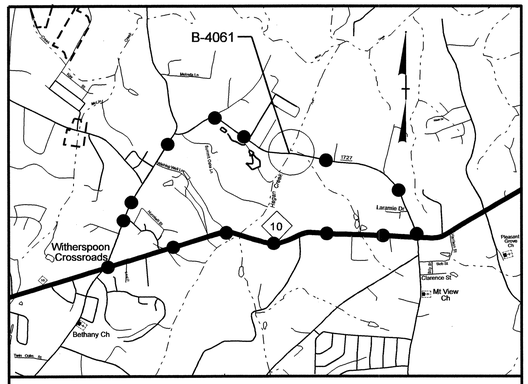
TIP PROJECT: B-4061

CONTRACT: C202775

STRUCTURE



VICINITY MAP

DETOUR ROUTE

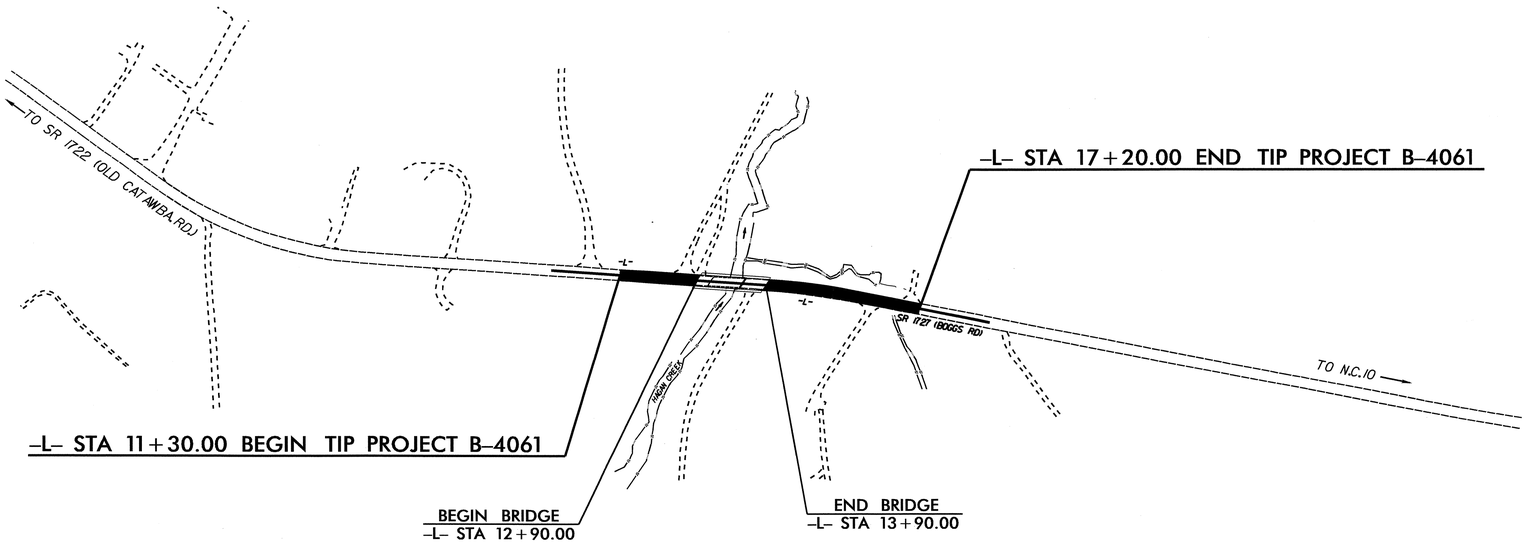
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CATAWBA COUNTY

LOCATION: ***BRIDGE No. 90 OVER HAGAN CREEK ON SR 1727 (BOGGS RD.)***

TYPE OF WORK: ***GRADING, PAVING, DRAINAGE, AND STRUCTURE***

STATE	STATE PROJECT REFERENCE NO.		
N.C.	B-4061		
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
33425.1.1	BRZ-1727(1)	P.E.	
33425.2.1	BRZ-1727(1)	RW,UTIL.	
33425.3.1	BRZ-1727(1)	CONST.	



DESIGN DATA	
ADT 2009 =	3570
ADT 2035 =	6060
DHV =	12 %
D =	70 %
T =	4 % *
V =	50 MPH
* TTST 1%	DUAL 3%
SUB-REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4061 = 0.093 MILES

LENGTH STRUCTURE TIP PROJECT B-4061 = 0.019 MILES

TOTAL LENGTH TIP PROJECT B-4061 = 0.112 MILES

2012 STANDARDS SPECIFICATION

LETTING DATE:
FEBRUARY 21, 2012

Prepared in the Office of:

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
1000 Birch Ridge Drive Raleigh, N.C. 27610

B.S. COX, P.E.
PROJECT ENGINEER

T.J. BEACH, P.E.
PROJECT DESIGN ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY ENGINEER - DESIGN

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED FOR
DIVISION ADMINISTRATOR *DATE*

09-NOV-2011 07:54
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kalford

F.A. PROJECT No. BRZ-1727(1)

820
810
800
790

FIX. 13+00 — SPAN "A" — 13+50 — FIX. 14+00

BEGIN FRONT SLOPE
STA. 12+82.80 -L-
GRADE PT. EL. 812.248

EL. 812.0±

FILL FACE @ END BENT No. 1
STA. 12+90.00 -L-
GRADE PT. EL. 812.270

EL. 812.0±

1'-7" BERM
NORMAL TO CAP (TYP.)

1'-6" MIN.
(TYP.)

EXISTING STRUCTURE (TYP.)

EL. 804.0±

EL. 802.0±

EL. 800.0±

(+) 0.300%
BEGIN GRADE @ STA. 11+30.00 -L-
EL. = 811.79

GRADE DATA -L-

CLASS II RIP RAP (TYP.)

EXCAVATE TO EL. 804.0±
SLOPE TO DRAIN
EXCAVATE TO NATURAL
GROUND RIGHT AND LEFT

END BENT No. 1

N.W.S. EL. 796.3
(8-17-2010)

EL. 796.0±

EL. 795.0±

UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

EL. 796.0±

1½:1 SLOPE
(NORMAL TO CAP)

FILL FACE @ END BENT No. 2
STA. 13+90.00 -L-
GRADE PT. EL. 812.570

EL. 812.0±

1'-0" MIN.
EARTH BERM NORMAL TO CAP (TYP.)

EXCAVATE TO
EL. 800.0±
SLOPE TO DRAIN
EXCAVATE TO NATURAL
GROUND RIGHT & LEFT

1½:1 SLOPE
(NORMAL TO CAP)
(TYP.)

HP 12 X 53
STEEL PILES
(TYP.)

END BENT No. 2

BEGIN FRONT SLOPE
STA. 13+97.30 -L-
GRADE PT. EL. 812.592

EL. 812.0±

APPROXIMATE NATURAL
GROUND LINE

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

SECTION ALONG ℄ SURVEY -L-

(SECTION THRU END BENTS ARE TAKEN AT RIGHT ANGLES)

NAD 83

CLASS II RIP RAP

EARTH BERM
EL. 806.039

1'-7" BERM
NORMAL TO CAP
(TYP.)

W.P. #1
FILL FACE @ END BENT No. 1
STA. 12+90.00 -L-

BEGIN APPROACH SLAB
STA. 12+79.15 -L-

BEGIN FRONT SLOPE
STA. 12+82.80 -L-

TO SR 1722

120°-00'-00"
(TYP.)

EARTH BERM
EL. 805.190

HAGAN CREEK

EXISTING
STRUCTURE
(TYP.)

℄ BRIDGE
STA. 13+40.00 -L-

℄ SURVEY -L-
(SR 1727) (BOGGS RD.)

CLASS II
RIP RAP

EARTH BERM
EL. 806.279

1'-0" MIN.
EARTH BERM (TYP.)
NORMAL TO CAP

W.P. #2
FILL FACE @ END BENT No. 2
STA. 13+90.00 -L-

END APPROACH SLAB
STA. 14+00.85 -L-

BEGIN FRONT SLOPE
STA. 13+97.30 -L-

TO NC 10

EARTH BERM
EL. 805.430

CLASS II
RIP RAP

50'-0"

100'-0" TOTAL LENGTH OF BRIDGE (FILL FACE @ END BENT No. 1 TO FILL FACE @ END BENT No. 2)

PLAN

(FOR CLARITY PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 90

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER HAGAN
CREEK ON SR 1727
BETWEEN SR 1722 AND NC 10

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : T. BANKOVICH DATE : 3-2011
CHECKED BY : S.B. WILLIAMS DATE : 3-2011

04-JAN-2012 08:30
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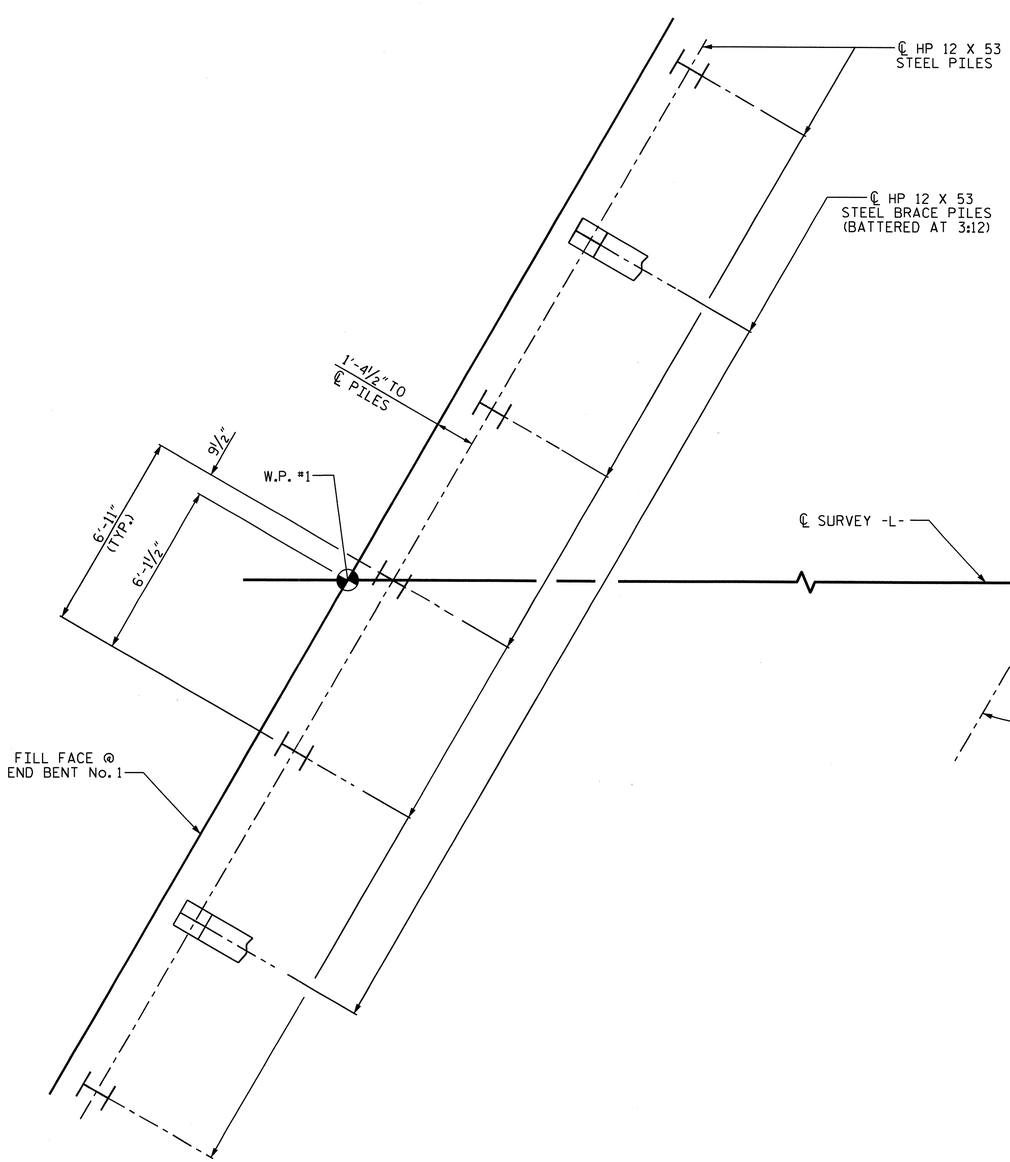
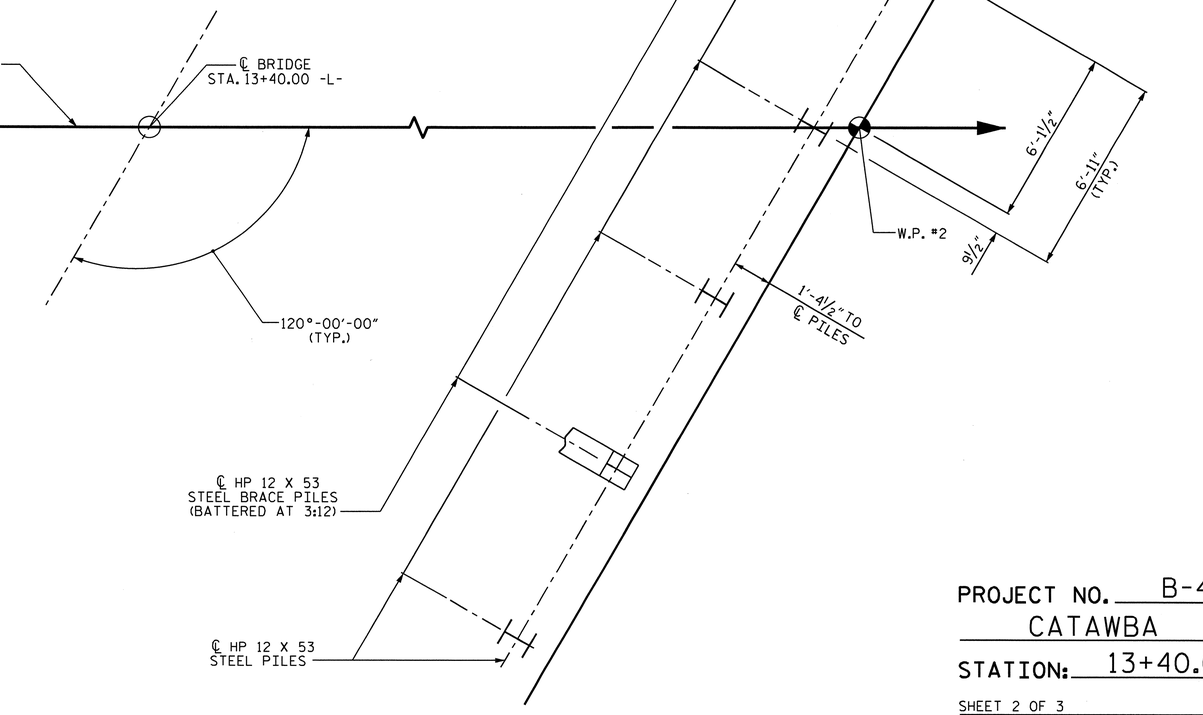


END BENT No. 1



END BENT No. 2

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF THE CAP)

NORTH CAROLINA PROFESSIONAL SEAL 34390 ENGINEER THEO J. BEACH
1/4/2012

PROJECT NO. B-4061
CATAWBA COUNTY
STATION: 13+40.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER HAGAN
CREEK ON SR 1727
BETWEEN SR 1722 AND NC 10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : S.B. WILLIAMS DATE : 3/11
CHECKED BY : N. PIERCE DATE : 4/11

04-JAN-2012 08:30
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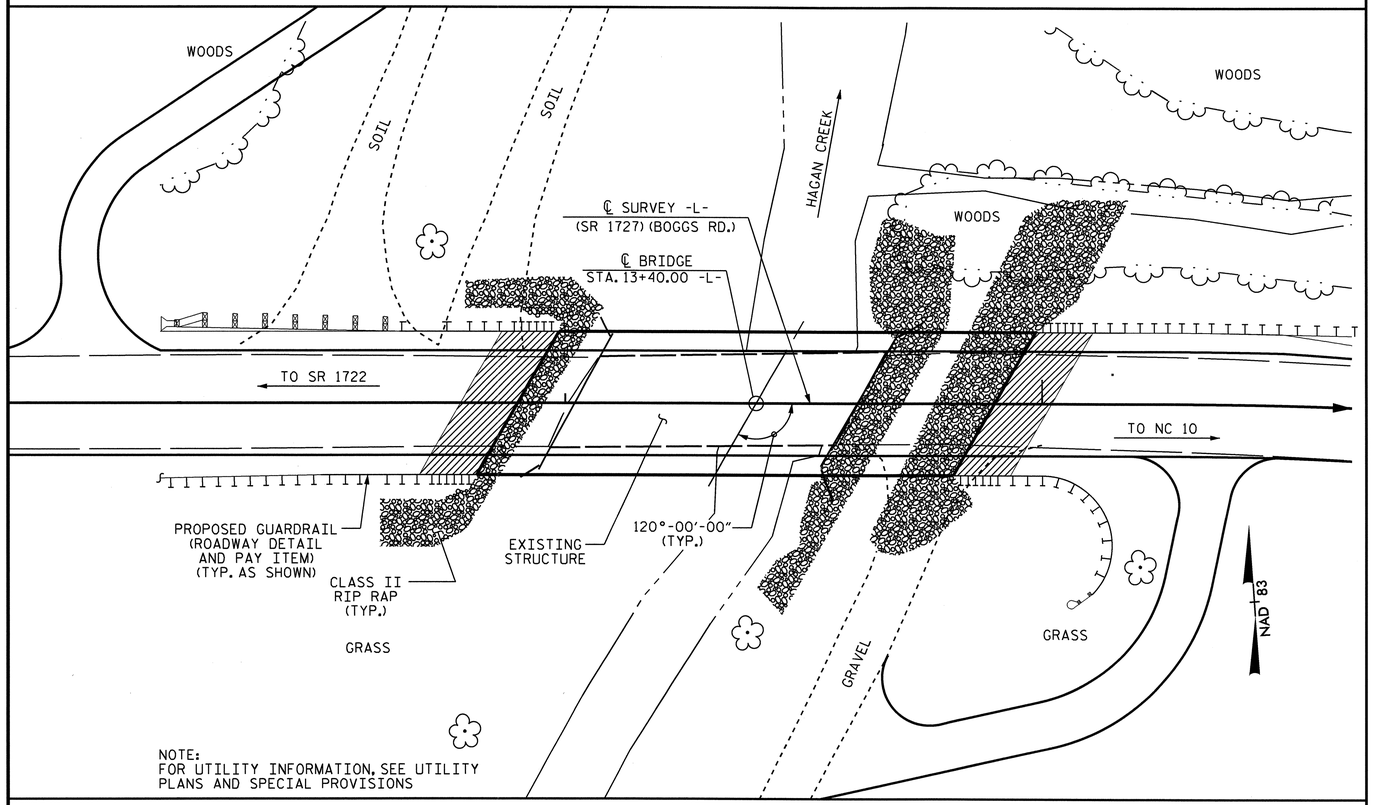
BM #2: 8" SPIKE IN ROOT OF ALDER TREE, 91.60' LT. OF STA. 12+96.11 -L-, EL. 808.20, NAVD 88



NOTE:
FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 2 SPANS @ 30'-6", WITH A CLEAR ROADWAY WIDTH OF 19'-4" AND CONSISTING OF ASPHALT WEARING SURFACE ON TIMBER DECK ON STEEL BEAMS WITH SUBSTRUCTURE CONSISTING OF TIMBER CAPS ON TIMBER PILES WITH TIMBER BULKHEADS, LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+40.00 -L-."

