This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

TIP NO: U-3440

CONTRACT: C203803

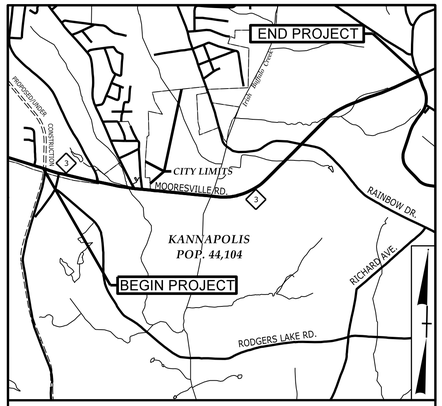
STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

CABARRUS COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3440		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
39010.1.1	STP-0003(6)	PE
39010.2.2		R/W
39010.2.RU1		UTILITY
39010.3.2		CONSTR.

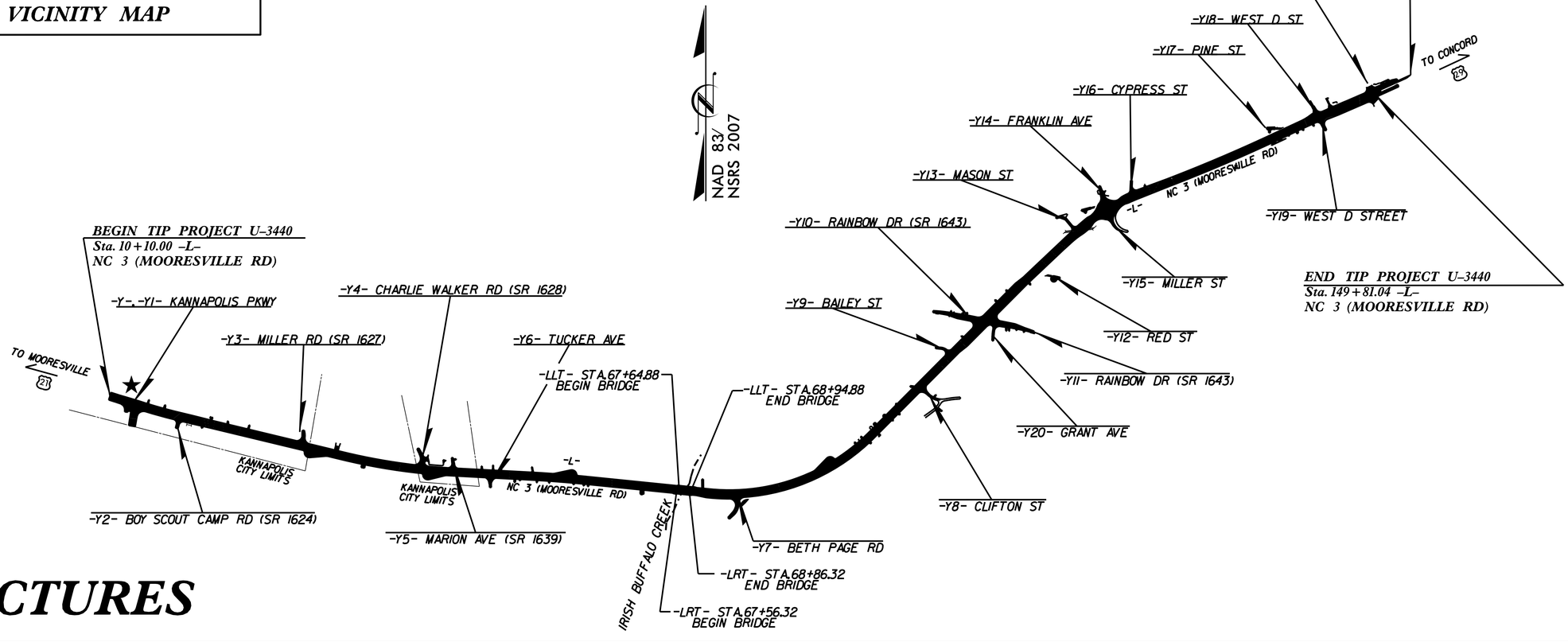


VICINITY MAP

LOCATION: NC 3, PROPOSED WEST SIDE BYPASS TO SR 1691 (LOOP ROAD) IN KANNAPOLIS

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, RETAINING WALLS, AND SIGNALS

NAD 83/
NSRS 2007



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2016 = 17,155
ADT 2036 = 23,900
K = 12 %
D = 60 %
T = 9 % *
V = 50 MPH
HIST. AREA V= 40 MPH
*(TTST 7% + DUALS 2%)
FUNC CLASS = MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3440	=	2.621 MILES
LENGTH STRUCTURE TIP PROJECT U-3440	=	0.025 MILE
TOTAL LENGTH TIP PROJECT U-3440	=	2.646 MILES

Prepared In the Office of:

