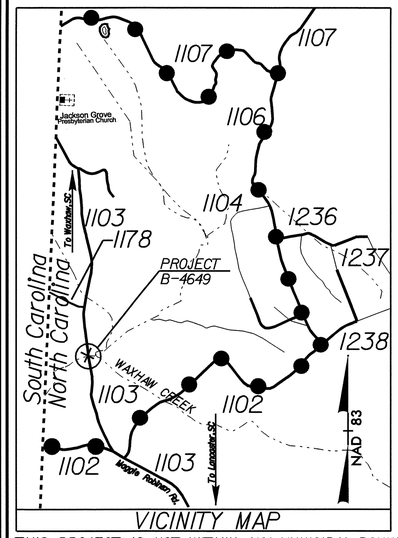
09/08/99

TIP PROJECT: B-4649

CONTRACT: C201930

STRUCTURE



VICINITY MAP

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

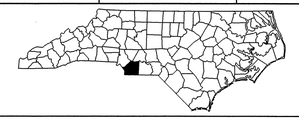
UNION COUNTY

LOCATION: BRIDGE NO. 377 ON SR 1103 OVER WAXHAW CREEK

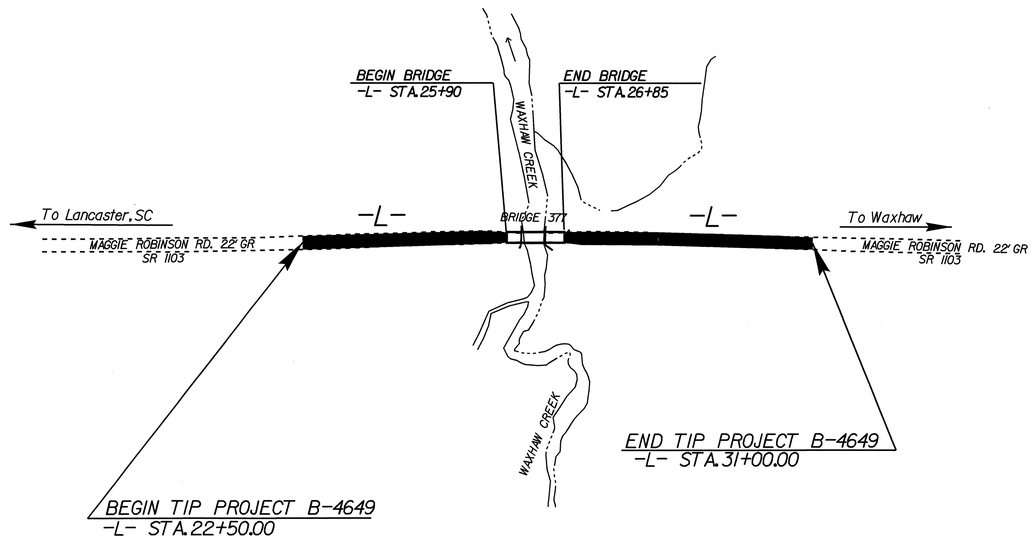
TYPE OF WORK: GRADING, PAVING, GUARDRAIL AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4649		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33815.1.1	BRZ-1103(16)	P.E.
33815.2.1	BRZ-1103(16)	R/W, UTIL.
33815.3.1	BRZ-1103(16)	CONST.



NAD 83



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2005	=	100
ADT 2030	=	200
DHV	=	60 %
D	=	10 %
T	=	3 %*
V	=	60 MPH**
FUNC CLASS	=	RURAL LOCAL
* TTST 1%		DUAL 2%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4649	=	0.143 MILES
LENGTH OF STRUCTURE TIP PROJECT B-4649	=	0.018 MILES
TOTAL LENGTH OF TIP PROJECT B-4649	=	0.161 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

Q.H. NGUYEN, PE
PROJECT ENGINEER

LETTING DATE:
SEPTEMBER 16, 2008

J.R. DUGGINS, JR., PE
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DRIVE
RALEIGH, NC 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

APPROVED *P.E.*
DIVISION ADMINISTRATOR

21-JUL-2008 12:19
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
mpoole

F.A. PROJECT : BRZ-1103(16)

25+50 26+00 26+50 27+00

510 500 490 480 470

SPAN A

GRADE DATA
-3.2866 % -0.5033 %
P.I. = 24+14.00
EL. = 494.46'
VC = 228'

4'-6" TO LIMITS OF UNCLASSIFIED STRUCTURE EXCAVATION
FIX
FILL FACE @ END BENT No. 1
STA. 25+90.00 -L-
GRADE POINT EL. 493.574
BEGIN FRONT SLOPE
STA. 25+84.50
GRADE POINT EL. 493.602
EL. 492.0 ±
NATURAL GROUND
EL. 491.± (2)
CLASS II RIP RAP (TYP.)
EL. 491± (2)
EL. 483± (2)
1½: 1 SLOPE
EL. 483.900
STEEL SHEET PILES
EXISTING ABUTMENT (SEE NOTES)
EL. 480± (2)
EL. 478± (2)
HP 12 X 53 STEEL PILES
UNCLASSIFIED STRUCTURE EXCAVATION

HISTORICAL H.W. ELEV. = 494.2 HURRICANE HUGO
NORMAL W.S. ELEV. = 482.5 ±
EL. 491.0±
4'-3" TO LIMITS OF UNCLASSIFIED STRUCTURE EXCAVATION
1'-0" MIN. EARTH BERM NORMAL TO CAP (TYP.)
FIX
EL. 490.9±
EL. 482±
2'-0" (TYP.)
1½: 1 SLOPE
EXISTING ABUTMENT (SEE NOTES)
EL. 483.600
HP 12 X 53 STEEL PILES
FILL FACE @ END BENT No. 2
STA. 26+85.00 -L-
GRADE POINT EL. 493.096
BEGIN FRONT SLOPE
STA. 26+90.50
GRADE POINT EL. 493.068
1'-6" MIN. (TYP.)
EL. 489.9±
NATURAL GROUND

END BENT No. 1 END BENT No. 2

SECTION ALONG -L-

1'-0" MIN. EARTH BERM NORMAL TO CAP EL. 486.875 (TYP.)
1'-0" MIN. EARTH BERM NORMAL TO CAP EL. 486.456 (TYP.)
EXISTING STRUCTURE
℄ BRIDGE STA. 26+37.50 -L-
WAXHAW CREEK
STA. 25+90.00 -L- W.P. #1
CLASS II RIP RAP
BEGIN FRONT SLOPE STA. 25+84.50 -L-
PT STATION 25+57.19 -L-
TO LANCASTER (SC)
STA. 25+76.00 -L- BEGIN APPROACH SLAB
FILL FACE @ END BENT No.1
-L-
90°-00'-00" (TYP.)
FILL FACE @ END BENT No. 2
W.P. #2 STA. 26+85.00 -L-
BEGIN FRONT SLOPE STA. 26+90.50 -L-
STA. 26+99.00 -L- END APPROACH SLAB
CLASS II RIP RAP
TO WAXHAW
47'-6" 47'-6"
95'-0" (FILL FACE @ END BENT No. 1 TO FILL FACE @ END BENT No. 2)

PLAN

PILES AND SHEET PILES NOT SHOWN FOR CLARITY

NORTH CAROLINA PROFESSIONAL SEAL 13014 ENGINEER QUANG H. NGUYEN
Quang H. Nguyen 7/22/08

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1103
OVER WAXHAW CREEK BETWEEN
SR 1102 AND SR 1105

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

DRAWN BY : M. POOLE DATE : 06-08
CHECKED BY : J.R. DUGGINS DATE : 06-08

21-JUL-2008 12:18
R:\Structures\B4649\mpoole\Microstation\B4649_sd_GD_01.dgn
mpoole

NOTES

DRIVE PILES AT END BENT No. 1 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT No. 1 IS 60 TONS PER PILE.

DRIVE PILES AT END BENT No. 2 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

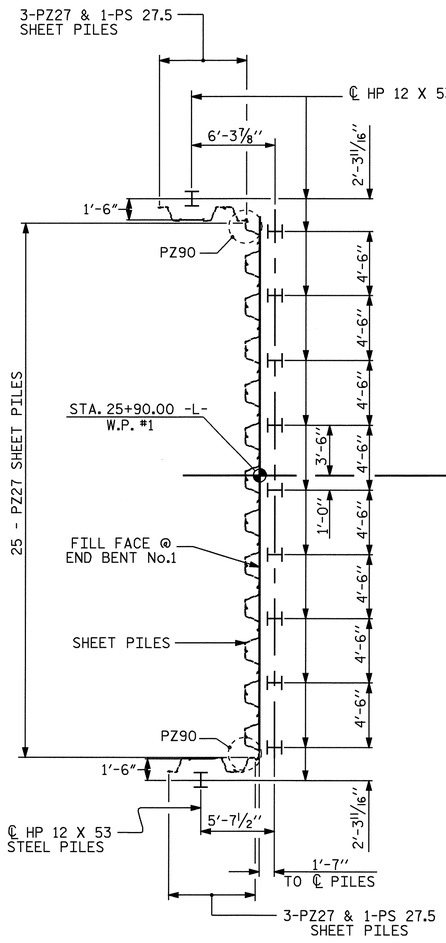
THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT No. 2 IS 60 TONS PER PILE.

THE CONTRACTOR SHALL INSTALL THE HP 12 X 53 STEEL PILES PRIOR TO DRIVING THE SHEET PILES.

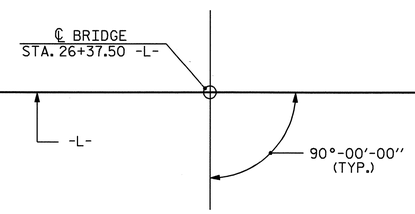
FOR 18" STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

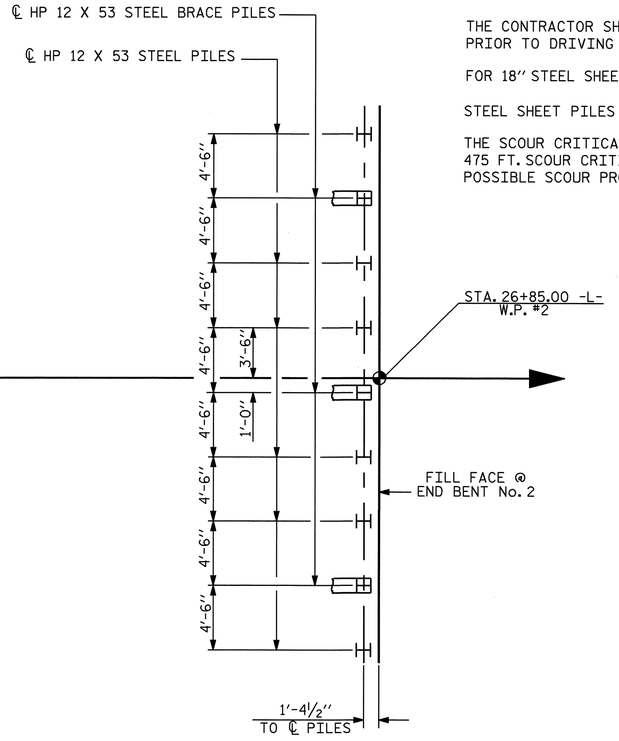
STEEL SHEET PILES AT END BENT No. 1 SHALL BE DRIVEN TO REFUSAL.

THE SCOUR CRITICAL ELEVATION FOR END BENT No. 1 IS ELEVATION 475 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.



END BENT No. 1





END BENT No. 2

FOUNDATION LAYOUT

ALL PILES IN THE END BENTS ARE HP 12 X 53 STEEL PILES

END BENT No. 2 BRACE PILES ARE BATTERED AT 3 : 12

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP.

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1103 OVER WAXHAW CREEK BETWEEN SR 1102 AND SR 1105

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

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

DRAWN BY : M. POOLE DATE : 06-08
CHECKED BY : J. R. DUGGINS DATE : 06-08

22-JUL-2008 09:50
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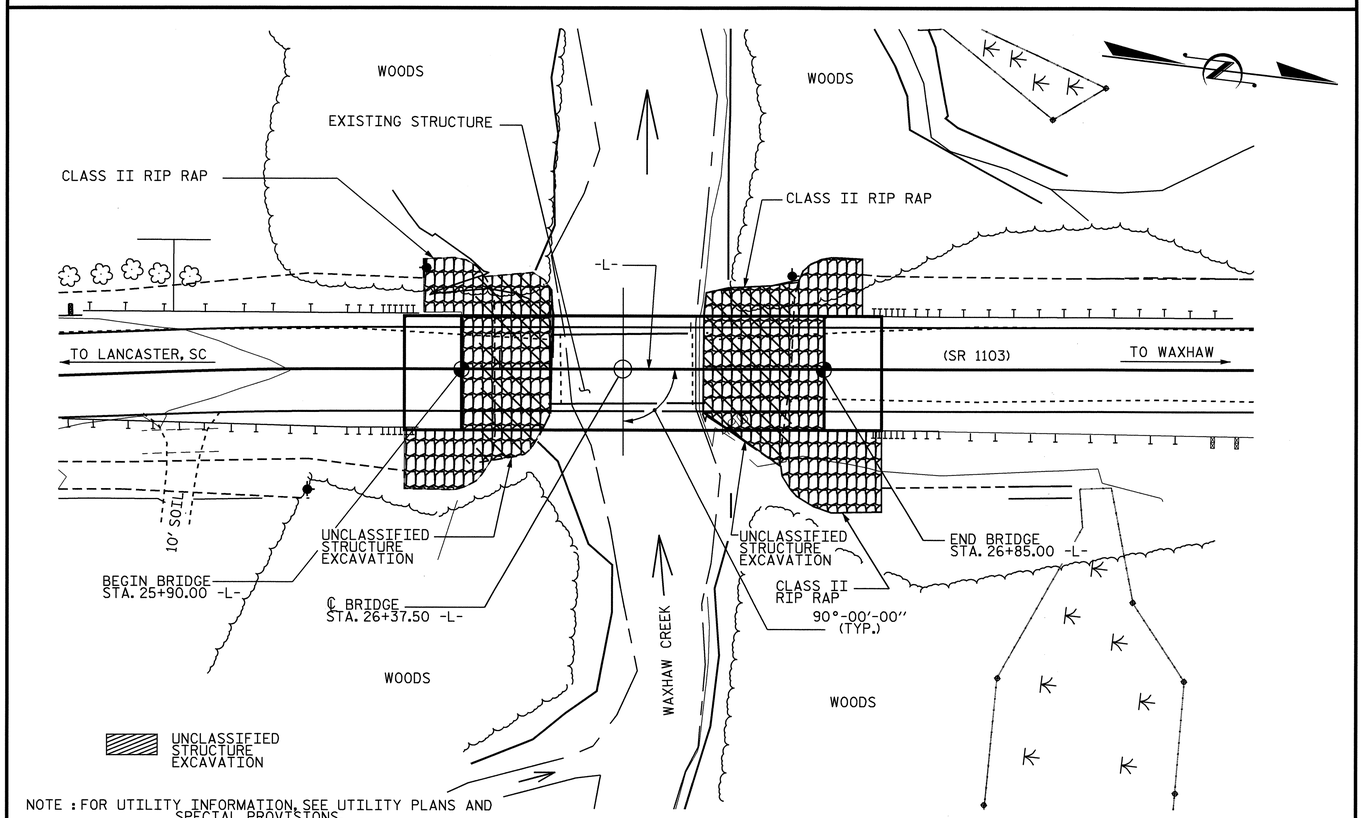
dahodge

B.M. #2 : R.R. SPIKE IN TELEPHONE POLE, 29 FT. LT. OF STA. 19+43.00 -L- EL. 491.60, NAVD 88



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

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE BOX BEAMS HAVE BEEN DESIGNED FOR HS-25.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN AT 41'-0" WITH AN ASPHALT WEARING SURFACE OVER A TIMBER DECK ON A STEEL GIRDER / STEEL STRINGER SYSTEM SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 15'-10" ON SUBSTRUCTURE CONSISTING OF A TIMBER CAP AND ON TIMBER PILES END BENTS AND A TIMBER CRUTCH BENT AND LOCATED AT THE PROPOSED STRUCTURE LOCATION SHALL BE REMOVED, SEE SPECIAL PROVISIONS FOR REMOVAL OF EXISTING STRUCTURE.