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR H-PILES AT END BENT No. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE

HYDRAULIC DATA

DESIGN DISCHARGE	= 2360 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 808.0
DRAINAGE AREA	= 8.9 SQ. MI.
BASE DISCHARGE (Q100)	= 3290 CFS
BASE HIGH WATER ELEVATION	= 809.6

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 6500 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500 YR. +
OVERTOPPING ELEVATION	= 811.7

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 x 53 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	1'-2" x 2'-7½" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 3'-3" PRESTRESSED CONCRETE BOX BEAMS	
	LUMP SUM	LUMP SUM	CU.YDS.	LUMP SUM	LBS.	No.	LIN.FT.	EACH	LIN. FT.	LIN. FT.	TONS	SQ.YDS.	LUMP SUM	No.	LIN. FT.
SUPERSTRUCTURE				LUMP SUM					178.45	194.79			LUMP SUM	11	1,071.35
END BENT No. 1			20.7		3,218	7	280	7			130	145			
END BENT No. 2			20.7		3,207	7	230				250	280			
TOTAL	LUMP SUM	LUMP SUM	41.4	LUMP SUM	6,425	14	510	7	178.45	194.79	380	425	LUMP SUM	11	1,071.35

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER HAGAN CREEK ON SR 1727 BETWEEN SR 1722 AND NC 10

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : S.B. WILLIAMS DATE : 3-2011
CHECKED BY : N. PEARCE DATE : 4-2011

04-JAN-2012 08:30
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LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE BOX BEAMS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INV)	N/A	1	1.101	--	1.75	0.242	1.74	A	ER	47.835	0.608	1.10	A	ER	4.783	0.80	0.242	1.28	A	ER	47.835	
		HL-93 (OPR)	N/A	--	1.427	--	1.35	0.242	2.26	A	ER	47.835	0.608	1.43	A	ER	4.783	N/A	--	--	--	--	--	
		HS-20 (INV)	36.000	2	1.481	53.317	1.75	0.242	2.40	A	ER	47.835	0.608	1.48	A	ER	4.783	0.80	0.242	1.77	A	ER	47.835	
		HS-20 (OPR)	36.000	--	1.920	69.115	1.35	0.242	3.12	A	ER	47.835	0.608	1.92	A	ER	4.783	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.182	56.458	1.4	0.242	7.09	A	ER	47.835	0.608	4.56	A	ER	4.783	0.80	0.242	4.18	A	ER	47.835	
		SNGARBS2	20.000	--	3.037	60.73	1.4	0.242	5.15	A	ER	47.835	0.608	3.19	A	ER	4.783	0.80	0.242	3.04	A	ER	47.835	
		SNAGRIS2	22.000	--	2.843	62.552	1.4	0.242	4.82	A	ER	47.835	0.608	2.95	A	ER	4.783	0.80	0.242	2.84	A	ER	47.835	
		SNCOTTS3	27.250	--	2.079	56.647	1.4	0.242	3.53	A	ER	47.835	0.608	2.27	A	ER	4.783	0.80	0.242	2.08	A	ER	47.835	
		SNAGGRS4	34.925	--	1.706	59.595	1.4	0.242	2.89	A	ER	47.835	0.608	1.85	A	ER	4.783	0.80	0.242	1.71	A	ER	47.835	
		SNS5A	35.550	--	1.671	59.394	1.4	0.242	2.83	A	ER	47.835	0.608	1.86	A	ER	4.783	0.80	0.242	1.67	A	ER	47.835	
		SNS6A	39.950	--	1.520	60.735	1.4	0.242	2.58	A	ER	47.835	0.608	1.68	A	ER	4.783	0.80	0.242	1.52	A	ER	47.835	
		SNS7B	42.000	--	1.447	60.787	1.4	0.242	2.46	A	ER	47.835	0.608	1.63	A	ER	4.783	0.80	0.242	1.45	A	ER	47.835	
	TTST	TNAGRIT3	33.000	--	1.850	61.057	1.4	0.242	3.14	A	ER	47.835	0.608	2.01	A	ER	4.783	0.80	0.242	1.85	A	ER	47.835	
		TNT4A	33.075	--	1.855	61.353	1.4	0.242	3.15	A	ER	47.835	0.608	1.97	A	ER	4.783	0.80	0.242	1.85	A	ER	47.835	
		TNT6A	41.600	--	1.505	62.604	1.4	0.242	2.55	A	ER	47.835	0.608	1.71	A	ER	4.783	0.80	0.242	1.50	A	ER	47.835	
		TNT7A	42.000	--	1.506	63.26	1.4	0.242	2.56	A	ER	47.835	0.608	1.68	A	ER	4.783	0.80	0.242	1.51	A	ER	47.835	
		TNT7B	42.000	--	1.543	64.808	1.4	0.242	2.62	A	ER	47.835	0.608	1.61	A	ER	4.783	0.80	0.242	1.54	A	ER	47.835	
		TNAGRIT4	43.000	--	1.479	63.603	1.4	0.242	2.51	A	ER	47.835	0.608	1.56	A	ER	4.783	0.80	0.242	1.48	A	ER	47.835	
		TNAGT5A	45.000	--	1.400	62.998	1.4	0.242	2.37	A	ER	47.835	0.608	1.53	A	ER	4.783	0.80	0.242	1.40	A	ER	47.835	
		TNAGT5B	45.000	3	1.388	62.45	1.4	0.242	2.35	A	ER	47.835	0.608	1.49	A	ER	4.783	0.80	0.242	1.39	A	ER	47.835	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

	YEAR	ADTT
CURRENT	2002	81
FUTURE	2025	143

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

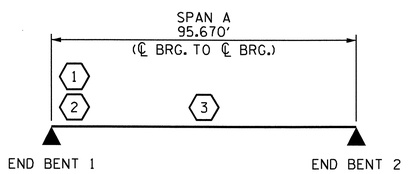
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

BOX BEAM LOCATION

I - INTERIOR BOX BEAM
EL - EXTERIOR LEFT BOX BEAM
ER - EXTERIOR RIGHT BOX BEAM



LRFR SUMMARY

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
11/10/11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE BOX BEAMS (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			22

STD. NO. LRFR1

ASSEMBLED BY : T. M. GARRISON	DATE : 1/11
CHECKED BY : M. K. TOM	DATE : 1/11
DRAWN BY : MAA 1/08	REV. 11/12/08R MAA/GM
CHECKED BY : GM/DI 2/08	

09-NOV-2011 07:52
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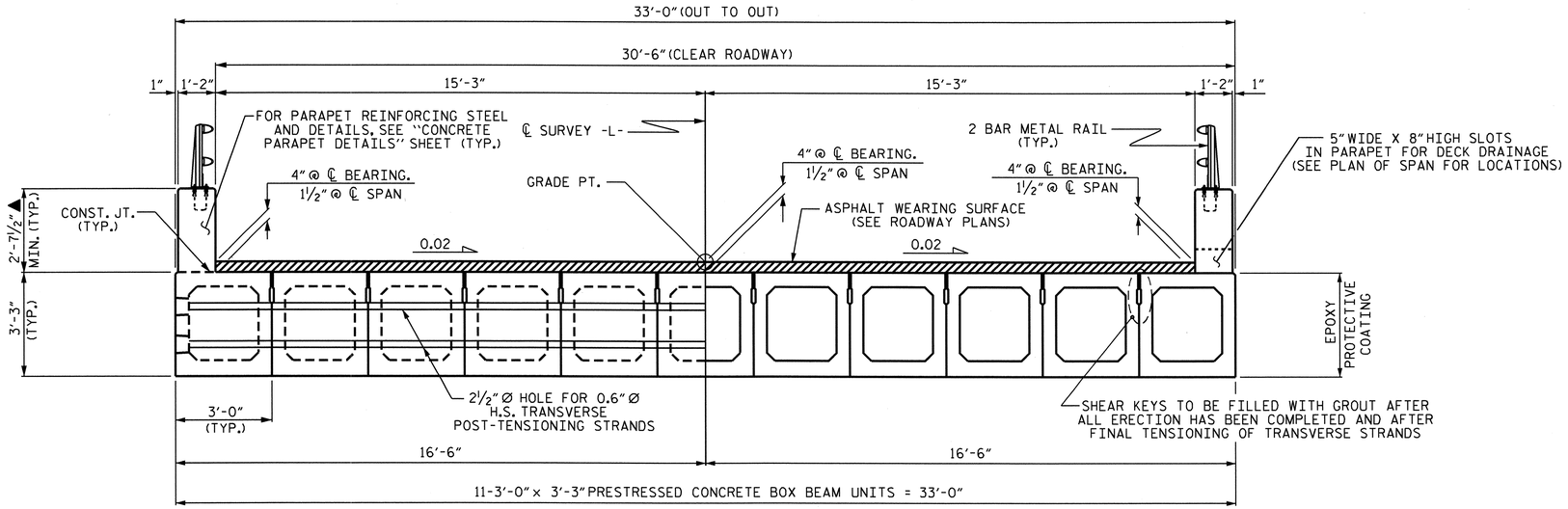
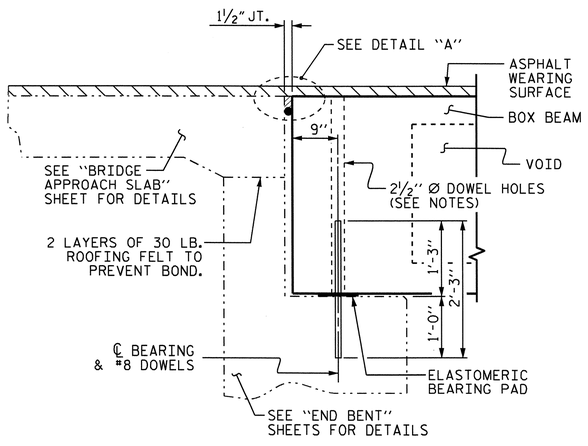


HALF SECTION @ INTERMEDIATE DIAPHRAGMS

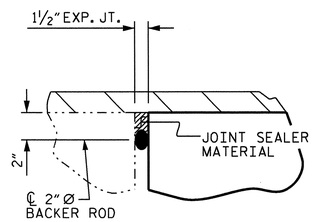
HALF SECTION @ VOIDS

TYPICAL SECTION



FIXED END

SECTION AT END BENT



DETAIL "A"

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH GROUT.

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5700 PSI.

ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL THE CONTRACTION JOINTS SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

▲ THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

THE LOCATION OF THE DRAINAGE SLOTS IN THE PARAPET MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR REINFORCING STEEL.

APPLY EPOXY PROTECTIVE COATING TO THE EXTERIOR FACE OF THE RIGHT EXTERIOR BOX BEAM.

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT

NORTH CAROLINA PROFESSIONAL SEAL 24380 ENGINEER THEO J. BEACH
1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : S.B. WILLIAMS DATE : 10/09
CHECKED BY : T. BANKOVICH DATE : 11/09

04-JAN-2012 08:29
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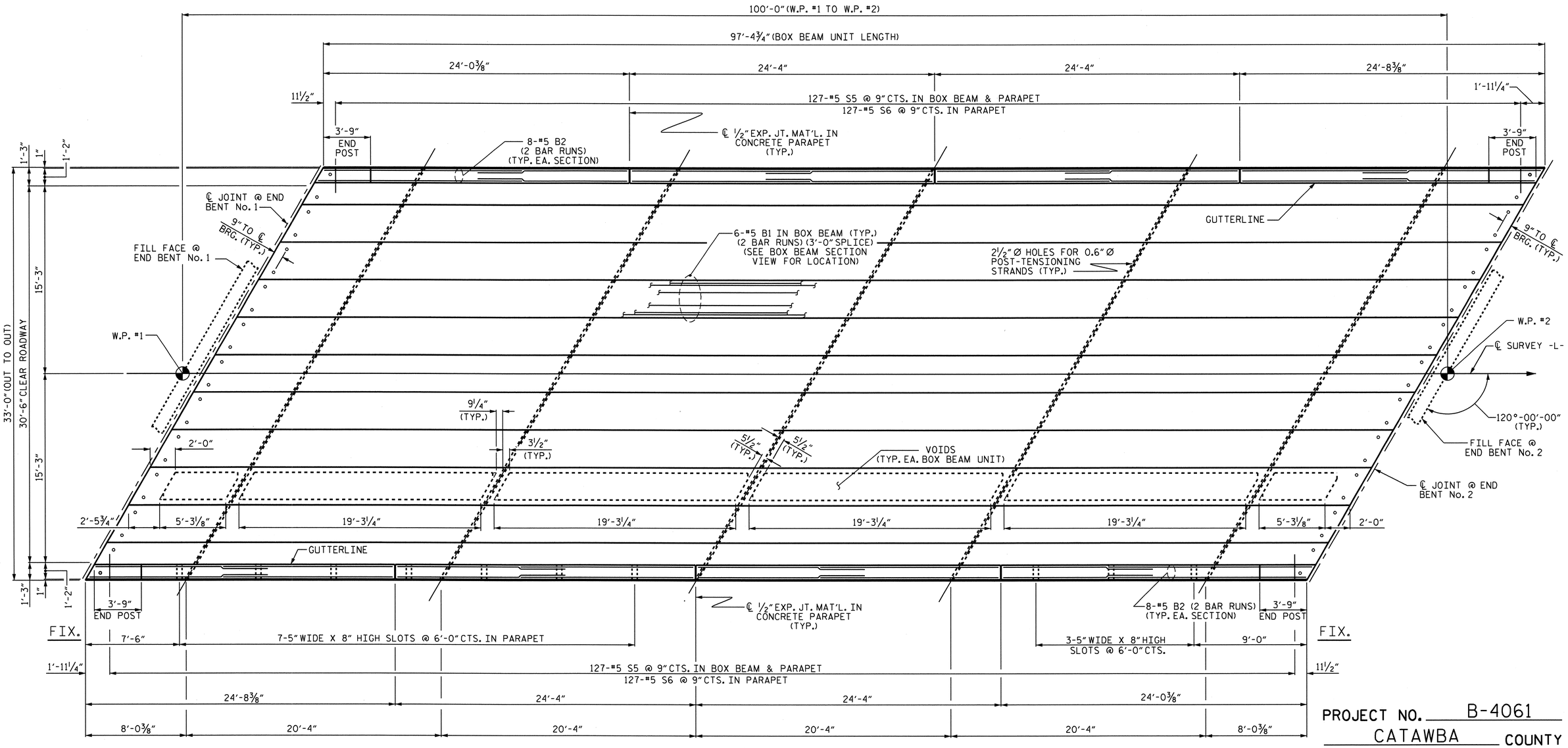

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 2 OF 9

PLAN OF SPAN "A"

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN "A"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

