TIP: B-3640

CONTRACT: C201471

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

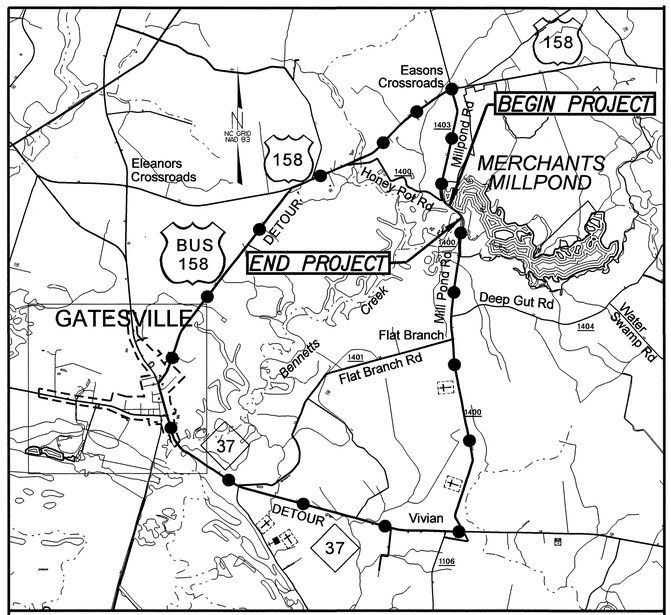
GATES COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3640		

WBS NO.	F. A. PROJ. NO.	DESCRIPTION
33188.1.1	BRZ-1400(4)	P.E.
33188.2.1	BRZ-1400(4)	R /W UTILITIES
33188.3.2	BRZ-1400(4)	CONSTRUCTION

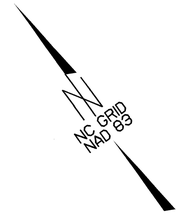
LOCATION: BRIDGE NO. 16 OVER MERCHANTS MILLPOND ON SR 1400

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



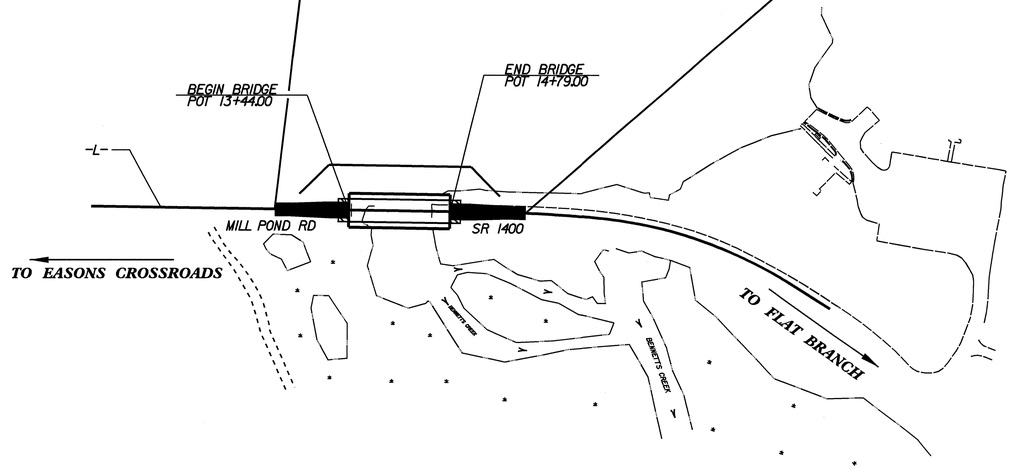
VICINITY MAP

LEGEND: DETOUR ●—●—●



STA. 12+45.00 –L– BEGIN TIP PROJECT B-3640

STA. 15+80.00 –L– END TIP PROJECT B-3640



STRUCTURE

DESIGN DATA

ADT 2005 = 1000
ADT 2025 = 1600
DHV = 10 %
D = 55 %
T = 4 % *
V = 50 MPH
* TTST 1% DUAL 3%

PROJECT LENGTH

LENGTH ROADWAY
TIP PROJECT B-3640 = 0.037 MILES

LENGTH STRUCTURE
TIP PROJECT B-3640 = 0.026 MILES

TOTAL LENGTH OF TIP PROJECT B-3640 = 0.063 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 BIRCH RIDGE DR., RALEIGH, NC 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:
SEPTEMBER 19, 2006

STRUCTURE DESIGN UNIT

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

F.A. PROJECT NO. BRZ-1400(4)

13+00 14+00 15+00 16+00

+0.1860% △ +0.3783%

PVI= 13+00.00
EL.= 11.780
VC= 40'

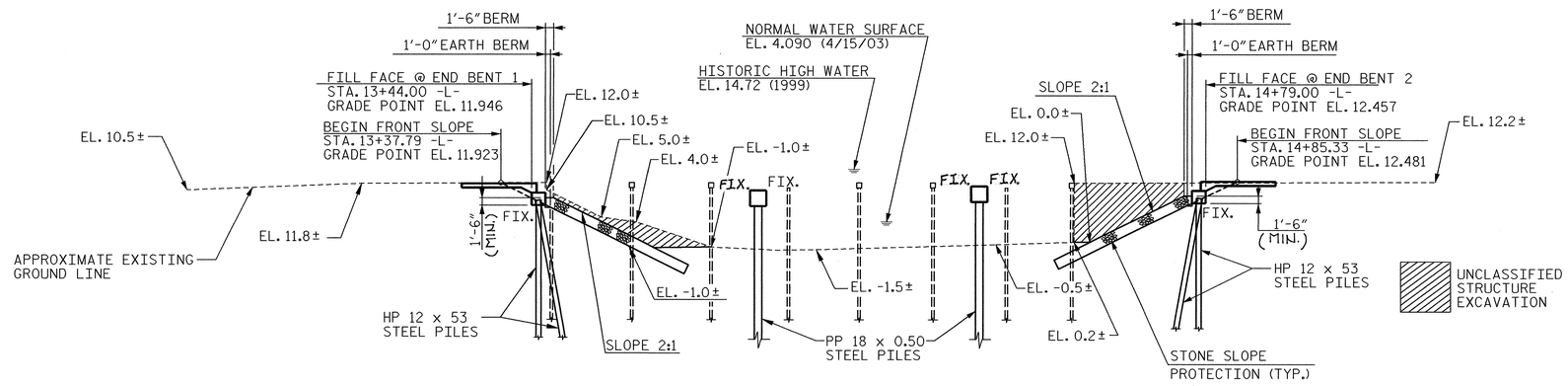
GRADE DATA LINE –L–

+0.3783% △ -0.4320%

PI = 15+30.00
EL = 12.650
VC = 70'

GRADE DATA LINE –L–

SPAN A **SPAN B** **SPAN C**



END BENT 1 **BENT 1** **BENT 2** **END BENT 2**

SECTION ALONG ℄ SURVEY –L–

SECTION TAKEN AT RIGHT ANGLES TO BENTS AND END BENTS

HORIZONTAL CURVE DATA –L–

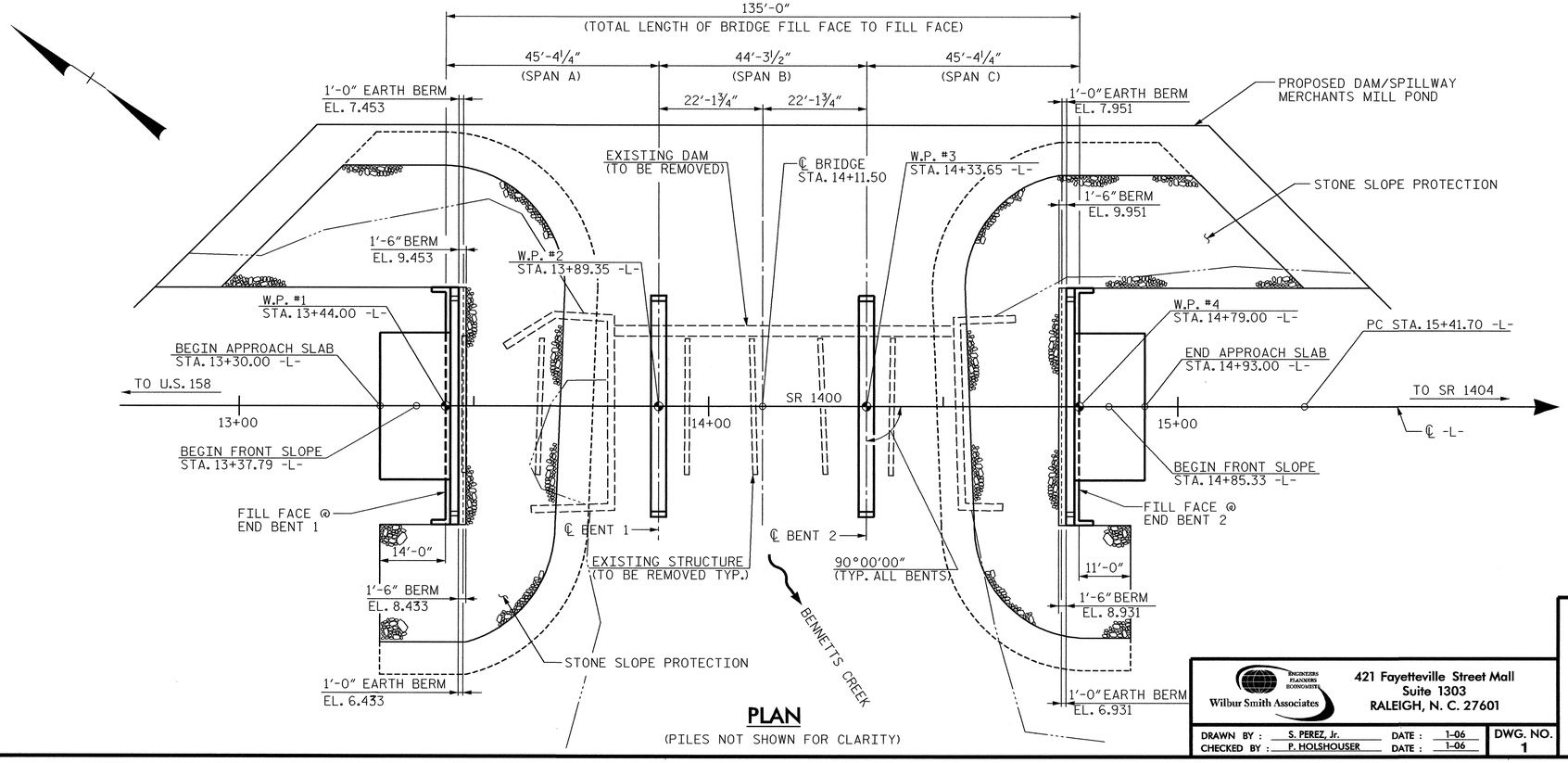
PI STA. 16+12.63
△ = 4°-57'-42.5"(RT)
D=3°-30'-00.0"
L=141.77'
T=70.93'
R=1637.02'

HYDROGRAPHIC DATA

DESIGN DISCHARGE	= 9492 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 10.62
DRAINAGE AREA	= 82.5 SQ. MI.
BASIC DISCHARGE (Q100)	= 1382 CFS
BASIC HIGH WATER ELEVATION	= 12.77

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 12300 CFS
FREQUENCY OF OVERTOPPING FLOOD	= + 50 YR.
OVERTOPPING FLOOD ELEVATION	= 11.60



PLAN

(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 1 OF 3 REPLACES BRIDGE #16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE #16 OVER BENNETTS CREEK AT MERCHANTS MILL POND ON SR 1400 BETWEEN U.S. 158 AND S.R. 1404

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			53

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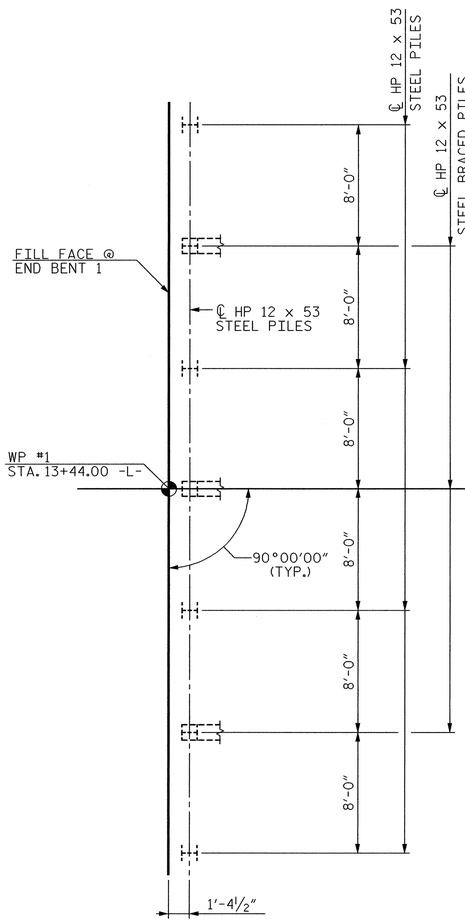
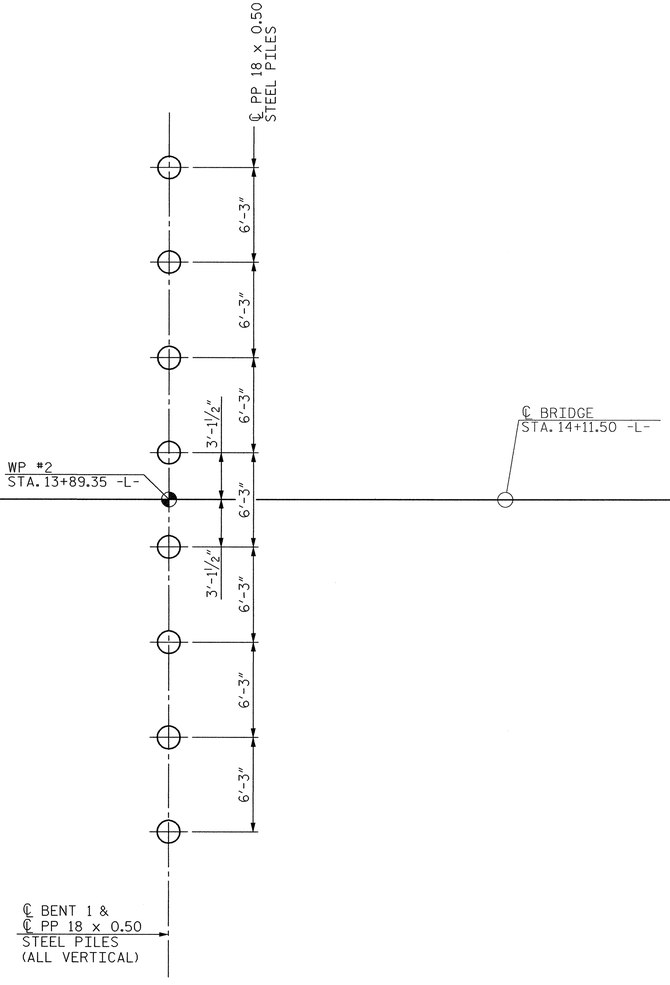
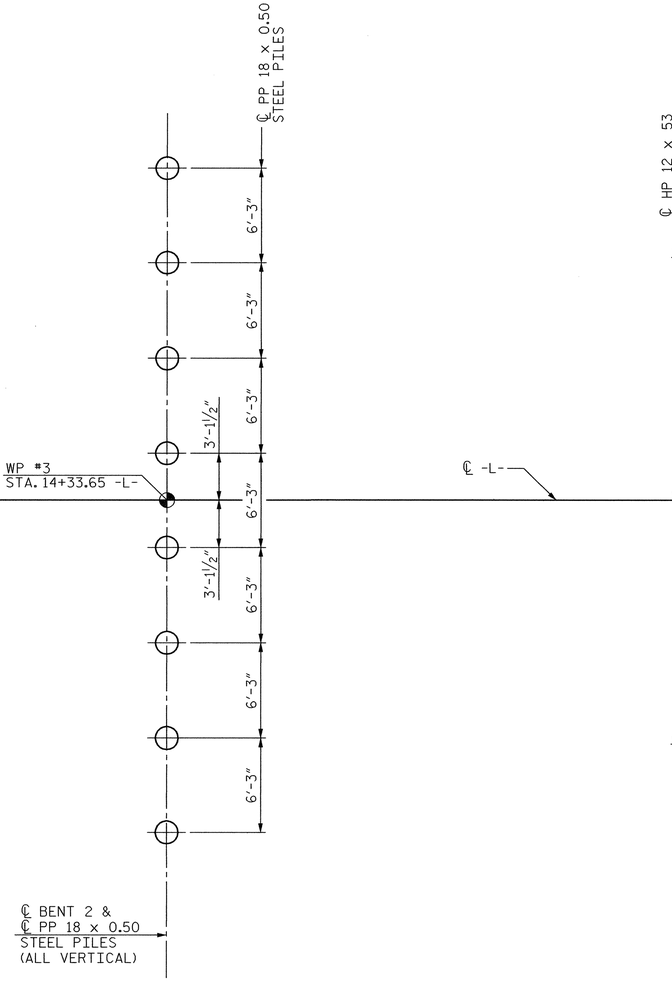
5/2/2006



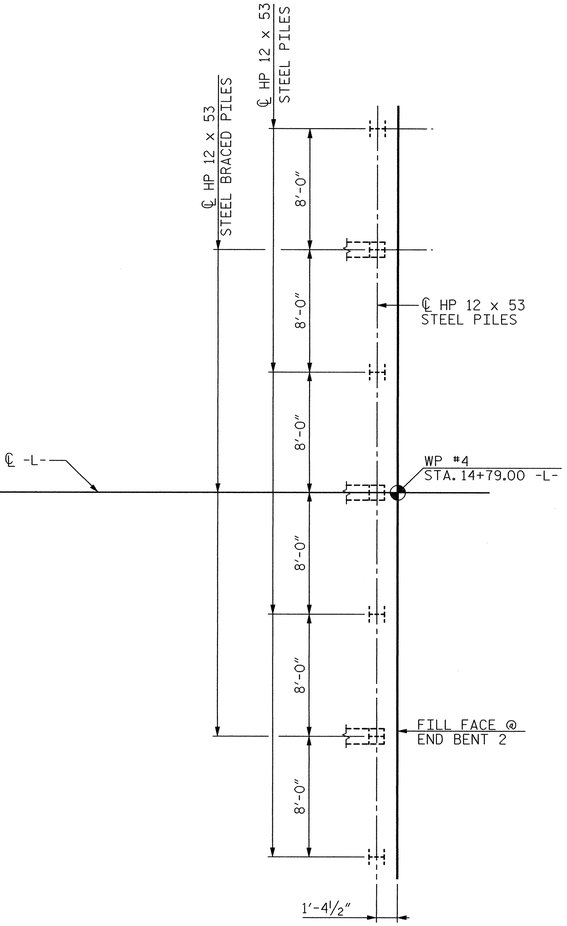
END BENT 1



BENT 1



BENT 2



END BENT 2

FOUNDATION LAYOUT

BRACE PILES IN END BENTS ARE TO BE BATTERED 3:12
DIMENSIONS LOCATING PILES ARE TO PILE CENTERLINE

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE #16 OVER BENNETTS CREEK AT MERCHANTS MILL POND ON S.R. 1400 BETWEEN U.S. 158 AND S.R. 1404

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			33

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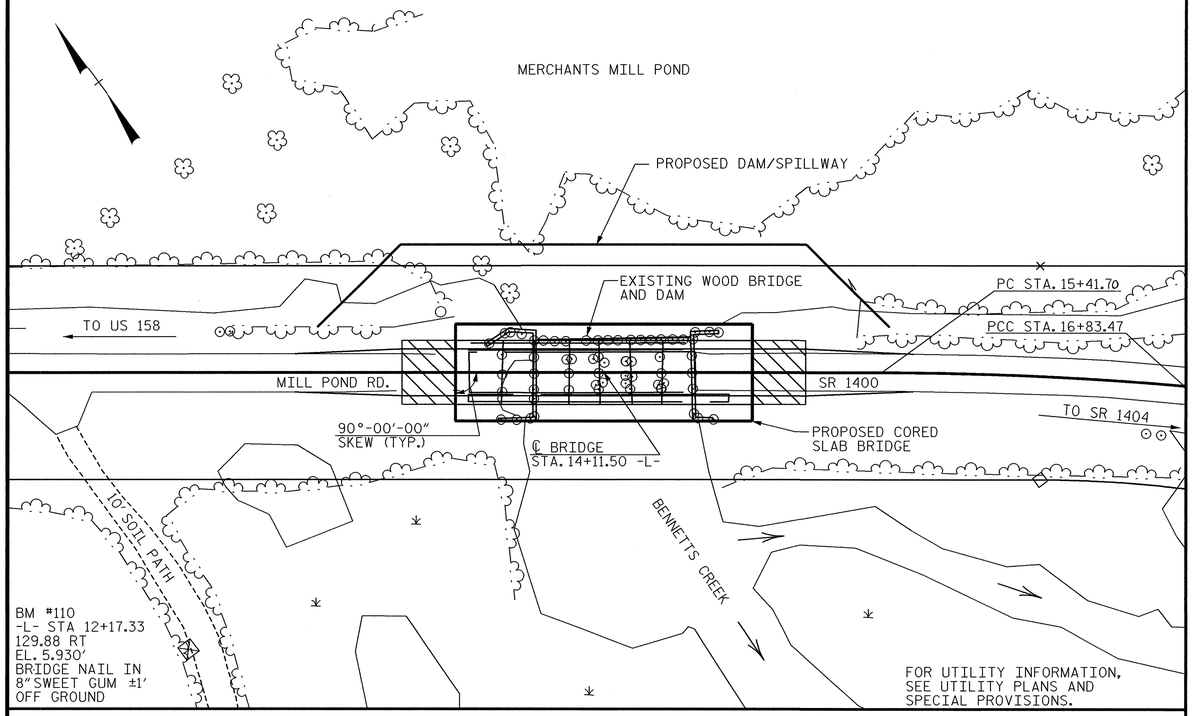
1/5/2006



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HS20 OR ALTERNATE LOADING, EXCEPT THAT CORED SLAB UNITS HAVE BEEN DESIGNED FOR HS25.

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

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.

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 50 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AS UNCLASSIFIED STRUCTURE EXCAVATION.

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 15'-8", 1 SPAN @ 15', 1 SPAN @ 16'-6", 1 SPAN @ 14', 1 SPAN @ 14'-6", 1 SPAN @ 15'-6" AND 1 SPAN @ 15' ON TIMBER DECK STRINGERS; 19'-4" CLEAR ROADWAY ON TIMBER CAP, TIMBER PILES AND TIMBER RAIL WITH A 3'-5" CLEAR WALKWAY ON BOTH SIDES OF BRIDGE WITH TIMBER STRINGERS, WALK BOARDS AND RAIL SUPPORTED ON STEEL CHANNELS ATTACHED TO EXISTING TIMBER CAPS LOCATED ALONG THE CENTERLINE OF THE PROPOSED ALIGNMENT SHALL BE REMOVED.

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.

THE EXISTING TIMBER DAM/SPILLWAY SHALL NOT BE REMOVED UNTIL THE PROPOSED DAM/SPILLWAY IS CONSTRUCTED.

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", NOVEMBER, 1995.

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 SAMPLE 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.

REMOVAL OF EXISTING DAM/SPILLWAY AND OTHER DEBRIS SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR "REMOVAL OF EXISTING STRUCTURE".

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 THE 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 14+11.50 -L-."

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CONSTRUCTION OF SUPERSTRUCTURE, SEE SPECIAL PROVISIONS.

FOR CONSTRUCTION OF SUBSTRUCTURE, SEE SPECIAL PROVISIONS.

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

PILES AT END BENT NOS. 1 & 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 50 TONS EACH.

PILES AT BENT NOS. 1 & 2 SHALL BE DRIVEN TO A TIP NO HIGHER THAN ELEVATION -32.0 FT. AND SATISFY THE BEARING CAPACITY OF 75 TONS EACH.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 AND BENT NO. 2 IS -15.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 TO 60,000 FT-POUNDS WILL BE REQUIRED TO DRIVE THE 18 INCH STEEL PILES. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM THE PROVISIONS OUTLINED IN ARTICLE 450-6 OF THE STANDARD SPECIFICATIONS.

THE FIRST PRODUCTION PILE AT BENT NO. 1 AND BENT NO. 2 SHALL BE DRIVEN AS A DYNAMIC LOAD TEST PILE AS DIRECTED BY THE ENGINEER. SEE PILE DRIVING ANALYZER SPECIAL PROVISIONS. THE PILE DRIVING ANALYZER AND WAVE EQUATION SHALL BE USED TO DETERMINE THE BEARING CAPACITY OF THE 18 INCH STEEL PIPE PILES.

WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.

FOR STONE SLOPE PROTECTION, SEE SPECIAL PROVISIONS.

FOR COLOR STAINING OF CONCRETE FOR PARAPETS, CURBS, AND CORED SLAB UNITS, SEE SPECIAL PROVISIONS FOR CONCRETE PENETRATING STAIN.

