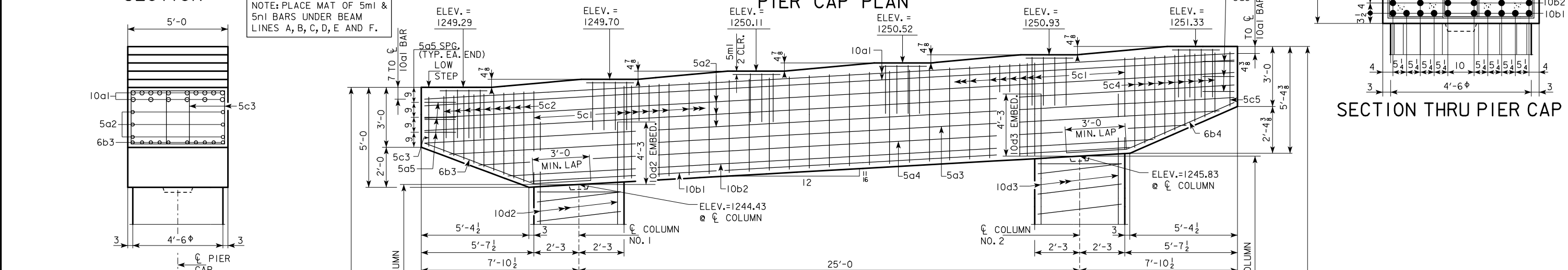
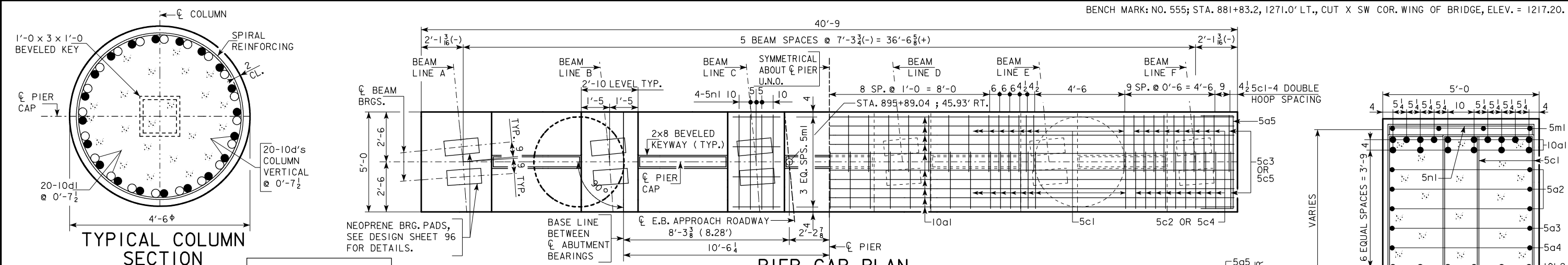
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 78 OF 117 FILE NO. 30187 DESIGN NO. 410

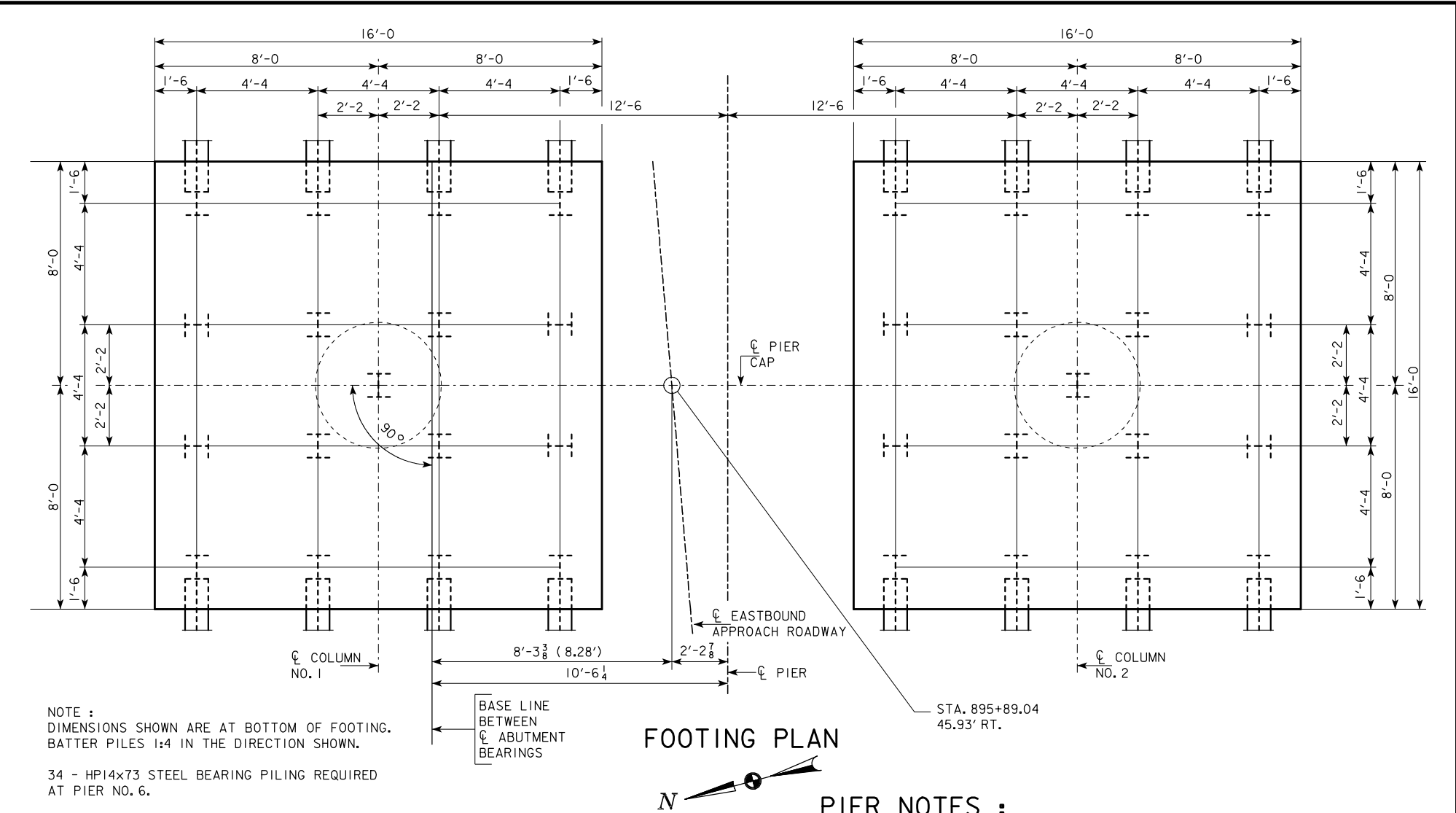
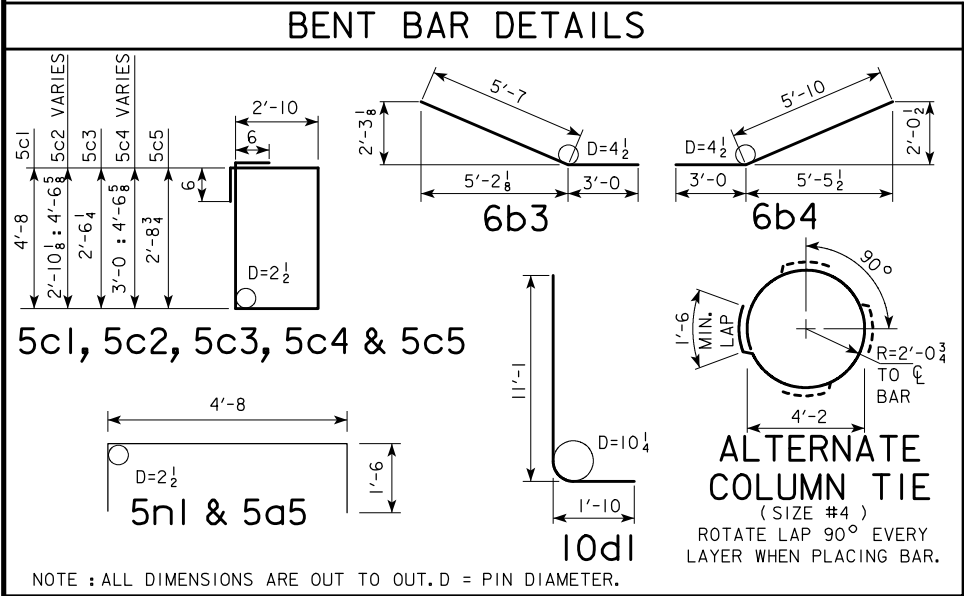
← C COLUMN BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.



PIER NO. 6 ELEVATION
(LOOKING EAST)

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
 DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES
 85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
 PIER NO. 6 DETAILS-EASTBOUND
 STATION : 893+14.13 ($\frac{1}{2}$ RELOCATED U.S. 20)
 AUGUST, 2010

REINFORCING BAR LIST - PIER NO. 6					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
10a1	CAP, TOP, LONGIT.		16	40'-5	2783
5a2	CAP, SIDES, LONGIT.		6	40'-5	253
5a3	CAP, SIDES, LONGIT.		2	38'-5	80
5a4	CAP, SIDES, LONGIT.		2	35'-5	74
5a5	CAP, ENDS, LONGIT.		6	7'-8	48
10b1	CAP, BOTTOM, LONGIT.		10	30'-0	1291
10b2	CAP, BOTTOM, LONGIT.		6	32'-3	833
6b3	CAP, BOTTOM, CANTILEVER		10	8'-7	129
6b4	CAP, BOTTOM, CANTILEVER		10	8'-10	133
5c1	CAP HOOPS		58	16'-0	968
5c2	CAP HOOPS, CANTILEVER		18	VARIES	264
5c3	CAP HOOPS, CANTILEVER		2	11'-9	25
5c4	CAP HOOPS, CANTILEVER		18	VARIES	267
5c5	CAP HOOPS, CANTILEVER		2	12'-2	25
10d1	FOOTING TO COLUMN DOWELS		40	12'-11	2223
10d2	COLUMN NO. 1, VERTICAL		20	44'-2	3801
10d3	COLUMN NO. 2, VERTICAL		20	45'-6	3916
5m1	CAP, STEPS, LONGITUDINAL		24	2'-8	67
5n1	CAP, STEPS, TRANSVERSE		24	7'-8	192
#4	COLUMN NO. 1, SPIRAL		1	549'-8	367
#4	COLUMN NO. 2, SPIRAL		1	567'-10	379
	COL. NO. 1, SPIRAL SPACERS $L\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ (0.7 LB./FT.)		4	39'-3	110
	COL. NO. 2, SPIRAL SPACERS $L\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ (0.7 LB./FT.)		4	40'-8	114
7f1	FOOTING, LONGIT. & TRANSV., TOP		64	15'-8	2049
9g1	FOOTING, LONGIT. & TRANSV., BOTTOM		100	15'-8	5327
REINFORCING STEEL TOTAL (LBS.)					25,718



CONCRETE PLACEMENT QUANTITIES - PIER NO. 6	
LOCATION	QUANTITY
FOOTING	94.8
COLUMNS	47.5
CAP & STEPS	36.9
TOTAL - CU.YDS.	179.2

ESTIMATED QUANTITIES - PIER NO. 6		
ITEM	UNITS	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	179.2
REINFORCING STEEL	LBS.	25,718
CLASS 20 EXCAVATION	CU.YDS.	600
HP14x73 STEEL PILE	LIN.FT.	1700

PIER NOTES :

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A $\frac{3}{4}$ " DRESSED AND BEVELED STRIP.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. THE 10d1 FOOTING TO COLUMN DOWELS ARE TO BE IN PLACE BEFORE FOOTING CONCRETE IS PLACED.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 2'-2. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

COLUMN TIES SPACED AT 12" CENTERS MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR SPLICE LAP LENGTH.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN PLACEMENT OF REINFORCING.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE ELEVATION 1191.3. PILES SHALL BE DRIVEN TO 69 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 64 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

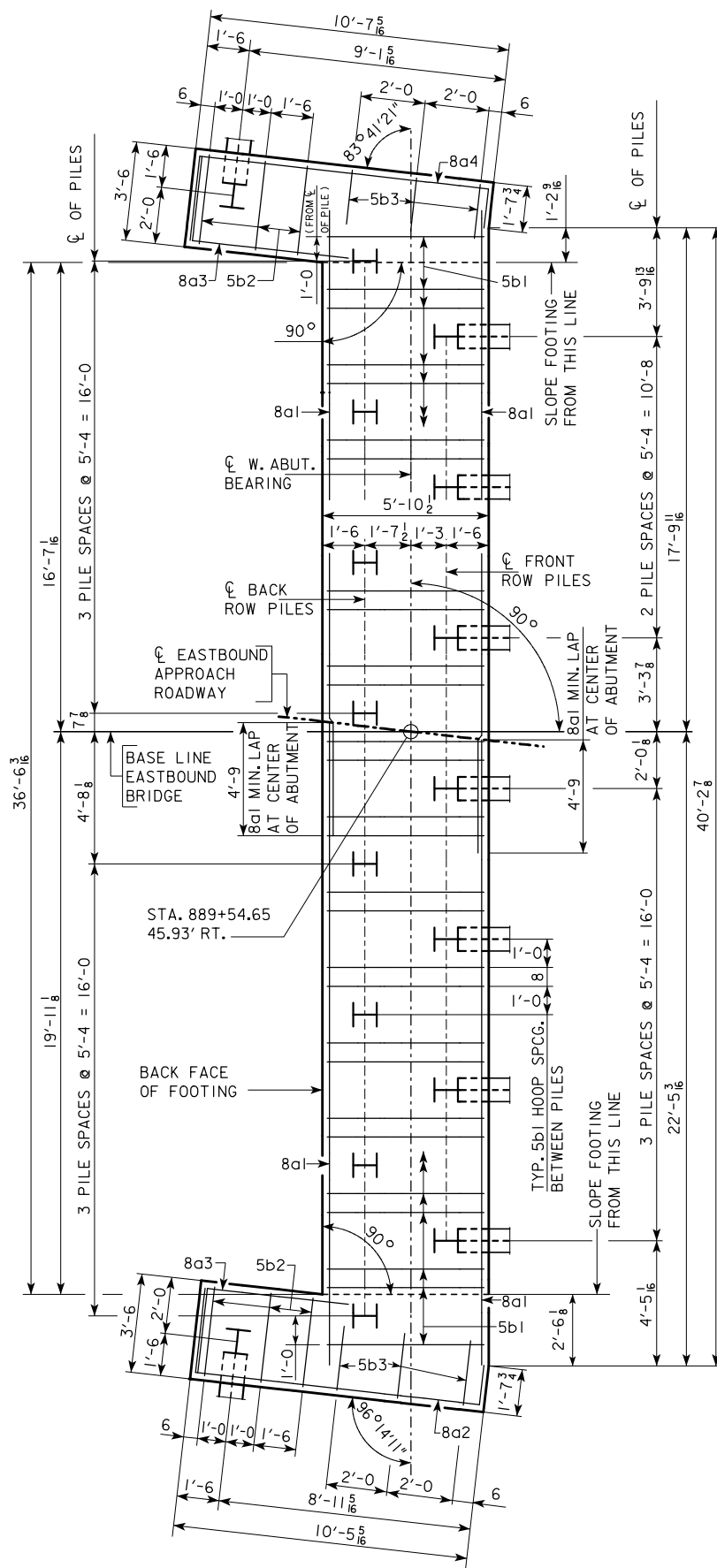
PIER NO. 6 DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 80 OF 117 FILE NO. 30187 DESIGN NO. 410

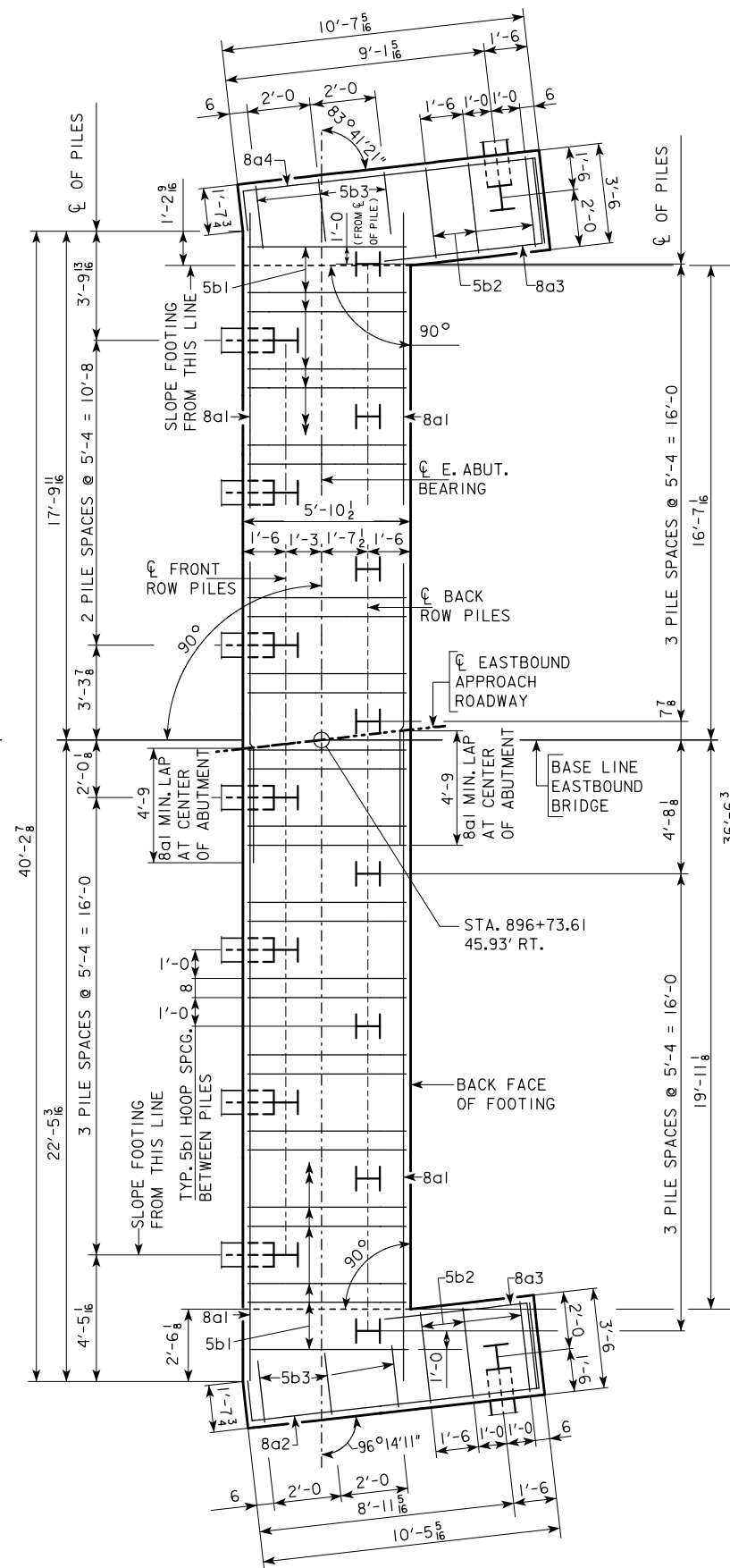


WEST ABUTMENT

17 - HP10x57 STEEL PILE REQUIRED AT WEST ABUTMENT

ABUTMENT PILE LAYOUTS

NOTE :
PILE DIMENSIONS SHOWN ARE AT BOTTOM OF FOOTING.
BATTER PILES 1:4 IN THE DIRECTION SHOWN.

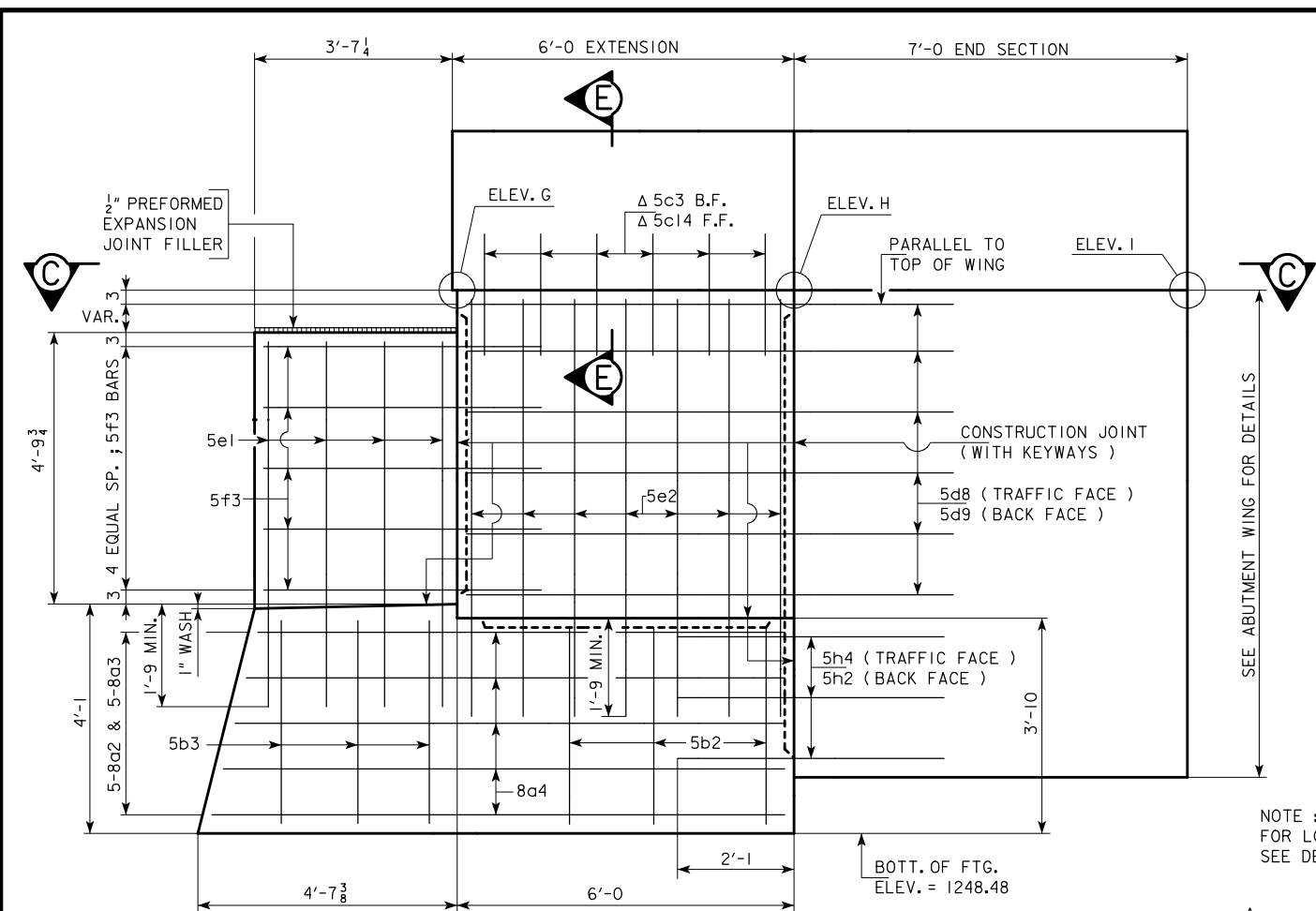


EAST ABUTMENT

17 - HP10x57 STEEL PILE REQUIRED AT EAST ABUTMENT

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES**
 85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
ABUTMENT PILE LAYOUT-EASTBOUND
 STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 81 OF 117 FILE NO. 30187 DESIGN NO. 410



NOTE :
FOR LOCATION OF VIEWS A-A & B-B,
SEE DESIGN SHEET 82.

NOTE :
SEE DESIGN SHEETS 109,110,111 & 112 IN
THESE PLANS FOR DETAILS OF
BARRIER RAIL WING EXTENSIONS.
REINFORCING BARS 5c3 AND 5c14
ARE INCLUDED IN THE SUPERSTRUCTURE
QUANTITIES.

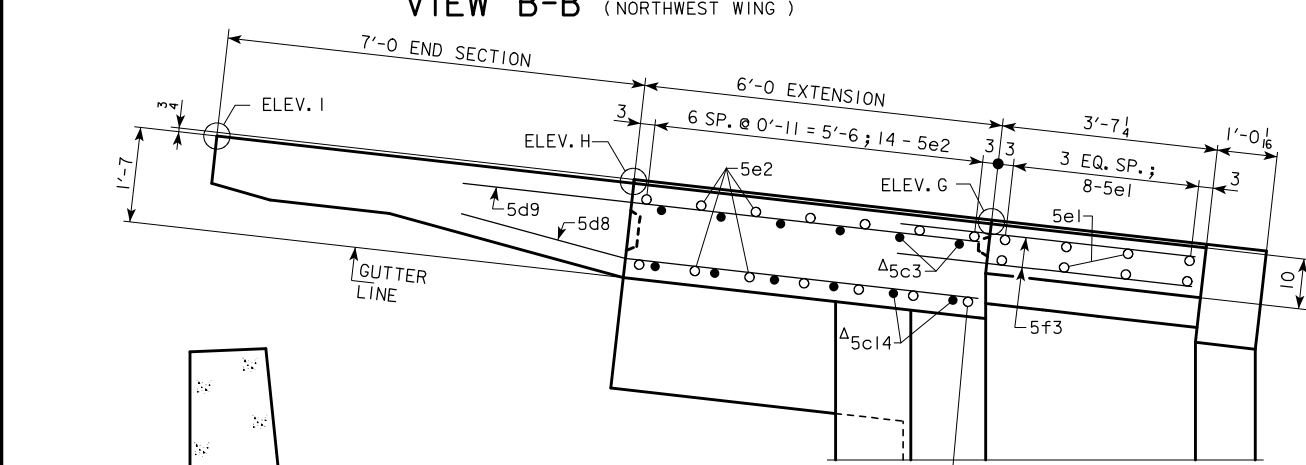
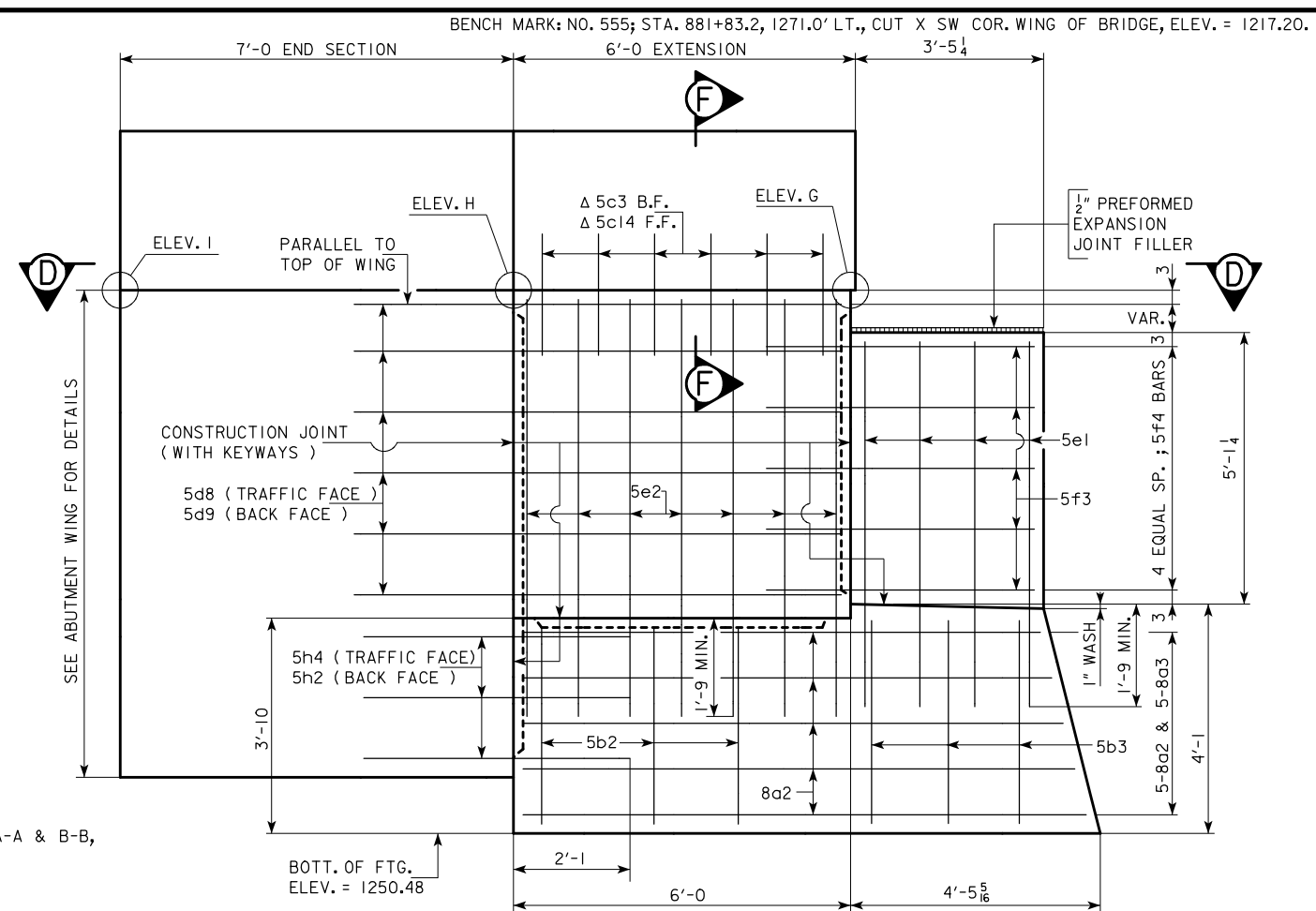
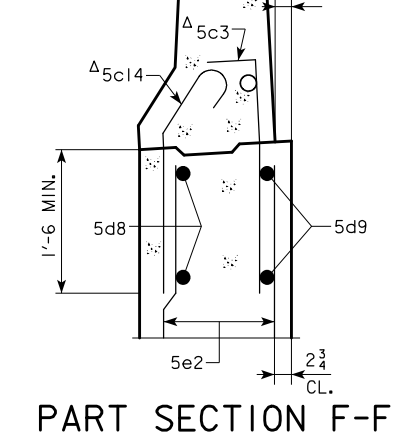
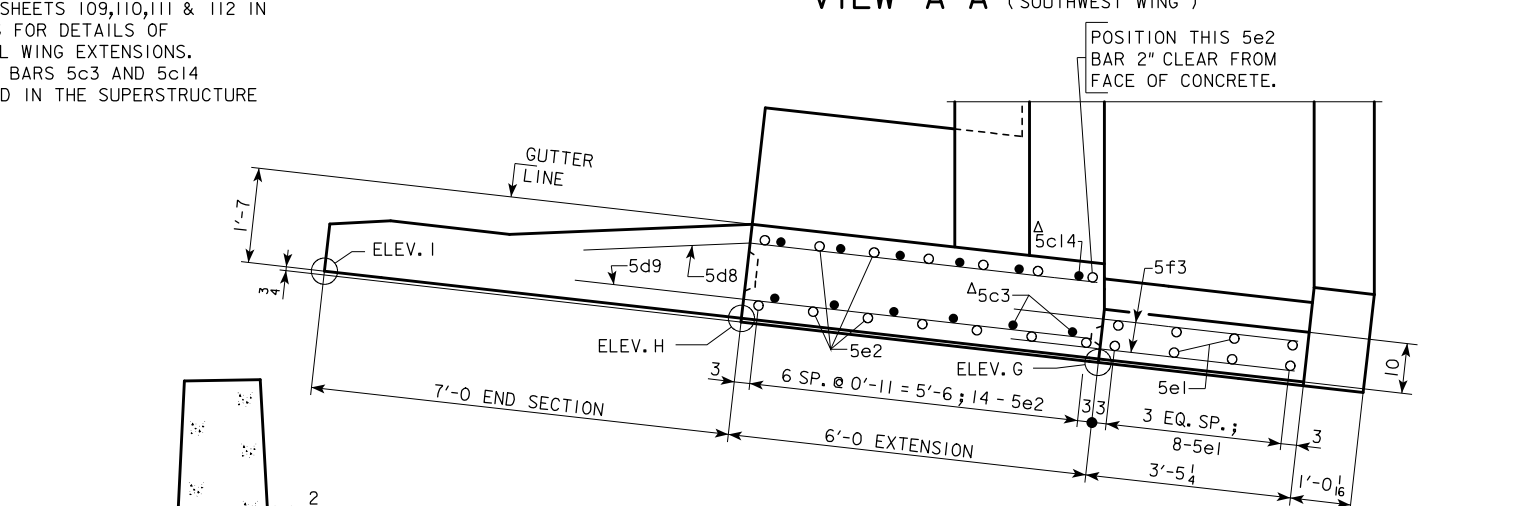
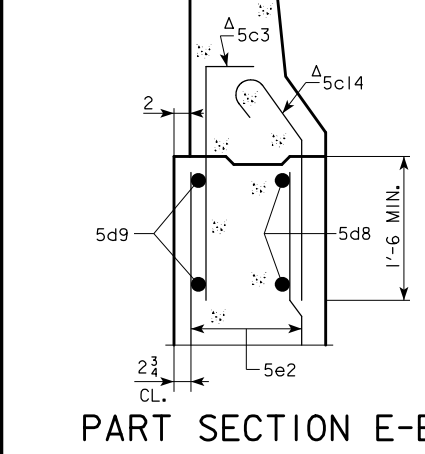