DRAWN BY : S. B. WILLIAMS DATE : 10/2009
CHECKED BY : T. BANKOVICH DATE : 11/2009

04-JAN-2012 08:29
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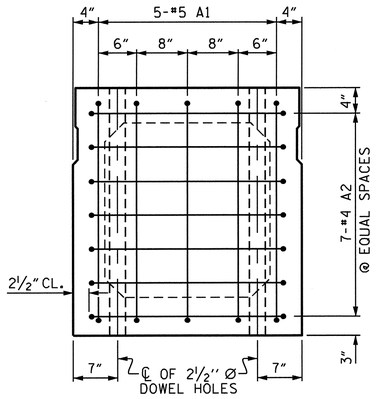
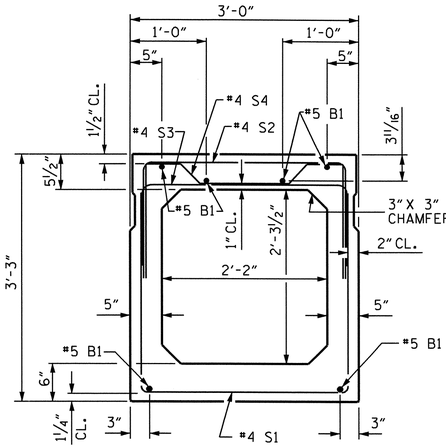
NCDOT



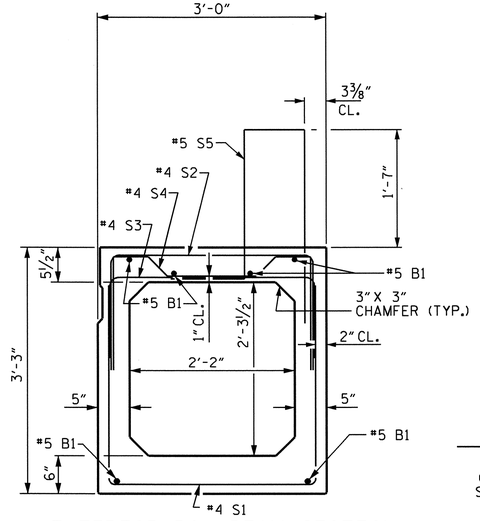
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



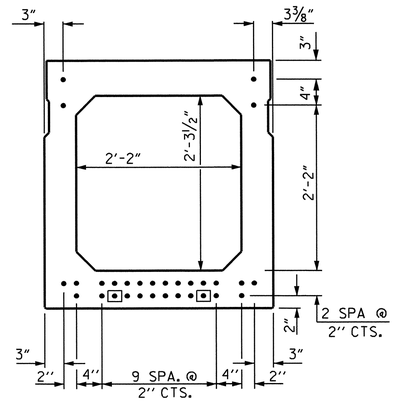
INTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



TYPICAL STRAND LOCATION

(30 STRANDS REQUIRED)

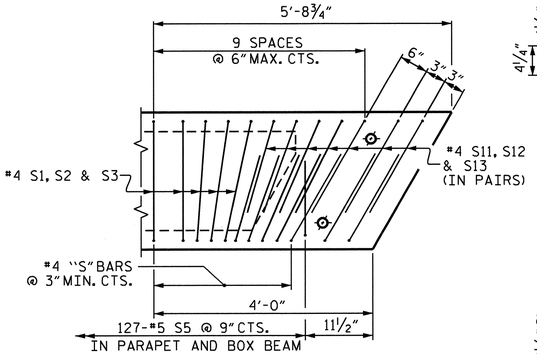
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⊡ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

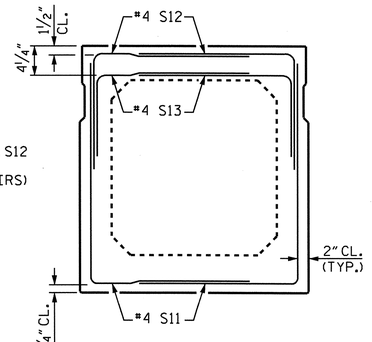
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

0.6" Ø LOW RELAXATION STRAND LAYOUT



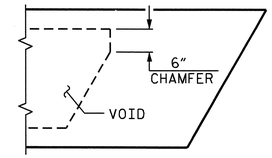
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



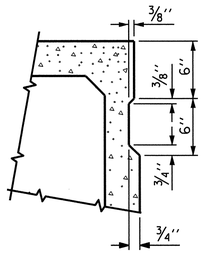
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



CHAMFER DETAIL

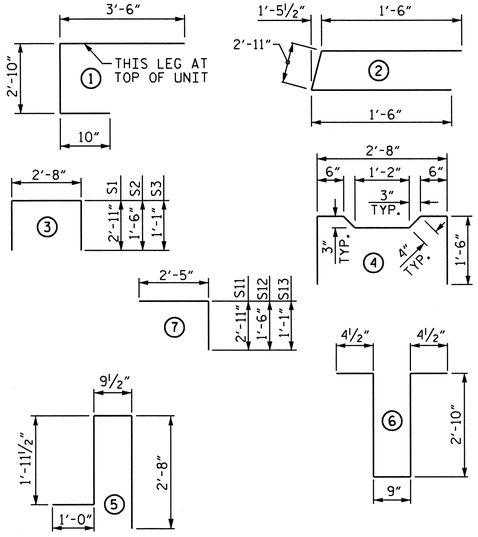
SHOWING 6" VOID CHAMFER



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

BAR TYPES



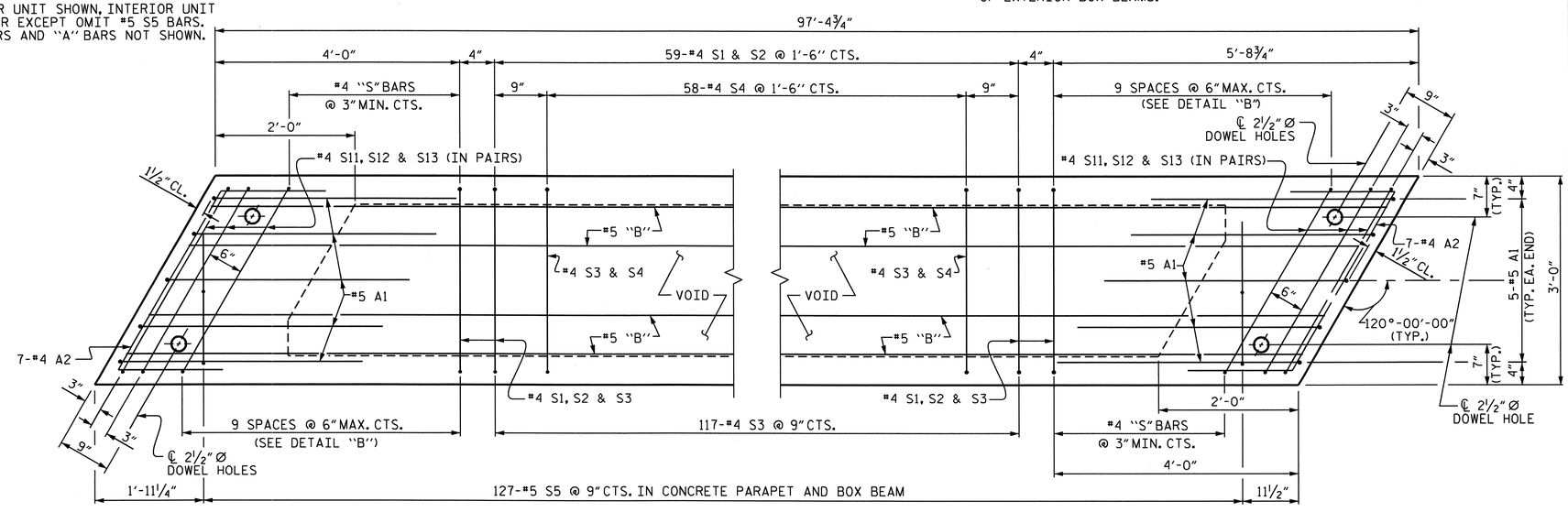
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-11"	174	5'-11"	174
B1	12	#5	STR	50'-0"	626	50'-0"	626
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-11"	19	2'-11"	19
S1	69	#4	3	8'-6"	392	8'-6"	392
S2	69	#4	3	5'-8"	261	5'-8"	261
S3	127	#4	3	4'-10"	410	4'-10"	410
S4	58	#4	4	5'-10"	226	5'-10"	226
S11	28	#4	7	5'-4"	100	5'-4"	100
S12	28	#4	7	3'-11"	73	3'-11"	73
S13	28	#4	7	3'-6"	65	3'-6"	65
✱S5	127	#5	5	6'-5"	850	--	--
REINFORCING STEEL					2493 LBS.		2493 LBS.
✱EPOXY COATED REINF. STEEL					850 LBS.		
7500 P.S.I. CONCRETE					19.2 CU. YDS.		19.2 CU. YDS.
0.6" Ø L.R. STRANDS					No. 30		No. 30

GRADE 270 STRANDS

	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS.
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT SPAN "A"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24390 THEO J. BEACH 11/10/11

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09
CHECKED BY : T. BANKOVICH	DATE : 11/09
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM

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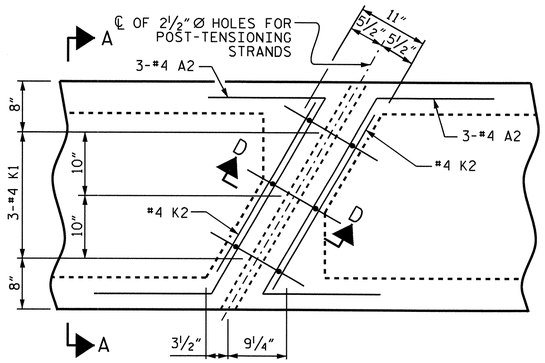
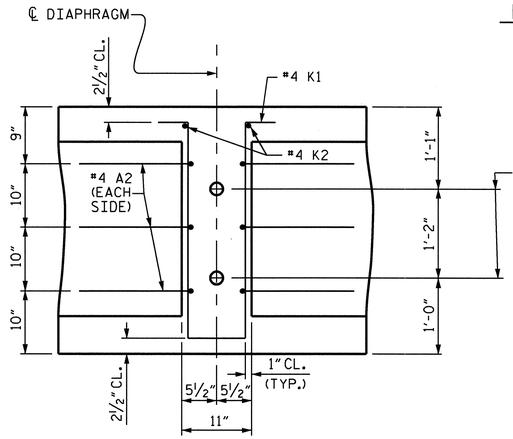
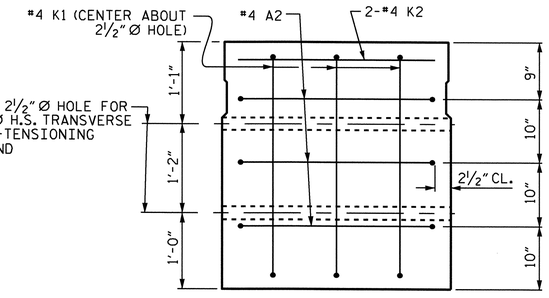
(SHT 2B) STD. NO. PCBB6



PLAN



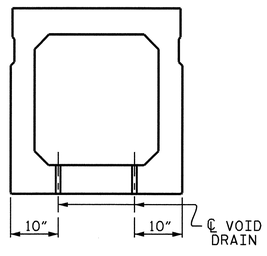
SECTION D-D



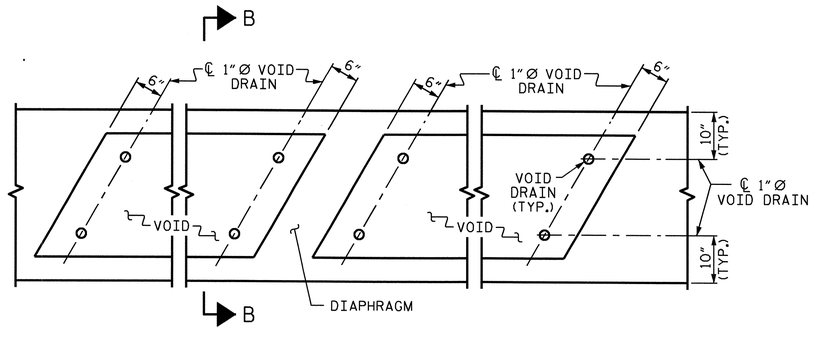
SECTION A-A
VOIDS NOT SHOWN

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLE.



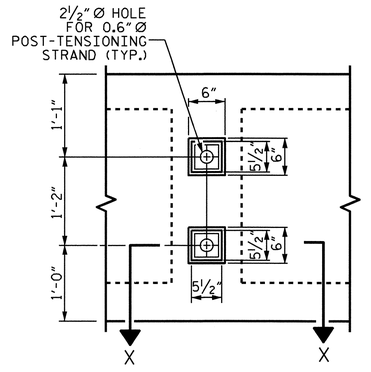
SECTION B-B



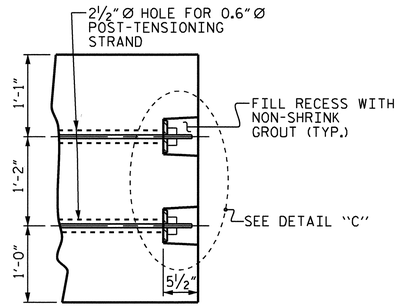
PART PLAN

VOID DRAIN DETAILS

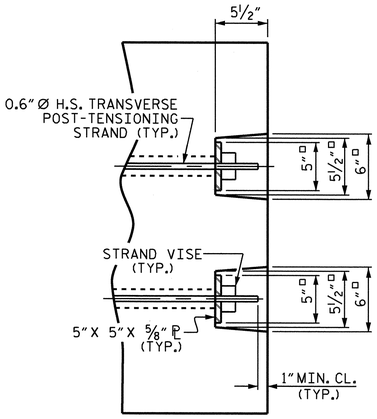
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)



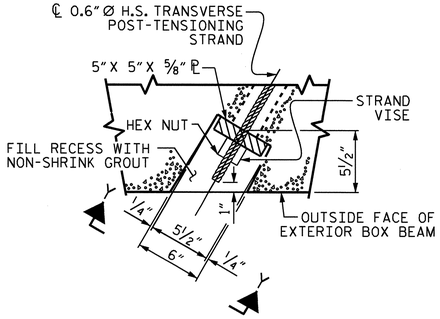
VIEW Y-Y
SHOWING ELEVATION VIEW OF GROUTED RECESS



PART SECTION AT RECESS



DETAIL "C"



SECTION X-X

GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0"x 3'-3"
	0.6"Ø L.R. STRAND
	SPAN "A"
CAMBER (BEAM ALONE IN PLACE) ↑	3 3/16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ** ↓	1 3/16"
FINAL CAMBER ↑	2 3/8"

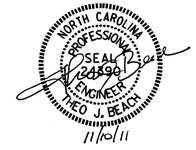
** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4061
CATAWBA COUNTY
STATION: 13+40.00 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			22



ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09
CHECKED BY : T. BANKOVICH	DATE : 11/09
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM

09-NOV-2011 07:51
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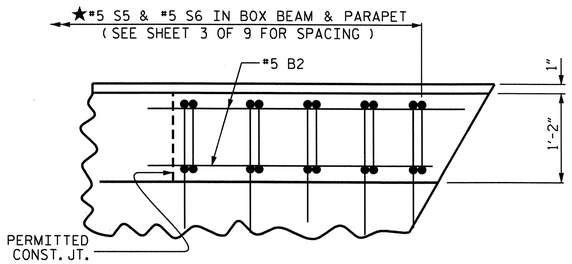
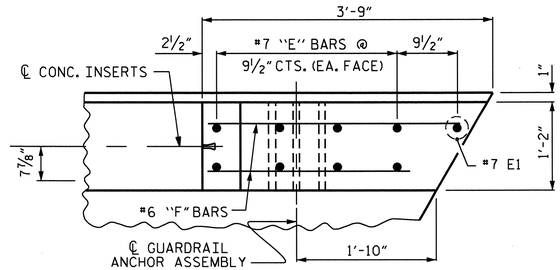
kalford