THE EXISTING TIMBER ABUTMENTS SHALL BE REMOVED TO THE NORMAL WATER SURFACE ELEVATION.

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 25 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.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY A.

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.

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 26+37.50-L-."

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE_____2700 CFS.

FREQUENCY OF DESIGN FLOOD_____5 YEARS

DESIGN HIGH WATER ELEVATION_____492.1

DRAINAGE AREA_____35.0 SQ. MI.

BASIC DISCHARGE(Q100)_____6900 CFS.

BASIC HIGH WATER ELEVATION_____495.4

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE_____2800 CFS.

FREQUENCY OF OVERTOPPING FLOOD_____5 YRS. ±

OVERTOPPING FLOOD ELEVATION_____491.7

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		18" STEEL SHEET PILES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS	
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	SQ. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN.FT.
SUPERSTRUCTURE	LUMP SUM			LUMP SUM					185.50			LUMP SUM	11	1020.25
END BENT No. 1		LUMP SUM	23.1		3401	11	275	980		225	250			
END BENT No. 2		LUMP SUM	17.4		2769	9	225			215	240			
TOTAL	LUMP SUM	LUMP SUM	40.5	LUMP SUM	6170	20	500	980	185.50	440	490	LUMP SUM	11	1020.25

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1103
OVER WAXHAW CREEK BETWEEN
SR 1102 AND SR 1105

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/21/08

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

DRAWN BY : M. POOLE DATE : 06-08
CHECKED BY : J.R. DUGGINS DATE : 06-08

21-JUL-2008 12:23
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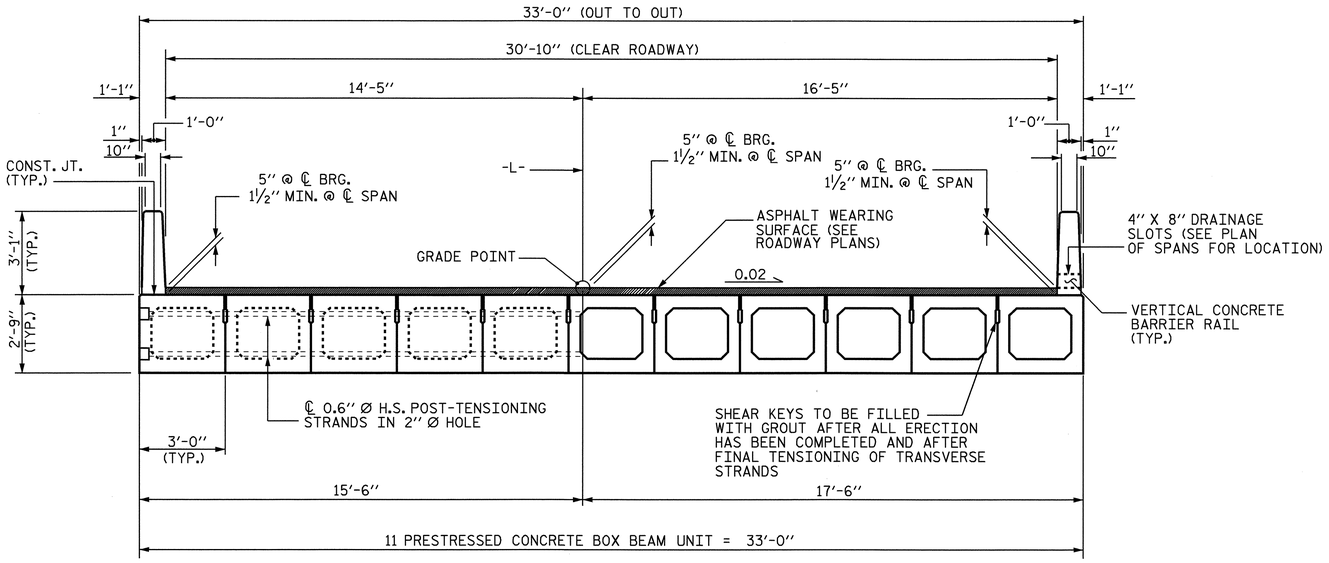
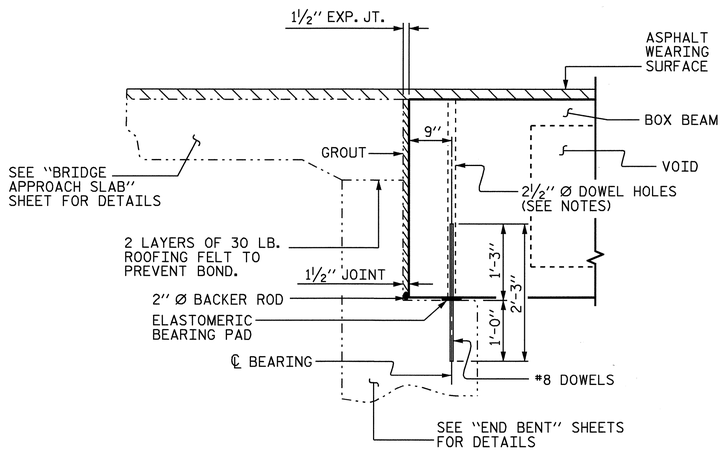
mpoole



HALF-SECTION @ INTERMEDIATE DIAPHRAGM

HALF-SECTION @ VOIDS

TYPICAL SECTION



SECTION AT END BENT

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 NON-SHRINK GROUT.

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 5600 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS 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 BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT 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.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ASSEMBLED BY : M. POOLE	DATE : 08/07		
CHECKED BY : J. R. DUGGINS	DATE : 06-08		
DRAWN BY : TLA 5/05	ADDED 7/11/05R REV. 5/1/06 TLA/GM		
CHECKED BY : GM 6/05			

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PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 1 OF 5

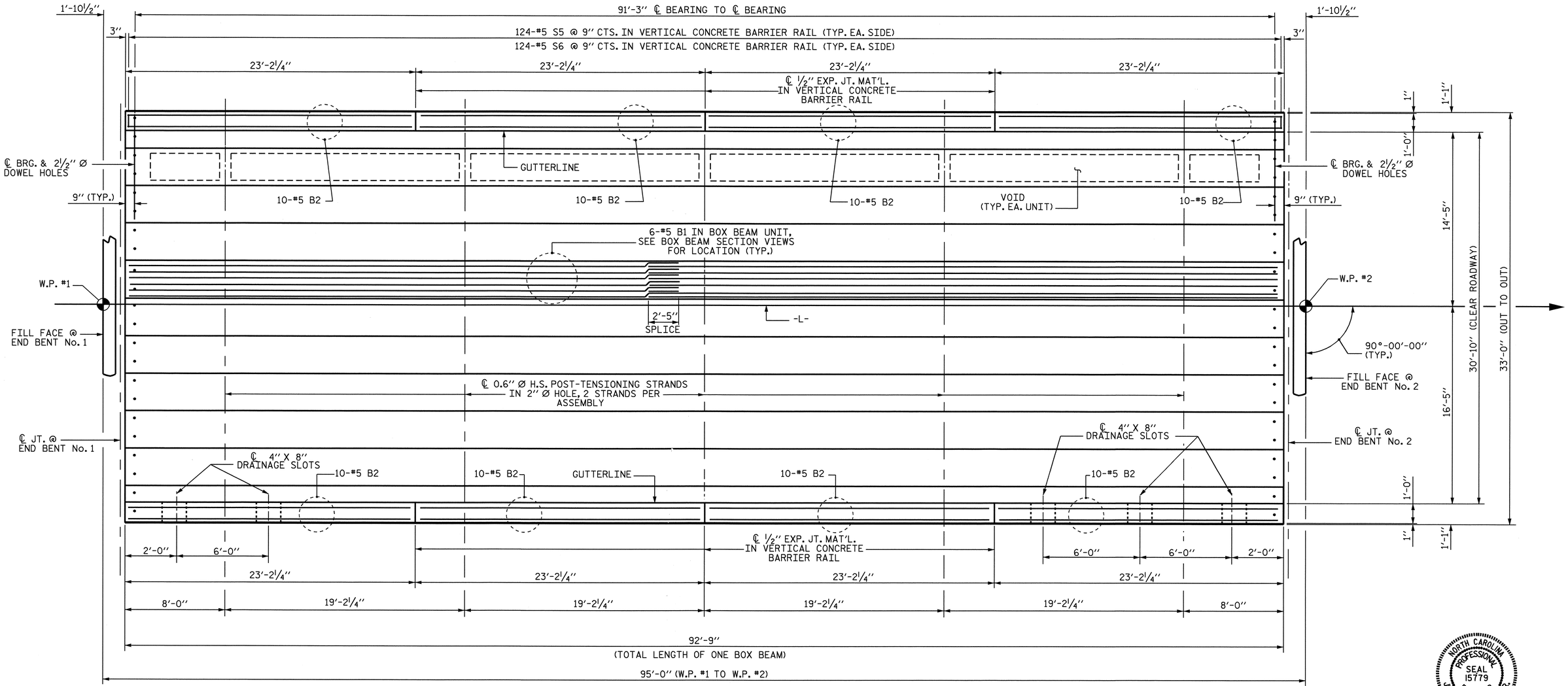
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0'' X 2'-9'' PRESTRESSED CONCRETE BOX BEAM UNIT

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.

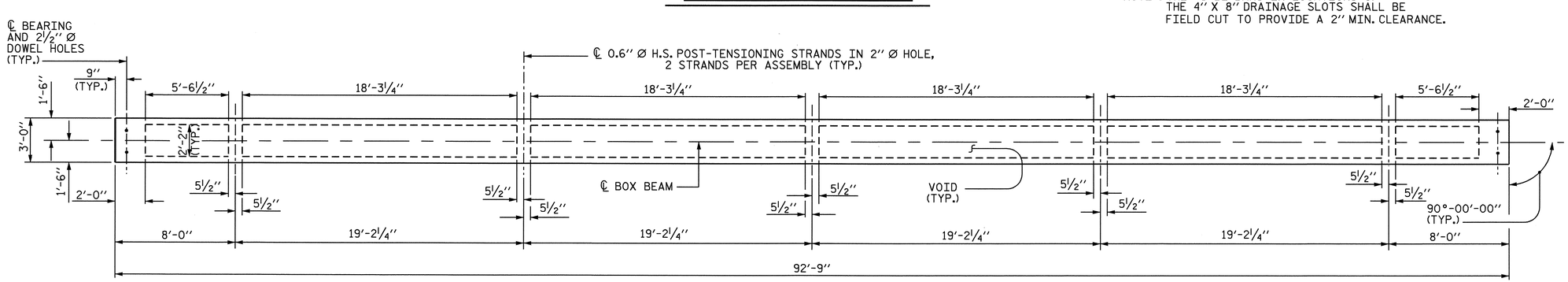
7/23/08

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



PLAN OF SPAN A

NOTE : THE #5 B2 BARS IN LOCATIONS OF THE 4" X 8" DRAINAGE SLOTS SHALL BE FIELD CUT TO PROVIDE A 2" MIN. CLEARANCE.



PLAN OF BOX BEAM UNIT

FOR REINFORCING STEEL, SEE PLAN OF BOX BEAM, SHEET 3 OF 5.