TABLE OF WINGWALL ELEVATIONS			
LOCATION	ELEV. G	ELEV. H	ELEV. I
NW WING	1258.20	1258.26	1258.32
SW WING	1260.49	1260.54	1260.61



DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

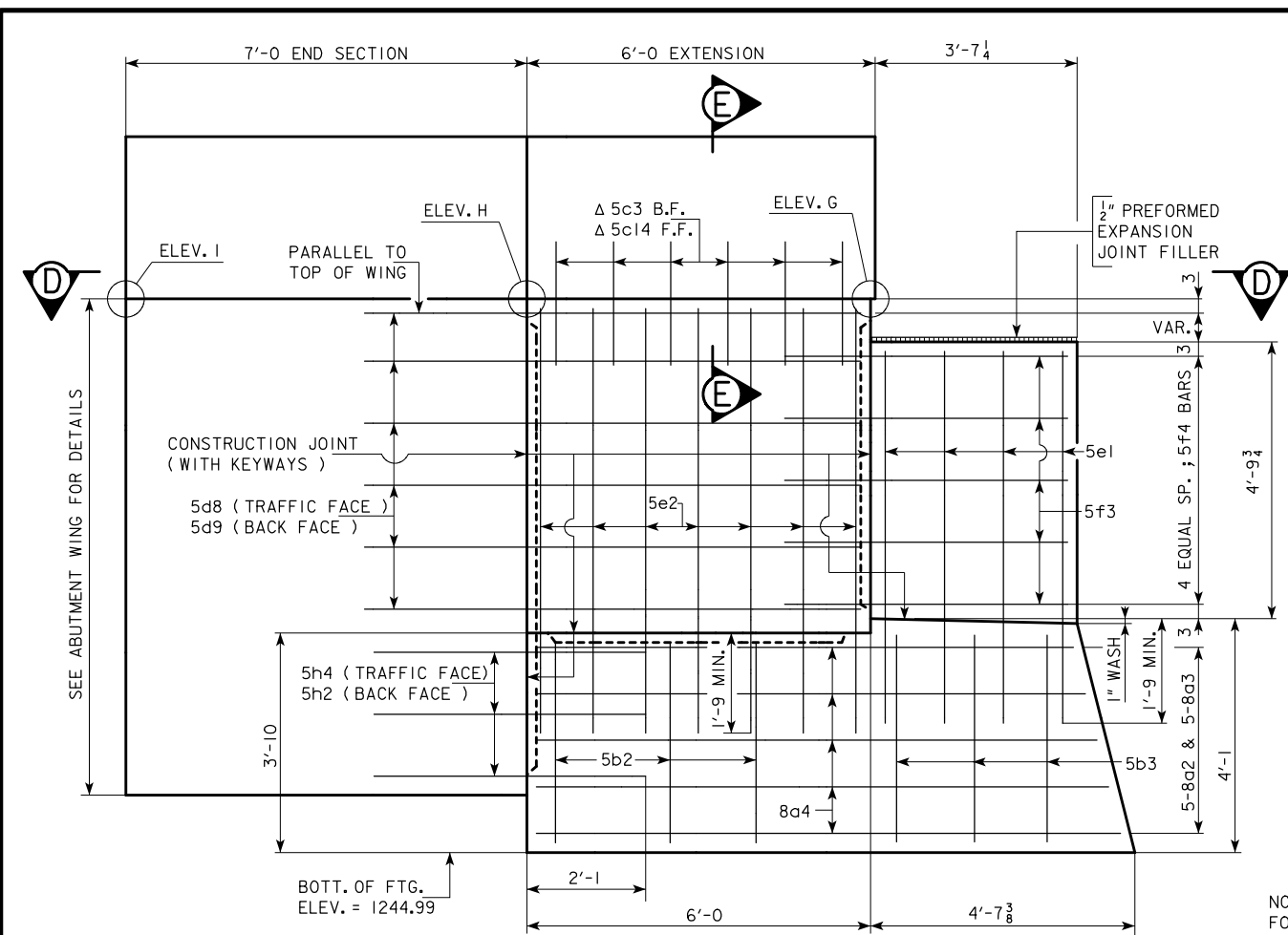
WEST ABUTMENT DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

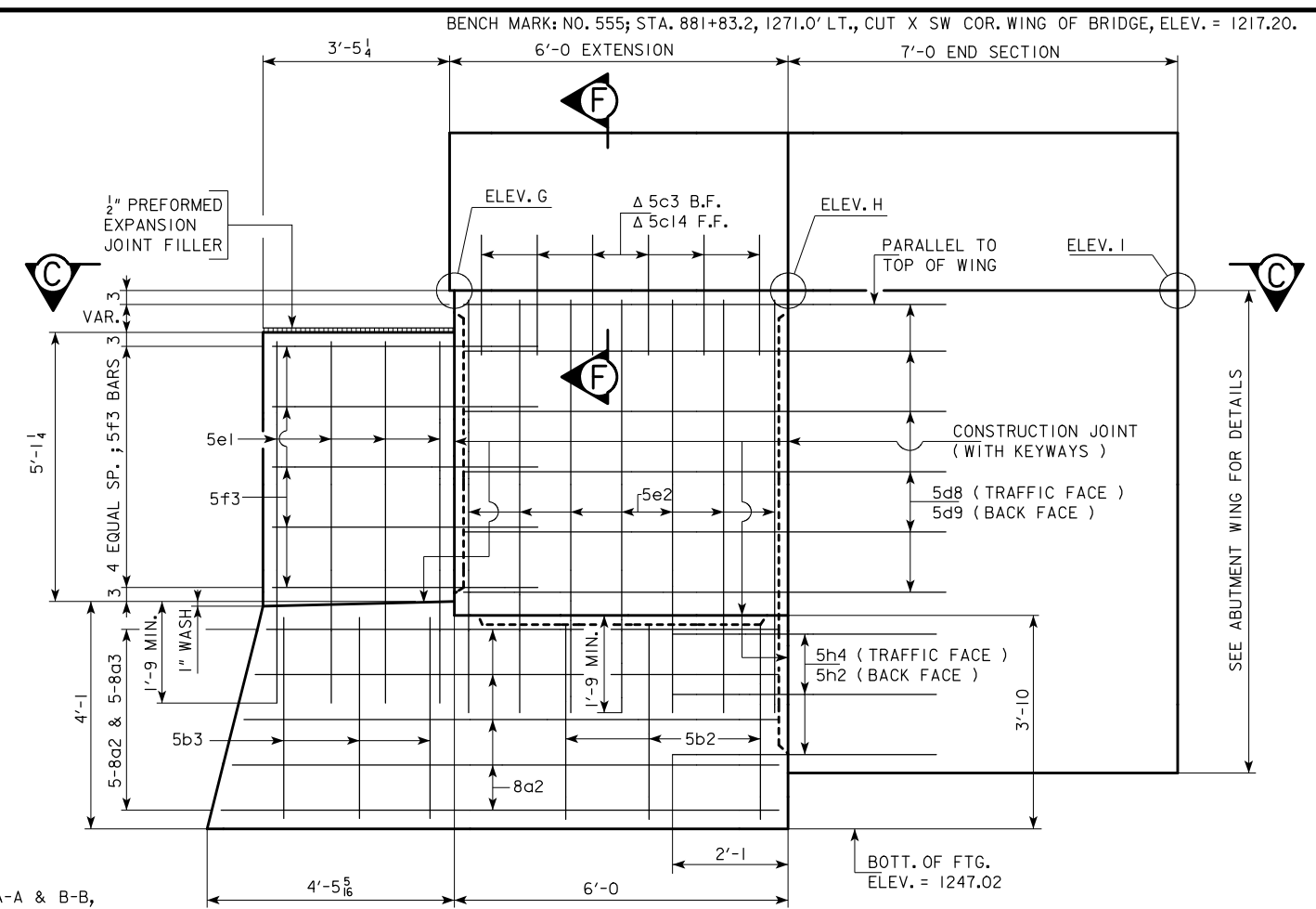
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

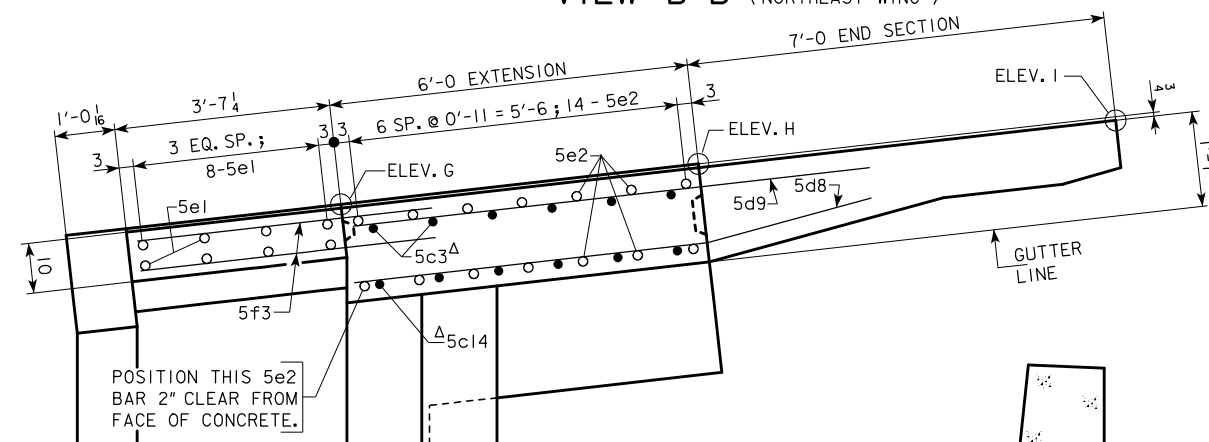
DESIGN SHEET NO. 84 OF 117 FILE NO. 30187 DESIGN NO. 410



NOTE :
FOR LOCATION OF VIEWS A-A & B-B,
SEE DESIGN SHEET 83.

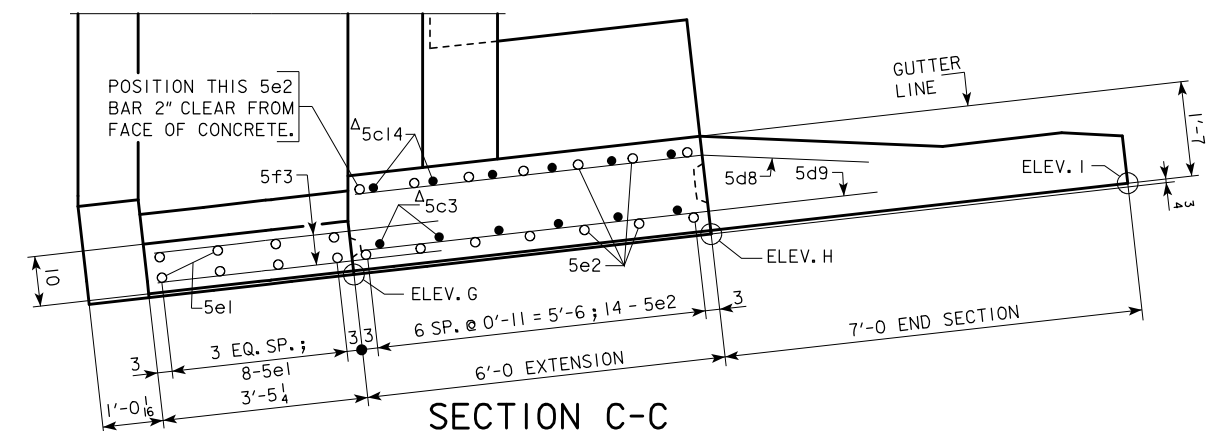
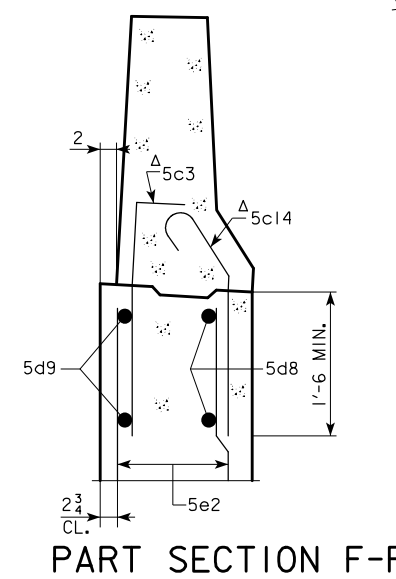
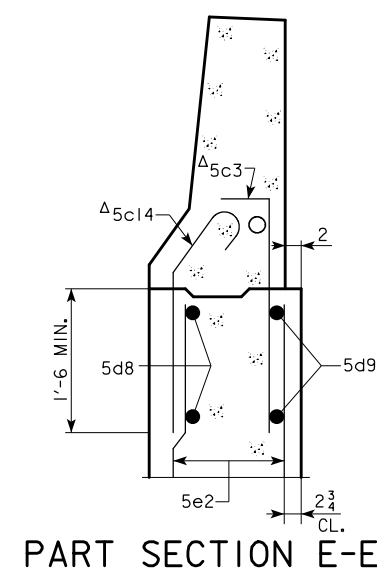


Δ NOTE :
SEE DESIGN SHEETS 110,111,112 & 113 IN
THESE PLANS FOR DETAILS OF
BARRIER RAIL WING EXTENSIONS.
REINFORCING BARS 5c3 AND 5c14
ARE INCLUDED IN THE SUPERSTRUCTURE
QUANTITIES.



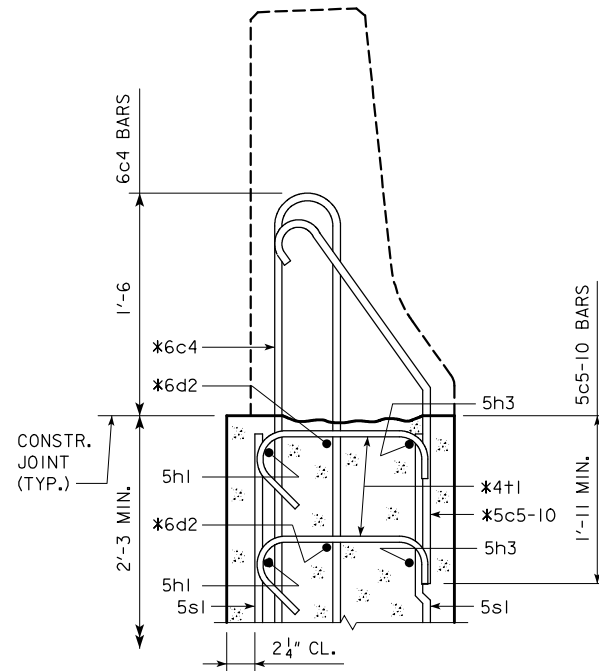
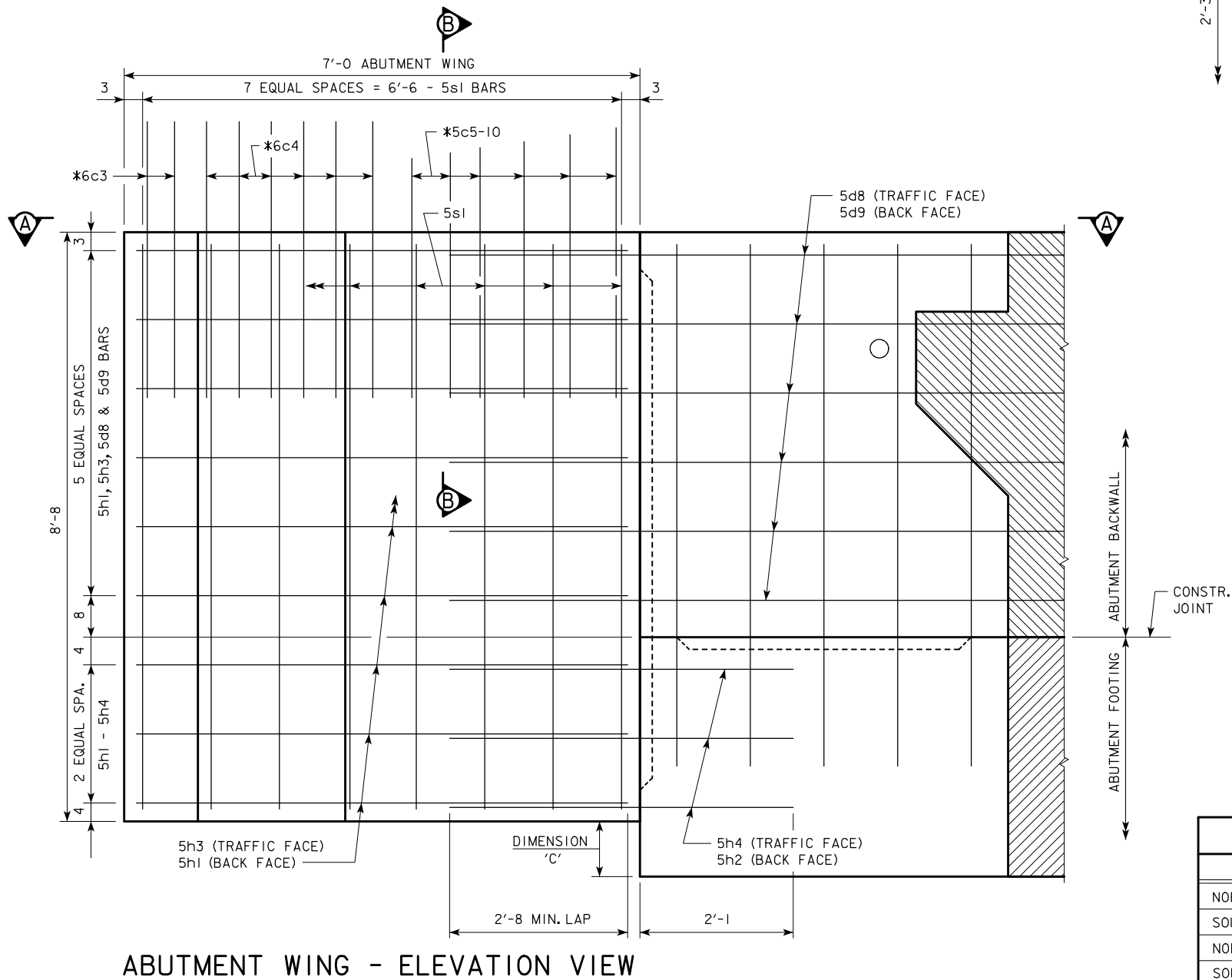
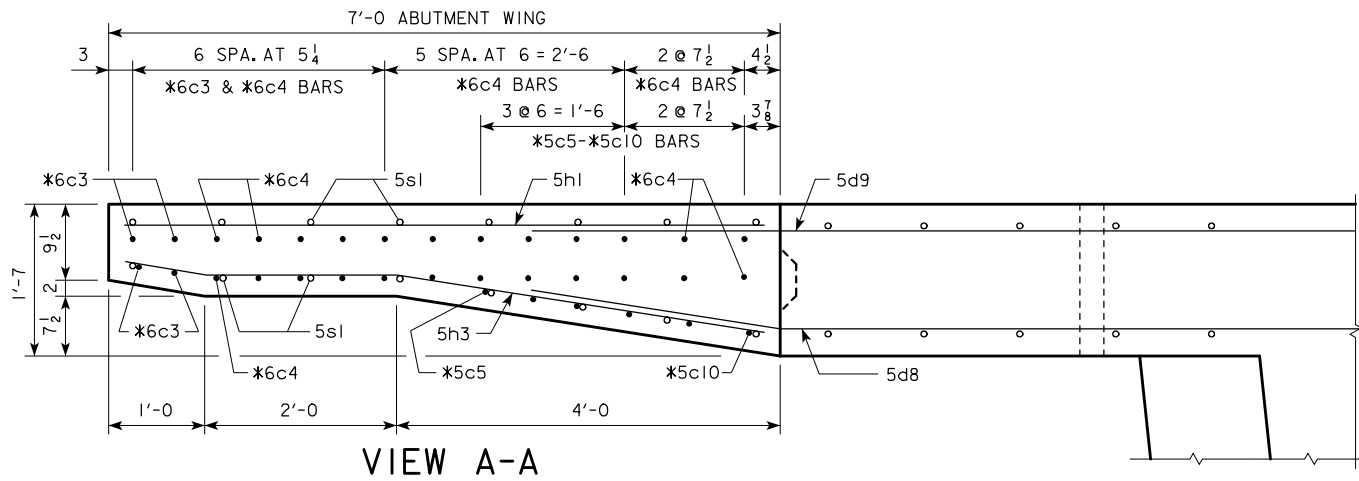
NOTE :
BARRIER RAIL NOT SHOWN.

TABLE OF WINGWALL ELEVATIONS			
LOCATION	ELEV. G	ELEV. H	ELEV. I
NE WING	1254.69	1254.69	1254.69
SE WING	1257.02	1257.02	1257.01



NOTE :
BARRIER RAIL NOT SHOWN.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
 PRESTRESSED CONCRETE BEAM BRIDGES**
 85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
EAST ABUTMENT DETAILS-EASTBOUND
 STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 85 OF 117 FILE NO. 30187 DESIGN NO. 410



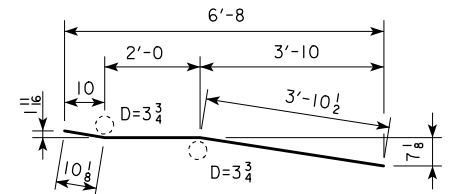
SECTION B-B

* BARRIER RAIL END SECTION
BARS TO BE PLACED WITH
ABUTMENT WING.

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

DIMENSION 'C'	
LOCATION	DIMENSION 'C'
NORTHWEST CORNER	1'-2 $\frac{1}{8}$
SOUTHWEST CORNER	1'-5 $\frac{1}{2}$
NORTHEAST CORNER	1'-0 $\frac{3}{8}$
SOUTHEAST CORNER	1'-3 $\frac{7}{8}$

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	8'-4	139
TOTAL (LBS.)					265



5h3

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

BENT BAR DETAILS

CONCRETE PLACEMENT SUMMARY	
CONCRETE	TOTAL
ONE ABUTMENT WING	2.5
TOTAL (CU. YDS.)	2.5

NOTE:

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

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

PRESTRESSED CONCRETE BEAM BRIDGES

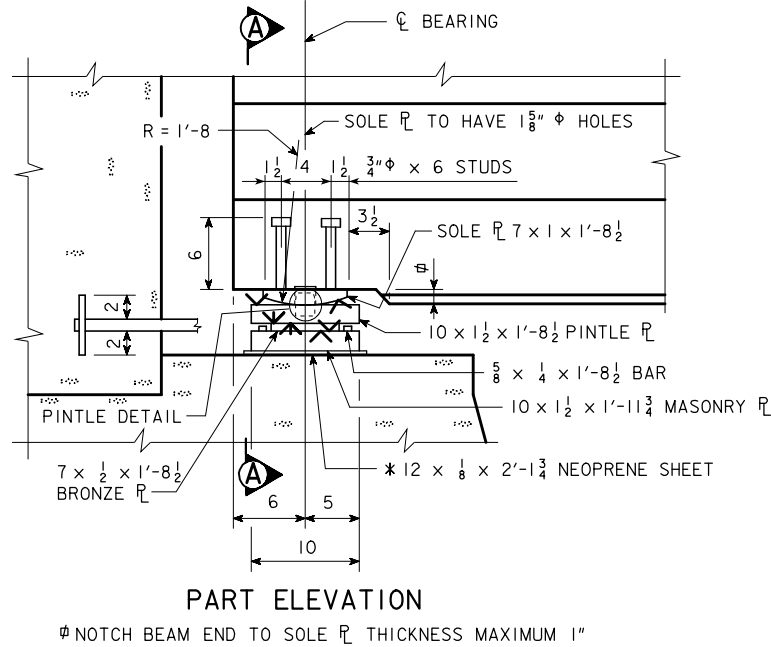
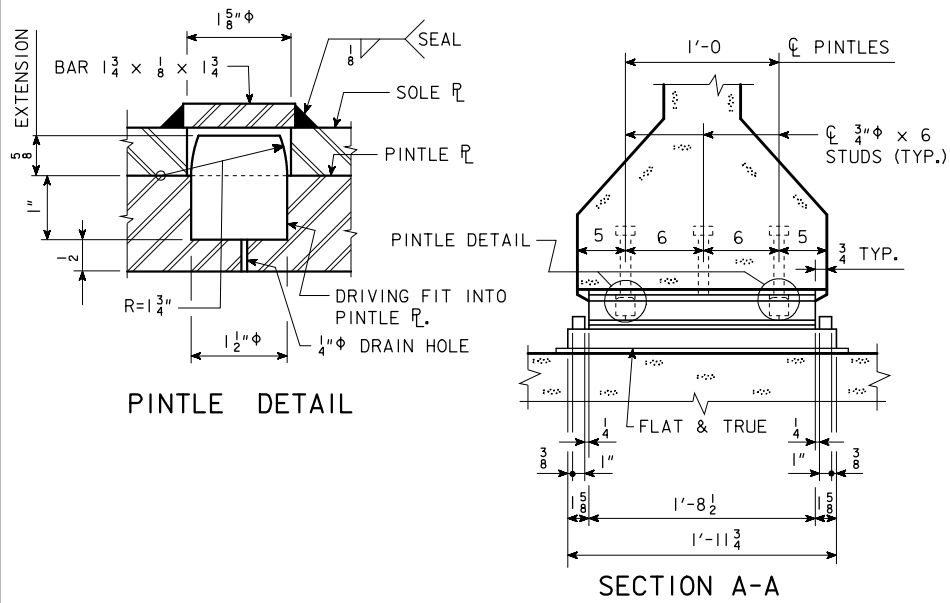
85'-9" END SPANS	5 - 111'-6" INTERIOR SPANS
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ABUTMENT WING DETAILS-EASTBOUND
STATION : 893+14.13 (C RELOCATED U.S. 20)
AUGUST-2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 86 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISED 07-09 - DEFINED ϕ PINTLES ON SECT. A-A. REVISED DUROMETER HARDNESS FOR $\frac{1}{8}$ " NEOPRENE.
ENGLISHBEAMS.DGN - 4541A - THIS SHEET ISSUED 03-08.



ABUTMENT BEARING NOTES:

THE SLIDING SURFACE OF THE BRONZE ϕ SHALL BE LUBRICATED IN ACCORDANCE WITH ARTICLE 4190.03, OF THE STANDARD SPECIFICATIONS AND THE BRONZE METAL SHALL BE CAST BRONZE IN ACCORDANCE WITH ARTICLE 4190.03, OF THE STANDARD SPECIFICATIONS. TOP EDGES OF BRONZE ϕ SHALL BE BEVELED $\frac{1}{8}$ ".

SURFACES MARKED "V" SHALL BE FINISHED ANSI 250 AND SURFACES MARKED "V" SHALL BE FINISHED ANSI 125.

MASONRY PLATES ARE TO BE SET ON A $\frac{1}{8}$ " NEOPRENE SHEET.