TOTAL BILL OF MATERIALS

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CONSTRUCTION OF SUPERSTRUCTURE	CONSTRUCTION OF SUBSTRUCTURE	HP 12 X 53 STEEL PILES		PP 18 X 0.5 GALVANIZED STEEL PILES		PDA TESTING	STONE SLOPE PROTECTION	BRIDGE APPROACH SLABS	PDA ASSISTANCE	PILE REDRIVES	CONSTRUCTION OF SPILLWAY
	LUMP SUM	CU. YDS.	LUMP SUM	LUMP SUM	NO.	LIN. FT.	NO.	LIN. FT.	EACH	TONS	LUMP SUM	EACH	EACH	LUMP SUM
SUPERSTRUCTURE	LUMP SUM		LUMP SUM								LUMP SUM			
END BENT #1		261		LUMP SUM	7	385.0				490			1	
BENT #1				LUMP SUM			8	560.0	1			1	1	
BENT #2				LUMP SUM			8	560.0	1			1	1	
END BENT #2		588		LUMP SUM	7	385.0				455			1	
TOTAL	LUMP SUM	849	LUMP SUM	LUMP SUM	14	770.0	16	1120.0	2	945	LUMP SUM	2	4	LUMP SUM

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE #16 OVER BENNETTS CREEK AT MERCHANTS MILL POND ON SR 1400 BETWEEN U.S. 158 AND S.R. 1404

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 3

NORTH CAROLINA PROFESSIONAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			33

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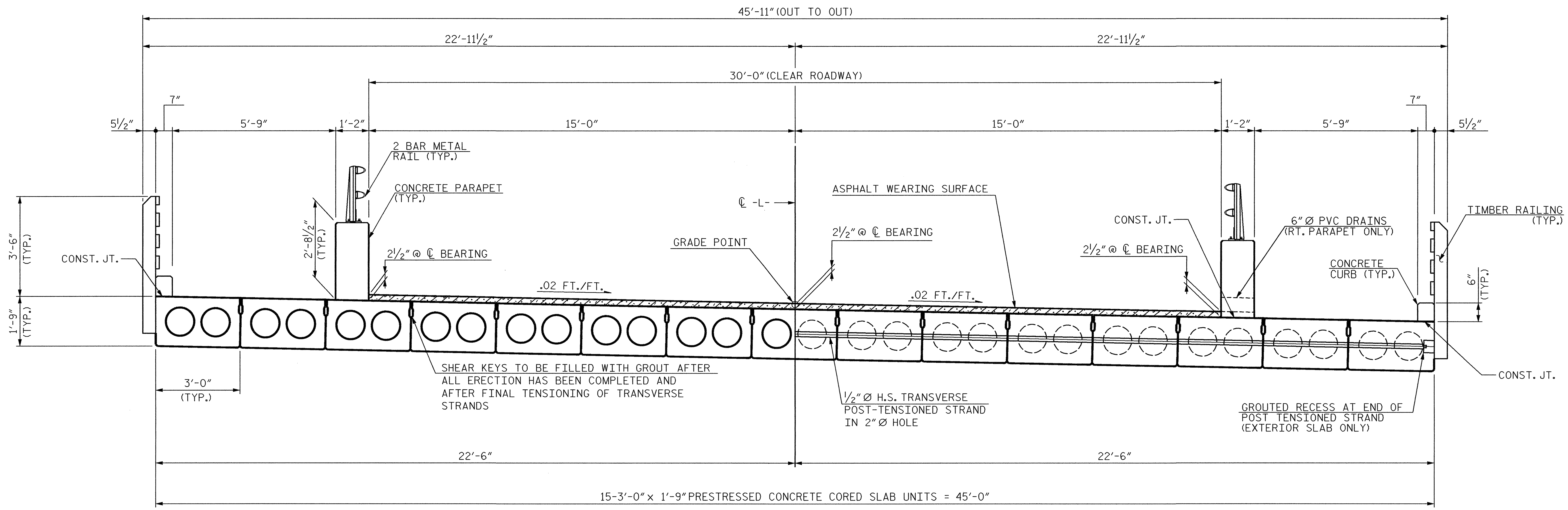
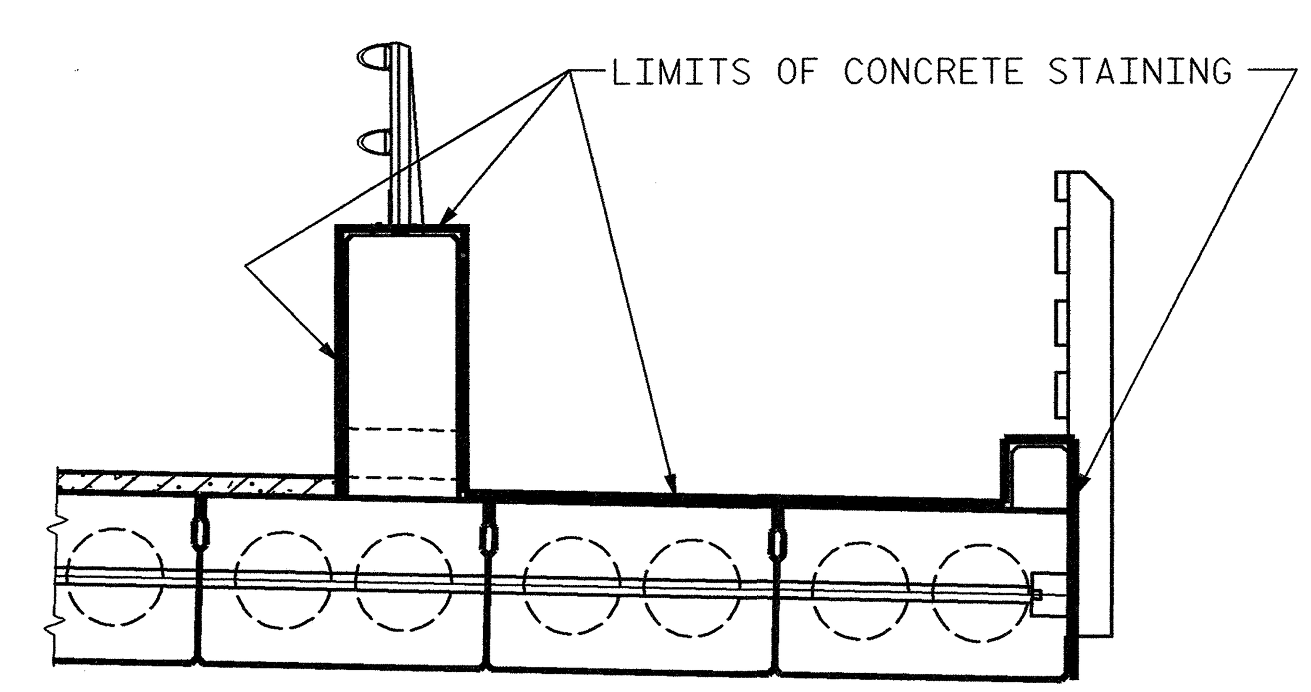
1/5/2006



HALF SECTION @ 1'-0" Ø VOIDS

HALF SECTION @ INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION



LIMITS FOR CONCRETE PENETRATING STAIN

(RIGHT SIDE SHOWN, LEFT SIDE SIMILAR)

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr.	DATE : 1-06	DWG. NO.
CHECKED BY : P. HOLSHOUSER	DATE : 1-06	4

NORTH CAROLINA PROFESSIONAL ENGINEER 20668 PAUL R. HOLSHOUSER
Paul R. Holshouser
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			33

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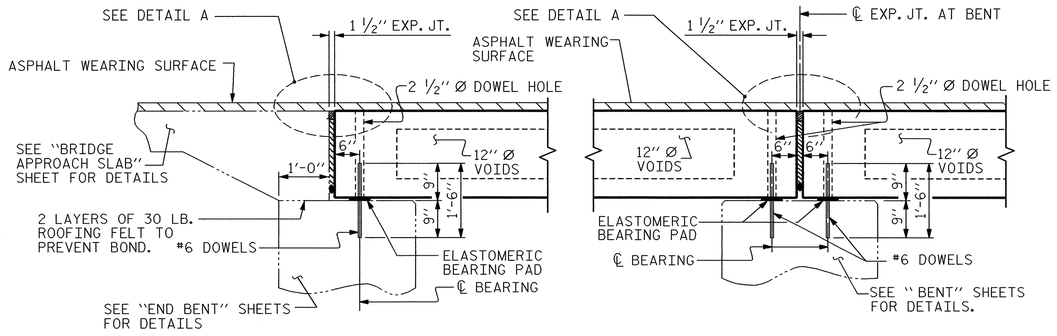
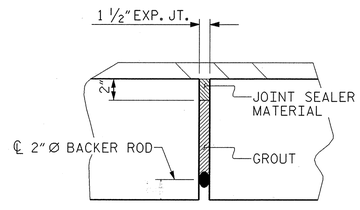
1/5/2006



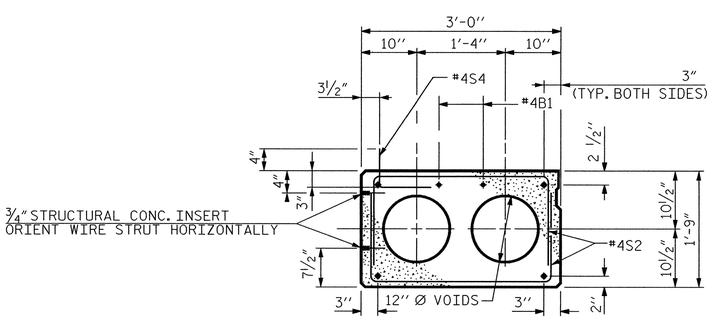
SECTION AT END BENT

SECTION AT BENT



DETAIL A

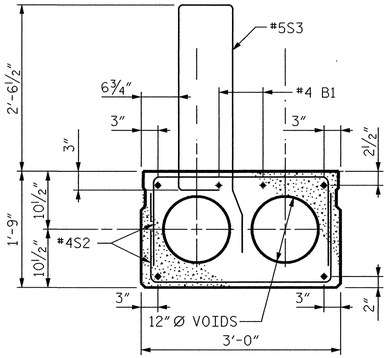
NOTE: BACKER ROD,JOINT SEALER MATERIAL AND GROUT SHALL BE CONTINUOUS FOR ENTIRE WIDTH OF BRIDGE. THE COLOR OF THE JOINT SEALER MATERIAL LOCATED WITHIN THE WALKWAY AREA SHALL MATCH THE COLOR OF THE CORED SLAB CONCRETE.



EXTERIOR SLAB SECTION ALL SPANS

(LEFT EXTERIOR SECTION SHOWN
RIGHT EXTERIOR SECTION SIMILAR)

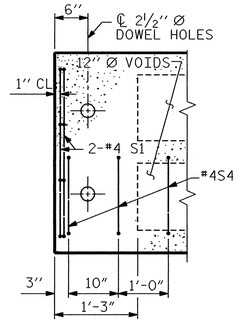
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION)



PARAPET SLAB SECTION ALL SPANS

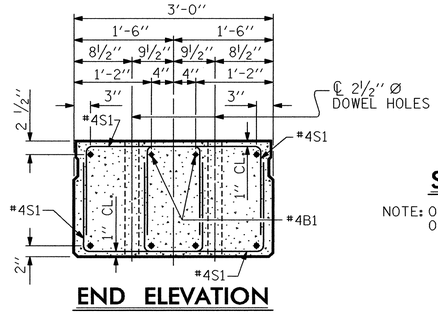
(LEFT PARAPET SECTION SHOWN
RIGHT PARAPET SECTION SIMILAR)

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION)



PART PLAN–EXTERIOR SECTION

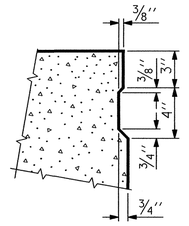
NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S4 BARS. PARAPET SECTION SIMILAR EXCEPT S3 BARS USED WHERE S4 BARS SHOWN



END ELEVATION

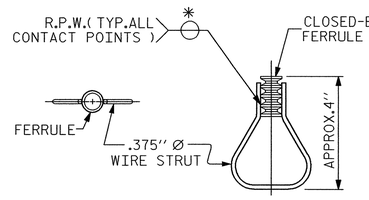
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.)

INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

INSERT NOTES:

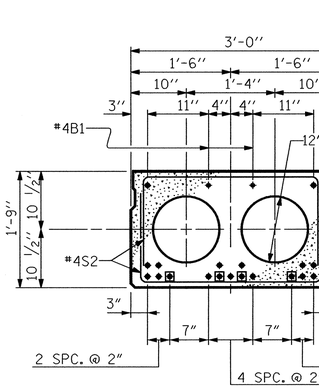
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS

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

B. 1-¾"Ø x 6½" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTMA A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾"Ø x 6½" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

D. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR AND TENSION CAPACITY OF 2,000 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø x 6½" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø x 6½" BOLT SHALL HAVE N.C. THREADS.

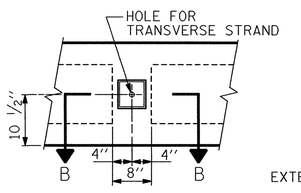


INTERIOR SLAB SECTION ALL SPANS

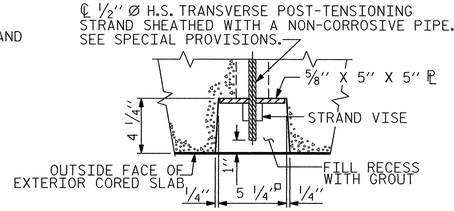
½" Ø LOW RELAXATION STRAND LAYOUT

(19 STRANDS, 4 SHEATHED)

◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF CORED SLAB UNIT, SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.



ELEVATION VIEW



SECTION B–B

GROUTED RECESS AT END OF POST–TENSIONED STRAND CORED SLABS

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD 3'–0" X 1'–9" PRESTRESSED CONCRETE CORED SLAB UNIT

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 10-05
CHECKED BY : P.R. HOLSHOUSER	DATE : 10-05
DRAWN BY : WJH 4/89	REV. 8/16/99 RWW/LES
CHECKED BY : FCJ 5/89	REV. 10/17/00 RWW/LES
	REV. 7/10/01R RWW/LES

Wilbur Smith Associates (Engineers Planners Economists)
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 5

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			33

STD. NO. PCS2

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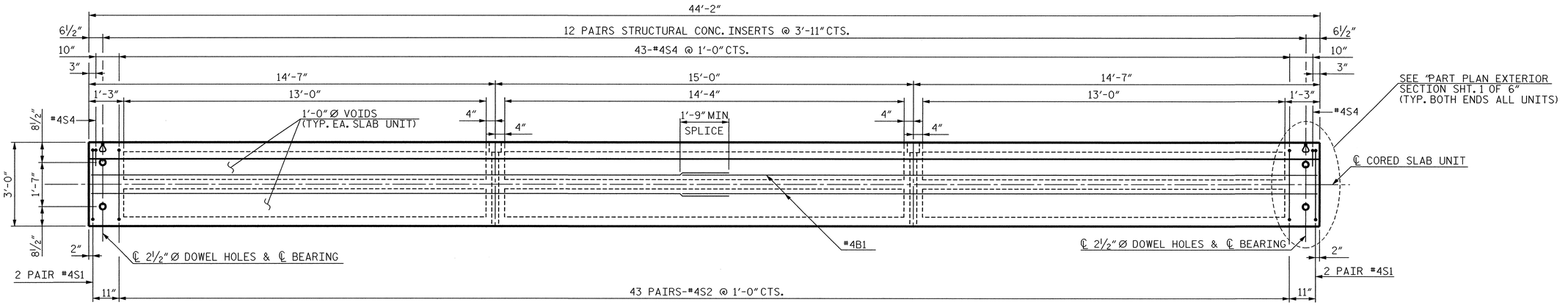
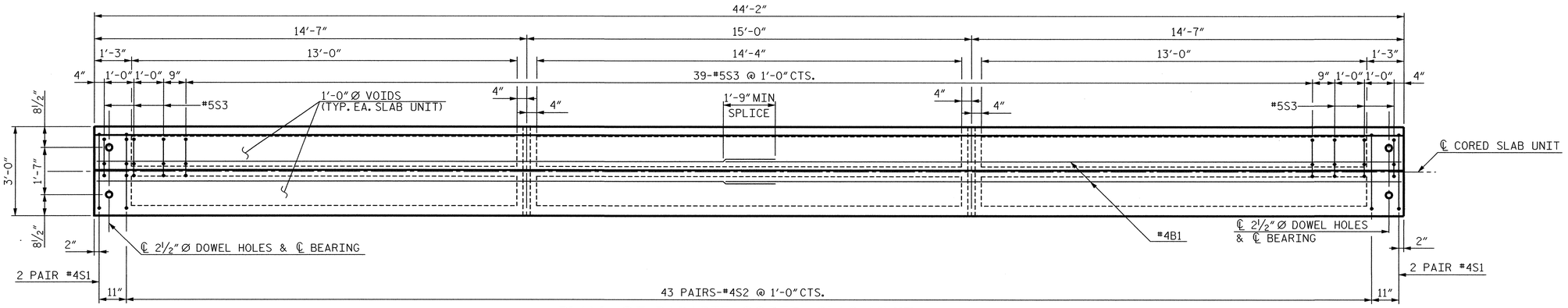
3/2/2006



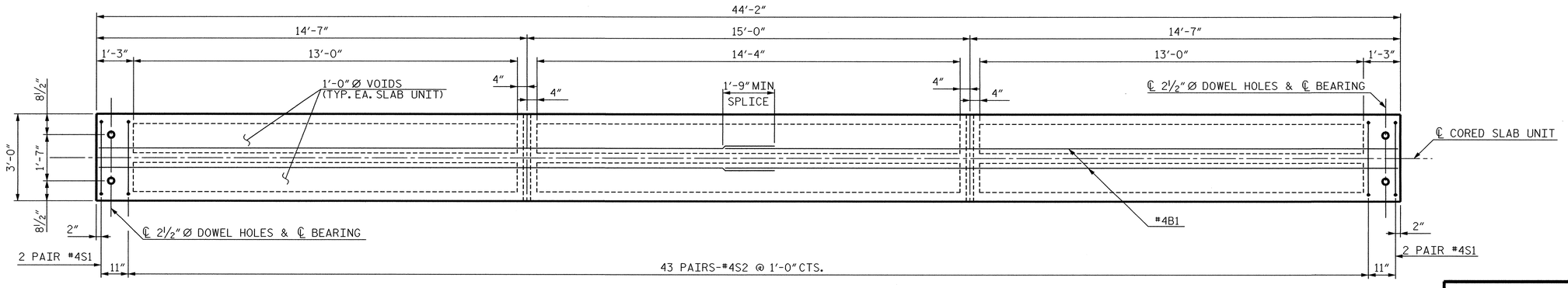
PLAN OF EXTERIOR CORED SLAB UNIT

(SPANS A, B & C)
(LEFT SLAB SHOWN, RIGHT SLAB SIMILAR)



PLAN OF PARAPET CORED SLAB UNIT

(SPANS A, B & C)
(LEFT SLAB SHOWN, RIGHT SLAB SIMILAR)



PLAN OF INTERIOR CORED SLAB UNIT

(SPANS A, B & C)

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 -L-
SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF TYPICAL CORED SLAB UNIT SPANS A, B & C

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ENGINEERS PLANNERS ECONOMISTS
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Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 6

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			33

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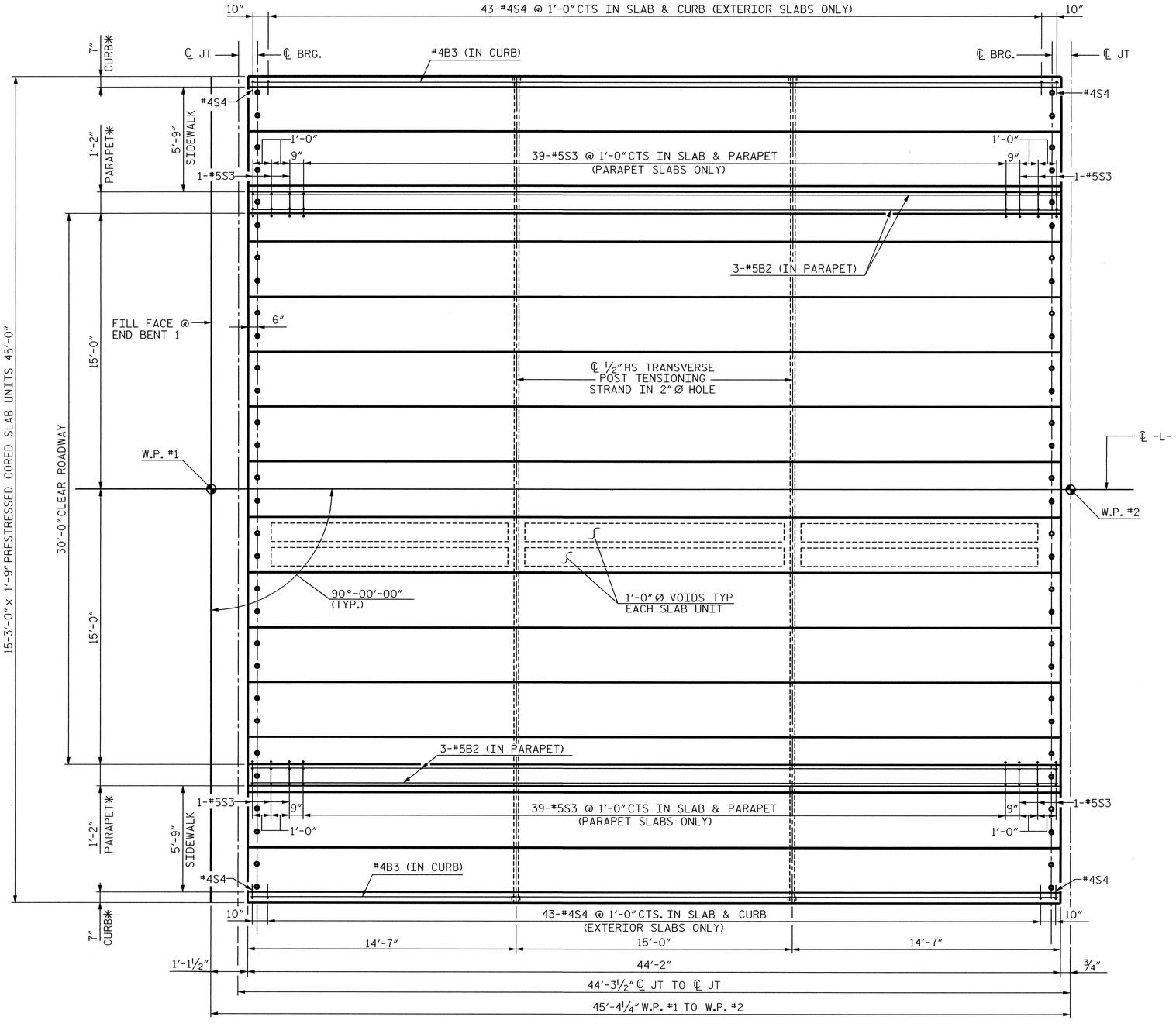
1/5/2006

NOTES:
FOR BAR DETAILS IN PARAPET AND CURB, SEE SHT. 6 OF 6.



* SEE "3′-0″ x 1′-9″ CORED SLAB UNIT SHEET 6 OF 6 FOR CURB AND PARAPET DETAILS AND SPACING FOR PVC DRAINS IN PARAPET (PVC DRAINS ON RT. SIDE PARAPET ONLY).

PLAN OF SPAN A

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

Wilbur Smith Associates
ENGINEERS ECONOMISTS PLANNERS
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Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

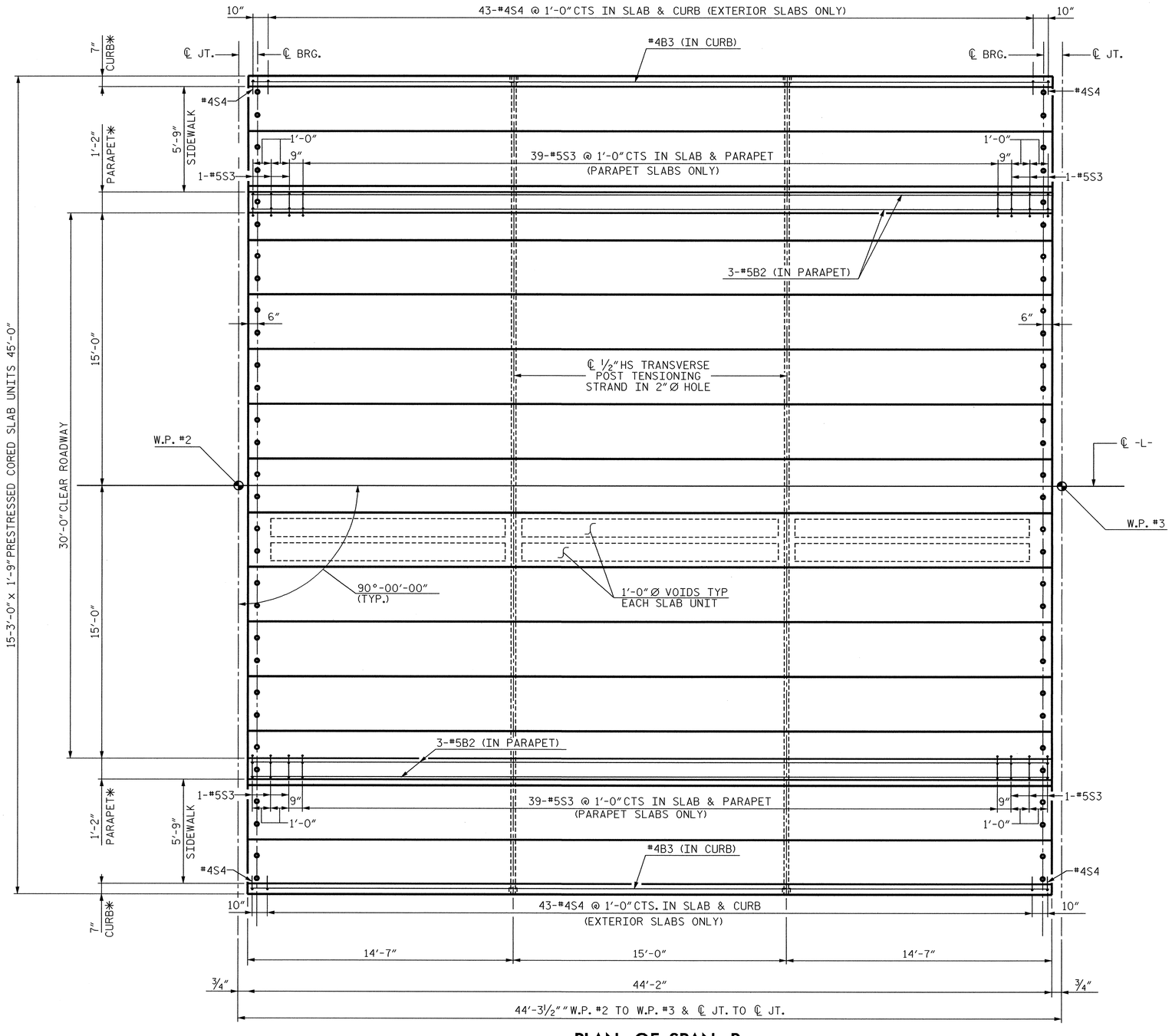
DWG. NO. 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			33

s:\rdcat\b3640\final\b3640_sd_s2.dgn
1/5/2006

NOTES:
FOR BAR DETAILS IN PARAPET AND CURB, SEE SHT. 6 OF 6.



PLAN OF SPAN B

* SEE "3'-0" x 1'-9" CORED SLAB UNIT SHEET 6 OF 6 FOR CURB AND PARAPET DETAILS AND SPACING FOR PVC DRAINS IN PARAPET (PVC DRAINS ON RT. SIDE PARAPET ONLY).

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 -L-
SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			33

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DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

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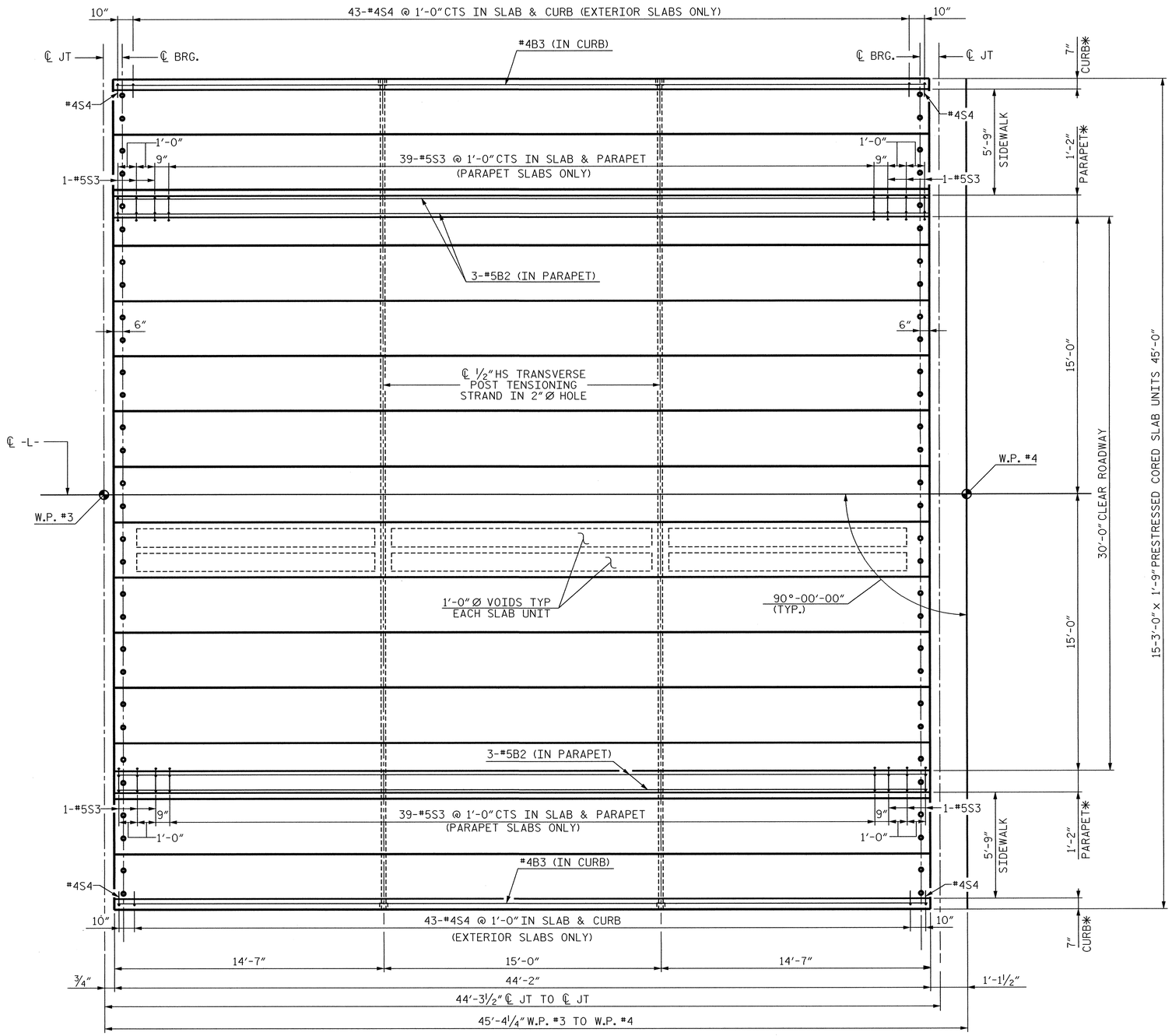
1/5/2006



PLAN OF SPAN C

* SEE "3′-0″ x 1′-9″ CORED SLAB UNIT SHEET 6 OF 6 FOR CURB AND PARAPET DETAILS AND SPACING FOR PVC DRAINS IN PARAPET (PVC DRAINS ON RT. SIDE PARAPET ONLY).

NOTES:
FOR BAR DETAILS IN PARAPET AND CURB, SEE SHT. 6 OF 6.