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/3/08

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-
SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : M. POOLE DATE : 08/07
CHECKED BY : J. R. DUGGINS DATE : 06-08

26-JUN-2008 11:58
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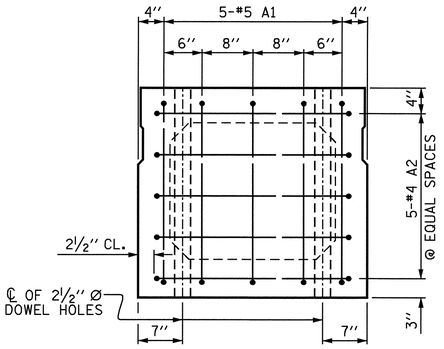
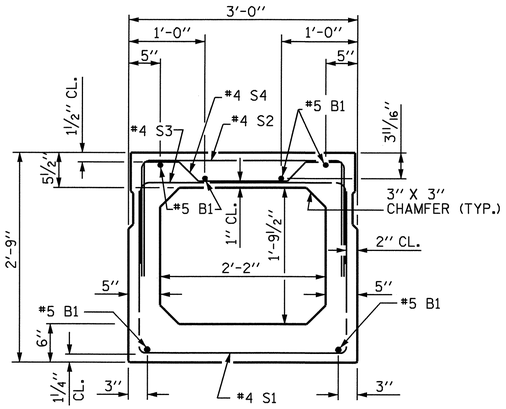


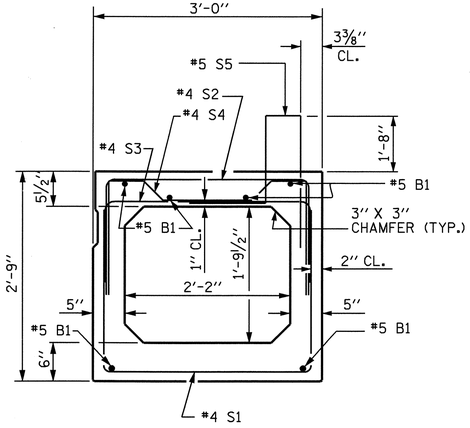
END ELEVATION

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

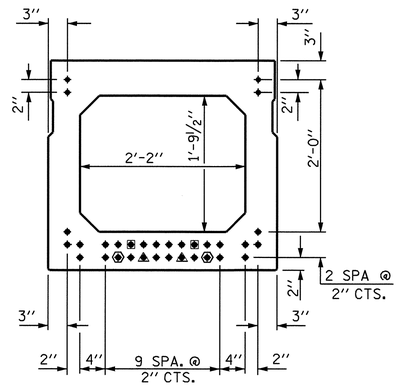
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

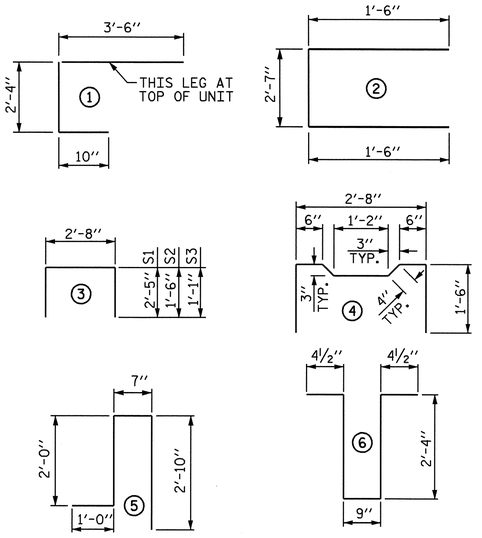
(32 STRANDS REQUIRED)

(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
- ▲ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ⬢ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER

BAR TYPES



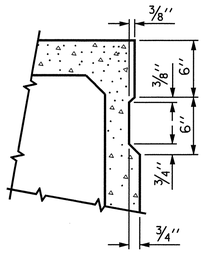
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	40	#4	2	5'-7"	149	5'-7"	149
B1	12	#5	STR	47'-5"	593	47'-5"	593
K1	15	#4	6	6'-2"	62	6'-2"	62
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	75	#4	3	7'-6"	376	7'-6"	376
S2	75	#4	3	5'-8"	284	5'-8"	284
S3	131	#4	3	4'-10"	423	4'-10"	423
S4	56	#4	4	5'-10"	218	5'-10"	218
✳ S5	124	#5	5	6'-5"	1032	--	--
REINFORCING STEEL					2192 LBS.		2192 LBS.
✳EPOXY COATED REINF. STEEL					830 LBS.		
7000 P.S.I. CONCRETE					15.4 CU. YDS.		15.4 CU. YDS.
0.6" Ø L.R. STRANDS					No. 32		No. 32

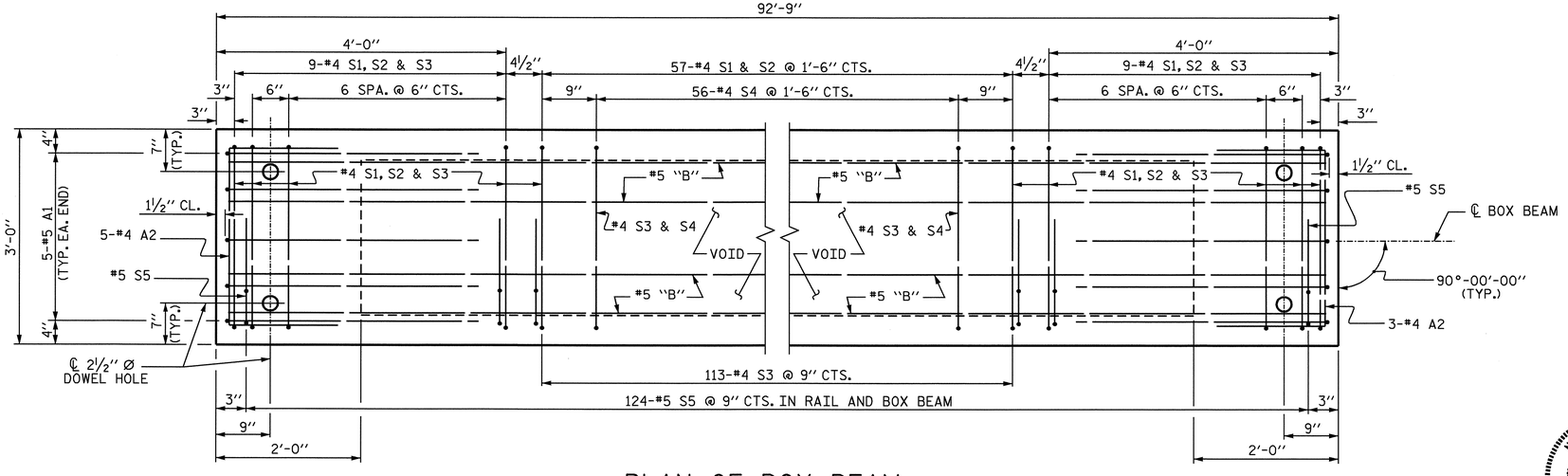
GRADE 270 STRANDS

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



SHEAR KEY DETAIL

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



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.

ASSEMBLED BY : M. POOLE	DATE : 08/07
CHECKED BY : J. R. DUGGINS	DATE : 06-08
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			19

21-JUL-2008 12:18
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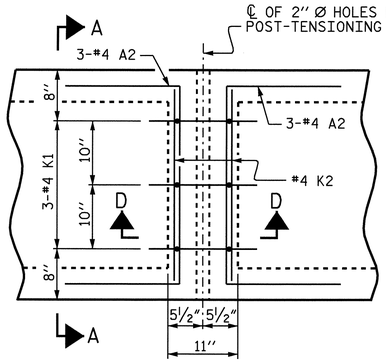
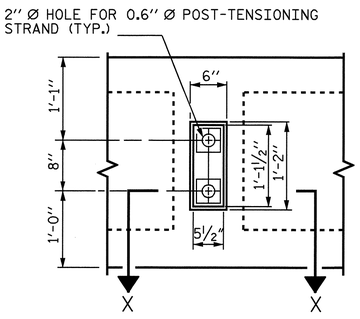
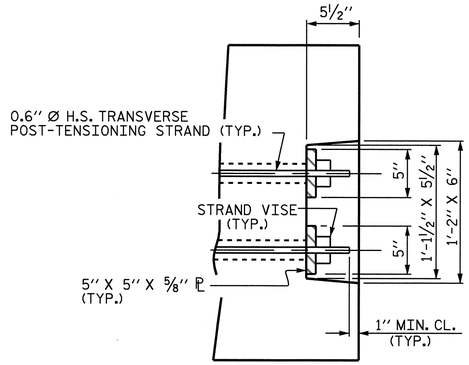


PLAN

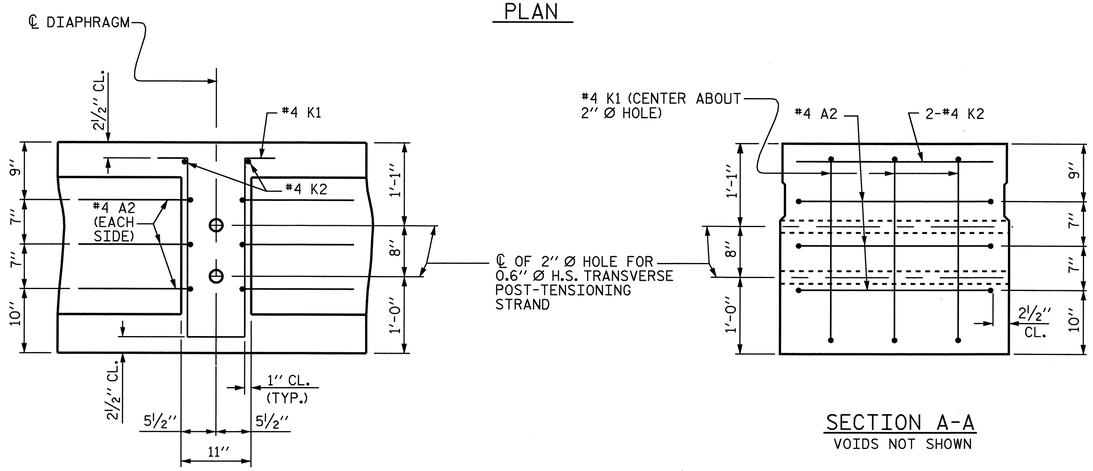


VIEW Y-Y

SHOWING ELEVATION VIEW OF GROUTED RECESS



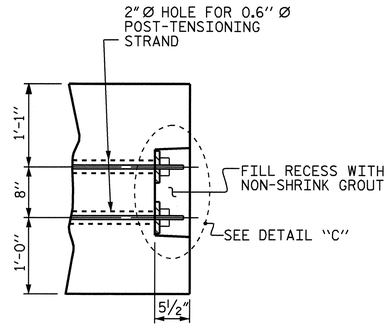
DETAIL "C"



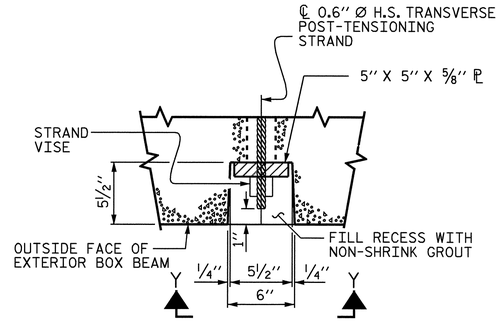
SECTION D-D

SECTION A-A

VOIDS NOT SHOWN



PART SECTION AT RECESS



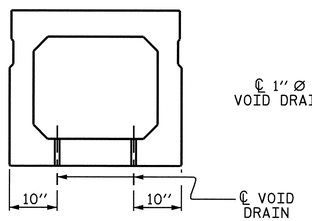
SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

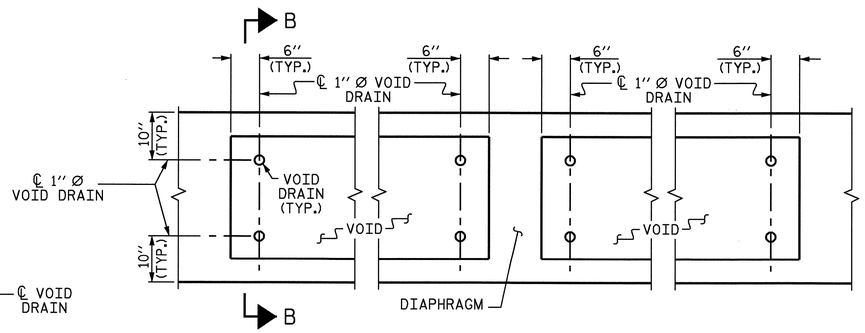
GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2" Ø HOLE.



SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-9"
	0.6"Ø L.R. STRAND
	SPAN A
CAMBER (BEAM ALONE IN PLACE)	↑ 4 11/16"
DEFLECTION DUE TO SUPERIMP. DEAD LOAD **	↓ 1¼"
FINAL CAMBER	↑ 3 7/16"

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			19

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.

7/31/08

ASSEMBLED BY : M. POOLE	DATE : 08/07		
CHECKED BY : J. R DUGGINS	DATE : 06-08		
DRAWN BY : TLA 5/05	ADDED 7/11/05		
CHECKED BY : GM 6/05	REV. 5/1/06	TLA/GM	

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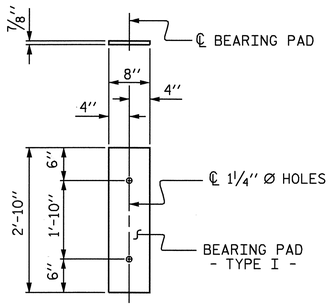
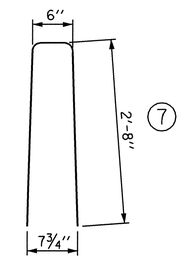
mpoole

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	92′-9″	185.50
INTERIOR B.B.	9	92′-9″	834.75
TOTAL	11	92′-9″	1020.25



FIXED END
(TYPE I - 22 REQ'D)

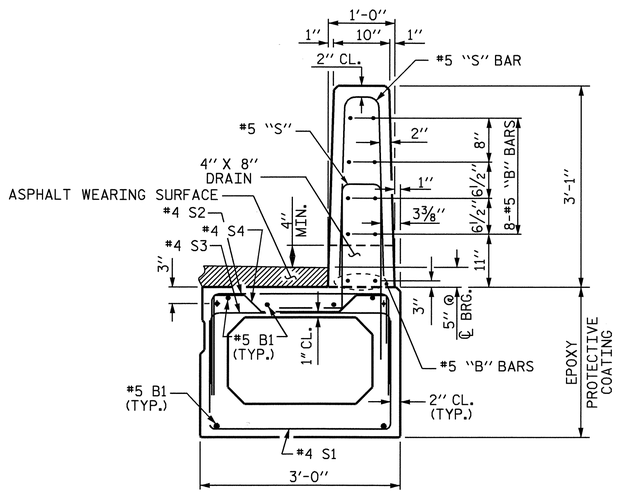
ELASTOMERIC BEARING DETAILS



BAR TYPE
BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B2	80	#5	STR	22′-10″	1905
		#5			
✳S6	248	#5	7	5′-10″	1509
✳EPOXY COATED REINFORCING STEEL LBS.					3414
CLASS AA CONCRETE CU. YDS.					19.4
TOTAL LIN. FT. OF VERTICAL CONCRETE BARRIER RAIL					185.50

ELEVATION AT EXPANSION JOINTS



SECTION VIEW

VERTICAL CONCRETE BARRIER RAIL DETAILS

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3′-0″ X 2′-9″
PRESTRESSED CONCRETE
BOX BEAM UNIT DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			19

ASSEMBLED BY : M. POOLE	DATE : 08/07		
CHECKED BY : J. R. DUGGINS	DATE : 06-08		
DRAWN BY : TLA 5/05	ADDED 7/11/05R		
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM		