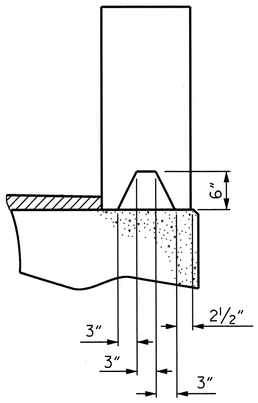
(SHT 3) STD. NO. PCBB7



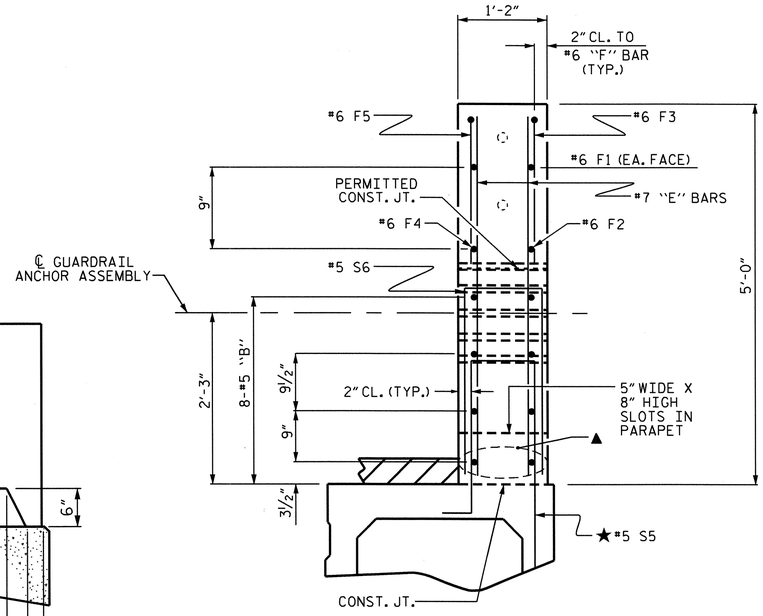
PLAN OF PARAPET



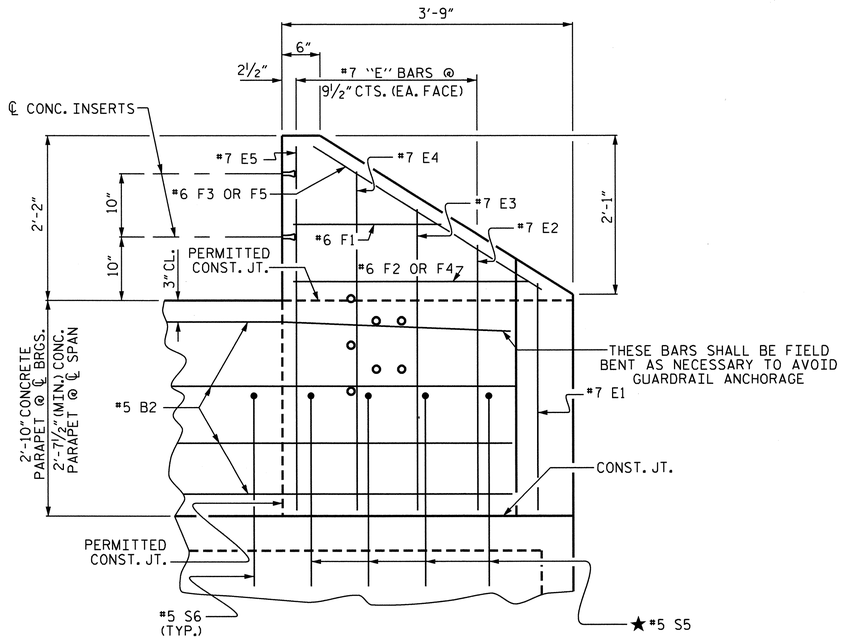
PLAN OF END POST



SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



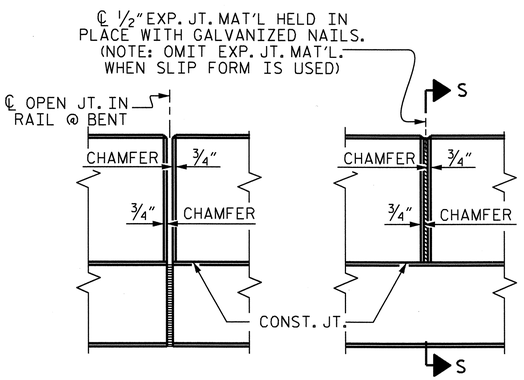
END VIEW



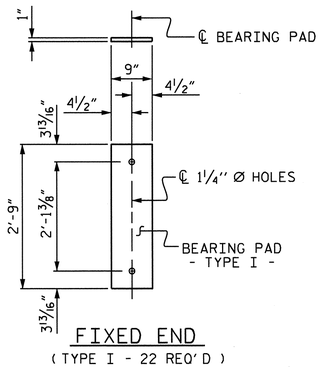
ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

▲THESE "B" BARS MAY BE FIELD CUT 2" CLEAR OF DRAINAGE SLOTS TO AVOID INTERFERENCE



ELEVATION AT EXPANSION JOINTS

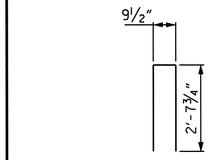


FIXED END
(TYPE I - 22 REQ'D)

ELASTOMERIC BEARING DETAIL

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
SPAN A			
EXTERIOR B.B.	2	97'-4¾"	194'-9½"
INTERIOR B.B.	9	97'-4¾"	876'-6¾"
TOTAL	11	———	1,071.35'



⑩

BAR TYPE
BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR PARAPETS & END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B2	128	# 5	STR	14'-0"	1869
✳E1	4	# 7	STR	2'-6"	20
✳E2	8	# 7	STR	3'-3"	53
✳E3	8	# 7	STR	3'-9"	61
✳E4	8	# 7	STR	4'-3"	69
✳E5	8	# 7	STR	4'-7"	75
✳F1	8	# 6	STR	1'-9"	21
✳F2	4	# 6	STR	3'-6"	21
✳F3	4	# 6	STR	3'-9"	23
✳F4	4	# 6	STR	2'-11"	18
✳F5	4	# 6	STR	3'-3"	20
✳S6	254	# 5	10	6'- 1"	1612
✳EPOXY COATED REINF. STEEL LBS.					3862
CLASS AA CONCRETE CU.YDS.					23.9
TOTAL LIN. FT. OF CONC. PARAPET					194.79'

★ NOTE:
#5 S5 BARS ARE INCLUDED IN THE
BILL OF MATERIAL FOR BOX BEAM SECTION

PROJECT NO. B-4061
CATAWBA COUNTY
STATION: 13+40.00 -L-
SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT DETAILS AND
CONCRETE PARAPET DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09
CHECKED BY : T. BANKOVICH	DATE : 11/09
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	REV. 5/1/06R TLA/GM

04-JAN-2012 08:29
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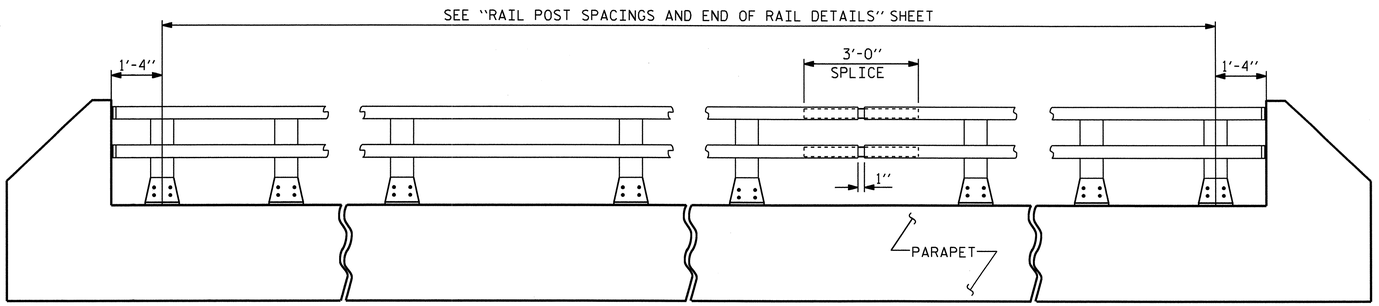
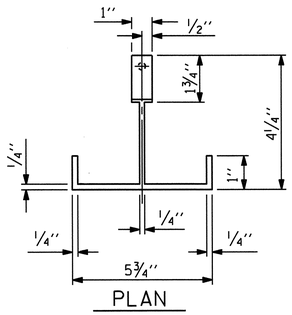
kalford

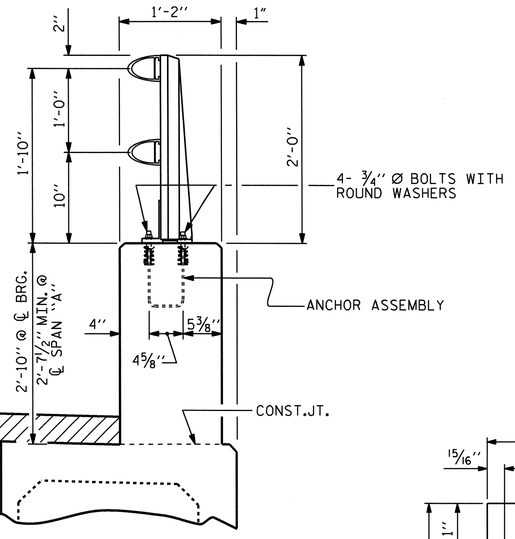


ELEVATION

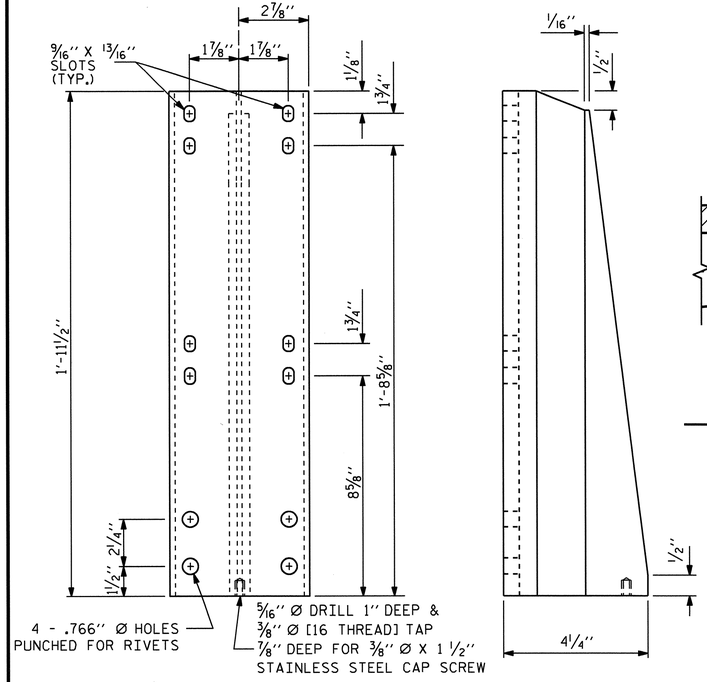
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN

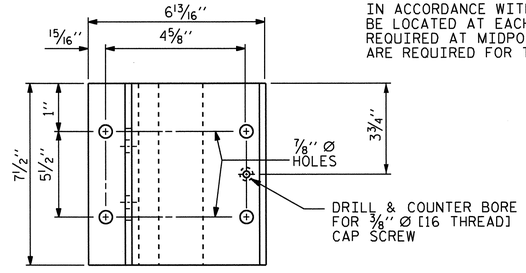


SECTION THRU PARAPET AND RAIL



FRONT ELEVATION SIDE ELEVATION

DETAILS OF POST



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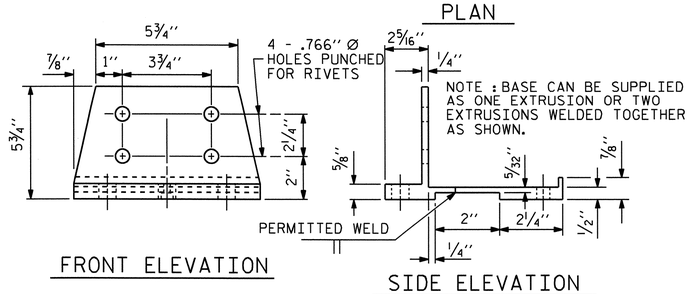
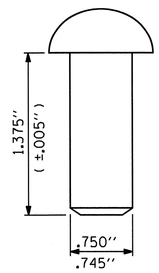


FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRATCTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SECTIONS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 178.45 LIN. FT.

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09					
CHECKED BY : T. BANKOVICH	DATE : 11/09					
DRAWN BY : EEM 6/94	REV. 10/17/00	LES/RDR				
CHECKED BY : RGW 6/94	REV. 5/7/03R	RWW/JTE				
	REV. 5/1/06	TLA/GM				

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			22

STD. NO. BMR3

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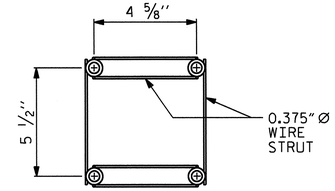
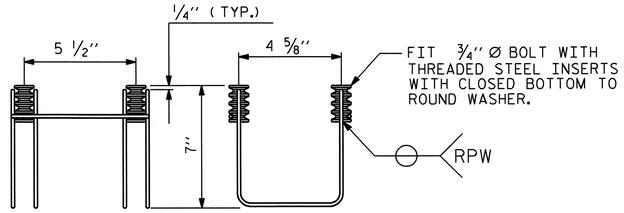


PLAN



SIDE VIEW ELEVATION

MINIMUM LENGTH OF THREADS IN INSERT (FERRULE): 1 3/4''

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(36 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

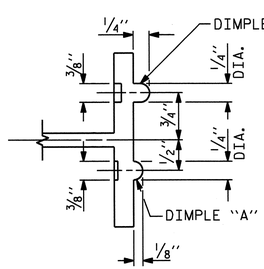
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

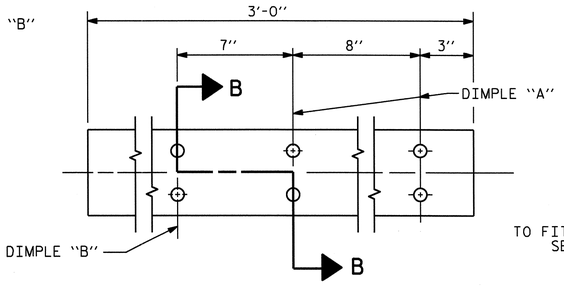
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4'' Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

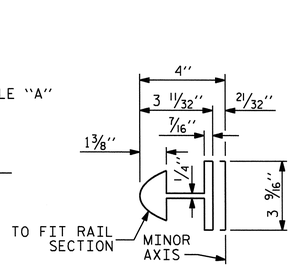
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



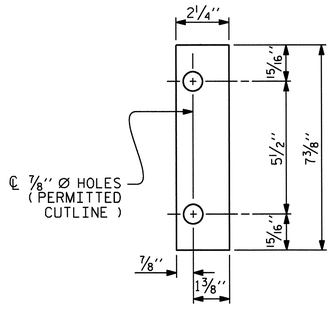
SECTION B - B



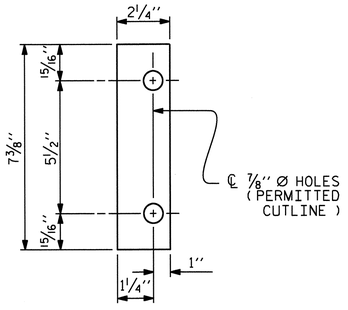
EXPANSION BAR DETAILS



BAR SECTION



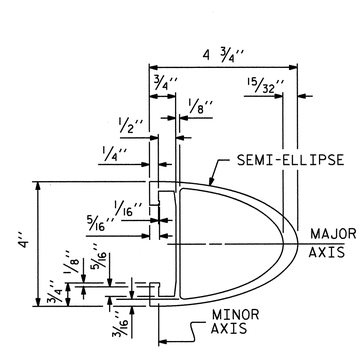
FRONT PLATE



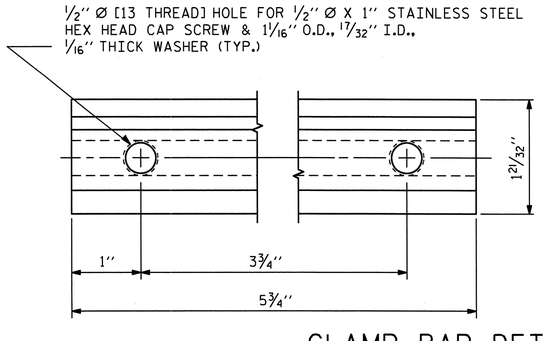
REAR PLATE

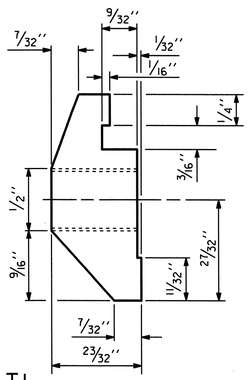
SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



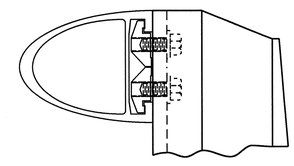
RAIL SECTION



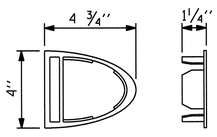


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09	
CHECKED BY : T. BANKOVICH	DATE : 11/09	
DRAWN BY : EEM 6/94	REV. 2/6/97	EEM/RGW
CHECKED BY : RGW 6/94	REV. 8/16/99	MAB/LES
	REV. 5/1/06R	KMM/GM

