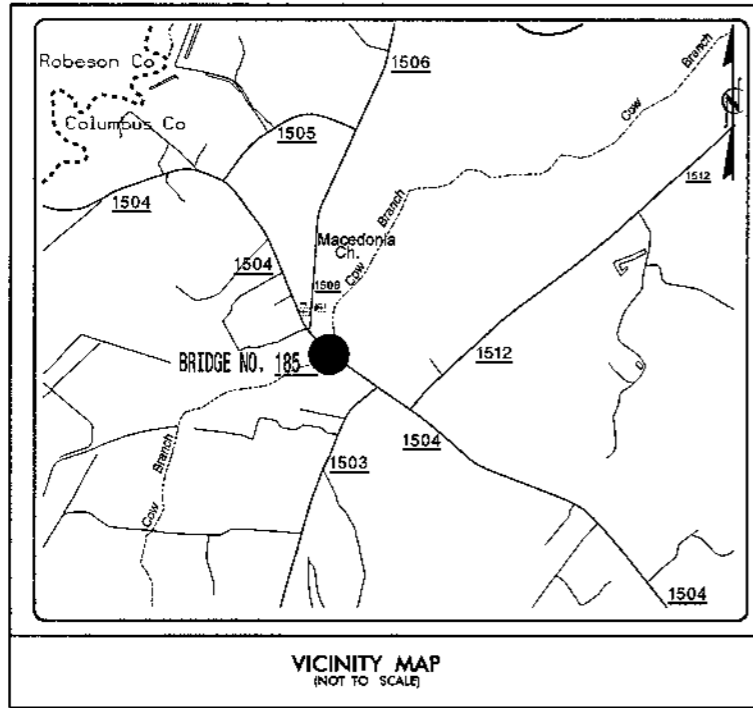


**TIP PROJECT: B-3829**  
**WBS: 35570**

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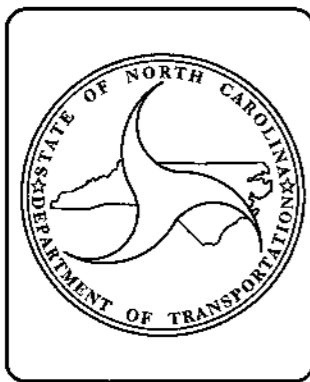
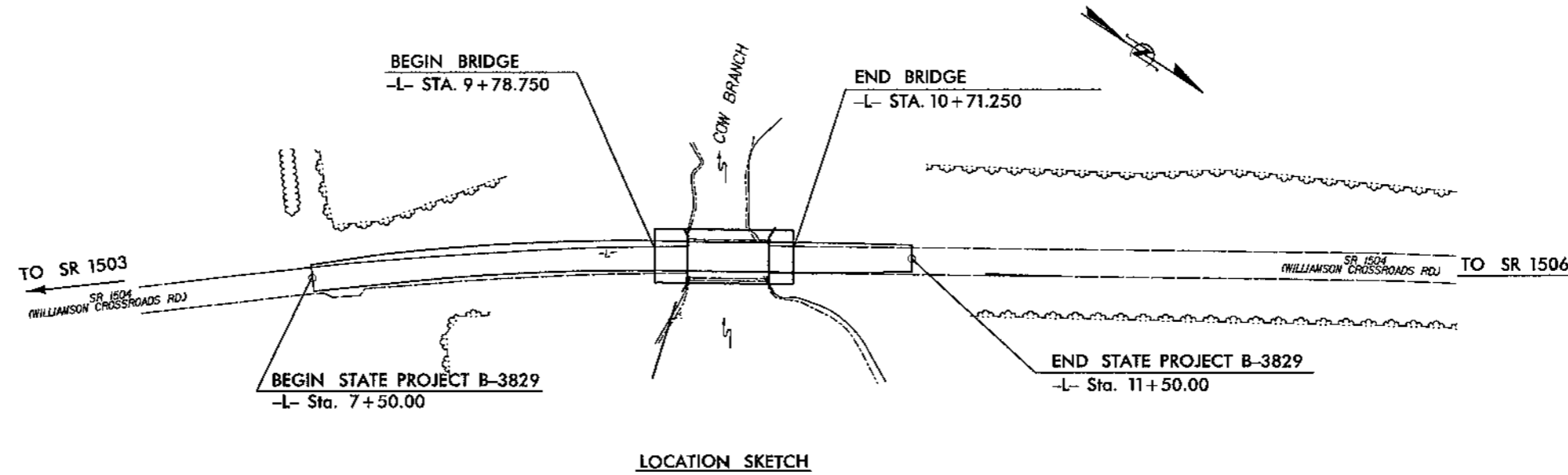


STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**COLUMBUS COUNTY**

LOCATION: SR 1504 BRIDGE NO. 185 OVER COW BRANCH

TYPE OF WORK: BRIDGE REPLACEMENT WITH PRE-STRESSED CONCRETE CORED SLAB  
 SUPERSTRUCTURE ON STEEL PILE END BENTS AND INTERIOR BENTS AND ROADWAY APPROACHES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3829	1	19
STATE PROJECT NO.	P.A. PROJECT NO.	DESCRIPTION	
35570		P.E.	



**DESIGN DATA**

ADT 2011 = 990

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-3829 = 0.058 MILE  
 LENGTH STRUCTURE TIP PROJECT B-3829 = 0.018 MILE  
 TOTAL LENGTH TIP PROJECT B-3829 = 0.076 MILE

**WETHERILL ENGINEERING**  
 Prepared for the North Carolina Department of Transportation in the Office of:  
 559 JONIS FRANKLIN ROAD  
 SUITE 104  
 FAYETTEVILLE, N.C. 27404  
 TEL: 910 853 9077  
 FAX: 910 858 8617  
 MICHENER REG. # 6-0277

2006 STANDARD SPECIFICATIONS  
 LETTING DATE: \_\_\_\_\_  
 JOHN A. DILWORTH, PE  
 PROJECT DESIGN ENGINEER  
 MIKE SUMMERS  
 BRIDGE MANAGEMENT PROJECT MANAGER

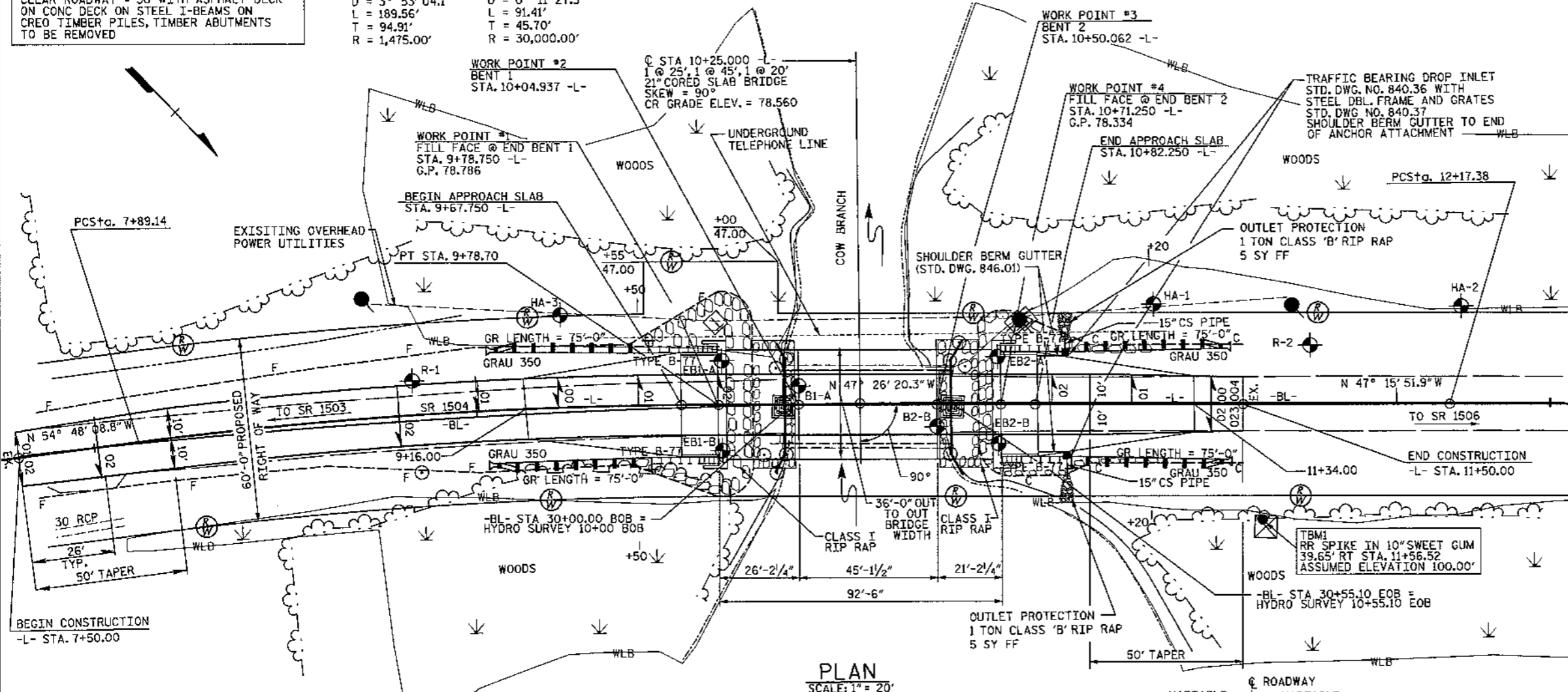
8-17-09  
 PROJECT DESIGN ENGINEER

WBS 35570

#185 COLUMBUS

EXISTING BRIDGE #185  
3 SPAN BRIDGE OF TOTAL LENGTH = 55.1'  
CLEAR ROADWAY = 30' WITH ASPHALT DECK  
ON CONC DECK ON STEEL I-BEAMS ON  
CREO TIMBER PILES, TIMBER ABUTMENTS  
TO BE REMOVED

HORIZONTAL CURVE DATA -L-  
PI Sta 8+84.05 PI Sta 12+63.08  
 $\Delta = 7^\circ 21' 48.5''$  (RT)  $\Delta = 0^\circ 10' 28.5''$  (RT)  
 $D = 3^\circ 53' 04.1''$   $D = 0^\circ 11' 27.5''$   
 $L = 189.56'$   $L = 91.41'$   
 $T = 94.91'$   $T = 45.70'$   
 $R = 1,475.00'$   $R = 30,000.00'$



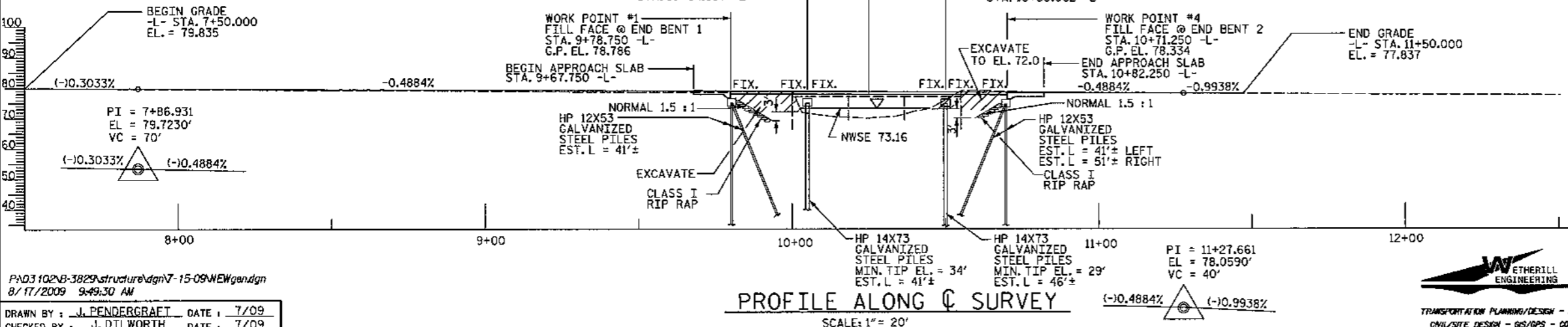
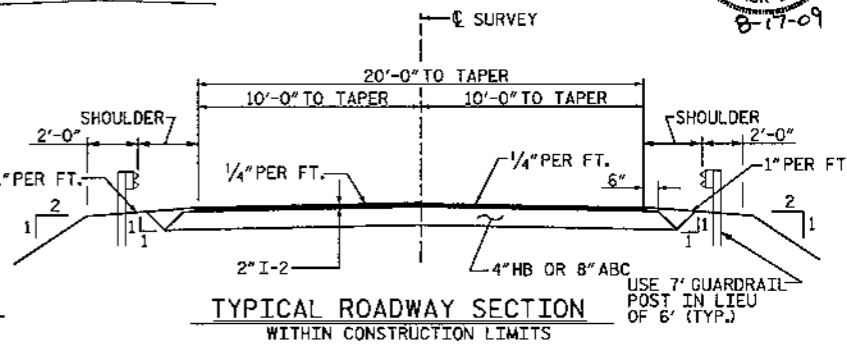
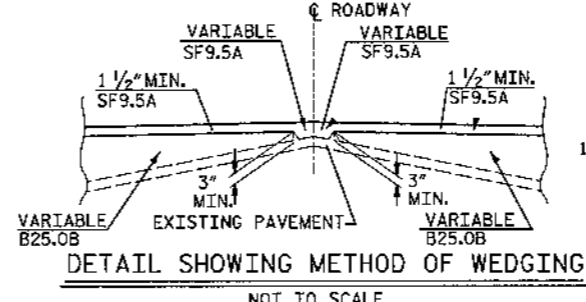
PLAN  
SCALE: 1" = 20'

**HYDRAULIC DATA**

DESIGN DISCHARGE	= 575 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 75.67
DRAINAGE AREA	= 12.8 SQ. MI.
BASIC DISCHARGE (Q100)	= 825 CFS
BASIC HIGH WATER ELEVATION	= 76.37

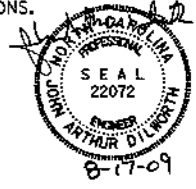
**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE	= 975 CFS
FREQUENCY OF OVERTOPPING FLOOD	= ± 200 YR.
OVERTOPPING FLOOD ELEVATION	= 76.66



PROFILE ALONG C SURVEY  
SCALE: 1" = 20'

**NOTES:**  
THE QUANTITY OF RIP RAP TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF TONS OF EACH CLASS OF RIP RAP WHICH HAS BEEN INCORPORATED INTO THE COMPLETED AND ACCEPTED WORK. THE RIP RAP WILL BE MEASURED BY BEING WEIGHED ON TRUCKS ON CERTIFIED PLATFORM SCALES OR OTHER CERTIFIED WEIGHING DEVICES. THE QUANTITY OF RIP RAP WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER TON.  
PLAIN RIP RAP CLASS I (2'-0" THICK) W/ FILTER FABRIC  
END BENT NO.1 200 TONS  
END BENT NO.2 190 TONS  
TOTAL: 390 TONS  
THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH FHWA'S TECHNICAL ADVISORY T5140.20 (SCOUR AT BRIDGES). PILES AT END BENTS 1 AND 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 45 TONS EACH. PILES AT BENTS 1 AND 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 60 TONS EACH. WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED. PILES AT BENT 1 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 59 FEET AND SATISFY THE MINIMUM BEARING CAPACITY OF 60 TONS. PILES AT BENT 2 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 54 FEET AND SATISFY THE MINIMUM BEARING CAPACITY OF 60 TONS. STEEL PILE POINTS (WITH TEETH) ARE REQUIRED FOR STEEL PILES @ END BENT 1. SEE STEEL PILE POINTS SPECIAL PROVISIONS. THE SCOUR CRITICAL ELEVATION (SCE) FOR BENT 1 IS 82 FEET. THE SCOUR CRITICAL ELEVATION (SCE) FOR BENT 2 IS 81 FEET. THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE. THE EXISTING BRIDGE SHALL BE REMOVED BY SAWING AND/OR NON SHATTERING METHODS SUCH THAT DEBRIS WILL NOT FALL INTO THE WATER.  
ADT 990 FOR YEAR 2011.  
DENOTES GEO-TECH BORING HOLE LOCATIONS.  
DATUM EQUALITY 75.36 = 100.00 GEOTECH BORINGS  
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.



WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

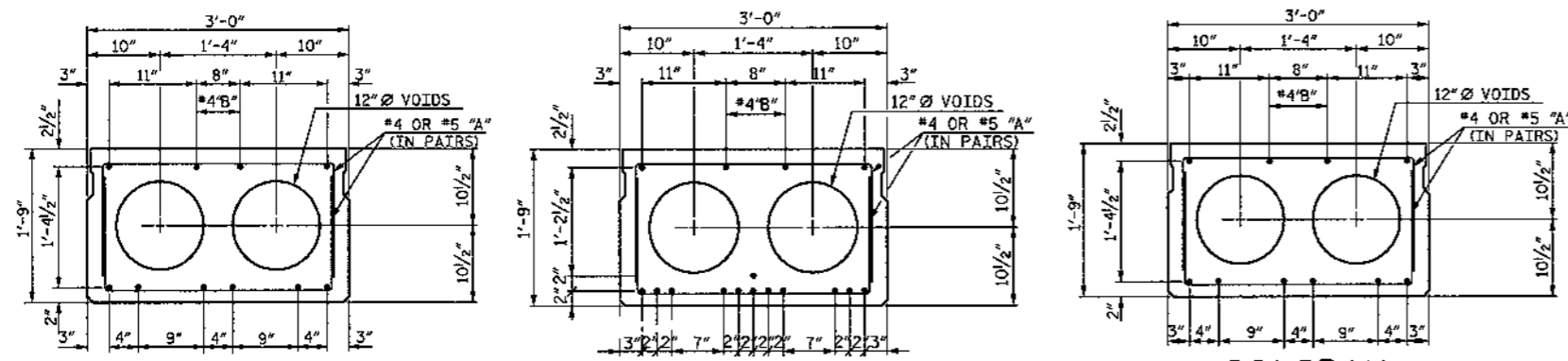
GENERAL DRAWING  
BRIDGE #185 ON SR 1504  
OVER COW BRANCH

REVISIONS				SHEET NO. 2
NO.	BY	DATE	DATE	
1				TOTAL SHEETS 19
2				

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DRAWN BY: J. PENDERGRAFT DATE: 7/09  
CHECKED BY: J. DILLWORTH DATE: 7/09

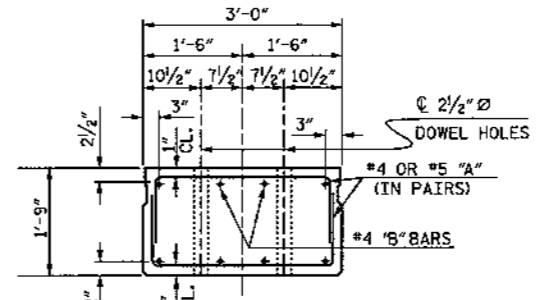
ETHERILL ENGINEERING  
Raleigh, N.C. 27606  
Bus: 919 861 8077  
Fax: 919 861 8077  
LICENSE NO. F-00377

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



**PART PLAN - SLAB SECTION**

NOTE: EXTERIOR SECTION SHOWN - INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



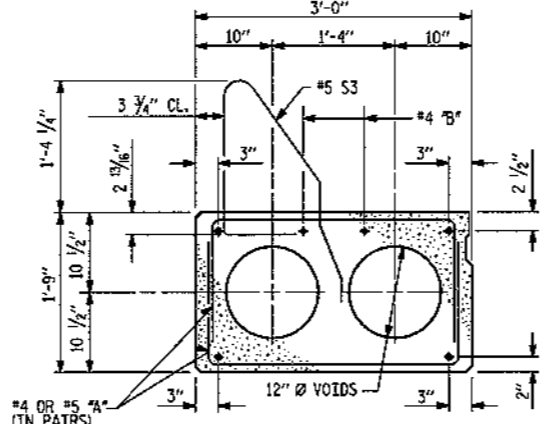
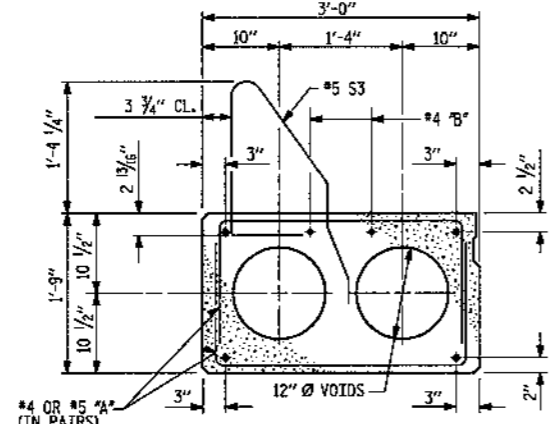
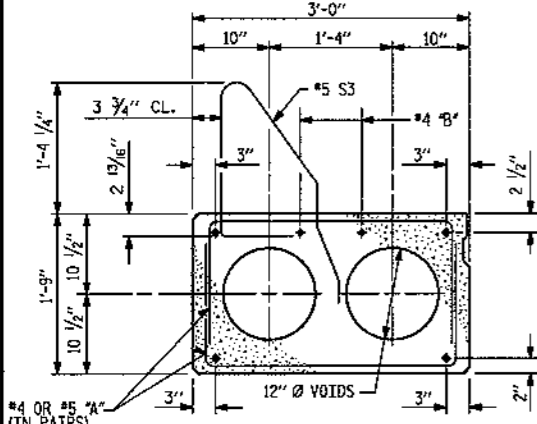
**SLAB END ELEVATION**

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SIMILAR EXCEPT SHEAR KEY LOCATION.

**25' SPAN**  
8 - 0.6" Ø LOW RELAXATION HIGH STRENGTH STRAND  
LAYOUT INTERIOR SLAB SECTIONS  
FINAL DEFLECTION 0.238" (UP)

**45' SPAN**  
14 - 0.6" Ø LOW RELAXATION HIGH STRENGTH STRAND  
LAYOUT INTERIOR SLAB SECTIONS  
FINAL DEFLECTION 1.345" (UP)

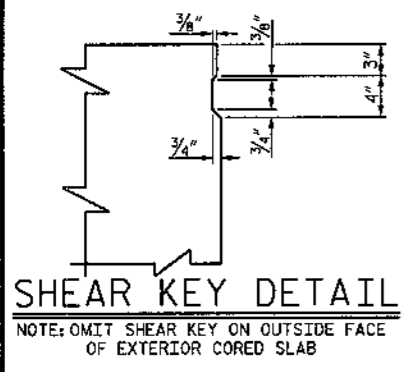
**20' SPAN**  
8 - 0.6" Ø LOW RELAXATION HIGH STRENGTH STRAND  
LAYOUT INTERIOR SLAB SECTIONS  
FINAL DEFLECTION 0.147" (UP)



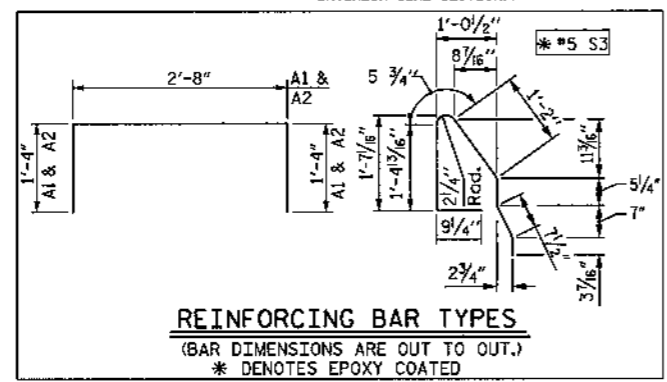
**25' SPAN**  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

**45' SPAN**  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

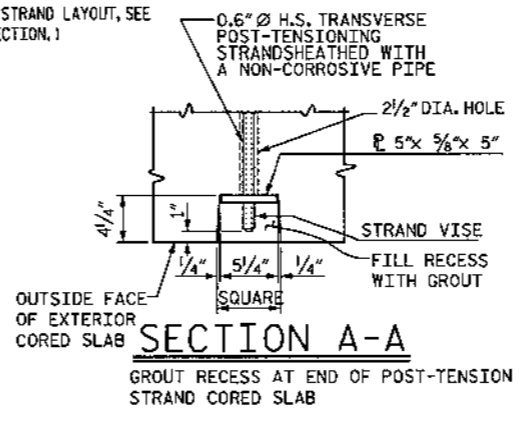
**20' SPAN**  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



**SHEAR KEY DETAIL**  
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLAB

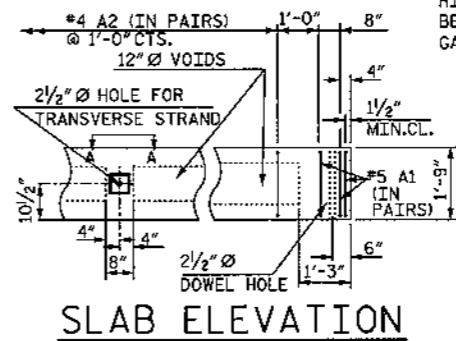


**REINFORCING BAR TYPES**  
(BAR DIMENSIONS ARE OUT TO OUT.)  
\* DENOTES EPOXY COATED



**SECTION A-A**

GROUT RECESS AT END OF POST-TENSION STRAND CORED SLAB



**SLAB ELEVATION**

**GENERAL NOTES:**  
ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING EXCEPT THAT THE BEAMS HAVE BEEN DESIGNED FOR HS 25. CONCRETE:  
f'c = 5000 psi MINIMUM 25' & 20' SPANS COMPRESSIVE STRENGTH @ 28 DAYS  
f'c = 4000 psi MINIMUM 45' SPAN COMPRESSIVE STRENGTH @ TRANSFER OF STRESSING FORCE  
f'c = 6000 psi MINIMUM 45' SPANS COMPRESSIVE STRENGTH @ 28 DAYS  
f'c = 4800 psi MINIMUM 45' SPAN COMPRESSIVE STRENGTH @ TRANSFER OF STRESSING FORCE

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.

SIZE TYPE	AREA	ULTIMATE STRENGTH
0.6" Ø L.R. H.S. STRANDS	0.217 IN <sup>2</sup>	58,590* PER STRANDS
APPLIED PRESTRESS	43,940*	PER STRAND

ALL MATERIAL AND WORKMANSHIP SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES OF THE NC DEPARTMENT OF TRANSPORTATION DATED JULY 2006 AND WITH THE SPECIAL PROVISIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS.

UNLESS OTHERWISE NOTED ON PLANS, ALL EXPOSED CORNERS ON STRUCTURE SHALL BE CHAMFERED 3/4".

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

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS, SHALL BE FILLED WITH NON-SHRINK GROUT.

THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BONO BREAKER, SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

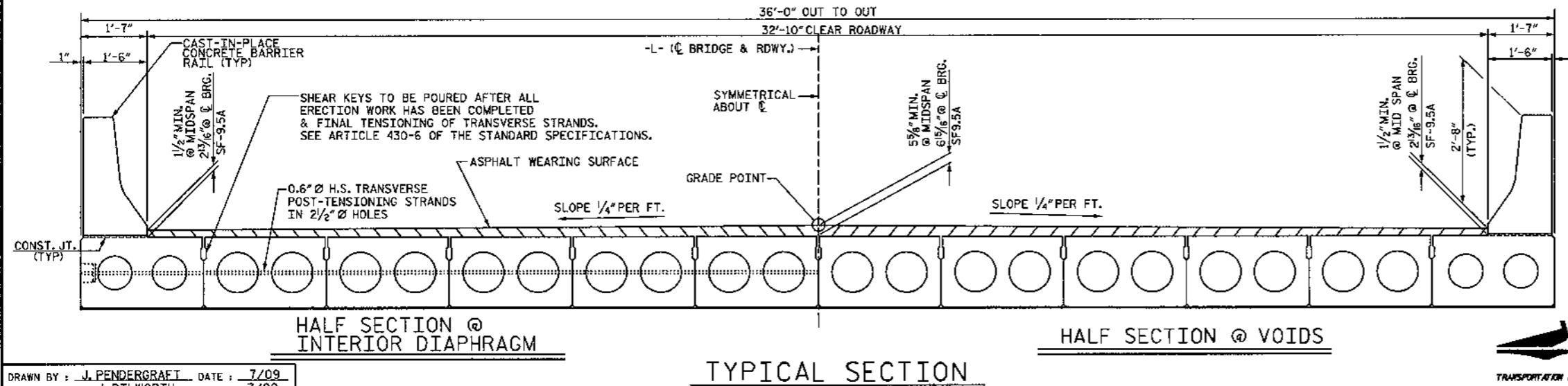
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNITS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

STRUCTURAL STEEL ITEMS SHALL BE OF A GRADE CONFORMING TO EITHER ASTM A36 OR A373, EXCEPT HIGH STRENGTH BOLTS. HIGH STRENGTH BOLTS SHALL BE ASTM A325. ALL STRUCTURAL STEEL SHALL BE GALVANIZED AS PER THE SPECIFICATIONS.



**HALF SECTION @ INTERIOR DIAPHRAGM**

**HALF SECTION @ VOIDS**

**TYPICAL SECTION**

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD PRESTRESSED  
CORED SLAB 25', 45', & 20' SPANS  
32'-10" CLEAR ROADWAY, 90° SKEW



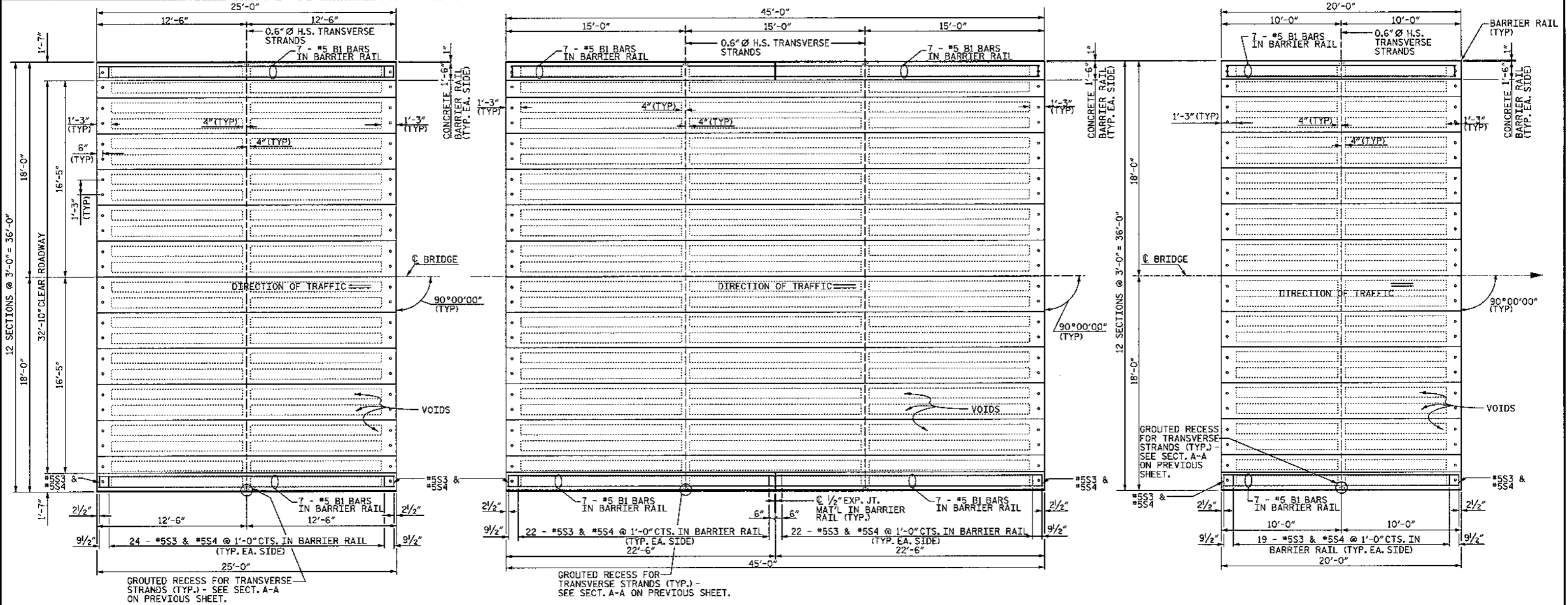
ETHERILL ENGINEERING  
Raleigh, N.C. 27606  
Tel: 919 851 9277  
Fax: 919 851 8107  
LICENCE NO. F-0377

REVISIONS		SHEET NO.	
NO.	DATE	NO.	DATE
1		3	
2		4	

TOTAL SHEETS: 19

DRAWN BY: J. PENDERGRAFT DATE: 7/09  
CHECKED BY: J. DILWORTH DATE: 7/09

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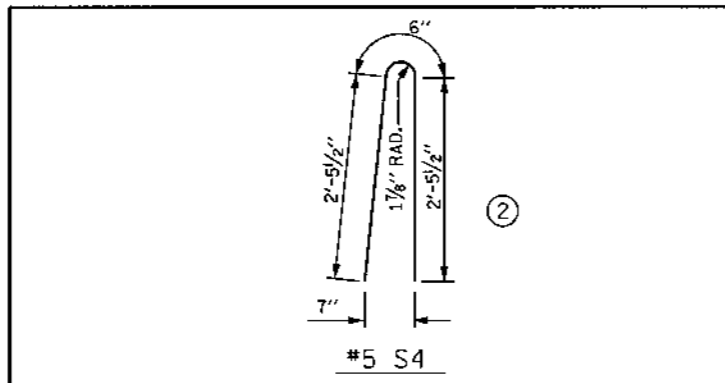


**NOTES**

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

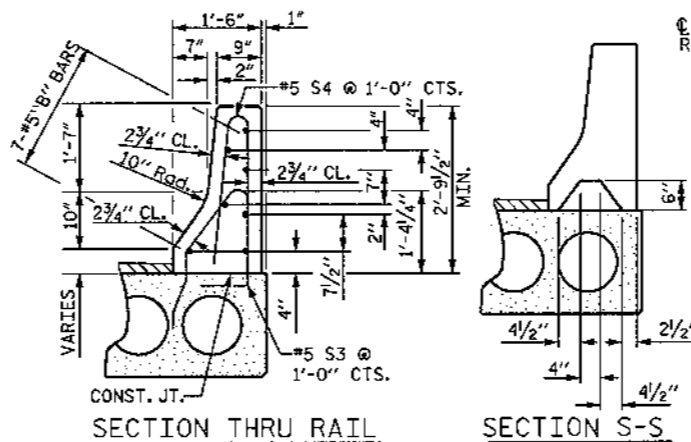
VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOoled IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION 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 MINIMUM HEIGHT OF THE BARRIER RAIL IS SHOWN. THE HEIGHT OF THE BARRIER RAIL VARIES WHILE THE TOP OF THE RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.