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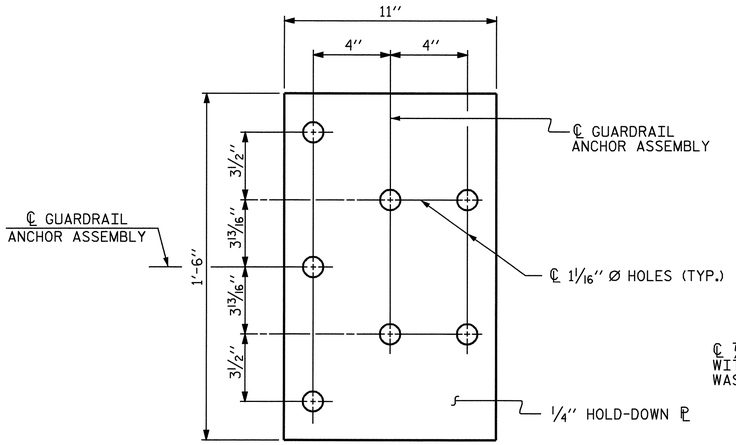
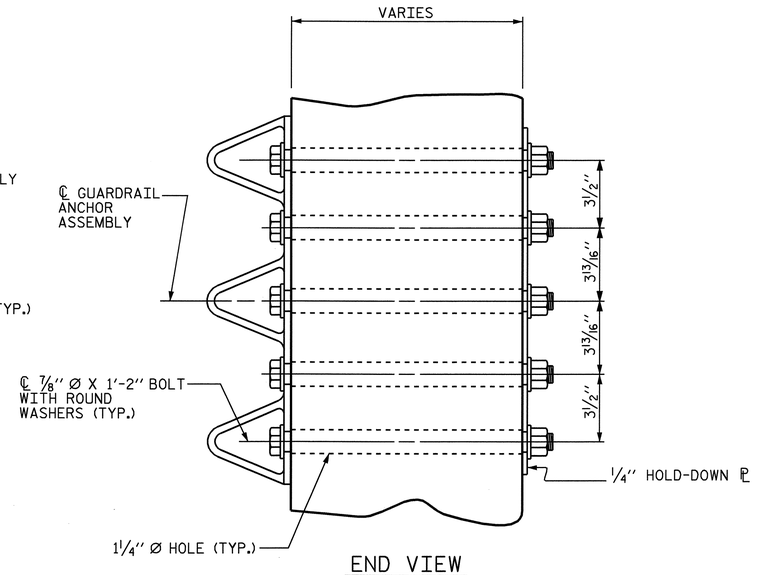


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' 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.

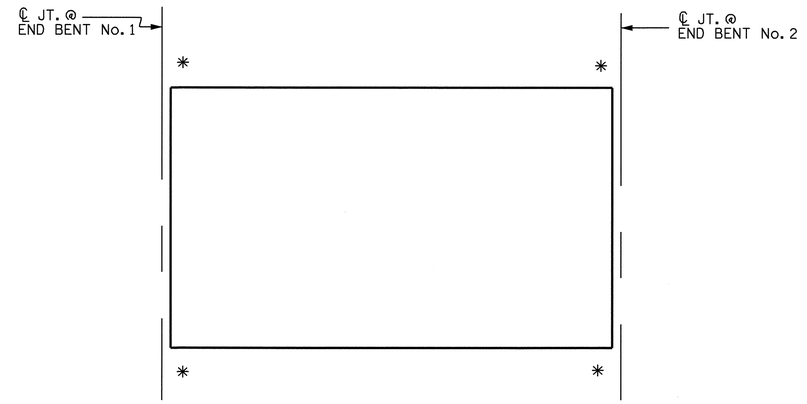
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞'' Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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.

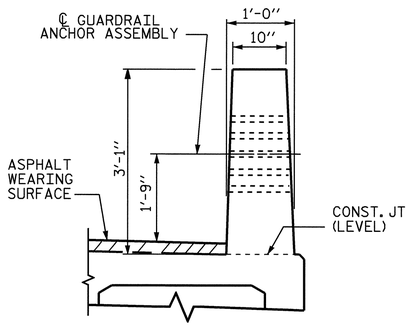
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1¼'' 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.

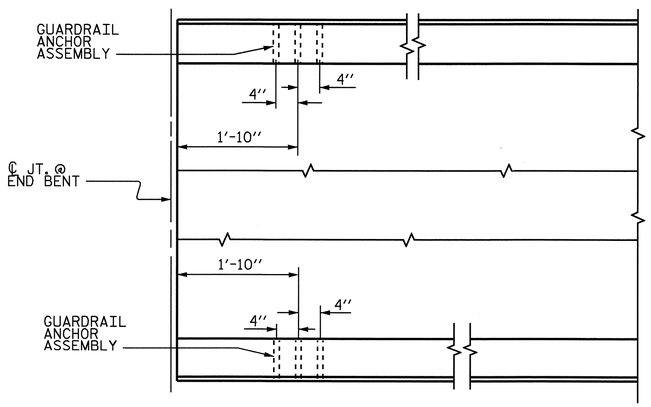


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

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

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-4696

UNION COUNTY

STATION: 26+37.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAILS

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.

7/22/08

ASSEMBLED BY : M. POOLE	DATE : 06-08		
CHECKED BY : J. R. DUGGINS	DATE : 06-08		
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	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			19

STD. NO. BMR8

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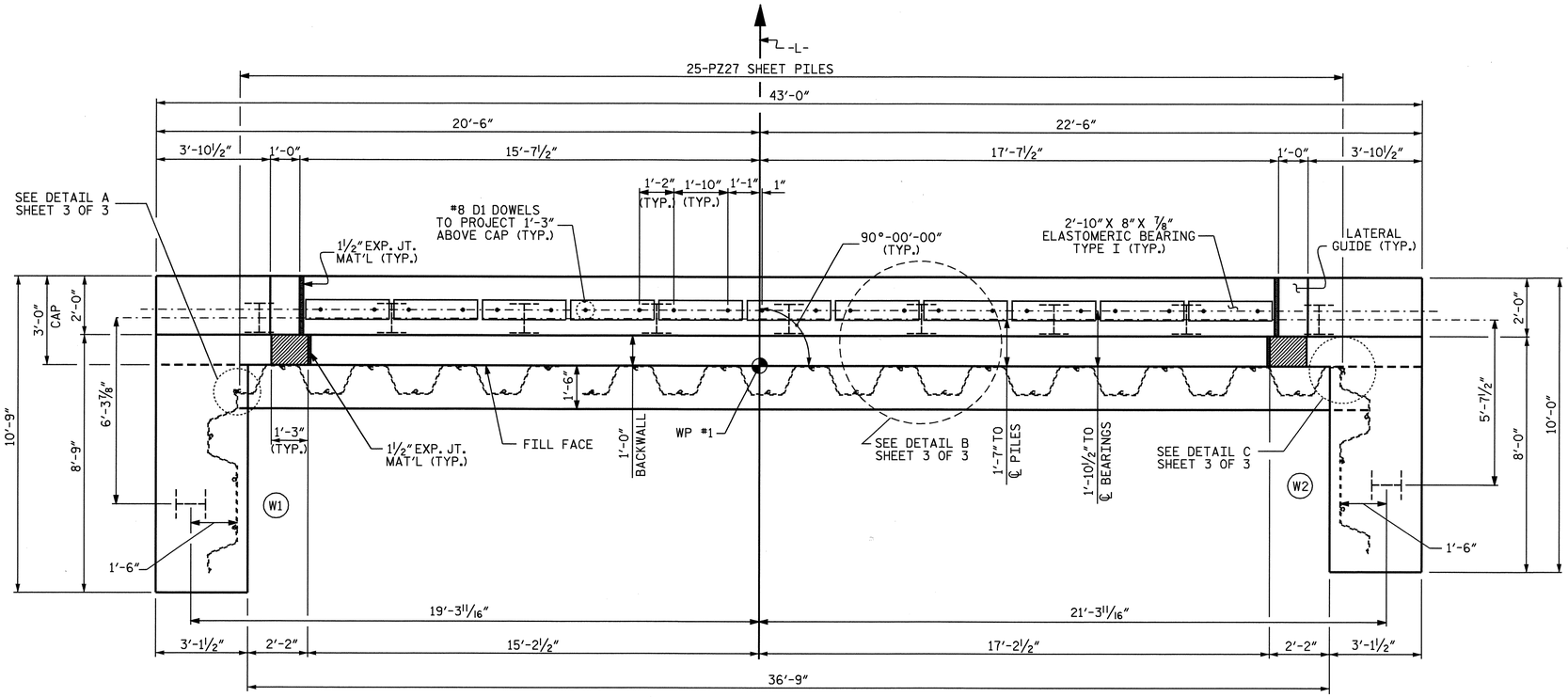
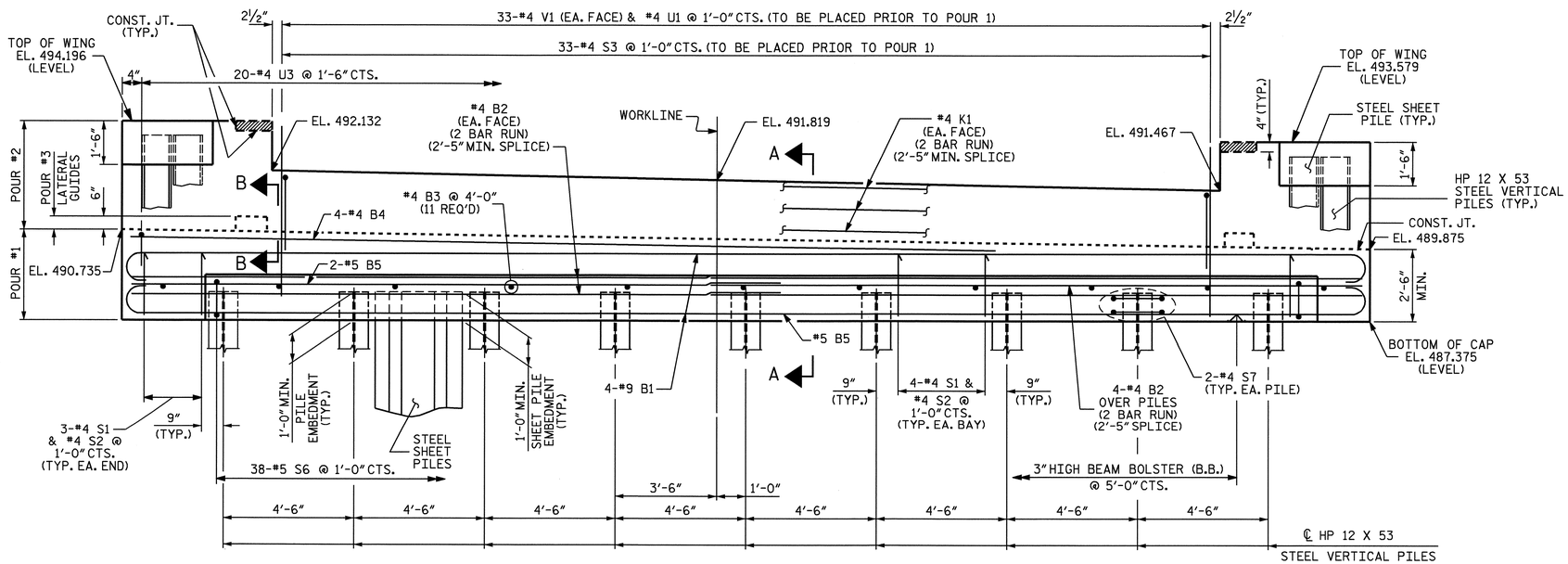


PLAN



ELEVATION

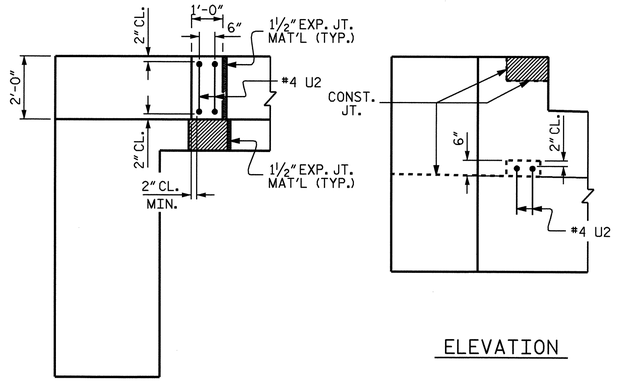
NOT ALL SHEET PILES SHOWN FOR CLARITY

NOTES:

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE RAILS ARE CAST, IF SLIP FORMING IS USED.

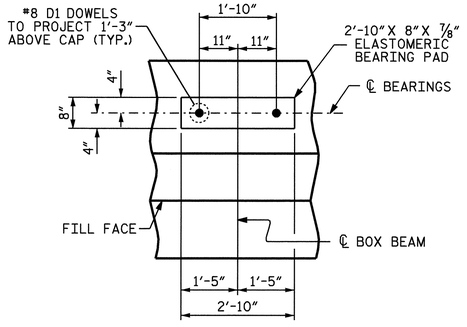
THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.