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 9

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER 1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			33

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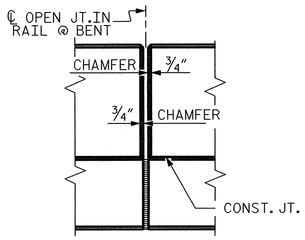
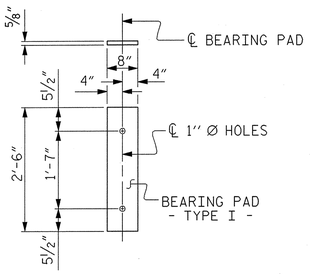
1/5/2006



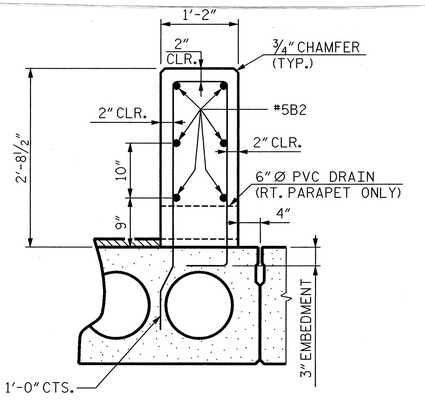
ELEVATION AT OPEN JOINTS

PARAPET DETAILS



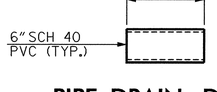
FIXED END
(TYPE I - 90 REQ'D)

ELASTOMERIC BEARING DETAILS



PARAPET SECTION (B–B) ON PARAPET CORED SLAB

RIGHT PARAPET SHOWN (LEFT PARAPET SIMILAR EXCEPT AS NOTED)



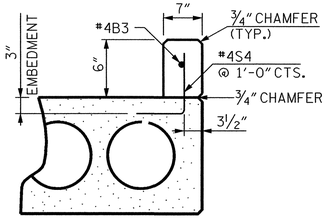
PIPE DRAIN DETAIL

33 REQ'D (TOTAL)

BILL OF MATERIAL FOR ONE CORED SLAB SECTION

SPAN A, SPAN B OR SPAN C

			EXTERIOR UNIT			PARAPET UNIT			INTERIOR UNIT		
BAR	SIZE	TYPE	NO	LENGTH	WEIGHT	NO	LENGTH	WEIGHT	NO	LENGTH	WEIGHT
B1	# 4	STR	4	22'-10"	61	4	22'-10"	61	4	22'-10"	61
S1	# 4	3	8	4'-3"	23	8	4'-3"	23	8	4'-3"	23
S2	# 4	3	86	5'-4"	306	86	5'-4"	306	86	5'-4"	306
✱ S3	# 5	1	0	——	——	45	8'-2"	383	0	——	——
✱ S4	# 4	2	45	1'-3"	38	0	——	——	0	——	——
REINFORCING STEEL LBS.			390			390			390		
✱ EPOXY COATED REINFORCING STEEL LBS.			38			383			0		
STRUCTURAL CONC. INSERTS			24			——			——		
5,000 P.S.I. CONCRETE CU. YDS.			6.0			6.0			6.0		
½" Ø L.R. STRANDS No.			19			19			19		



CURB SECTION (A–A) ON EXTERIOR CORED SLAB

RIGHT CURB SHOWN (LEFT CURB SIMILAR)

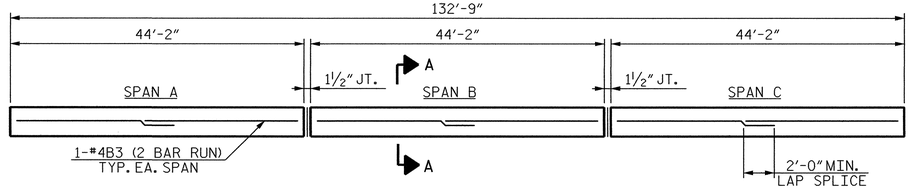
CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR UNIT	6	44'-2"	265'-0"
PARAPET UNIT	6	44'-2"	265'-0"
INTERIOR UNIT	33	44'-2"	1457'-6"
TOTAL	45		1987'-6"

DEAD LOAD DEFLECTION AND CAMBER

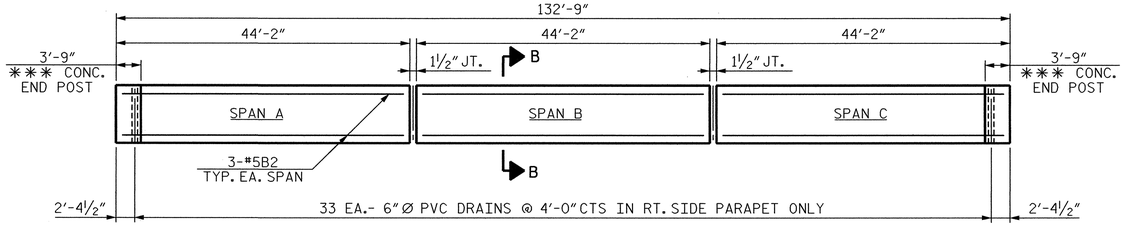
SPANS A, B, & C	
CAMBER (SLAB ALONE IN PLACE)	↑ 1 7⁄16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD ✱✱	↓ 3⁄16"
FINAL CAMBER	↑ 1¼"

✱✱ INCLUDES FUTURE WEARING SURFACE



PLAN RIGHT CURB

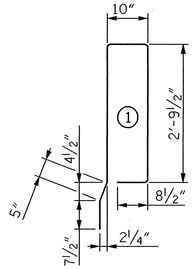
(LEFT CURB SIMILAR)

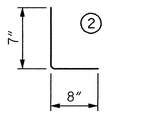


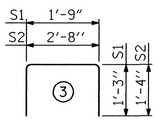
PLAN RIGHT PARAPET

(LEFT PARAPET SIMILAR EXCEPT AS NOTED)

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

GRADE 270 STRANDS

	½" Ø L.R.
AREA (SQUARE INCHES)	0.153
ULTIMATE STRENGTH (LBS. PER STRAND)	41,300
APPLIED PRESTRESS (LBS. PER STRAND)	30,980

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 CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CONSTRUCTION OF SUPERSTRUCTURE.

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

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

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI.

ALL REINFORCING STEEL IN PARAPETS & CURBS SHALL BE EPOXY COATED.

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND CURB IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL FOR CONCRETE PARAPET RAIL

BAR	BARS PER SPAN				TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	SPAN A	SPAN B	SPAN C						
✱ B2	12	12	12		36	#5	STR	43'-10"	1646
✱ EPOXY COATED REINFORCING STEEL LBS.									1646
CLASS AA CONCRETE CU.YDS.									31.1
TOTAL LIN. FT. OF CONCRETE PARAPET									265.5

BILL OF MATERIAL FOR CONCRETE CURB

BAR	BARS PER SPAN				TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	SPAN A	SPAN B	SPAN C						
✱ B3	4	4	4		12	#4	STR	22'-11"	184
✱ EPOXY COATED REINFORCING STEEL LBS.									184
CLASS AA CONCRETE CU.YDS.									3.8
TOTAL LIN. FT. OF CONCRETE CURB									265.5

✱✱✱ FOR CONCRETE END POST, SEE "RAIL POSTS SPACING AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS, SHT. 2 OF 2".

PROJECT NO. B–3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD 3'–0" X 1'–9" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			33

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-2005	
CHECKED BY : P. HOLSHOUSER	DATE : 4-2005	
DRAWN BY : WJH 4/89	REV. 10/17/00	RWW/LES
CHECKED BY : FCJ 5/89	REV. 7/10/01	RWW/LES
	REV. 5/7/03R	RWW/JTE

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS
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Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 10

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

STD. NO. PCS3

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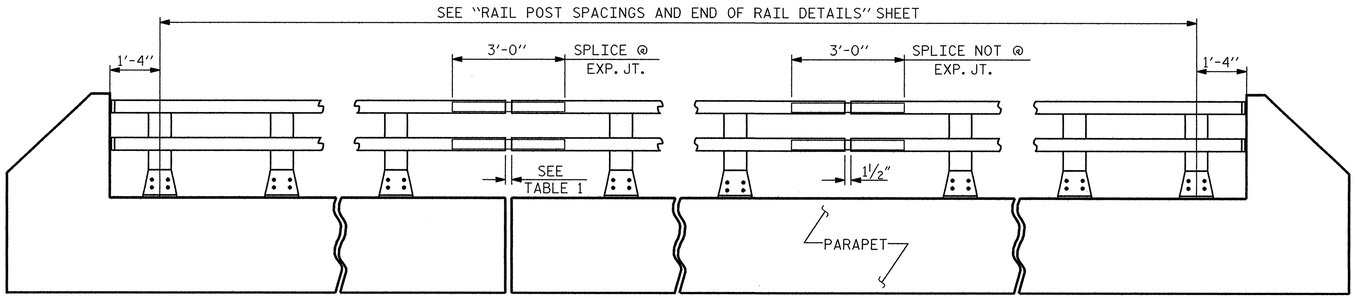
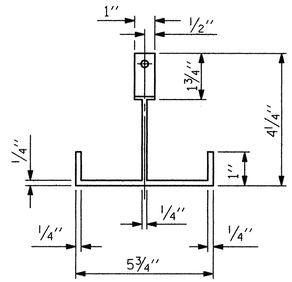
1/5/2006



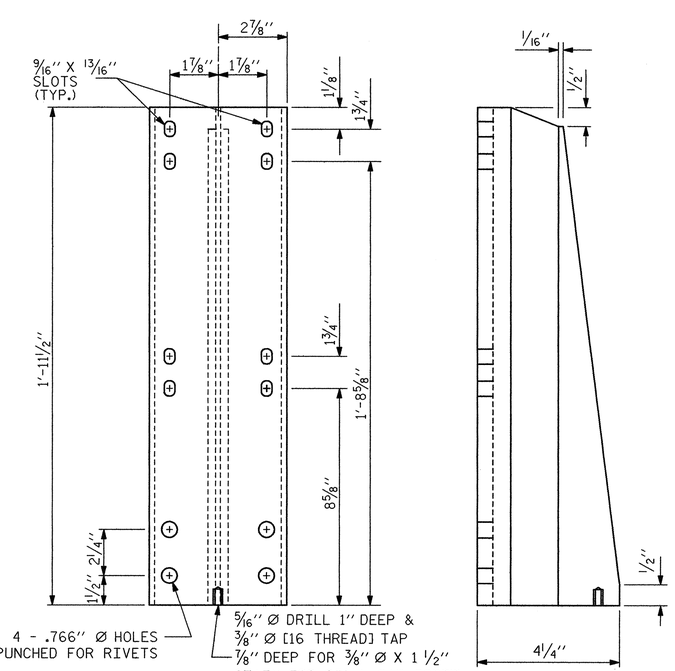
ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "STANDARD RAIL POSTS SPACING AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS, SHT. 2 OF 2".

TABLE 1	
℄ EXP. JT. @	RAIL OPENING
BENT No. 1	1½"
BENT No. 2	1½"



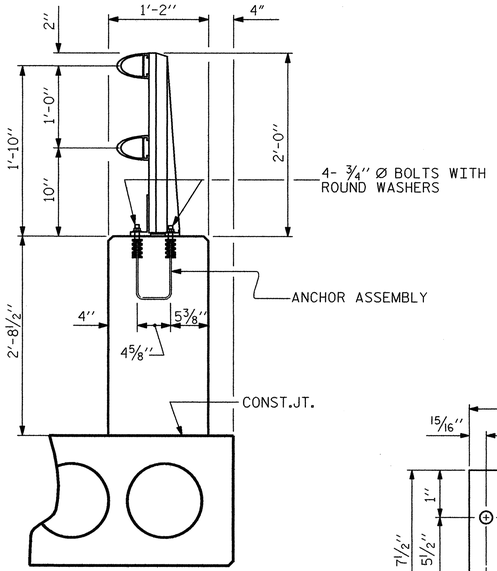
PLAN



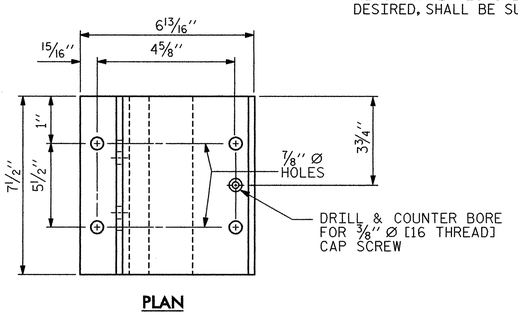
FRONT ELEVATION

SIDE ELEVATION

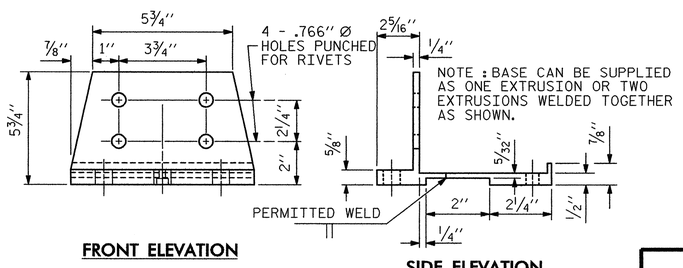
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



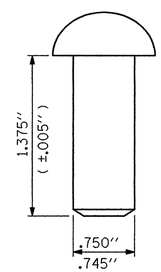
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES:

ALUMINUM RAILS

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

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

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

ANODIZING

ALUMINUM FOR POSTS, BASES, RAILS, EXPANSION BARS, CLAMP BARS, RIVETS, CAPS, SHIMS, ATTACHMENT BRACKETS AND HOLD-DOWN PLATES SHALL BE ANODIZED. THE COLOR OF THE ANODIZED RAIL SHALL BE DARK BRONZE.

ANY DAMAGED TO THE ANODIZED SURFACE OF THE RAIL OR COMPONETS DURING CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURE'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.

THE CONTRACTOR SHALL SUBMIT A SAMPLE OF COMPATIBLE EXTERIOR ACRYLIC HOUSE PAINT TO THE ENGINEER. THIS PAINT SHALL MATCH THE ANODIZED RAIL COLOR AS CLOSELY AS POSSIBLE. AFTER ERECTION OF THE ANODIZED ALUMINUM RAILING. ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, BOLTS, AND BUILT UP ANGLES SHALL BE COATED WITH TWO COATS OF THIS PAINT.

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

LENGTH OF RAIL = 250.50 LIN. FT.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD
2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			33

STD. NO. BMR3

ASSEMBLED BY : S. PEREZ, Jr. DATE : 4-2005
CHECKED BY : P. HOLSHOUSER DATE : 4-2005

DRAWN BY : EEM 6/94
CHECKED BY : RGW 6/94

REV. 8/16/99	RWW/LES
REV. 10/17/00	LES/RDR
REV. 5/7/03	RWW/JTE

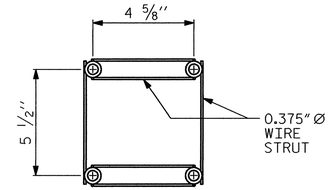
#FILE# #DATE#

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

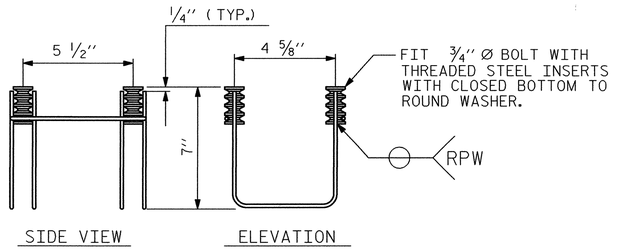
DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 11

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER 1/06/06



PLAN



SIDE VIEW ELEVATION

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

4–BOLT METAL RAIL ANCHOR ASSEMBLY

(46 ASSEMBLIES REQUIRED)

NOTES:

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

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

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

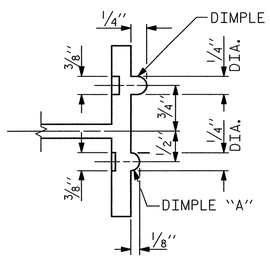
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

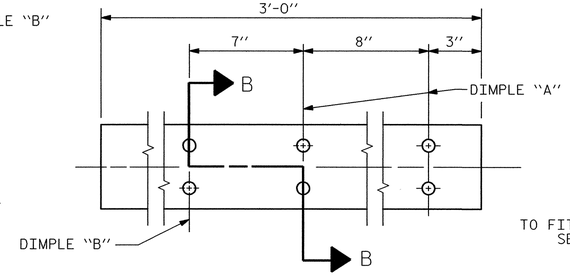
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

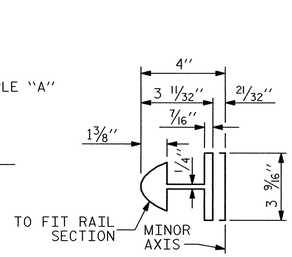
THE CONTRACTOR, AT HIS OPTION, MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN LIEU OF THE METAL RAIL ANCHOR ASSEMBLY. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS REQUIRED.

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



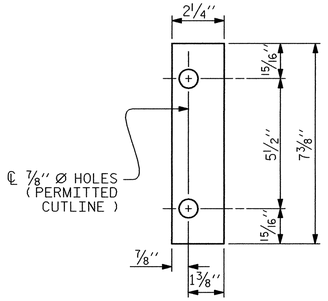
SECTION B – B



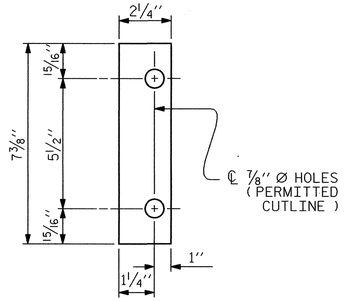


BAR SECTION

EXPANSION BAR DETAILS



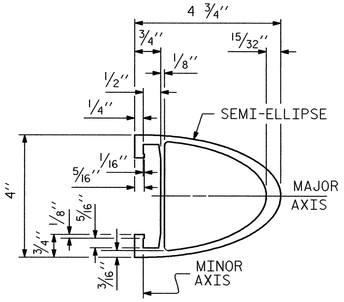
FRONT PLATE



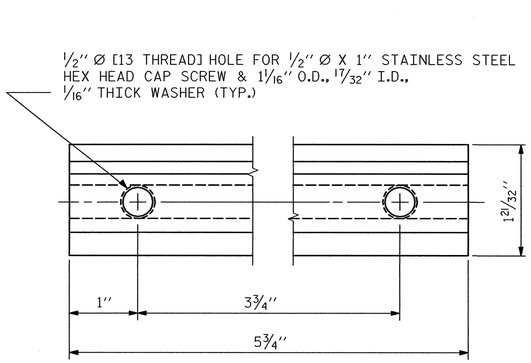
REAR PLATE

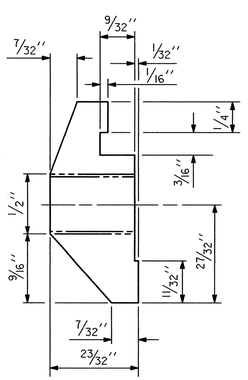
SHIM DETAILS

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



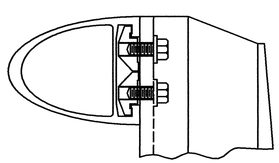
RAIL SECTION



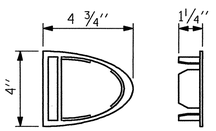


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B–3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD
2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			33

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-2005		
CHECKED BY : P. HOLSHOUSER	DATE : 4-2005		
DRAWN BY : EEM 6/94	REV. 2/6/97	EEM/RGW	
CHECKED BY : RGW 6/94	REV. 8/16/99	MAB/LES	
	REV. 5/7/03	RWW/JTE	

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DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 12

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

STD. NO. BMR4

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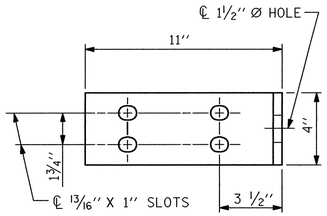
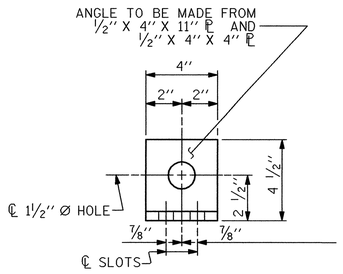
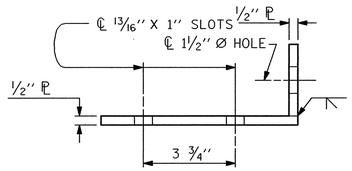
1/5/2006



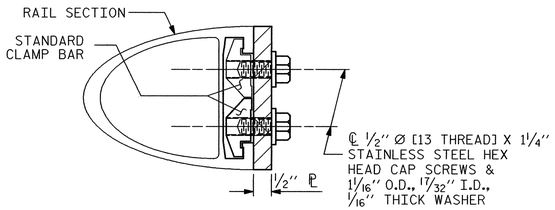
ELEVATION



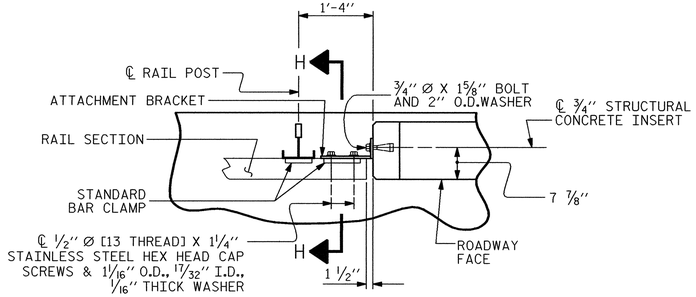
END VIEW



TOP VIEW

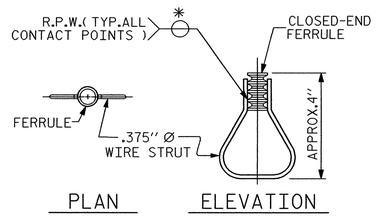


SECTION H–H



PLAN – RAIL AND END POST

DETAILS FOR ATTACHING METAL RAIL TO END POST



STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½'' PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE ANODIZED AFTER FABRICATION. FOR DETAILS, SEE "2 BAR METAL RAIL, SHT. 1 OF 2".

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

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

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

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

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' BOLT.

FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. B–3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD RAIL POSTS SPACING AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			33

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 13

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER 1/06/06

ASSEMBLED BY : S. PEREZ, Jr. DATE : 4-2005
CHECKED BY : P. HOLSHOUSER DATE : 4-2005

DRAWN BY : FCJ 1/88
CHECKED BY : CRK 3/89

REV. 8/16/99 RWW/LES
REV. 10/17/00 LES/RDR
REV. 5/7/03 RWW/JTE

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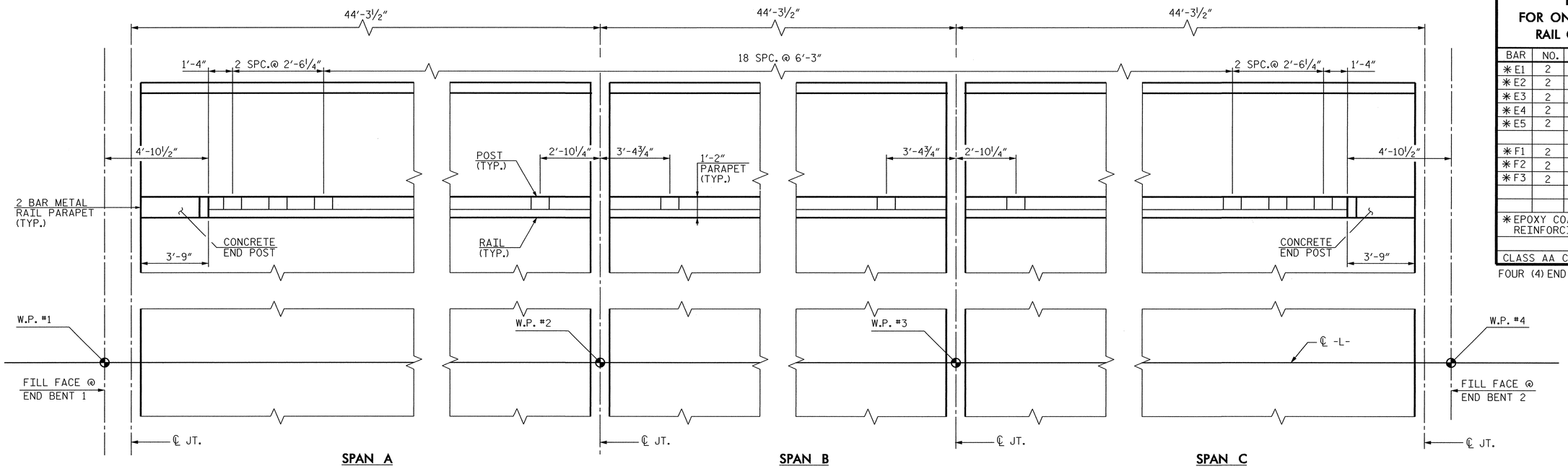
1/5/2006

STD. NO. BMR2



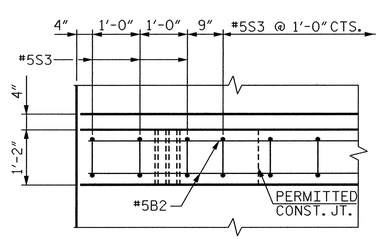
PLAN OF LEFT RAIL POST SPACING

(RIGHT RAIL POST SPACING SIMILAR)

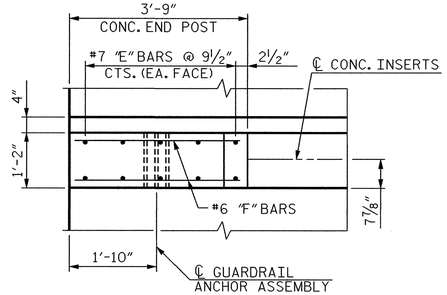
BILL OF MATERIAL FOR ONE (1) – TWO BAR METAL RAIL CONCRETE END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳E1	2	#7	STR	2′-6″	10
✳E2	2	#7	STR	3′-0″	12
✳E3	2	#7	STR	3′-6″	14
✳E4	2	#7	STR	4′-0″	16
✳E5	2	#7	STR	4′-4″	18
✳F1	2	#6	STR	1′-10″	6
✳F2	2	#6	STR	3′-0″	9
✳F3	2	#6	STR	3′-3″	10
✳EPOXY COATED REINFORCING STEEL				LBS.	95
CLASS AA CONCRETE				C.Y.	0.2

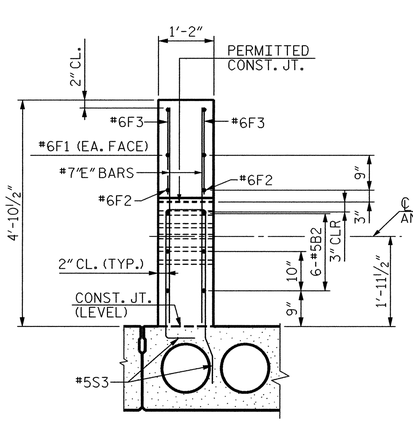
FOUR (4) END POST REQ'D.