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

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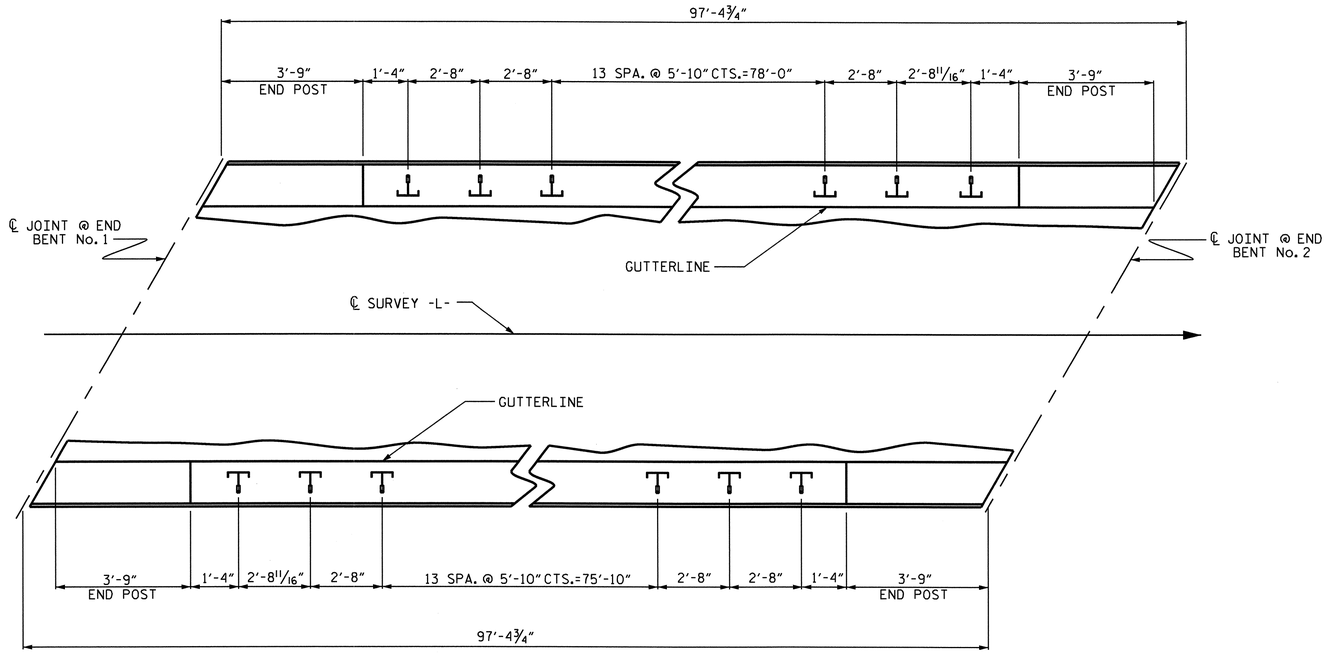
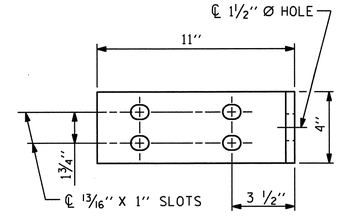
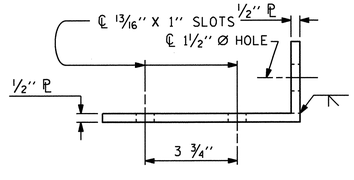
STD. NO. BMR4



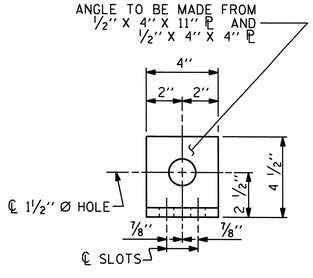
PLAN OF RAIL POST SPACINGS



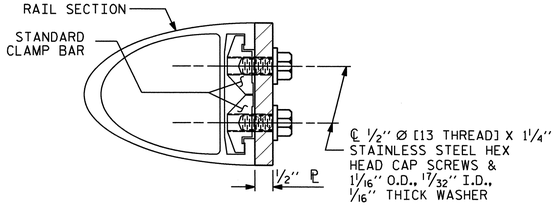
ELEVATION



TOP VIEW



END VIEW



SECTION H-H

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

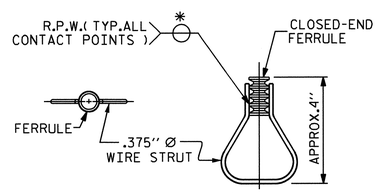
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

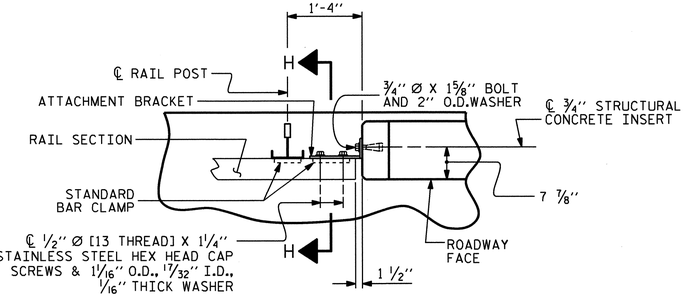
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



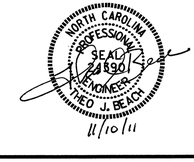
PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

*EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



PLAN - RAIL AND END POST



PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00-L-

SHEET 8 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			22

STD. NO. BMR2

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10-09	
CHECKED BY : T. BANKOVICH	DATE : 11-09	
DRAWN BY : FCJ 1/88	REV. 10/17/00	LES/RDR
CHECKED BY : CRK 3/89	REV. 5/7/03	RWW/JTE
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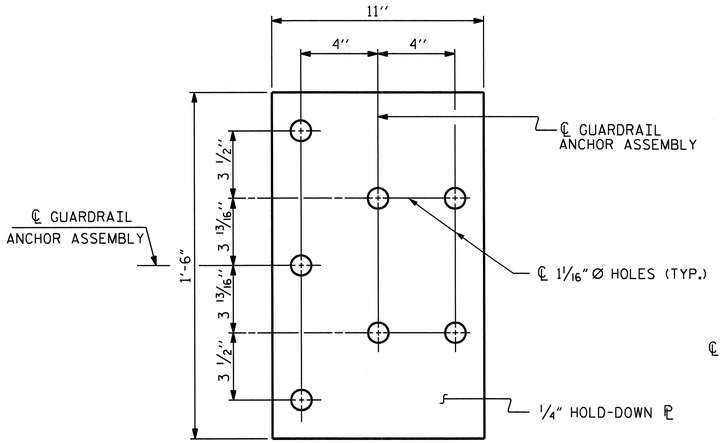
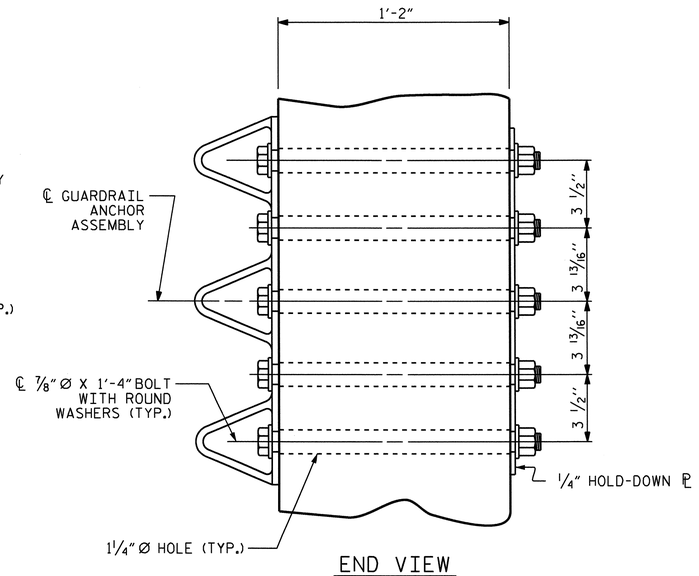


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4'' HOLD DOWN PLATE AND 7 - 7/8'' Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8'' Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

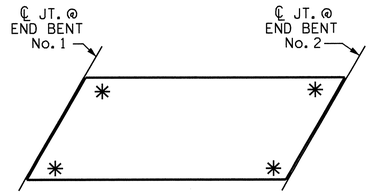
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

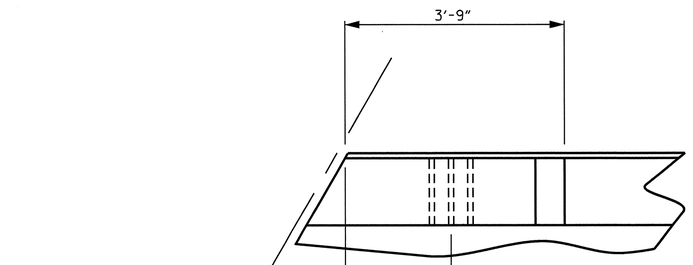
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



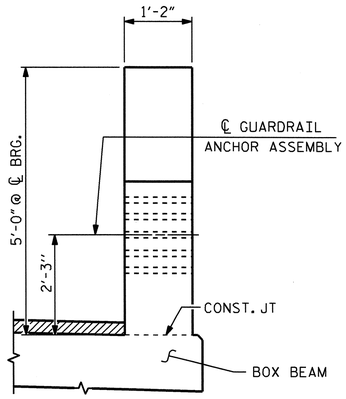
SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY



PLAN

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR)



END VIEW

LOCATION OF GUARDRAIL ANCHOR AT END POST

ASSEMBLED BY : S.B. WILLIAMS	DATE : 10/09		
CHECKED BY : T. BANKOVICH	DATE : 11/09		
DRAWN BY : EEM 6/94		REV. 10/17/00	RWW/LES
CHECKED BY : RGW 6/94		REV. 5/7/03	RWW/JTE
		REV. 5/1/06	TLA/GM

04-JAN-2012 08:28
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kalford

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			22

NOTES:

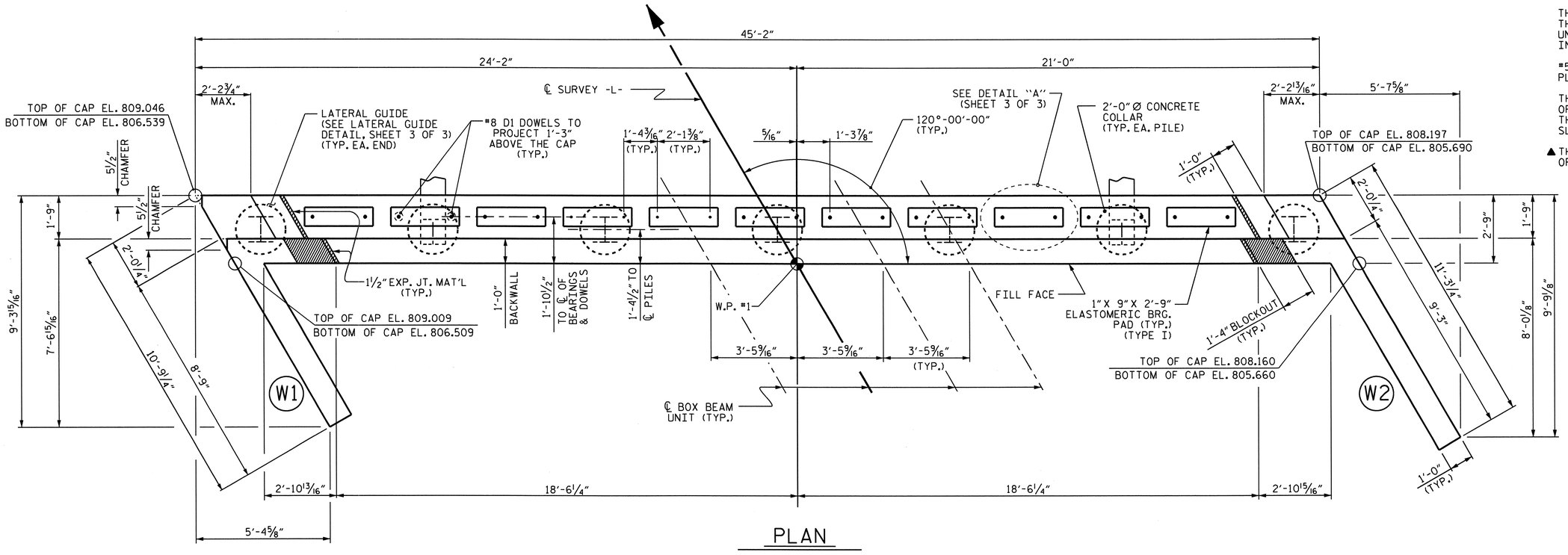
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER BOX BEAM UNITS ARE IN PLACE.

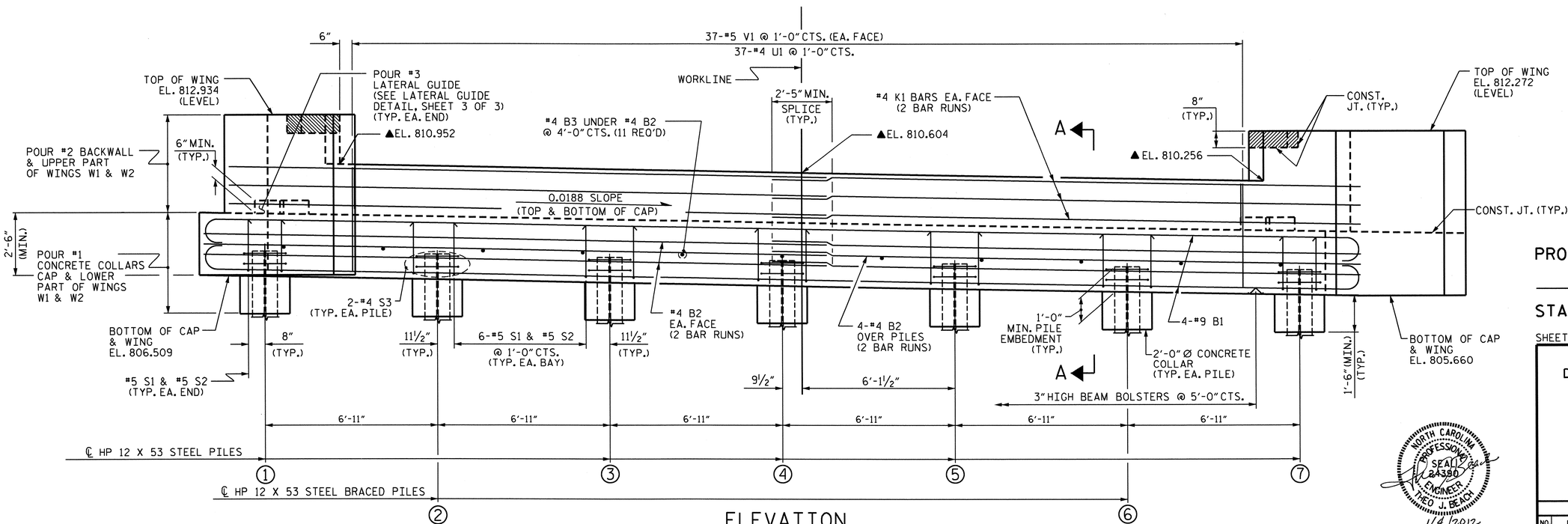
#5 V1 BARS IN BACKWALL SHALL BE PLACED 2"FROM TOP OF BACKWALL.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

▲ THIS ELEVATION TAKEN AT FILL FACE OF BACKWALL.



PLAN



ELEVATION

FOR SECTION A-A SEE SHEET 3 OF 3

TOP OF PILE ELEVATIONS	
①	807.500
②	807.370
③	807.240
④	807.110
⑤	806.980
⑥	806.850
⑦	806.720

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 24380 ENGINEER THEO J. BEACH
1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : M. L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

04-JAN-2012 08:27
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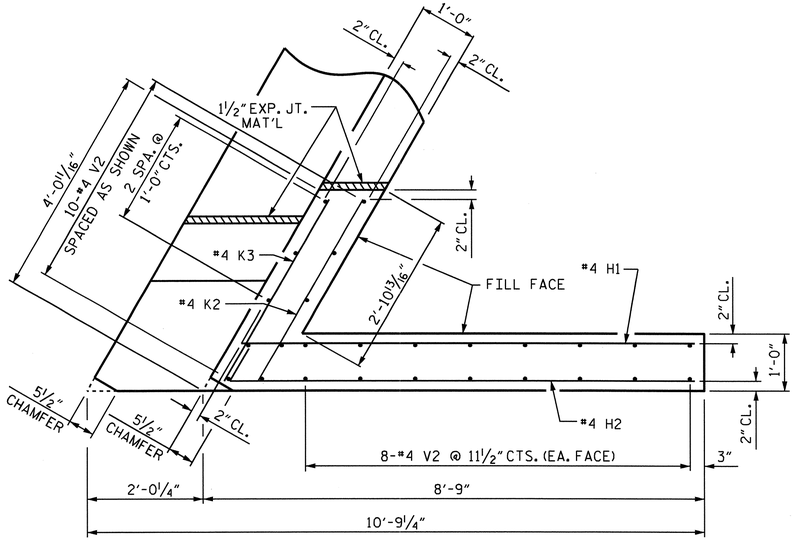
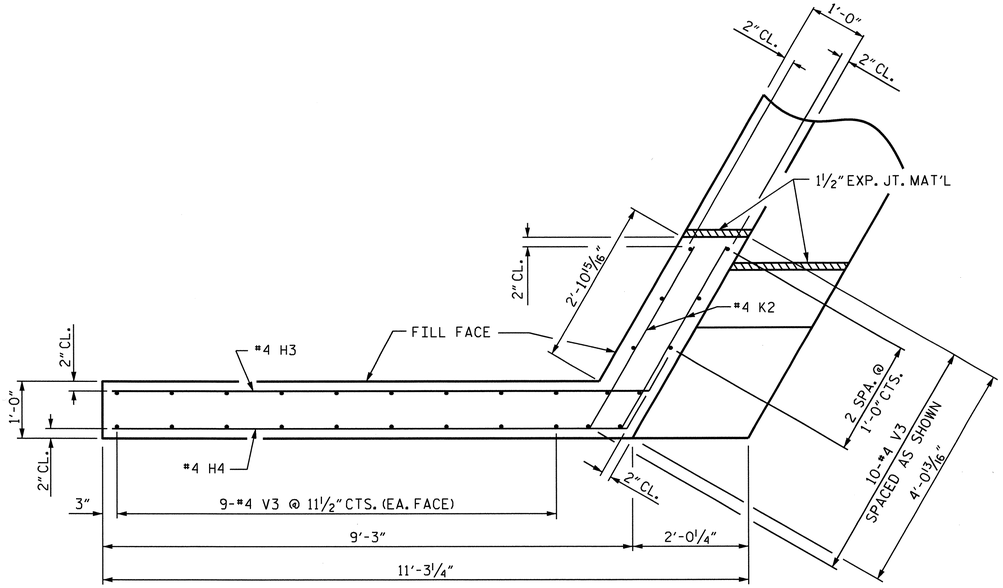
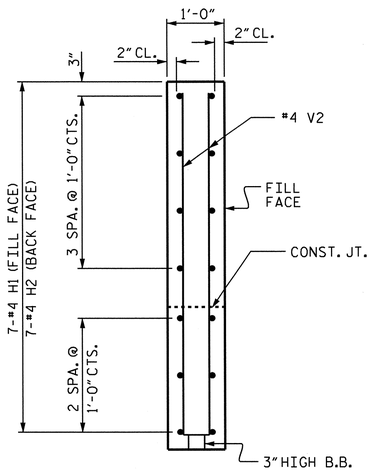
kalford