ELEVATION

PLAN

LATERAL GUIDE DETAILS



BEARING DETAIL

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT NO. 1

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : A. SORSENGINH DATE : 4/20/08
CHECKED BY : D. HODGE DATE : 6/20/08

22-JUL-2008 09:51
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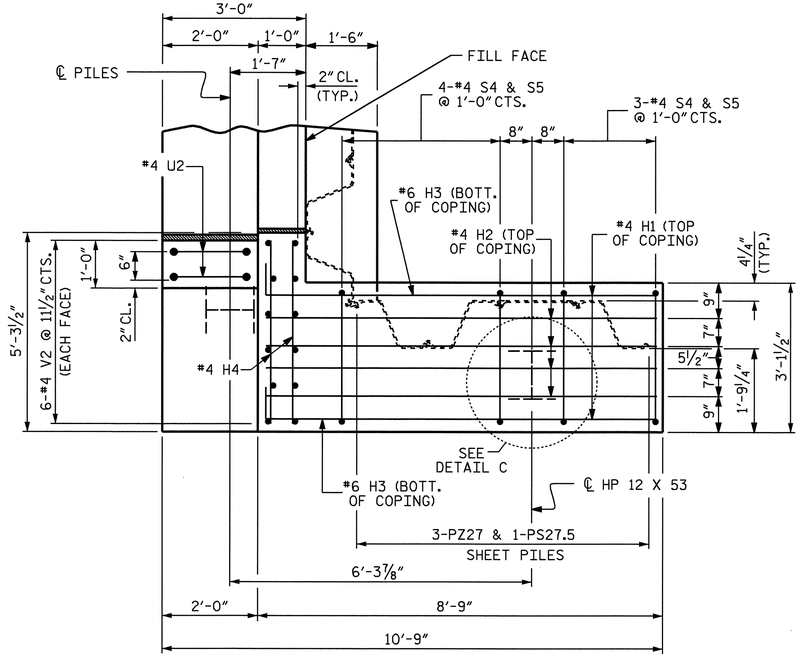
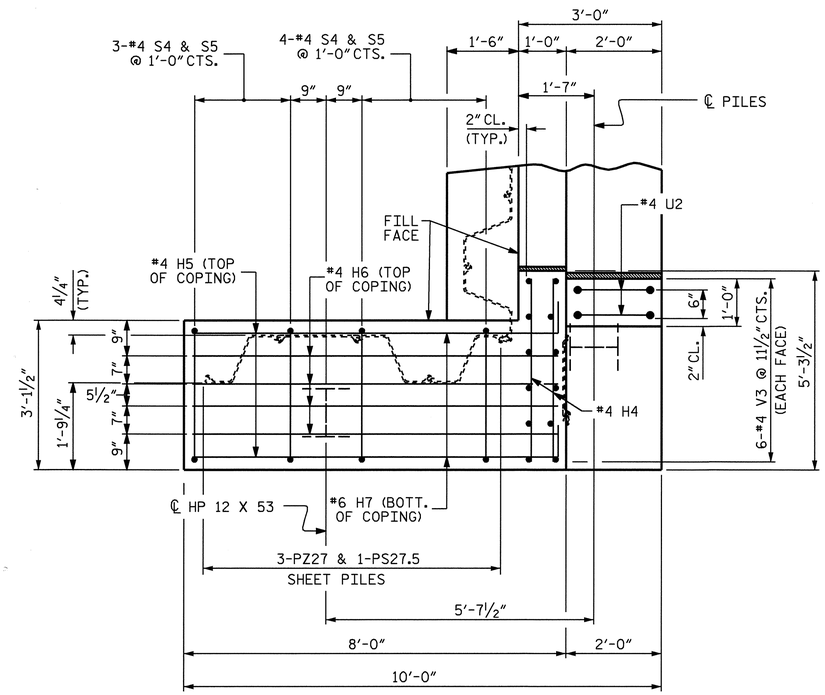
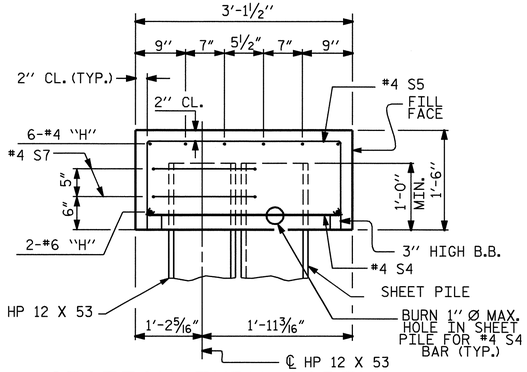
NCBDS



PLAN OF LEFT WING - W1



PLAN OF RIGHT WING - W2



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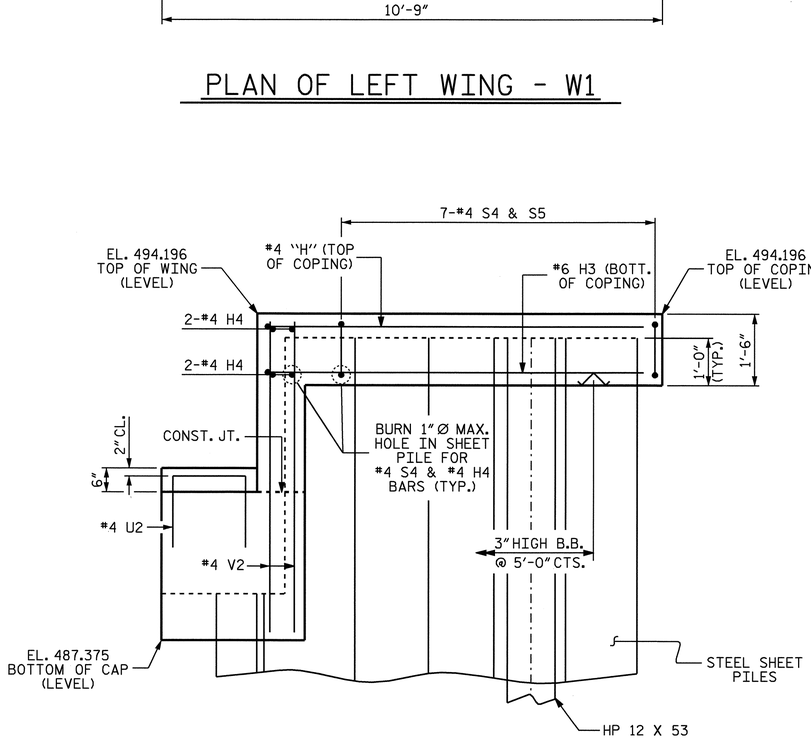
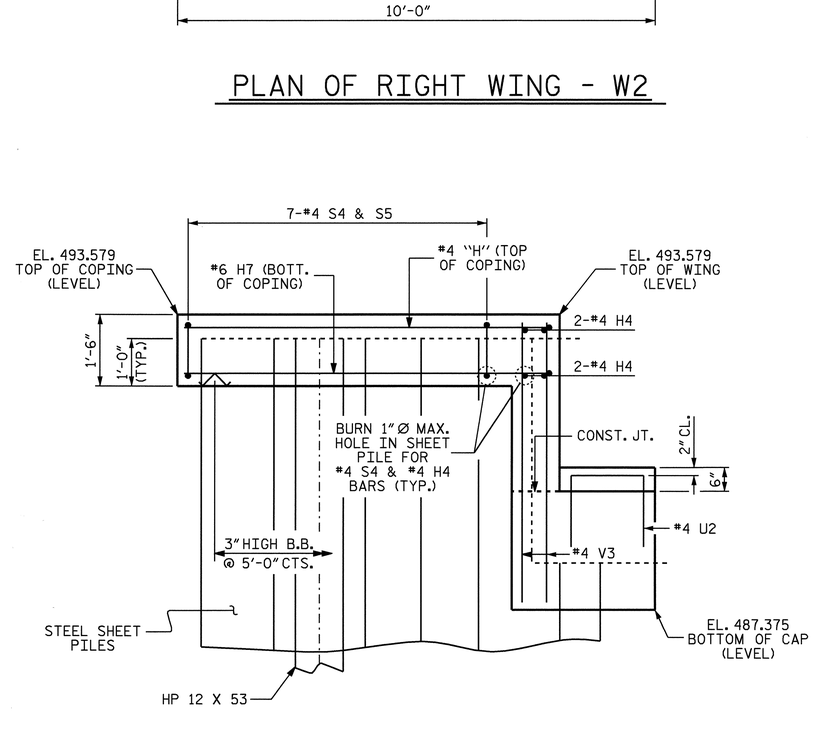
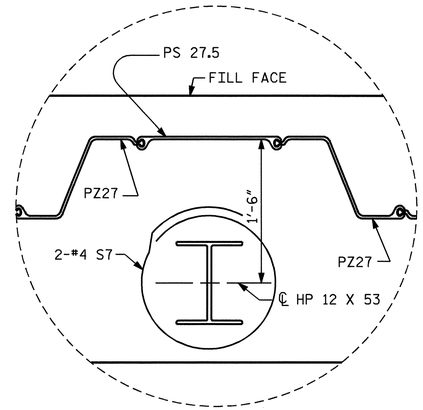


ELEVATION OF LEFT WING - W1



ELEVATION OF RIGHT WING - W2



DETAIL C

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT NO. 1

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : A. SORSENGINH DATE : 4/20/08
CHECKED BY : D. HODGE DATE : 6/20/08

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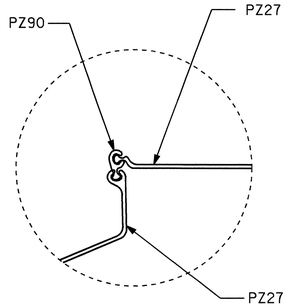
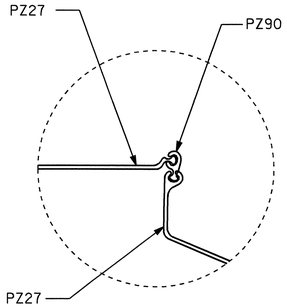
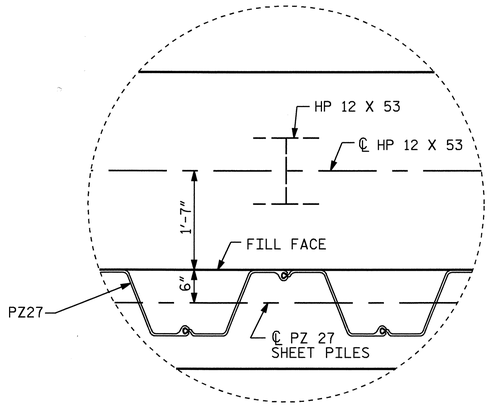


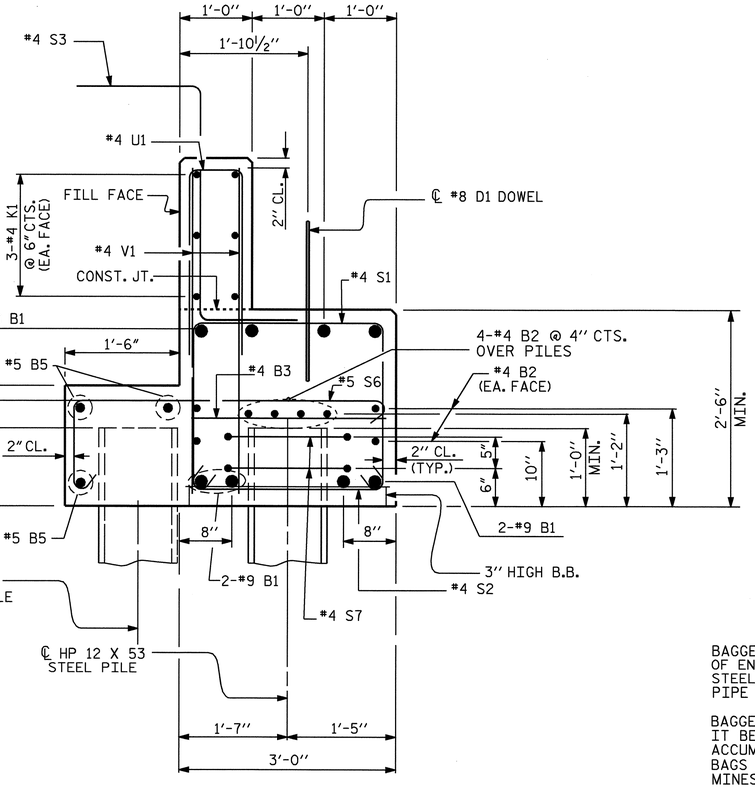
DETAIL A



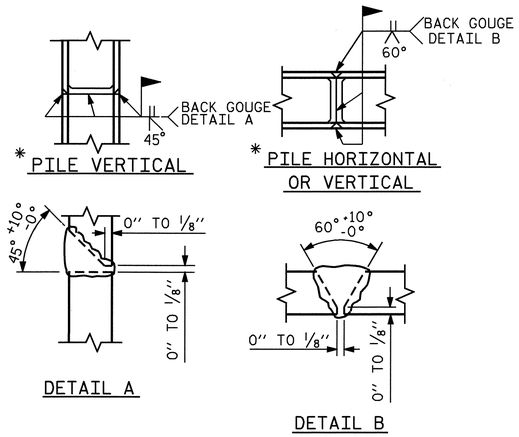
DETAIL C



DETAIL B

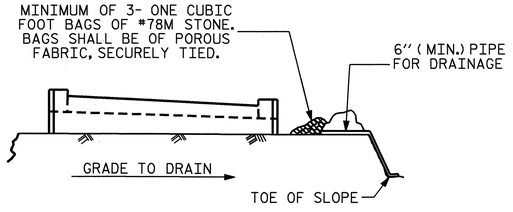


SECTION A-A



PILE SPLICE DETAILS

* POSITION OF PILE DURING WELDING.



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.

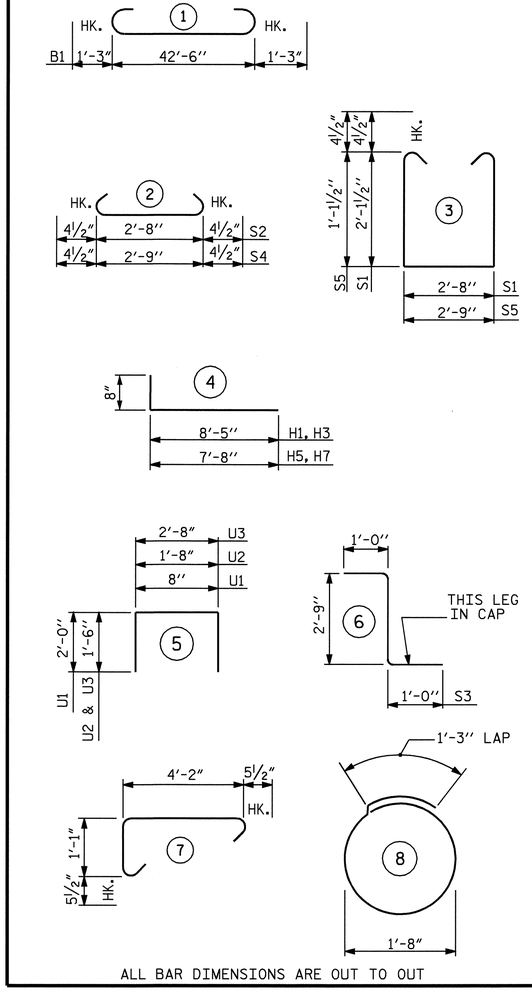
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

BILL OF MATERIAL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	45'-0"	1224
B2	16	4	STR	22'-7"	241
B3	11	4	STR	2'-8"	20
B4	4	4	STR	30'-0"	80
B5	3	5	STR	37'-0"	116
D1	22	8	STR	2'-3"	132
H1	2	4	4	9'-1"	12
H2	4	4	STR	8'-5"	22
H3	2	6	4	9'-1"	27
H4	8	4	STR	4'-11"	26
H5	2	4	4	8'-4"	11
H6	4	4	STR	7'-8"	20
H7	2	6	4	8'-4"	25
K1	12	4	STR	22'-7"	181
S1	38	4	3	7'-8"	195
S2	38	4	2	3'-5"	87
S3	33	4	6	4'-9"	105
S4	14	4	2	3'-6"	33
S5	14	4	3	5'-9"	54
S6	38	5	7	6'-2"	244
S7	22	4	8	6'-6"	96
U1	33	4	5	4'-8"	103
U2	4	4	5	4'-8"	12
U3	20	4	5	5'-8"	76
V1	66	4	STR	3'-8"	162
V2	12	4	STR	6'-5"	51
V3	12	4	STR	5'-9"	46

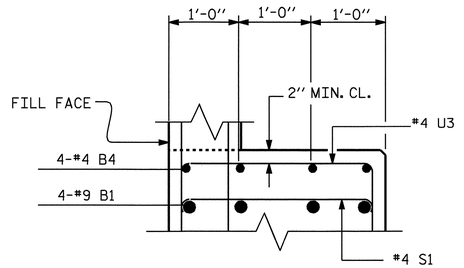
REINFORCING STEEL 3,401 LBS.