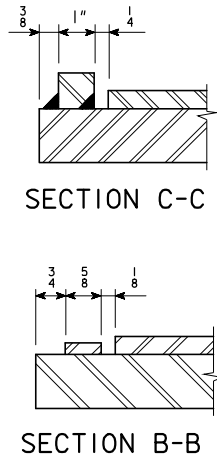
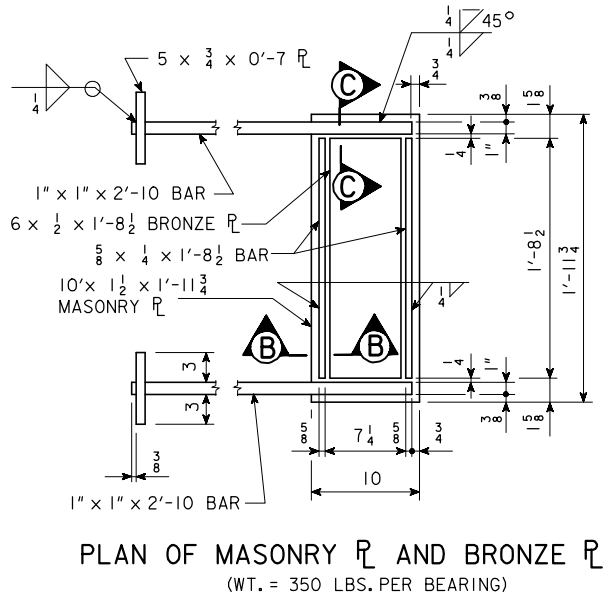
PINTLE PLATES, MASONRY PLATES, AND LUBRICATED BRONZE PLATES ARE A PART OF THE SUPERSTRUCTURE STRUCTURAL STEEL QUANTITY. UNIT PRICE BID FOR "STRUCTURAL STEEL" SHALL INCLUDE ALLOWANCE FOR COST OF BRONZE PLATES. COST OF NEOPRENE SHEETS SHALL BE CONSIDERED INCIDENTAL TO THE STRUCTURAL STEEL BID ITEM. COST OF THE ANCHORED CURVED SOLE PLATES IS TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

THE SOLE PLATE, PINTLE PLATE AND THE MASONRY PLATE SHALL BE GALVANIZED. THE SOLE PLATE AND MASONRY PLATE SHALL BE FITTED UP AND WELDED PRIOR TO GALVANIZING. THE SURFACE OF PINTLE PLATE IN CONTACT WITH BRONZE BEARING PLATE SHALL BE SMOOTH AND FREE OF PROJECTIONS DUE TO 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 SPECIFICATIONS :

- ASTM A 852
- ASTM A 514 GRADE B
- ASTM A 709 GRADE HPS 70W



PRETENSIONED PRESTRESSED CONCRETE BEAM ABUTMENT BEARING DETAILS

* THE $\frac{1}{8}$ INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

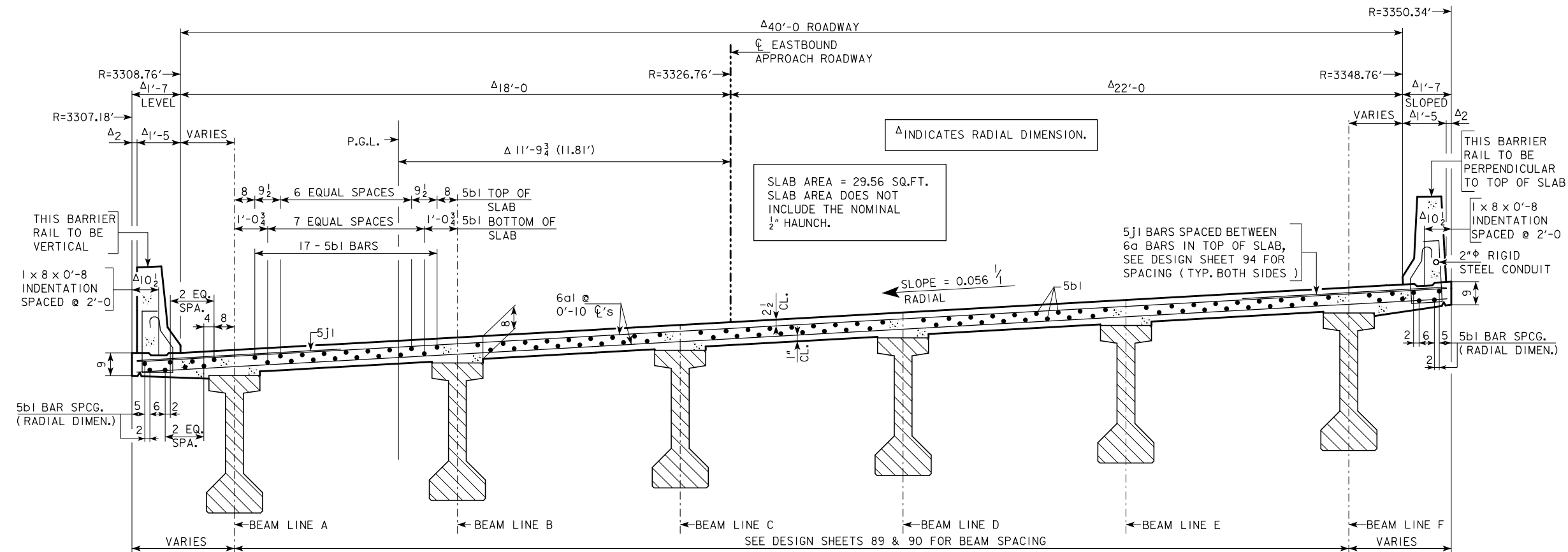
ABUTMENT BEARING DETAILS-EASTBOUND

STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

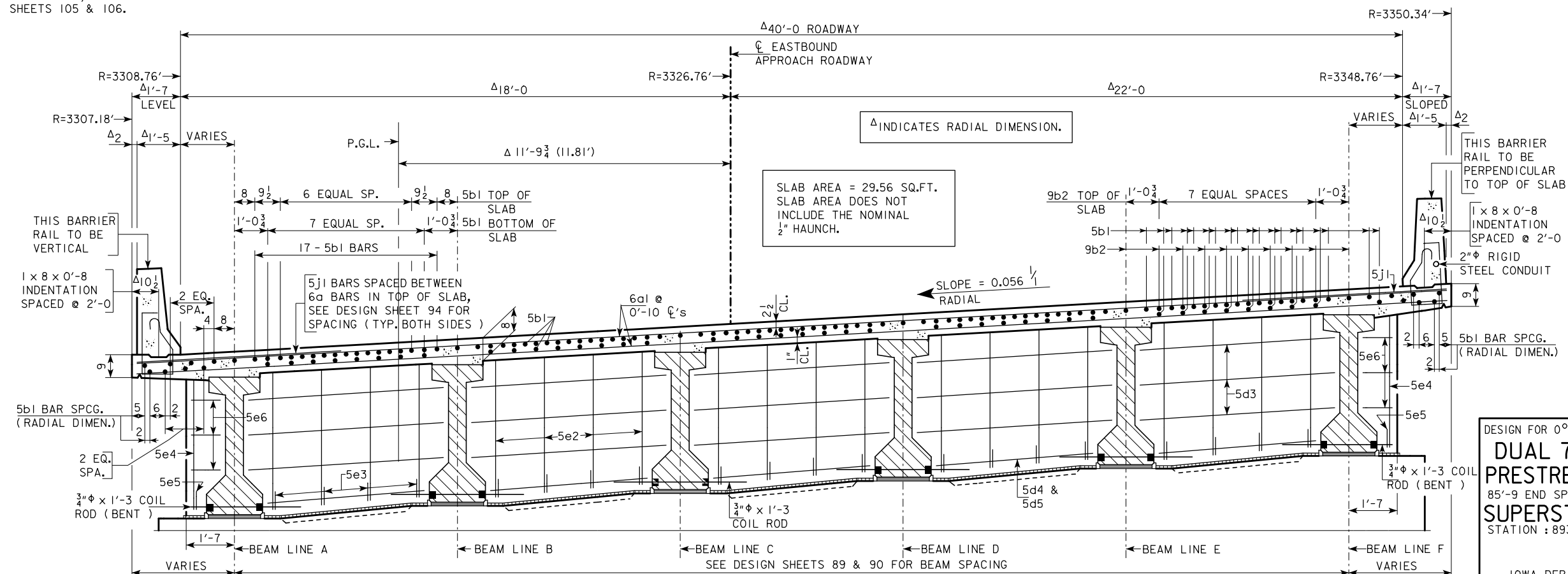
DESIGN SHEET NO. 88 OF 117 FILE NO. 30187 DESIGN NO. 410



NOTE :
FOR DETAILS OF INTERMEDIATE
DIAPHRAGMS, SEE DESIGN
SHEETS 105 & 106.

(INTERMEDIATE DIAPHRAGM NOT SHOWN) **TYPICAL SECTION NEAR MID SPAN**
(LOOKING EAST)

NOTE :
FOR DETAILS OF RAIL AND RAIL
REINFORCING, SEE DESIGN SHEETS
110 & 111.

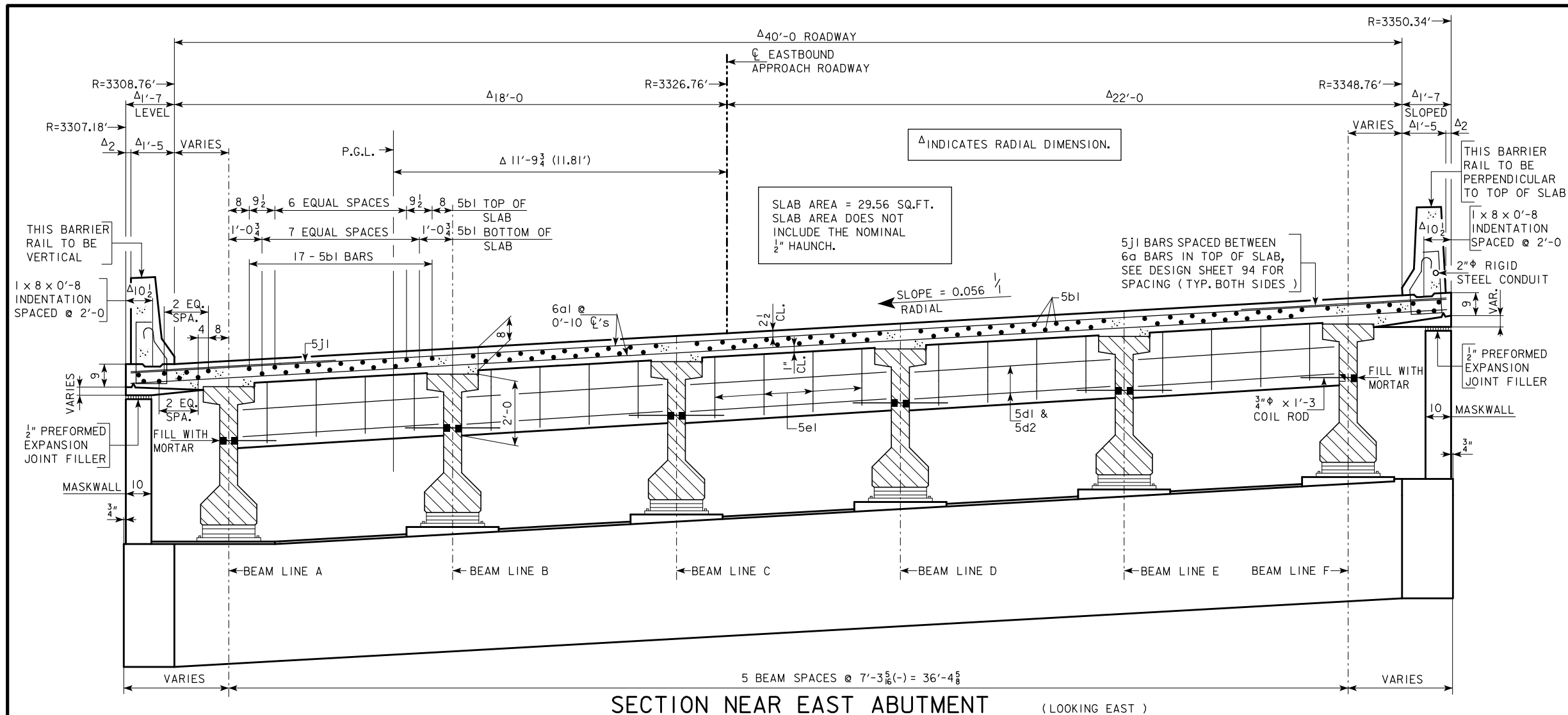


NOTE :
SEE DESIGN SHEET 92 FOR CROSS
SECTION NEAR EAST ABUTMENT AND SLAB
AND HAUNCH DETAILS AT INTERIOR
AND EXTERIOR BEAMS.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
SUPERSTRUCTURE DETAILS-EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20)
AUGUST, 2010

SECTION NEAR PIERS (LOOKING EAST)

SAC COUNTY
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DESIGN SHEET NO. 91 OF 117 FILE NO. 30187 DESIGN NO. 410



NOTE :
FOR DETAILS OF RAIL AND RAIL
REINFORCING, SEE DESIGN SHEETS
110 & 111.

NOTE :
FOR DETAILS OF INTERMEDIATE
DIAPHRAGMS, SEE DESIGN
SHEETS 105 & 106.

SUPERSTRUCTURE NOTES:

THE FLOOR SLAB AS SHOWN INCLUDES $\frac{1}{2}$ " INTEGRAL WEARING SURFACE.

THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE FLOOR SLAB.

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

ALL BEAMS ARE TO BE SET VERTICAL.

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

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

ALL SLAB AND DIAPHRAGM REINFORCING IS TO BE WIRED IN PLACE AND ADEQUATELY SUPPORTED BEFORE CONCRETE IS PLACED.

TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND $2\frac{1}{2}$ " CLEAR BELOW TOP OF SLAB. BOTTOM TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF SLAB. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL EPOXY COATED METAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF EPOXY COATED METAL BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0" APART.

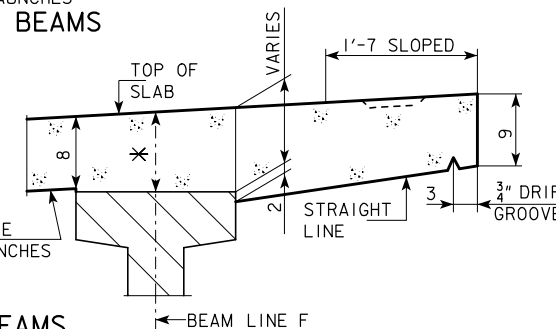
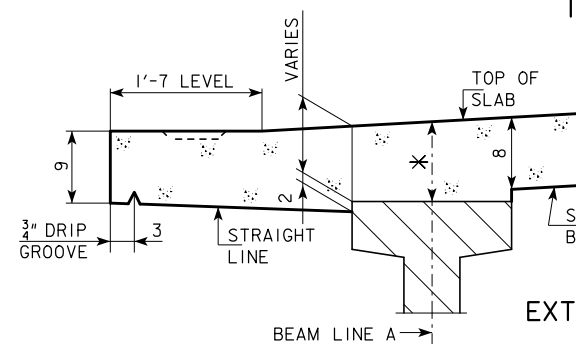
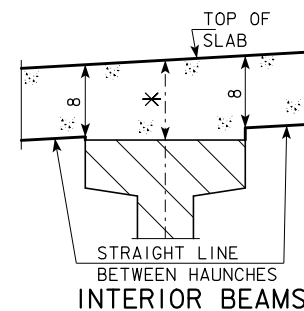
TRANSVERSE SLAB REINFORCING MAY BE SPLICED WITH ONE LAP LOCATED AS FOLLOWS:

TOP BAR - LAP MIDWAY BETWEEN BEAMS (MIN. LAP = 1'-10").

BOTTOM BARS - LAP OVER BEAMS (MIN. LAP = 1'-10").

PAYMENT FOR REINFORCING BARS SHALL BE BASED ON NO SPLICES, AND NO ALLOWANCE SHALL BE MADE FOR THE ADDITIONAL LENGTH OF BAR REQUIRED FOR THE USE OF SPLICES.

SECTION NEAR EAST ABUTMENT (LOOKING EAST)



TYPICAL SLAB AND HAUNCH DETAILS

* FOR SLAB THICKNESS OVER BEAMS SEE HAUNCH AND CAMBER DETAILS ON DESIGN SHEET 102.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

SUPERSTRUCTURE DETAILS-EASTBOUND

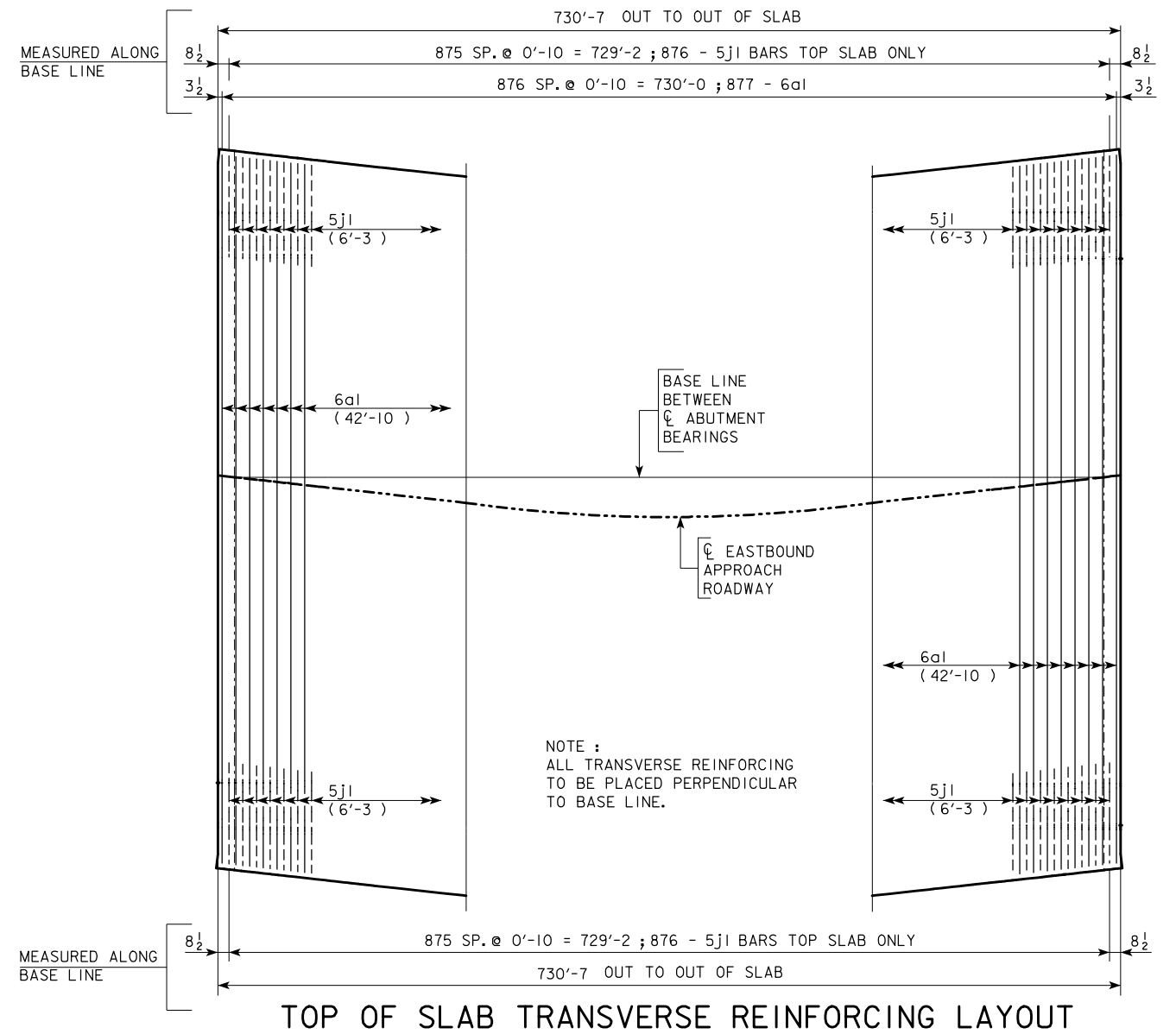
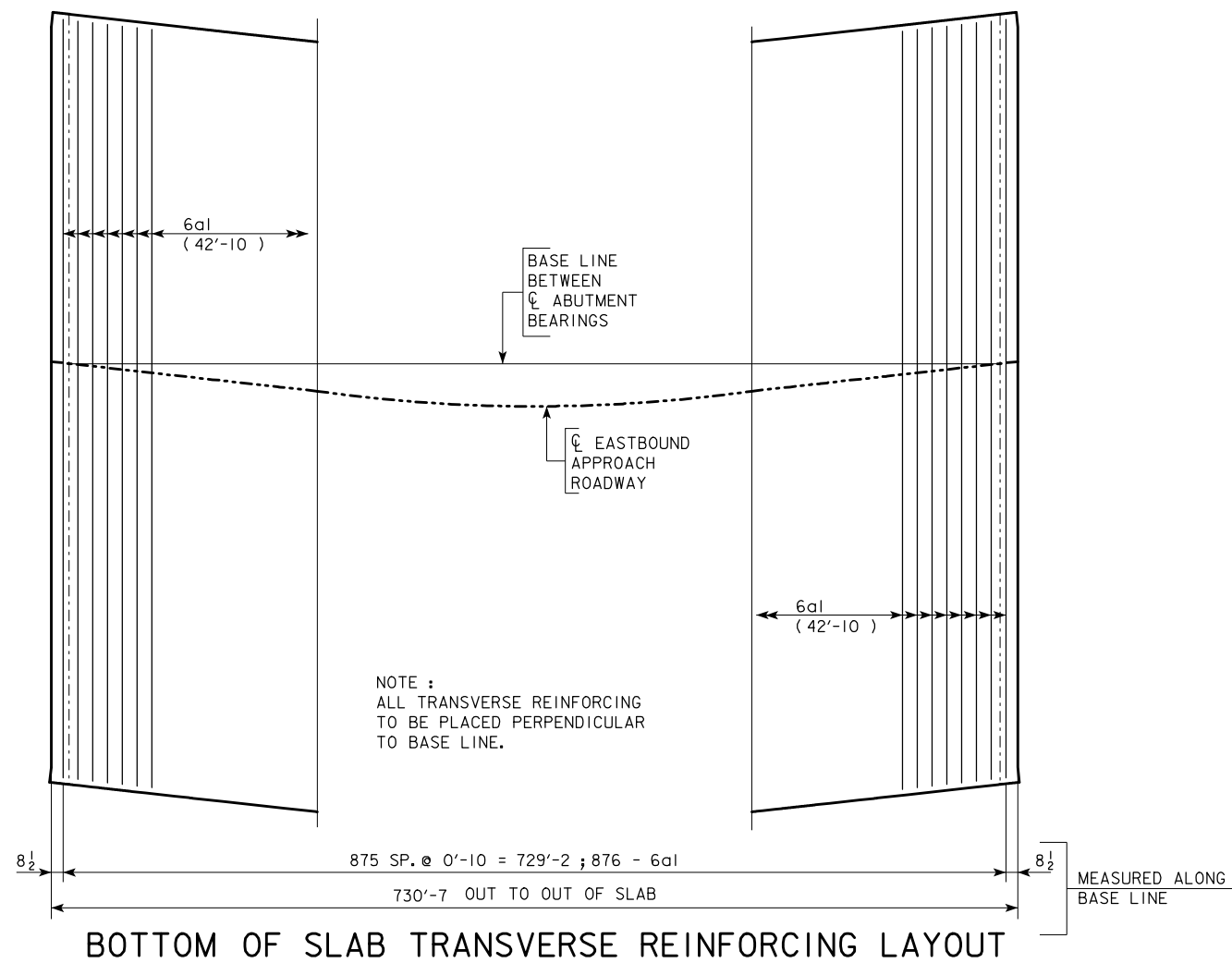
STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 92 OF 117 FILE NO. 30187 DESIGN NO. 410



DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 1/2' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

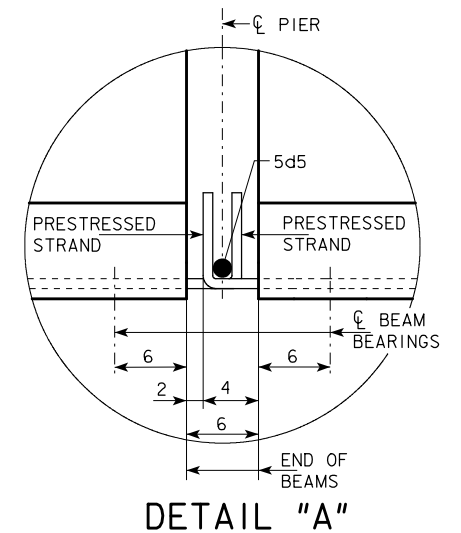
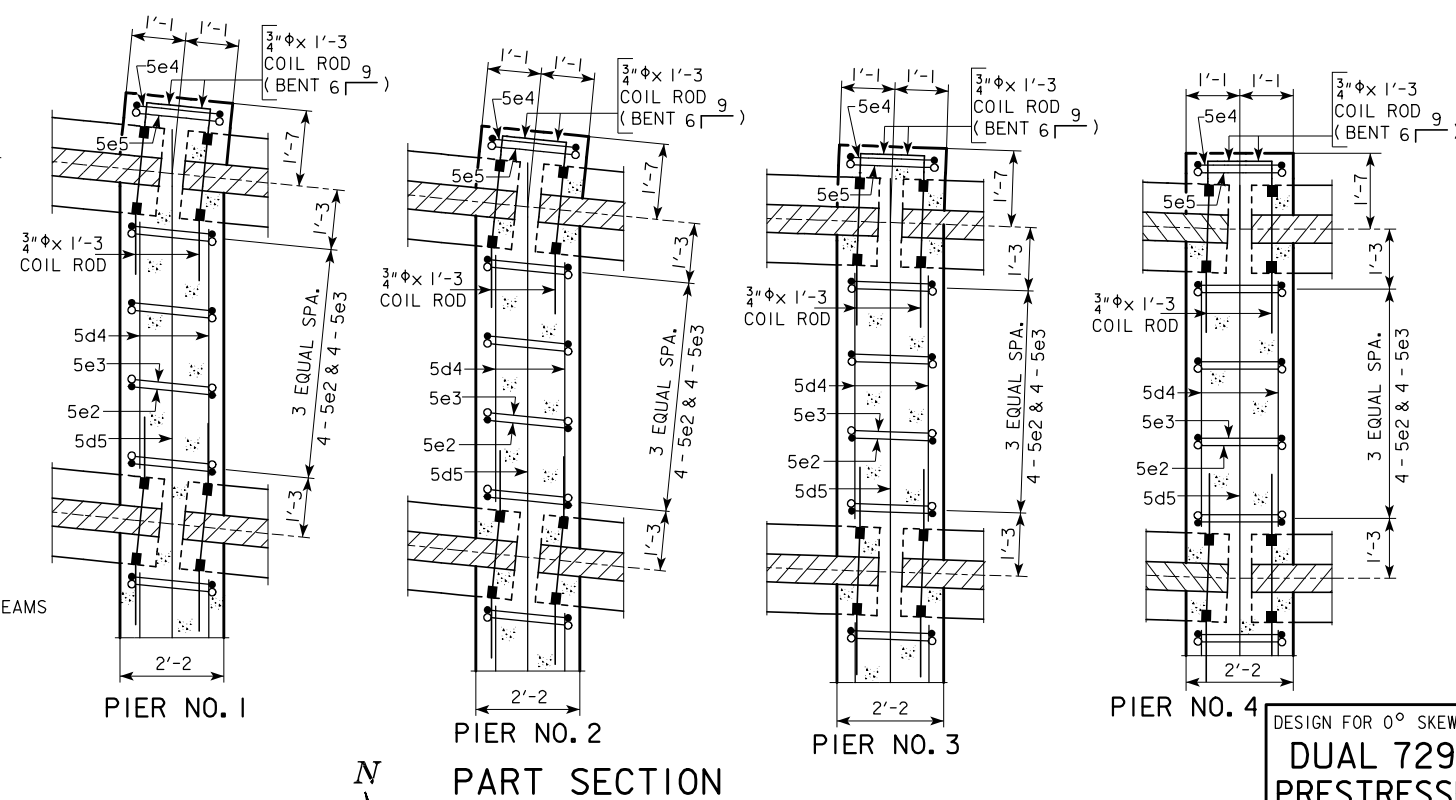
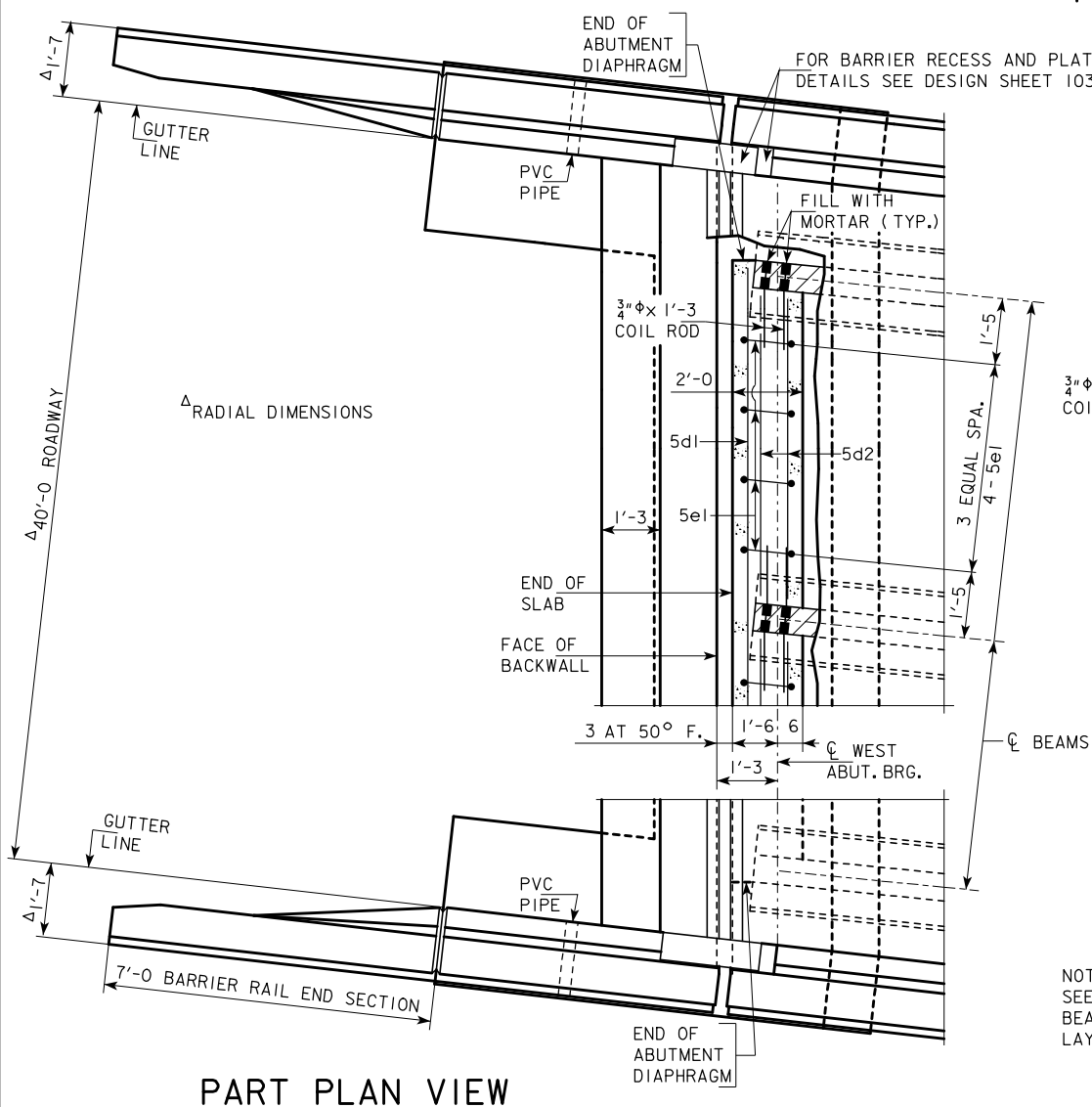
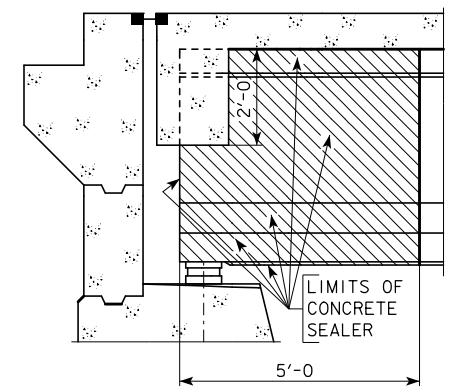
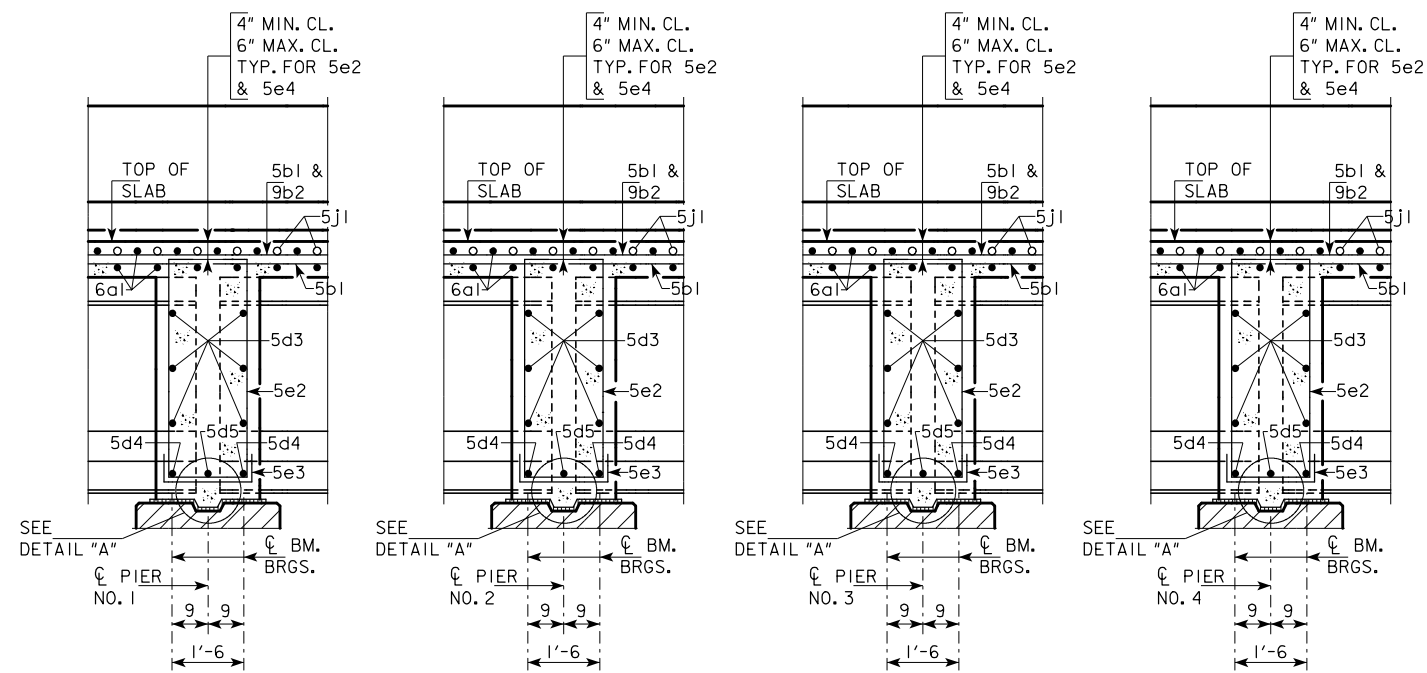
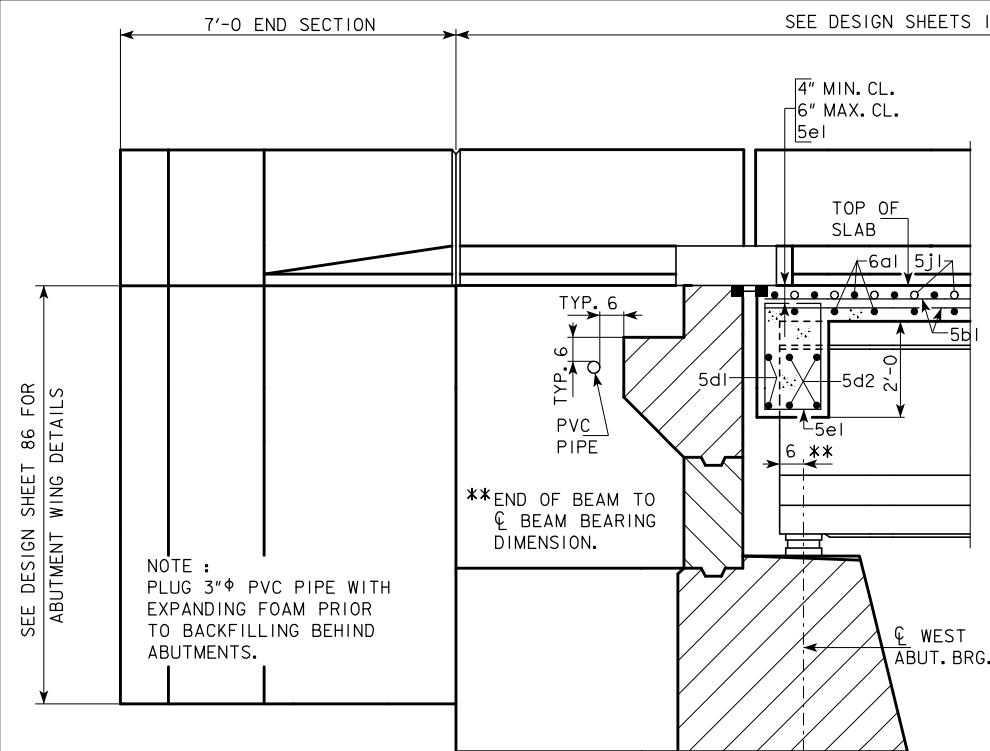
SUPERSTRUCTURE DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 94 OF 117 FILE NO. 30187 DESIGN NO. 410