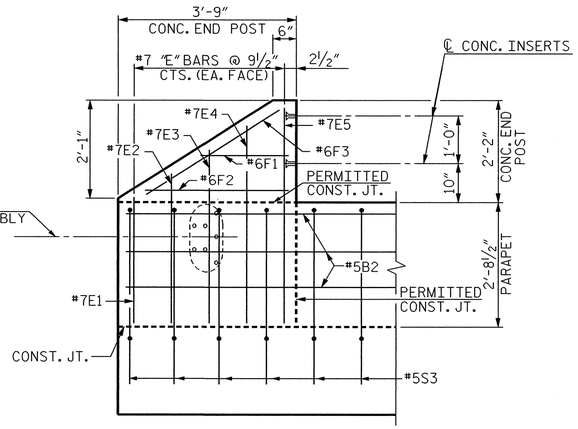
PLAN OF PARAPET



PLAN OF END POST



END VIEW



ELEVATION

NOTE:
VERTICAL AND HORIZONTAL REINFORCING IN RAIL MAY BE SHIFTED SLIGHTLY AT GUARD RAIL ANCHOR ASSEMBLY TO AVOID BOLTS AND DRILL FOR THRU HOLES.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STANDARD
RAIL POSTS SPACING AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 14

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			33

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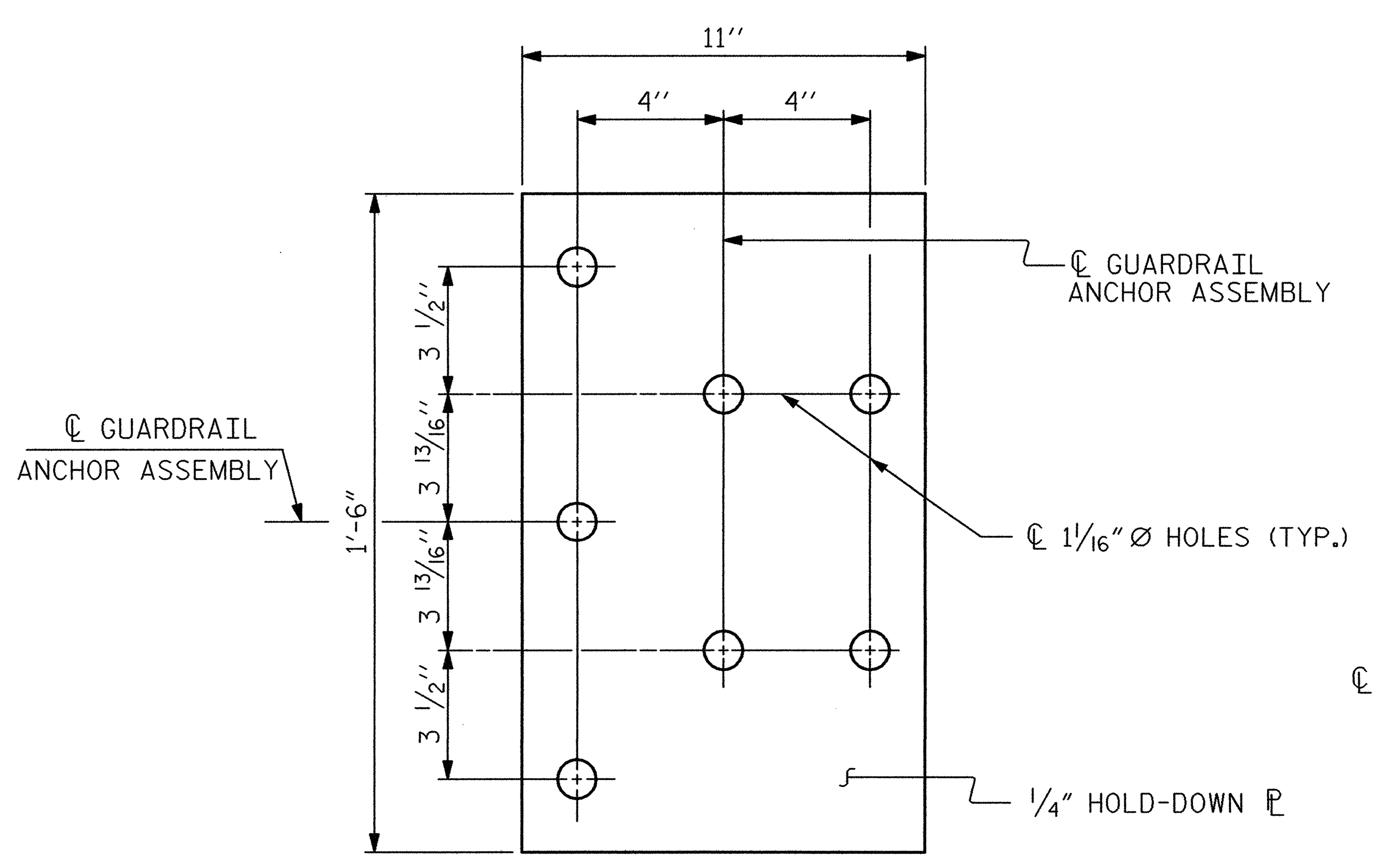
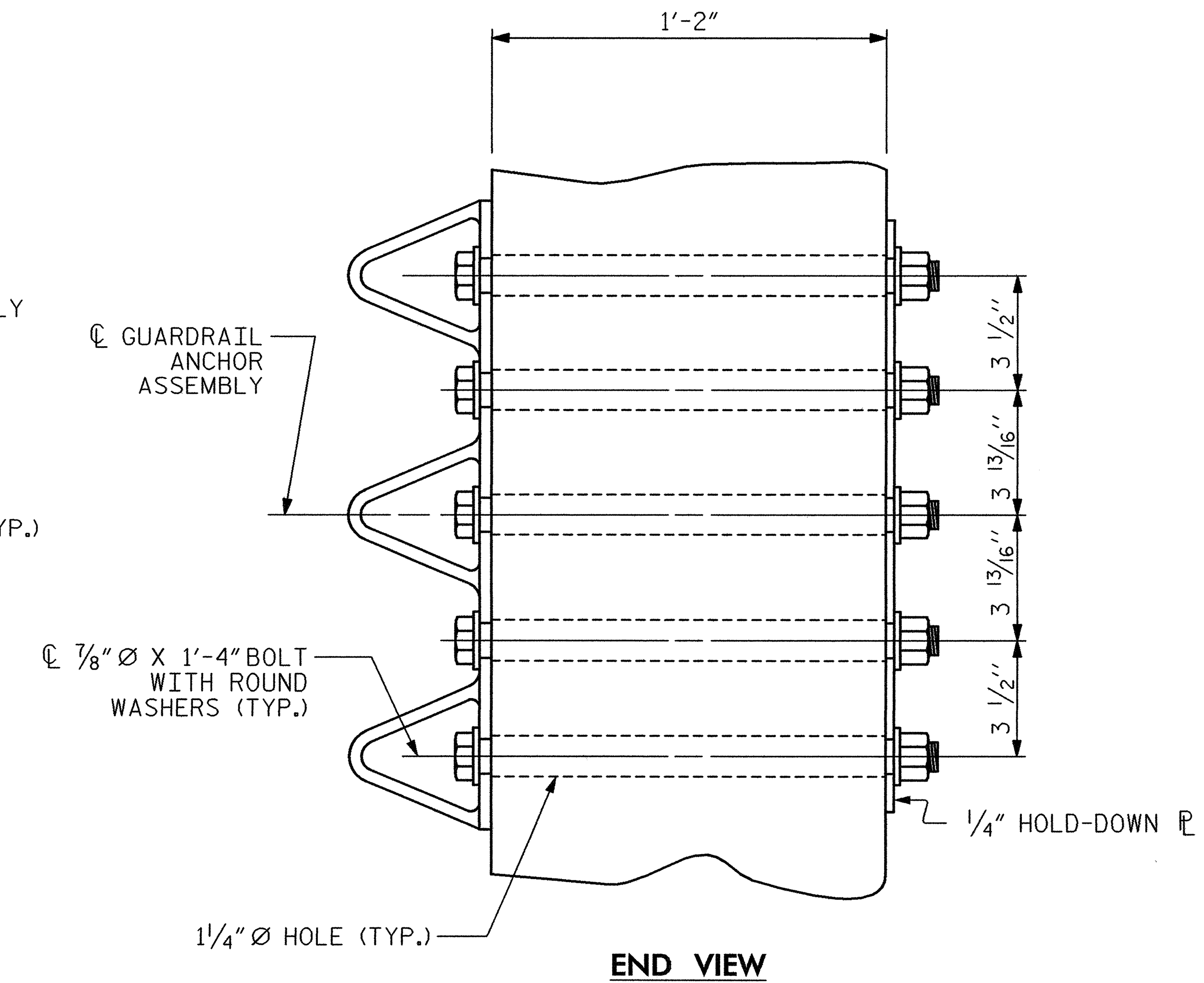
1/5/2006



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE ANODIZED. FOR DETAILS, SEE 2 BAR METAL RAIL, SHEET 1 OF 2.

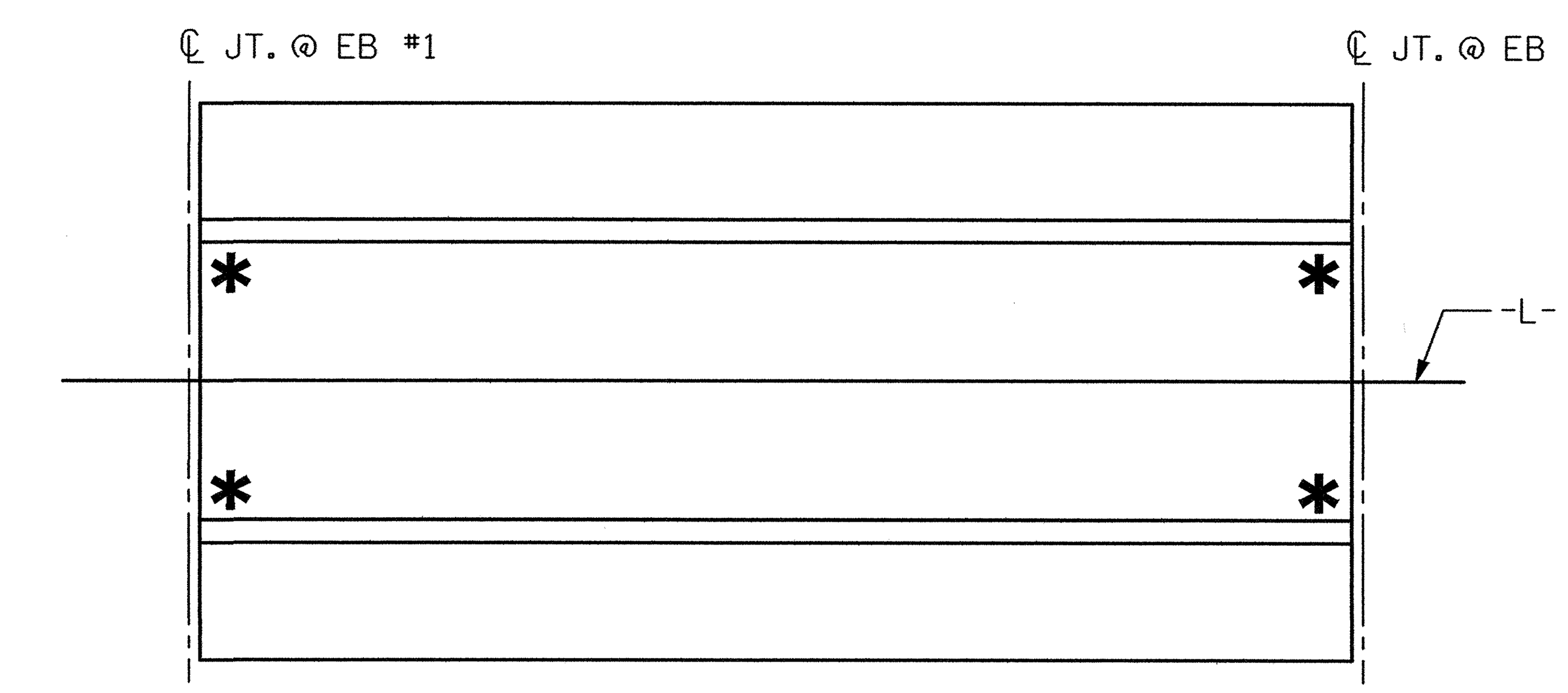
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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.

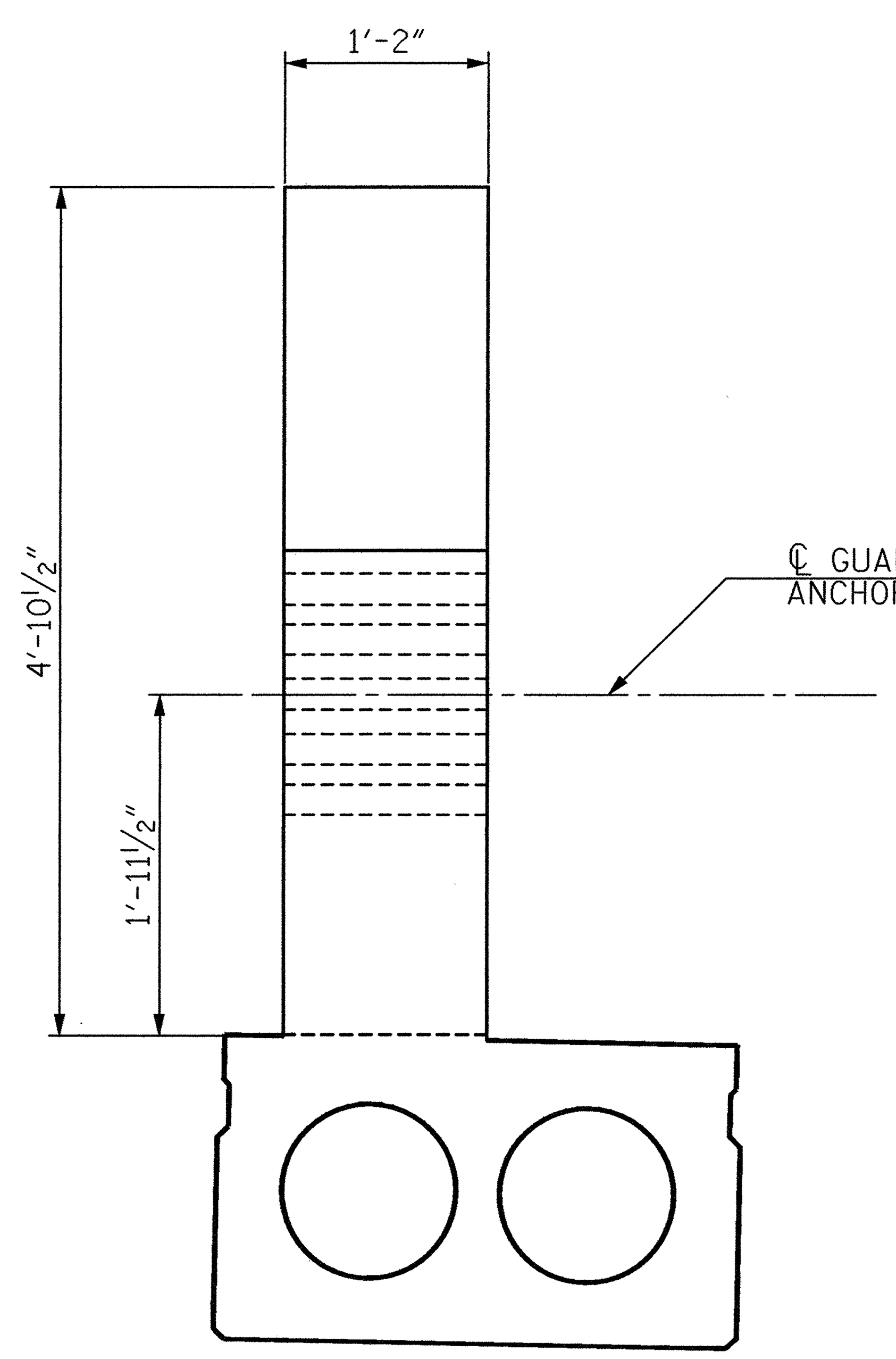
THE VERTICAL AND HORIZONTALREINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. IF CORING OPTION IS USED ALL REBAR IN THE AREA TO BE CORED SHALL BE SHIFTED AND BRACED PRIOR TO CASTING PARAPET SO THAT REBAR IS NOT DAMAGED BY CORING ANY CONCRETE OR REINFORCING STEEL DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



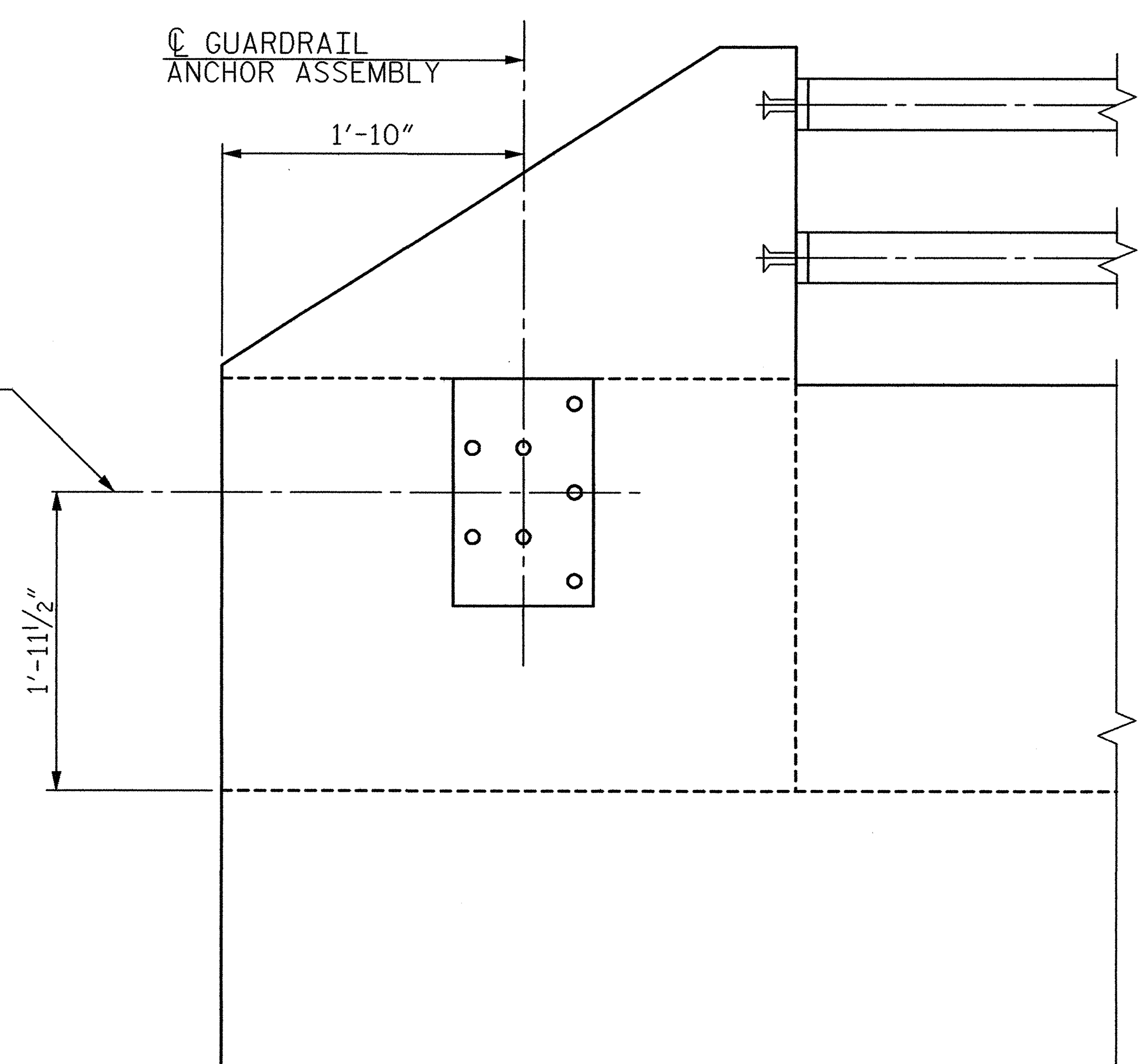
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

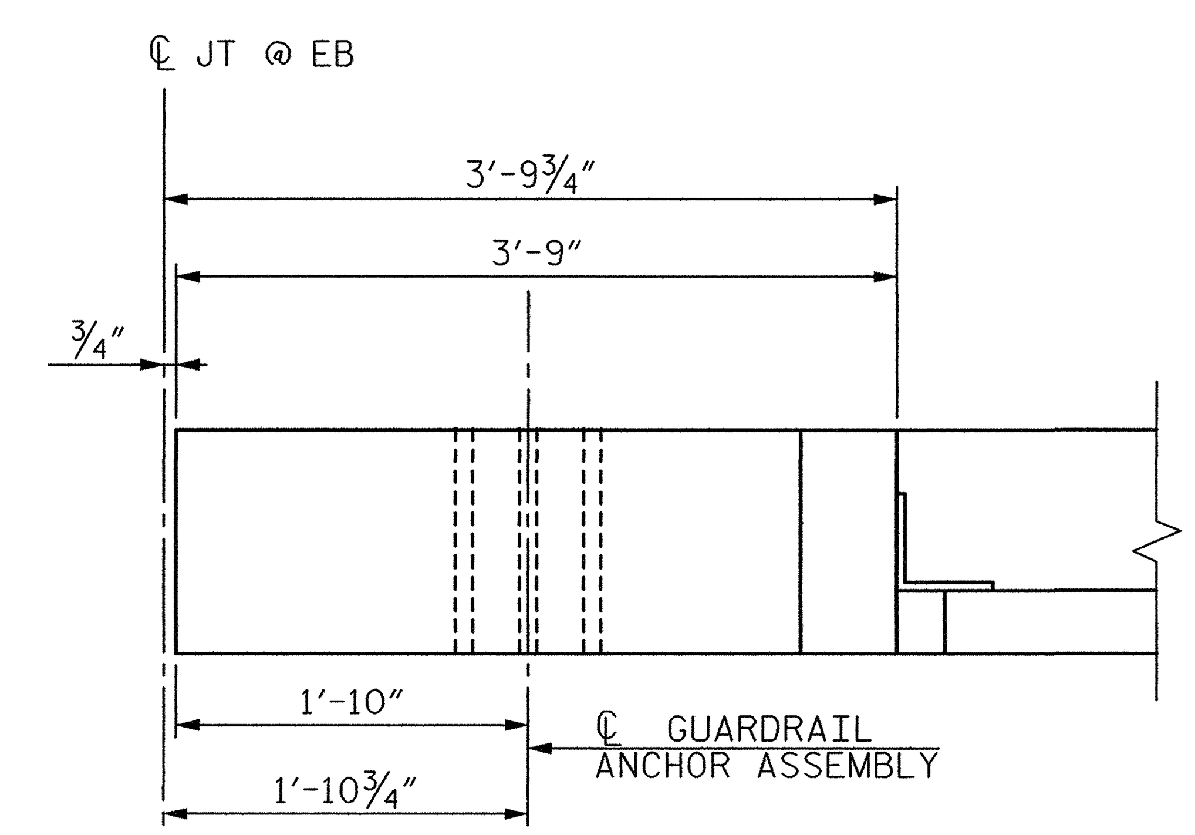


END VIEW

(TWO BAR METAL RAIL)



ELEVATION



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

(LEFT SIDE AT EB1 SHOWN ALL OTHER LOCATIONS SIMILAR)

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STANDARD GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER — Paul R. Holshouser 1/06/06

Wilbur Smith Associates — ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY :	S. PEREZ, Jr.	DATE :	1-06	DWG. NO.
CHECKED BY :	P. HOLSHOUSER	DATE :	1-06	15

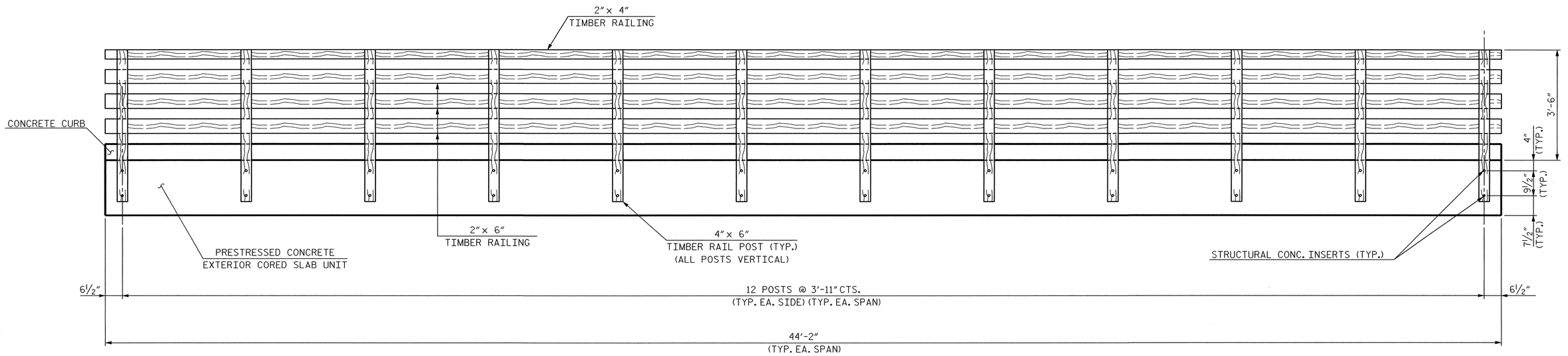
REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-15
1			3					TOTAL SHEETS
2			4					33

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-2005
CHECKED BY : 4-2005	DATE : 4-2005

DRAWN BY : EEM 6/94	REV. 8/16/99	RWW/LES
CHECKED BY : RGW 6/94	REV. 10/17/00	RWW/LES
	REV. 5/7/03	RWW/JTE

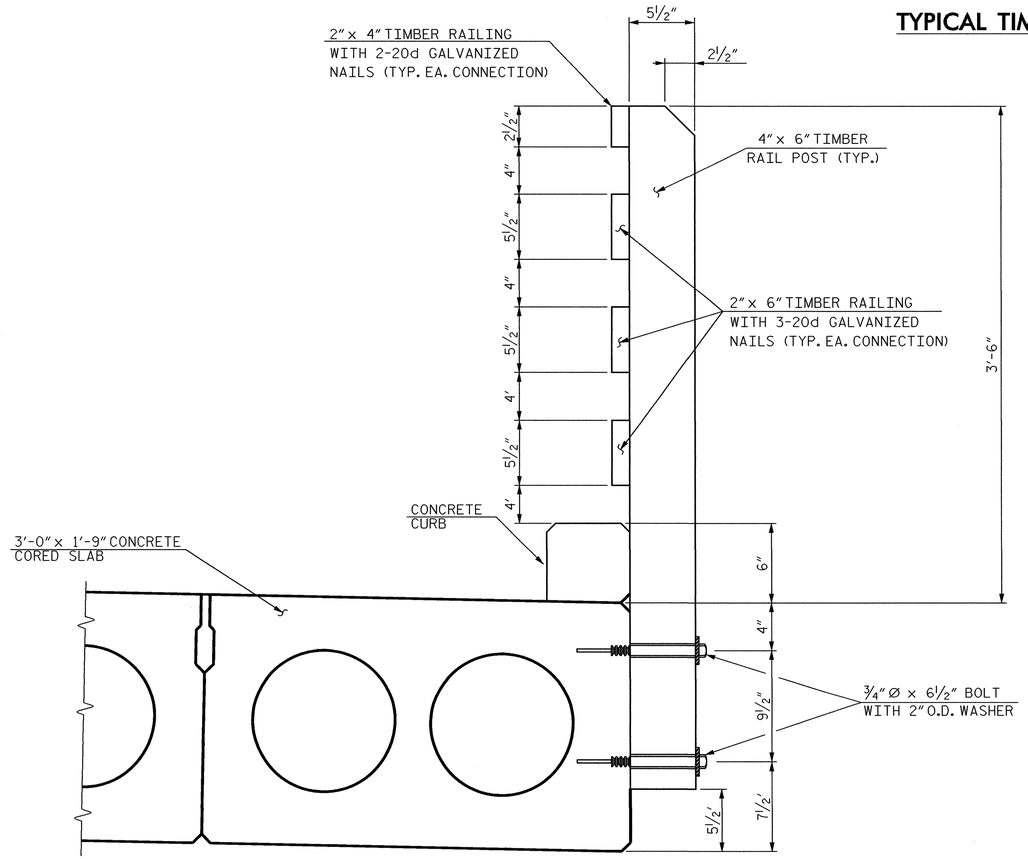
STD. NO. BMR8

s:\ncdot\b3640\final\b3640_sd_gr.dgn
1/5/2006



ELEVATION

TYPICAL TIMBER RAILING PER SPAN



SECTION THRU TIMBER RAILING

(RIGHT RAIL SHOWN)
(LEFT RAIL SIMILAR)

NOTES:

ALL TIMBER AND LUMBER USED FOR THE TIMBER RAILING SYSTEM SHALL BE TREATED WITH CHROMATED COPPER ARSENATE PRESERVATIVE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL TIMBER AND LUMBER USED SHALL BE IN CONFORMANCE WITH SECTION 1082 OF THE STANDARD SPECIFICATIONS.

BOLTS, NUTS, AND WASHERS SHALL CONFORM TO OR EXCEED THE REQUIREMENTS OF MECHANICAL ASTM GRADE A307. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.

PAYMENT FOR TIMBER RAIL SYSTEM AND CONCRETE CURB SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR "CONSTRUCTION OF SUPERSTRUCTURE".