CLASS A CONCRETE BREAKDOWN

POUR 1 - CAP	17.2 C.Y.
POUR 2 - BACKWALL, WINGS AND COPING	5.8 C.Y.
POUR 3 - LATERAL GUIDES	0.1 C.Y.
CLASS A CONCRETE TOTAL	23.1 C.Y.

HP 12 x 53 STEEL PILES
NO. 11 275 LIN. FEET

18" STEEL SHEET PILES
NO. PS27.5 = 2
NO. PZ27 = 31
NO. PZ90 = 2
TOTAL NO. = 35 980 SQ. FT.



SECTION B-B

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 3 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-12
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : A. SORSENGINH DATE : 4/21/08
CHECKED BY : D. HODGE DATE : 6/20/08

22-JUL-2008 09:52
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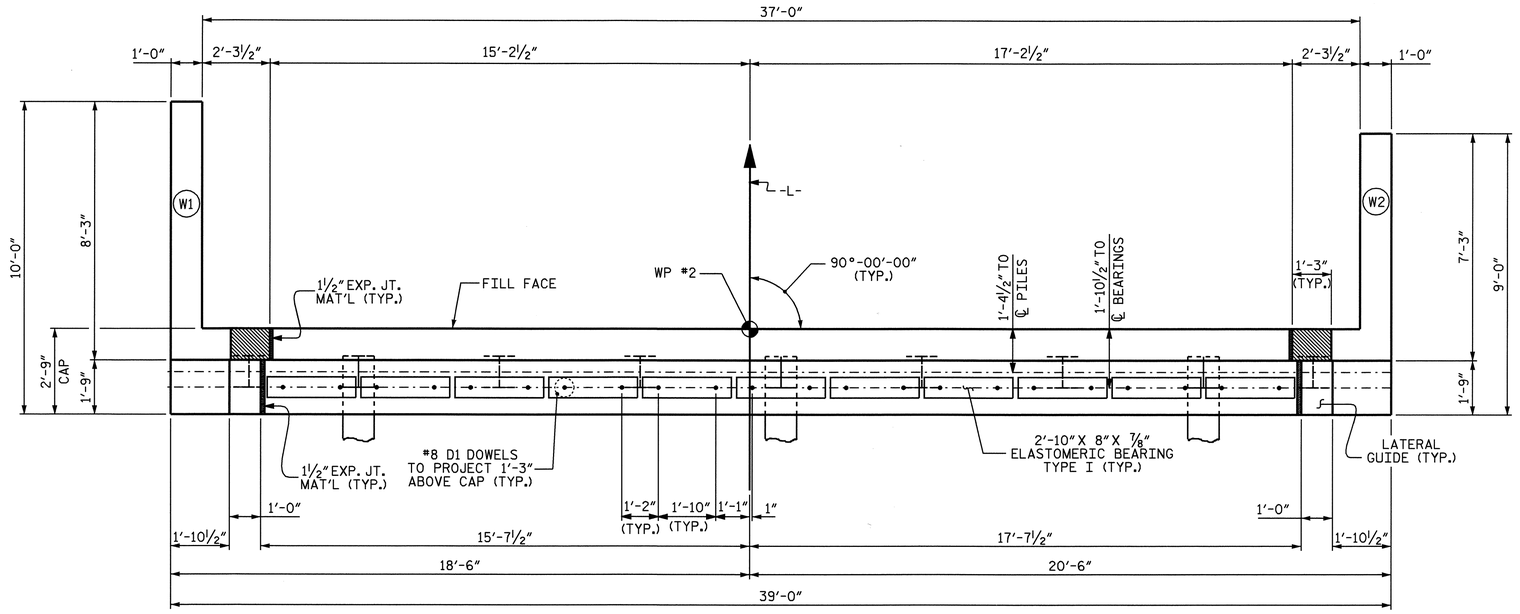


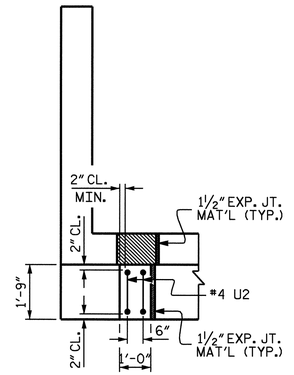
PLAN

NOTES:

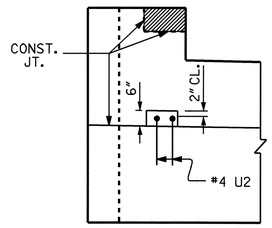
STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE RAILS ARE CAST, IF SLIP FORMING IS USED.

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

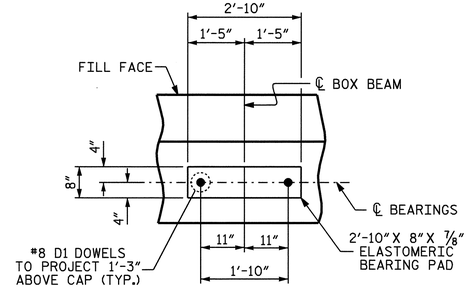


PLAN

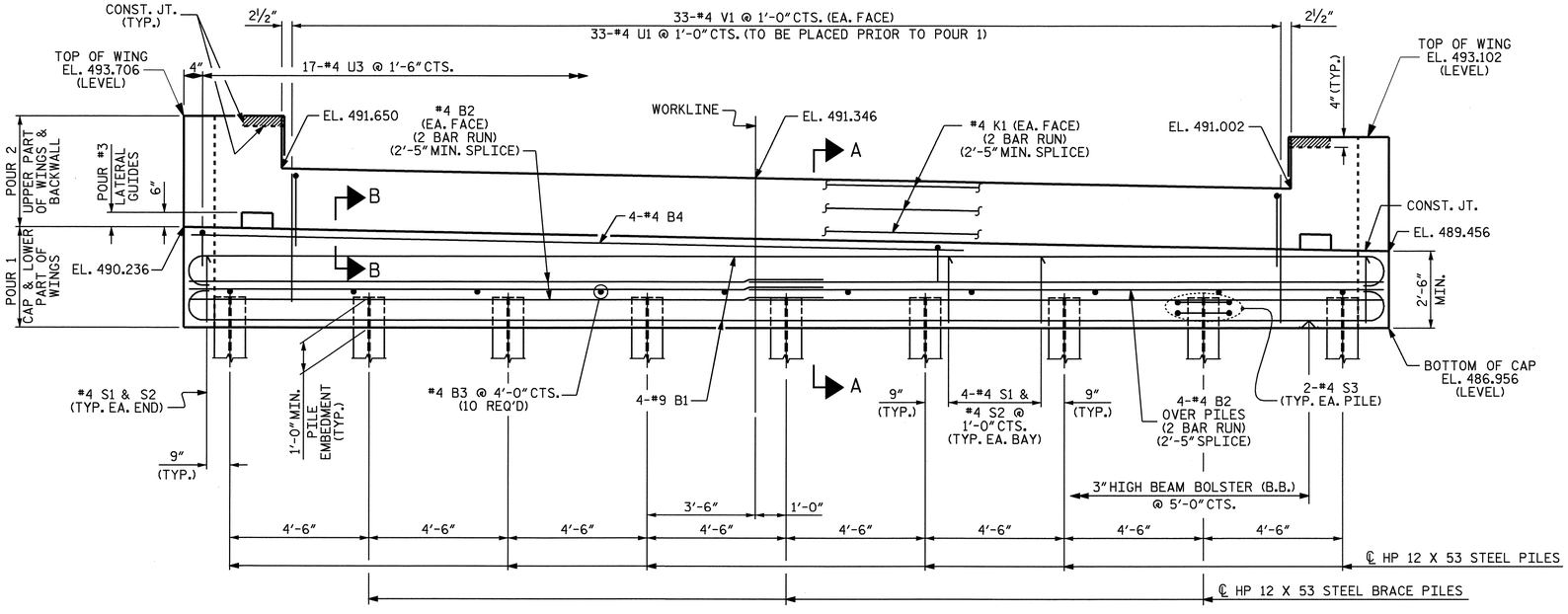


ELEVATION

LATERAL GUIDE DETAILS



BEARING DETAIL



ELEVATION

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT NO. 2

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.

7/3/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : A. SORSENGINH DATE : 4/20/08
CHECKED BY : D. HODGE DATE : 6/30/08

03-JUL-2008 10:57
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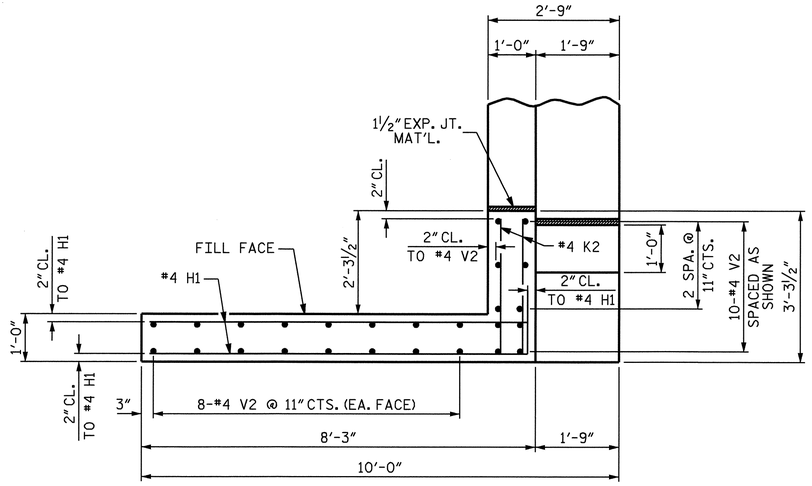
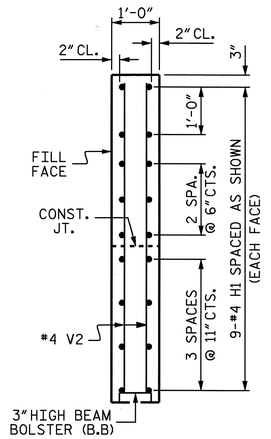
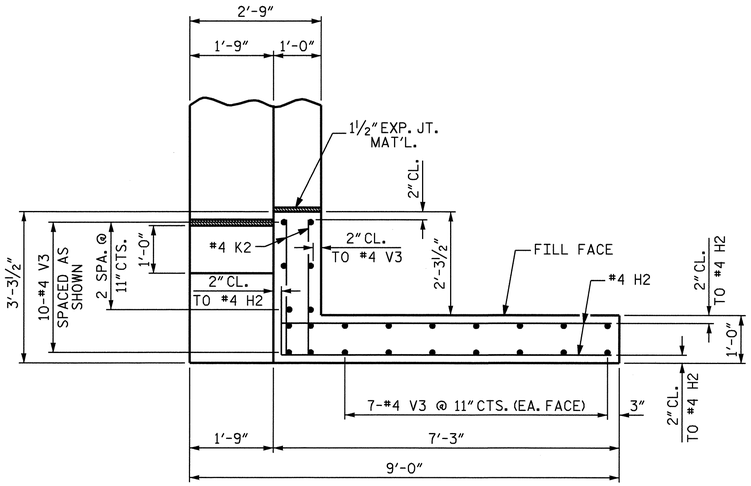


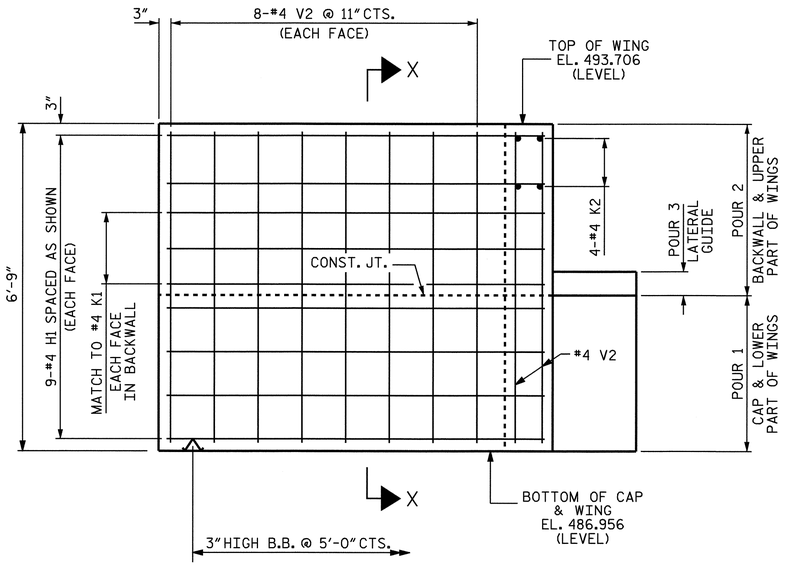
PLAN OF LEFT WING - W1



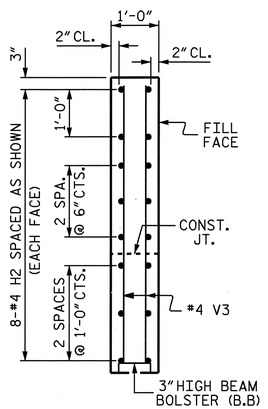
SECTION X-X



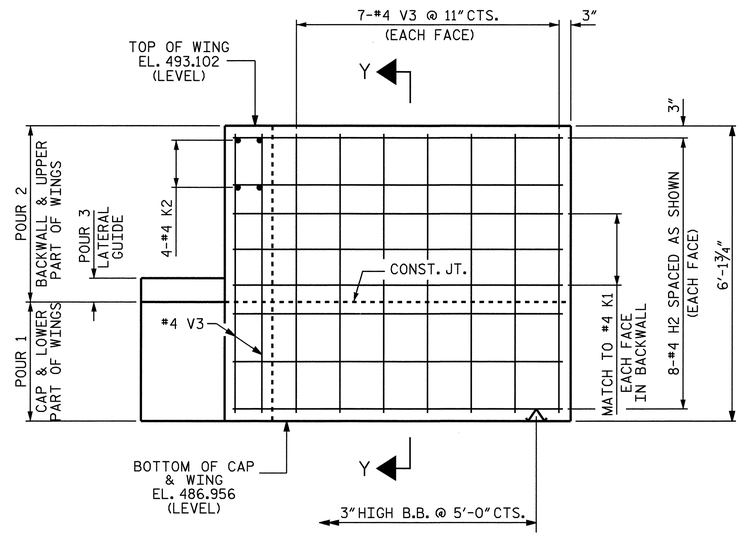
PLAN OF RIGHT WING - W2



ELEVATION OF LEFT WING - W1



SECTION Y-Y



ELEVATION OF RIGHT WING - W2

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT NO. 2

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.