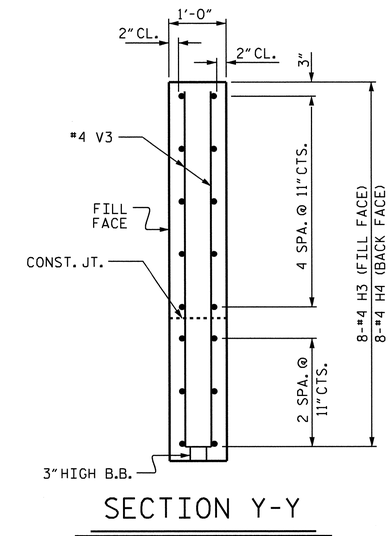
PLAN OF WING (W1)



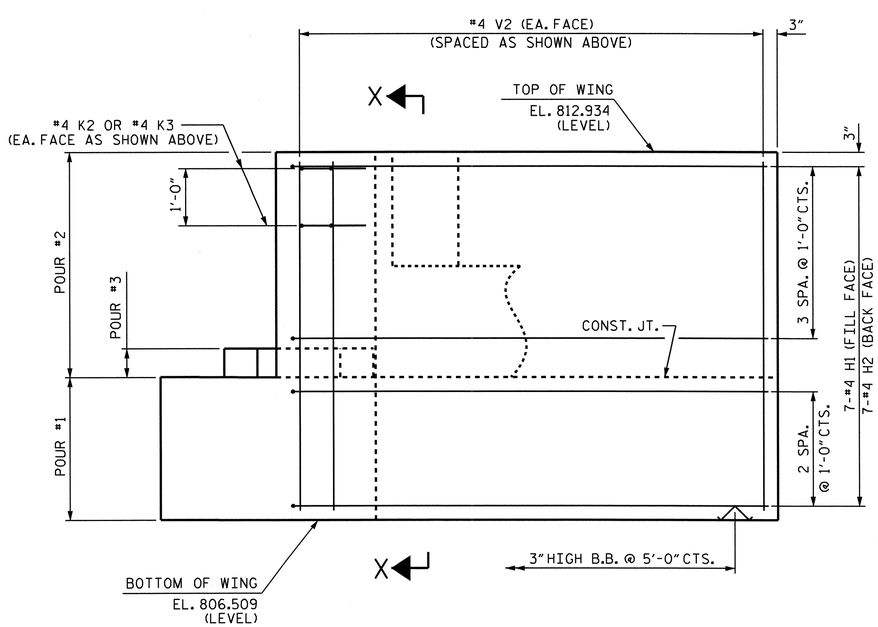
PLAN OF WING (W2)



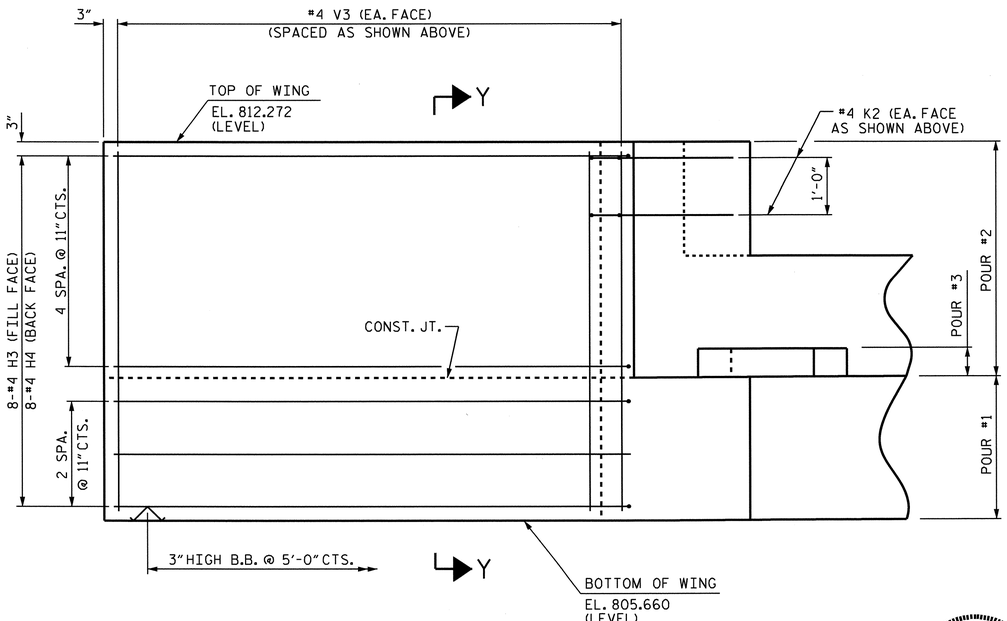
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : M.L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

09-NOV-2011 07:49
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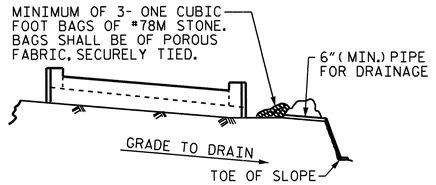
kalford



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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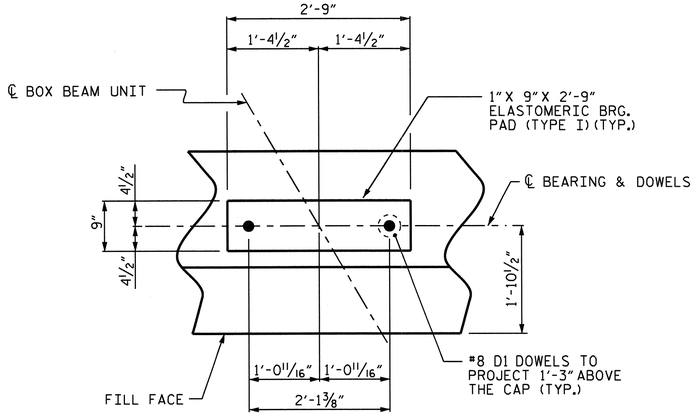
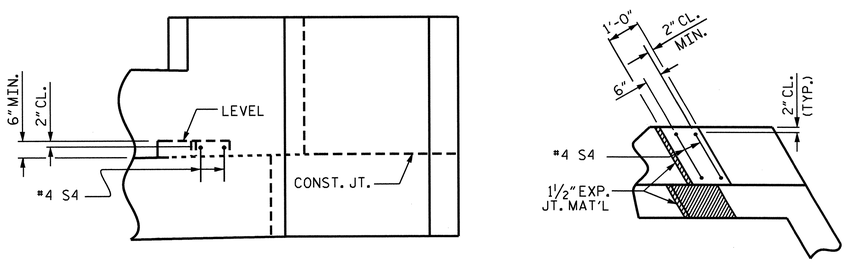
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

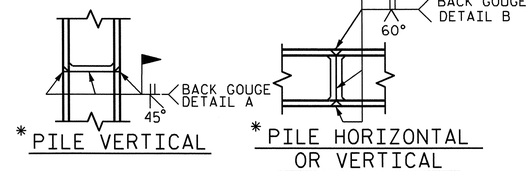
(TYP. EA. BEARING)



ELEVATION PLAN

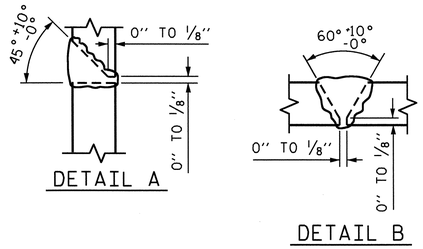
LATERAL GUIDE DETAIL

(RIGHT LATERAL GUIDE SHOWN, LEFT LATERAL GUIDE SIMILAR)



* PILE VERTICAL

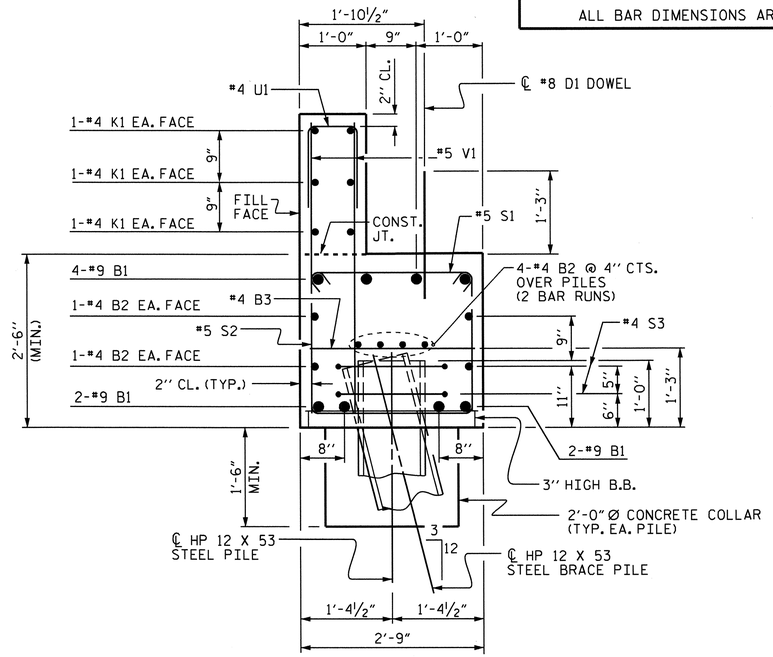
* PILE HORIZONTAL OR VERTICAL



DETAIL A DETAIL B

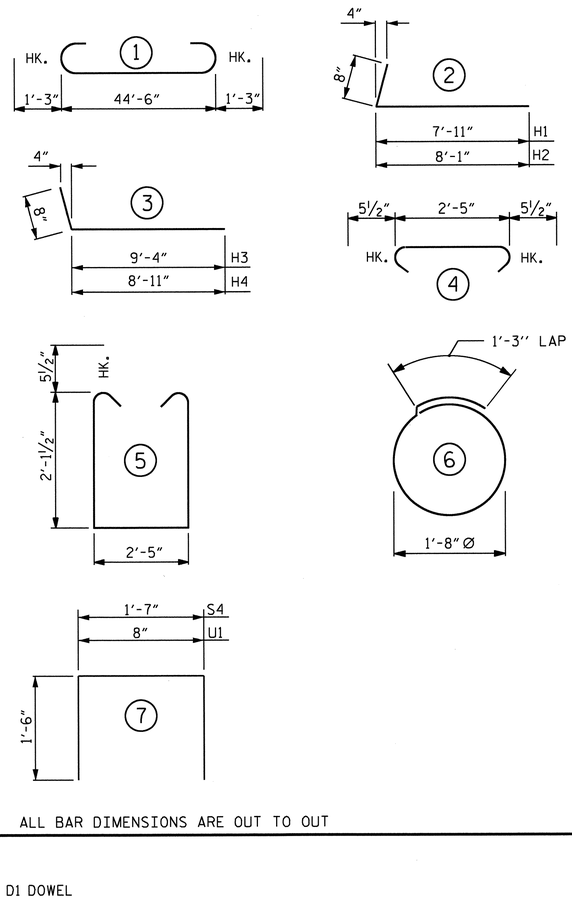
* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	47'-0"	1278
B2	16	#4	STR	23'-8"	253
B3	11	#4	STR	2'-5"	18
D1	22	#8	STR	2'-3"	132
H1	7	#4	2	8'-7"	40
H2	7	#4	2	8'-9"	41
H3	8	#4	3	10'-0"	53
H4	8	#4	3	9'-7"	51
K1	12	#4	STR	23'-8	190
K2	6	#4	STR	3'-8"	15
K3	2	#4	STR	3'-6"	5
S1	38	#5	4	3'-4"	132
S2	38	#5	5	7'-7"	301
S3	14	#4	6	6'-6"	61
S4	4	#4	7	4'-7"	12
U1	37	#4	7	3'-8"	91
V1	74	#5	STR	4'-2"	322
V2	26	#4	STR	6'-1"	106
V3	28	#4	STR	6'-3"	117

REINFORCING STEEL 3218 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CONCRETE COLLARS, CAP & LOWER WINGS	14.2 C.Y.
POUR #2	UPPER WINGS & BACKWALL	6.4 C.Y.
POUR #3	LATERAL GUIDES	0.1 C.Y.
TOTAL CLASS A CONCRETE		20.7 C.Y.

HP 12 X 53 STEEL PILES

NO. = 7 LIN. FT. = 280

STEEL PILE POINTS No. 7

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : M. L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

04-JAN-2012 08:27
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kalford

NOTES:

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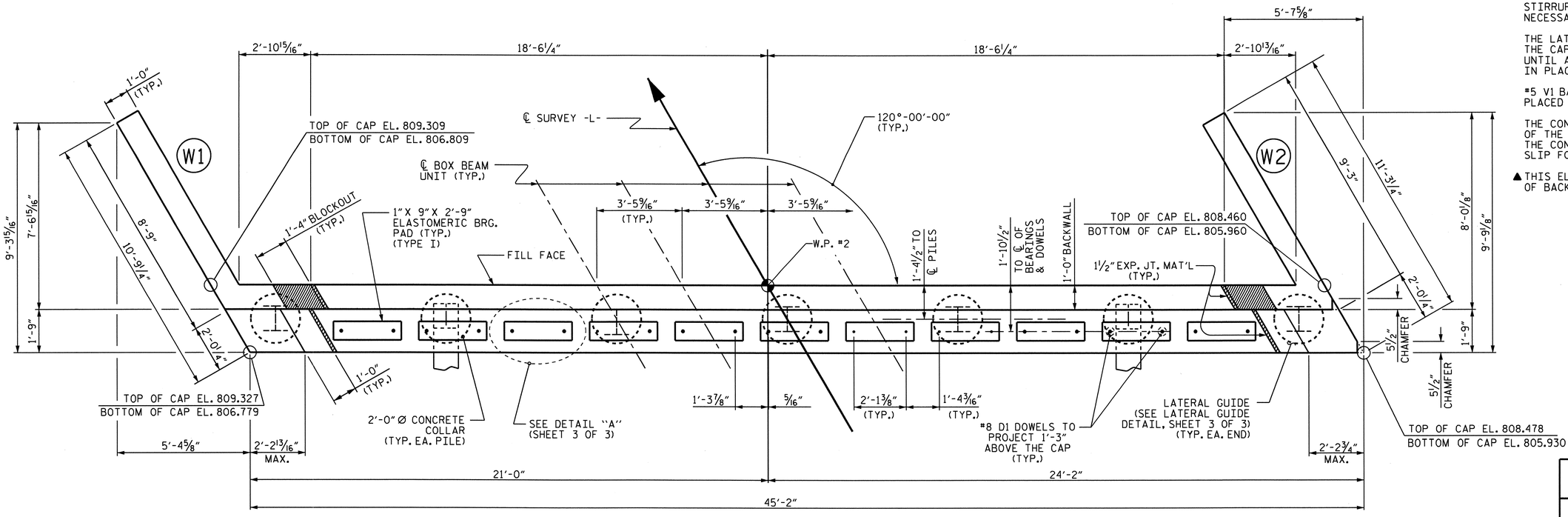
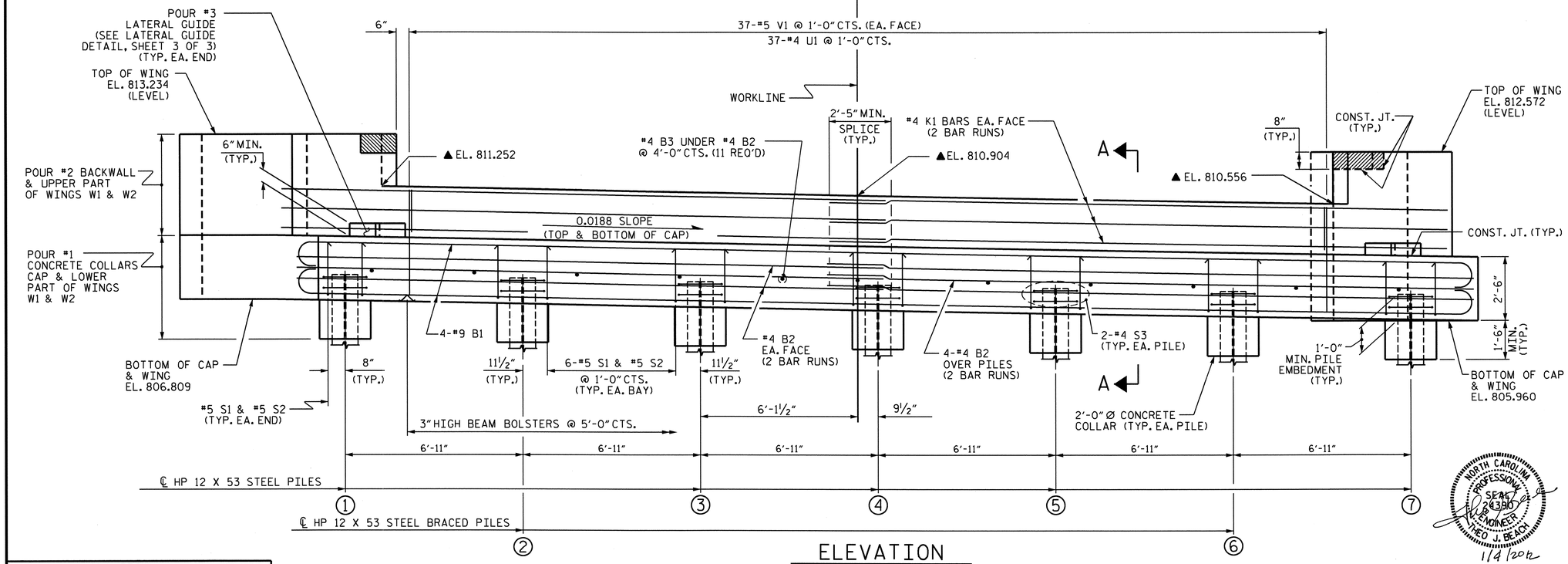
▲ THIS ELEVATION TAKEN AT FILL FACE OF BACKWALL.