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TIMBER RAILING DETAILS

Wilbur Smith Associates
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER 1/06/06

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			33

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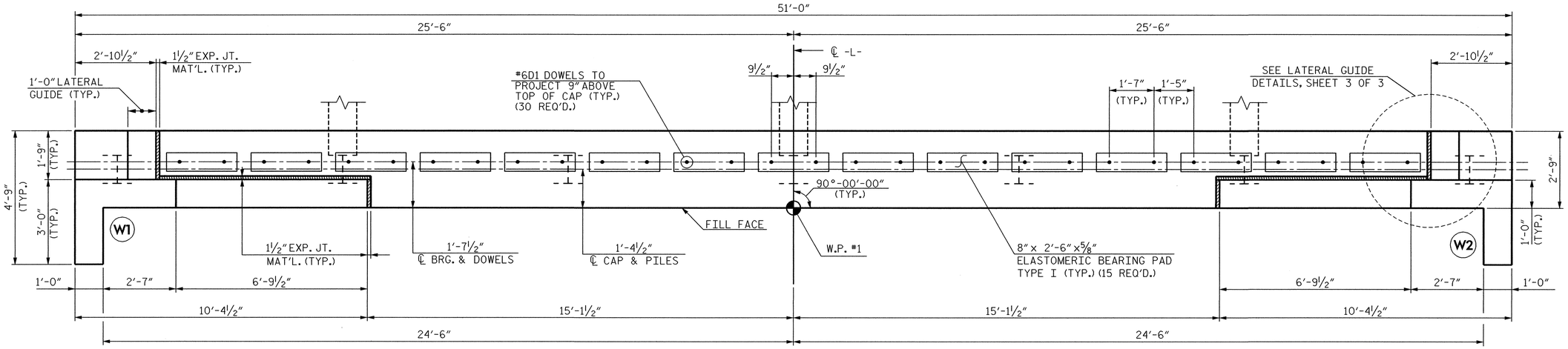
1/5/2006



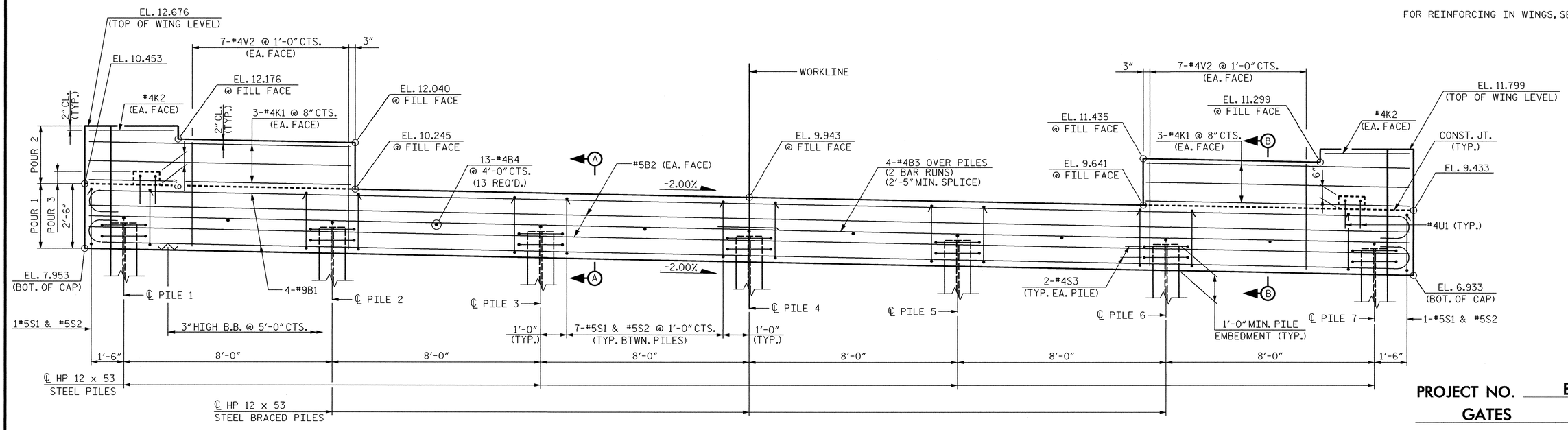
PLAN

NOTES:

FOR END BENT NOTES, SEE SHEET 3 OF 3.

FOR SECTIONS A-A & B-B, SEE SHEET 3 OF 3.

FOR REINFORCING IN WINGS, SEE SHEET 2 OF 3.



ELEVATION

TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
1	8.923
2	8.763
3	8.603
4	8.443
5	8.283
6	8.123
7	7.963

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 17

NORTH CAROLINA PROFESSIONAL ENGINEER 20668 PAUL R. HOLSHOUSER 1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			33

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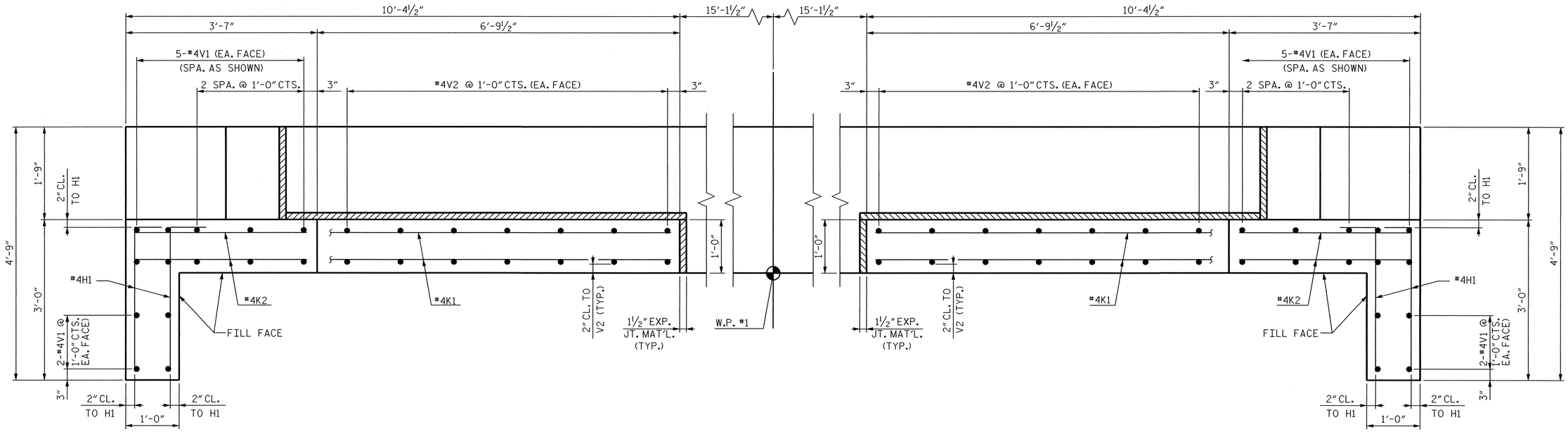
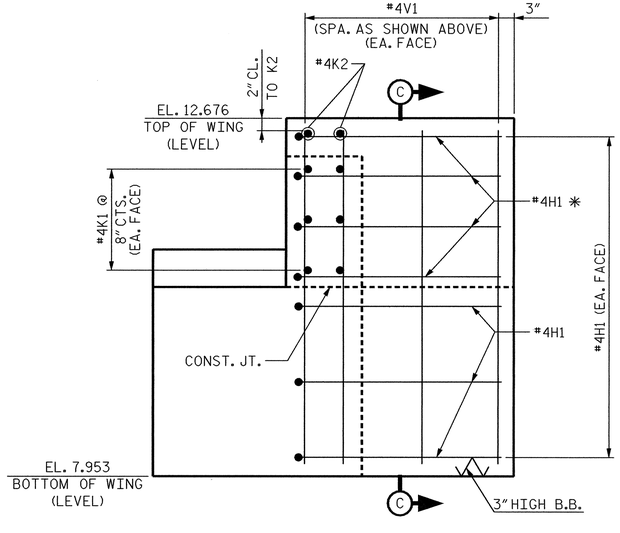
2/2/2006

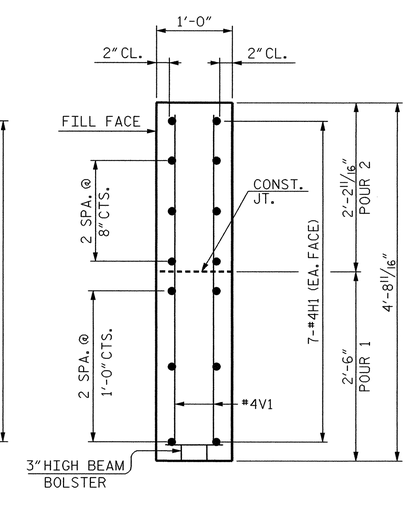


PLAN OF WING W1

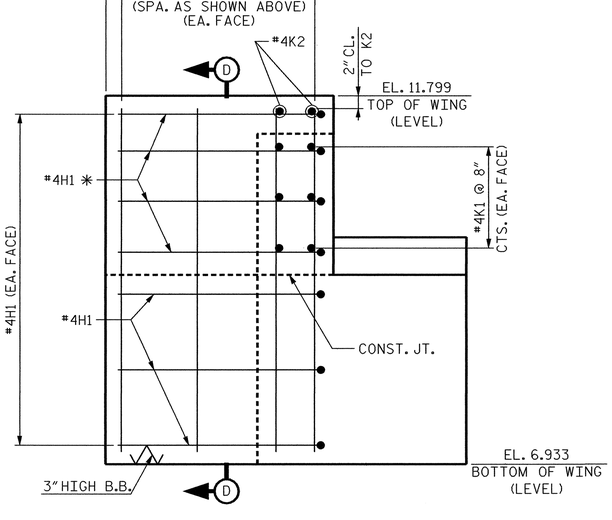
PLAN OF WING W2



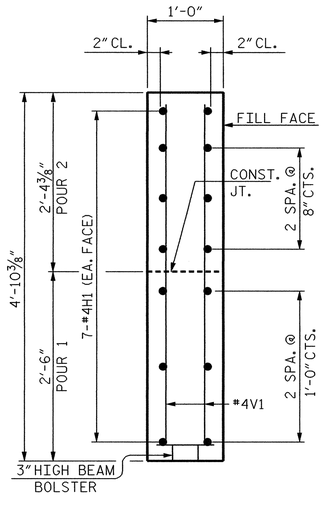
ELEVATION OF WING W1



SECTION C–C



ELEVATION OF WING W2



SECTION D–D

* MATCH THESE BARS TO "K" BARS IN THE BACKWALL

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 18

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			33

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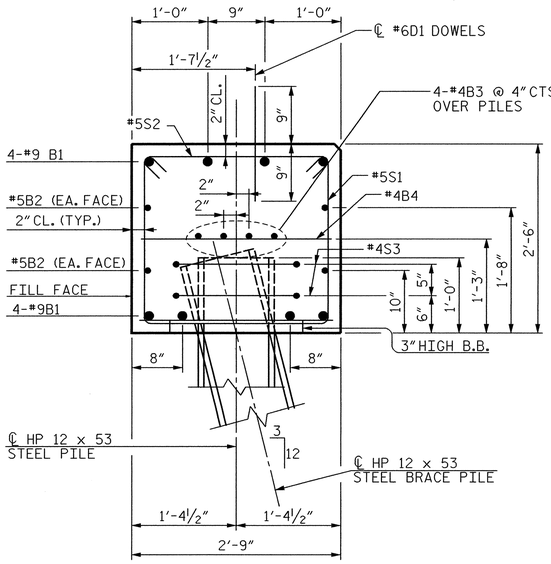
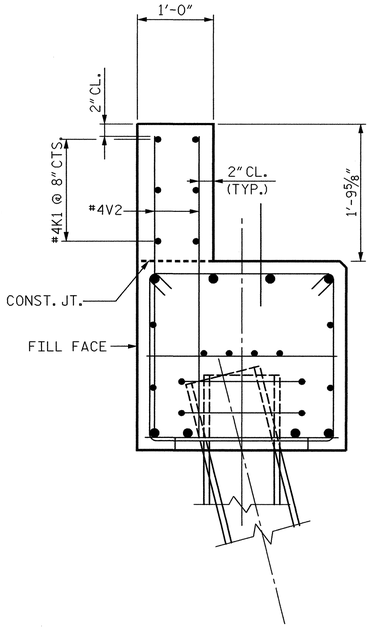
1/6/2006



SECTION A–A



SECTION B–B

(REINFORCEMENT IN CAP SAME AS SECTION A-A)

NOTES:

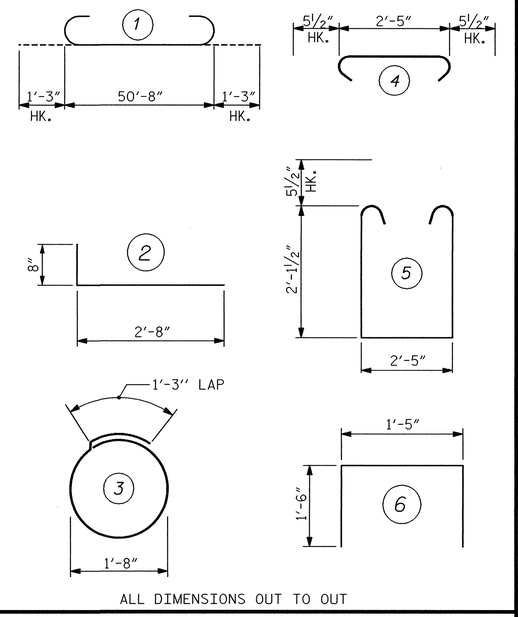
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR TEMPORARY DRAINAGE AT END BENT, SEE "END BENT 2 SHEET 3 OF 3".

BAR TYPES



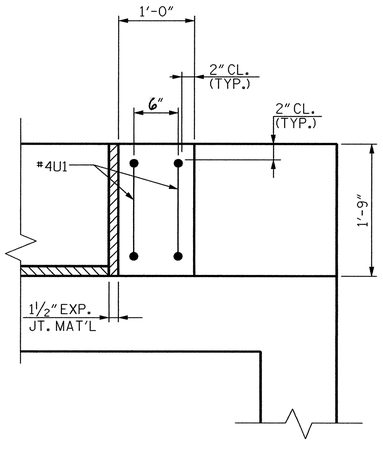
ALL DIMENSIONS OUT TO OUT

BILL OF MATERIAL

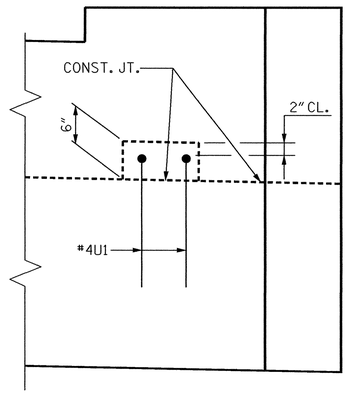
END BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	53'-2"	1446
B2	4	#5	STR	50'-8"	211
B3	8	#4	STR	26'-7"	142
B4	13	#4	STR	2'-5"	21
D1	30	#6	STR	1'-6"	68
H1	28	#4	2	3'-4"	62
K1	12	#4	STR	10'-0"	80
K2	4	#4	STR	3'-3"	9
S1	44	#5	5	7'-7"	348
S2	44	#5	4	3'-4"	153
S3	14	#4	3	6'-6"	61
U1	4	#4	6	4'-5"	12
V1	28	#4	STR	4'-3"	80
V2	28	#4	STR	3'-10"	72

REINFORCING STEEL LBS.	2765
CLASS A CONC. BREAKDOWN	
POUR 1 (CAP & LOWER WINGS) C.Y.	13.4
POUR 2 (UPPER WINGS & B.W.) C.Y.	1.7
POUR 3 (LATERAL GUIDES) C.Y.	0.1
TOTAL C.Y.	15.2
HP 12 x 53 STEEL PILES	
NUMBER =7	LIN. FT.= 385.0



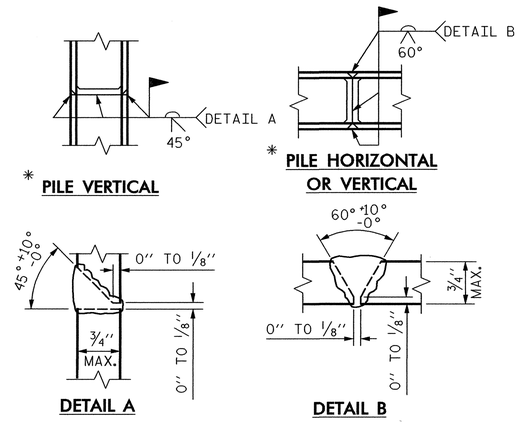
PLAN



ELEVATION

LATERAL GUIDE DETAILS

(EACH END SIMILAR)



* PILE VERTICAL

* PILE HORIZONTAL OR VERTICAL

DETAIL A

DETAIL B

PILE SPLICE DETAILS

*POSITION OF PILE DURING WELDING.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 19

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			33

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8/5/2005

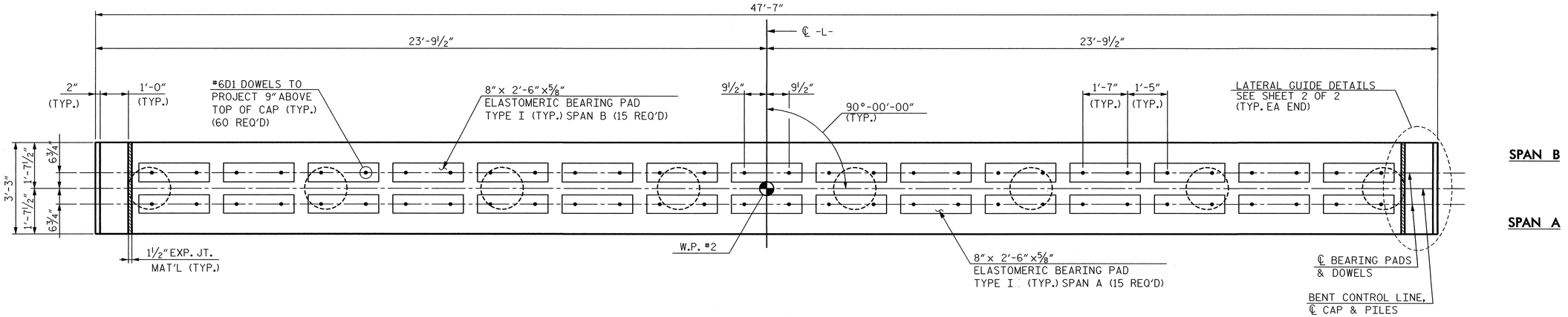
NOTES:

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

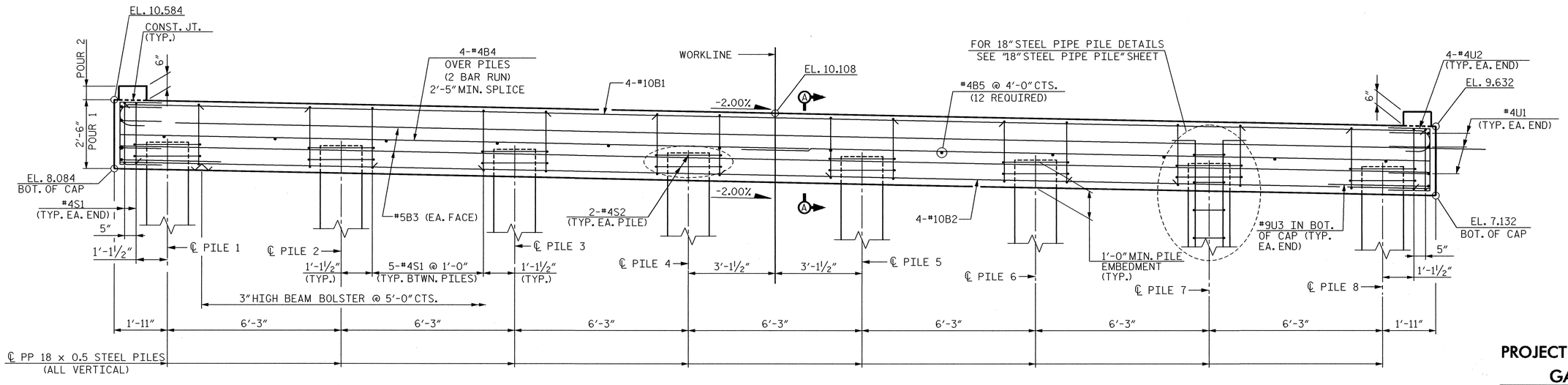
INVERT ALTERNATE STIRRUPS.

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

FOR SECTION A-A, SEE SHEET 2 OF 2.



PLAN



ELEVATION

(#6D1 DOWELS NOT SHOWN FOR CLARITY)

TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
1	9.046
2	8.921
3	8.796
4	8.671
5	8.546
6	8.421
7	8.296
8	8.171

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 20

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 R. HOLSHOUSER 1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			33

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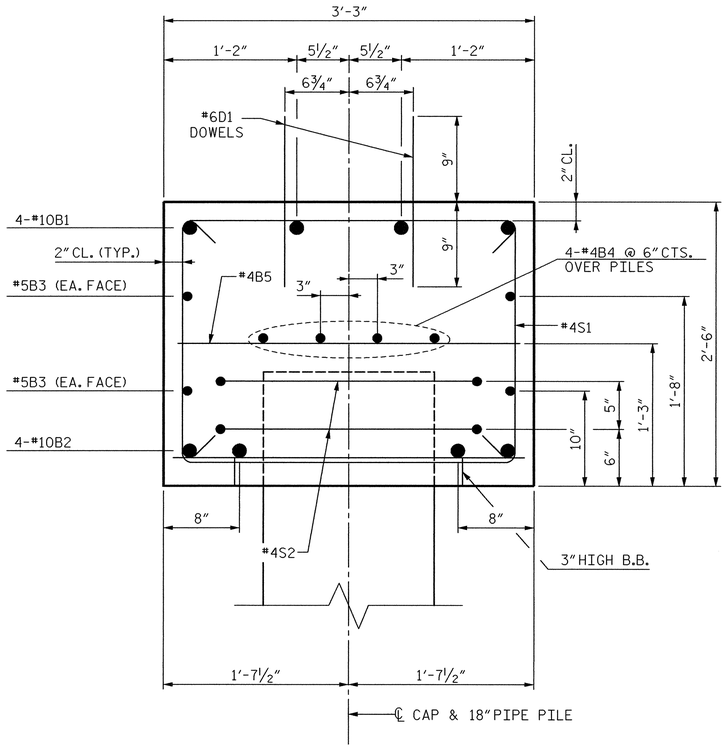
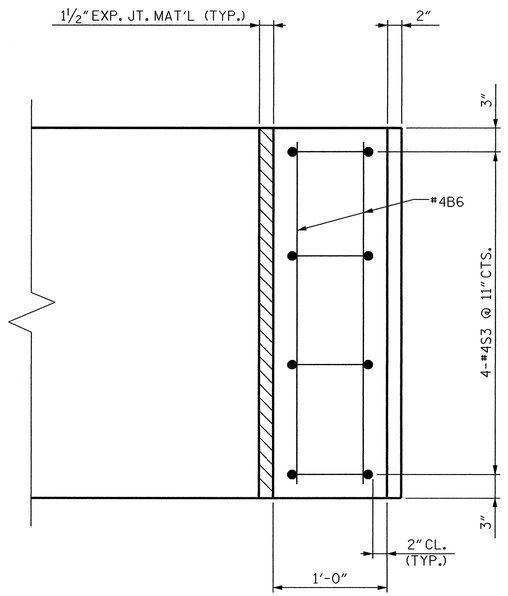
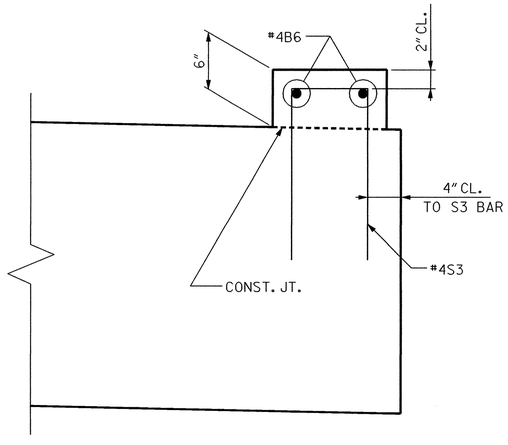
1/5/2006



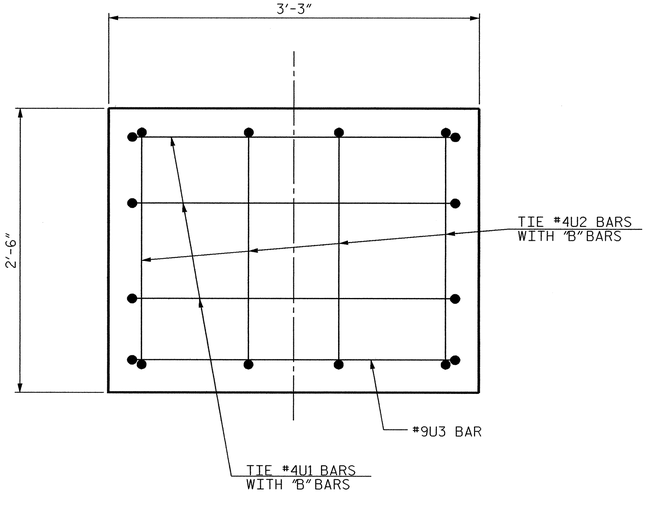
SECTION A–A



PLAN



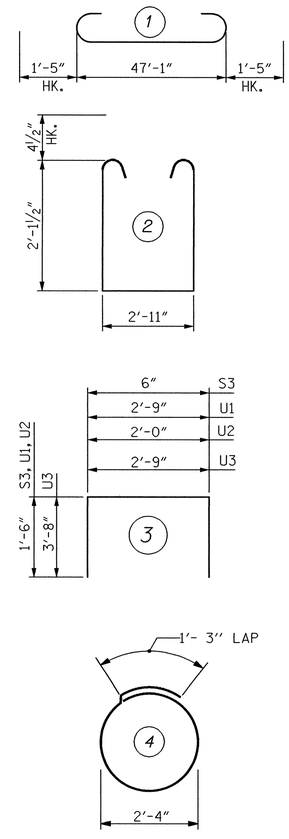
ELEVATION



END VIEW

LATERAL GUIDE DETAILS

BAR TYPES



ALL BARS DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	49'-11"	859
B2	4	#10	STR	47'-3"	813
B3	4	#5	STR	47'-3"	197
B4	8	#4	STR	24'-11"	133
B5	12	#4	STR	2'-11"	23
B6	4	#4	STR	2'-11"	8
D1	60	#6	STR	1'-6"	135
S1	39	#4	2	7'-11"	206
S2	16	#4	4	8'-7"	92
S3	8	#4	3	3'-6"	19
U1	6	#4	3	5'-9"	23
U2	8	#4	3	5'-0"	27
U3	2	#9	3	10'-1"	69

REINFORCING STEEL LBS.	2604
CLASS A CONC. BREAKDOWN	
POUR 1 (CAP) C.Y.	13.8
POUR 2 (LATERAL GUIDES) C.Y.	0.1
TOTAL C.Y.	13.9
18" Ø STEEL PIPE PILES	
NUMBER = 8	LIN. FT.= 560.0

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 21

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			33

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1/5/2006

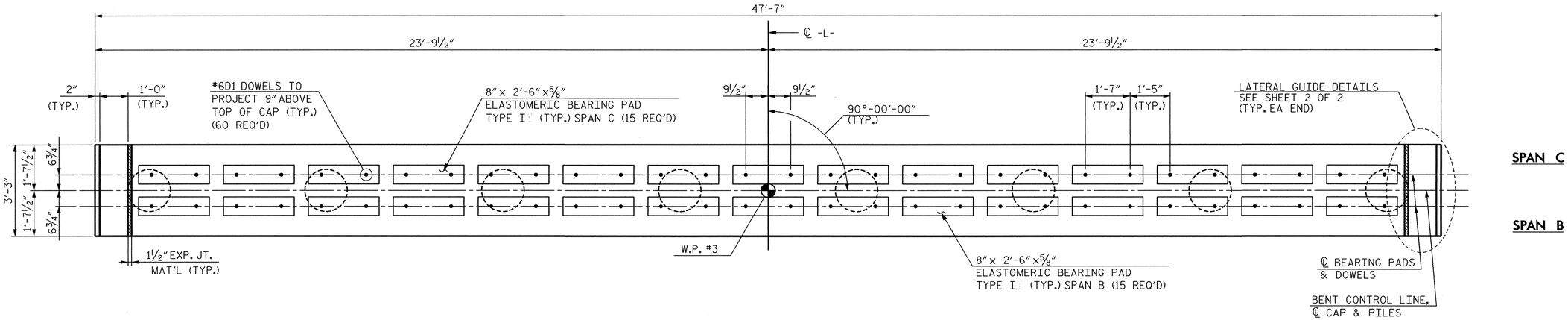
NOTES:

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

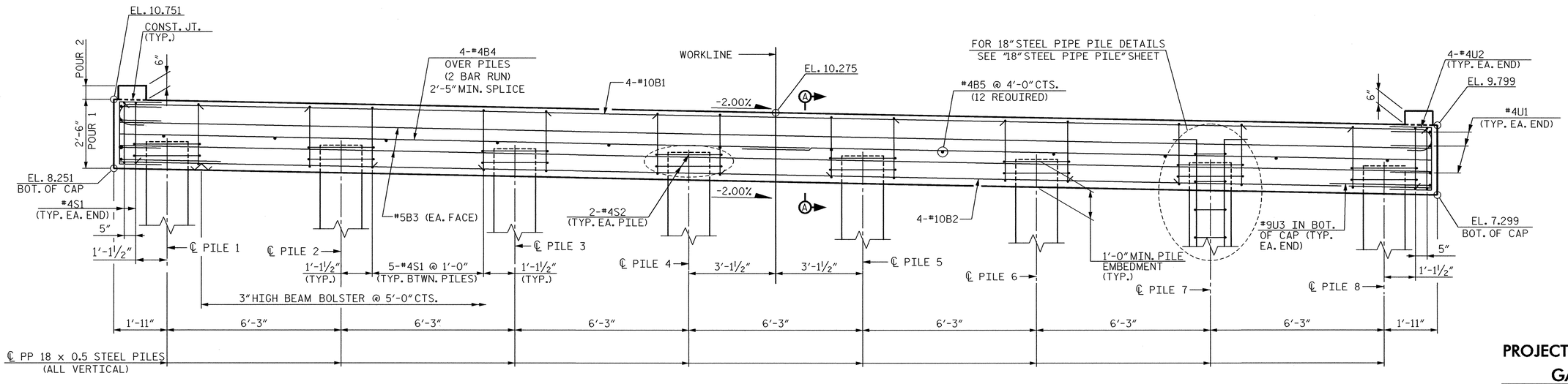
INVERT ALTERNATE STIRRUPS.