7/3/08

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

DRAWN BY : A. SORSENGINH DATE : 4/20/08
CHECKED BY : D. HODGE DATE : 6/30/08

03-JUL-2008 10:57
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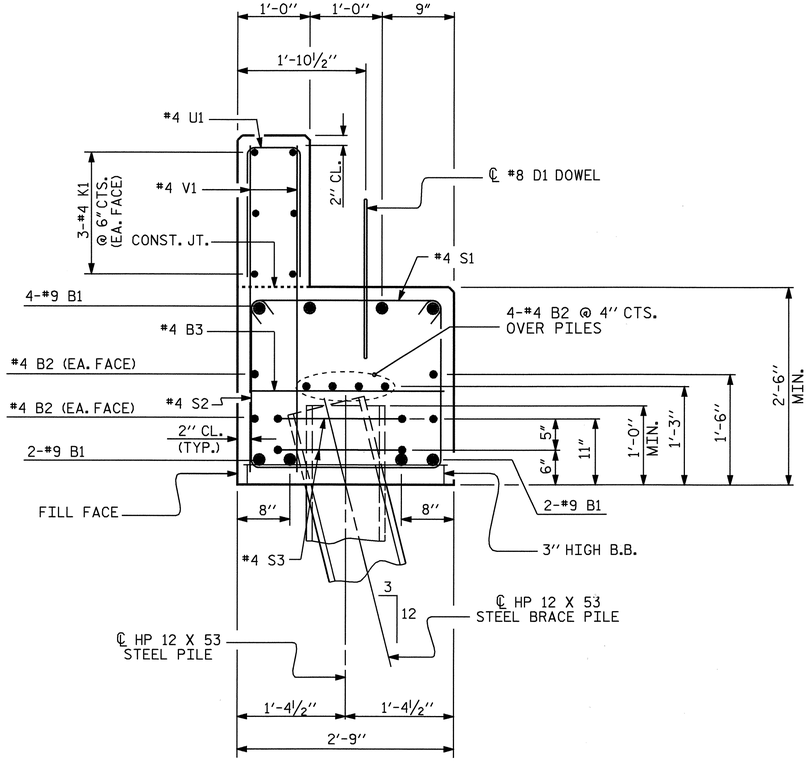
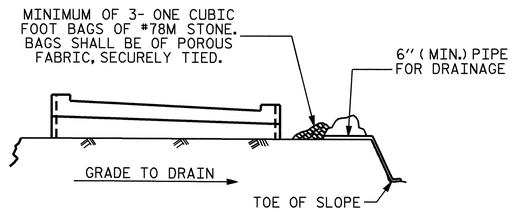


SECTION A-A



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.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

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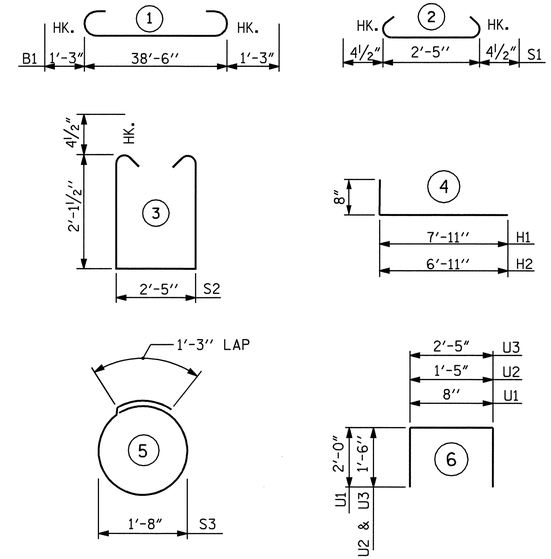
TEMPORARY DRAINAGE AT END BENT

BILL OF MATERIAL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	41'-0"	1115
B2	16	4	STR	20'-7"	220
B3	10	4	STR	2'-5"	16
B4	4	4	STR	25'-0"	67
D1	22	8	STR	2'-3"	132
H1	18	4	4	8'-7"	103
H2	16	4	4	7'-7"	81
K1	12	4	STR	20'-7"	165
K2	8	4	STR	2'-11"	16
S1	34	4	2	3'-2"	72
S2	34	4	3	7'-5"	168
S3	18	4	5	6'-6"	78
U1	33	4	6	4'-8"	103
U2	4	4	6	4'-5"	12
U3	17	4	6	5'-5"	62
V1	66	4	STR	3'-7"	158
V2	26	4	STR	6'-4"	110
V3	24	4	STR	5'-8"	91

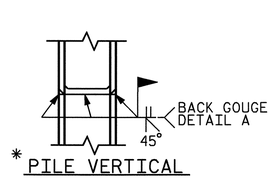
REINFORCING STEEL 2,769 LBS.

CLASS A CONCRETE BREAKDOWN

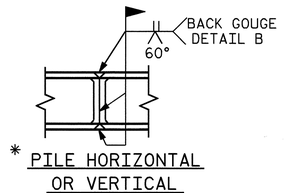
POUR 1 - CAP & LOWER PART OF WINGS	12.9 C.Y.
POUR 2 - UPPER PART OF WINGS & BACKWALL	4.4 C.Y.
POUR 3 - LATERAL GUIDES	0.1 C.Y.
CLASS A CONCRETE TOTAL	17.4 C.Y.

HP 12 x 53 STEEL PILES

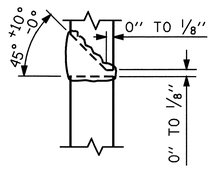
NO. 9 225 LIN. FEET



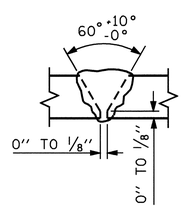
* PILE VERTICAL



* PILE HORIZONTAL OR VERTICAL



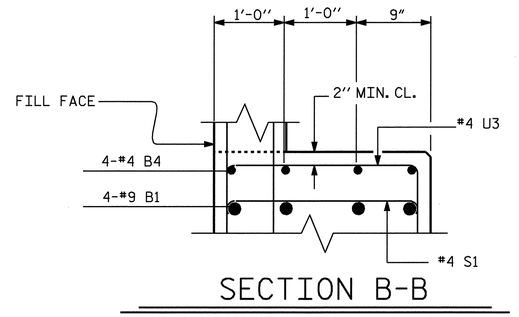
DETAIL A



DETAIL B

PILE SPLICE DETAILS

* POSITION OF PILE DURING WELDING.



SECTION B-B

PROJECT NO. B-4649

UNION COUNTY

STATION: 26+37.50 -L-

SHEET 3 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-15
1			3			TOTAL SHEETS
2			4			19

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS
7/3/08

DRAWN BY : A. SORSENGINH DATE : 4/21/08
CHECKED BY : D. HODGE DATE : 6/30/08

03-JUL-2008 10:57
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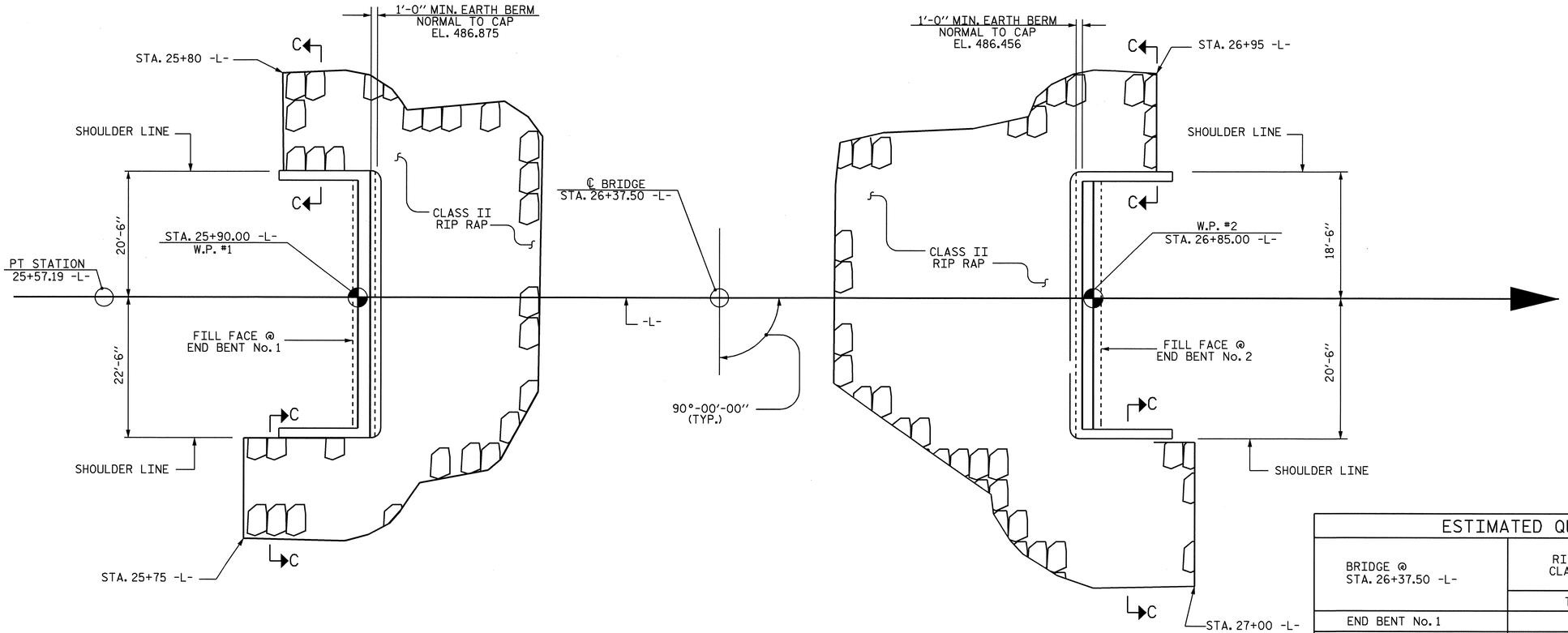
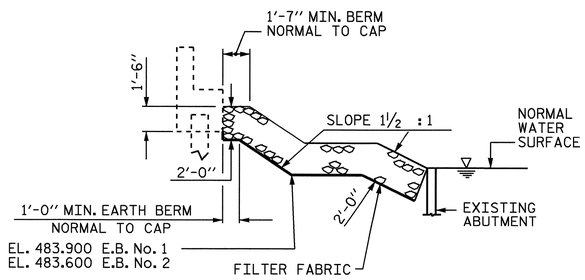
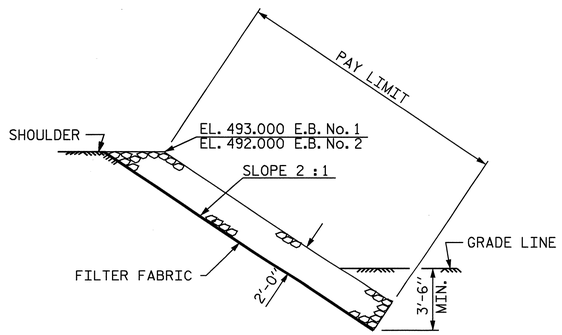
dahodge



ESTIMATED QUANTITIES		
BRIDGE @ STA. 26+37.50 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT No. 1	225	250
END BENT No. 2	215	240