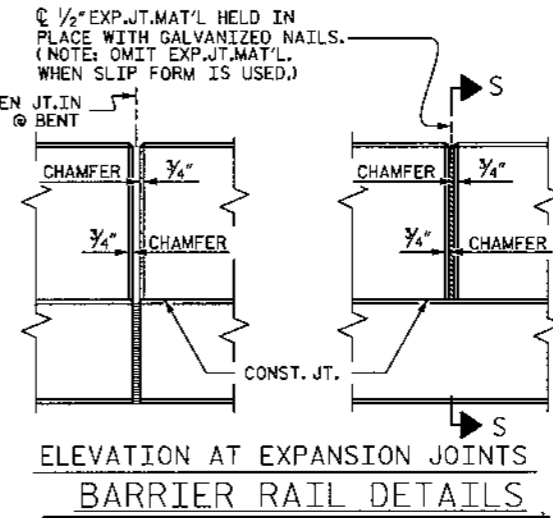


**BILL OF MATERIAL FOR CONCRETE BARRIER RAIL**

BAR	SIZE	TYPE	TOTAL NO. BARS PER SPAN			LENGTH			WEIGHT
			SPAN A	SPAN B	SPAN C	SPAN A	SPAN B	SPAN C	
*B1	#5	STR	14	28	14	24'-8"	22'-1"	19'-8"	1292
*S4	#5		2	52	92	5'-5"	5'-5"	5'-5"	1051
*EPOXY COATED REINFORCING STEEL			2343 LBS.						
CLASS AA CONCRETE			19.3 CU.YDS.						
TOTAL LIN. FT. OF CONCRETE BARRIER RAIL			180						



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



**ELEVATION AT EXPANSION JOINTS BARRIER RAIL DETAILS**

WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PLAN OF SPANS AND CAST IN PLACE CONCRETE BARRIER RAIL**

3-17-09

SEAL 22072  
 ARTHUR DILWORTH

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS 19

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DRAWN BY: J. PENDERGRAFT DATE: 7/09  
 CHECKED BY: J. DILWORTH DATE: 7/09

ETHERILL ENGINEERING  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8077  
 LICENCE NO. 7-0377

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 4 - 1/8" Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

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.

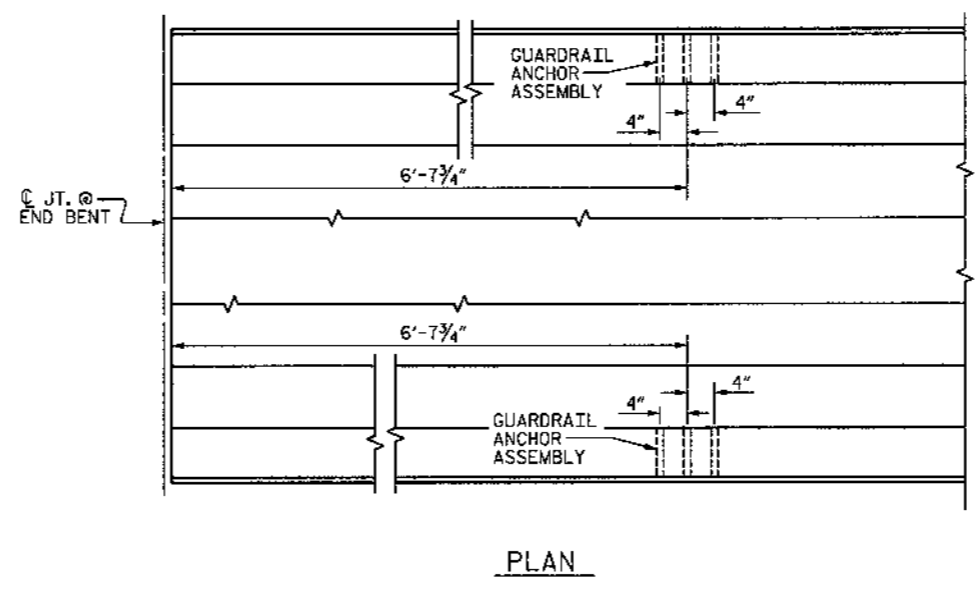
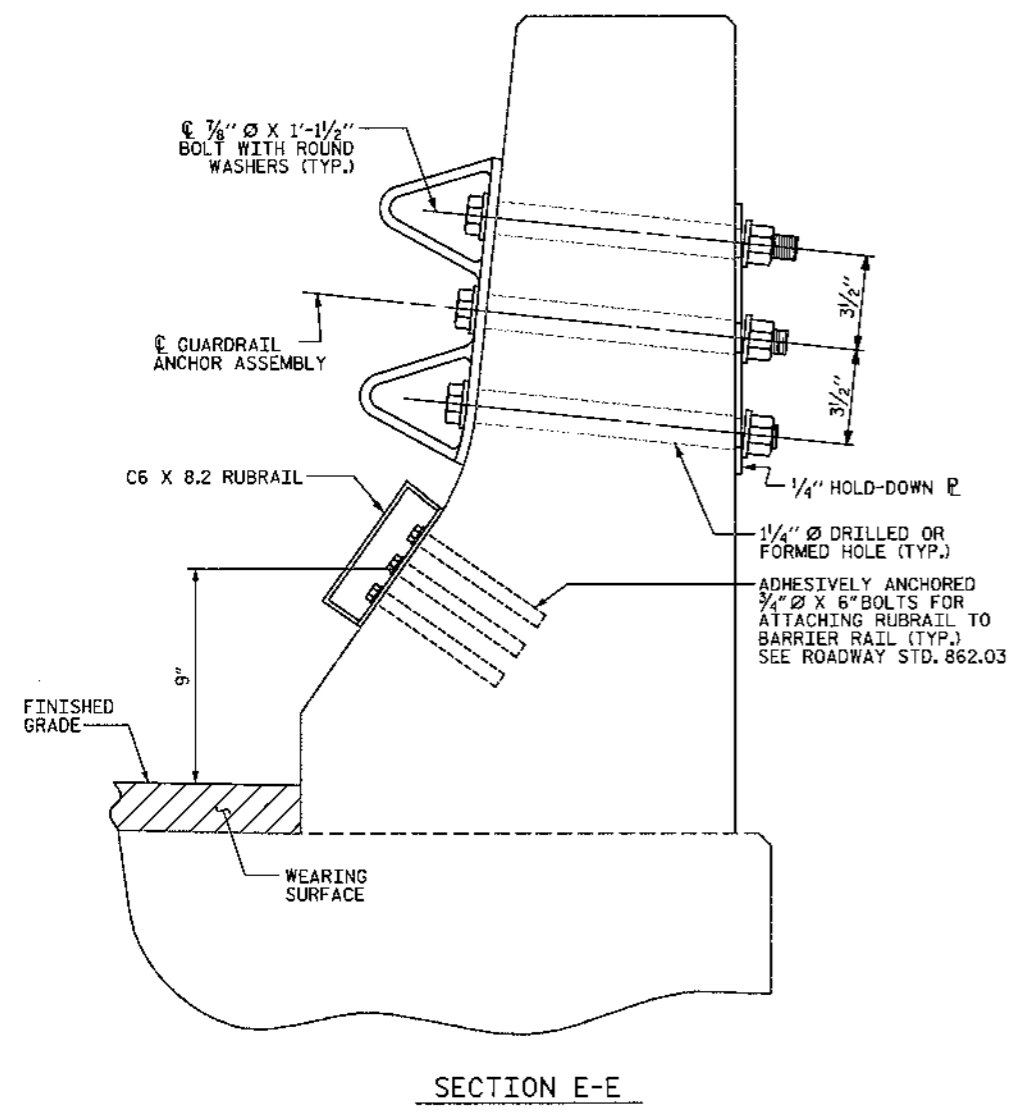
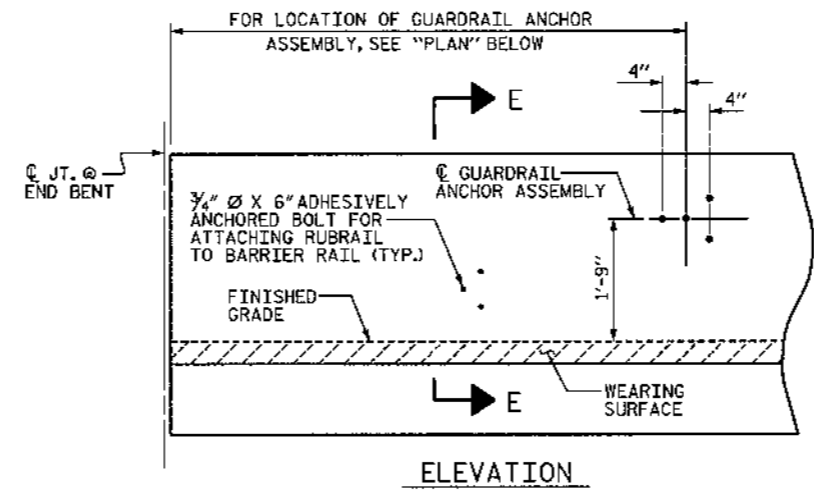
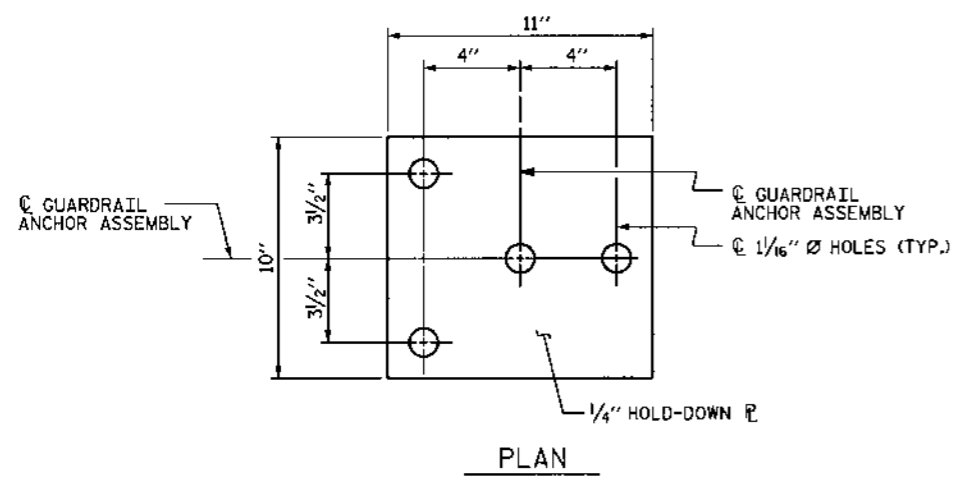
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. 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 BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

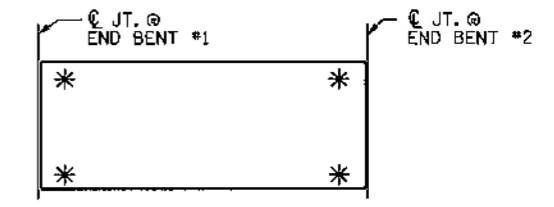
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185



ETHERILL ENGINEERING  
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GS/QPS - CONSTRUCTION OBSERVATION

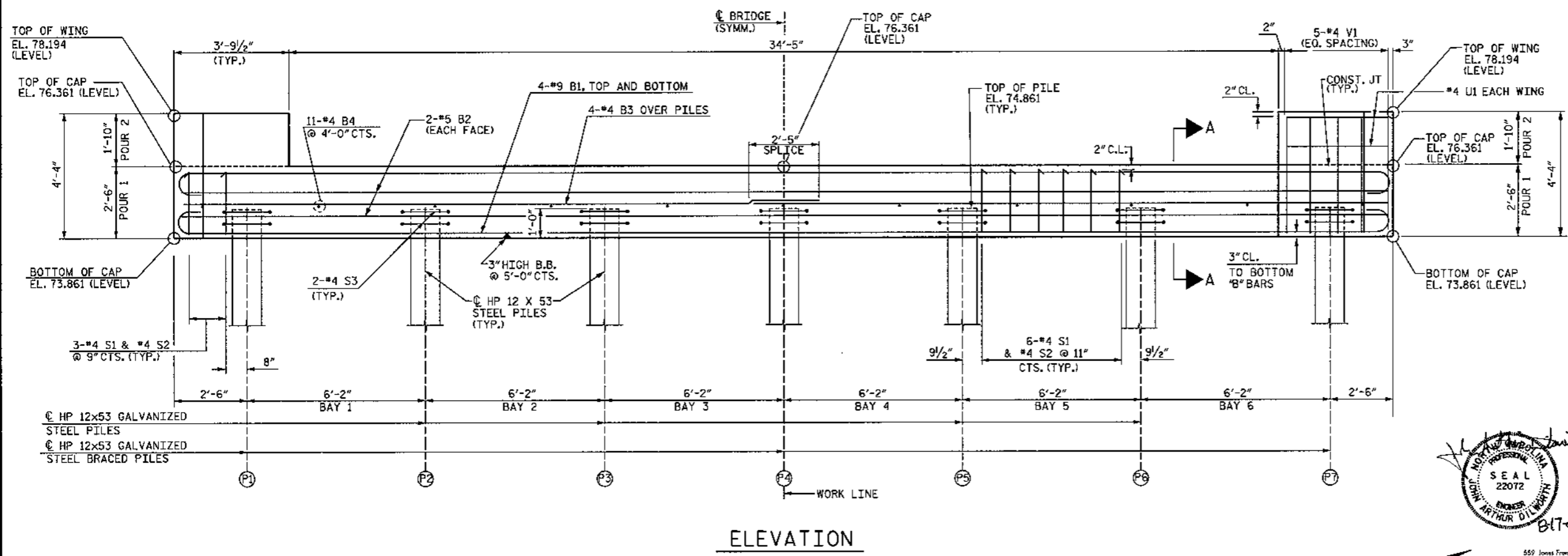
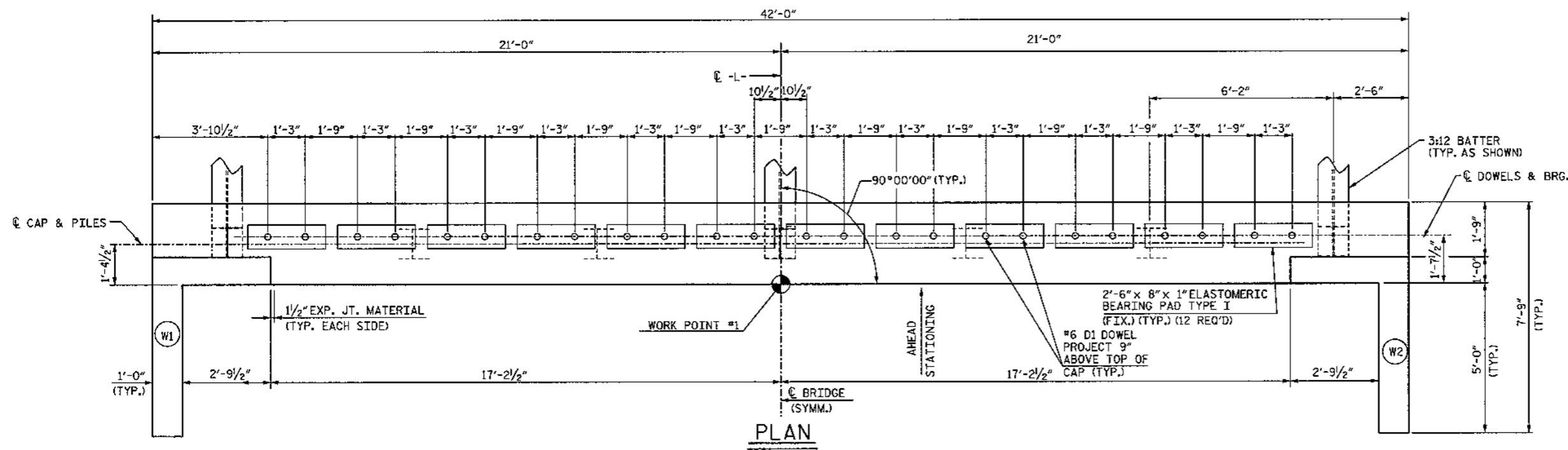
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GUARDRAIL ANCHORAGE FOR BARRIER RAIL					
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					5
					TOTAL SHEETS
					19

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 8/17/2009 10:13:50 AM

DRAWN BY: J. PENDERGRAFT DATE: 7/09  
 CHECKED BY: J. DILWORTH DATE: 7/09

**NOTES:**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 FOR SECTION A-A SEE SHEET 2 OF 3.  
 FOR MISC. DETAILS SEE SHEET 2 OF 3.



WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185  
 SHEET 1 OF 3



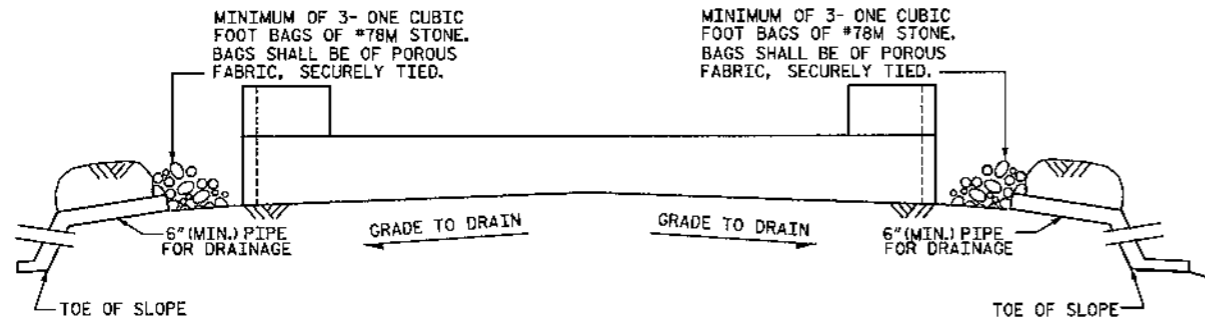
ETHERILL ENGINEERING  
 559 Jones Franklin Rd.  
 Suite 104  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0372

STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION		RALEIGH	
SUBSTRUCTURE END BENT 1					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. 6
					TOTAL SHEETS 19

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DRAWN BY: J. PENDERGRAFT DATE: 7/09  
 CHECKED BY: J. DILWORTH DATE: 7/09

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

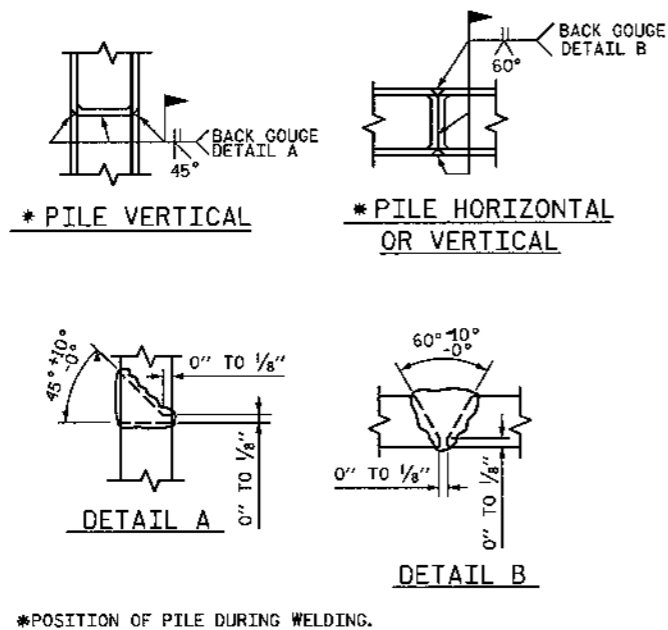


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

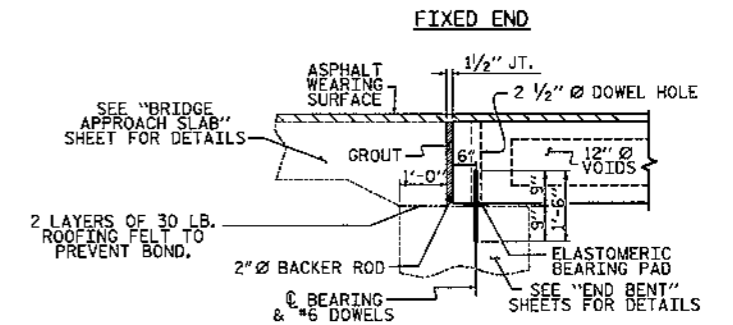
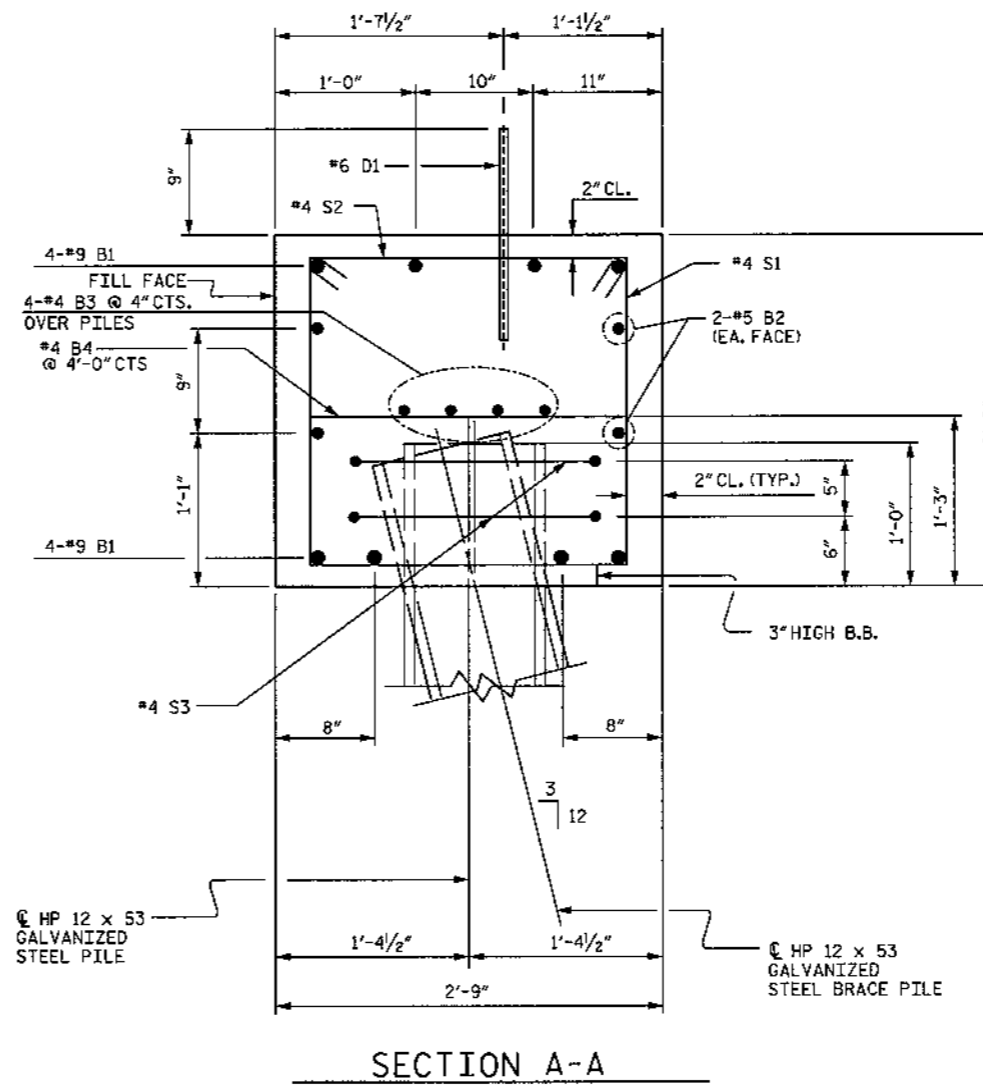
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



### PILE SPLICE DETAILS



### SECTION AT END BENT

NOTE:  
 ☉ OF DOWELS SHALL MATCH ☉ OF DOWEL HOLES IN CORED SLAB UNITS.

WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1

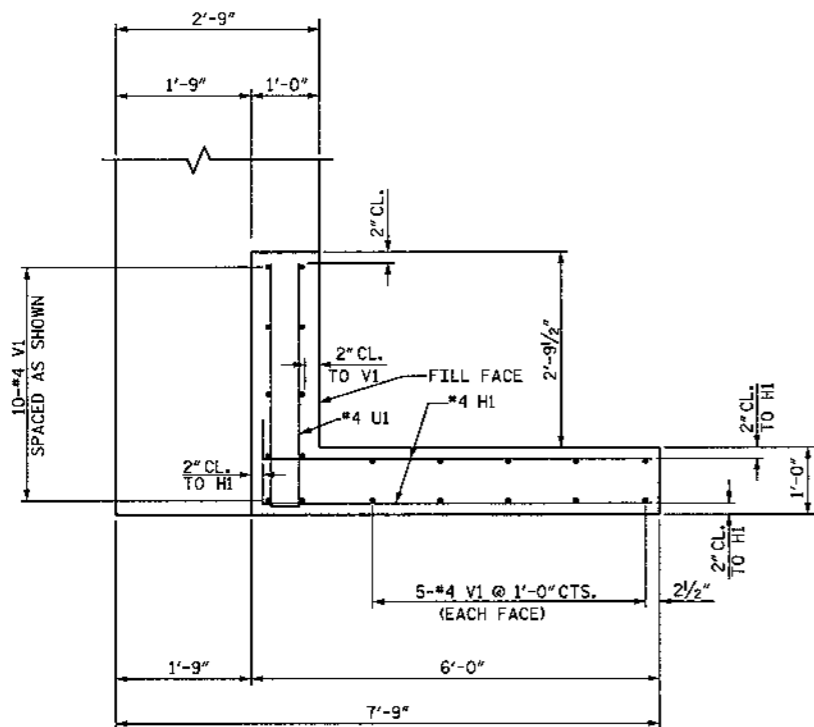


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 559 Jones Franklin Rd.  
 Suite 804  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

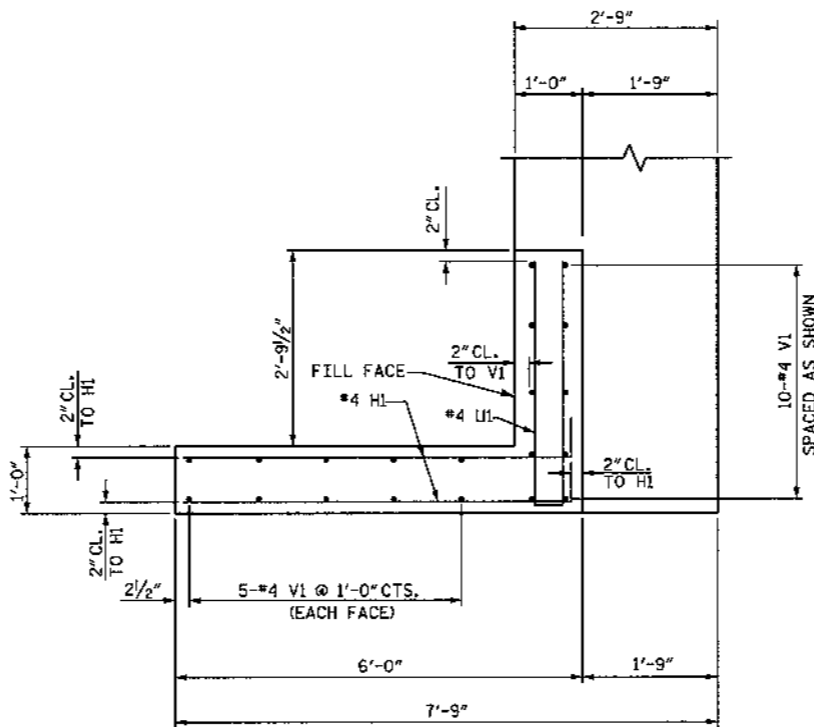
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	7
1			3			TOTAL SHEETS
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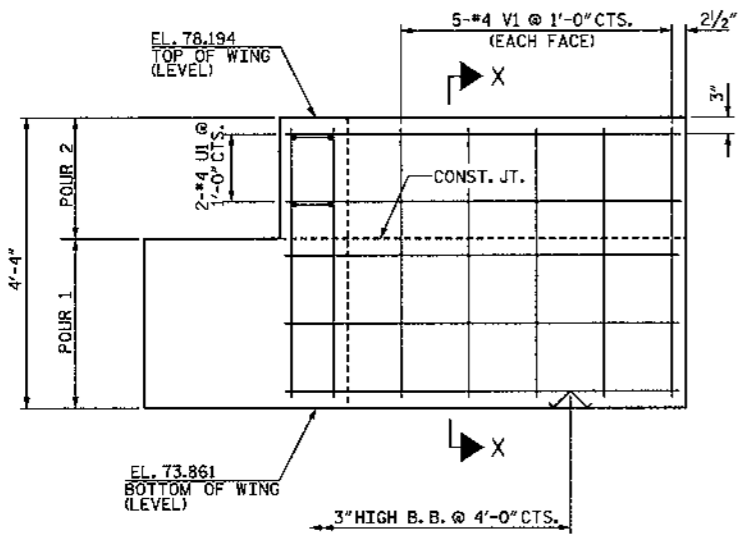
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 CHECKED BY: J. DILWORTH DATE: 7/09



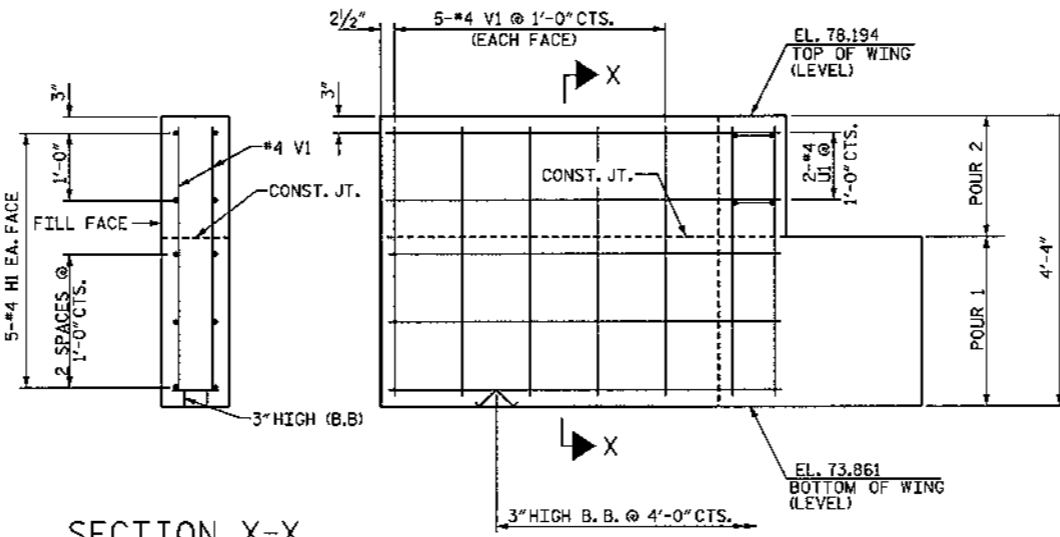
PLAN OF WING (W1)



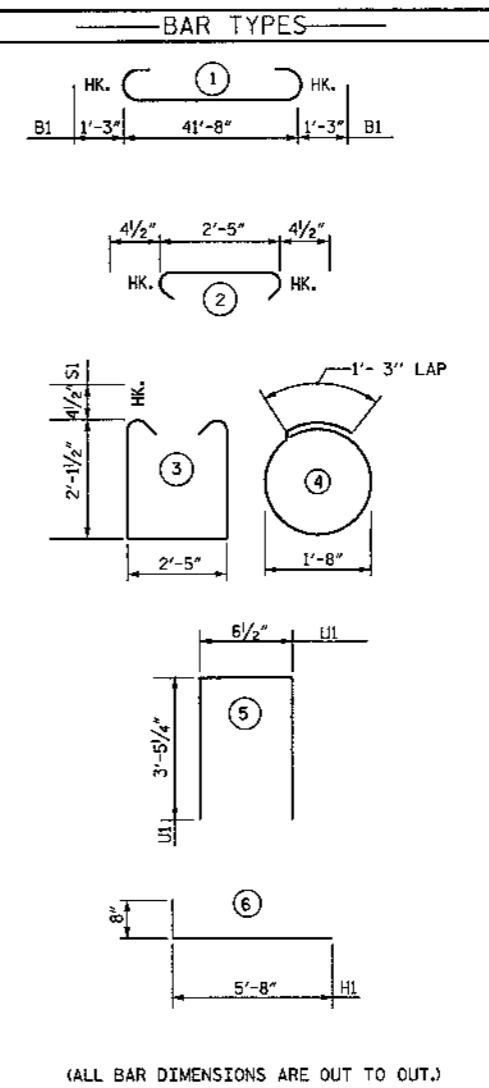
PLAN OF WING (W2)



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



BILL OF MATERIAL					
END BENT 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-2"	1201
B2	4	#5	STR	41'-8"	174
B3	8	#4	STR	22'-1"	118
B4	11	#4	STR	2'-5"	18
D1	24	#6	STR	1'-6"	54
H1	20	#4	6	6'-4"	85
S1	42	#4	3	7'-5"	208
S2	42	#4	2	3'-2"	89
S3	14	#4	4	6'-6"	61
U1	4	#4	5	7'-5"	20
V1	40	#4	STR	3'-11"	105
REINFORCING STEEL					= 2133 LBS.
CLASS A CONCRETE					
POUR 1 CAP & LOWER PART OF WINGS				C.Y.	11.6
POUR 2 UPPER PART OF WINGS				C.Y.	1.2
TOTAL				C.Y.	12.8
HP 12 X 53 GALVANIZED STEEL PILES					
NO.=7 (LIN. FT.)					287'
STEEL PILE POINTS WITH TEETH					
TOTAL NO. = 7					

WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185  
 SHEET 3 OF 3



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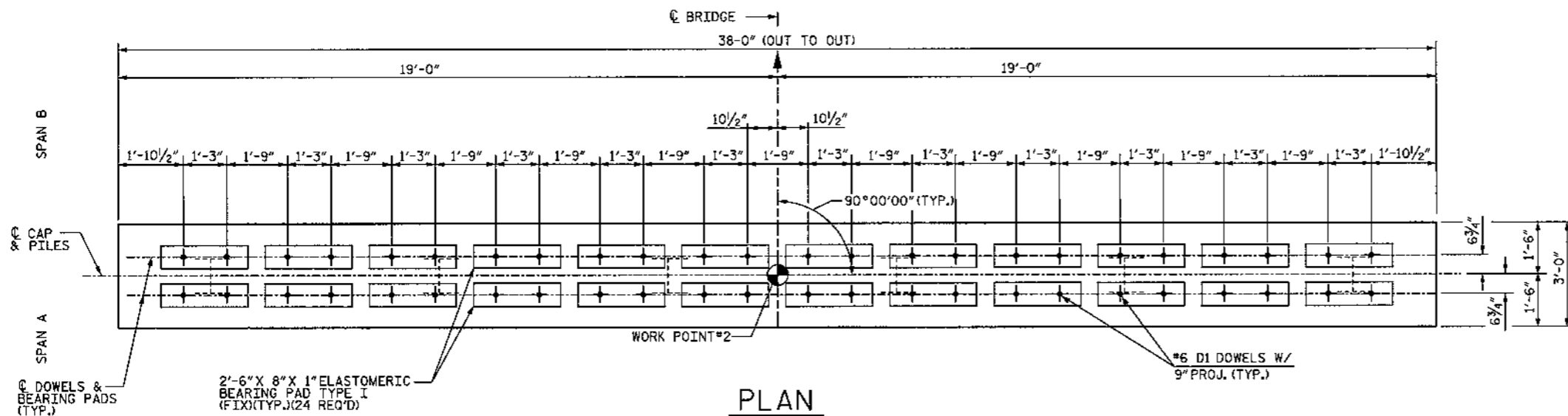
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1					
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
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2			4		
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					TOTAL SHEETS 19