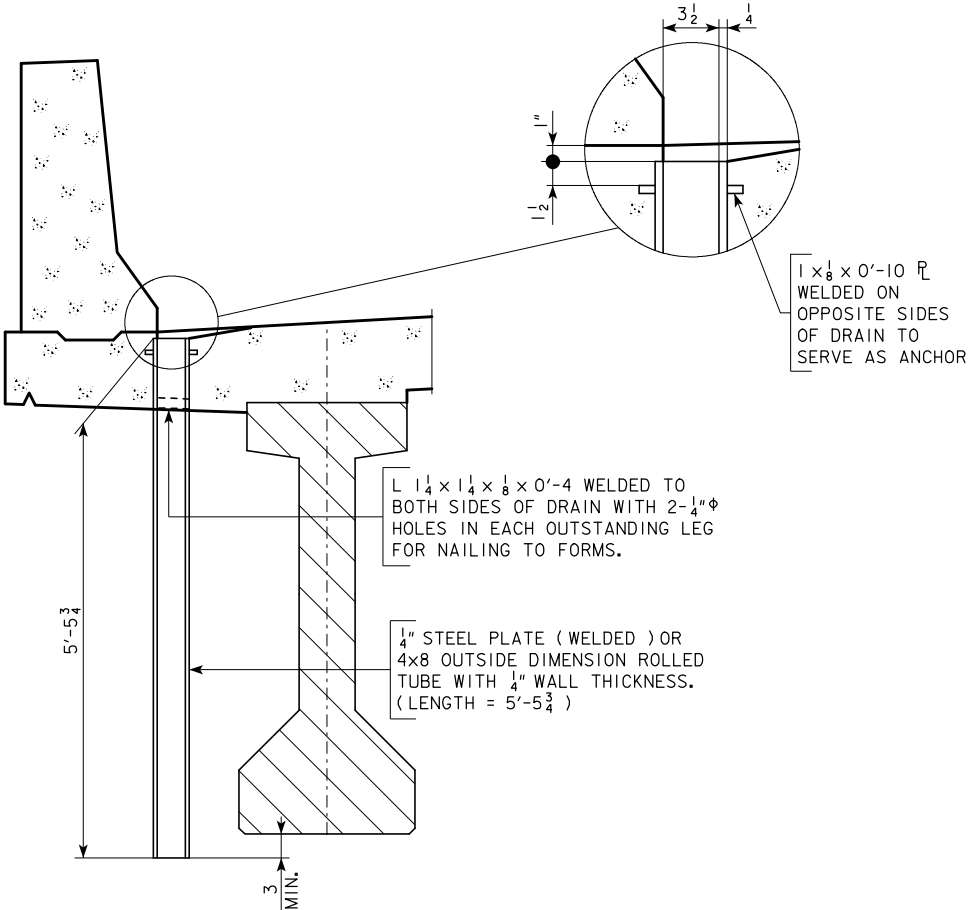
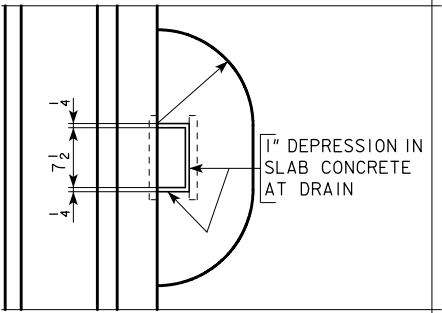
NOTE :
FOR TOP OF PIER DETAILS, PART
LONGITUDINAL AND PART SECTION
FROM PIER NO. 4 TO EAST ABUTMENT,
SEE DESIGN SHEET 96.

NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN SOUTH BARRIER RAIL.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
SUPERSTRUCTURE DETAILS-EASTBOUND
STATION : 893+14.13 (@ RELOCATED U.S. 20)

AUGUST, 2010

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DRAIN DETAILS

NOTE :
DRAINS ARE TO BE GALVANIZED. 35 DRAINS REQUIRED. SEE "SITUATION PLAN" ON DESIGN SHEETS 61 & 62 FOR LOCATION. WEIGHT OF DRAINS (106 LBS./PER DRAIN) IS INCLUDED IN THE QUANTITY FOR "STRUCTURAL STEEL". WEIGHT IS BASED ON ROLLED TUBE.

CONCRETE PLACEMENT QUANTITIES - EASTBOUND SUPERSTRUCTURE

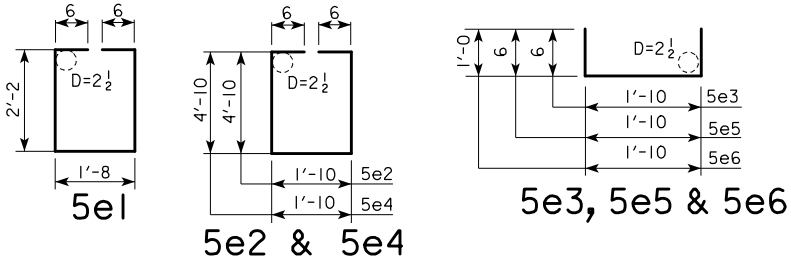
LOCATION	QUANTITY
SECTION 1 - SLAB & ABUTMENT DIAPHRAGM	88.4
SECTION 2 - SLAB	95.1
SECTION 3 - SLAB	95.3
SECTION 4 - SLAB	95.3
SECTION 5 - SLAB	95.3
SECTION 6 - SLAB	95.1
SECTION 7 - SLAB & ABUTMENT DIAPHRAGM	88.4
SECTION 8 - SLAB & PIER DIAPHRAGM	47.3
SECTION 9 - SLAB & PIER DIAPHRAGM	47.3
SECTION 10 - SLAB & PIER DIAPHRAGM	47.3
SECTION 11 - SLAB & PIER DIAPHRAGM	47.3
SECTION 12 - SLAB & PIER DIAPHRAGM	47.3
SECTION 13 - SLAB & PIER DIAPHRAGM	47.3
TOTAL - CU.YDS.	936.7

REFER TO DESIGN SHEET 93 FOR LOCATIONS OF SECTIONS.

EPOXY COATED REINFORCING BAR LIST - SUPERSTRUCTURE - EASTBOUND

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	SLAB, TRANSV., TOP & BOTTOM	—	1753	42'-10	112,780
5b1	SLAB, LONGIT., TOP & BOTTOM	—	2020	38'-10	81,816
9b2	SLAB, LONGIT., TOP AT PIERS	—	276	28'-0	26,275
5d1	ABUTMENT DIAPH., LONGIT.	—	4	36'-6	152
5d2	ABUTMENT DIAPH., LONGIT.	—	40	6'-4	264
5d3	PIER DIAPH., LONGIT.	—	180	6'-4	1189
5d4	PIER DIAPH., LONGIT.	—	60	5'-2	323
5d5	PIER DIAPH., LONGIT.	—	6	38'-4	240
5e1	ABUTMENT DIAPH., HOOPS	□	40	7'-0	292
5e2	PIER DIAPH., HOOPS	□	120	12'-6	1565
5e3	PIER DIAPH., HAIRPINS	┘	120	2'-10	355
5e4	PIER DIAPH., HOOPS, ENDS	□	12	12'-6	156
5e5	PIER DIAPH., HAIRPINS, ENDS	┘	12	2'-10	35
5e6	PIER DIAPH., TIES, ENDS	┘	36	3'-10	144
5J1	TOP OF SLAB, TRANSV. (AT RAIL)	—	1752	6'-3	11,421
NORTH BARRIER RAIL - SEE DESIGN SHEET 110					17,538
SOUTH BARRIER RAIL - SEE DESIGN SHEET 111					17,538
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					272,083

BENT BAR DETAILS



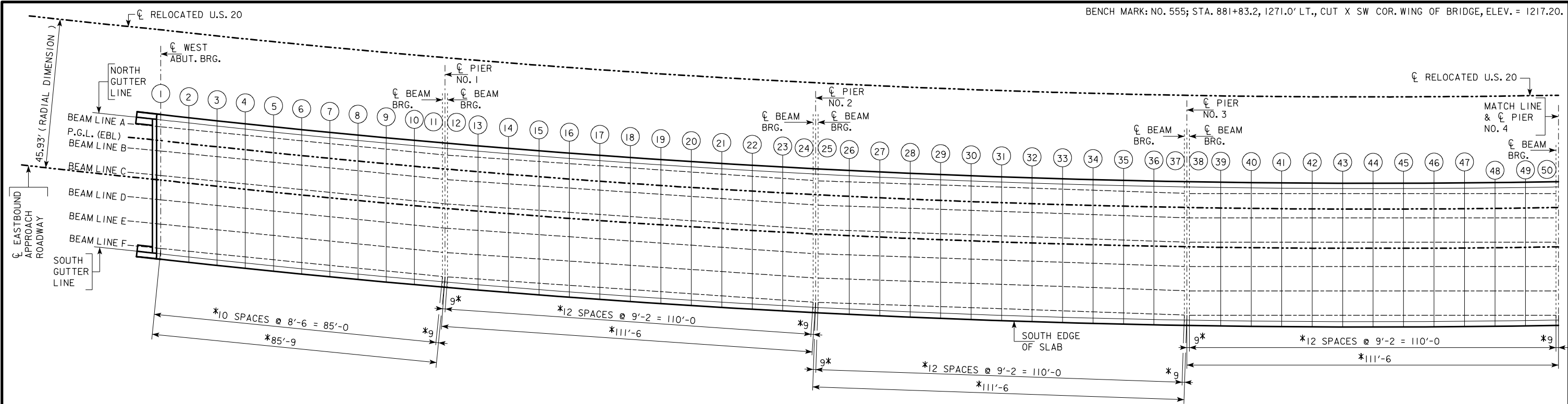
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D= PIN DIAMETER.

ESTIMATED QUANTITIES - SUPERSTRUCTURE - EASTBOUND

ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (BRIDGE)	CU.YDS.	936.7
REINFORCING STEEL EPOXY COATED	LBS.	272,083
STRUCTURAL STEEL	LBS.	17,614
STEEL EXTRUSION JOINT W/NEOPRENE	LIN.FT.	87
PRETENSIONED PRESTRESSED CONCRETE BEAMS	D85	EACH 12
	D110	EACH 30

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
SUPERSTRUCTURE DETAILS-EASTBOUND
STATION : 893+14.13 (¢ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
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DESIGN SHEET NO. 97 OF 117 FILE NO. 30187 DESIGN NO. 410



BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.

LOCATIONS FOR TOP OF SLAB ELEVATIONS

* NOTE :
ELEVATION SPACINGS AND DIMENSIONS ARE ALONG BEAM LINES.



TOP OF SLAB ELEVATIONS - EASTBOUND

	CL W.ABUT. BEARING											PIER NO. 1 BEAM BEARINGS												PIER NO. 2 BEAM BEARINGS											
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34	
N.GUTTERLINE	1258.18	1258.10	1258.02	1257.95	1257.87	1257.79	1257.72	1257.65	1257.57	1257.50	1257.43	1257.42	1257.34	1257.27	1257.19	1257.12	1257.05	1256.98	1256.91	1256.84	1256.78	1256.71	1256.65	1256.58	1256.57	1256.51	1256.45	1256.39	1256.33	1256.27	1256.21	1256.16	1256.10	1256.05	
BEAM LINE A	1258.30	1258.21	1258.13	1258.05	1257.97	1257.89	1257.82	1257.75	1257.67	1257.61	1257.54	1257.53	1257.45	1257.36	1257.29	1257.21	1257.14	1257.07	1257.00	1256.93	1256.87	1256.81	1256.75	1256.69	1256.68	1256.61	1256.54	1256.48	1256.41	1256.35	1256.30	1256.24	1256.19	1256.14	
BEAM LINE B	1258.69	1258.61	1258.53	1258.45	1258.37	1258.29	1258.22	1258.15	1258.08	1258.01	1257.94	1257.93	1257.85	1257.77	1257.69	1257.61	1257.54	1257.47	1257.40	1257.34	1257.27	1257.21	1257.15	1257.10	1257.09	1257.02	1256.95	1256.88	1256.82	1256.76	1256.70	1256.65	1256.59	1256.54	
BEAM LINE C	1259.09	1259.01	1258.93	1258.85	1258.77	1258.69	1258.62	1258.55	1258.48	1258.41	1258.35	1258.33	1258.25	1258.17	1258.09	1258.02	1257.95	1257.87	1257.81	1257.74	1257.68	1257.62	1257.56	1257.50	1257.49	1257.42	1257.36	1257.29	1257.23	1257.17	1257.11	1257.06	1257.00	1256.95	
EB APPR.RDWDY.	1259.17	1259.09	1259.02	1258.94	1258.86	1258.79	1258.71	1258.64	1258.57	1258.50	1258.43	1258.41	1258.34	1258.26	1258.19	1258.12	1258.05	1257.98	1257.91	1257.84	1257.78	1257.71	1257.65	1257.58	1257.57	1257.51	1257.45	1257.39	1257.33	1257.27	1257.22	1257.16	1257.10	1257.05	
BEAM LINE D	1259.49	1259.41	1259.33	1259.25	1259.17	1259.10	1259.02	1258.95	1258.88	1258.81	1258.75	1258.74	1258.66	1258.58	1258.50	1258.42	1258.35	1258.28	1258.21	1258.15	1258.08	1258.02	1257.97	1257.91	1257.90	1257.83	1257.76	1257.70	1257.64	1257.58	1257.52	1257.46	1257.41	1257.36	
BEAM LINE E	1259.89	1259.81	1259.73	1259.65	1259.57	1259.50	1259.42	1259.35	1259.28	1259.22	1259.15	1259.14	1259.06	1258.98	1258.90	1258.83	1258.75	1258.68	1258.62	1258.55	1258.49	1258.43	1258.37	1258.32	1258.31	1258.24	1258.17	1258.11	1258.04	1257.98	1257.93	1257.87	1257.82	1257.77	
BEAM LINE F	1260.29	1260.21	1260.13	1260.05	1259.97	1259.90	1259.83	1259.75	1259.69	1259.62	1259.56	1259.54	1259.46	1259.38	1259.31	1259.23	1259.16	1259.09	1259.02	1258.96	1258.90	1258.84	1258.78	1258.72	1258.71	1258.64	1258.58	1258.51	1258.45	1258.39	1258.33	1258.28	1258.23	1258.18	
S.GUTTERLINE	1260.38	1260.30	1260.23	1260.15	1260.07	1260.00	1259.93	1259.85	1259.78	1259.71	1259.64	1259.63	1259.56	1259.48	1259.41	1259.34	1259.27	1259.20	1259.13	1259.07	1259.00	1258.93	1258.87	1258.81	1258.80	1258.74	1258.68	1258.62	1258.56	1258.50	1258.44	1258.39	1258.33	1258.28	
S.EDGE OF SLAB	1260.47	1260.39	1260.31	1260.24	1260.16	1260.09	1260.01	1259.94	1259.87	1259.80	1259.73	1259.72	1259.64	1259.57	1259.50	1259.43	1259.36	1259.29	1259.22	1259.15	1259.09	1259.02	1258.96	1258.90	1258.89	1258.82	1258.76	1258.70	1258.65	1258.59	1258.53	1258.48	1258.42	1258.37	

TOP OF SLAB ELEVATIONS - EASTBOUND

	PIER NO. 3 BEAM BEARINGS										PIER NO. 4 BM. BRGS.									
	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50				
N.GUTTERLINE	1255.99	1255.94	1255.89	1255.88	1255.83	1255.78	1255.74	1255.69	1255.64	1255.60	1255.56	1255.51	1255.47	1255.43	1255.39	1255.35				
BEAM LINE A	1256.09	1256.04	1256.00	1255.99	1255.93	1255.88	1255.83	1255.78	1255.73	1255.68	1255.64	1255.60	1255.56	1255.53	1255.49	1255.46				
BEAM LINE B	1256.50	1256.45	1256.41	1256.40	1256.34	1256.29	1256.23	1256.18	1256.14	1256.09	1256.05	1256.01	1255.97	1255.94	1255.90	1255.87				
BEAM LINE C	1256.90	1256.86	1256.82	1256.81	1256.75	1256.70	1256.64	1256.59	1256.55	1256.50	1256.46	1256.42	1256.38	1256.35	1256.31	1256.28				
EB APPR.RDWDY.	1257.00	1256.95	1256.90	1256.89	1256.84	1256.79	1256.74	1256.70	1256.65	1256.61	1256.56	1256.52	1256.48	1256.44	1256.40	1256.36				
BEAM LINE D	1257.31	1257.27	1257.22	1257.22	1257.16	1257.10	1257.05	1257.00	1256.96	1256.91	1256.87	1256.83	1256.79	1256.76	1256.72	1256.69				
BEAM LINE E	1257.72	1257.68	1257.63	1257.62	1257.57	1257.51	1257.46	1257.41	1257.36	1257.32	1257.28	1257.24	1257.20	1257.17	1257.13	1257.10				
BEAM LINE F	1258.13	1258.08	1258.04	1258.03	1257.98	1257.92	1257.87	1257.82	1257.77	1257.73	1257.69	1257.65	1257.61	1257.58	1257.54	1257.51				
S.GUTTERLINE	1258.23	1258.18	1258.13	1258.12	1258.07	1258.02	1257.97	1257.93	1257.88	1257.84	1257.80	1257.75	1257.71	1257.67	1257.63	1257.60				
S.EDGE OF SLAB	1258.32	1258.26	1258.21	1258.21	1258.16	1258.11	1258.06	1258.02	1257.97	1257.93	1257.88	1257.84	1257.80	1257.76	1257.72	1257.69				

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 ¹/₂ x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

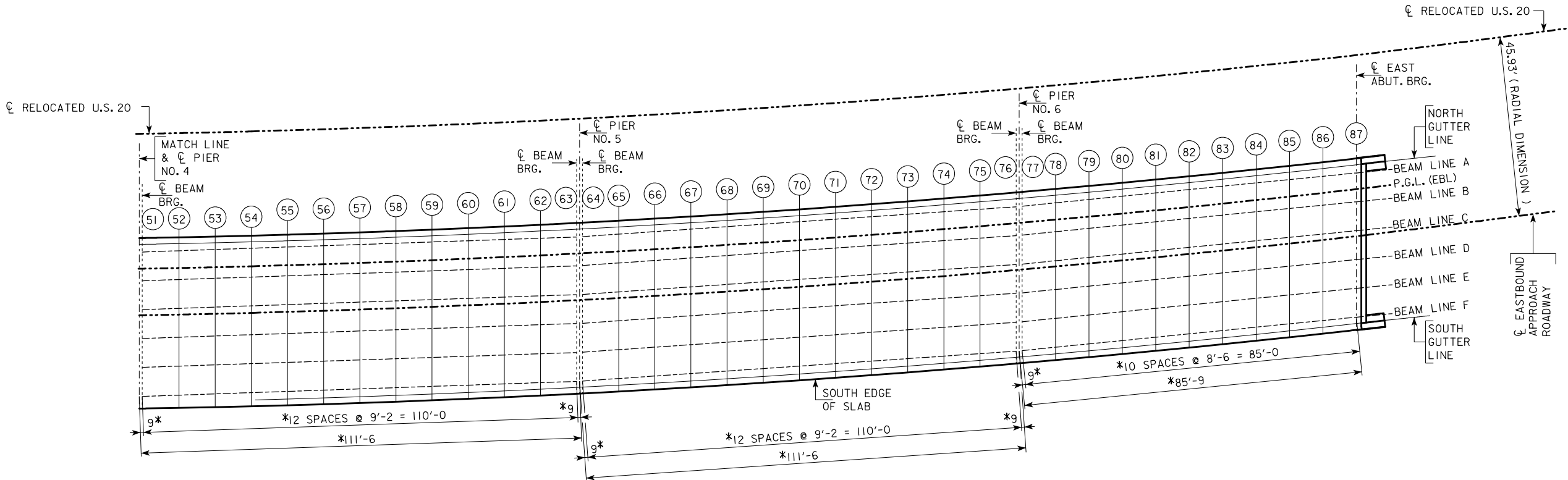
SUPERSTRUCTURE DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 98 OF 117 FILE NO. 30187 DESIGN NO. 410



LOCATIONS FOR TOP OF SLAB ELEVATIONS

*NOTE :
ELEVATION SPACINGS AND DIMENSIONS ARE ALONG BEAM LINES.



TOP OF SLAB ELEVATIONS - EASTBOUND

	PIER NO. 4 BM. BRGS.												PIER NO. 5 BEAM BEARINGS																PIER NO. 6 BEAM BEARINGS	
	LINE 51	LINE 52	LINE 53	LINE 54	LINE 55	LINE 56	LINE 57	LINE 58	LINE 59	LINE 60	LINE 61	LINE 62	LINE 63	LINE 64	LINE 65	LINE 66	LINE 67	LINE 68	LINE 69	LINE 70	LINE 71	LINE 72	LINE 73	LINE 74	LINE 75	LINE 76	LINE 77			
N.GUTTERLINE	1255.35	1255.31	1255.28	1255.24	1255.21	1255.17	1255.14	1255.11	1255.08	1255.05	1255.03	1255.00	1254.97	1254.97	1254.95	1254.92	1254.90	1254.88	1254.86	1254.84	1254.82	1254.81	1254.79	1254.78	1254.76	1254.75	1254.75			
BEAM LINE A	1255.46	1255.41	1255.37	1255.33	1255.29	1255.26	1255.23	1255.20	1255.17	1255.15	1255.12	1255.10	1255.09	1255.08	1255.05	1255.02	1254.99	1254.97	1254.95	1254.93	1254.91	1254.90	1254.89	1254.88	1254.87	1254.87	1254.86			
BEAM LINE B	1255.87	1255.82	1255.78	1255.74	1255.70	1255.67	1255.64	1255.61	1255.58	1255.56	1255.53	1255.51	1255.50	1255.49	1255.46	1255.43	1255.40	1255.38	1255.36	1255.34	1255.32	1255.31	1255.29	1255.29	1255.28	1255.27	1255.27			
BEAM LINE C	1256.28	1256.23	1256.19	1256.15	1256.11	1256.08	1256.05	1256.02	1255.99	1255.97	1255.94	1255.92	1255.91	1255.90	1255.87	1255.84	1255.81	1255.79	1255.77	1255.75	1255.73	1255.72	1255.70	1255.69	1255.69	1255.68	1255.68			
EB APPR.RDWY.	1256.36	1256.32	1256.28	1256.25	1256.22	1256.18	1256.15	1256.12	1256.09	1256.06	1256.04	1256.01	1255.99	1255.98	1255.96	1255.93	1255.91	1255.89	1255.87	1255.85	1255.84	1255.82	1255.80	1255.79	1255.77	1255.76	1255.76			
BEAM LINE D	1256.69	1256.64	1256.60	1256.56	1256.52	1256.49	1256.46	1256.43	1256.40	1256.38	1256.35	1256.33	1256.32	1256.31	1256.28	1256.25	1256.22	1256.20	1256.18	1256.16	1256.14	1256.13	1256.11	1256.10	1256.10	1256.09	1256.09			
BEAM LINE E	1257.10	1257.05	1257.01	1256.97	1256.93	1256.90	1256.87	1256.84	1256.81	1256.79	1256.76	1256.74	1256.73	1256.72	1256.69	1256.66	1256.63	1256.61	1256.59	1256.57	1256.55	1256.53	1256.52	1256.51	1256.51	1256.50	1256.50			
BEAM LINE F	1257.51	1257.46	1257.42	1257.38	1257.34	1257.31	1257.28	1257.25	1257.22	1257.20	1257.17	1257.15	1257.14	1257.13	1257.10	1257.07	1257.04	1257.02	1257.00	1256.98	1256.96	1256.94	1256.93	1256.92	1256.91	1256.91	1256.91			
S.GUTTERLINE	1257.59	1257.55	1257.52	1257.48	1257.45	1257.42	1257.39	1257.36	1257.33	1257.30	1257.27	1257.25	1257.22	1257.22	1257.19	1257.17	1257.15	1257.13	1257.11	1257.09	1257.07	1257.05	1257.04	1257.02	1257.01	1257.00	1256.99			
S.EDGE OF SLAB	1257.68	1257.64	1257.61	1257.57	1257.54	1257.51	1257.48	1257.45	1257.42	1257.39	1257.36	1257.33	1257.31	1257.31	1257.28	1257.26	1257.24	1257.22	1257.20	1257.18	1257.16	1257.14	1257.13	1257.11	1257.10	1257.09	1257.08			

TOP OF SLAB ELEVATIONS - EASTBOUND

											CL E.ABUT. BEARING
	LINE 78	LINE 79	LINE 80	LINE 81	LINE 82	LINE 83	LINE 84	LINE 85	LINE 86	LINE 87	
N.GUTTERLINE	1254.74	1254.73	1254.72	1254.71	1254.71	1254.70	1254.70	1254.69	1254.69	1254.69	
BEAM LINE A	1254.85	1254.83	1254.82	1254.81	1254.81	1254.80	1254.80	1254.80	1254.80	1254.80	
BEAM LINE B	1255.26	1255.24	1255.23	1255.22	1255.21	1255.21	1255.21	1255.21	1255.21	1255.21	
BEAM LINE C	1255.66	1255.65	1255.64	1255.63	1255.62	1255.62	1255.61	1255.61	1255.61	1255.62	
EB APPR.RDWY.	1255.75	1255.74	1255.73	1255.72	1255.72	1255.71	1255.71	1255.70	1255.70	1255.70	
BEAM LINE D	1256.07	1256.06	1256.05	1256.04	1256.03	1256.03	1256.02	1256.02	1256.02	1256.02	
BEAM LINE E	1256.48	1256.47	1256.46	1256.45	1256.44	1256.43	1256.43	1256.43	1256.43	1256.43	
BEAM LINE F	1256.89	1256.88	1256.86	1256.85	1256.85	1256.84	1256.84	1256.84	1256.84	1256.84	
S.GUTTERLINE	1256.98	1256.97	1256.97	1256.96	1256.95	1256.94	1256.93	1256.93	1256.93	1256.93	
S.EDGE OF SLAB	1257.07	1257.06	1257.05	1257.05	1257.04	1257.03	1257.03	1257.02	1257.02	1257.02	

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

SUPERSTRUCTURE DETAILS-EASTBOUND

STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 99 OF 117 FILE NO. 30187 DESIGN NO. 410

BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)																									
LOCATION	℄ W.ABUT. BRG.											PIER NO. 1 BEAM BEARINGS												PIER NO. 2 BEAM BEARINGS	
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25
BEAM LINE A	1257.63	1257.57	1257.51	1257.45	1257.38	1257.31	1257.23	1257.15	1257.06	1256.97	1256.87	1256.86	1256.83	1256.79	1256.74	1256.69	1256.63	1256.56	1256.49	1256.41	1256.32	1256.23	1256.13	1256.02	1256.01
BEAM LINE B	1258.03	1257.97	1257.91	1257.85	1257.78	1257.71	1257.63	1257.55	1257.46	1257.37	1257.28	1257.26	1257.23	1257.19	1257.15	1257.09	1257.03	1256.97	1256.89	1256.82	1256.73	1256.64	1256.54	1256.43	1256.42
BEAM LINE C	1258.43	1258.37	1258.31	1258.25	1258.18	1258.11	1258.03	1257.95	1257.87	1257.78	1257.68	1257.67	1257.63	1257.60	1257.55	1257.50	1257.44	1257.37	1257.30	1257.22	1257.14	1257.04	1256.94	1256.84	1256.83
BEAM LINE D	1258.83	1258.77	1258.72	1258.65	1258.58	1258.51	1258.44	1258.35	1258.27	1258.18	1258.08	1258.07	1258.04	1258.00	1257.95	1257.90	1257.84	1257.78	1257.70	1257.63	1257.54	1257.45	1257.35	1257.24	1257.23
BEAM LINE E	1259.23	1259.17	1259.12	1259.05	1258.98	1258.91	1258.84	1258.76	1258.67	1258.58	1258.49	1258.47	1258.44	1258.40	1258.36	1258.31	1258.25	1258.18	1258.11	1258.03	1257.95	1257.85	1257.75	1257.65	1257.64
BEAM LINE F	1259.63	1259.57	1259.52	1259.45	1259.39	1259.32	1259.24	1259.16	1259.07	1258.98	1258.89	1258.88	1258.84	1258.81	1258.76	1258.71	1258.65	1258.59	1258.52	1258.44	1258.35	1258.26	1258.16	1258.06	1258.05

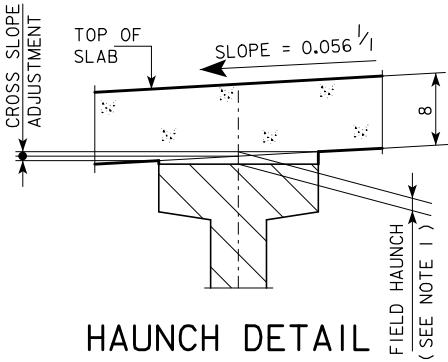
BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)																											
LOCATION												PIER NO. 3 BEAM BEARINGS															PIER NO. 4 BM. BRGS.
	LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50		
BEAM LINE A	1255.99	1255.97	1255.93	1255.89	1255.85	1255.79	1255.73	1255.67	1255.59	1255.51	1255.42	1255.33	1255.32	1255.32	1255.30	1255.28	1255.26	1255.22	1255.18	1255.13	1255.08	1255.02	1254.95	1254.88	1254.80		
BEAM LINE B	1256.40	1256.37	1256.34	1256.30	1256.25	1256.20	1256.14	1256.07	1256.00	1255.92	1255.83	1255.74	1255.73	1255.72	1255.71	1255.69	1255.66	1255.63	1255.59	1255.54	1255.49	1255.43	1255.36	1255.29	1255.21		
BEAM LINE C	1256.81	1256.78	1256.75	1256.71	1256.66	1256.61	1256.55	1256.48	1256.41	1256.33	1256.24	1256.15	1256.14	1256.13	1256.12	1256.10	1256.07	1256.04	1256.00	1255.95	1255.90	1255.84	1255.77	1255.70	1255.62		
BEAM LINE D	1257.21	1257.19	1257.16	1257.12	1257.07	1257.02	1256.96	1256.89	1256.82	1256.74	1256.65	1256.56	1256.55	1256.54	1256.53	1256.51	1256.48	1256.45	1256.41	1256.36	1256.31	1256.25	1256.18	1256.11	1256.03		
BEAM LINE E	1257.62	1257.59	1257.56	1257.52	1257.48	1257.42	1257.36	1257.30	1257.23	1257.15	1257.06	1256.97	1256.96	1256.95	1256.94	1256.92	1256.89	1256.86	1256.82	1256.77	1256.72	1256.66	1256.59	1256.52	1256.44		
BEAM LINE F	1258.03	1258.00	1257.97	1257.93	1257.88	1257.83	1257.77	1257.71	1257.63	1257.55	1257.47	1257.38	1257.37	1257.36	1257.35	1257.33	1257.30	1257.27	1257.23	1257.18	1257.13	1257.07	1257.00	1256.93	1256.85		

MISCELLANEOUS DATA TABLE

	BEAM LINE		℄ W.ABUT. BRG.										PIER NO. 1 BEAM BEARINGS												PIER NO. 2 BEAM BEARINGS		
			LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{15}{16}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	0	0	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0	0
CROSS SLOPE ADJUSTMENTS (IN)	ALL		$\pm \frac{9}{16}$																								
ALLOWABLE FIELD HAUNCH AT ℄ BEAM (in.)	MAX.	ALL	2									3		4		3		2			3		4				
	MIN.	ALL	$\frac{1}{16}$									1		2		1		$\frac{1}{16}$			1		2				

MISCELLANEOUS DATA TABLE

	BEAM LINE														PIER NO. 3 BEAM BEARINGS														PIER NO. 4 BM. BRGS.
			LINE 26	LINE 27	LINE 28	LINE 29	LINE 30	LINE 31	LINE 32	LINE 33	LINE 34	LINE 35	LINE 36	LINE 37	LINE 38	LINE 39	LINE 40	LINE 41	LINE 42	LINE 43	LINE 44	LINE 45	LINE 46	LINE 47	LINE 48	LINE 49	LINE 50		
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0	0	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{15}{16}$	2	$1\frac{15}{16}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	0		
CROSS SLOPE ADJUSTMENTS (IN)	ALL		$\pm \frac{9}{16}$																										
ALLOWABLE FIELD HAUNCH AT C BEAM (in.)	MAX.	ALL	4	3		2					3		4			3		2				3		4					
	MIN.	ALL	2	1		$\frac{1}{16}$					1		2			1		$\frac{1}{16}$				1		2					



HAUNCH DETAIL

NOTE:
BRIDGE SEAT ELEVATIONS ARE SET BASED ON THEORETICAL CAMBER AND BEAM DEFLECTIONS. THESE BRIDGE SEATS WILL PROVIDE A THEORETICAL BEAM HAUNCH WITHIN DESIGN PARAMETERS. ACTUAL HAUNCHES ARE DETERMINED USING SURVEYED TOP OF BEAM ELEVATIONS AND "BEAM LINE HAUNCH ELEVATION" DATA. ALLOWABLE MAXIMUM AND MINIMUM "FIELD HAUNCH" VALUES ARE GIVEN IN THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES FROM THE "MISCELLANEOUS DATA" TABLE WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE.