PLAN



ELEVATION

FOR SECTION A-A SEE SHEET 3 OF 3

TOP OF PILE ELEVATIONS	
①	807.770
②	807.640
③	807.510
④	807.380
⑤	807.250
⑥	807.120
⑦	806.990

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

DRAWN BY : M. L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

04-JAN-2012 08:26
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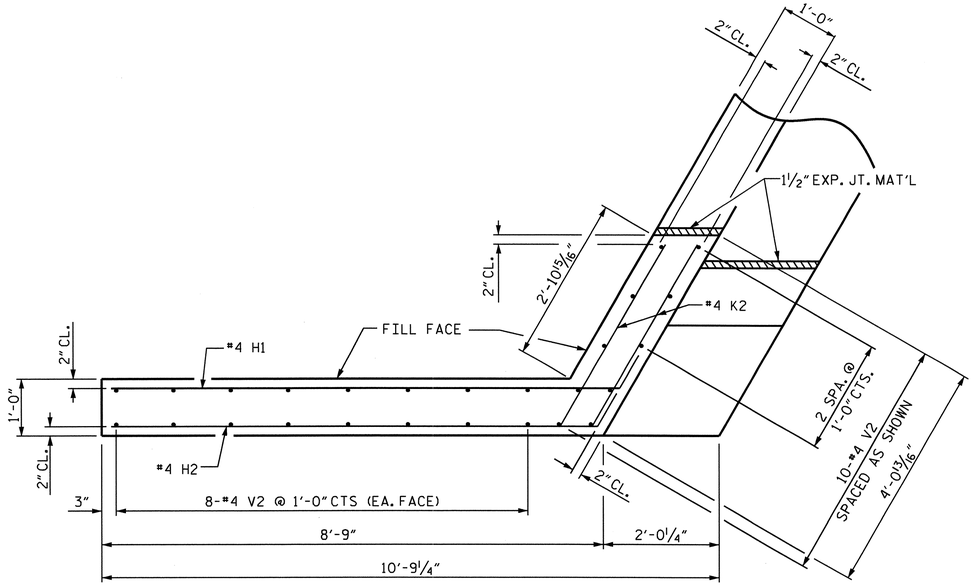
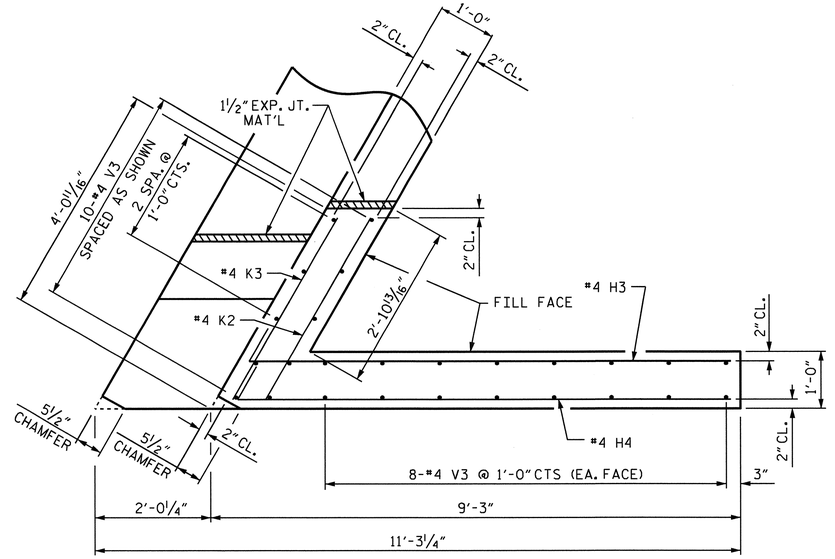
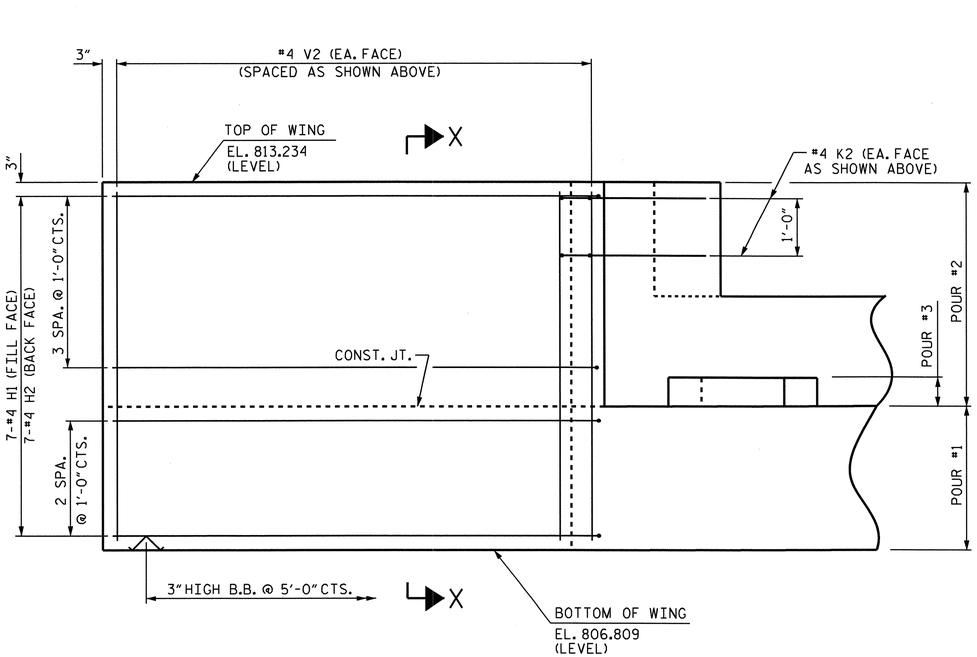
kalford



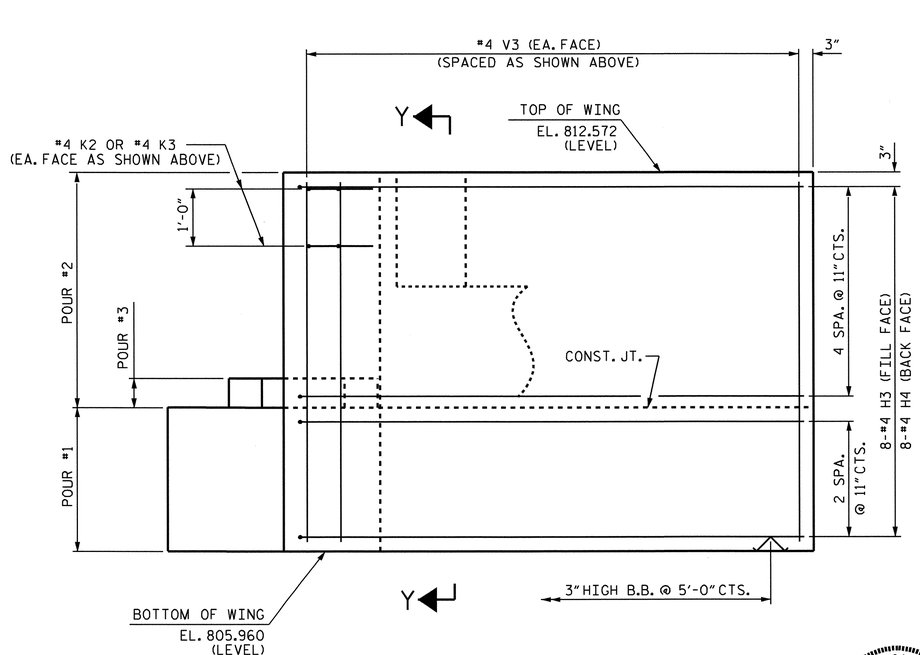
PLAN OF WING (W1)



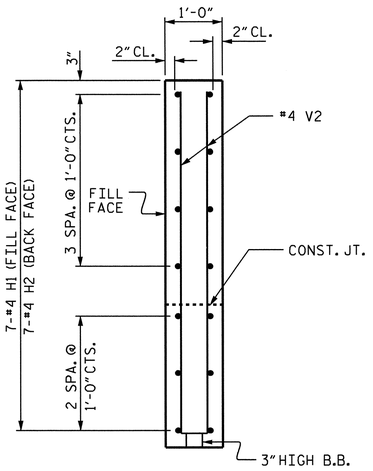
PLAN OF WING (W2)



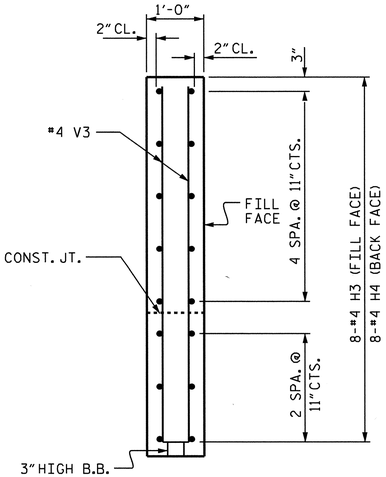
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
11/10/11

DRAWN BY : M.L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

09-NOV-2011 07:48
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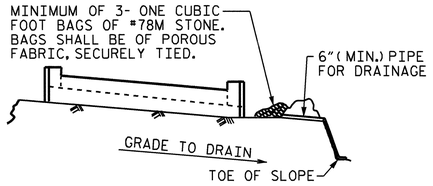
kalford



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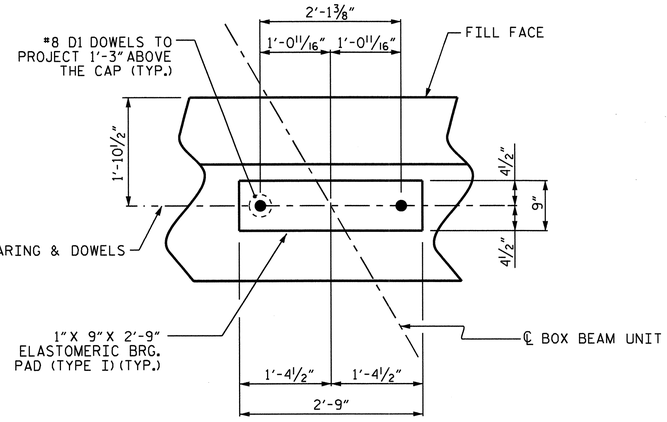
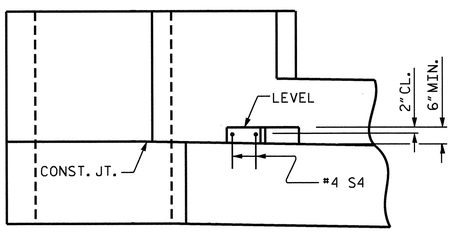
TEMPORARY DRAINAGE AT END BENT

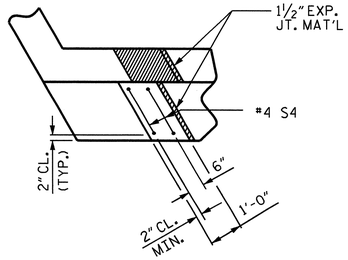


DETAIL "A"

(TYP. EA. BEARING)



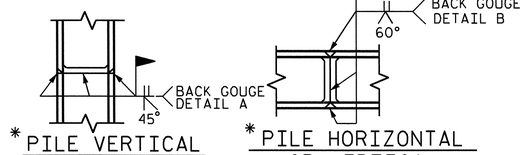
ELEVATION



PLAN

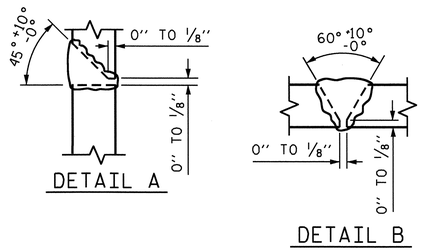
LATERAL GUIDE DETAIL

(LEFT LATERAL GUIDE SHOWN, RIGHT LATERAL GUIDE SIMILAR)



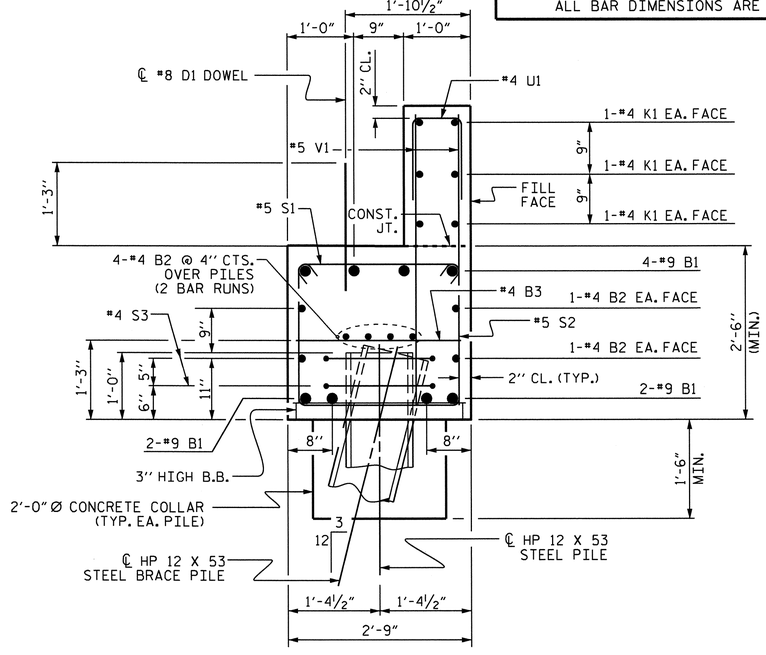
* PILE VERTICAL

* PILE HORIZONTAL OR VERTICAL



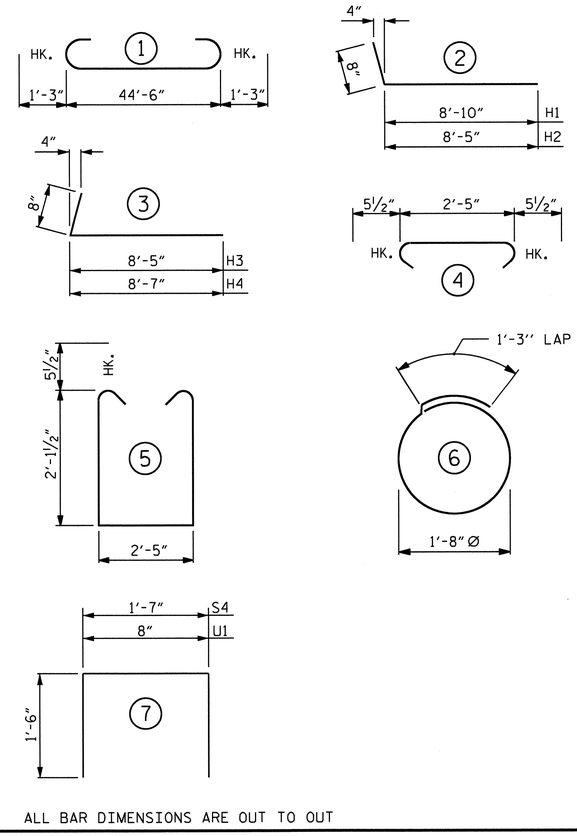
POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	47'-0"	1278
B2	16	#4	STR	23'-8"	253
B3	11	#4	STR	2'-5"	18
D1	22	#8	STR	2'-3"	132
H1	7	#4	2	9'-6"	44
H2	7	#4	2	9'-1"	42
H3	8	#4	3	9'-1"	49
H4	8	#4	3	9'-3"	49
K1	12	#4	STR	23'-8"	190
K2	6	#4	STR	3'-8"	10
K3	2	#4	STR	3'-6"	5
S1	38	#5	4	3'-4"	132
S2	38	#5	5	7'-7"	301
S3	14	#4	6	6'-6"	61
S4	4	#4	7	4'-7"	12
U1	37	#4	7	3'-8"	91
V1	74	#5	STR	4'-2"	322
V2	26	#4	STR	6'-0"	104
V3	28	#4	STR	6'-3"	109

REINFORCING STEEL 3207 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CONCRETE COLLARS, CAP & LOWER WINGS	14.2 C.Y.
POUR #2	UPPER WINGS & BACKWALL	6.4 C.Y.
POUR #3	LATERAL GUIDES	0.1 C.Y.
TOTAL CLASS A CONCRETE		20.7 C.Y.