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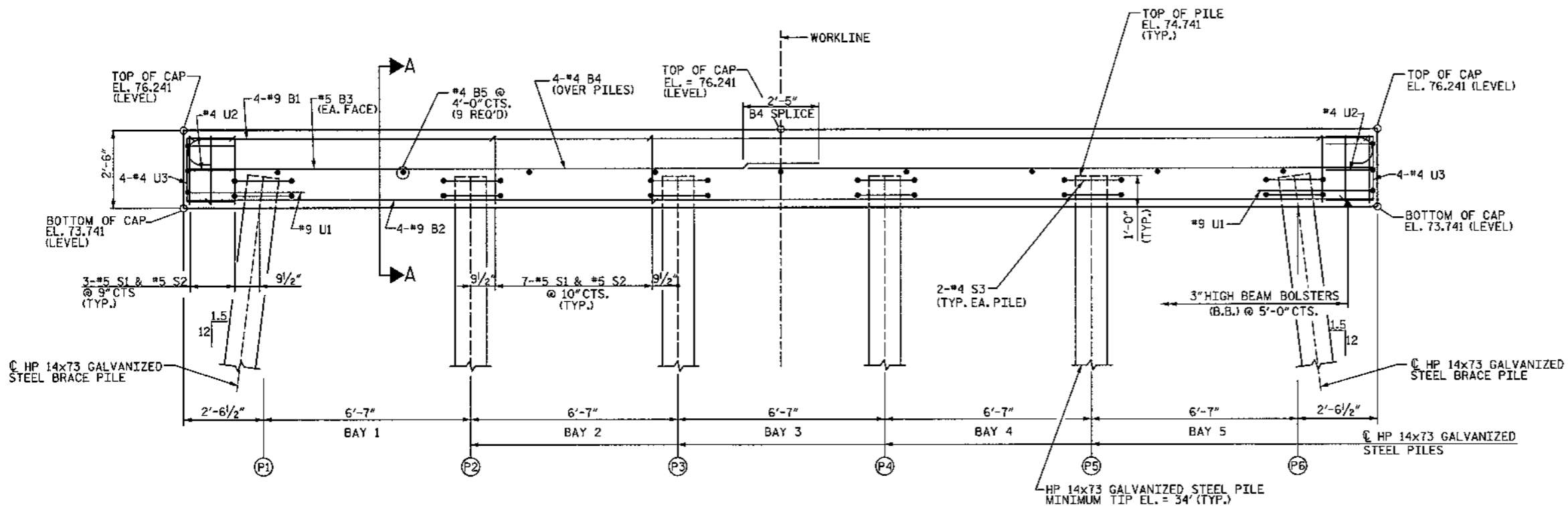
DRAWN BY: J. PENDERGRAFT DATE: 7/09  
 CHECKED BY: J. DILWORTH DATE: 7/09



NOTES:  
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #6 D1 DOWELS.



PLAN



ELEVATION

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185  
SHEET 1 OF 2

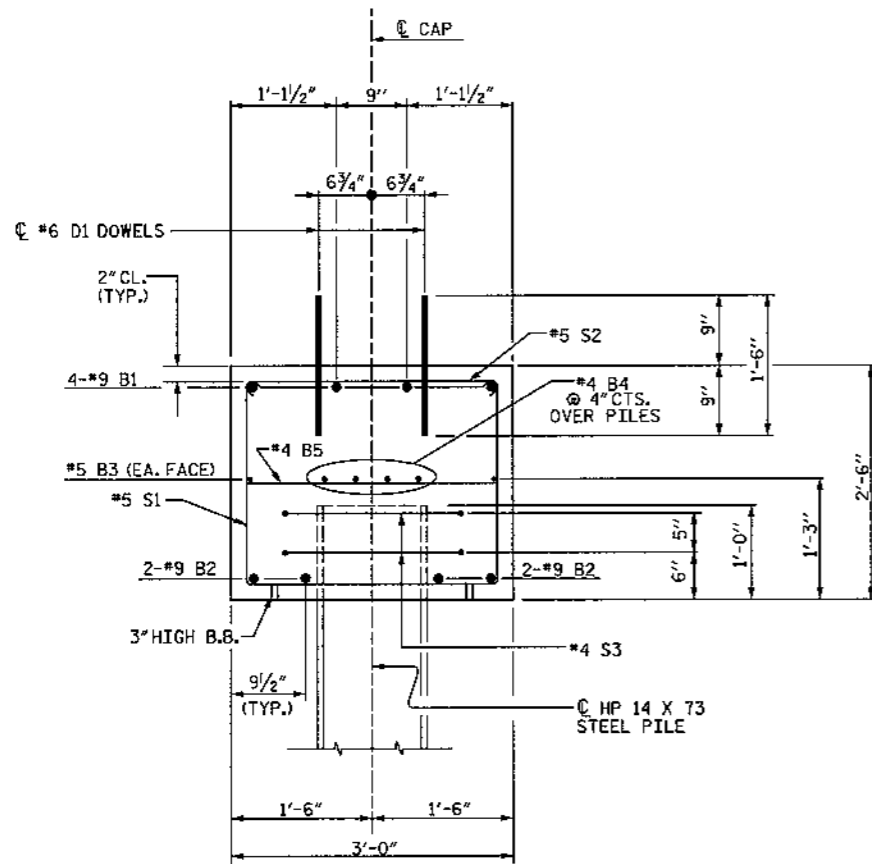


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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

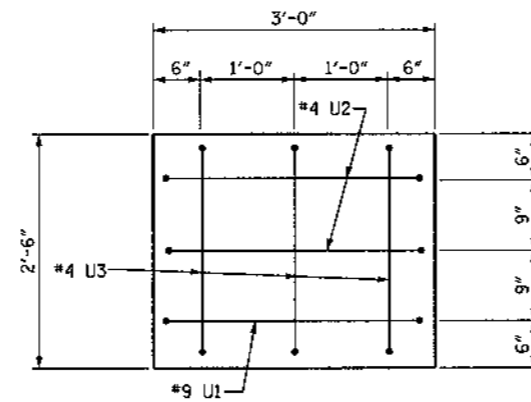
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH RALEIGH						SHEET NO. 9
SUBSTRUCTURE BENT 1						TOTAL SHEETS 19
REVISIONS						
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

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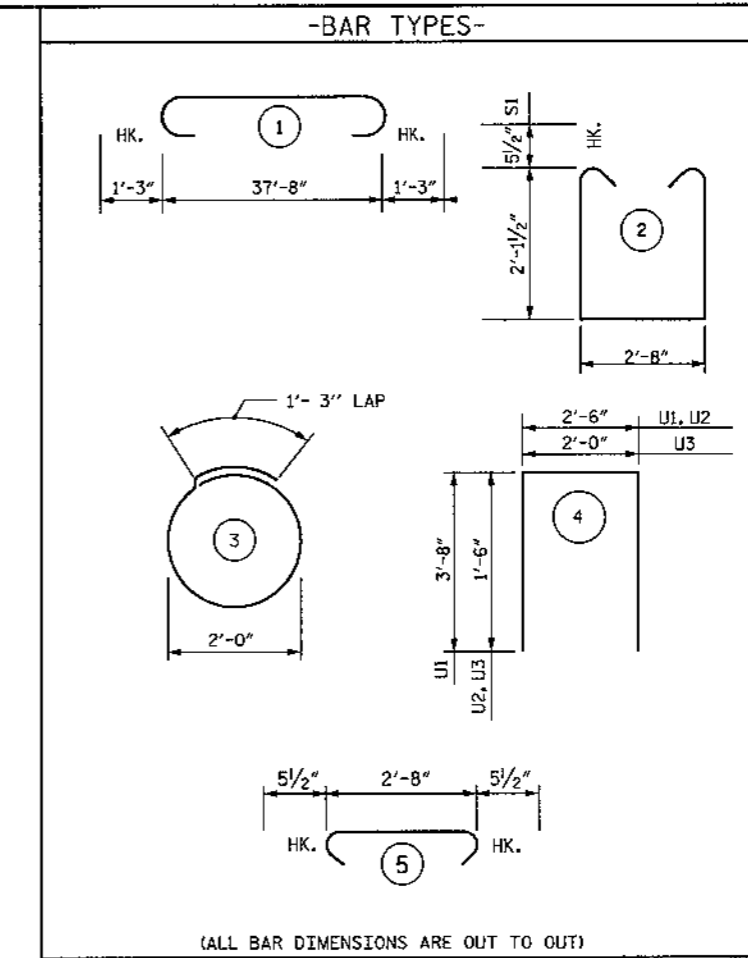


SECTION A-A



END VIEW  
(TYP. EA. END)

2" MIN. COVER FROM END OF CAP REQUIRED FOR ALL #9U1, #4U2 AND #4U3 BARS.  
#9U1, #4U2 AND #4U3 BARS MAY BE SHIFTED UP TO 2" TO CLEAR "B" BARS.

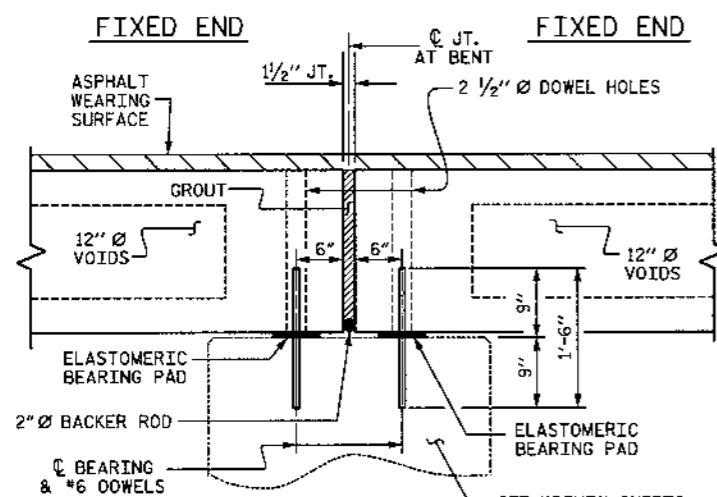


(ALL BAR DIMENSIONS ARE OUT TO OUT)

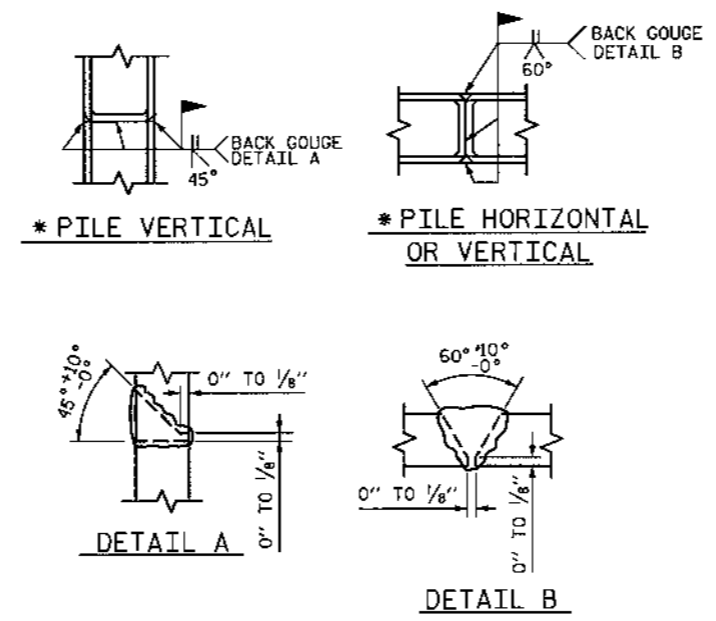
BILL OF MATERIAL

BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	4	#9	1	40'-2"	546
B2	4	#9	STR	37'-8"	512
B3	2	#5	STR	37'-8"	79
B4	8	#4	STR	20'-1"	107
B5	9	#4	STR	2'-8"	16
D1	48	#6	STR	1'-6"	108
S1	41	#5	2	7'-10"	335
S2	41	#5	5	3'-7"	153
S3	12	#4	3	7'-7"	61
U1	2	#9	4	9'-10"	67
U2	4	#4	4	5'-6"	15
U3	6	#4	4	5'-0"	20

REINFORCING STEEL 2019 LBS.  
CLASS A CONCRETE  
BENT CAP 10.6 C.Y.  
HP 14x73 GALVANIZED STEEL PILES  
NO. 6 246 LIN. FT.



SECTION AT BENT



PILE SPLICE DETAILS  
\*POSITION OF PILE DURING WELDING.

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185  
SHEET 2 OF 2



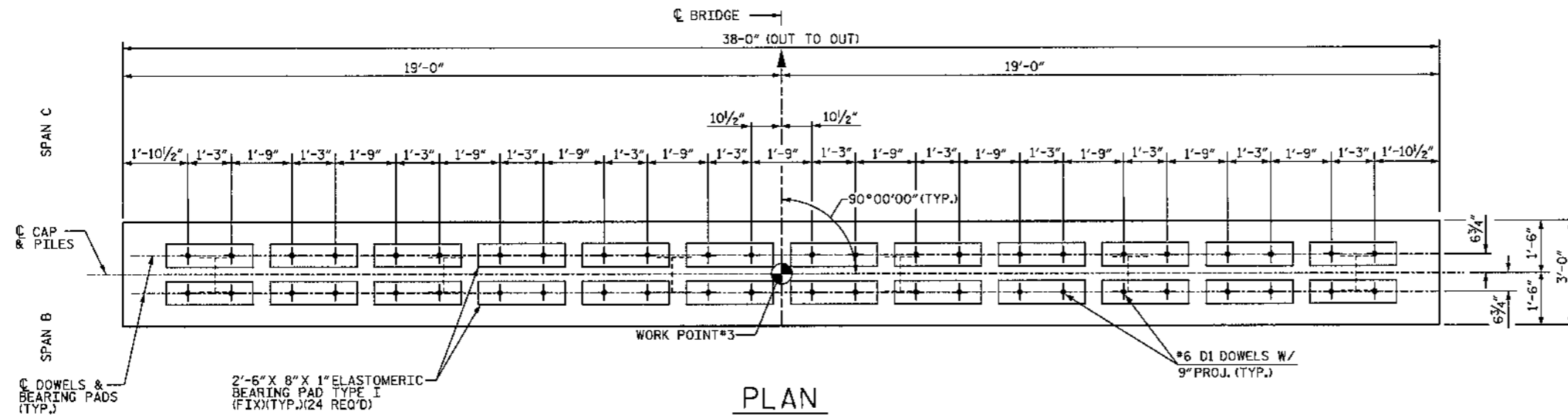
ETHERILL ENGINEERING  
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 19

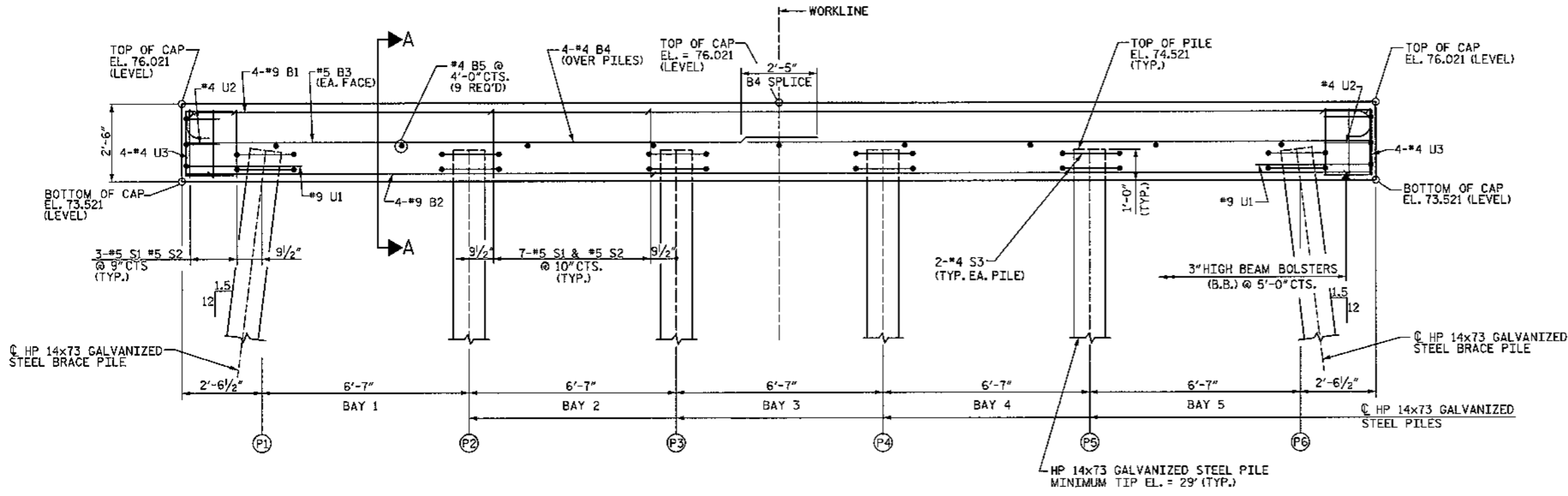
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NOTES:  
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #6 D1 DOWELS.