NOTE 1 :
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACINGS SHOWN ON THE "LOCATIONS FOR TOP OF SLAB ELEVATIONS" ON DESIGN SHEET 98. SUBTRACT THE SURVEYED BEAM SHOT FROM THE "BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE "FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES ADJUSTMENTS FOR SLAB THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS INDICATED IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

NOTE :
HAUNCH LOCATIONS ARE AT THE SAME LOCATIONS AS THE BEAM LINES AND ENCIRCLED NUMBERS SHOWN ON DESIGN SHEET 98.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
HAUNCH DATA DETAILS-EASTBOUND
STATION : 893+14.13 (℄ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 100 OF 117 FILE NO. 30187 DESIGN NO. 410

BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)																													
LOCATION	PIER NO. 4 BM. BRGS.													PIER NO. 5 BEAM BEARINGS														PIER NO. 6 BEAM BEARINGS	
	LINE 51	LINE 52	LINE 53	LINE 54	LINE 55	LINE 56	LINE 57	LINE 58	LINE 59	LINE 60	LINE 61	LINE 62	LINE 63	LINE 64	LINE 65	LINE 66	LINE 67	LINE 68	LINE 69	LINE 70	LINE 71	LINE 72	LINE 73	LINE 74	LINE 75	LINE 76	LINE 77		
BEAM LINE A	1254.79	1254.80	1254.80	1254.79	1254.77	1254.75	1254.72	1254.69	1254.65	1254.60	1254.55	1254.49	1254.42	1254.41	1254.43	1254.45	1254.45	1254.45	1254.44	1254.43	1254.40	1254.38	1254.34	1254.30	1254.25	1254.20	1254.20		
BEAM LINE B	1255.20	1255.21	1255.21	1255.20	1255.18	1255.16	1255.13	1255.10	1255.06	1255.01	1254.96	1254.90	1254.83	1254.82	1254.84	1254.86	1254.86	1254.86	1254.85	1254.84	1254.81	1254.79	1254.75	1254.71	1254.66	1254.61	1254.61		
BEAM LINE C	1255.61	1255.62	1255.62	1255.62	1255.61	1255.59	1255.57	1255.54	1255.51	1255.47	1255.42	1255.37	1255.31	1255.24	1255.23	1255.25	1255.27	1255.27	1255.27	1255.26	1255.25	1255.22	1255.20	1255.16	1255.12	1255.07	1255.02	1255.01	
BEAM LINE D	1256.02	1256.03	1256.03	1256.02	1256.00	1255.98	1255.95	1255.92	1255.88	1255.83	1255.78	1255.72	1255.65	1255.64	1255.66	1255.68	1255.68	1255.68	1255.67	1255.66	1255.63	1255.61	1255.57	1255.53	1255.48	1255.42	1255.42		
BEAM LINE E	1256.43	1256.44	1256.44	1256.43	1256.41	1256.39	1256.36	1256.33	1256.29	1256.24	1256.19	1256.13	1256.06	1256.05	1256.07	1256.08	1256.09	1256.09	1256.08	1256.06	1256.04	1256.01	1255.98	1255.94	1255.89	1255.83	1255.83		
BEAM LINE F	1256.84	1256.85	1256.85	1256.84	1256.82	1256.80	1256.78	1256.74	1256.70	1256.65	1256.60	1256.54	1256.47	1256.46	1256.48	1256.49	1256.50	1256.50	1256.49	1256.47	1256.45	1256.42	1256.39	1256.35	1256.30	1256.24	1256.24		

BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)

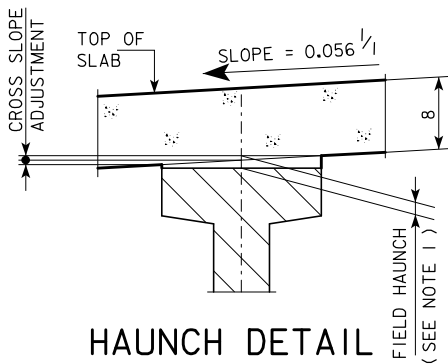
BEAM LINE HAUNCH ELEVATIONS (SEE NOTE 1)										
LOCATION										℄ E.ABUT. BRG.
	LINE 78	LINE 79	LINE 80	LINE 81	LINE 82	LINE 83	LINE 84	LINE 85	LINE 86	LINE 87
BEAM LINE A	1254.21	1254.22	1254.23	1254.23	1254.22	1254.21	1254.20	1254.19	1254.16	1254.14
BEAM LINE B	1254.62	1254.63	1254.63	1254.63	1254.63	1254.62	1254.61	1254.59	1254.57	1254.54
BEAM LINE C	1255.03	1255.04	1255.04	1255.04	1255.04	1255.03	1255.02	1255.00	1254.98	1254.95
BEAM LINE D	1255.44	1255.45	1255.45	1255.45	1255.45	1255.44	1255.42	1255.41	1255.38	1255.36
BEAM LINE E	1255.85	1255.86	1255.86	1255.86	1255.86	1255.85	1255.83	1255.82	1255.79	1255.76
BEAM LINE F	1256.25	1256.26	1256.27	1256.27	1256.26	1256.25	1256.24	1256.22	1256.20	1256.17

MISCELLANEOUS DATA TABLE

MISCELLANEOUS DATA TABLE																													
	BEAM LINE		PIER NO. 4 BM. BRGS.												PIER NO. 5 BEAM BEARINGS													PIER NO. 6 BEAM BEARINGS	
			LINE 51	LINE 52	LINE 53	LINE 54	LINE 55	LINE 56	LINE 57	LINE 58	LINE 59	LINE 60	LINE 61	LINE 62	LINE 63	LINE 64	LINE 65	LINE 66	LINE 67	LINE 68	LINE 69	LINE 70	LINE 71	LINE 72	LINE 73	LINE 74	LINE 75	LINE 76	LINE 77
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		0	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{16}$	2	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{5}{8}$	0	0	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{16}$	2	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{5}{8}$	0	0
CROSS SLOPE ADJUSTMENTS (IN)	ALL		$\pm \frac{9}{16}$																										
ALLOWABLE FIELD HAUNCH AT C BEAM (in.)	MAX.	ALL	4	3		2					3			4			3			2			3			4			
	MIN.	ALL	2	1		$\frac{1}{16}$					1			2			1			$\frac{1}{16}$			1			2			

MISCELLANEOUS DATA TABLE

MISCELLANEOUS DATA TABLE												
	BEAM LINE											℄ E.ABUT. BRG.
			LINE 78	LINE 79	LINE 80	LINE 81	LINE 82	LINE 83	LINE 84	LINE 85	LINE 86	LINE 87
ANTICIPATED DEFLECTION DUE TO SLAB (IN)	ALL		3 8	5 8	7 8	15 16	1	15 16	7 8	5 8	3 8	0
CROSS SLOPE ADJUSTMENTS (IN)	ALL		± 9 16									
ALLOWABLE FIELD HAUNCH AT ℄ BEAM (in.)	MAX.	ALL	4	3	2							
	MIN.	ALL	2	1	1 16							



NOTE 1 :
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS
CONSISTENT WITH THE SPACINGS SHOWN ON THE "LOCATIONS FOR TOP OF SLAB
ELEVATIONS" ON DESIGN SHEET 99. SUBTRACT THE SURVEYED BEAM SHOT FROM THE
"BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE
"FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES
ADJUSTMENTS FOR SLAB THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL
CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND
MINIMUMS INDICATED IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE
OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.

NOTE :
HAUNCH LOCATIONS ARE AT THE SAME
LOCATIONS AS THE BEAM LINES AND
ENCIRCLED NUMBERS SHOWN ON
DESIGN SHEET 99.

SAC COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. 101 OF 117 FILE NO. 30187 DESIGN NO. 410



Diagram illustrating the required hex head for a 3/4" ϕ GALVANIZED STEEL SOCKET FLAT COUNTERSUNK HEAD CAP SCREW.

A diagram of a 90-degree elbow. The horizontal run is labeled with a dimension line and the number 4. The vertical riser has four horizontal lines inside, representing a stack of four units.

NOTE: IT IS INTENDED THAT THE $\frac{11}{16}$ INCH RECESSED AREA BE FORMED SO THAT WHEN THE $\frac{3}{8}$ " BENT PLATE IS INSTALLED THE PLATE WILL BE ABLE TO MOVE FREELY IN THIS RECESSED AREA.



SECTION A-A

(DRAWN FOR 0° SKEW FOR ILLUSTRATIVE PURPOSES)

NOTE:
SEE DESIGN SHEET 104 FOR EXPANSION DEVICE
NOTES CONTAINING THE STEEL EXTRUSION NOTES,
NEOPRENE GLAND NOTES, AND WATERTIGHT INTEGRITY
TESTING AND REPAIR NOTES.

EXPANSION JOINT SETTINGS	1 $\frac{7}{16}$ AT 90° F.
	2 AT 70° F.
	2 $\frac{1}{2}$ AT 50° F.
	3 $\frac{9}{16}$ AT 10° F.



ΔΔ USED FOR ALL OUT TO OUT DIMENSIONS OF SLAB.
THE DIMENSION MAY VARY SLIGHTLY DEPENDING ON
MANUFACTURER FURNISHING THE JOINT.

NOTE: JOINT SETTINGS ARE BASED ON SIZE OF 5" GLAND. IF LARGER NEOPRENE GLAND IS USED, MAINTAIN JOINT SETTINGS.

DUAL 729'-0 $\frac{1}{2}$ ' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES

EXPANSION DEVICE DETAILS-EASTBOUND

STATION : 893+14.13 (♀ RELOCATED U.S. 20) AUGUST 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 103 OF 117 FILE NO. 30187 DESIGN NO. 410

ENGLISHDECKRAILBRIDGES.DGN - 1026s2 - THIS SHEET ISSUED 11-08.

STEEL EXTRUSION NOTES:

THE CONTRACTOR SHALL SUBMIT FOR APPROVAL SHOP DRAWINGS OF THE EXPANSION DEVICES SHOWING LAYOUT, MATERIAL TO BE USED, AND PROVISIONS FOR HOLDING DEVICE DURING PLACEMENT OF CONCRETE.

THE EXPANSION DEVICE SHALL BE GALVANIZED AFTER WELDING.

THE EXPANSION DEVICE IS TO BE PARALLEL TO GRADE.

CAP SCREWS SHALL BE COUNTERSUNK 1/16" BELOW TOP OF THE PLATE.

THE MINIMUM GRADE OF STRUCTURAL STEEL FOR THE EXPANSION DEVICE SHALL BE ASTM A-36.

BLOCKOUT DETAILS MAY BE ALTERED FROM THOSE SHOWN PROVIDED THE GLAND MAY BE INSTALLED AND REMOVED IF NECESSARY AND THE CURB AREA REMAINS WATERTIGHT.

SHOP AND OR FIELD SPLICES OF THE STEEL EXTRUSION WILL BE PERMITTED. FIELD SPLICES OF THE STEEL EXTRUSION SHALL BE MADE AT THE STAGING JOINTS IF CONSTRUCTION IS STAGED. FIELD WELDS ON GALVANIZED ITEMS SHALL BE COATED WITH A ZINC RICH MATERIAL APPROVED BY THE ENGINEER. PIECES OF STEEL EXTRUSION IN THE 15 FT. TO 22 FT. RANGE SHALL BE USED TO FORM THE REQUIRED GUTTER TO GUTTER LENGTH. THE INDIVIDUAL LENGTH OF PIECES SHALL BE CHOSEN SO THAT A MINIMUM NUMBER OF SPLICES IS REQUIRED. ALL PIECES SHALL BE JOINED WITH A PREQUALIFIED PARTIAL PENETRATION SINGLE GROOVE WELD, AND ALL SURFACES NOT IN CONTACT WITH CONCRETE ARE TO BE GROUND FLUSH. NO WELD SHALL BE PERMITTED IN THE INTERNAL SECTION OF THE EXTRUSION WHERE THE NEOPRENE GLAND IS TO BE LOCATED.

THE NUMBER OF FEET OF STEEL EXTRUSION INSTALLED SHALL BE PAID FOR AT THE CONTRACT PRICE PER FOOT BASED ON PLAN QUANTITIES. THE PRICE BID FOR "STEEL EXTRUSION JOINT W/NEOPRENE" SHALL INCLUDE THE COST OF FURNISHING BUT NOT THE COST OF INSTALLING THE NEOPRENE GLAND. THE CONTRACT PRICE BID FOR "STEEL EXTRUSION JOINT W/NEOPRENE" SHALL BE FULL COMPENSATION FOR FURNISHING AND INSTALLING STEEL EXTRUSIONS. THIS WORK WILL CONSIST OF FURNISHING ALL REQUIRED MATERIALS, (INCLUDING THE 3/8" PLATES AT THE CURBS AND THEIR ANCHORAGE SYSTEMS), AND THE INSTALLATION AND ADJUSTMENT OF THE EXPANSION JOINTS IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER. THE FURNISHING AND INSTALLATION OF ALL NECESSARY HARDWARE AND ACCESSORIES AS SUPPLIED BY THE EXPANSION JOINT MANUFACTURER ARE TO BE INCLUDED IN THIS WORK, INCLUDING THE ANCHORAGE SYSTEM AND ANY TEMPORARY ERECTION MATERIAL. ALL WORK AND MATERIALS FOR THE INSTALLATION OF THE EXPANSION JOINTS ARE TO COMPLY WITH THE WRITTEN RECOMMENDATIONS OF THE EXPANSION JOINT MANUFACTURER.

NEOPRENE GLAND NOTES:

THE NEOPRENE GLAND IS TO BE PLACED AS ONE CONTINUOUS PIECE FROM END TO END OF THE STEEL EXTRUSION.

THE NEOPRENE GLAND SHALL CONFORM TO ASTM-2628 MODIFIED TO EXCLUDE RECOVER TEST AND COMPRESSION SET.

THE CONTRACTOR SHALL INSTALL THE GLAND ONLY WHEN THE DECK TEMPERATURE IS BETWEEN 40°F AND MAXIMUM INSTALLATION TEMPERATURE SHOWN IN THESE PLANS INCLUSIVE. THE DECK TEMPERATURE SHALL BE MEASURED BY RECORDING THE SURFACE TEMPERATURES ON THE UNDERSIDE OF THE DECK ADJACENT TO THE JOINTS. IF THE DECK TEMPERATURE DOES NOT FALL WITHIN THE SPECIFIED TEMPERATURE RANGE BEFORE THE CONTRACTOR HAS COMPLETED ALL OTHER REQUIRED WORK, IT WILL BE NECESSARY FOR THE CONTRACTOR TO RETURN TO THE PROJECT SITE TO COMPLETE INSTALLATION AND TESTING OF THE NEOPRENE GLAND. IF THE CONTRACTOR IS REQUIRED TO RETURN TO THE PROJECT SITE AFTER ALL OTHER REQUIRED WORK HAS BEEN COMPLETED, THE CONTRACTOR SHALL COMPLETE INSTALLATION AND TESTING OF NEOPRENE GLAND AT NO EXTRA CHARGE TO THE STATE.

THE NUMBER OF FEET OF NEOPRENE GLAND INSTALLED SHALL BE PAID FOR AT THE CONTRACT PRICE PER FOOT BASED ON PLAN QUANTITIES. THE PRICE FOR "NEOPRENE GLAND INSTALLATION AND TESTING" SHALL BE FULL COMPENSATION FOR INSTALLING AND TESTING OF THE NEW NEOPRENE GLAND. THIS WORK WILL CONSIST OF CLEANING THE EXTRUSION, INSTALLATION OF THE NEOPRENE GLAND AND WATER TIGHT TESTING OF THE EXPANSION JOINT SYSTEM. ALL WORK AND MATERIALS NECESSARY FOR THE INSTALLATION OF THE NEOPRENE GLAND SHALL COMPLY WITH THE RECOMMENDATIONS OF THE EXPANSION JOINT MANUFACTURER. THE PRICE BID FOR "NEOPRENE GLAND INSTALLATION AND TESTING" SHALL INCLUDE ALL WATERTIGHT INTEGRITY TESTING, LEAK REPAIRS AS DIRECTED BY THE ENGINEER, AND SUBSEQUENT WATERTIGHT TESTING UNTIL A LEAK FREE INSTALLATION IS ACHIEVED.

WATERTIGHT INTEGRITY TESTING AND REPAIR NOTES:

AFTER INSTALLATION OF EACH NEOPRENE GLAND, THE CONTRACTOR SHALL PERFORM WATERTIGHT INTEGRITY TESTS AT THE DECK LEVEL TO DETECT ANY LEAKAGE. THE TESTS ARE TO CHECK FOR LEAKAGE AT THE UPTURNED ENDS OF THE EXPANSION DEVICE AND FOR LEAKAGE ALONG THE EXPANSION DEVICE ACROSS THE DECK AND ANY MEDIANS OR SIDEWALKS. THE CONTRACTOR MAY CONDUCT A SINGLE TEST OF THE ENTIRE DEVICE INCLUDING UPTURNED ENDS OR MAY CONDUCT SEPARATE TESTS OF UPTURNED ENDS AND ONE OR MORE TESTS OF OVERLAPPING LENGTHS BETWEEN THE UPTURNED ENDS.

AT EACH UPTURNED END OF THE EXPANSION DEVICE, THE CONTRACTOR SHALL BLOCK OUT ON THE DECK AT LEAST 3 FEET OF THE EXPANSION DEVICE LEADING TO THE UPTURNED END AND FLOOD THE AREA. A MINIMUM WATER DEPTH OF 3" SHALL BE MAINTAINED AT THE GUTTERLINE FOR AT LEAST 30 MINUTES. DURING THE TEST, THE INSPECTOR SHALL OBSERVE FOR ANY OVERFLOW AT THE UPTURNED END. AT THE CONCLUSION OF THE TEST THE INSPECTOR WILL EXAMINE THE UNDERSIDE OF THE JOINT FOR LEAKAGE. THE EXPANSION DEVICE IS CONSIDERED WATERTIGHT IF THE INSPECTOR OBSERVES NO OVERFLOW DURING THE TEST AND IF NO DRIPPING WATER OR WATER DROPLETS ARE VISIBLE IN THE UNDERDECK AREAS NEAR THE UPTURNED END.

THE CONTRACTOR SHALL TEST THE EXPANSION DEVICE BETWEEN UPTURNED ENDS BY BLOCKING OUT AND COVERING THE DEVICE WITH PONDED OR FLOWING WATER TO A DEPTH OF AT LEAST 1" AT ALL POINTS, FOR AT LEAST 30 MINUTES. VERTICAL CURB SURFACES MAY BE TESTED WITH AN UNNOZZLED HOSE DELIVERING APPROXIMATELY ONE GALLON PER MINUTE DIRECTED TO FLOW OVER THE ENTIRE CURB HEIGHT FOR 30 MINUTES. AT THE CONCLUSION OF THE TEST, THE INSPECTOR WILL EXAMINE THE UNDERSIDE OF THE JOINT FOR LEAKAGE. THE EXPANSION DEVICE IS CONSIDERED WATERTIGHT IF NO DRIPPING WATER OR WATER DROPLETS ARE VISIBLE IN THE UNDERDECK AREAS ALONG THE FULL LENGTH OF THE EXPANSION JOINT. DAMP CONCRETE THAT DOES NOT SHOW DRIPPING WATER OR WATER DROPLETS IS NOT CONSIDERED A SIGN OF LEAKAGE.

IF THE EXPANSION DEVICE LEAKS AT AN UPTURNED END OR ALONG ITS LENGTH, THE CONTRACTOR SHALL LOCATE THE LEAK(S) AND TAKE REPAIR MEASURES TO STOP THE LEAKAGE. THE REPAIR MEASURES SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER PRIOR TO BEGINNING CORRECTIVE WORK.

IF MEASURES TO ELIMINATE LEAKAGE ARE TAKEN, THE CONTRACTOR SHALL PERFORM SUBSEQUENT WATERTIGHT INTEGRITY TESTS SUBJECT TO THE SAME CONDITIONS AS THE ORIGINAL TEST.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED

PRESTRESSED CONCRETE BEAM BRIDGES

85'-9 END SPANS5 - 111'-6 INTERIOR SPANS

EXPANSION DEVICE NOTES-EASTBOUND

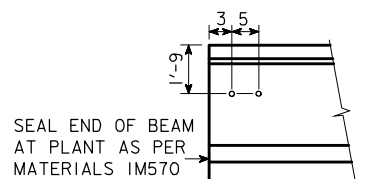
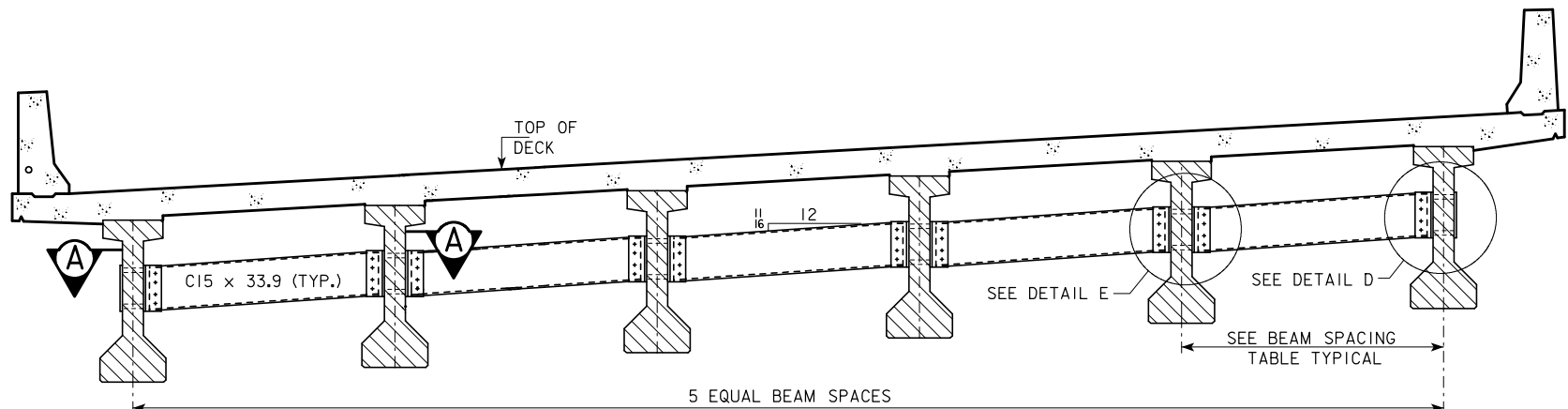
STATION : 893+14.13 (¢ RELOCATED U.S. 20)AUGUST, 2010

SAC COUNTY

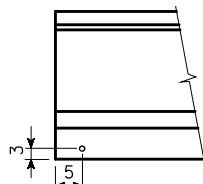
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 104 OF 117FILE NO. 30187DESIGN NO. 410

CORRECTION 01-08 - H.T.S. BOLT LABELS CHANGED TO H.S.. HEX NUTS CHANGED TO HEAVY HEX NUTS.
ENGLISH BEAMS.DGN 1036 - THIS SHEET ISSUED 9-8-88



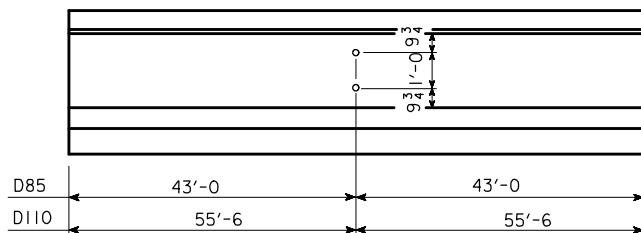
ABUTMENTS



PIERS

BEAM COIL TIE LOCATIONS

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" HOLES FOR THE 7/8" H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.
THE 7/8" 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.

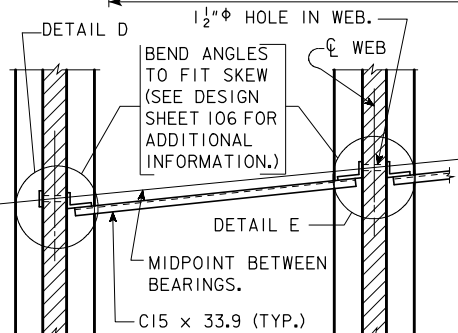


INTERMEDIATE DIAPHRAGM BOLT LOCATIONS

SECTION SHOWING INTERMEDIATE DIAPHRAGM

BEAM SPACING TABLE	
SPACING	SPAN
7'-3 5/16	SPAN 1
7'-3 1/2	SPAN 2
7'-3 11/16	SPAN 3
7'-3 3/4	SPAN 4
7'-3 11/16	SPAN 5
7'-3 1/2	SPAN 6
7'-3 5/16	SPAN 7

NOTE :
SEE DESIGN SHEET 106 FOR
ADDITIONAL INTERMEDIATE
DIAPHRAGM DETAILS.



SECTION A-A

INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE CONNECTION DETAIL "E"

2 - 7/8" H.S. BOLTS WITH NUTS AND WASHERS				WEIGHT
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "E"	NUMBER OF DETAIL "E"	
7"	10"	4.66 LB	28	131
2 - L 6 x 4 x 1/2 x 1'-3 1/4 = 41.2 LB				28

ONE CONNECTION DETAIL "D"

2 - 7/8" H.S. BOLTS WITH NUTS AND WASHERS				WEIGHT
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "D"	NUMBER OF DETAIL "D"	
7"	10"	4.66 LB	14	65
1 - BACKING PL 4 x 3/8 x 1'-3 1/4 = 6.5 LB				14
1 - L 6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LB				289

C15 x 33.9 DIAPHRAGMS

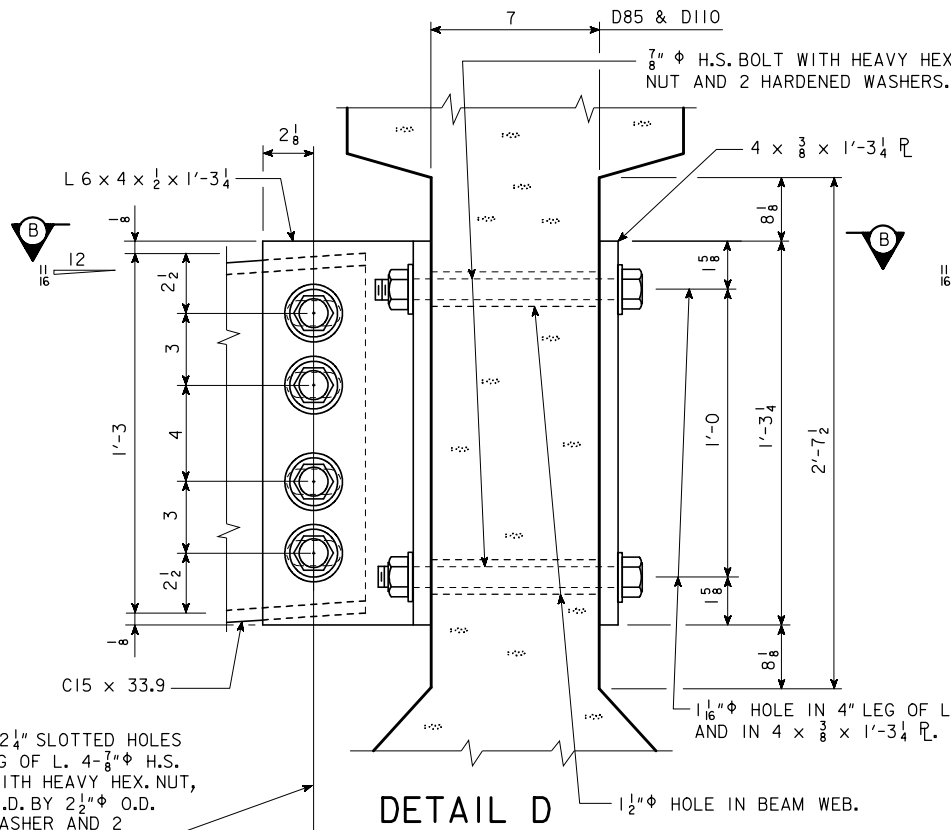
LOCATION	BEAM SPACING	DIAPHRAGM LENGTH *		
SPAN 1 & 7	7'-3 5/16 (-)	6'-4 15/16	10	2175
SPAN 2 & 6	7'-3 1/2 (+)	6'-4 15/16	10	2175
SPAN 3 & 5	7'-3 11/16	6'-4 15/16	10	2175
SPAN 4	7'-3 3/4 (-)	6'-4 15/16	5	1088

* THE LENGTH OF THE C15 X 33.9 DIAPHRAGMS SHOWN IS THE SLOPED DISTANCE BETWEEN BEAMS. THE ENDS OF THE DIAPHRAGMS ARE TO BE VERTICAL.