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

FOR SECTION A-A, SEE SHEET 2 OF 2.



PLAN



ELEVATION

(#6D1 DOWELS NOT SHOWN FOR CLARITY)

TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
1	9.213
2	9.088
3	8.963
4	8.838
5	8.713
6	8.588
7	8.463
8	8.338

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 22

NORTH CAROLINA PROFESSIONAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			33

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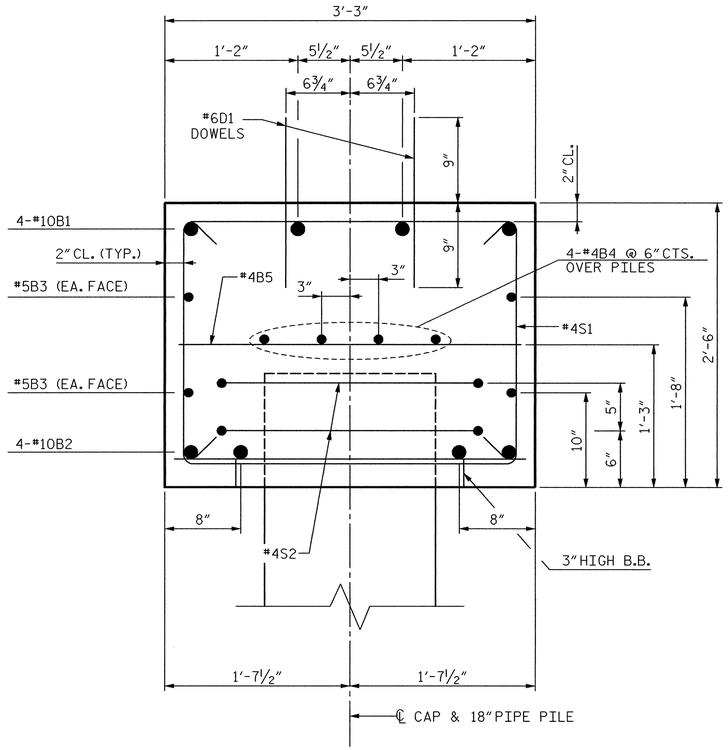
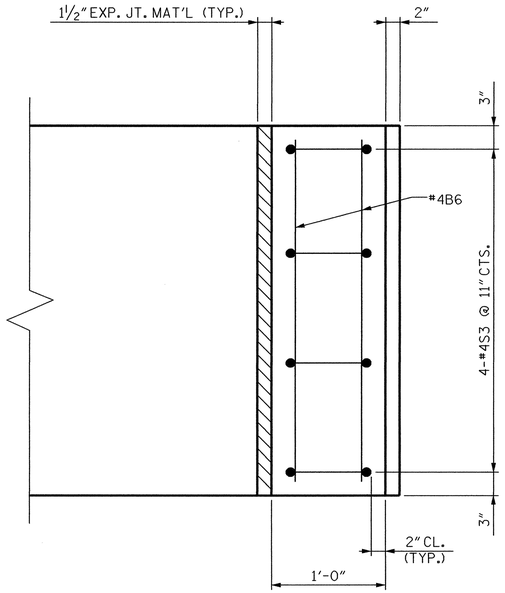
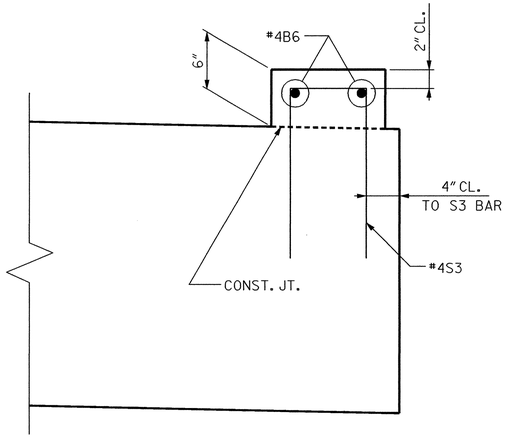
1/5/2006



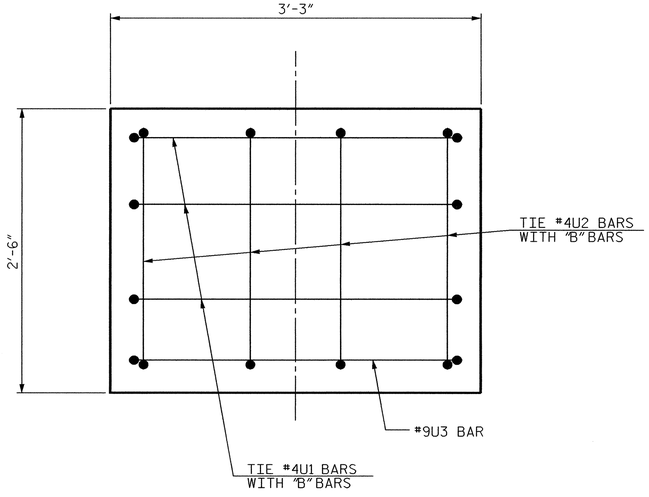
SECTION A-A



PLAN



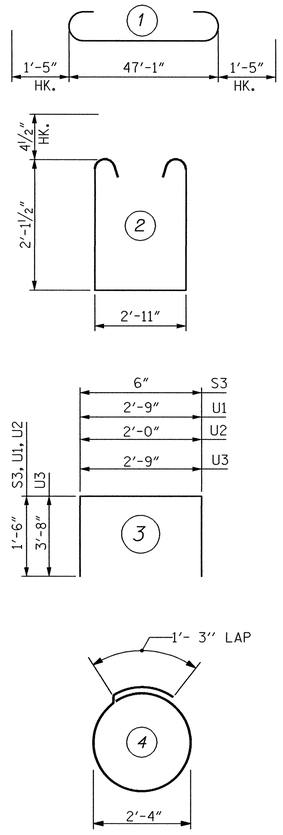
ELEVATION



END VIEW

LATERAL GUIDE DETAILS

BAR TYPES



ALL BARS DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	49'-11"	859
B2	4	#10	STR	47'-3"	813
B3	4	#5	STR	47'-3"	197
B4	8	#4	STR	24'-11"	133
B5	12	#4	STR	2'-11"	23
B6	4	#4	STR	2'-11"	8
D1	60	#6	STR	1'-6"	135
S1	39	#4	2	7'-11"	206
S2	16	#4	4	8'-7"	92
S3	8	#4	3	3'-6"	19
U1	6	#4	3	5'-9"	23
U2	8	#4	3	5'-0"	27
U3	2	#9	3	10'-1"	69

REINFORCING STEEL LBS.	2604
CLASS A CONC. BREAKDOWN	
POUR 1 (CAP) C.Y.	13.8
POUR 2 (LATERAL GUIDES) C.Y.	0.1
TOTAL C.Y.	13.9
18"Ø STEEL PIPE PILES	
NUMBER = 8	LIN. FT.= 560.0

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 23

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER 1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			33

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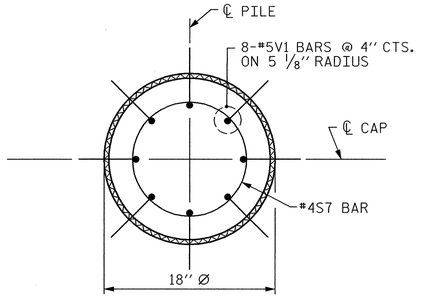
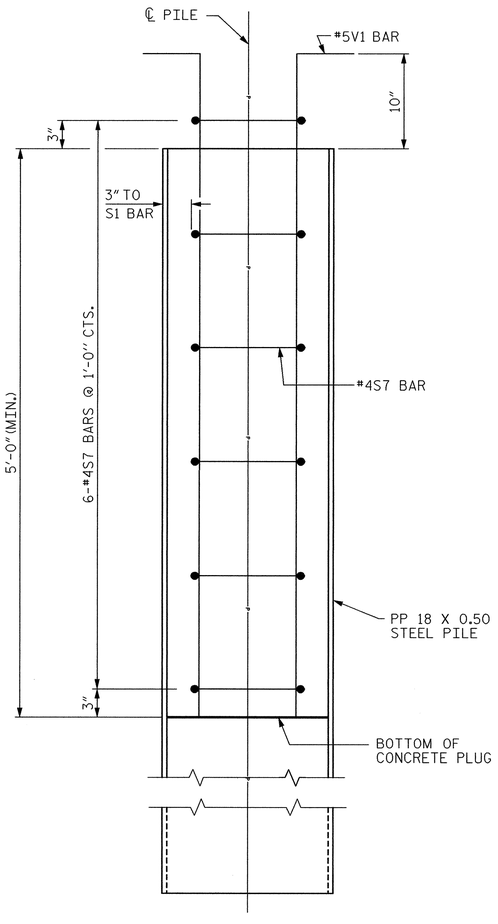
1/5/2006



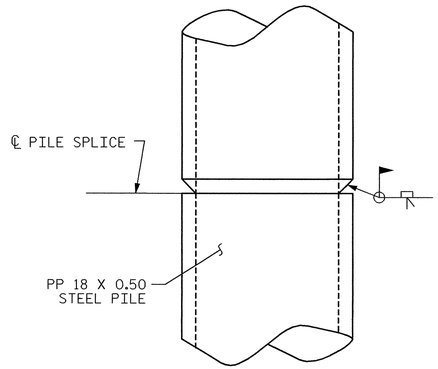
PLAN



ELEVATION

PP 18 X 0.50 STEEL PILE

(OPEN END)



PILE SPLICE DETAILS

NOTES:

STEEL PIPE PILES SHALL BE OF UNIFORM DIAMETER AND MEET THE REQUIREMENTS OF ASTM A252, GRADE 3 MODIFIED (50,000 PSI YIELD STRENGTH).

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

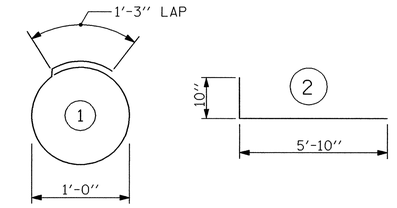
FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 18 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE PP 18 X 0.50 STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S7	6	#4	1	4'-5''	18
V1	8	#5	2	6'-8''	56
REINFORCING STEEL =					74 lbs
CLASS A CONCRETE 5'-0'' MINIMUM PLUG					0.3 CY
TOTAL NO. OF PILES (BENT 1 & 2)					16

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

18'' STEEL PIPE PILE

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-05
CHECKED BY : P.R. HOLSHOUSER	DATE : 4-05
DRAWN BY : RWW 1/01	REV. 7/10/01 RWW/LES
CHECKED BY : LES 1/01	REV. 5/7/03 RWW/JTE

Wilbur Smith Associates — Engineers, Planners, Economists
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 24

NORTH CAROLINA PROFESSIONAL ENGINEER 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			33

STD. NO. SPP1

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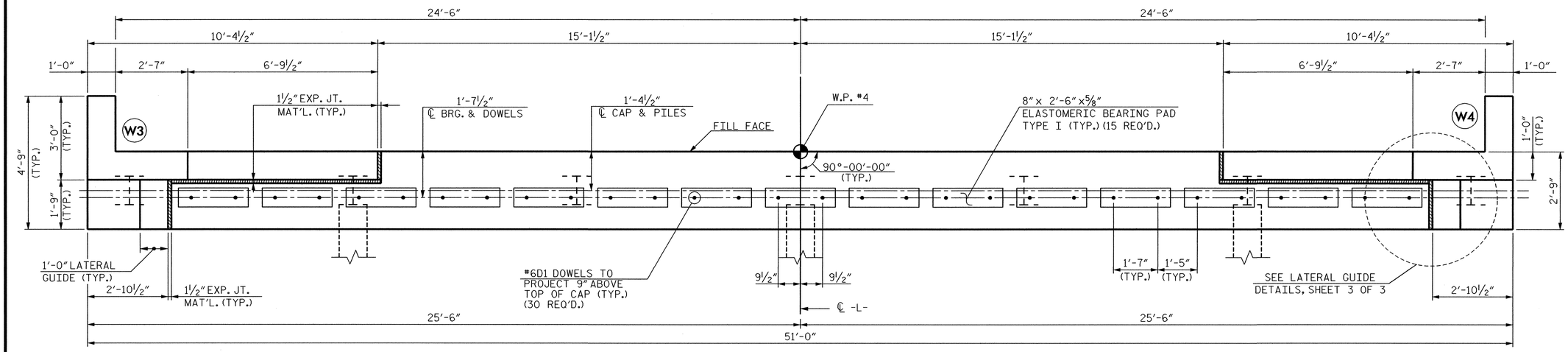
1/6/2006



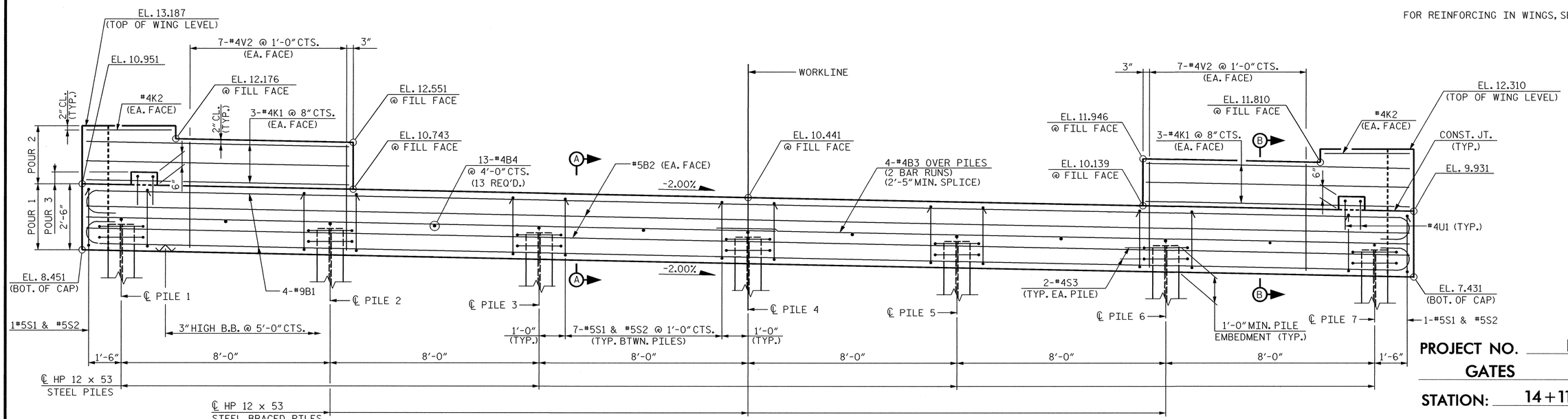
PLAN

NOTES:

FOR END BENT NOTES, SEE SHEET 3 OF 3.

FOR SECTIONS A-A & B-B, SEE SHEET 3 OF 3.

FOR REINFORCING IN WINGS, SEE SHEET 2 OF 3.



ELEVATION

TOP OF PILE ELEVATIONS	
PILE NO.	ELEVATION
1	9.421
2	9.261
3	9.101
4	8.941
5	8.781
6	8.621
7	8.461

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 25

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			33

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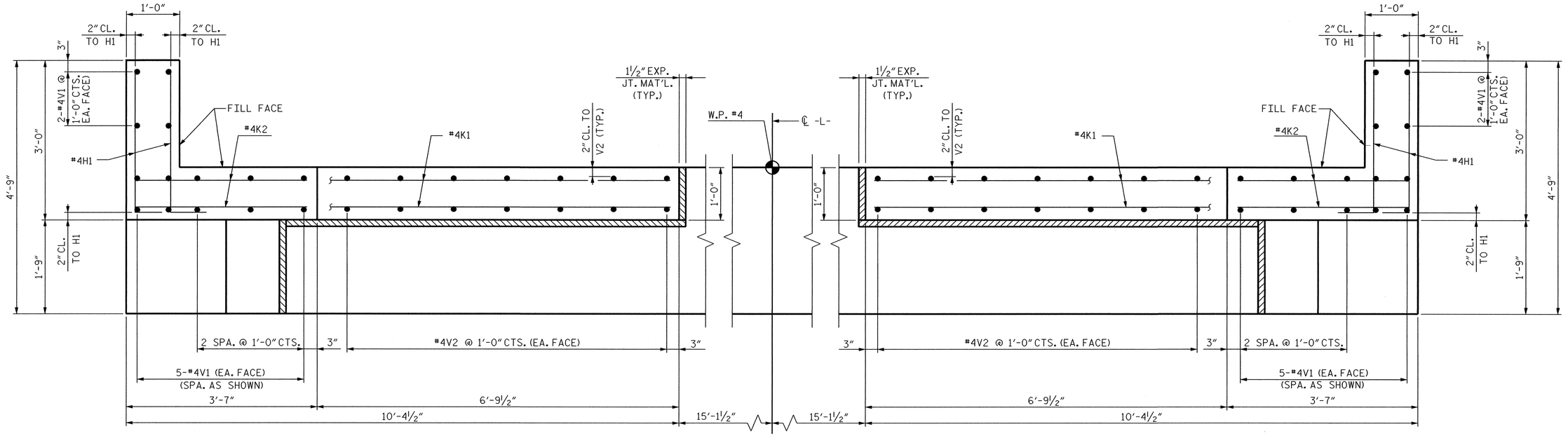
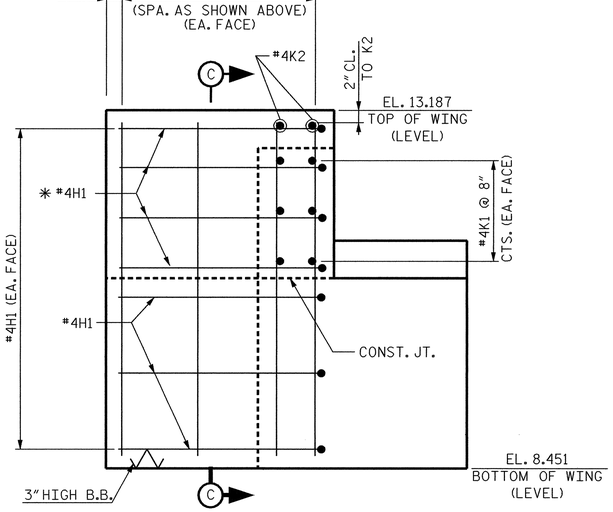
1/5/2006

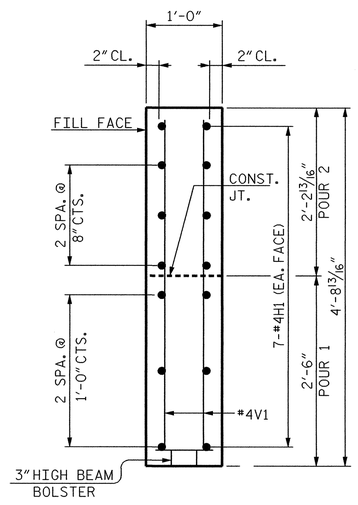


PLAN OF WING W3

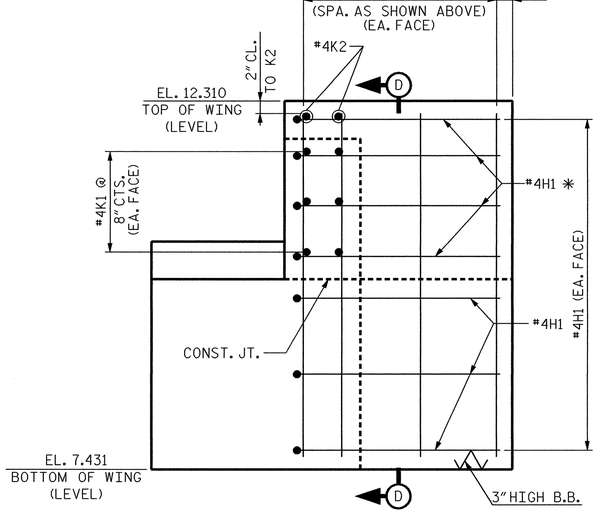
PLAN OF WING W4



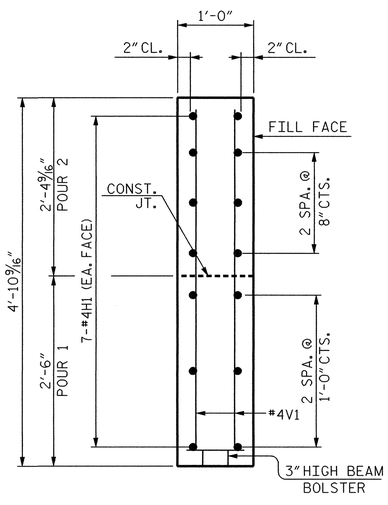
ELEVATION OF WING W3



SECTION C–C



ELEVATION OF WING W4



SECTION D–D

✳ MATCH THESE BARS TO "K" BARS IN THE BACKWALL

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

Wilbur Smith Associates
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 26

NORTH CAROLINA PROFESSIONAL ENGINEER 20668 PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			33

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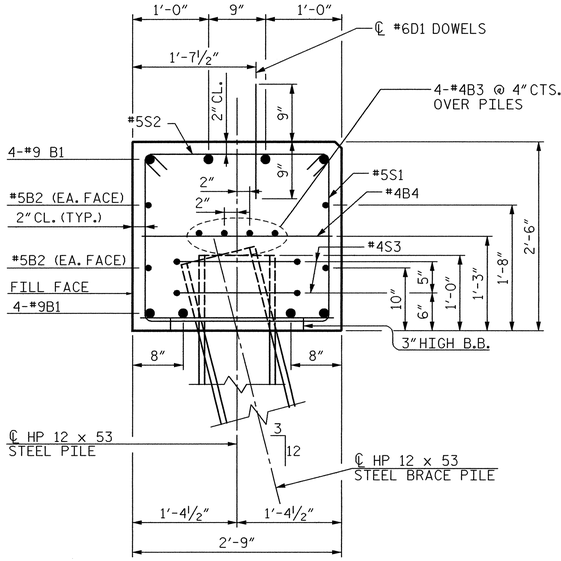
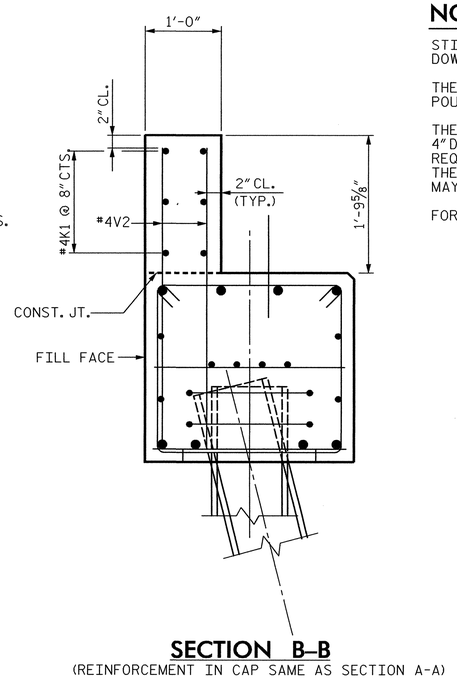
1/5/2006



SECTION A–A



SECTION B–B

(REINFORCEMENT IN CAP SAME AS SECTION A-A)

NOTES:

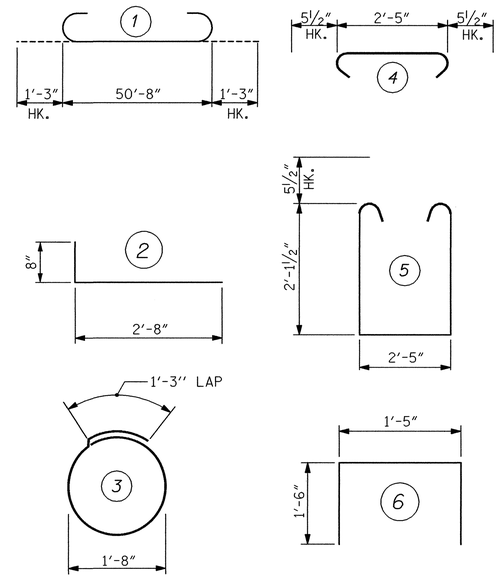
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR PILE SPLICE DETAILS, SEE "END BENT 1 SHEET 3 OF 3".

BAR TYPES



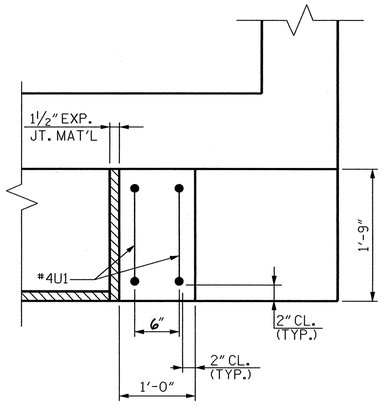
ALL DIMENSIONS OUT TO OUT

BILL OF MATERIAL

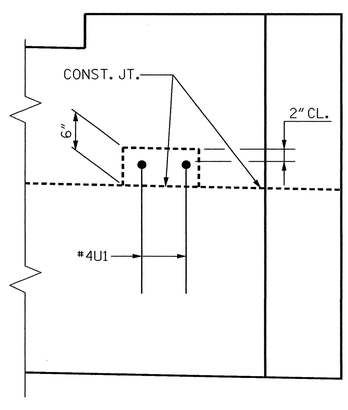
END BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	53'-2"	1446
B2	4	#5	STR	50'-8"	211
B3	8	#4	STR	26'-7"	142
B4	13	#4	STR	2'-5"	21
D1	30	#6	STR	1'-6"	68
H1	28	#4	2	3'-4"	62
K1	12	#4	STR	10'-0"	80
K2	4	#4	STR	3'-3"	9
S1	44	#5	5	7'-7"	348
S2	44	#5	4	3'-4"	153
S3	14	#4	3	6'-6"	61
U1	4	#4	6	4'-5"	12
V1	28	#4	STR	4'-3"	80
V2	28	#4	STR	3'-10"	72

REINFORCING STEEL LBS.	2765
CLASS A CONC. BREAKDOWN	
POUR 1 (CAP & LOWER WINGS) C.Y.	13.4
POUR 2 (UPPER WINGS & B.W.) C.Y.	1.7
POUR 3 (LATERAL GUIDES) C.Y.	0.1
TOTAL C.Y.	15.2
HP 12 x 53 STEEL PILES	
NUMBER =7	LIN. FT.= 385.0



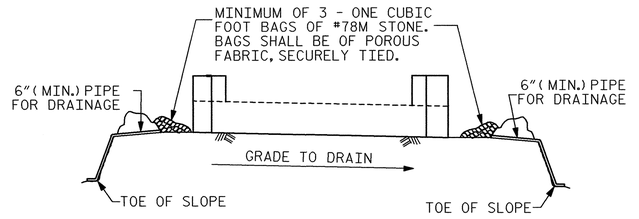
PLAN



ELEVATION

LATERAL GUIDE DETAILS

(EACH END SIMILAR)



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 ACCUMALATIONS 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 SERARATE 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

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 27

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R. HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			33

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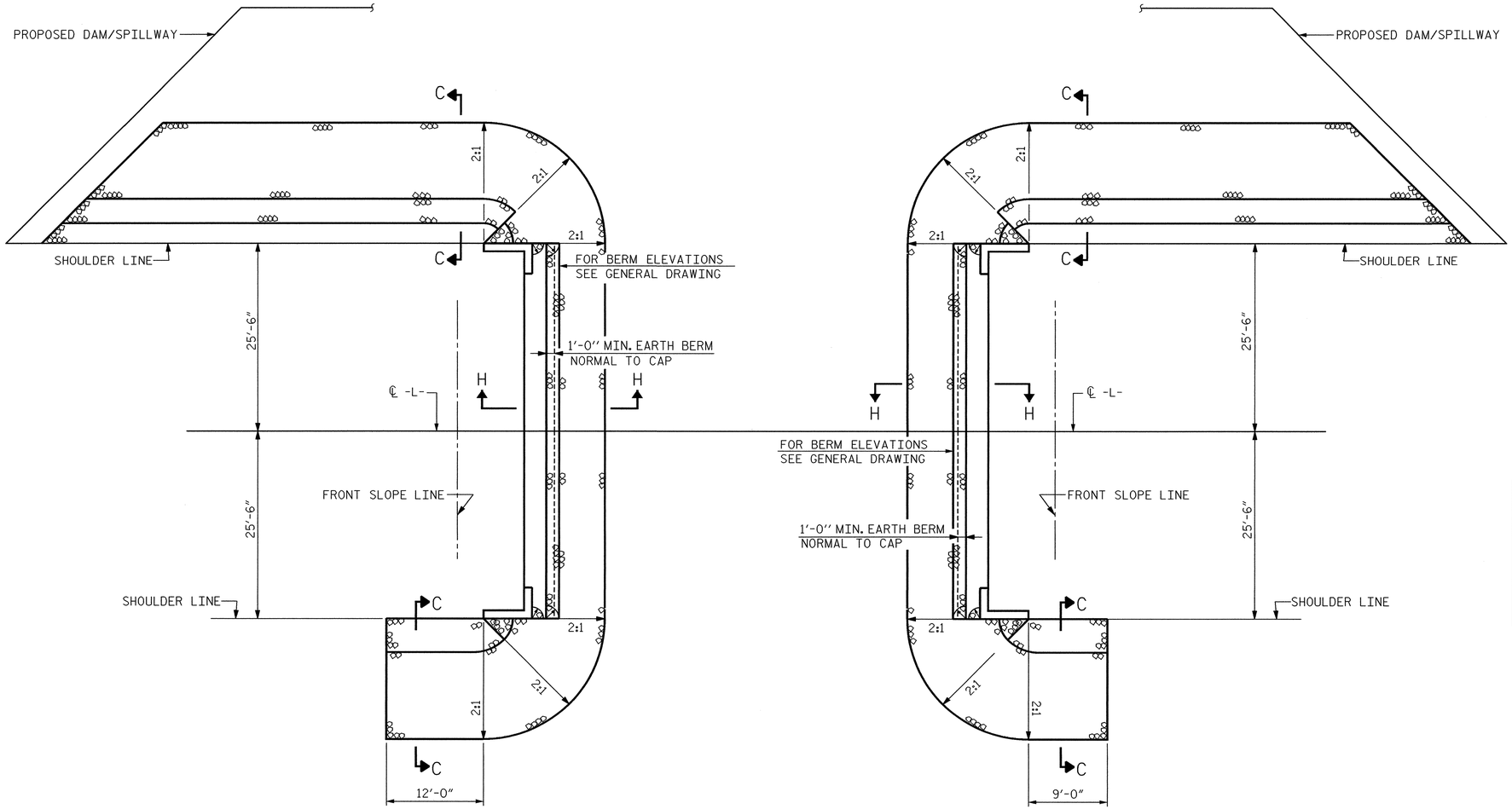
1/5/2006



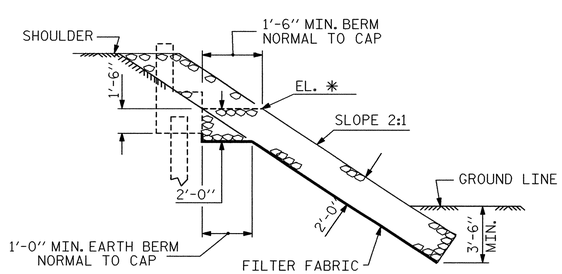
NOTES:

FOR STONE SLOPE PROTECTION, SEE SPECIAL PROVISION.