PLAN



ELEVATION

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185  
SHEET 1 OF 2

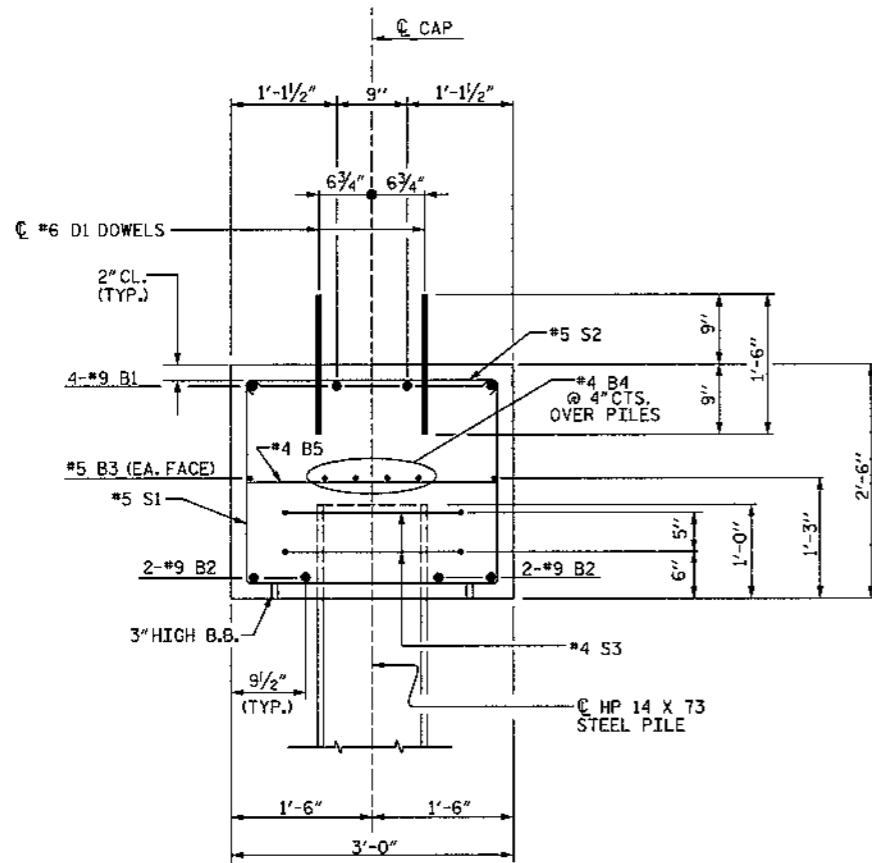


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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GS/GPS - CONSTRUCTION OBSERVATION

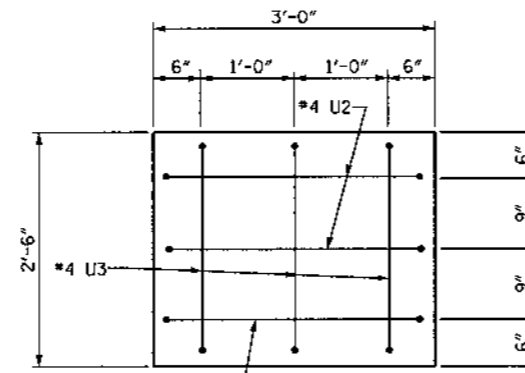
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
TOTAL SHEETS					11
					19

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CHECKED BY: J. DILWORTH DATE: 7/09



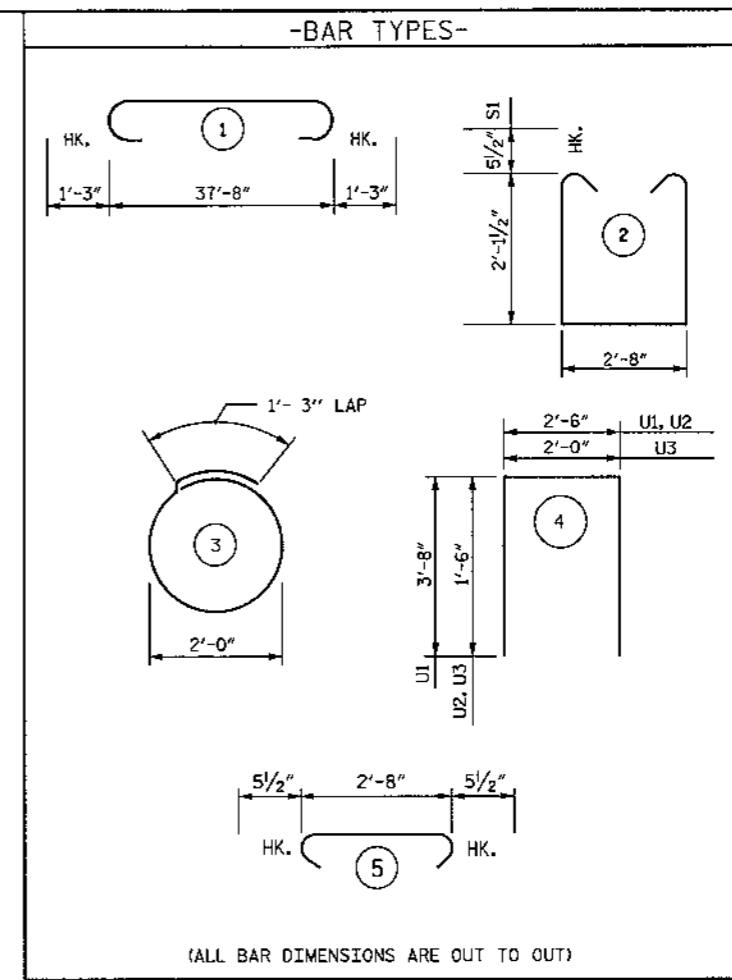
SECTION A-A



END VIEW

(TYP. EA. END)

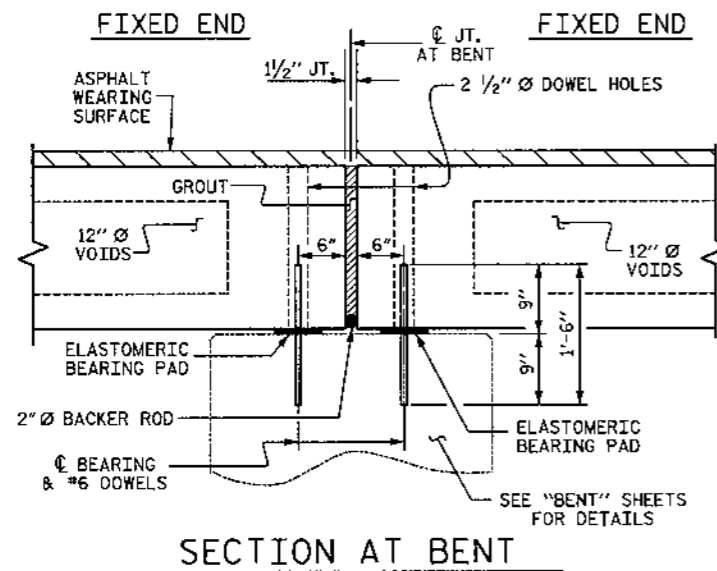
2" MIN. COVER FROM END OF CAP REQUIRED FOR ALL #9U1, #4U2 AND #4U3 BARS.  
#9U1, #4U2 AND #4U3 BARS MAY BE SHIFTED UP TO 2" TO CLEAR "B" BARS.



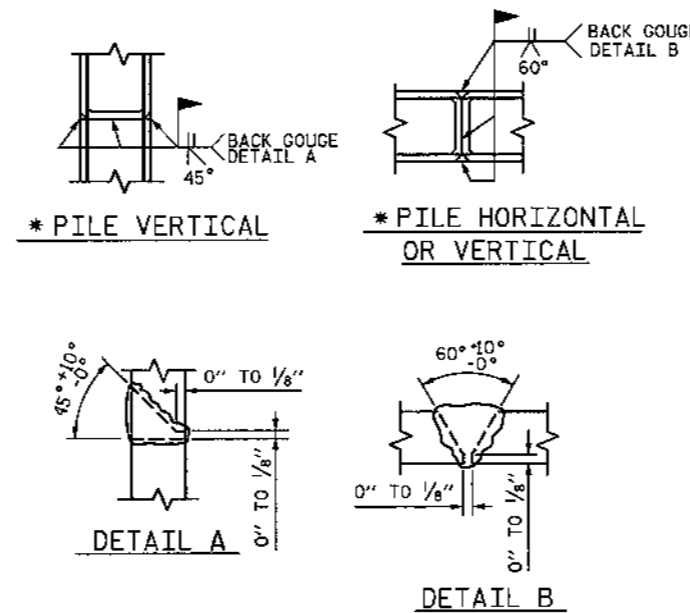
(ALL BAR DIMENSIONS ARE OUT TO OUT)

BILL OF MATERIAL					
BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	4	#9	1	40'-2"	546
B2	4	#9 STR	1	37'-8"	512
B3	2	#5 STR	1	37'-8"	79
B4	8	#4 STR	1	20'-1"	107
B5	9	#4 STR	1	2'-8"	16
D1	48	#6 STR	1	1'-6"	108
S1	41	#5	2	7'-10"	335
S2	41	#5	5	3'-7"	153
S3	12	#4	3	7'-7"	61
U1	2	#9	4	9'-10"	67
U2	4	#4	4	5'-6"	15
U3	6	#4	4	5'-0"	20

REINFORCING STEEL 2019 LBS.  
CLASS A CONCRETE  
BENT CAP 10.6 C.Y.  
HP 14x73 GALVANIZED STEEL PILES  
NO. 6 276 LIN. FT.



SECTION AT BENT



PILE SPLICE DETAILS

\* POSITION OF PILE DURING WELDING.

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185  
SHEET 2 OF 2

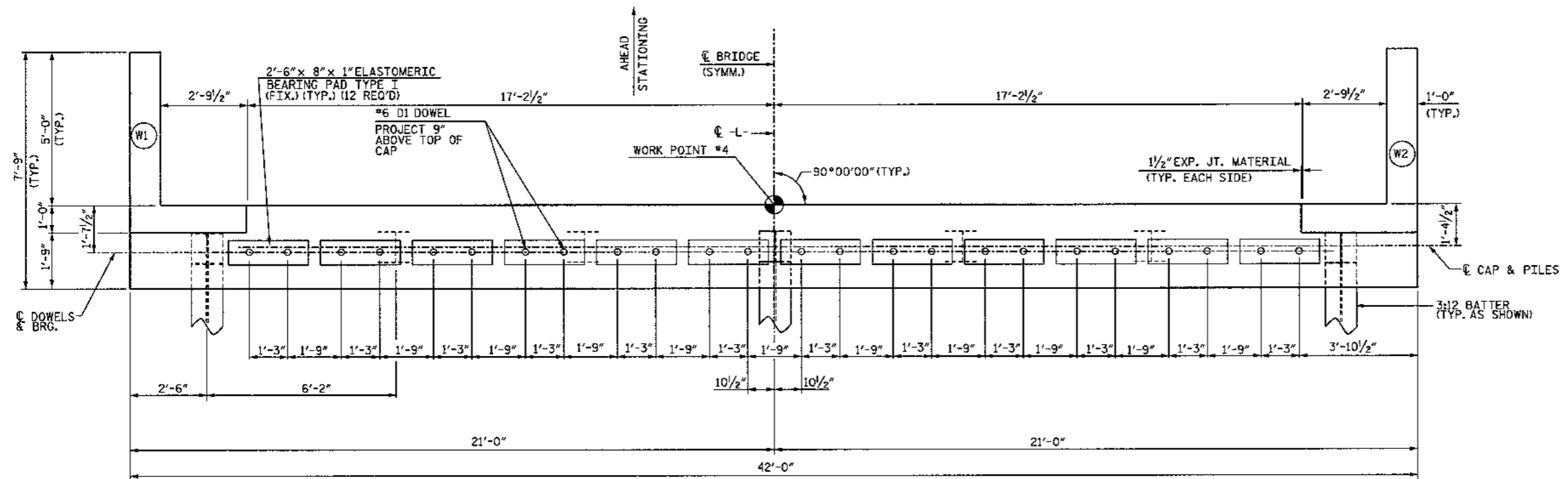
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SUBSTRUCTURE BENT 2					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			1		
2			2		
					12
					TOTAL SHEETS
					19

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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

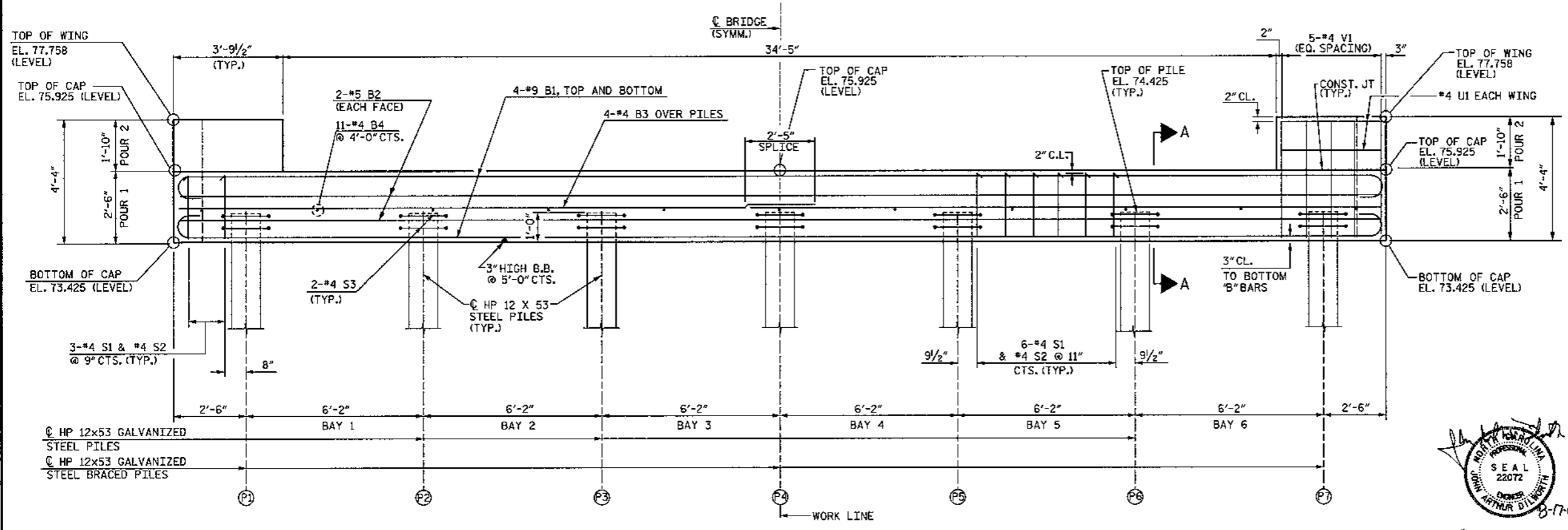
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CHECKED BY: J. DILWORTH DATE: 7/09

**NOTES:**  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 FOR SECTION A-A, SEE END BENT 1, SHEET 2 OF 3.  
 FOR MISC. DETAILS, SEE END BENT 1, SHEET 2 OF 3.