DIAPHRAGM CONNECTION BOLTS

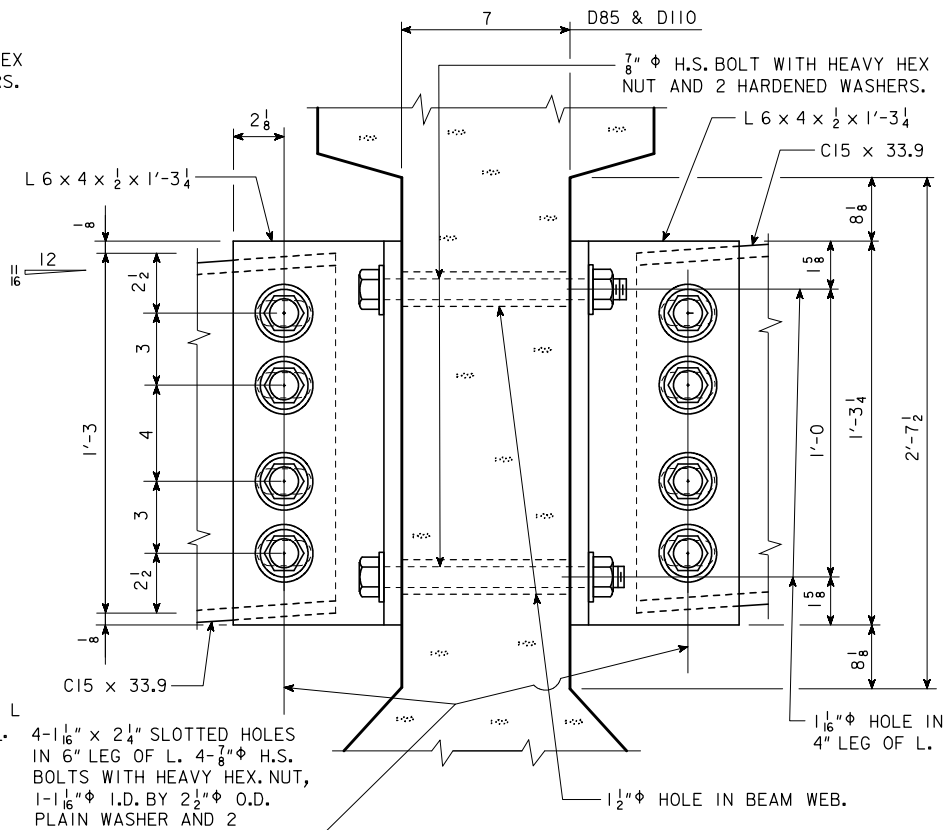
8 - 7/8" H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM	NUMBER OF DIAPHRAGMS	
10.3 LB	35	361

EASTBOUND BRIDGE - INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL (TOTAL LB) = 9704

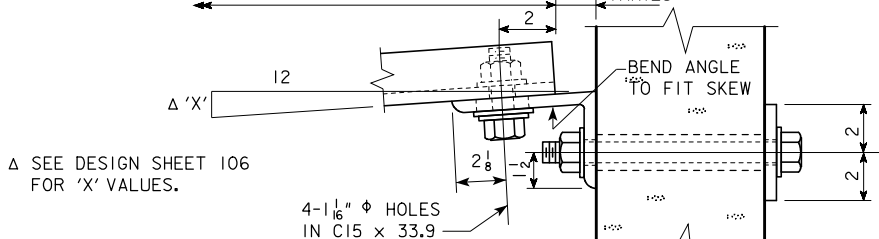


DETAIL D

4-1 1/8" x 2 1/4" SLOTTED HOLES IN 6" LEG OF L. 4-7/8" H.S. BOLTS WITH HEAVY HEX. NUT, 1-1 1/8" I.D. BY 2 1/2" O.D. PLAIN WASHER AND 2 HARDENED WASHERS.



DETAIL E



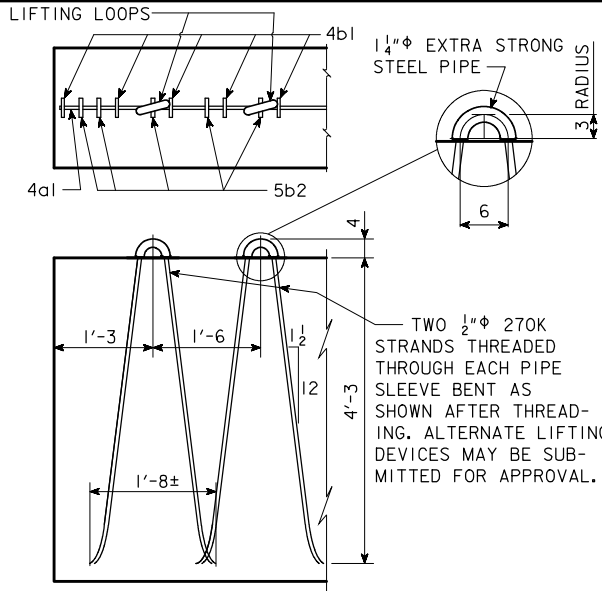
SECTION B-B

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
INTERMEDIATE DIAPHRAGM DETAILS
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

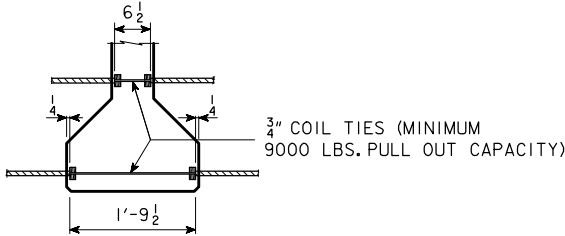
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 105 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 08-09 - SPECIFICATION REFERENCE NUMBER CHANGED. DESIGN STRESSES & SPECIFICATIONS SERIES CHANGED TO 2007. D45 BEAM NUMBER OF STRANDS CHANGED. ENGLISH BEAMS.DGN - 4630 - LRFD - THIS SHEET RE-ISSUED 09-06.



LIFTING LOOP DETAIL

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



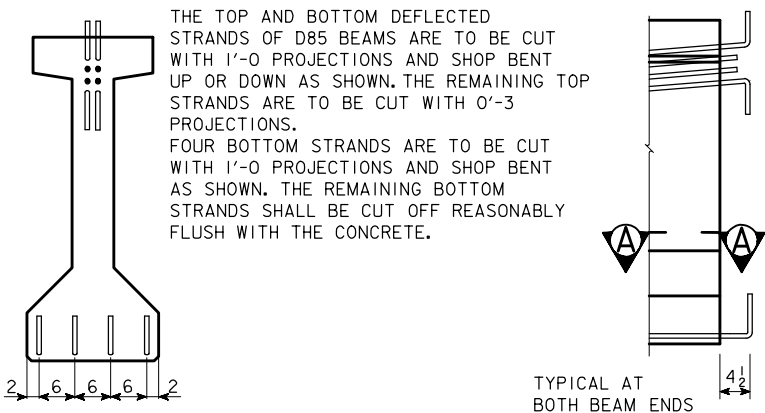
COIL TIE DETAIL

SPECIFICATIONS:

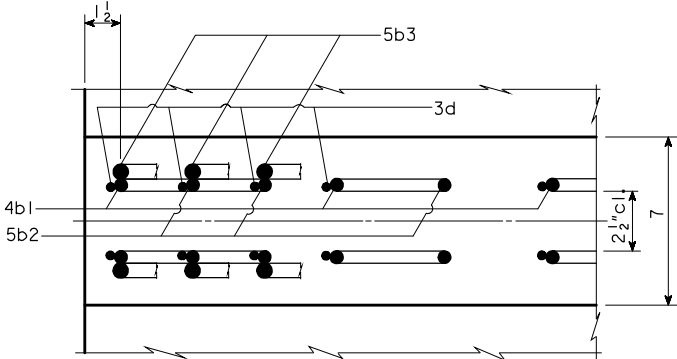
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.

ΔΔ BARS TO BE EPOXY COATED



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

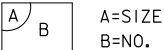


SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM

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, f'c = 5000 psi. (EXCEPT AS NOTED).
PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f's = 270,000 psi.



REINFORCING BAR LIST

BEAM	SPAN	D35	D40	D45	D50	D55	D60	D65	D70	D75	D80	D85	D90	D95	D100	D105
BAR	SHAPE											NO.	LENGTH			
4a1	—											2	16'-0			
a2	—											5/4	29'-4			
a3	—											6/2	32'-0			
ΔΔ4b1	—											42	10'-4			
ΔΔ4b2	—											11	10'-6			
ΔΔ4b3	—											15	10'-8			
5b2	—											16	8'-8			
5b3	—											12	4'-4			
3c	—											68	2'-1			
3d	—											84	5'-7			
3e	—											30	2'-3			

MODIFIED STANDARD SHEET 4630

SAC COUNTY

PROJECT NUMBER NHXS-020-2 (84)--3H-81

SHEET NUMBER 108

D BEAM DATA

BEAM	SPAN LENGTH ℳ-ℳ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS ②	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.)Δ _D		PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C.Y.)	REINFORCING STEEL - (lbs.)
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE ^① (ELASTIC) Δ _i	TIME ^② (PLASTIC) Δ _T					
D35																
D40																
D45																
D50																
D55																
D60																
D65																
D70																
D75																
D80																
D85	85'-0	86'-0	0.60	14	6	851	27.3	1.27	2.24	0.87	0.22		7'-6	28.6	14.1	1166
D90																
D95																
*D100																
*D105																

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 760 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (3191 #) OR ONE STEEL DIAPHRAGM (285 #) AT CL 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 CL OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:

(A) Δ_D = Δ_i + Δ_T FOR SIMPLE SPAN.
(B) Δ_D = Δ_i + 3/4 Δ_T FOR END SPANS OF CONTINUOUS BRIDGE.
(C) Δ_D = Δ_i + 1/2 Δ_T FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

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

* MINIMUM CONCRETE f'c (AT 28 DAYS) SHALL BE 7500 psi. MINIMUM f'ci AT RELEASE SHALL BE 6000 psi.

NOTES: (CONTINUED)

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.

IF STUB ABUTMENTS ARE USED, ALL STRANDS AT THE ENDS OF BEAMS AT STUB ABUTMENTS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

WHEN EXPANSION JOINTS ARE USED, CONCRETE SEALER SHALL BE APPLIED TO THE PRESTRESSED BEAM END SECTIONS. THE SEALING SHALL BE IN ACCORDANCE WITH MATERIALS I.M. 570 AND 491.12.

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.

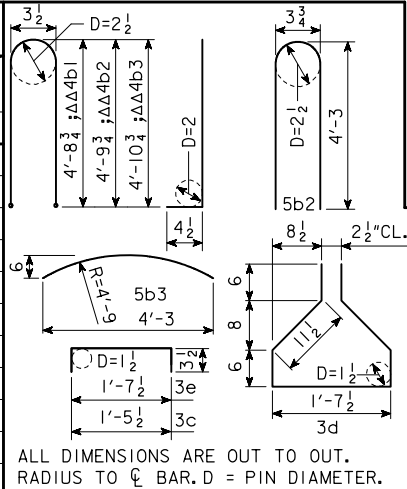
BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

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 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.

FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ARTICLE 2407.03, K, OF THE STANDARD SPECIFICATIONS, EXCEPT THE OVERHANG MAY BE INCREASED TO A MAXIMUM OF 8 FEET FOR THE D85 BEAM.

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.



DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS

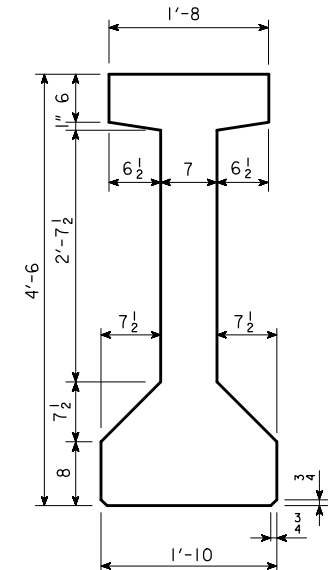
BEAM DETAILS

STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 107 OF 117 FILE NO. 30187 DESIGN NO. 410

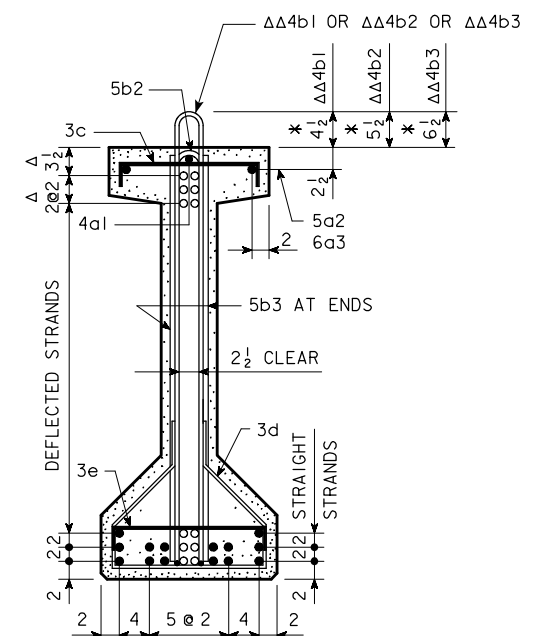


"D" BEAM
CROSS SECTION

$$\begin{aligned} \text{AREA} &= 638.75 \text{ in}^2 \\ Y_b &= 24.37 \text{ in} \\ I &= 214,974 \text{ in}^4 \end{aligned}$$


NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS
ARE AT $\bar{C}$ BEAM AND END OF BEAM.

NOTE STIRRUP EXTENSIONS



BEAM D85

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

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0 $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

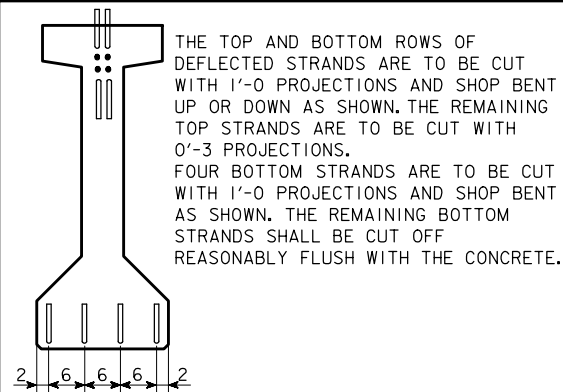
BEAM DETAILS D85

STATION : 893+14.13 (@ RELOCATED U.S. 20) AUGUST, 2010

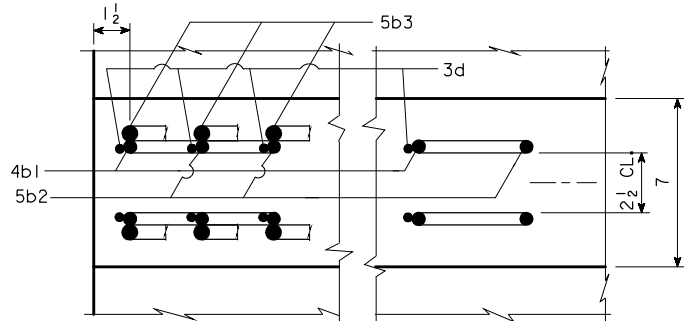
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 108 OF 117 FILE NO. 30187 DESIGN NO. 410

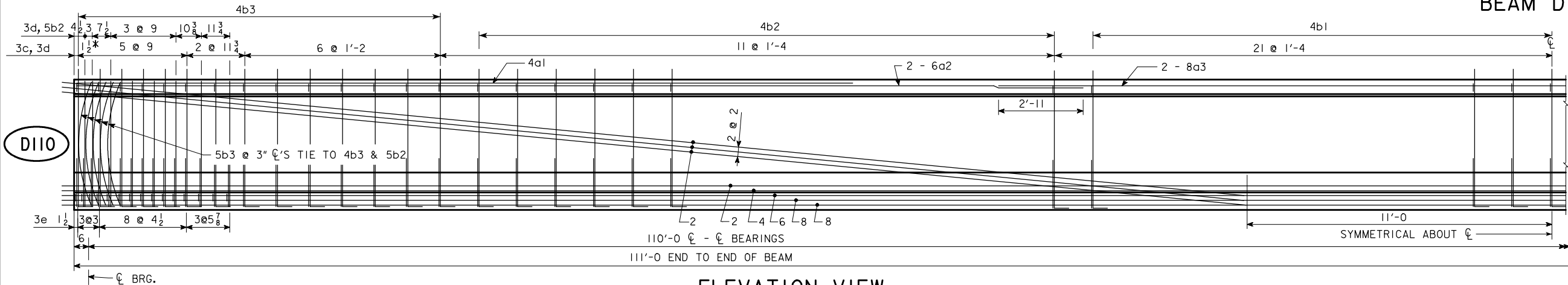
REVISION 08-09 - SPECIFICATION REFERENCE NUMBER CHANGED, DESIGN STRESSES & SPECIFICATIONS SERIES CHANGED TO 2007.
ENGLISHBEAMS.DGN - 4636 - LRFD - THIS SHEET RE-ISSUED 09-06.



STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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



NOTES:

- THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN BEAM DATA 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 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 2403.03, I, OF THE STANDARD SPECIFICATIONS.
- ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.
- FOR TRANSPORTING, THE OVERHANG SHALL BE IN ACCORDANCE WITH ARTICLE 2407.03, K, OF STANDARD SPECIFICATIONS, EXCEPT THE OVERHANG MAY BE INCREASED TO 14 FEET.
- THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAMS DURING HANDLING, TRANSPORTING AND ERECTION BY PROVIDING TEMPORARY BRACING AS NEEDED.
- 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.

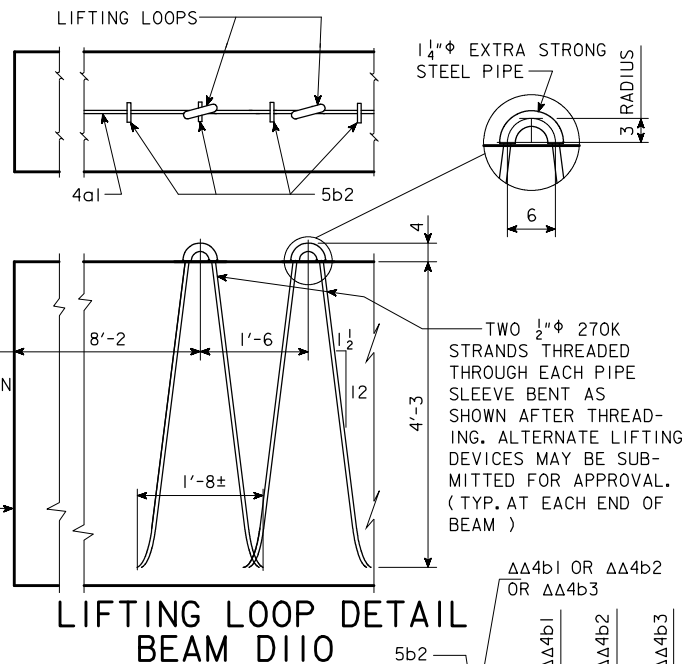
DI10 BEAM DATA

BEAM	SPAN LENGTH ℓ-℄ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS ③	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.)Δ ₀				PERMISSIBLE SPACING				WEIGHT (TONS)	CONCRETE (c.y.)	REINFORCING STEEL - (lbs.)	
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE ^① (ELASTIC) Δ _E		TIME ^② (PLASTIC) Δ _T		HL93 LOADING							
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.								
														CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.				CONC. DIAPH.
DI10	110'-0	111'-0	0.6"	28	6	1446	21.2	2.83	4.83	1.92	1.81	0.48	0.45			7'-6	7'-6	36.9		18.2	1672

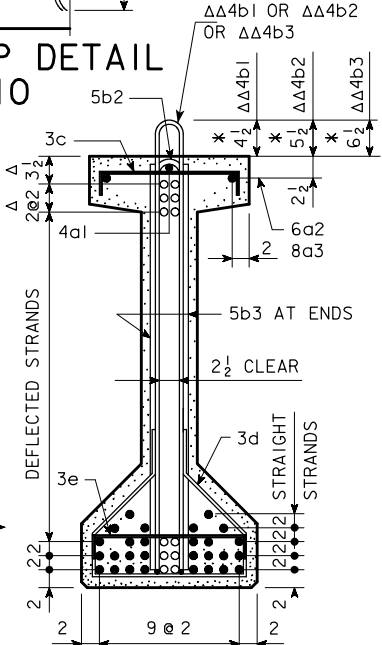
- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 760 #/FT. (8" SLAB AND 7'-6" BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (3191 #) OR ONE STEEL DIAPHRAGM (285 #) AT CL OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.
- TOTAL DEFLECTIONS AT CL OF SPAN, Δ_D , DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
- (A) $\Delta_D = \Delta_i + \Delta_T$ FOR SIMPLE SPAN.
- (B) $\Delta_D = \Delta_i + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
- (C) $\Delta_D = \Delta_i + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS FOR DI10 IS BASED ON 72.6% f'_s .
 $f'_s = 270$ ksi AND $A_s = 0.217$ sq. in.

NOTES: (CONTINUED)

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.



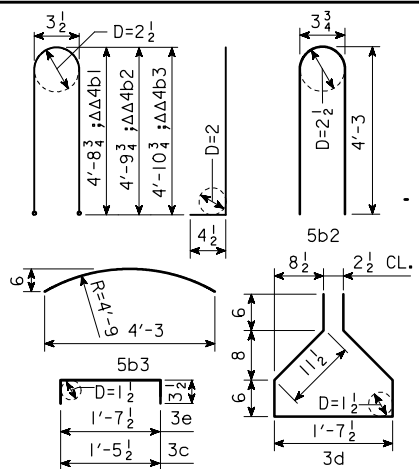
LIFTING LOOP DETAIL BEAM DI10



BEAM DI10

REINFORCING BAR LIST BEAM DI10

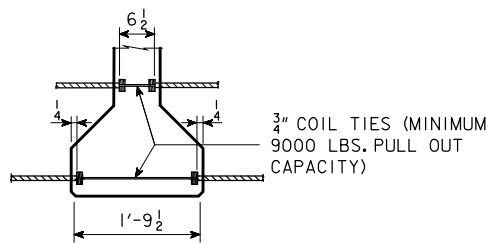
BAR	SHAPE	NO.	LENGTH
4a1	—	2	26'-6"
6a2	—	4	38'-4"
8a3	—	2	40'-0"
4b1	U	41	10'-4"
4b2	U	22	10'-6"
4b3	U	28	10'-8"
5b2	U	16	8'-8"
5b3	U	20	4'-4"
3c	—	91	2'-1"
3d	—	107	5'-7"
3e	—	30	2'-3"



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

NOTE STIRRUP EXTENSION

$\Delta\Delta$ BARS TO BE EPOXY COATED



COIL TIE DETAIL

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

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.

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:

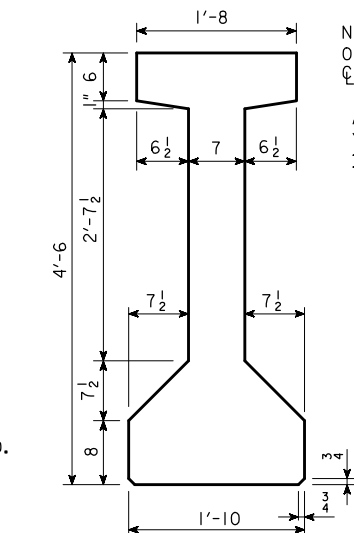
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH SECTION 5.

MINIMUM CONCRETE f'_c (AT 28 DAYS) SHALL BE 7500 psi.

MINIMUM f'_ci AT RELEASE SHALL BE 6500 psi.

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, $f'_s = 270,000$ psi.



DI10 CROSS SECTION

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

AREA = 638.75 in²
 $Y_b = 24.37$ in
I = 214,974 in⁴

- DEFLECTED STRANDS
- * KEEP
- $\Delta\Delta$ EPOXY COATED BARS
- Δ DIMENSIONS AT END OF BEAM

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

DUAL 729'-0" $\frac{1}{2}$ x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

BEAM DETAILS DI10

STATION : 893+14.13 (CL RELOCATED U.S. 20)

AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 109 OF 117 FILE NO. 30187 DESIGN NO. 410

DESIGN TEAM KBK/JTN/RAR/MSF

D BEAMS - LRFD DESIGN

MODIFIED STANDARD SHEET 4636

SAC COUNTY

PROJECT NUMBER NHSX-020-2 (84)--3H-81

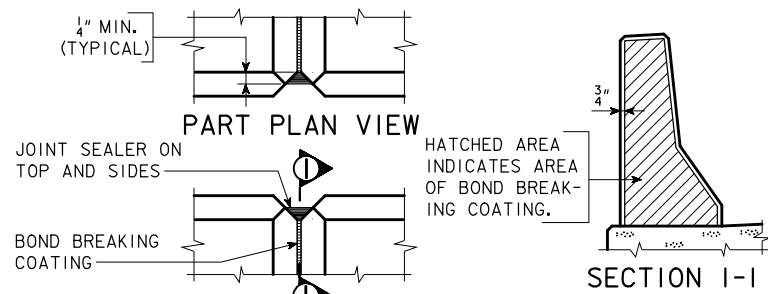
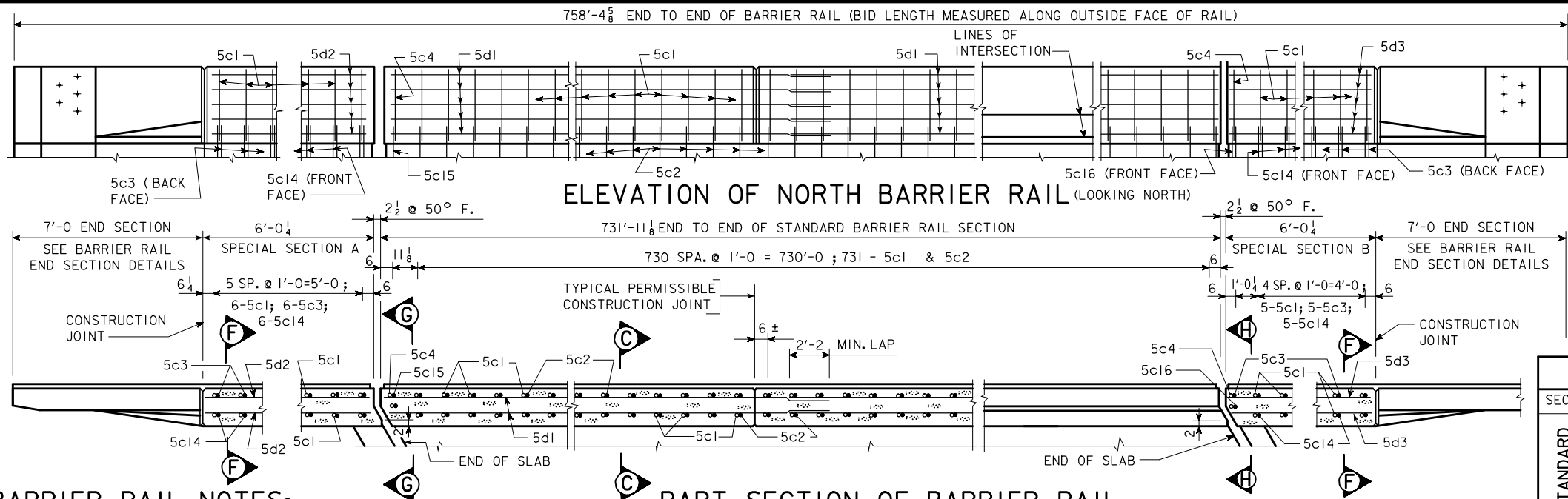
SHEET NUMBER 110

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CORRECTION 05-08 - BARRIER RAIL END SECTION QUANTITIES CORRECTED.
ENGLISHDECKRAILBRIDGES.DGN 1018A - THIS SHEET REISSUED 09-01 FOR F-SHAPE.

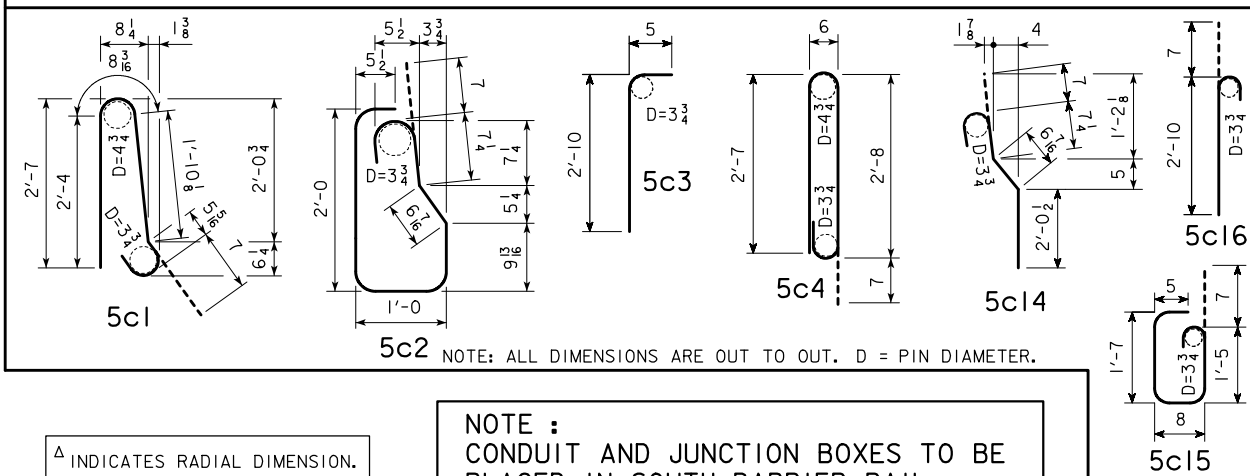


PART ELEVATION VIEW
BARRIER RAIL JOINT DETAILS

BARRIER RAIL NOTES:

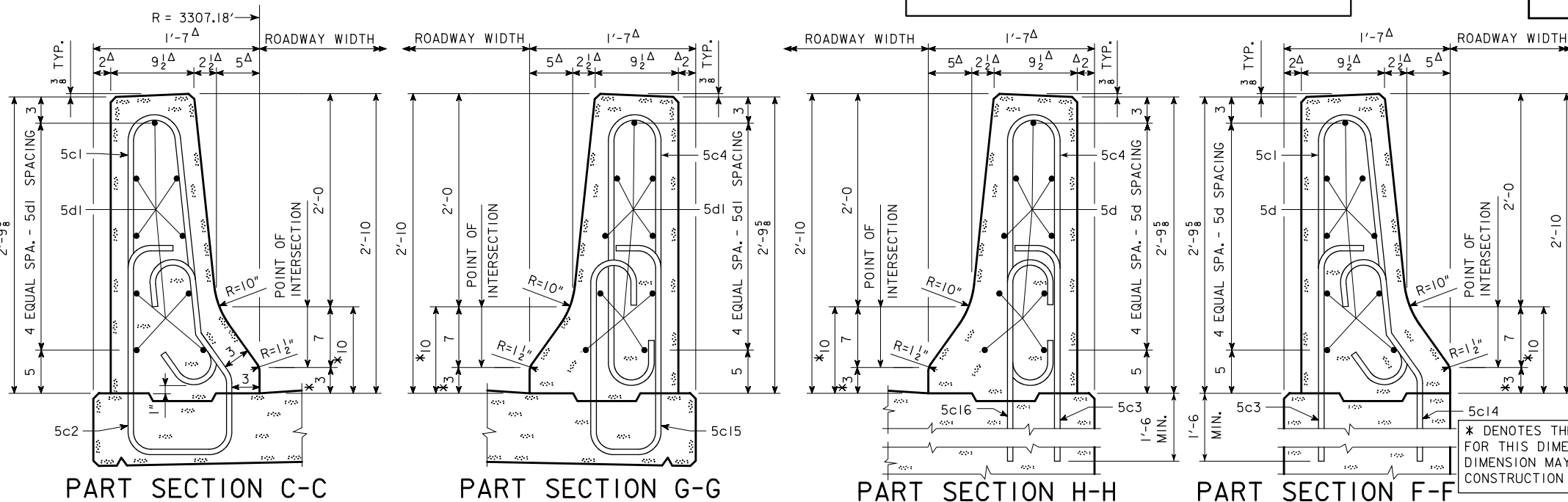
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.
COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.
ALL BARRIER RAIL REINFORCING STEEL IS TO BE EPOXY COATED.
THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS. IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.
ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.
THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.
TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL $\bar{C}$ GRADE.
CROSS SECTIONAL AREA OF THE STANDARD AND SPECIAL SECTIONS OF THE BARRIER RAIL = 2.84 SQUARE FEET.