THE COST OF THE FILTER FABRIC SHALL BE INCLUDED IN THE CONTRACT PRICE BID FOR STONE SLOPE PROTECTION.

ESTIMATED QUANTITIES

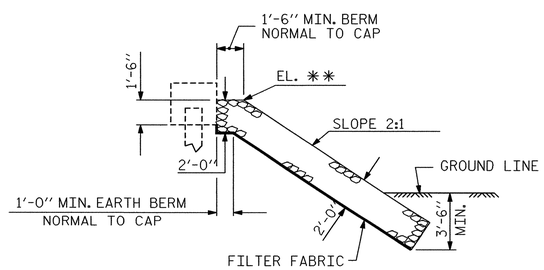
BRIDGE @ STA. 14+11.50 -L-	STONE SLOPE PROTECTION	FILTER FABRIC (TYPE II) FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	490	540
END BENT 2	455	505



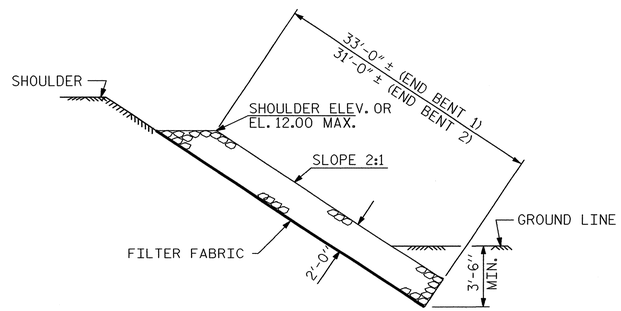
SECTION H–H

* BERM AT END OF CAP ELEVATION SEE GENERAL DRAWING PLAN.

** VARIES SEE GENERAL DRAWING FOR END OF CAP ELEVATIONS.



℄ SECTION BERM RIP RAPPED



SECTION C–C

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

STONE SLOPE PROTECTION DETAILS

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-05
CHECKED BY : P.R. HOLSHOUSER	DATE : 4-05
DRAWN BY : FCJ 2/88	REV. 7/17/98 REK/RWW
CHECKED BY : ARB 8/88	REV. 8/16/99 RWW/LES
	REV. 10/17/00 RWW/LES

Wilbur Smith Associates — Engineers, Planners, Economists
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 28

NORTH CAROLINA PROFESSIONAL SEAL 20668 ENGINEER PAUL R HOLSHOUSER
1/06/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			33

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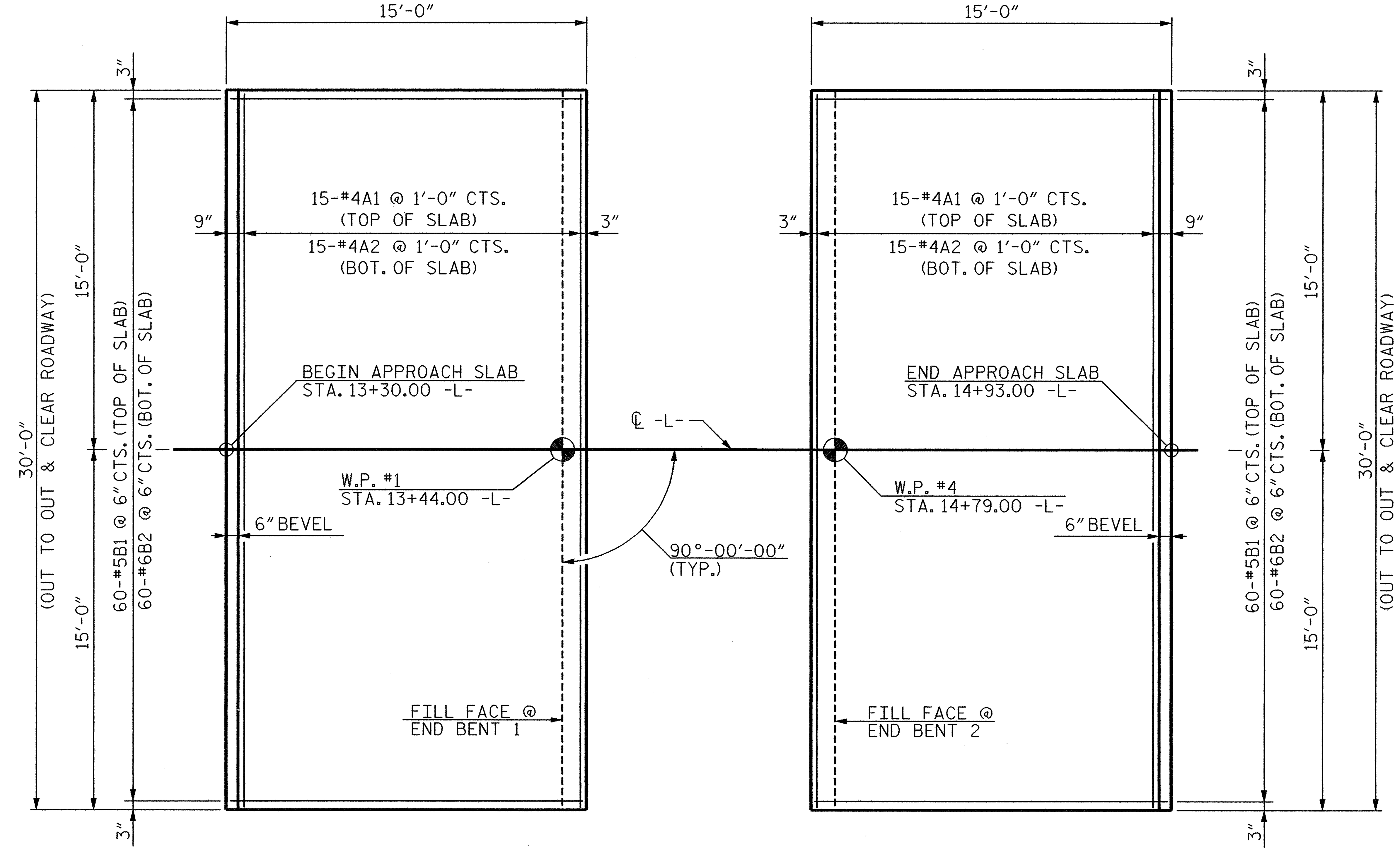
1/5/2006

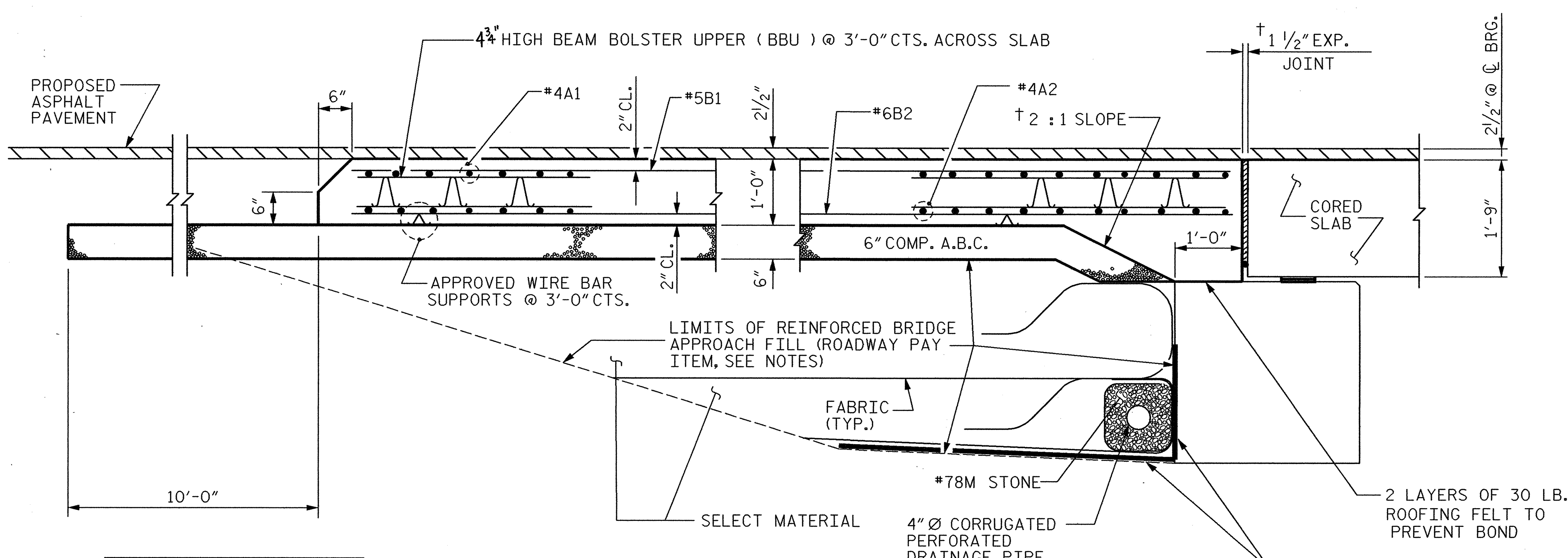
STD. NO. RR2



@ END BENT 1

@ END BENT 2

PLAN OF APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

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

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

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 10'-0" BEYOND THE END OF THE APPROACH SLAB AND 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 EXTEND 1'-0" BEYOND THE 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 EXTEND 1'-0" BEYOND THE 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 CORED SLAB UNIT" SHEETS.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	15	#4	STR	29'-8"	297
A2	15	#4	STR	29'-8"	297
* B1	60	#5	STR	14'-2"	887
B2	60	#6	STR	14'-8"	1322
REINFORCING STEEL				LBS.	1184
* EPOXY COATED REINFORCING STEEL				LBS.	1619
CLASS AA CONCRETE				C. Y.	18.1

APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	15	#4	STR	29'-8"	297
A2	15	#4	STR	29'-8"	297
* B1	60	#5	STR	14'-2"	887
B2	60	#6	STR	14'-8"	1322
REINFORCING STEEL				LBS.	1184
* EPOXY COATED REINFORCING STEEL				LBS.	1619
CLASS AA CONCRETE				C. Y.	18.1

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB

REVISIONS

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

SHEET NO. S-29
TOTAL SHEETS 33

STD. NO. BAS7

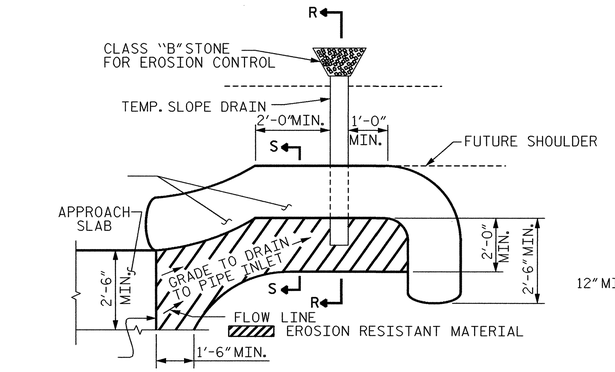
Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06
DWG. NO. 29

NORTH CAROLINA PROFESSIONAL ENGINEER 20668 PAUL R. HOLSHOUSER
1/06/06

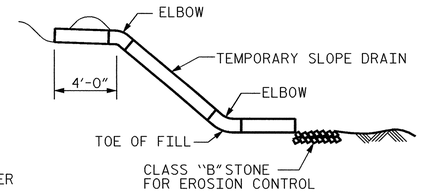
ASSEMBLED BY : S. PEREZ, Jr. DATE : 4-05
CHECKED BY : P.R. HOLSHOUSER DATE : 4-05
DRAWN BY : FCJ 6/87
CHECKED BY : EGA 6/87
REV. 10/17/00 RWW/LES
REV. 7/10/01 LES/RDR
REV. 5/7/03 RWW/JTE

s:\ncdot\b3640\final\b3640_sd_asl.dgn
1/5/2006

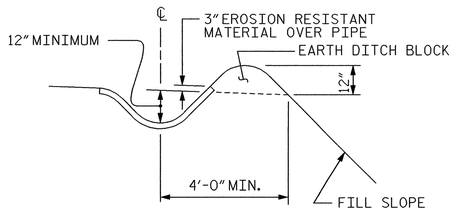


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

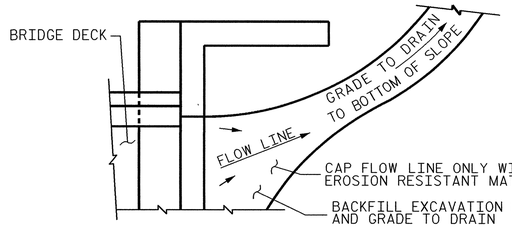
PLAN VIEW



SECTION R–R



SECTION S–S



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

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

ASSEMBLED BY : S. PEREZ, Jr.	DATE : 4-05		
CHECKED BY : P.R. HOLSHOUSER	DATE : 4-05:		
DRAWN BY : FCJ 11/88	REV. 8/16/99	MAB/LES	
CHECKED BY : ARB 11/88	REV. 10/17/00	RWW/LES	
	REV. 5/7/03	RWW/JTE	

Wilbur Smith Associates — Engineers, Planners, Economists
421 Fayetteville Street Mall
Suite 1303
RALEIGH, N. C. 27601

DRAWN BY : S. PEREZ, Jr. DATE : 1-06
CHECKED BY : P. HOLSHOUSER DATE : 1-06

DWG. NO. 30

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20668 PAUL R. HOLSHOUSER
1/06/06

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 –L–

SHEET 2 OF 2

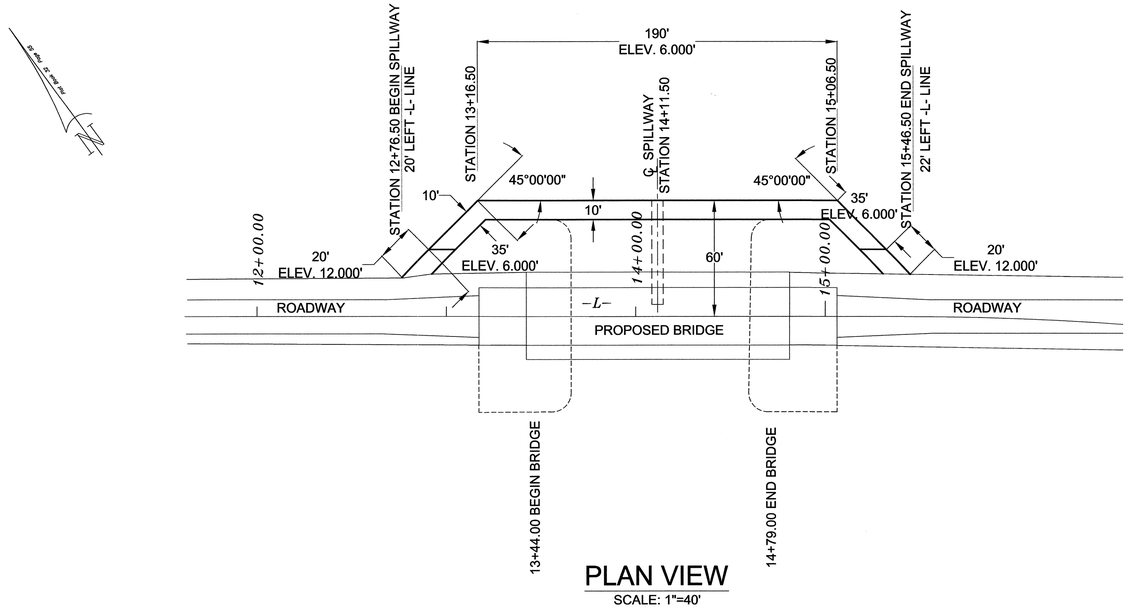
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB DETAILS

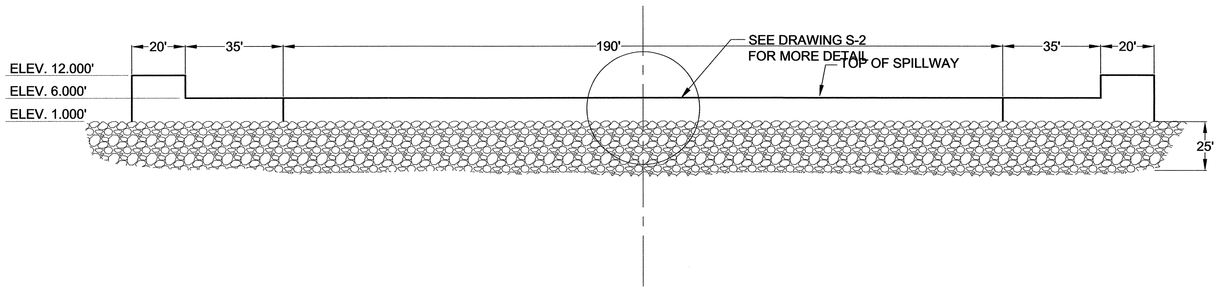
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			33

STD. NO. BAS10

s:\ncdot\b3640\final\b3640_sd_as2.dgn
1/5/2006



PLAN VIEW
SCALE: 1"=40'



PROFILE
SCALE: 1"=20'

Bill of Materials

Item	Construction of Spillway	Material	
	Lump Sum	Quantity	Unit
Steel Sheet Piles	Lump Sum	303160	lb
		16640	ft^2
Coal Tar Epoxy		8533	ft^2
Steel Cap	Lump Sum	8420	lb
		550	ft^2
Rip-Rap (200-700 lb)	Lump Sum	250	tons
Rip-Rap (1000-1800 lb)	Lump Sum	2600	tons
57 stone		125	tons
Filter Fabric		5600	ft^2
Aluminum Fish Ladder	Lump Sum	1	each
H-piles	Lump Sum	8316	lb
Sluice Gate	Lump Sum	2	each
Deck Platform	Lump Sum	2	each

CONSTRUCTION SEQUENCE

1. The appropriate sections of sheet pile and the steel cap shall be coated with coal tar epoxy prior to delivery for construction.
2. The fish ladder, as shown on Drawing SP-3, shall be fabricated and assembled prior to installation.
3. Each sluice gate shall be secured to the appropriate section of sheet pile, prior to installation of the sheet-pile sections.
4. Steel sheet pile (PZC 12 or equivalents) shall be driven to the specified depth and in the alignment shown on Drawing SP-1 and in accordance with the details shown on Drawing SP-2.
5. Using the sluice gates, the water level within the pond shall be lowered 6 inches.
6. The steel cap shall be placed on top of the z-section sheet piles and bolted in-place in accordance with the details shown on Drawing SP-2.
7. The old spillway and bridge will be removed.
8. The H-pile supports for the fish ladder shall be installed in accordance with the details on Drawing SP-3.
9. A section at the top of the sheet pile shall be removed to allow for the installation of the fish ladder, as shown on Drawing SP-3. The fish ladder shall be located at the centerline of the spillway.
10. The fish ladder shall be installed and secured to the spillway and H-pile supports as shown on Drawing SP-3.
11. The Sluice gate platforms shall be installed and secured to the spillway as shown on drawings SP-4 and SP-5.
12. Rip-rap shall be placed at the base of the new spillway and beneath the fish ladder in accordance with the details shown on Drawing SP-2.

SPECIAL NOTES

- FOR SPILLWAY CONSTRUCTION, SEE SPECIAL PROVISIONS.
- FOR SLUICE GATE, SEE SPECIAL PROVISIONS.
- FOR EPOXY COATING FOR STEEL MEMBERS, SEE SPECIAL PROVISIONS.
- FOR ENERGY DISSIPATION AND EROSION CONTROL MEASURES, SEE SPECIAL PROVISIONS.
- FOR FISH LADDER, SEE SPECIAL PROVISIONS.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPILLWAY PLAN AND PROFILE

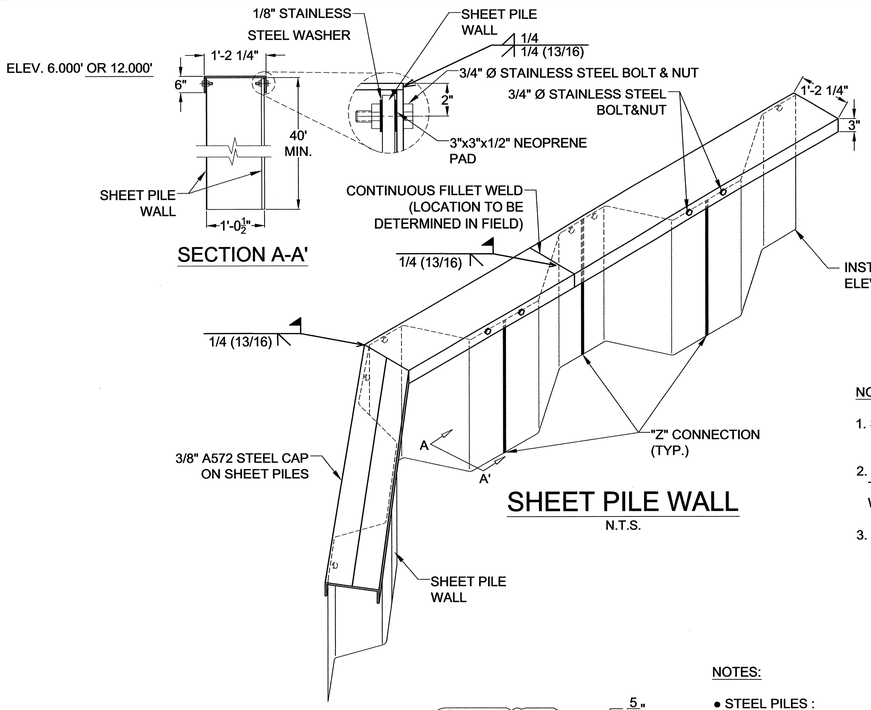
MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA

DRAWN BY : J. MANN DATE : 10/21/05
CHECKED BY : J. TICE DATE : 10/21/05

DWG. NO. SP-1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26984 JEFFREY A. MANN 9/5/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1	J.A.M.	04/11/06	3	J.A.M.	08/28/06	TOTAL SHEETS
2	J.A.M.	05/03/06	4			33

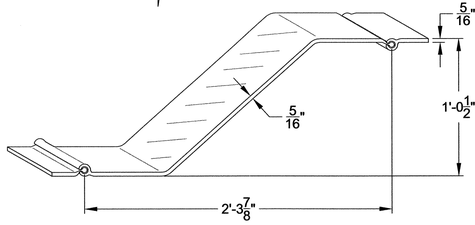


SHEET PILE WALL

N.T.S.

NOTES:

1. SPACING OF CAP WELDS SHALL BE DETERMINED IN THE FIELD BY CONTRACTOR.
2. ALL WELDING SHALL BE IN ACCORDANCE TO THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE.
3. TOP OF CAP SHALL BE AT ELEVATION 6.000 OR 12.000 FEET MSL WHEN COMPLETED, AS SHOWN.



NOTES:

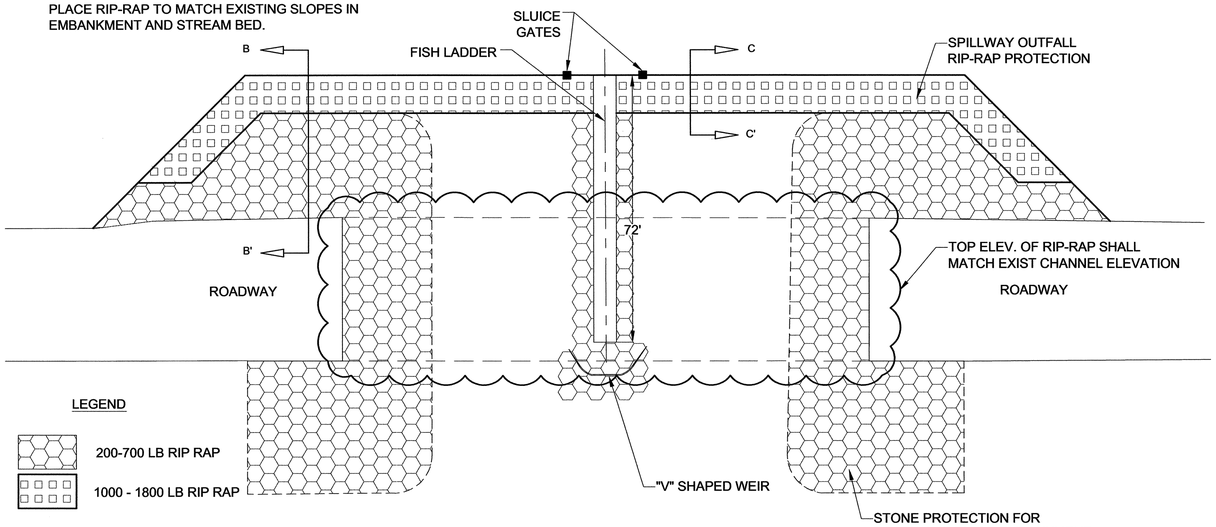
- STEEL PILES : PZC 12 OR EQUIVALENT FOR SPILLWAY CONFIGURATION, A572 STEEL WITH COAL TAR EPOXY COATING.
- MINIMUM SECTION MODULUS OF 22 CUBIC INCHES PER FOOT OF WALL FOR ENTIRE SPILLWAY WALL.
- A WIDTH OF AT LEAST 27" IS REQUIRED FOR SPILLWAY PANELS THAT SUPPORT SLUICE GATES.
- DIMENSIONS ARE APPROXIMATE.

SHEET PILE SECTION

N.T.S.

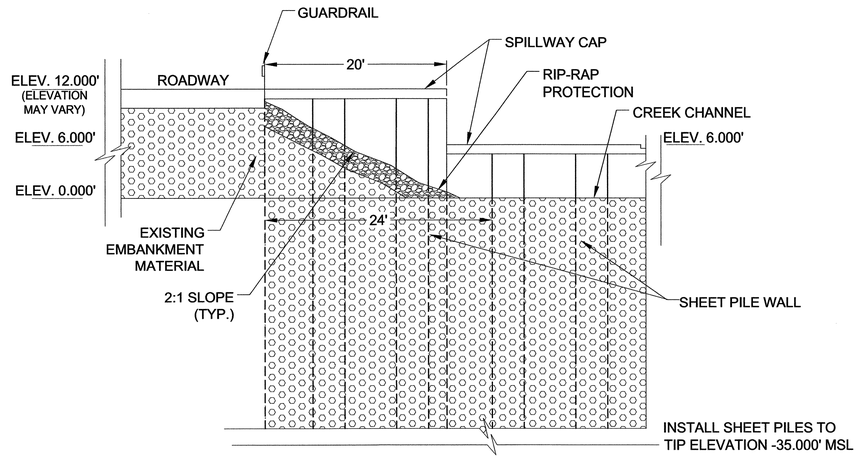
NOTE:

PLACE RIP-RAP TO MATCH EXISTING SLOPES IN EMBANKMENT AND STREAM BED.