**PLAN**



**ELEVATION**

WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2

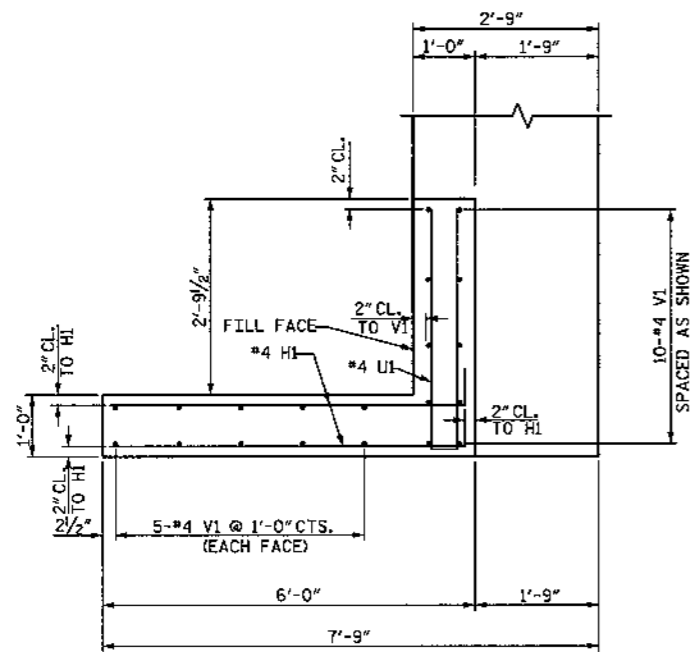


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 559 Jones Emilek Rd.  
 Suite 164  
 Raleigh, N.C. 27605  
 Fax: 919 851 8072  
 Lic: 919 851 8102  
 LICENCE NO. F-0077

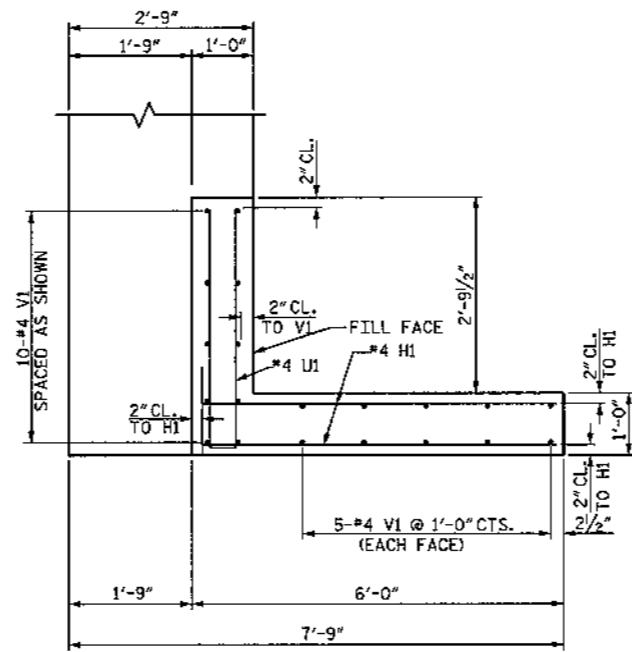
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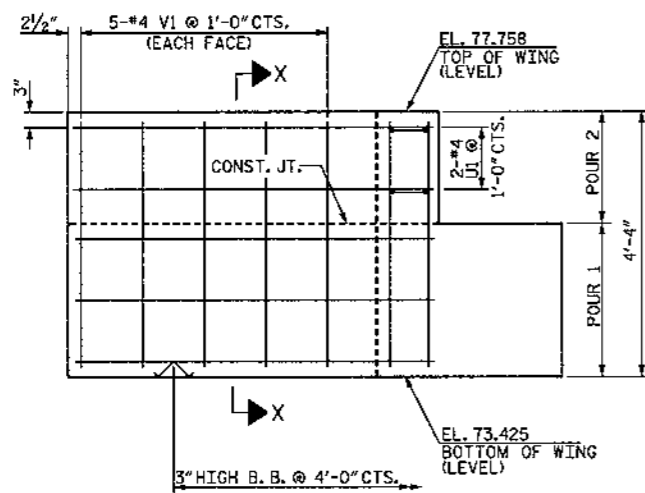
DRAWN BY: J. PENDERGRAFT DATE: 7/09  
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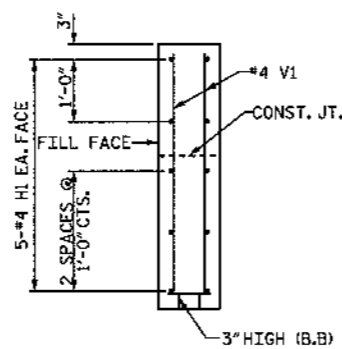
PLAN OF WING (W1)



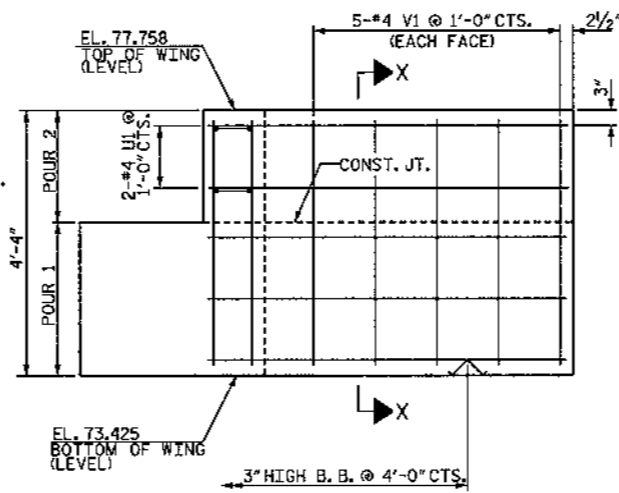
PLAN OF WING (W2)



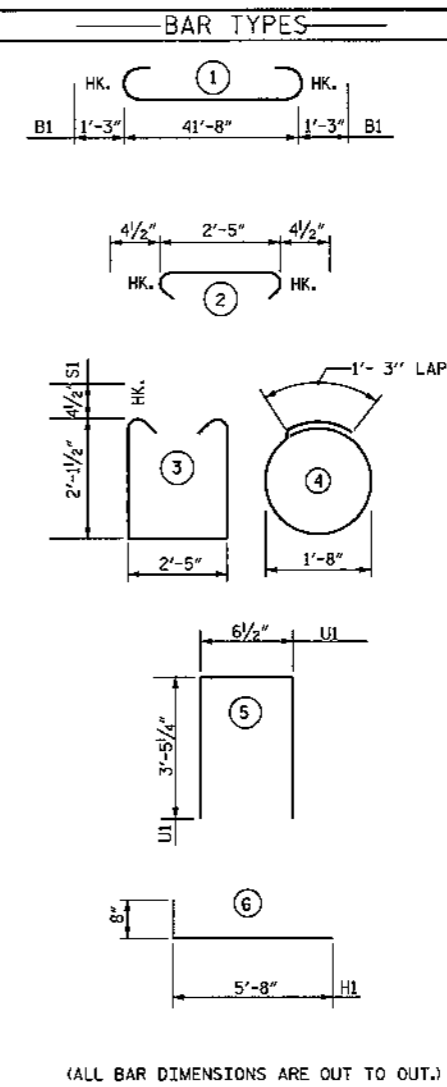
ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)



(ALL BAR DIMENSIONS ARE OUT TO OUT.)

BILL OF MATERIAL

END BENT 2

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	#8		44'-2"	1201
B2	#5	STR	41'-8"	174
B3	#4	STR	22'-1"	118
B4	#4	STR	2'-5"	18
D1	#6	STR	1'-6"	54
H1	#4		6'-4"	85
S1	#4		7'-5"	208
S2	#4		3'-2"	89
S3	#4		6'-6"	61
U1	#4		7'-5"	20
V1	#4	STR	3'-11"	105
REINFORCING STEEL				= 2133 LBS.
CLASS A CONCRETE				
POUR 1 CAP & LOWER PART OF WINGS			C.Y. 11.6	
POUR 2 UPPER PART OF WINGS			C.Y. 1.2	
TOTAL			C.Y. 12.8	
HP 12 X 53 GALVANIZED STEEL PILES				
NO.=7 (LIN. FT.)			322'	

WBS NO. 35570  
 COLUMBUS COUNTY  
 STATION: 10+25.000 -L-  
 REPLACES BRIDGE NO. 185

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 2

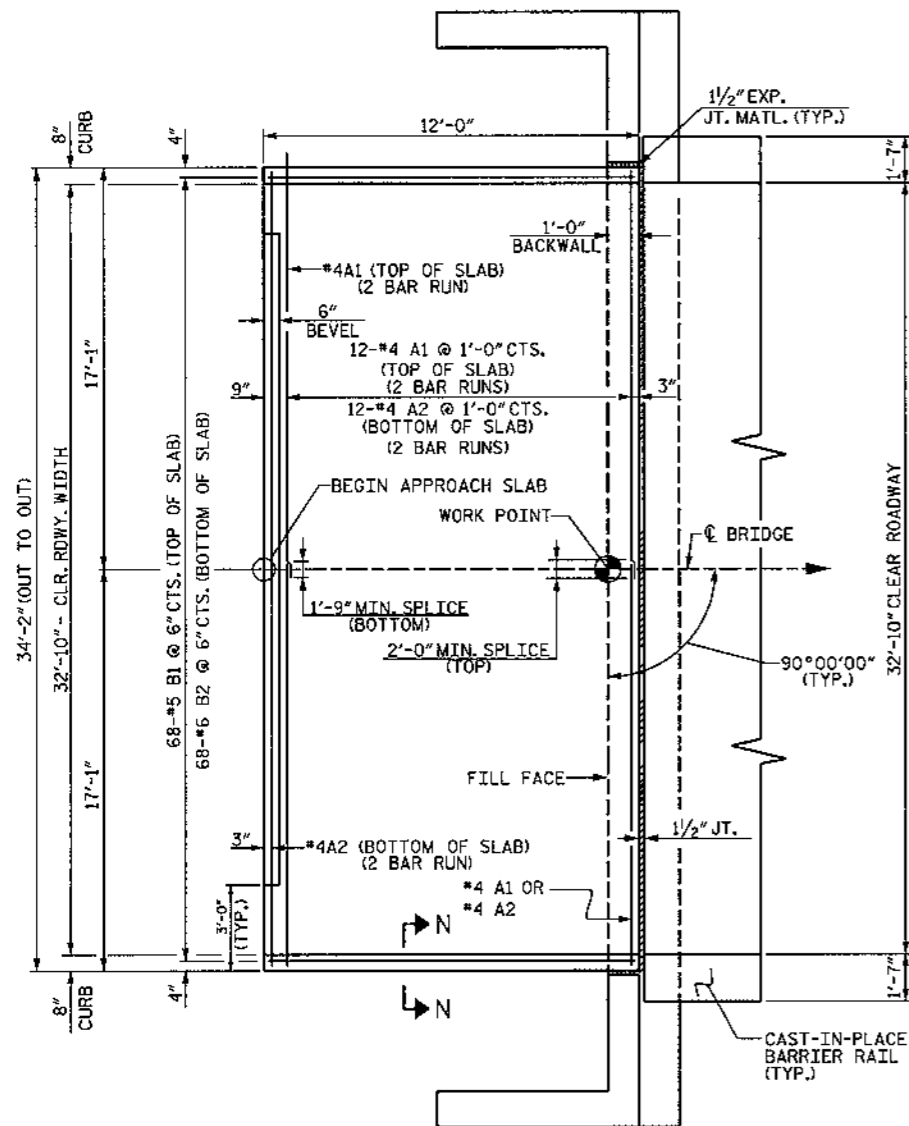


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 Raleigh, N.C. 27606  
 Box: 919 851 8077  
 Fax: 919 851 9707  
 LICENSE NO. F-02277

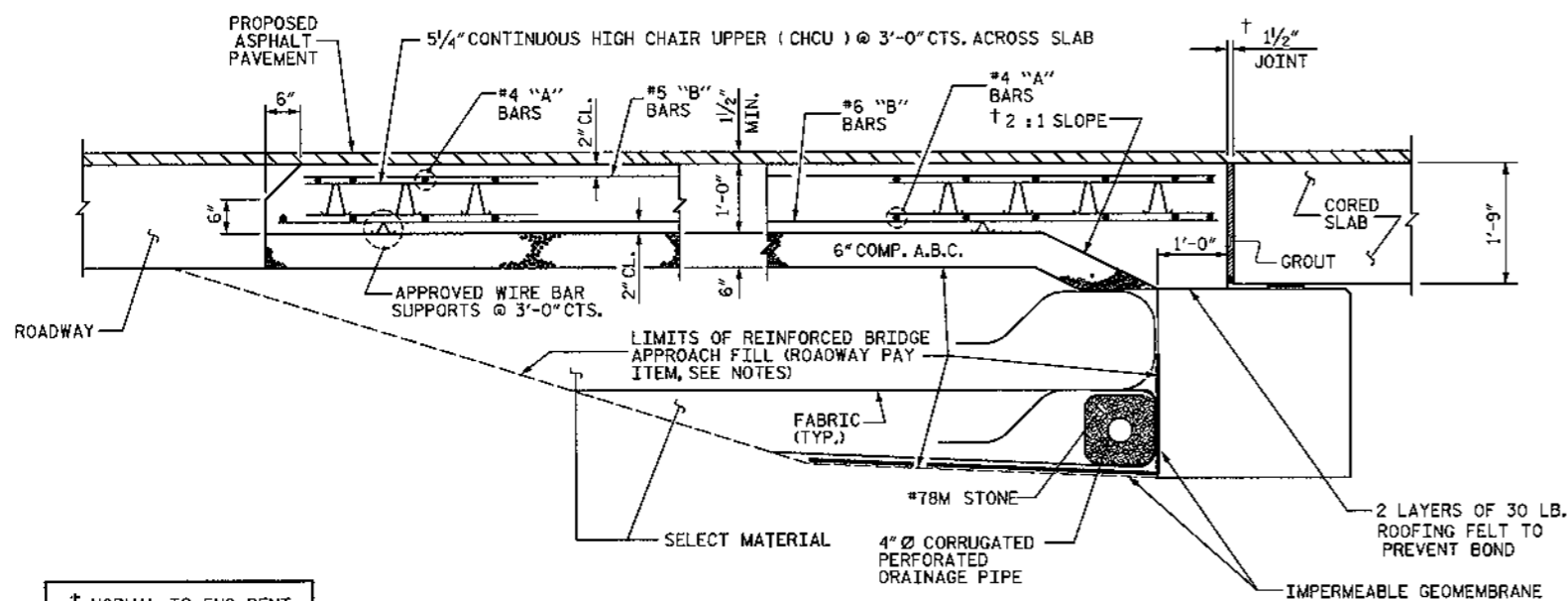
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NO.	BY	DATE		14
1			3	TOTAL SHEETS
2			4	19

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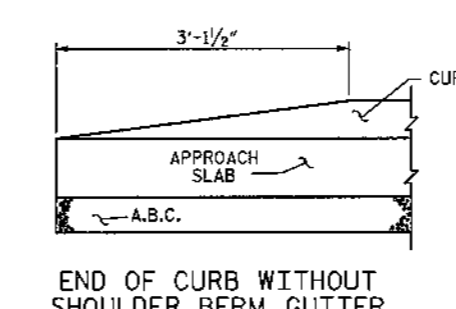
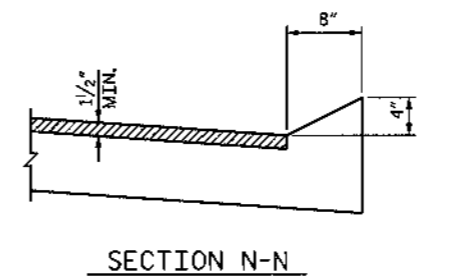
DRAWN BY: J. PENDERGRAFT DATE: 7/09  
 CHECKED BY: J. DILWORTH DATE: 7/09



PLAN OF APPROACH SLAB @ END BENT 1  
(END BENT 2 SIMILAR)



SECTION THRU SLAB



CURB DETAILS

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY STANDARD 422.10.

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 WITH 4" OF INTERMEDIATE OR SURFACE COURSE ASPHALT.

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 THE APPROACH 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 "SECTION AT END BENT" SHEET NO. 7.

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.

WORK SHOWN ON THIS DRAWING WILL BE PAID UNDER THE LUMP SUM PRICE FOR APPROACH SLABS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR APPROACH SLABS, SEE ROADWAY STANDARD 1622.01.

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	24	#4	STR	17'-11"	287
A2	26	#4	STR	17'-10"	310
* B1	68	#5	STR	11'-2"	792
B2	68	#6	STR	11'-8"	1192
REINFORCING STEEL				LBS.	1502
*EPOXY COATED REINFORCING STEEL				LBS.	1079
CLASS AA CONCRETE				C. Y.	16.9

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB



WETHERILL ENGINEERING  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENCE NO. P-0377

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
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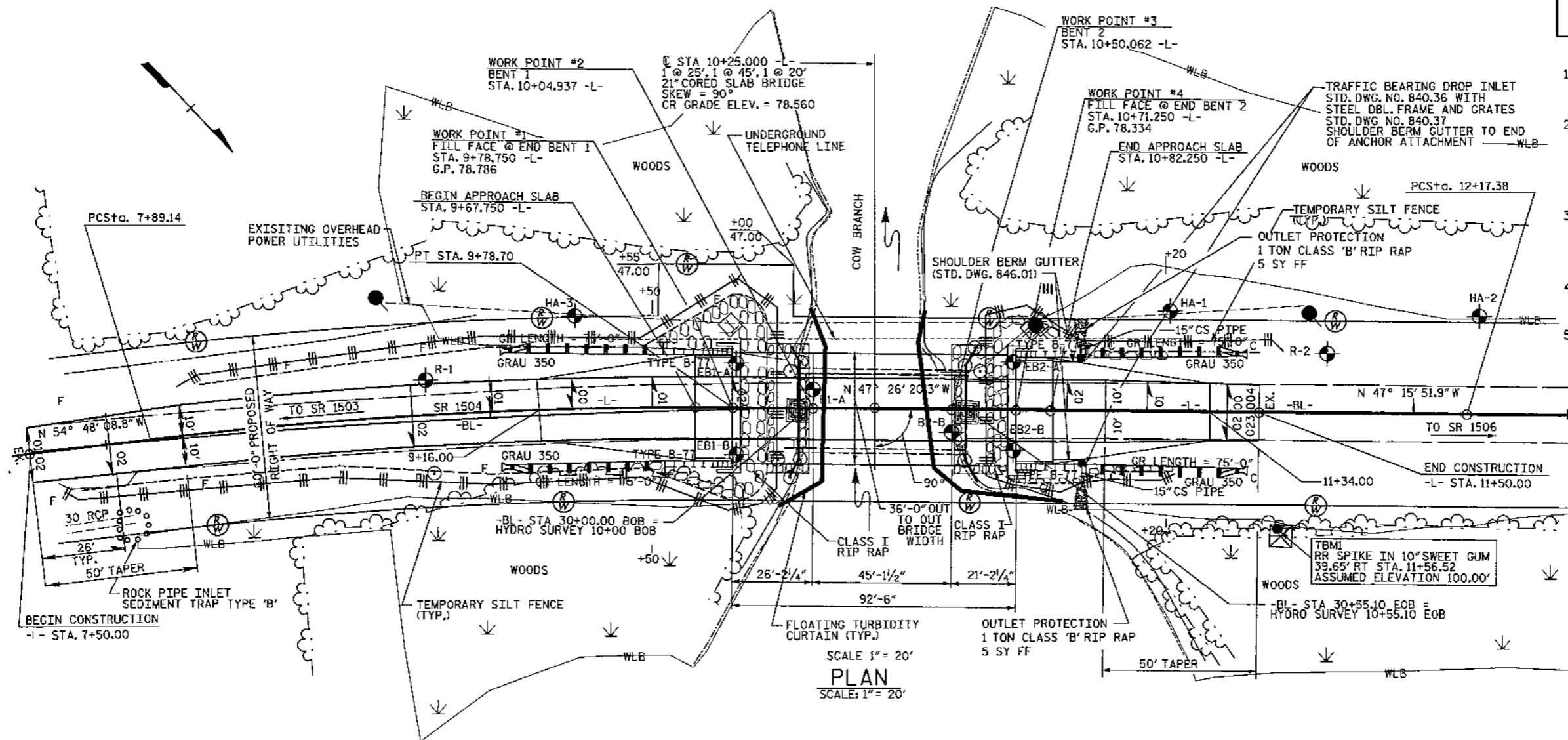
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DRAWN BY: J. PENDERGRAFT DATE: 7/09  
CHECKED BY: J. DILWORTH DATE: 7/09

# EROSION CONTROL PLAN

ROADSIDE ENVIRONMENTAL UNIT  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, NC  
2002 STANDARD SPECIFICATIONS



- CONSTRUCTION SEQUENCE
1. ACCESS AND MOBILIZATION; STABILIZE BARE AREAS IMMEDIATELY WITH TEMPORARY VEGETATION AND/OR GRAVEL AS CONSTRUCTION TAKES PLACE.
  2. INSTALL SILT FENCE AND TURBIDITY CURTAIN. SILT FENCE SHALL BE INSTALLED UP TO THE EXISTING BRIDGE ABUTMENTS TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE. SILT FENCE SHALL BE INSTALLED AT THE PERIMETER OF DISTURBED AREAS.
  3. PROCEED WITH CONSTRUCTION OF THE NEW BRIDGE. ADDITIONAL GRAVEL STABILIZATION OR SILT FENCE MAY BE REQUIRED BEHIND THE OLD ABUTMENTS WHEN THE OLD BRIDGE IS REMOVED AND BEFORE THE NEW BRIDGE IS INSTALLED.
  4. MAINTENANCE INSPECTIONS SHALL BE PERFORMED WEEKLY AND AFTER PERIODS OF RAINFALL. REPAIRS SHALL BE MADE IMMEDIATELY.
  5. ONCE THE SITE IS STABILIZED, REMOVE SILT FENCE.