PART SECTION OF BARRIER RAIL BENT BAR DETAILS



NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN SOUTH BARRIER RAIL.

Δ INDICATES RADIAL DIMENSION.



EPOXY REINFORCING STEEL - NORTH RAIL

SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
STANDARD SECTION	5c1	VERTICAL		731	5'-11	4511
	5c2	VERTICAL		731	6'-0	4575
	5c4	VERTICAL		1	6'-4	7
	5c15	VERTICAL		1	4'-8	5
	5d1	LONGITUDINAL		180	38'-8	7259
SPECIAL SECTION A	5c1	VERTICAL		6	5'-11	37
	5c3	VERTICAL		6	3'-3	20
	5c14	VERTICAL		6	3'-10	24
	5d2	LONGITUDINAL		9	5'-8	53
SPECIAL SECTION B	5c1	VERTICAL		5	5'-11	31
	5c3	VERTICAL		5	3'-3	17
	5c4	VERTICAL		1	6'-4	7
	5c14	VERTICAL		5	3'-10	20
	5c16	VERTICAL		1	3'-3	3
	5d3	LONGITUDINAL		9	5'-8	53
BARRIER RAIL END SECTION					2 AT 458 LBS	916
(INCLUDED WITH SUPERSTRUCTURE REINFORCING)					TOTAL WEIGHT (LBS.)	17,538

CONCRETE PLACEMENT SUMMARY

SECTION		TOTAL
STANDARD SECTION	731.93' AT 0.1052 CU. YDS. PER FT.	77.0
SPECIAL SECTION A	6.0' AT 0.1052 CU. YDS. PER FT.	0.6
SPECIAL SECTION B	6.0' AT 0.1052 CU. YDS. PER FT.	0.6
BARRIER RAIL END SECTION	2 AT 0.65 CU. YDS.	1.3
TOTAL (CU. YD.)		79.5

CONCRETE BARRIER RAIL QUANTITIES

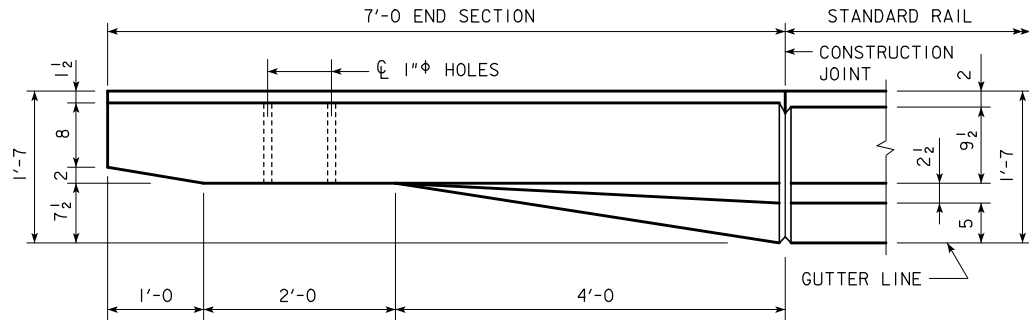
ITEM	UNIT	QUANTITY
CONCRETE BARRIER RAILING	LIN. FT.	758.4

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2' x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9' END SPANS 5 - 111'-6' INTERIOR SPANS
NORTH BARRIER RAIL DETAILS-EASTBOUND
STATION : 893+14.13 ($\bar{C}$ RELOCATED U.S. 20)
AUGUST, 2010

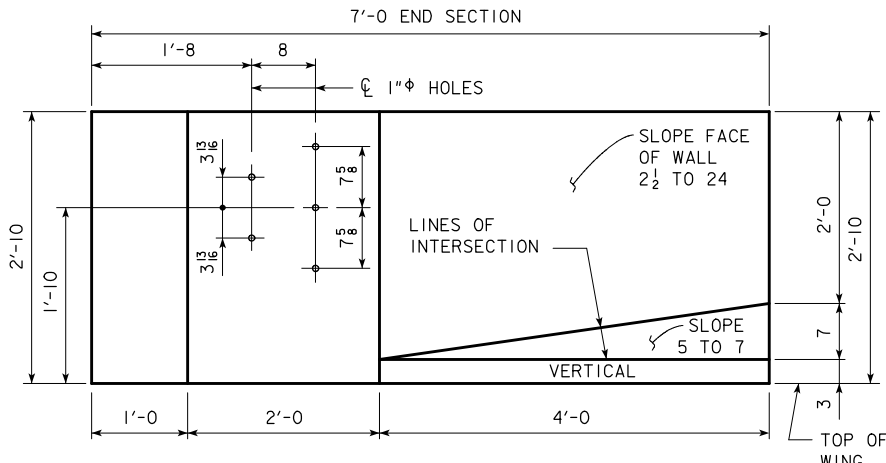
SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 110 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 02-08 - REINFORCING STEEL PATTERN & SIZE CHANGED AND WEIGHT ADJUSTED. CONCRETE THICKNESS WAS INCREASED 1/2" AND QUANTITY ADJUSTED.
ENGLISHDECKRAILBRIDGES.DGN 1017 - THIS SHEET ISSUED 09-01

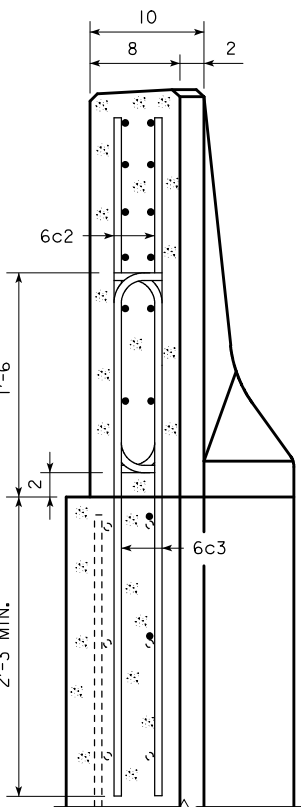


PART PLAN VIEW

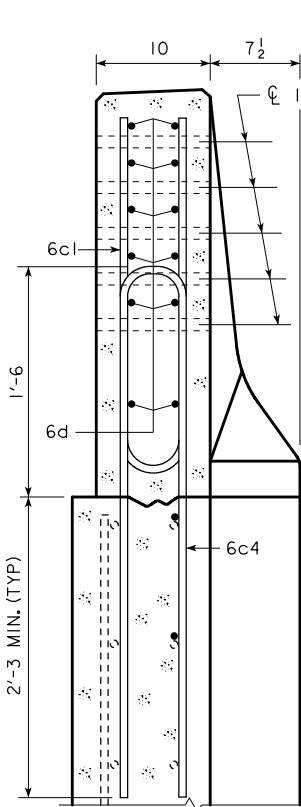


PART ELEVATION VIEW

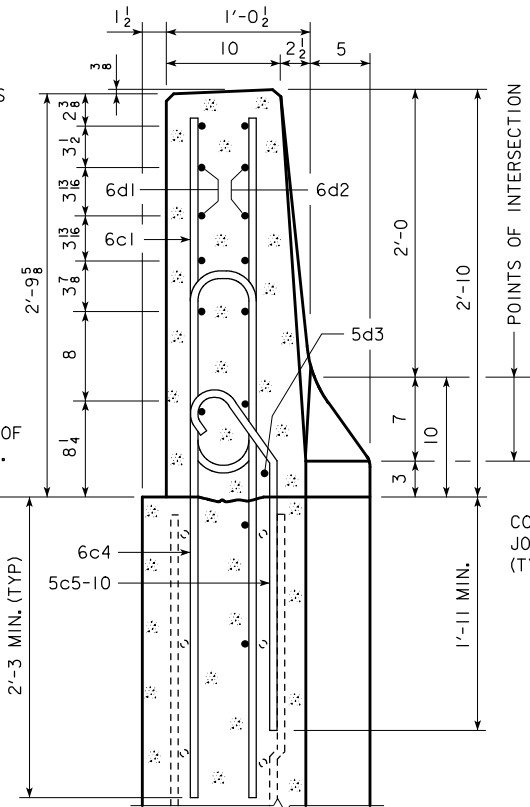
PROVIDE 5 HOLES FORMED WITH 1" PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



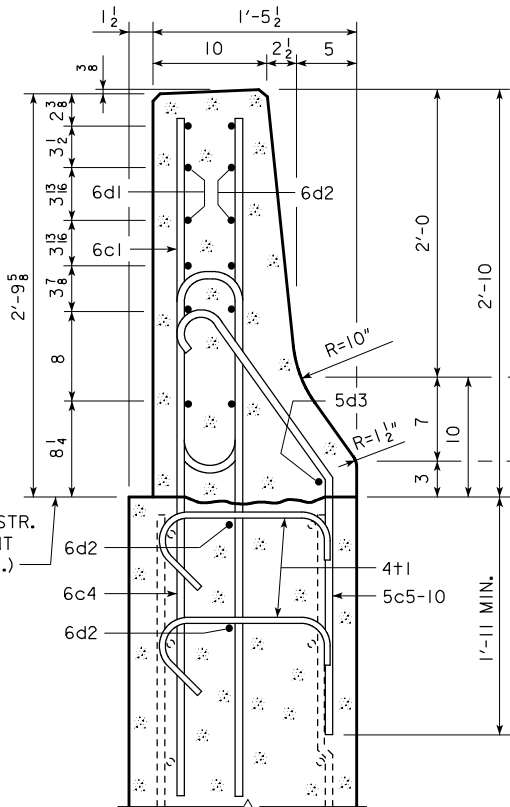
VIEW A-A



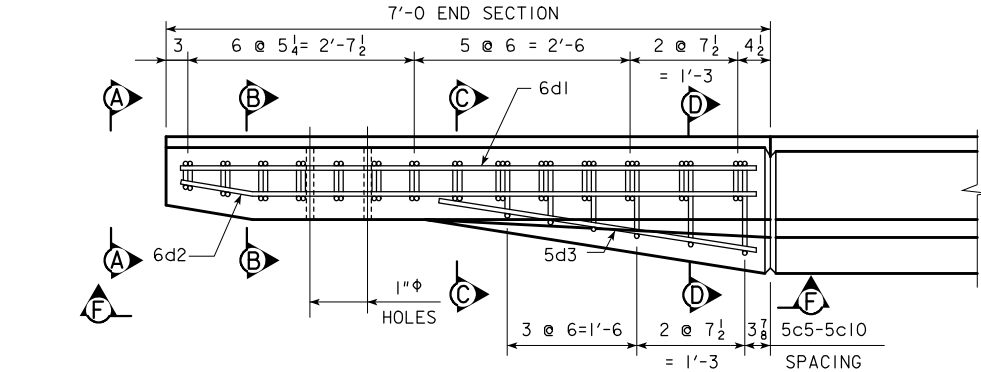
SECTION B-B



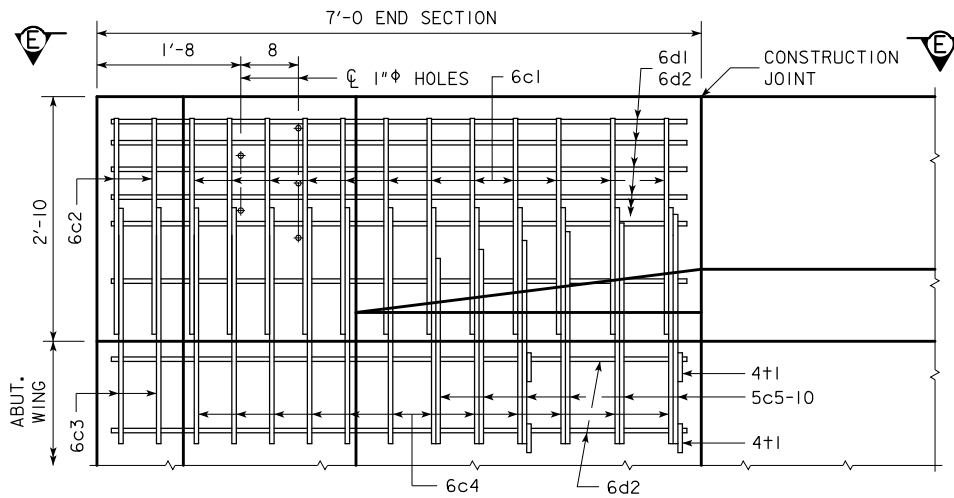
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW F-F

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

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

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

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

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

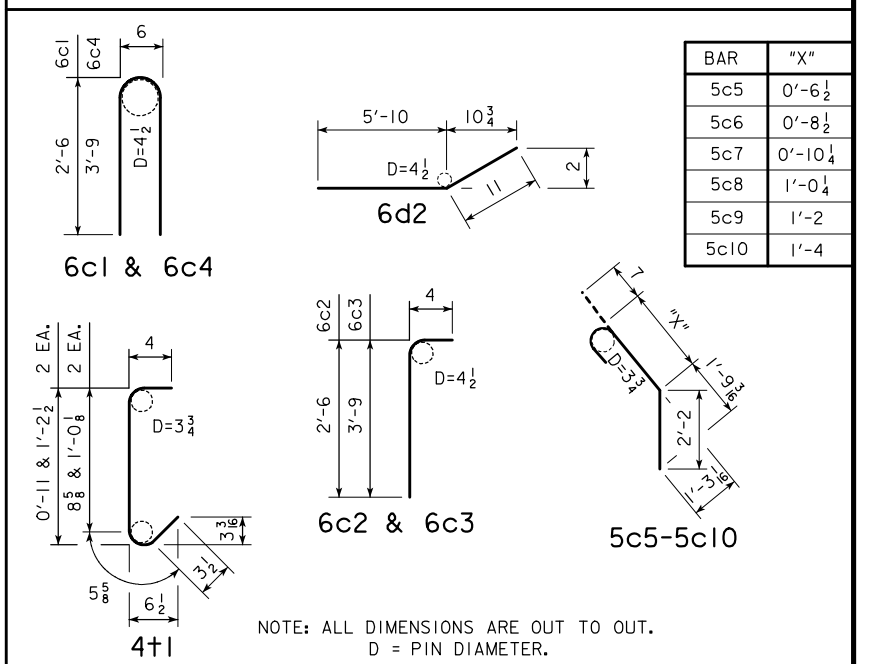
EPOXY REINFORCING STEEL - ONE END SECTION

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

CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

BENT BAR DETAILS

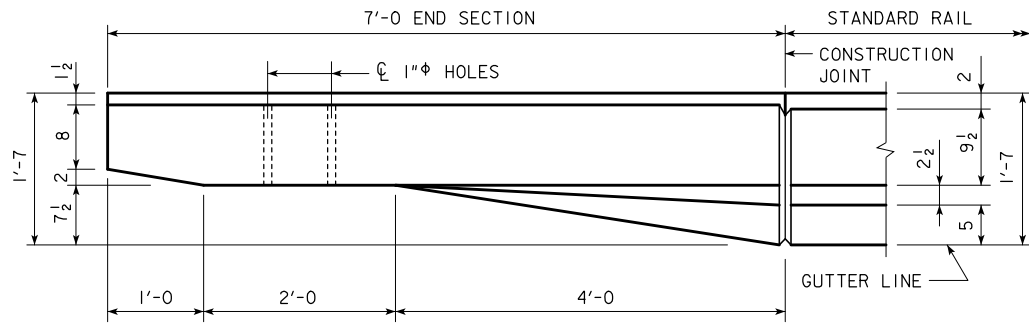


NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN SOUTH BARRIER RAIL.

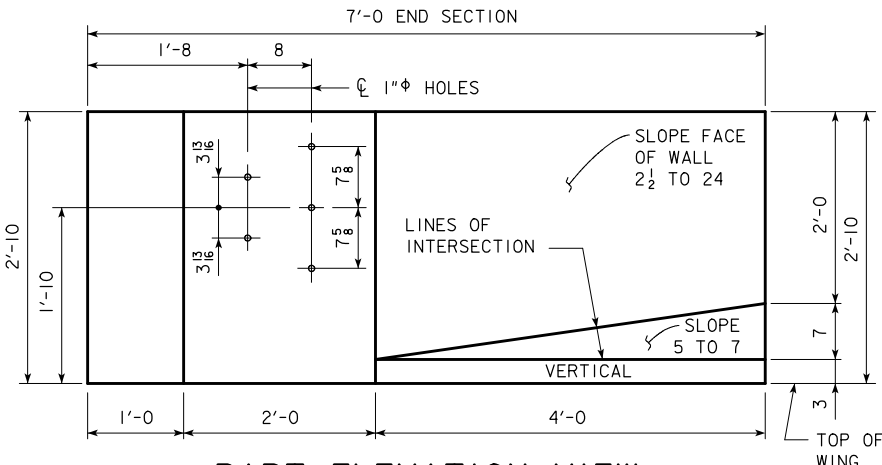
DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
END SECTION DETAILS-NORTH RAIL-EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20)
AUGUST, 2010

SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 112 OF 117 FILE NO. 30187 DESIGN NO. 410

REVISION 02-08 - REINFORCING STEEL PATTERN & SIZE CHANGED AND WEIGHT ADJUSTED. CONCRETE THICKNESS WAS INCREASED 1/2" AND QUANTITY ADJUSTED.
ENGLISHDECKRAILBRIDGES.DGN 1017 - THIS SHEET ISSUED 09-01

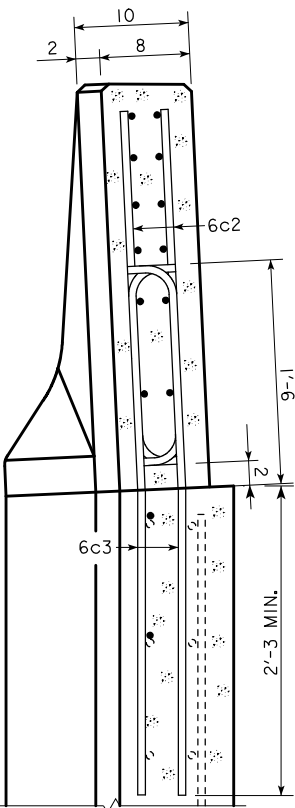


PART PLAN VIEW

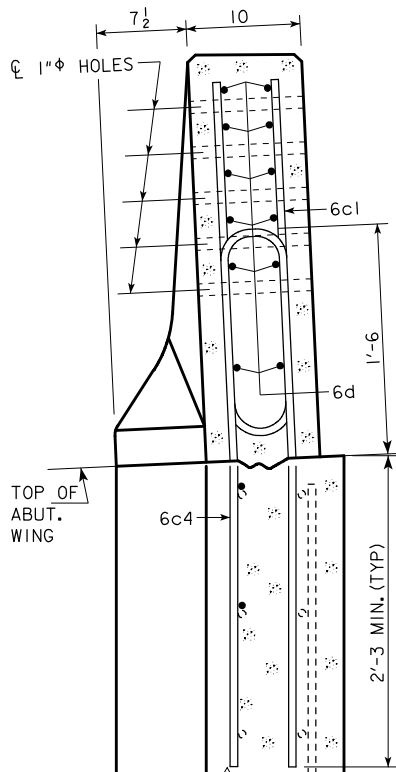


PART ELEVATION VIEW

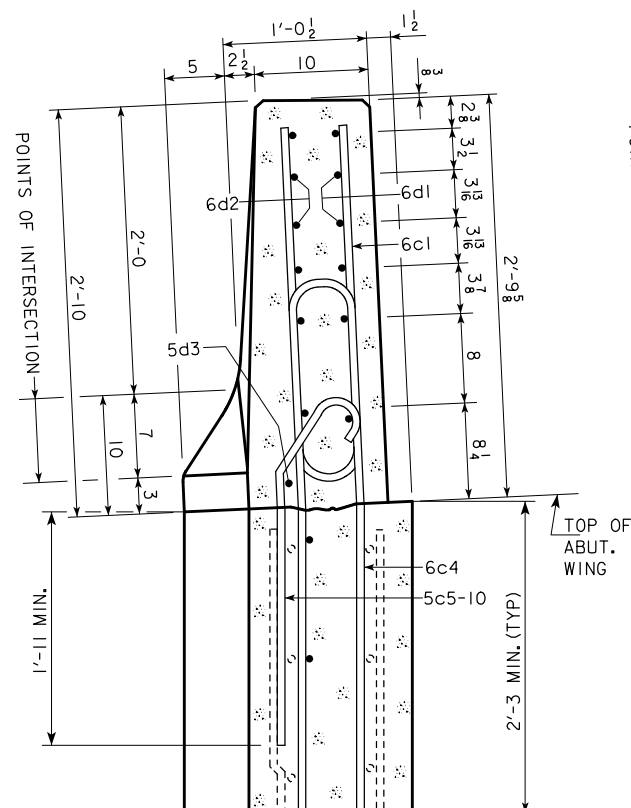
PROVIDE 5 HOLES FORMED WITH 1" PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



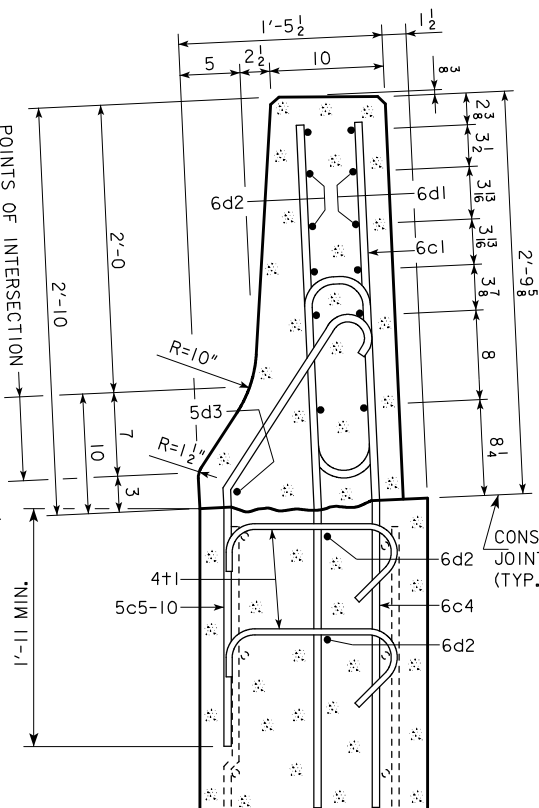
VIEW A-A



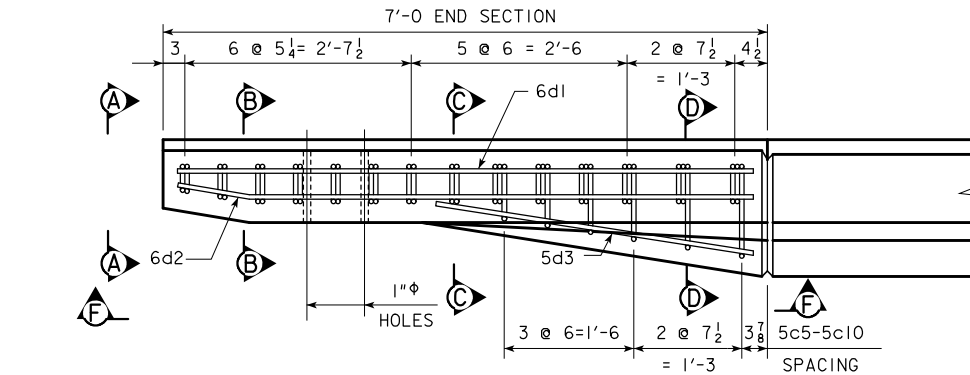
SECTION B-B



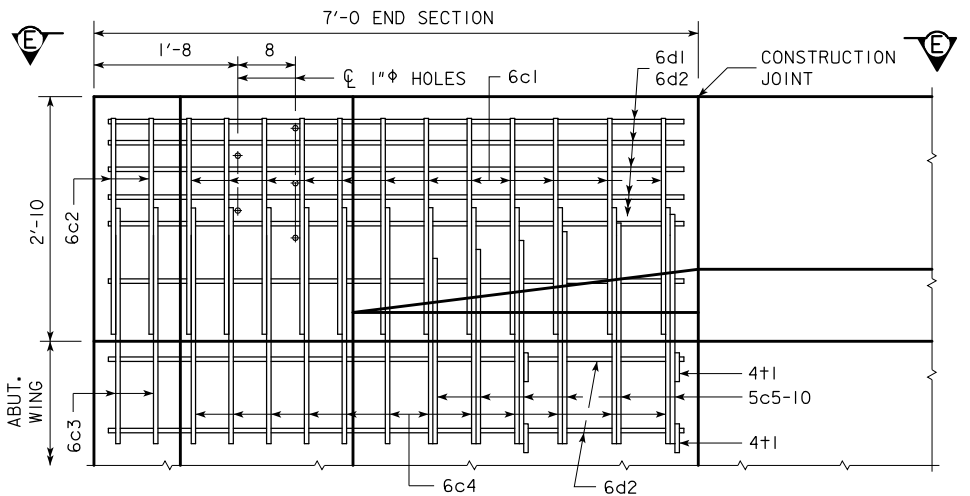
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW F-F

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

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

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

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

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

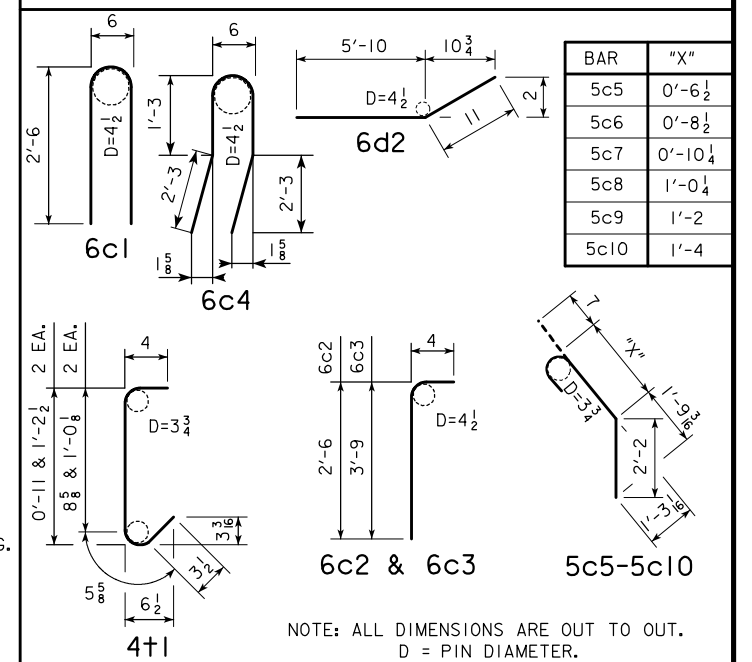
EPOXY REINFORCING STEEL - ONE END SECTION

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

CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

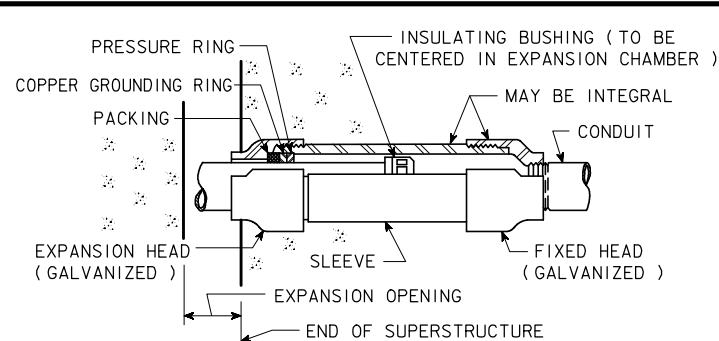
BENT BAR DETAILS



NOTE :
CONDUIT AND JUNCTION BOXES TO BE
PLACED IN SOUTH BARRIER RAIL.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
END SECTION DETAILS-SOUTH RAIL-EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20)
AUGUST, 2010

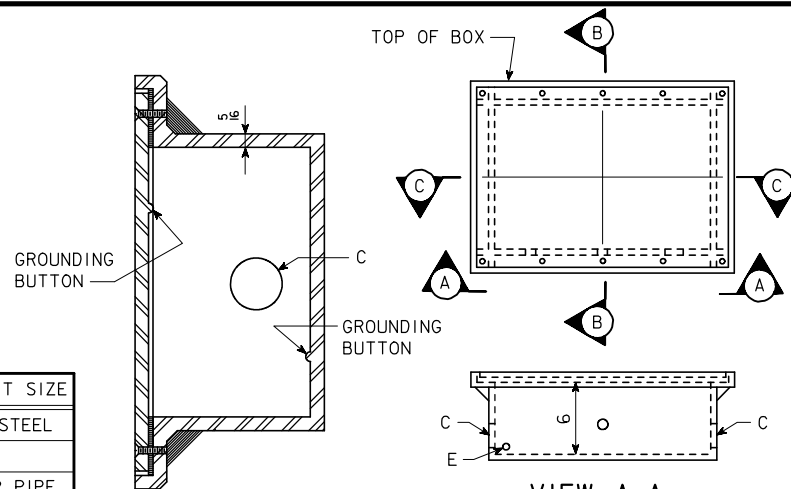
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 113 OF 117 FILE NO. 30187 DESIGN NO. 410



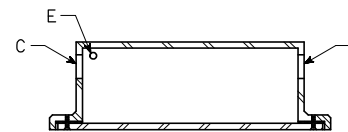
EXPANSION FITTING DETAIL
(2 REQUIRED)

BOSSSED FOR	HOLE	FOR CONDUIT SIZE
5 THREADS	C	2" ϕ RIGID STEEL
NONE	E	1/2" ϕ COPPER PIPE

NOTE:
THE GROUNDING BUTTONS ARE TO BE BLIND DRILLED AND TAPPED FOR 3/8" ϕ x 0'-0 3/4" BOLTS.