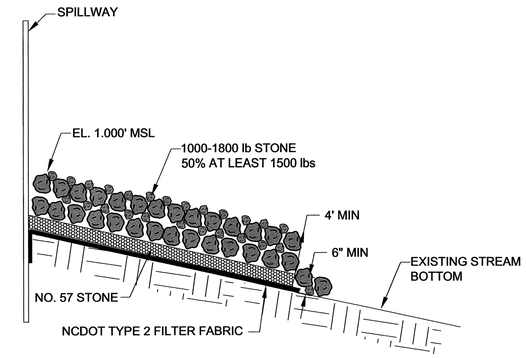
PLAN VIEW - RIPRAP DETAIL

N.T.S.



SECTION B-B'
EMBANKMENT / SHEET PILE CONNECTION

N.T.S.



SECTION C-C'
TYPICAL RIP-RAP

N.T.S.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SPILLWAY DETAILS

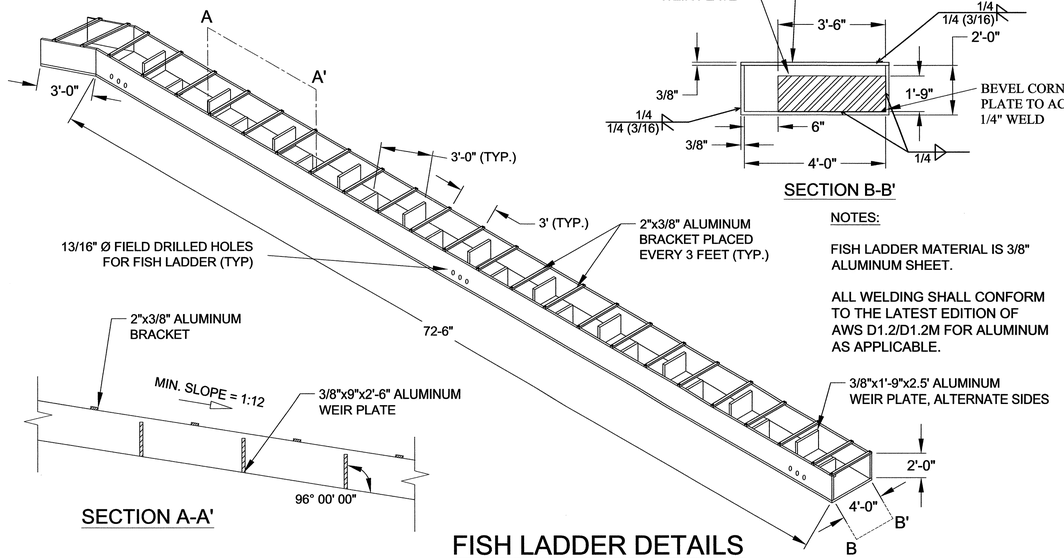
MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA

DRAWN BY : J. MANN DATE : 10/21/05
CHECKED BY : J. TICE DATE : 10/21/05

DWG. NO. SP-2

NORTH CAROLINA PROFESSIONAL SEAL 26974 ENGINEER JEFFREY A. MANN 9/5/06

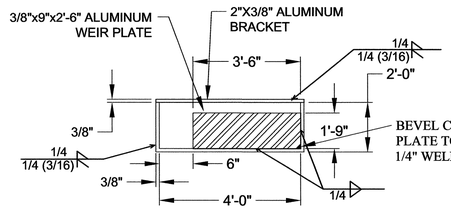
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1	J.A.M.	04/11/06	3	J.A.M.	08/28/06	TOTAL SHEETS
2	J.A.M.	05/03/06	4			33



SECTION A-A'

FISH LADDER DETAILS

N.T.S.

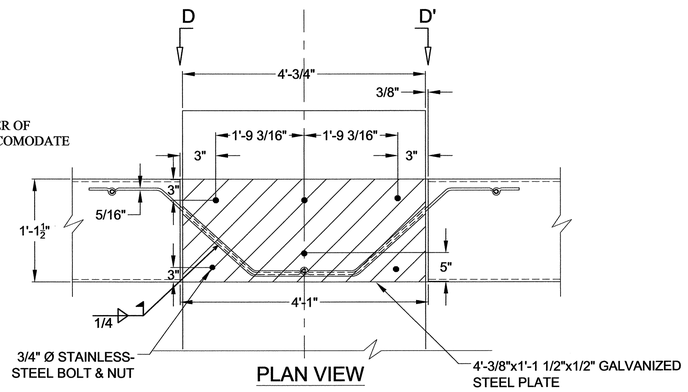


SECTION B-B'

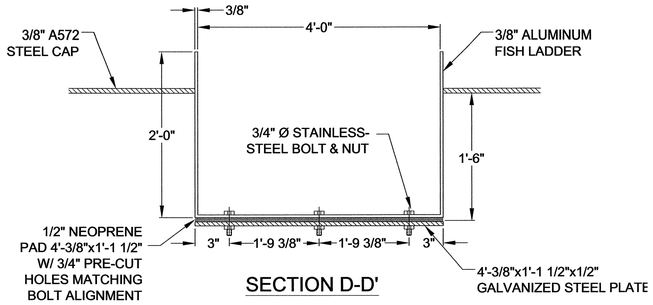
NOTES:

FISH LADDER MATERIAL IS 3/8" ALUMINUM SHEET.

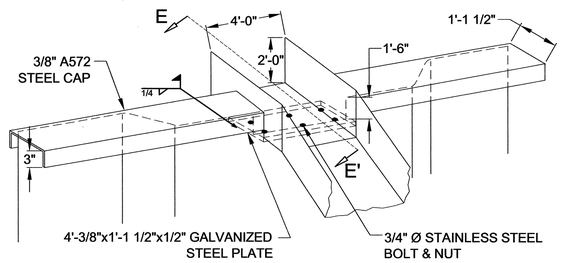
ALL WELDING SHALL CONFORM TO THE LATEST EDITION OF AWS D1.2/D1.2M FOR ALUMINUM AS APPLICABLE.



PLAN VIEW

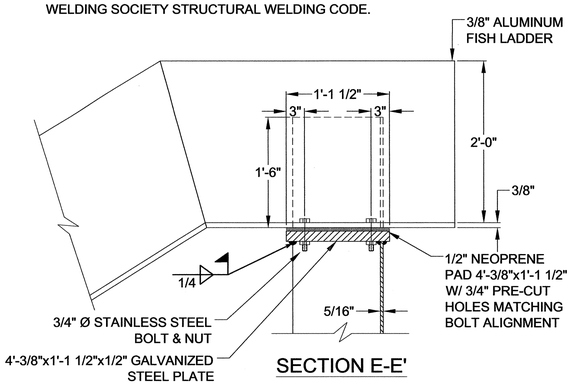


SECTION D-D'



NOTES:

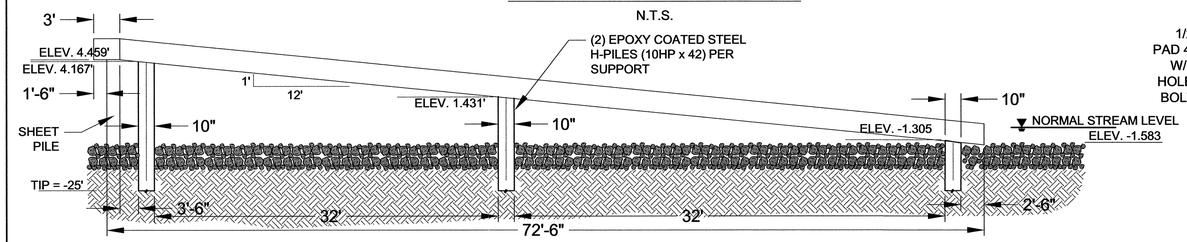
ALL WELDING SHALL BE IN ACCORDANCE TO THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE.



SECTION E-E'

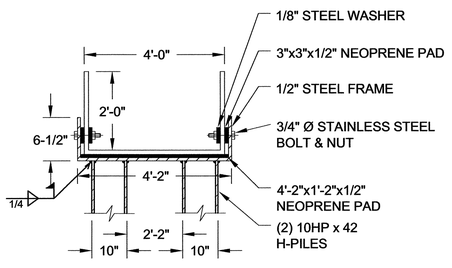
FISH LADDER CONNECTION DETAILS

N.T.S.



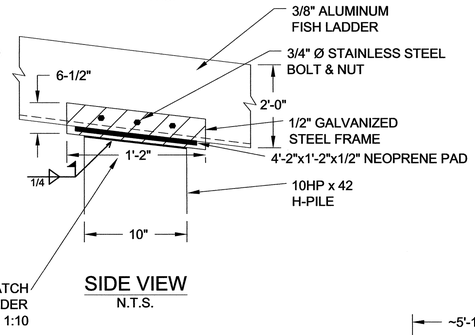
FISH LADDER PROFILE

N.T.S.



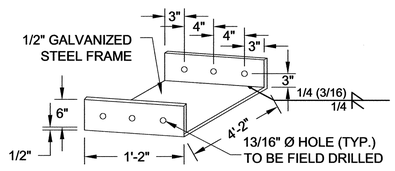
CROSS SECTION

N.T.S.



SIDE VIEW

N.T.S.

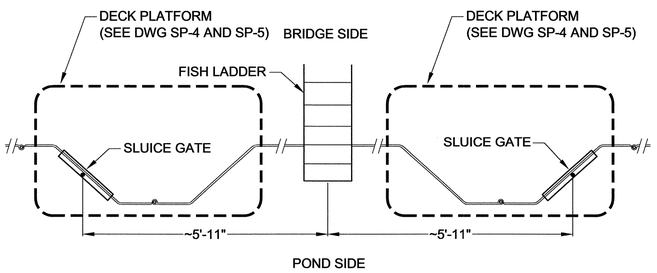


STEEL FRAME

N.T.S.

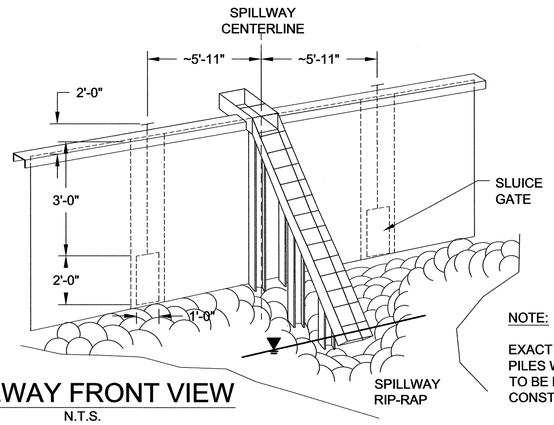
NOTES:

FOR SUBMITTAL OF SHOP DRAWINGS, SEE "FISH LADDER" PROJECT SPECIAL PROVISION.



PLAN VIEW

N.T.S.

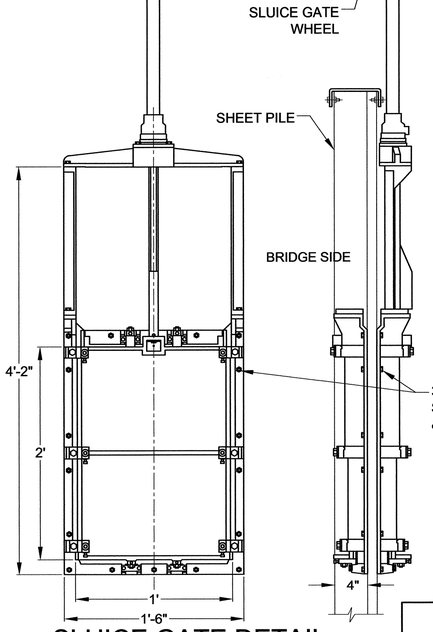


SPILLWAY FRONT VIEW

N.T.S.

NOTE:

EXACT LOCATION OF SHEET PILES WITH SLUICE GATES TO BE DETERMINED DURING CONSTRUCTION OF SPILLWAY.



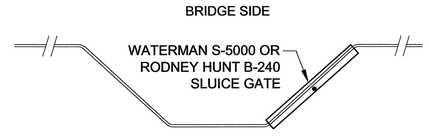
SLUICE GATE DETAIL

N.T.S.

NOTE:

DETAILS PROVIDED FOR GENERAL SLUICE GATE DIMENSIONS AND LAYOUT SLUICE GATE SHALL CONFORM TO SPECIFICATION PROVIDED BY MANUFACTURERS (WATERMAN, RODNEY HUNT).

SLUICE GATE ARM AND WHEEL SHALL BE REMOVED DURING INSTALLATION OF SHEET PILE.



TOP VIEW

N.T.S.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

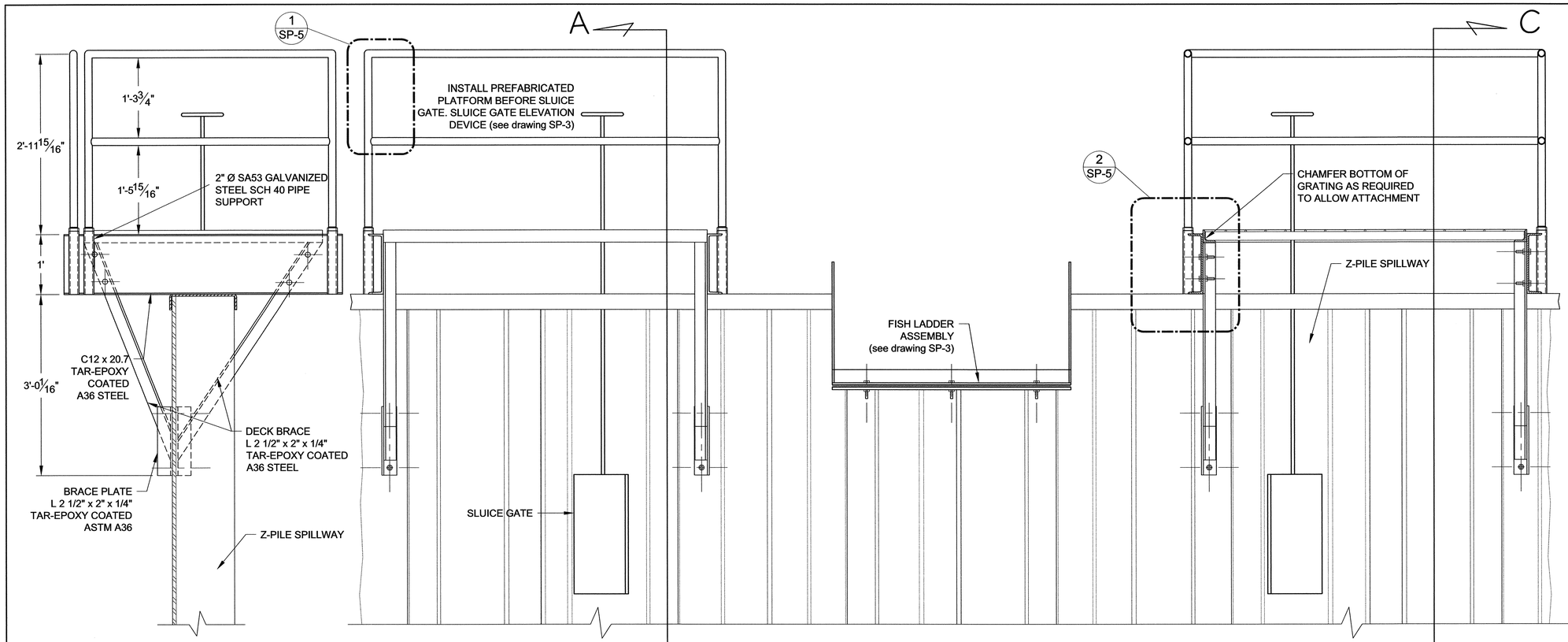
FISH LADDER PLAN AND DETAILS

MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA

DRAWN BY : J. MANN DATE : 10/21/05
CHECKED BY : J. TICE DATE : 10/21/05
DWG. NO. SP-3

NORTH CAROLINA PROFESSIONAL SEAL 20934 ENGINEER JEFFREY A. GAIN 11/5/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1	J.A.M.	04/11/06	3	J.A.M.	08/28/06	TOTAL SHEETS
2	J.A.M.	05/03/06	4			33



SECTION ELEVATION RIGHT SIDE A-A (left side similar)

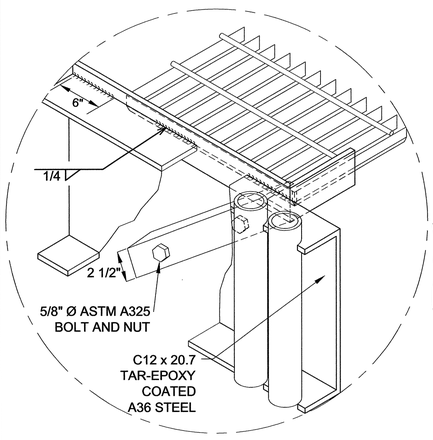
SCALE: 1" = 1'-0"

SECTION ELEVATION (LOW SIDE) B-B

SCALE: 1" = 1'-0"

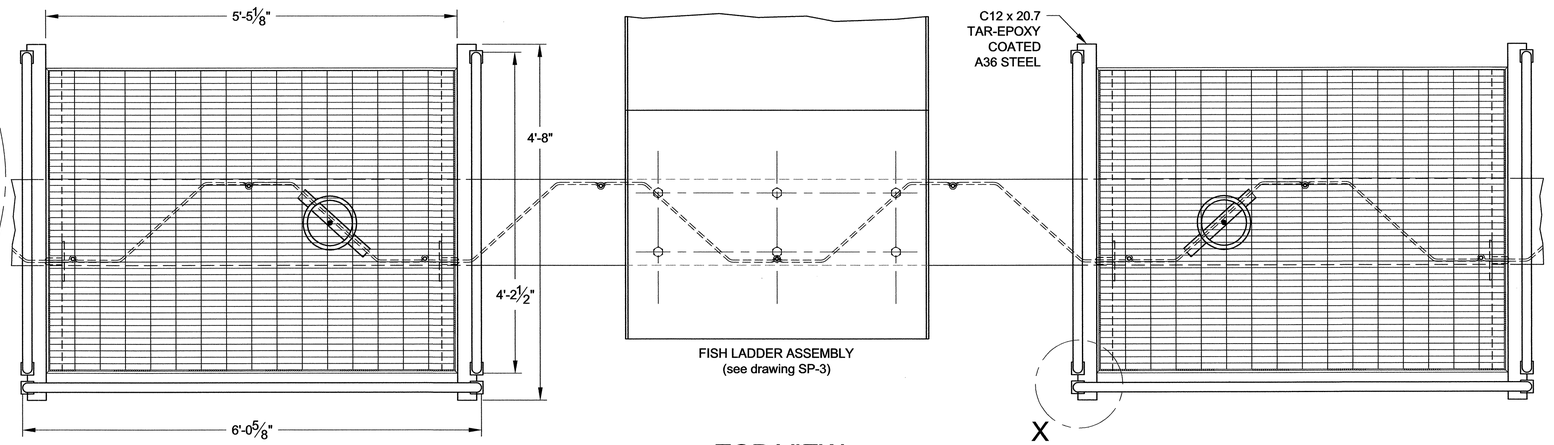
CROSS SECTION C-C

SCALE: 1" = 1'-0"



VIEW X

N.T.S.



TOP VIEW

SCALE: 1" = 1'-0"

CONSTRUCTION SEQUENCE NOTES:

1. PREFABRICATE PLATFORMS (CHANNELS, GALVANIZED GRATING, STEEL ANGLES, 2"Ø SUPPORT PIPES).
2. PREFABRICATE CROSS BRACES (DECK BRACES AND MOUNTING PLATES).
3. PREFABRICATE HANDRAILS (1 ½" Ø PIPE RAILS BALUSTRADE).
4. PRE DRILL HOLES IN Z-PILE SHEET FOR CROSS BRACING.
5. INSTALL SHEET PILE WALL (Z-PILE SHEETING, TOP CHANNEL SLUICE GATE COMPONENTS). DO NOT INSTALL GATE ELEVATOR MECHANISM.

CONSTRUCTION SEQUENCE NOTES (cont'd):

6. FIELD FIT ALL COMPONENTS.
7. INSTALL ALL COMPONENTS TO PERMANENT LOCATION. (WELD BOTH SIDES OF PLATFORM CHANNELS TO TOP OF SHEET PILE WALL, BOLT DECK BRACES THROUGH SHEET PILE WALL AND TO PLATFORM, INSTALL PIPE HANDRAILS TO PLATFORM, INSTALL BALANCE OF SLUICE GATE ELEVATOR COMPONENTS.)

MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA

DRAWN BY : J. Tice DATE : 08/28/06
CHECKED BY : J. Mann DATE : 08/28/06

DWG. NO. SP-4

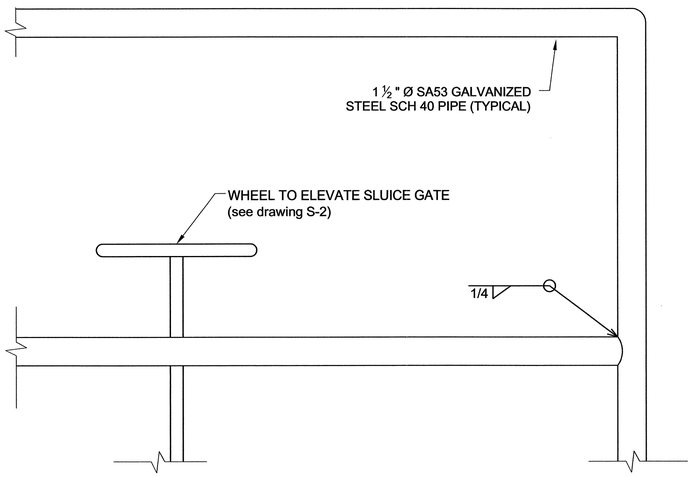
NORTH CAROLINA PROFESSIONAL SEAL 26914 ENGINEER JEFFREY A. MANN 7/5/06

PROJECT NO. B-3640
GATES COUNTY
STATION: 14+11.50 -L-

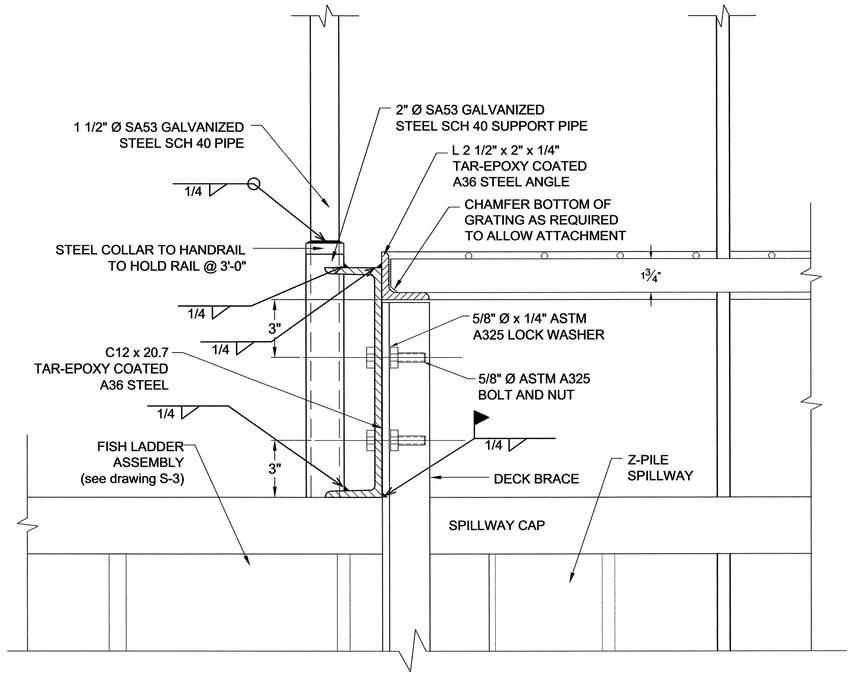
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLUICE GATE PLATFORM PLAN

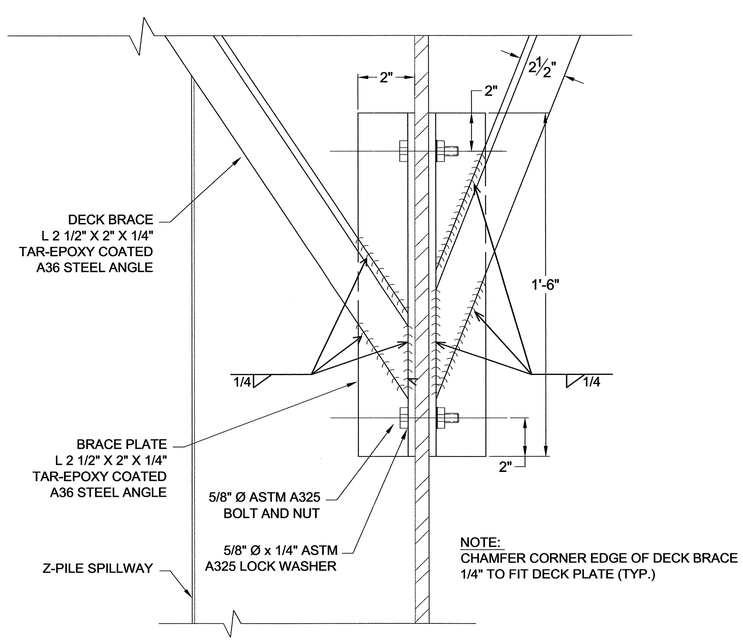
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-334
1			3			TOTAL SHEETS
2			4			33



DETAIL 1
SCALE: 1" = 4"

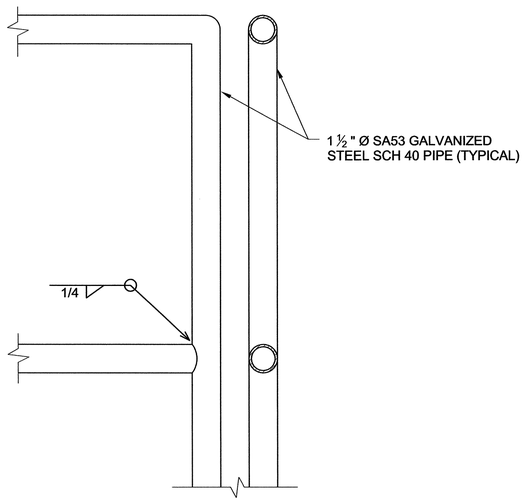


DETAIL 2
SCALE: 1" = 4"

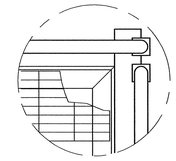


NOTE:
CHAMFER CORNER EDGE OF DECK BRACE
1/4" TO FIT DECK PLATE (TYP.)

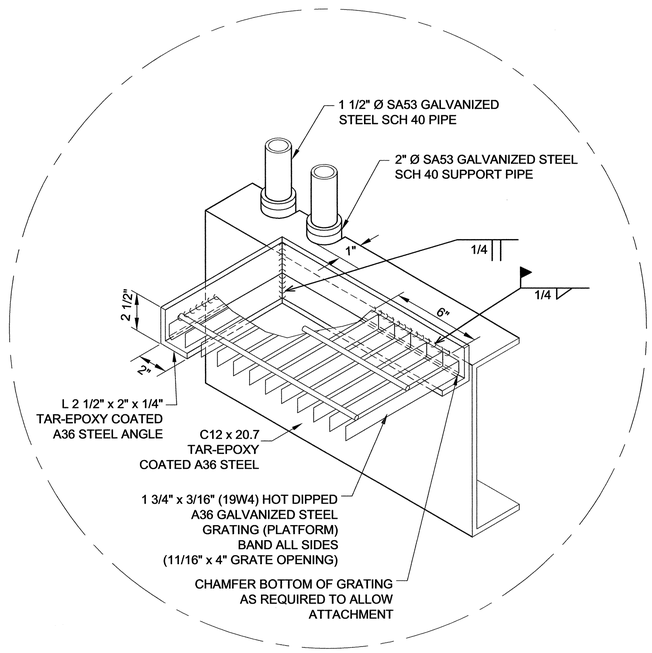
DETAIL 3
SCALE: 1" = 4"



DETAIL 4
SCALE: 1" = 4"



PLAN VIEW X (rotated 180°)
N.T.S.



OBLIQUE VIEW OF VIEW X
N.T.S.

PROJECT NO. B-3640

GATES COUNTY

STATION: 14+11.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLUICE GATE PLATFORM DETAILS

MACTEC
MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA

DRAWN BY : J. Tice DATE : 08/28/06
CHECKED BY : J. Mann DATE : 08/28/06

DWG. NO. SP-5

NORTH CAROLINA PROFESSIONAL SEAL 26954 ENGINEER JEFFREY A. MANN 9/5/06

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33B
1			3			TOTAL SHEETS
2			4			33

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 ω RGW REV. 6-27-02 RWW ω JTE

ENGLISH

JANUARY, 1990

STD. NO. SN