SCALE 1" = 20'  
**PLAN**  
SCALE: 1" = 20'

STD. #	Description	Quantity	Symbol
	Floating Turbidity Curtain	38 SY	—
1605.01	Temporary Silt Fence	720 LF	
1635.02	Rock Pipe Inlet Sediment Trap Type 'B'	1	⊙

NOTE: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185  
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
BRIDGE #185 ON SR 1504 OVER COW BRANCH						16
REVISIONS						TOTAL SHEETS
NO.	BY	DATE	NO.	BY	DATE	19
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2			4			

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CHECKED BY: J. DILWORTH DATE: 7/09

**WETHERILL ENGINEERING**  
Raleigh, N.C. 27606  
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Fax: 919 851 8107  
LICENSE NO. F-2537

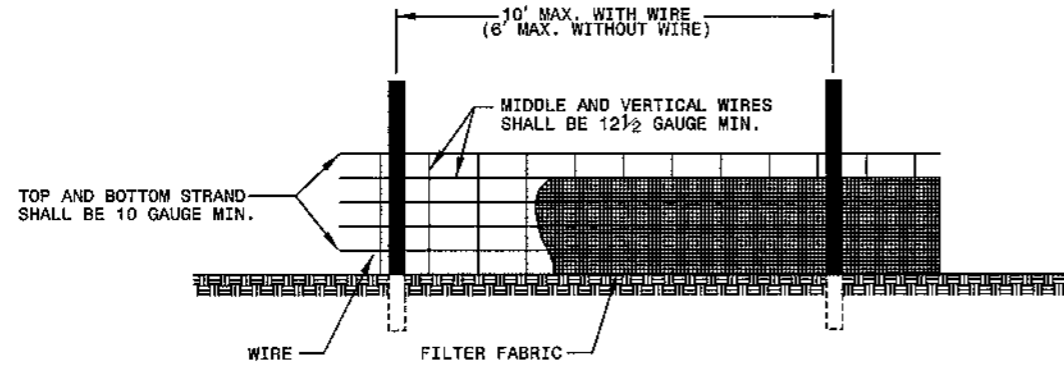
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

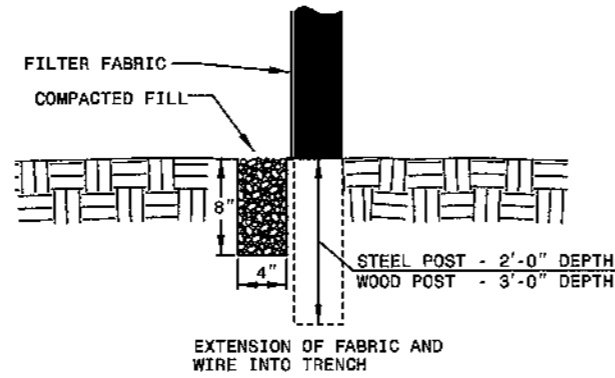
ENGLISH STANDARD DRAWING FOR  
**TEMPORARY SILT FENCE**

SHEET 1 OF 1  
**1605.01**



**NOTES**

WIRE SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.  
FILTER FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED ADEQUATELY TO THE WIRE AS DIRECTED BY THE ENGINEER.  
STEEL POST SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.  
WOOD POST SHALL BE 6'-0" IN HEIGHT AND 3" IN DIAMETER.



STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**TEMPORARY SILT FENCE**

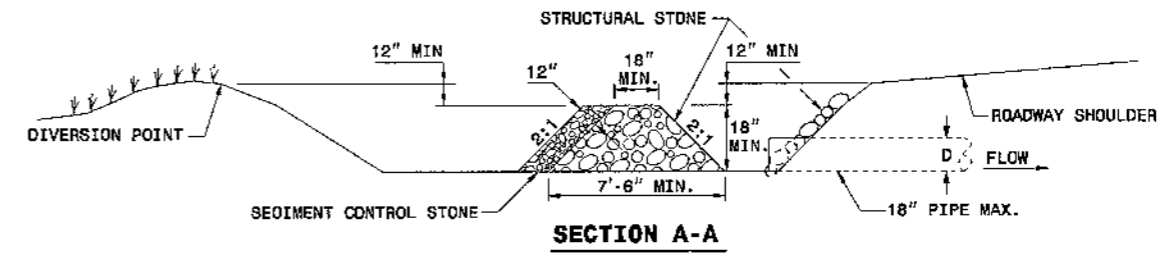
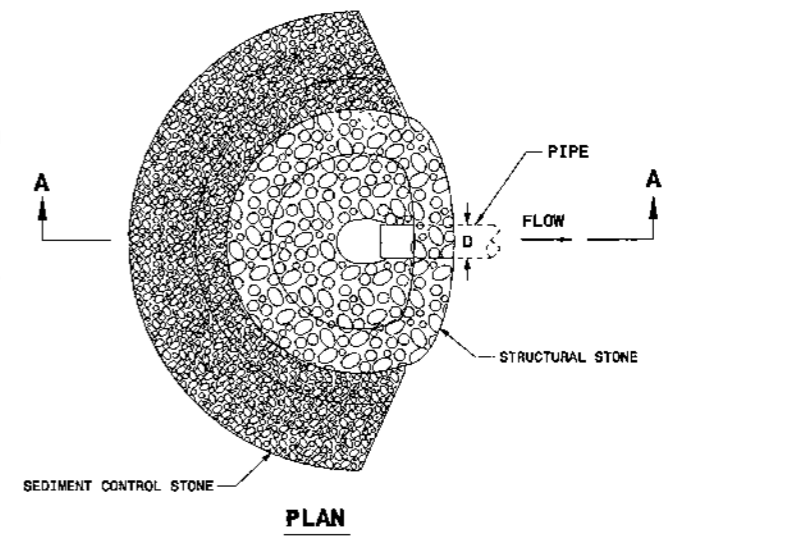
SHEET 1 OF 1  
**1605.01**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**ROCK PIPE INLET SEDIMENT TRAP TYPE 'B'**

SHEET 1 OF 1  
**1635.02**

**NOTE:**  
USE CLASS B STONE FOR STRUCTURAL STONE AND PAY FOR AT THE CONTRACT UNIT PRICE PER TON STONE FOR EROSION CONTROL, CLASS B.  
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL AND PAY FOR AT THE CONTRACT UNIT PRICE PER TON SEDIMENT CONTROL STONE.  
CONSTRUCT TOP OF BERM A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR DIVERSION POINT.  
PROVIDE A TOTAL SEDIMENT TRAP VOLUME OF 1800± CUBIC FEET PER ACRE OF DISTURBED AREA. SOME OF THE REQUIRED VOLUME MAY BE PROVIDED BY UP OR DOWNSTREAM CONTROLS.



STATE OF NORTH CAROLINA  
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RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**ROCK PIPE INLET SEDIMENT TRAP TYPE 'B'**

SHEET 1 OF 1  
**1635.02**

WBS NO. 35570  
COLUMBUS COUNTY  
STATION: 10+25.000 -L-  
REPLACES BRIDGE NO. 185

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**BRIDGE #185 ON SR 1504  
OVER COW BRANCH**

**ETHERILL ENGINEERING**  
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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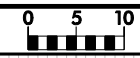
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CHECKED BY: J. DILWORTH DATE: 7/09

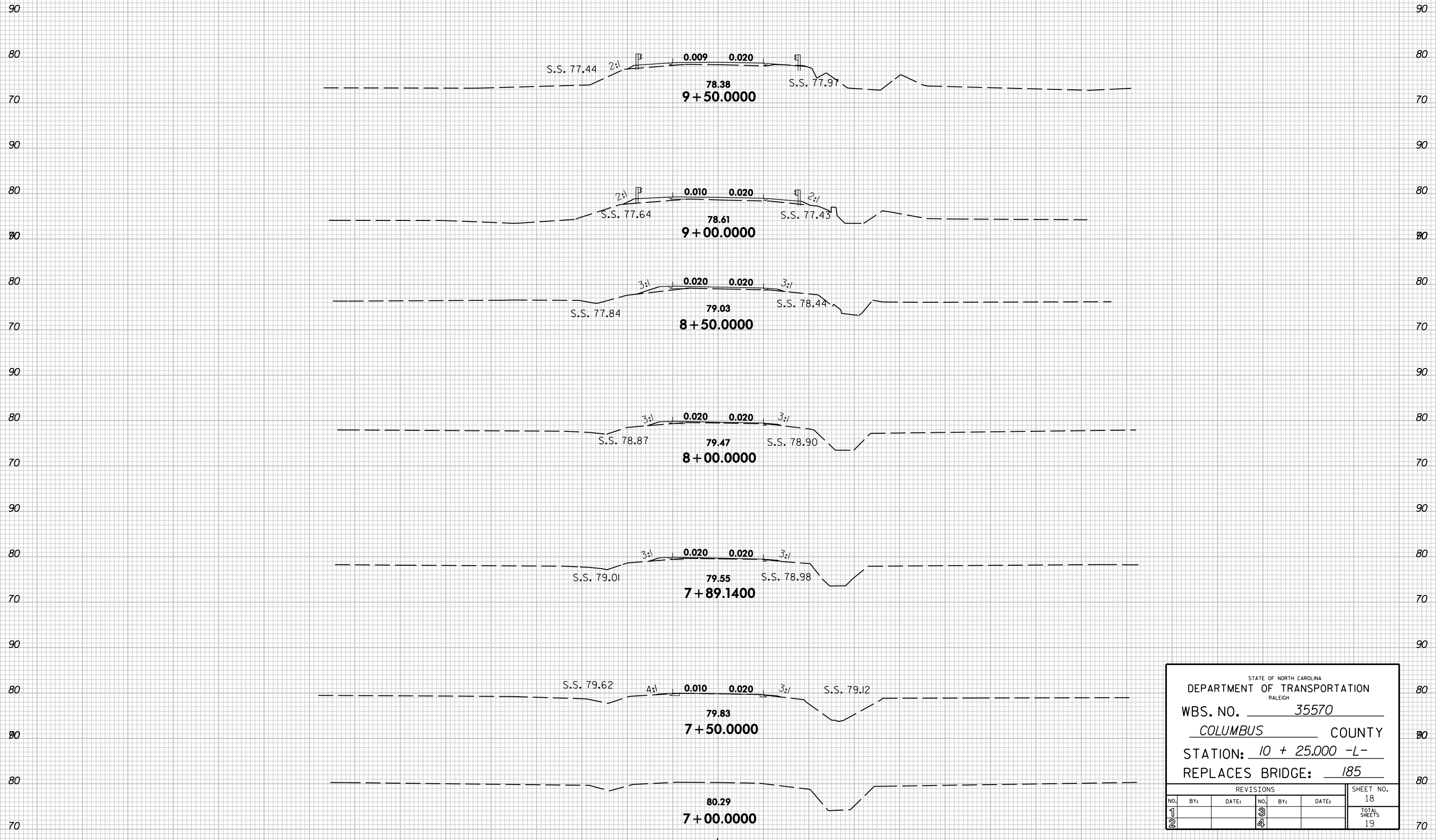
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PROJ. REFERENCE NO.  
B-3829

SHEET NO.  
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STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
WBS. NO.		35570			
COLUMBUS		COUNTY			
STATION:		10 + 25.000 -L-			
REPLACES BRIDGE:		185			
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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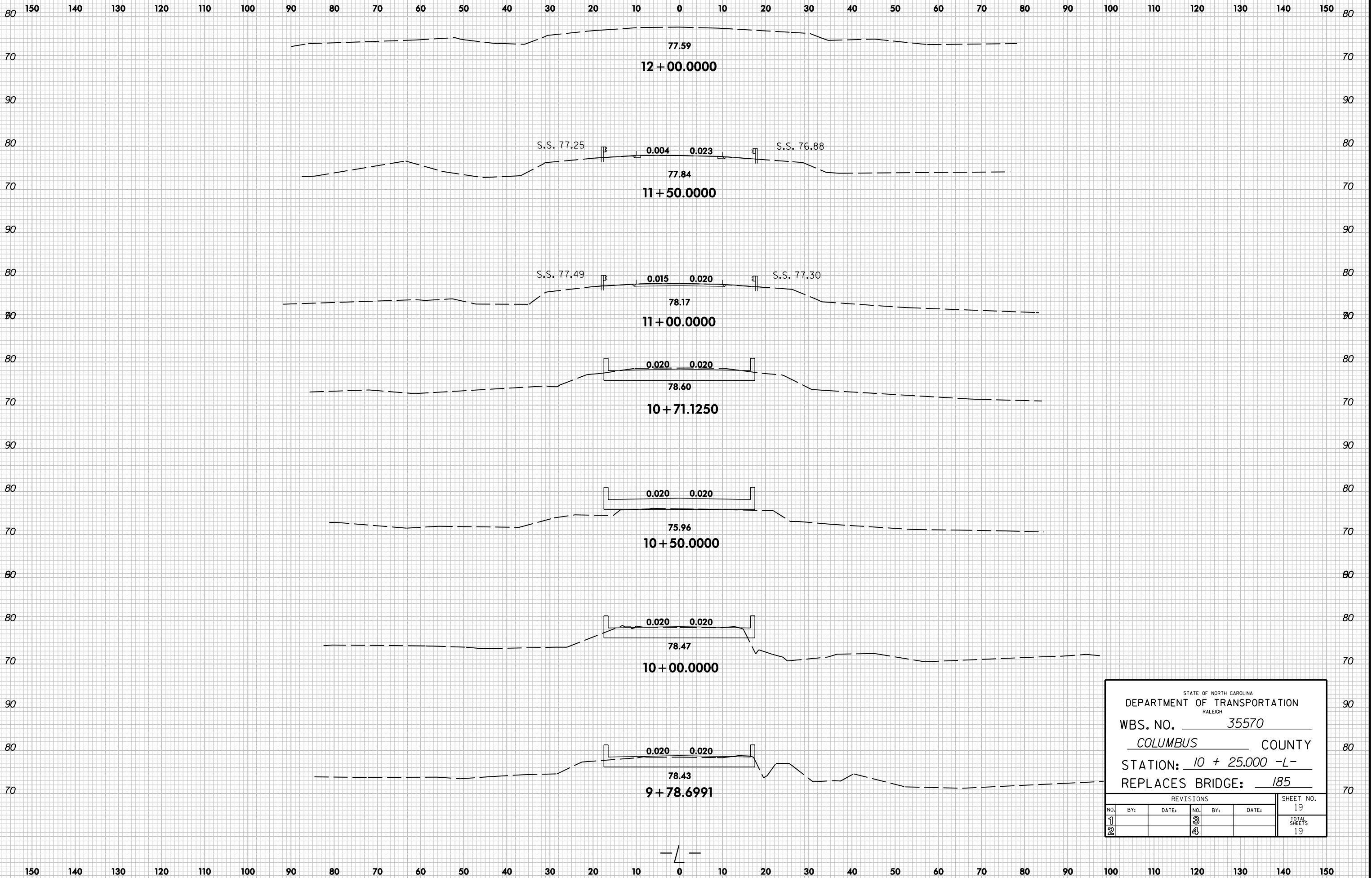
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PROJ. REFERENCE NO.  
B-3829

SHEET NO.  
X-2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

WBS. NO. 35570

COLUMBUS COUNTY

STATION: 10 + 25.000 -L-

REPLACES BRIDGE: 185

REVISIONS						SHEET NO.
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