HP 12 X 53 STEEL PILES

NO. = 7 LIN. FT. = 230

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH

1/4/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : M. L. BROWN DATE : 02/10
CHECKED BY : A. V. ROYAL DATE : 03/10

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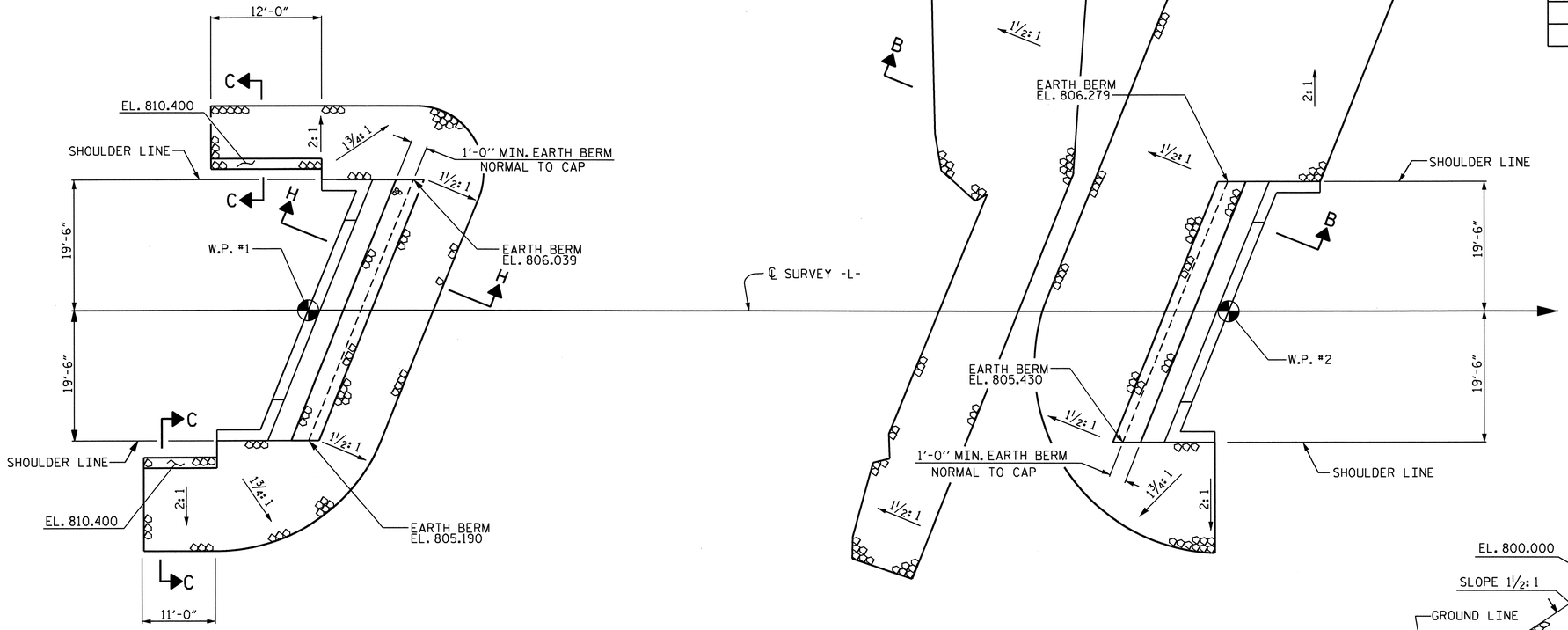
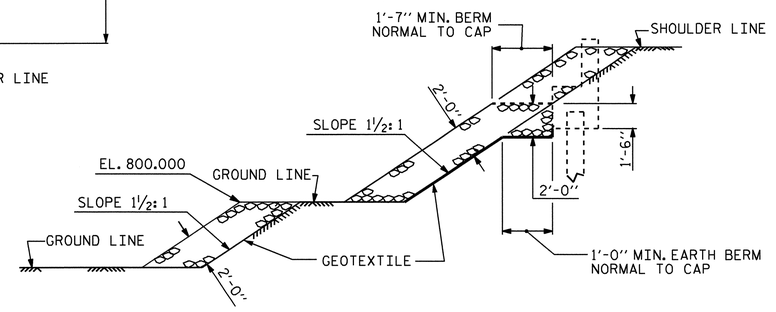
ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+40.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	130	145
END BENT 2	250	280

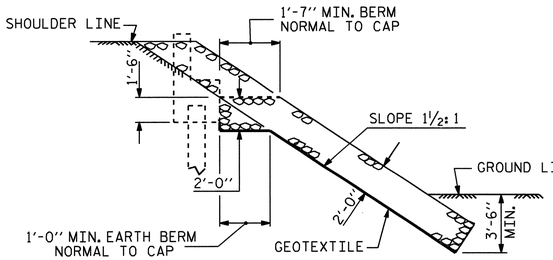




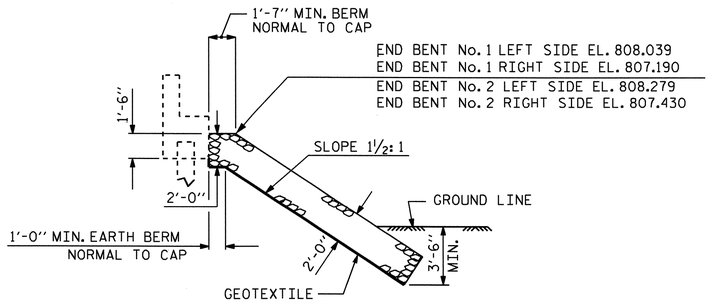
SECTION B-B

PLAN OF RIP RAP AT END BENT No. 1

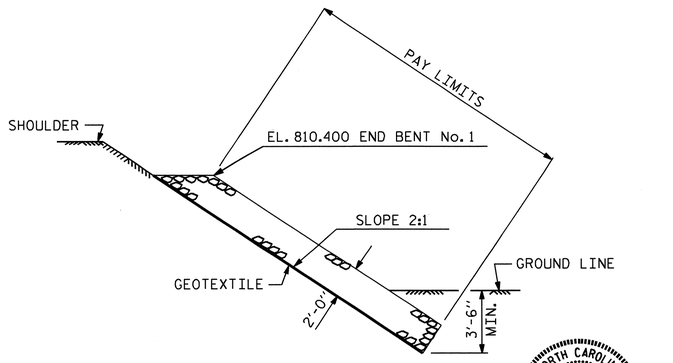
PLAN OF RIP RAP AT END BENT No. 2



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-4061
CATAWBA COUNTY
STATION: 13+40.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : S.B. WILLIAMS	DATE : 7-11	
CHECKED BY : A.V. ROYAL	DATE : 7-11	
DRAWN BY : REK 1/84	REV. 8/16/99	RWW/LES
CHECKED BY : RDU 1/84	REV. 10/17/00	RWW/LES
	REV. 5/1/06R	TLA/GM

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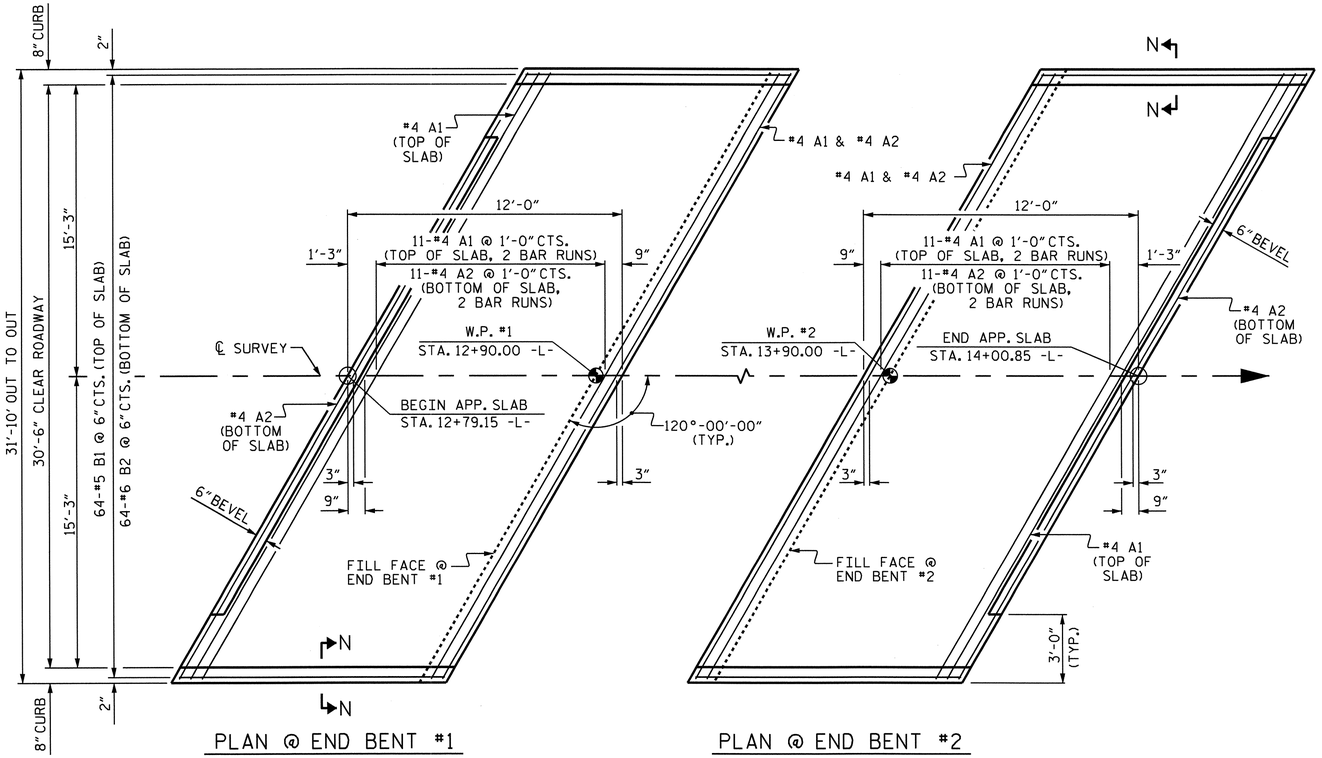
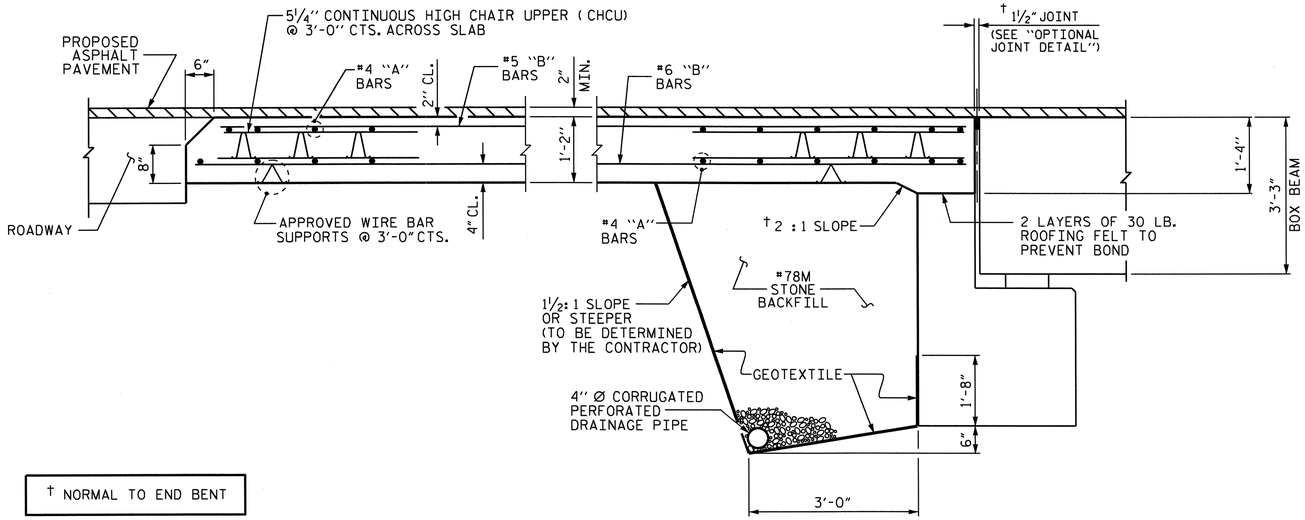
STD. NO. RR3



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL INCLUDING FABRIC, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

FABRIC SHALL BE TYPE 1 ENGINEERING FABRIC IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

THE CONTRACTOR HAS THE OPTION TO OMIT THE JOINT SEALER MATERIAL BETWEEN THE APPROACH SLAB AND THE BOX BEAM UNITS AND POUR THE APPROACH SLAB DIRECTLY AGAINST THE BOX BEAM UNITS. SEE "OPTIONAL JOINT DETAIL".

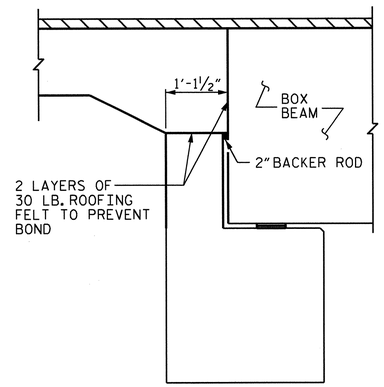
BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	19'-3"	334
A2	26	#4	STR	19'-2"	333
✱ B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL				LBS.	1446
✱ EPOXY COATED REINFORCING STEEL				LBS.	1074
CLASS AA CONCRETE					C. Y. 16.8

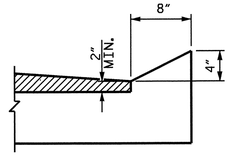
APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	19'-3"	334
A2	26	#4	STR	19'-2"	333
✱ B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL				LBS.	1446
EPOXY COATED REINFORCING STEEL				LBS.	1074
CLASS AA CONCRETE					C. Y. 16.8



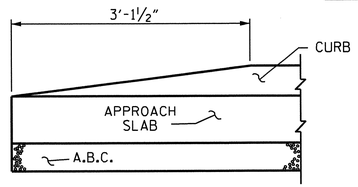
OPTIONAL JOINT DETAIL

(AT FIXED JOINT ONLY)



SECTION N-N

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			22

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
1/4/2012

(SHT 3c) STD. NO. BAS13

ASSEMBLED BY : S. B. WILLIAMS	DATE : 10-11		
CHECKED BY : T. L. CLELLAND	DATE : 10-11		
DRAWN BY : KMM 3-08		REV. 9/27/11	MAA/GM
CHECKED BY : GM 3-08		REV. 10/1/11	MAA/GM

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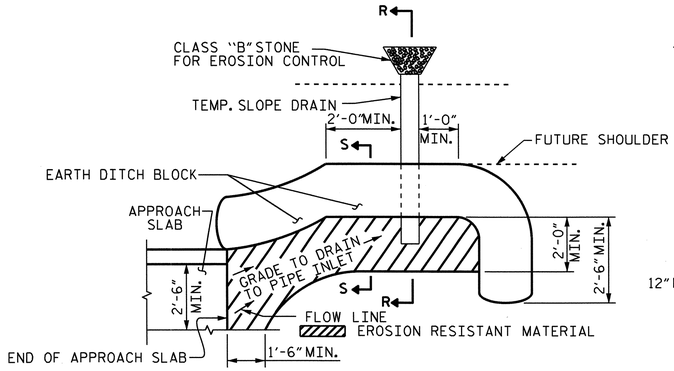
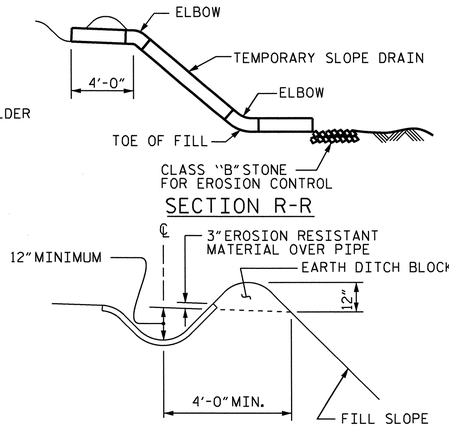


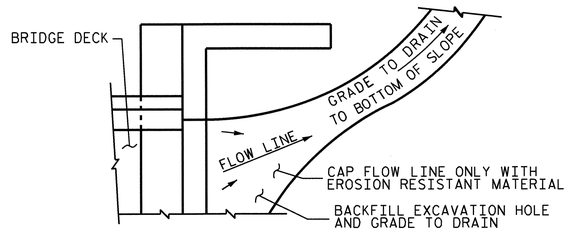
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



SECTION R-R

SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. B-4061

CATAWBA COUNTY

STATION: 13+40.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH

ASSEMBLED BY : S.B. WILLIAMS	DATE : 5-17-10				
CHECKED BY : A.V. ROYAL	DATE : 5-19-10				
DRAWN BY : FCJ 11/88	REV. 10/17/00	RWW/LES			
CHECKED BY : ARB 11/88	REV. 5/7/03	RWW/JTE			
	REV. 5/1/06RR	MAA/KMM			

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			22

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STD. NO. BAS10

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF	
STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED - EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM W RGW REV. 5-7-03 RWW W JTE
REV. 8-16-99 RWW W LES REV. 5-1-06 TLA W GW

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