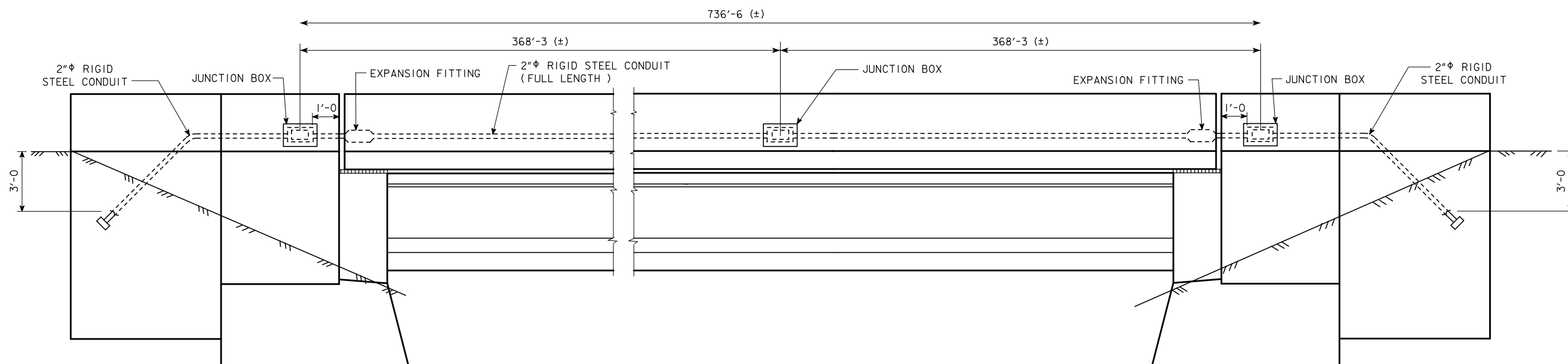
SECTION B-B
RM-37, TYPE I JUNCTION BOX
WATERTIGHT , CAST IRON - FLUSH MOUNT



SECTION C-C

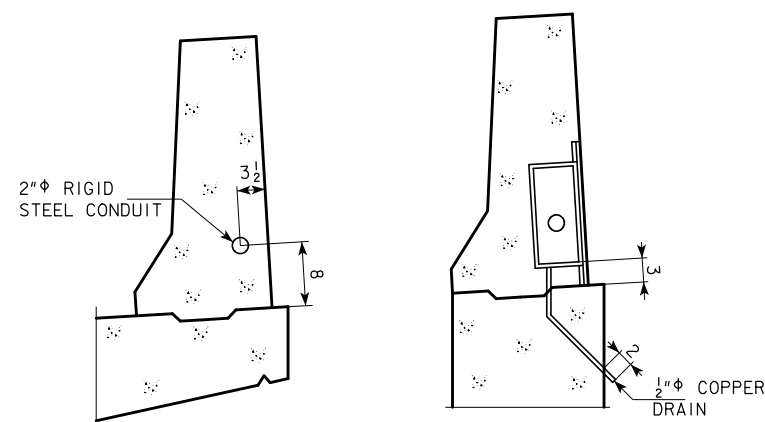
LIGHTING NOTES:

SEE RM-37 STANDARD ROAD PLAN FOR ADDITIONAL INFORMATION ON JUNCTION BOXES.
CONSTRUCTION SHALL CONFORM TO THE CURRENT IOWA D.O.T. STANDARD AND SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.
CONDUIT INSTALLATION SHALL COMPLY WITH THE ARTICLE "ELECTRICAL DUCTS", SECTION 2523.
ALL "C" ENTRANCE HOLES IN JUNCTION BOXES SHALL BE DRILLED AND TAPPED FOR THE SPECIFIED CONDUIT SIZE. ALL OTHER HOLES SHALL HAVE A CONCRETE - TIGHT SLIP FIT. CONDUIT ENDS SHALL NOT PROTRUDE INTO JUNCTION BOX MORE THAN 1/4". DRAIN PIPE END SHALL BE FLUSH WITH INSIDE SURFACE OF BOX. GROUNDING BUTTONS SHALL BE LOCATED APPROXIMATELY 3" FROM THE INSIDE SURFACE OF THE BOX WALL, AND NOT CLOSER THAN 3" TO THE EDGE OF ANY HOLE IN THE BOX FLOOR. HOLES FOR DRAIN PIPE SHALL BE PLACED IN THE LOW CORNER OF THE BOX, WITH A MINIMUM CLEARANCE OF 1" BETWEEN THE EDGE OF THE HOLE AND THE INSIDE SURFACE OF THE BOX WALL. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.
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.
EXPANSION FITTING SHALL BE AS SPECIFIED OR AS APPROVED BY THE ENGINEER. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.

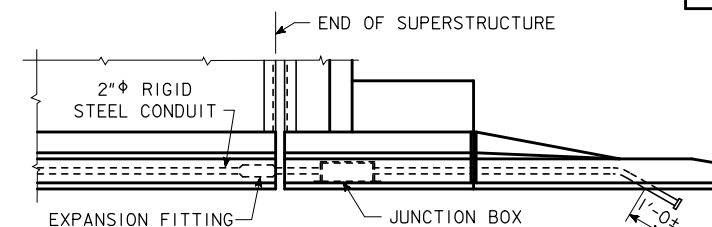


EXTERIOR ELEVATION-SOUTH BARRIER RAIL-WESTBOUND BRIDGE-LOOKING NORTH

NOTE :
CONDUIT AND JUNCTION BOXES TO BE PLACED IN SOUTH BARRIER RAIL.



SECTION THRU BARRIER RAIL
SECTION THRU JUNCTION BOX
SOUTH BARRIER RAIL DETAILS



PART PLAN AT WING

LIGHTING QUANTITIES

ITEM	AMOUNT
2" ϕ RIGID STEEL CONDUIT - EASTBOUND BRIDGE	736.5 LIN.FT.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
LIGHTING DETAILS - EASTBOUND
STATION : 893+14.13 (ϕ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

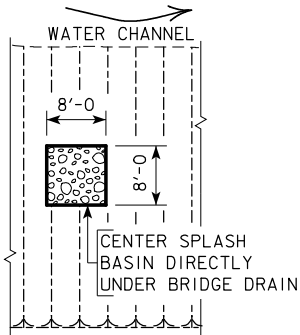
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 114 OF 117 FILE NO. 30187 DESIGN NO. 410

BENCH MARK: NO. 555; STA. 881+83.2, 1271.0' LT., CUT X SW COR. WING OF BRIDGE, ELEV. = 1217.20.

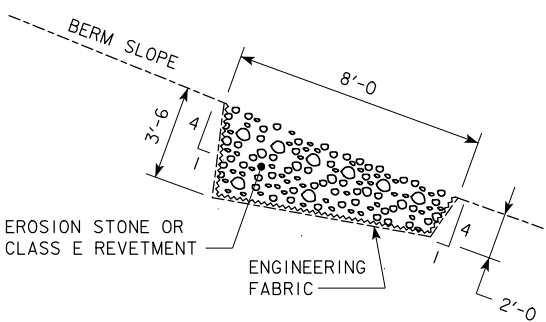
SPLASH BASIN NOTES :

THE COST OF FURNISHING AND PLACING SPLASH BASINS (INCLUDING EXCAVATION, EROSION STONE OR CLASS E REVETMENT, AND ENGINEERING FABRIC) IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

NUMBER OF SPLASH BASINS = 16 FOR EASTBOUND BRIDGE.



SPLASH BASIN PLAN VIEW
(SEE DESIGN SHEETS 61 & 62 FOR LOCATION)



SPLASH BASIN UNDER BRIDGE DRAIN
TYPICAL SECTION FOR BERM SLOPES

SUBDRAIN NOTES :

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

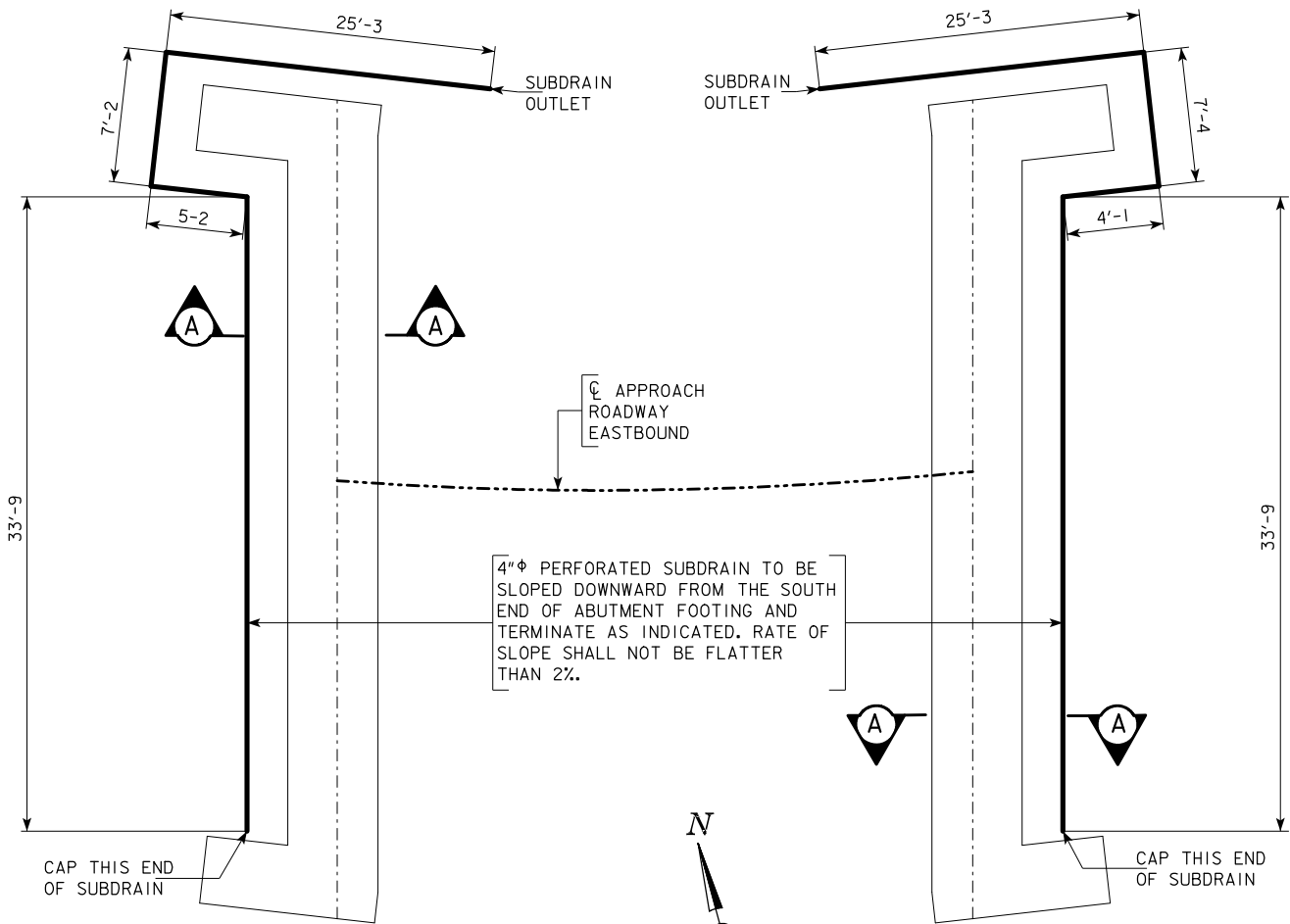
THE SUBDRAINS SHALL BE 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B OF THE CURRENT I.D.O.T. STANDARD SPECIFICATION. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0 LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET.

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.

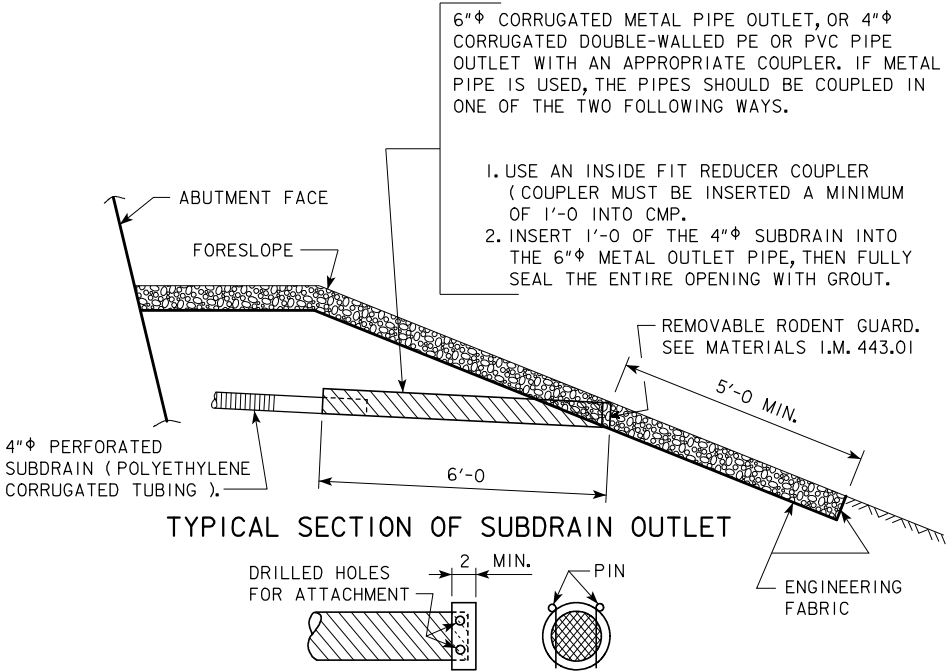
THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

SUBDRAIN OUTLET ELEVATIONS

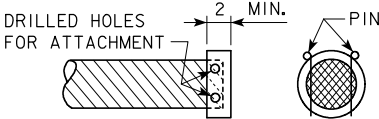
LOCATION		ELEVATION
EASTBOUND BRIDGE	WEST ABUTMENT	1248.06
	EAST ABUTMENT	1244.57



SITUATION PLAN
(SHOWING SUBDRAIN LOCATIONS)



TYPICAL SECTION OF SUBDRAIN OUTLET



REMOVABLE RODENT GUARD DETAILS
OUTLET DETAILS

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9 END SPANS 5 - 111'-6 INTERIOR SPANS
SUBDRAIN DETAILS - EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 115 OF 117 FILE NO. 30187 DESIGN NO. 410

NOTE:
SECTION A- A IS SHOWN ON ABUTMENT
BACKFILL DETAILS SHEET.

REVISED 04-09 - SPLASH BASIN DETAILS AND NOTES ADDED TO STANDARD.
ENGLISH FOR SLOPE PROTECTION BRIDGES.DGN 1007C - THIS SHEET ISSUED 06-02 FOR WATER CROSSINGS.

DESIGN TEAM KBK/JTN/RAR/MSF

SPLASH BASIN & SUBDRAIN DETAILS (WATER CROSSING)

STANDARD SHEET 1007C

SAC COUNTY

PROJECT NUMBER NHSX-020-2 (84)--3H-81

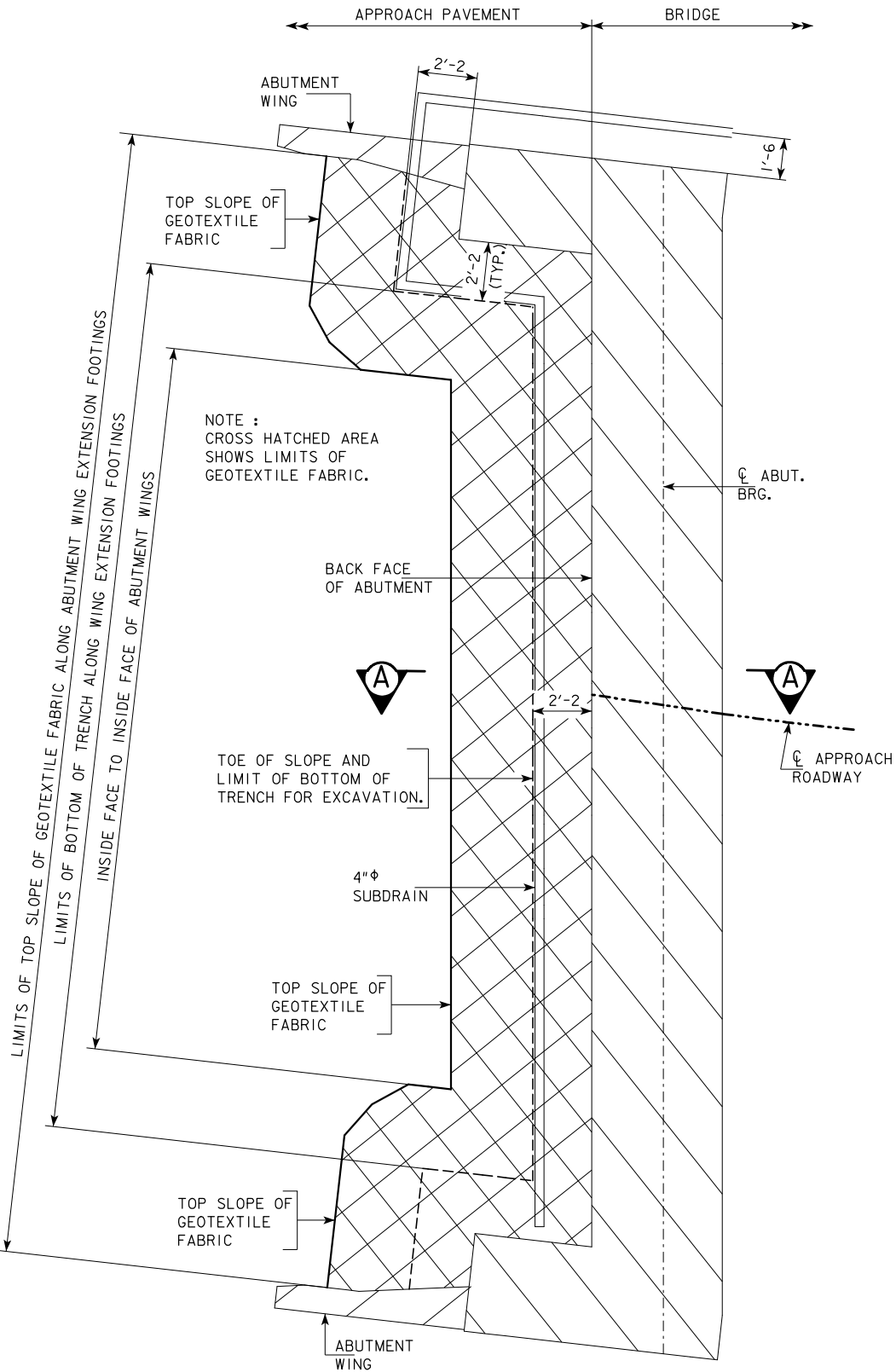
SHEET NUMBER 116

02-AUG-2010 07:25

msfish

W:\Projects\81020020A98\BRFinal\810202084.brg 810410S115 \NTPPRTSVR2\BrgPDF

REVISION 10-09 - CHANGED PERMEABILITY DATA TO APPARENT OPENING SIZE DATA.
ENGLISHFORESLOPEPROTECTIONBRIDGES.DGN - 1007E - THIS SHEET ISSUED 08-07.



ABUTMENT PLAN VIEW

ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

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

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 3 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

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

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

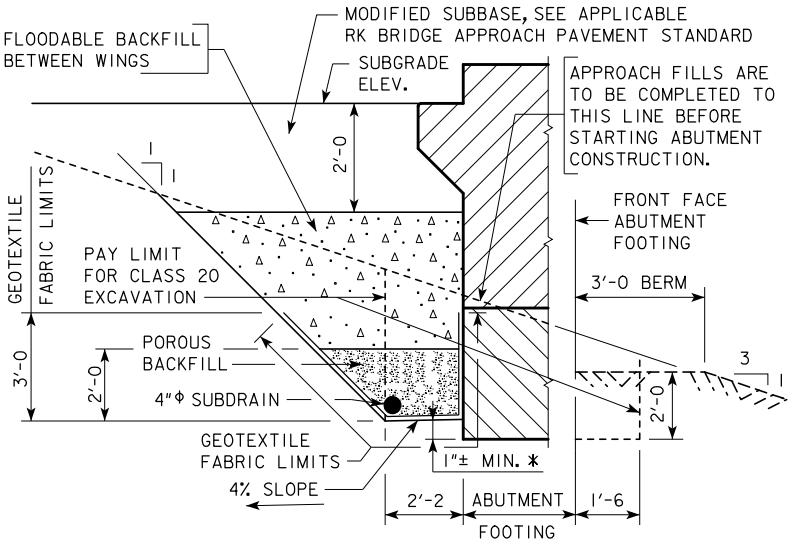
TECHNICAL DATA INFORMATION - GEOTEXTILE FABRIC

MECHANICAL PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE ROLL VALUE	
			MD	CD
TENSILE STRENGTH (AT 5% STRAIN)	ASTM D 4595	kN/m (LBS/FT)	19.8 (1356)	19.8 (1356)
APPARENT OPENING SIZE (AOS)	ASTM D 4751	mm (U.S. SIEVE)	0.43 MAX (#40)	
FLOW RATE	ASTM D 4491	L/MIN/m ² (GAL/MIN/FT ²)	733 (18)	
UV RESISTANCE (AT 500 HOURS)	ASTM D 4355	% STRENGTH RETAINED	70	

NOTE:

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

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



SECTION A-A
BACKFILL DETAILS

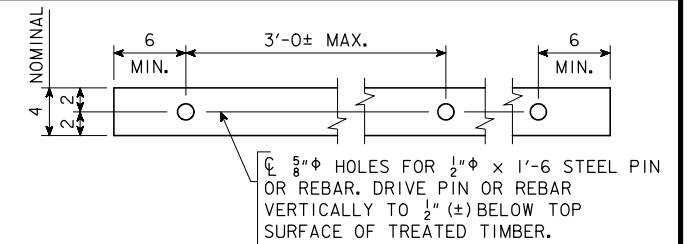
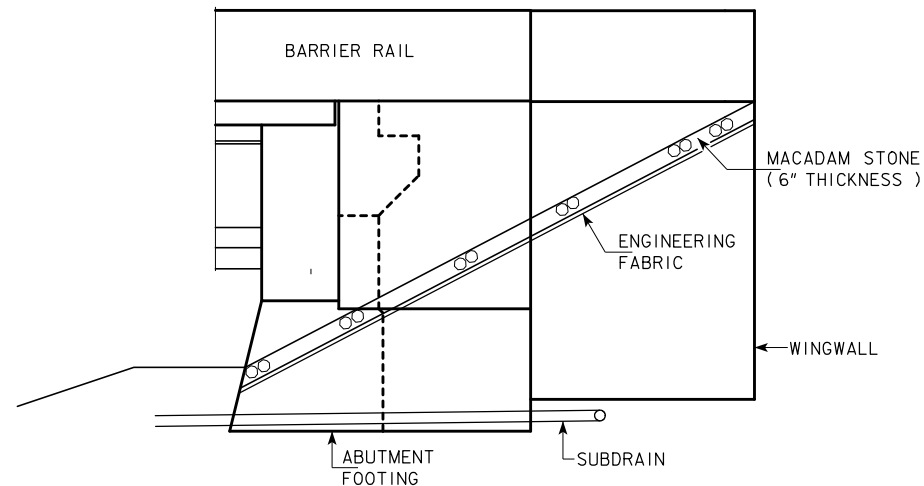
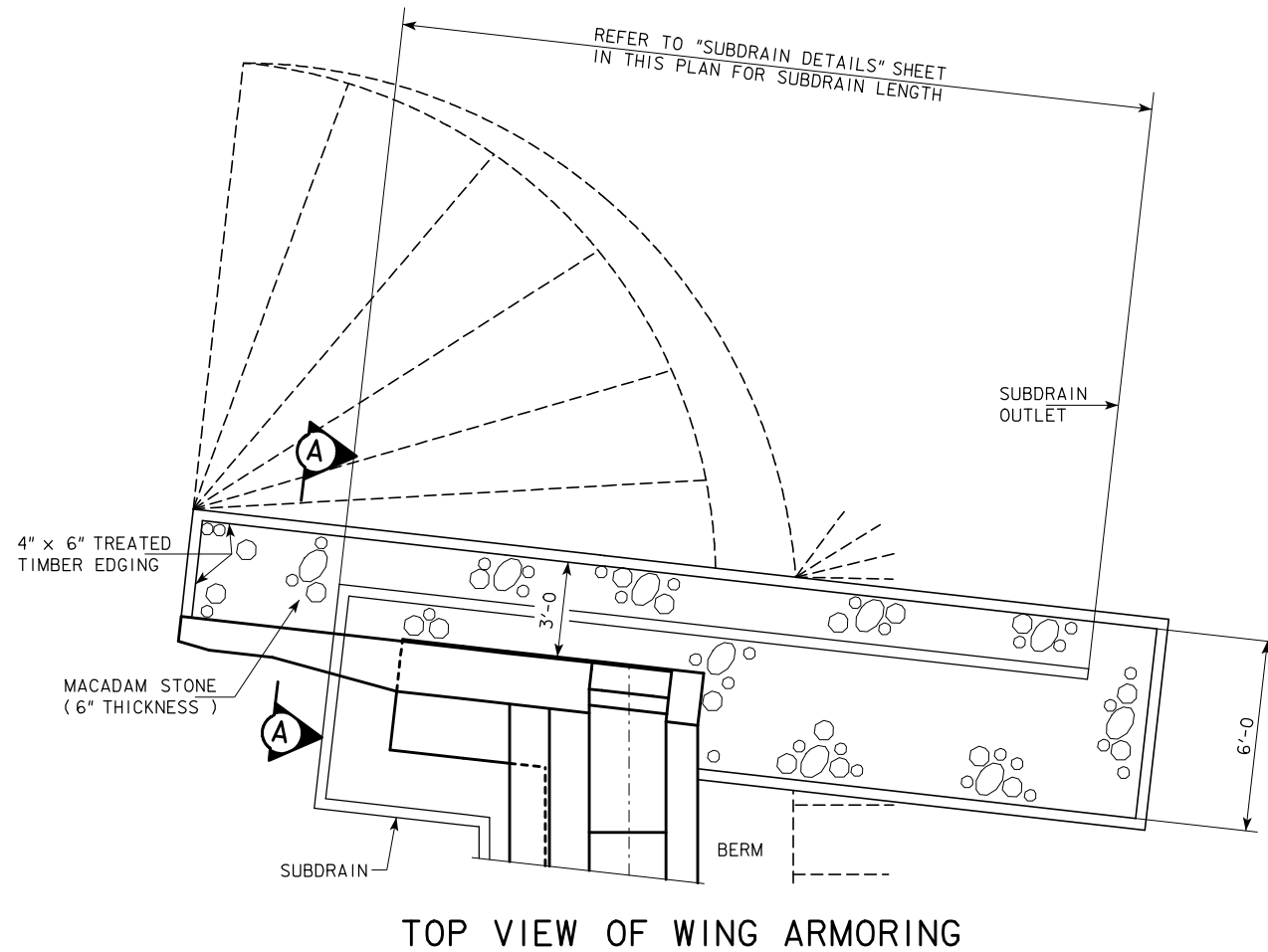
NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

* DIMENSION VARIES DUE TO SUBDRAIN SLOPE.

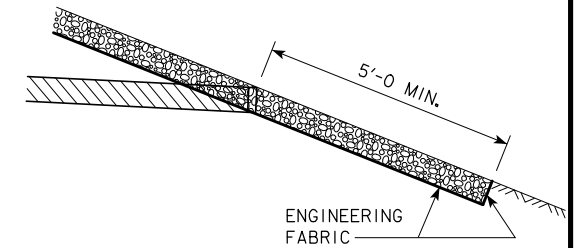
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE
DUAL 729'-0 1/2 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS
ABUTMENT BACKFILL DETAILS-EASTBOUND
STATION : 893+14.13 (CL RELOCATED U.S. 20) AUGUST, 2010
SAC COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 116 OF 117 FILE NO. 30187 DESIGN NO. 410

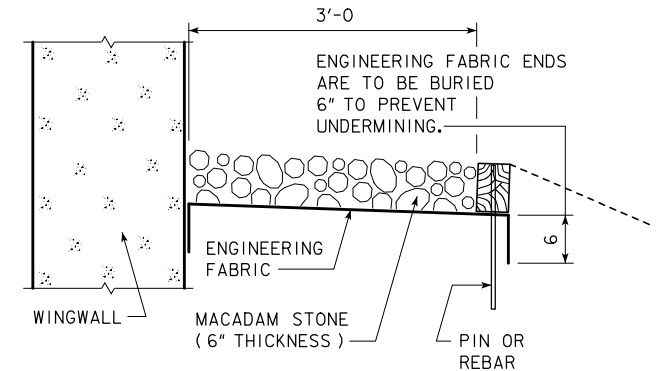
CORRECTION 03-08 - WING SHAPE CHANGED TO RECTANGULAR WING AND STUB ABUTMENT EXAMPLE OUTSIDE OF SHEET.
ENGLISHFORESLOPEPROTECTIONBRIDGES.DGN 1005A - THIS SHEET ISSUED 06-02.



4" x 6" TREATED TIMBER
EDGING DETAILS



TYPICAL SECTION
OF SUBDRAIN OUTLET



SECTION A-A

GENERAL NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. 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.B.3

THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF 4122, 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 6" 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.

DESIGN FOR 0° SKEW (NORMAL TO BASELINE) ON A 1°45' HORIZONTAL CURVE

**DUAL 729'-0 1/2 x 40' PRETENSIONED
PRESTRESSED CONCRETE BEAM BRIDGES**

85'-9" END SPANS 5 - 111'-6" INTERIOR SPANS

BRIDGE WING ARMORING - EASTBOUND

STATION : 893+14.13 (℄ RELOCATED U.S. 20) AUGUST, 2010

SAC COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 117 OF 117 FILE NO. 30187 DESIGN NO. 410

ESTIMATED PROJECT QUANTITIES					
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2122-5190501	PAVED SHOULDER, PORTLAND CEMENT CONCRETE (PAVED SHOULDER PANEL FOR BRIDGE END DRAIN)	SY	39.5	
2	2301-0690200	BRIDGE APPROACH, RK-20	SY	909.7	
3	2503-0500400	BRIDGE END DRAIN, RF-40	EACH	1	
4	2528-8445110	TRAFFIC CONTROL	LS	1.00	
5	2601-2643401	TURF REINFORCEMENT MAT	SQ	1.2	
6	2601-2700010	OUTLET OR CHANNEL SCOUR PROTECTION	SF	32	

ESTIMATE REFERENCE INFORMATION		
ITEM NO.	ITEM CODE	DESCRIPTION
1	2122-5190501	PAVED SHOULDER, PORTLAND CEMENT CONCRETE (PAVED SHOULDER PANEL FOR BRIDGE END DRAIN) Refer to Tab 104-8A (Sheet C.4) for locations and details.
2	2301-0690200	BRIDGE APPROACH, RK-20 Refer to Tab 112-6 (Sheet C.4) for locations and details.
3	2503-0500400	BRIDGE END DRAIN, RF-40 Refer to Tab 104-8A (Sheet C.4) for locations and details.
4	2528-8445110	TRAFFIC CONTROL Refer to Traffic Control Plan on Tab 108-23 (Sheet J.1). The Bridge Contractor shall maintain road closures placed by the Grading Contractor.
5	2601-2643401	TURF REINFORCEMENT MAT Refer to Tab 104-8A (Sheet C.4) for locations and details.
6	2601-2700010	OUTLET OR CHANNEL SCOUR PROTECTION Method of Measurement will be in square feet of actual area covered. Basis of Payment will include all material, equipment, and labor needed to install the Scourstop as defined by Standard Road Plan RF-39. Refer to Tab 104-8A (Sheet C.4) for locations and details.

STANDARD ROAD PLANS			105-4
			04-20-10
The following Standard Road Plans shall be considered applicable to construction work on this project.			
Number	Date	Title	
PV-1	04-20-10	Joints	
RF-19E	04-20-09	Outlets for Longitudinal, Transverse and Backslope Subdrains	
RF-39	04-20-10	Scour Protection for Bridge End Drain	
RF-40	04-20-10	Rock Flume for Bridge End Drain	
RK-20	04-20-10	Double Reinforced 12" Approach	
RK-30	04-20-10	Bridge Approach (Abutting Pavement)	
RM-37	10-21-08	Junction Box (Cast Iron)	
TC-1	10-17-06	Work Not Affecting Traffic	
TC-202	04-20-10	Shoulder Closure (One Lane)	

ROADWAY DESIGN	
105-4 04-20-10 Paul W. Flattery 15282 IOWA	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. Paul W. Flattery Signature 07-22-2010 Date Printed or Typed Name My license renewal date is December 31, 2011
Pages or sheets covered by this seal: C.1-C.4, J.1	

Design No. 410

File No. 30187

① Not a Bid Item

04-20-10

Refer to Standard Road Plan RF-39 or RF-40

[illegible]

112-6

Refer to the RK-Series Standard Road Plans.

* Not a bid item

10-21-08

[illegible]

Design No. 410
File No. 30187