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			17

DRAWN BY : M. POOLE DATE : 03-08
CHECKED BY : J. R. DUGGINS DATE : 06-08

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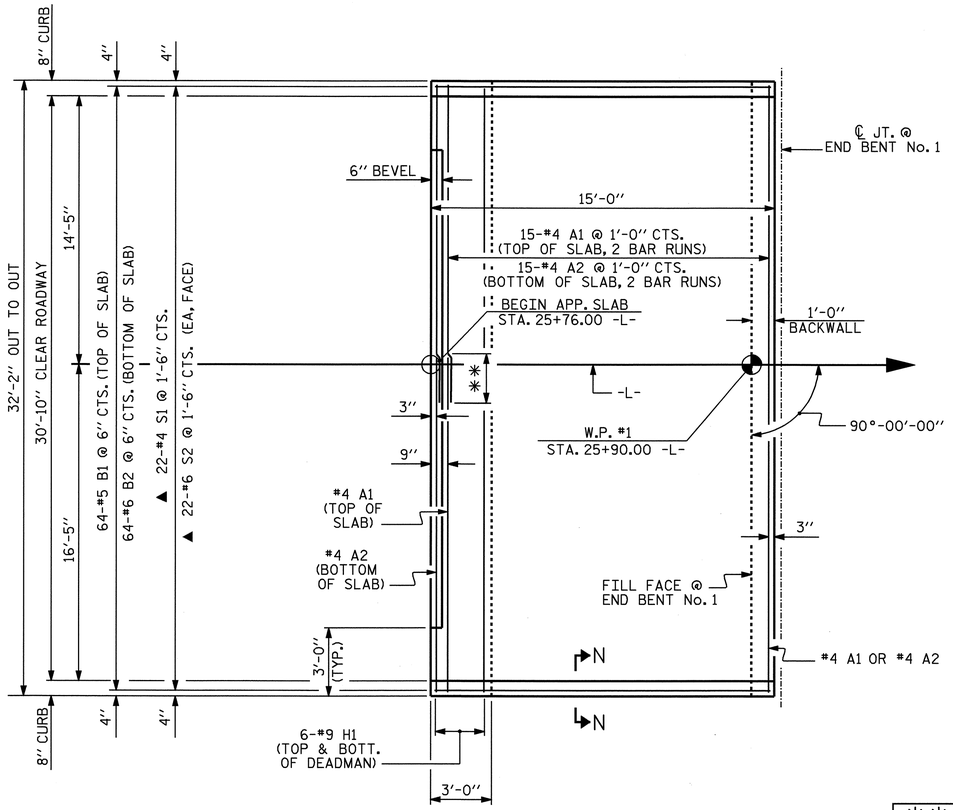
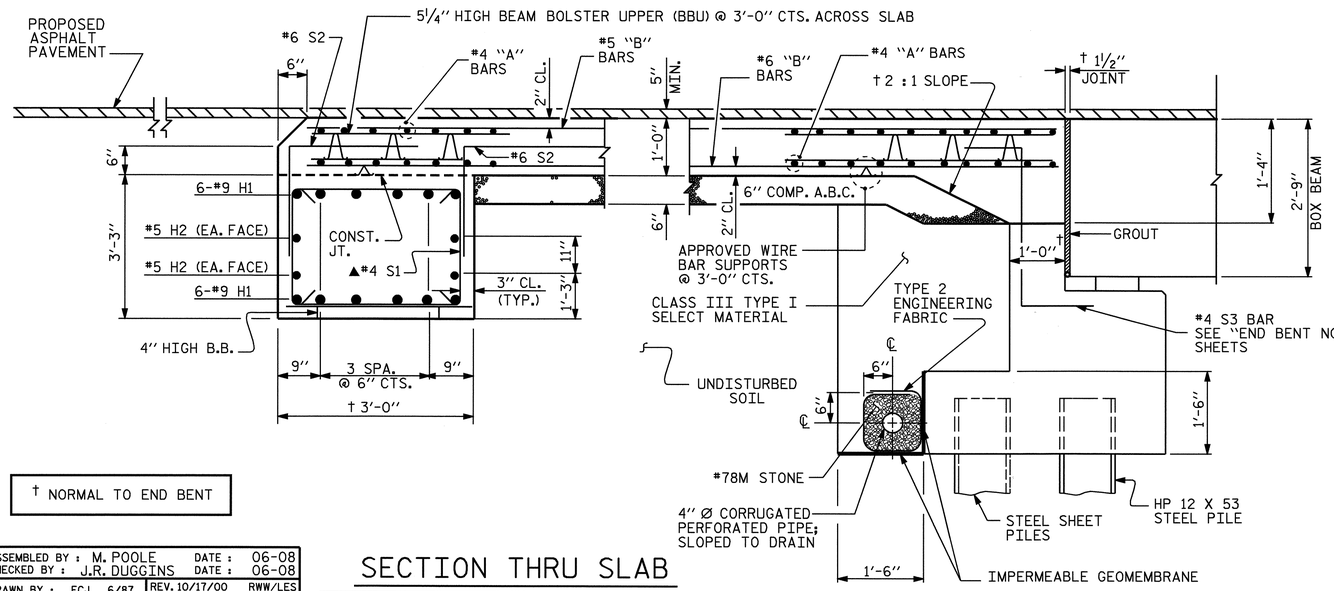


▲ INVERT ALTERNATE STIRRUPS

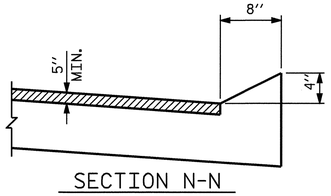
✱✱ 2'-0" SPLICE #4 A1
✱✱ 1'-9" SPLICE #4 A2

PLAN @ END BENT NO. 1

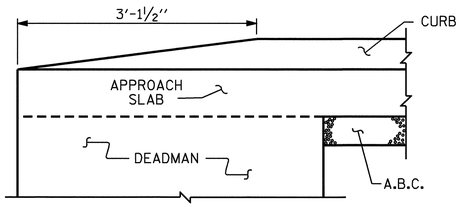


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLABS.

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.

THE 6" COMP. A.B.C. SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

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

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

CONCRETE AND REINFORCING STEEL IN DEADMAN TO BE PAID FOR UNDER LUMPSUM PRICE BID FOR BRIDGE APPROACH SLABS.

IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, TYPE 2 ENGINEERING FABRIC, SELECT MATERIAL, 6" COMP. A.B.C. & #78M STONE SHALL BE PAID FOR UNDER LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT No. 1
BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			19

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/22/08

ASSEMBLED BY : M. POOLE	DATE : 06-08		
CHECKED BY : J.R. DUGGINS	DATE : 06-08		
DRAWN BY : FCJ 6/87	REV. 10/17/00	RWW/LES	
CHECKED BY : EGA 6/87	REV. 7/10/01	LES/RDR	
	REV. 5/7/03R	RWW/JTE	

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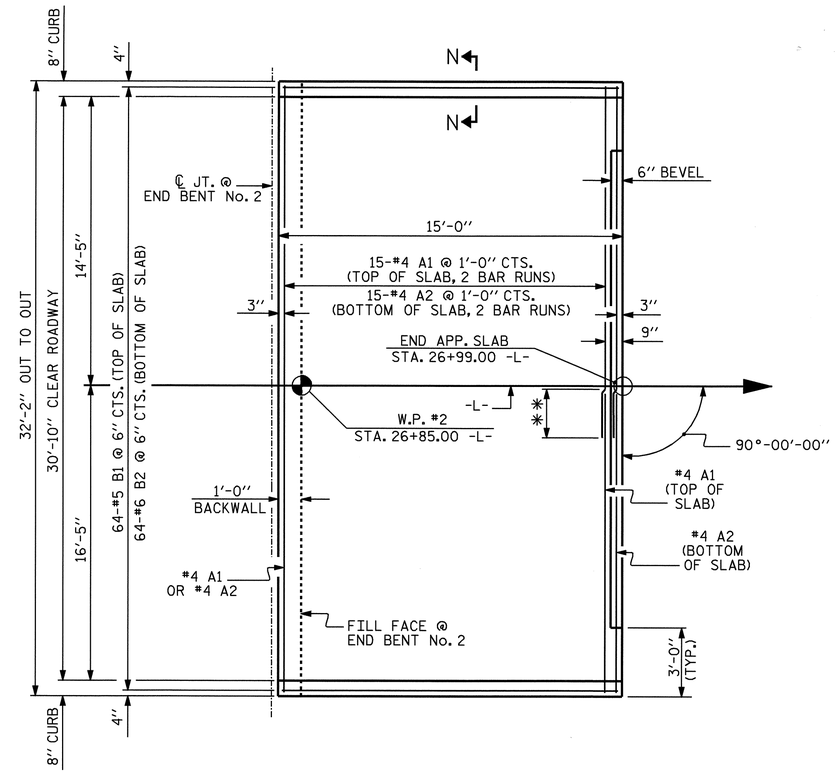
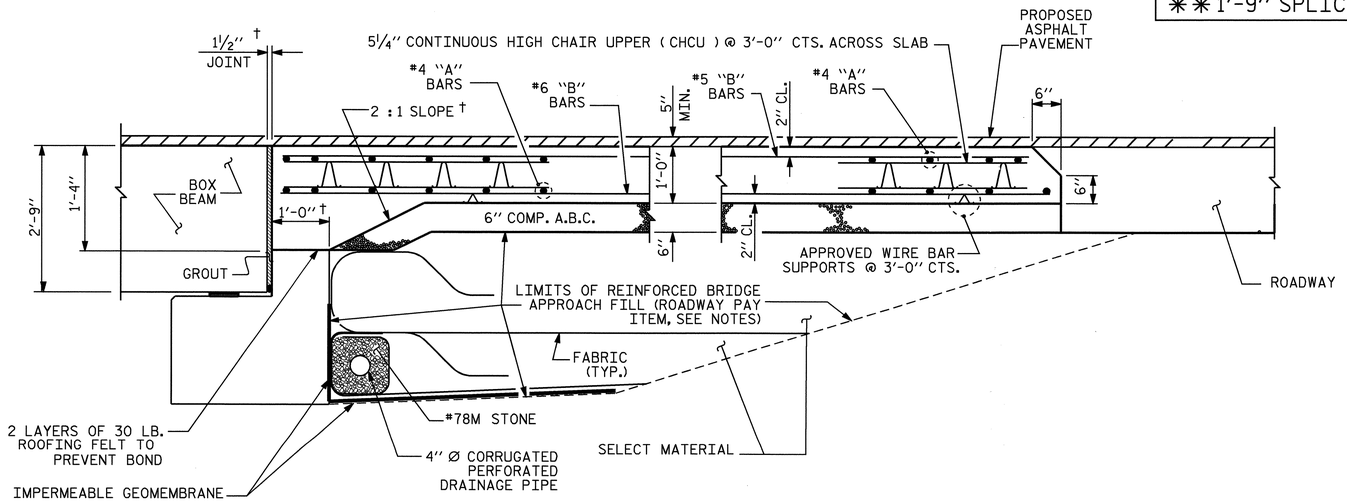


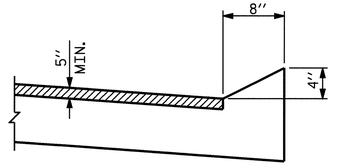
PLAN @ END BENT No. 2



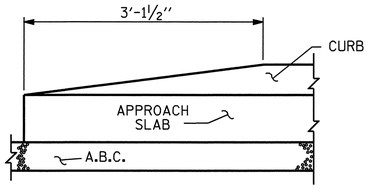
SECTION THRU SLAB

** 2'-0" SPLICE #4 A1
** 1'-9" SPLICE #4 A2

NORMAL TO END BENT †



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

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

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT No. 2
BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			19

NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR. 7/21/08

ASSEMBLED BY : M. POOLE DATE : 03-08
CHECKED BY : J. R. DUGGINS DATE : 06-08

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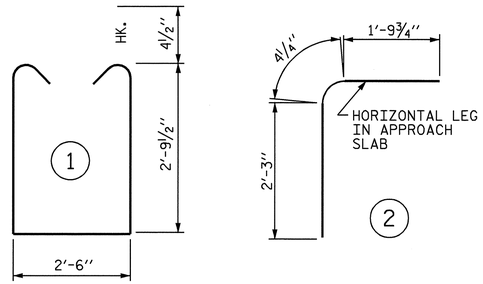
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

APPROACH SLAB AT END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	30	#4	STR	16'-11"	339
A2	30	#4	STR	16'-10"	337
✳B1	64	#5	STR	14'-2"	945
B2	64	#6	STR	14'-8"	1410
H1	12	#9	STR	31'-10"	1299
H2	4	#5	STR	31'-10"	133
S1	22	#4	1	8'-10"	130
S2	44	#6	2	4'-5"	292

REINFORCING STEEL	LBS.	3601
✳EPOXY COATED REINFORCING STEEL	LBS.	1284

CLASS AA CONCRETE BREAKDOWN

POUR 1	DEADMAN	C. Y.	11.6
POUR 2	APPROACH SLAB	C. Y.	18.4
TOTAL CLASS AA CONCRETE		C. Y.	30.0

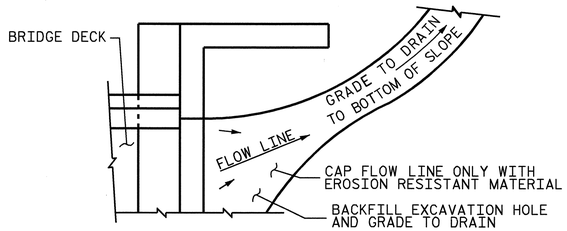
APPROACH SLAB AT END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	30	#4	STR	16'-11"	339
A2	30	#4	STR	16'-10"	337
✳B1	64	#5	STR	14'-2"	945
B2	64	#6	STR	14'-8"	1410

REINFORCING STEEL	LBS.	1747
✳EPOXY COATED REINFORCING STEEL	LBS.	1284

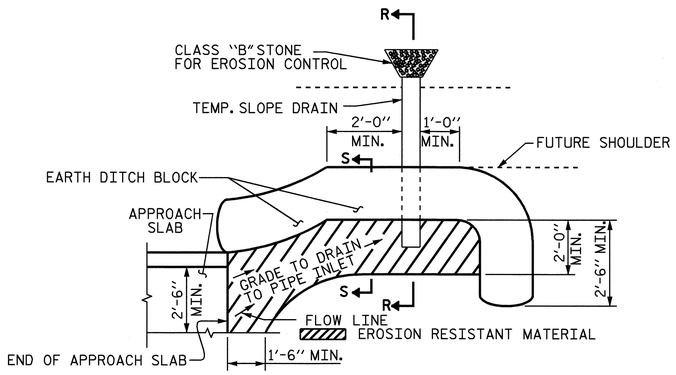
TOTAL CLASS AA CONCRETE C. Y. 18.4

✳THESE BARS ARE EPOXY COATED



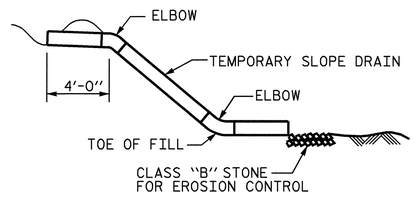
IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO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

TEMPORARY DRAINAGE DETAIL

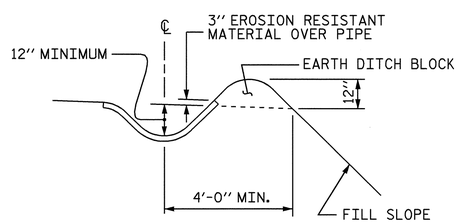


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

ASSEMBLED BY : M. POOLE	DATE : 06-08	REV. 8/16/99	MAB/LES
CHECKED BY : J.R. DUGGINS	DATE : 06-08	REV. 10/17/00	RWW/LES
DRAWN BY : FCJ 11/88		REV. 5/7/03	RWW/JTE
CHECKED BY : ARB 11/88			

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NORTH CAROLINA PROFESSIONAL SEAL 15779 ENGINEER JOHN R. DUGGINS, JR.
7/3/08

PROJECT NO. B-4649
UNION COUNTY
STATION: 26+37.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

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

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 2002 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; CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP; AND CLASS S SHALL BE USED FOR UNDERWATER FOOTING SEALS.

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 WITH THE EXCEPTION OF #2 BARS WHICH MAY BE FABRICATED FROM COLD DRAWN STEEL WIRE. 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.

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991. THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

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.

REV. 6-16-95 EEM W RGW REV. 6-27-02 RWW W JTE
REV. 8-16-99 RWW W JLES

ENGLISH

JANUARY, 1990

STD. NO. SN