DIVISION OF HIGHWAYS

STRUCTURES MANAGEMENT UNIT

1000 BIRCH RIDGE DR.

RALEIGH, N.C. 27610

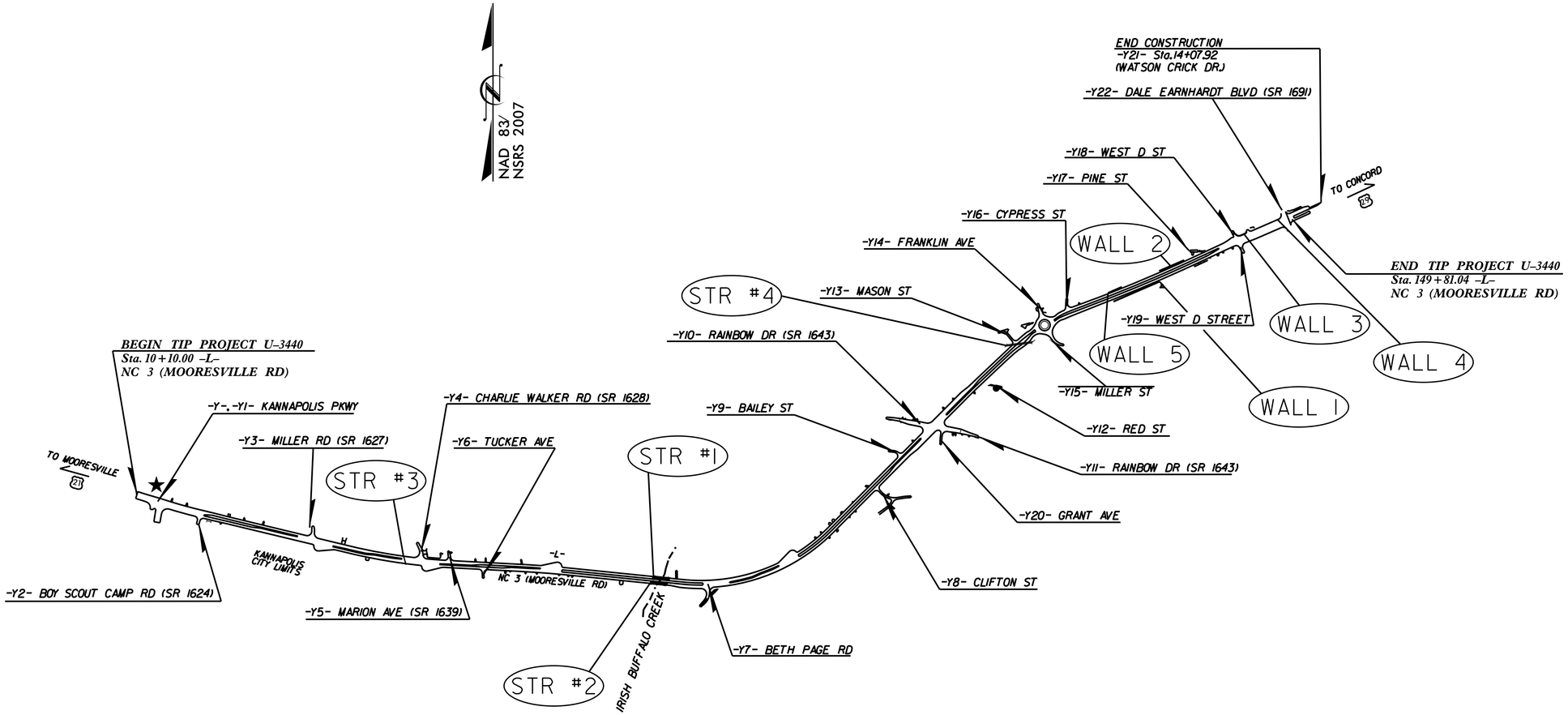
2012 STANDARD SPECIFICATIONS

LETTING DATE :

NOVEMBER 15, 2016

EMILY E. MURRAY, PE
PROJECT ENGINEER

DONALD R. SMITH, JR., PE
PROJECT DESIGN ENGINEER



INDEX

	STATION	DESCRIPTION	SHEET NUMBERS
STR #1	STA. 68+25.60 -L-	PROPOSED BRIDGE #402 CARRYING NC 3 (LEFT LANE) OVER IRISH BUFFALO CREEK	S1-1 THRU S1-37
STR #2	STA. 68+25.60 -L-	PROPOSED BRIDGE #36 CARRYING NC 3 (RIGHT LANE) OVER IRISH BUFFALO CREEK	S2-1 THRU S2-37
STR #3	STA. 40+60.90 -L-	SINGLE 10 FT. x 9 FT. CONCRETE BOX CULVERT, 66°-30'-00"	C1-1 THRU C1-5
STR #4	STA. 117+50.00 -L-	DOUBLE 8 FT. x 10 FT. CONCRETE BOX CULVERT, 34°-24'-00"	C2-1 THRU C2-8
WALL 1	STA. 132+00.00 -L-	SOIL NAIL WALL	W-1 THRU W-2
WALL 2	STA. 137+00.00 -L-	MSE RETAINING WALL	W-3 THRU W-5
WALL 3	STA. 11+56.70 -Y18-	CIP GRAVITY WALL	W-6 THRU W-7
WALL 4	STA. 145+73.00 -L-	SOLDIER PILE RETAINING WALL	W-8 THRU W-9
WALL 5	STA. 132+90.00 -L-	MSE RETAINING WALL	W-3 THRU W-5

PROJECT NO. U-3440

CABARRUS COUNTY

STATION:

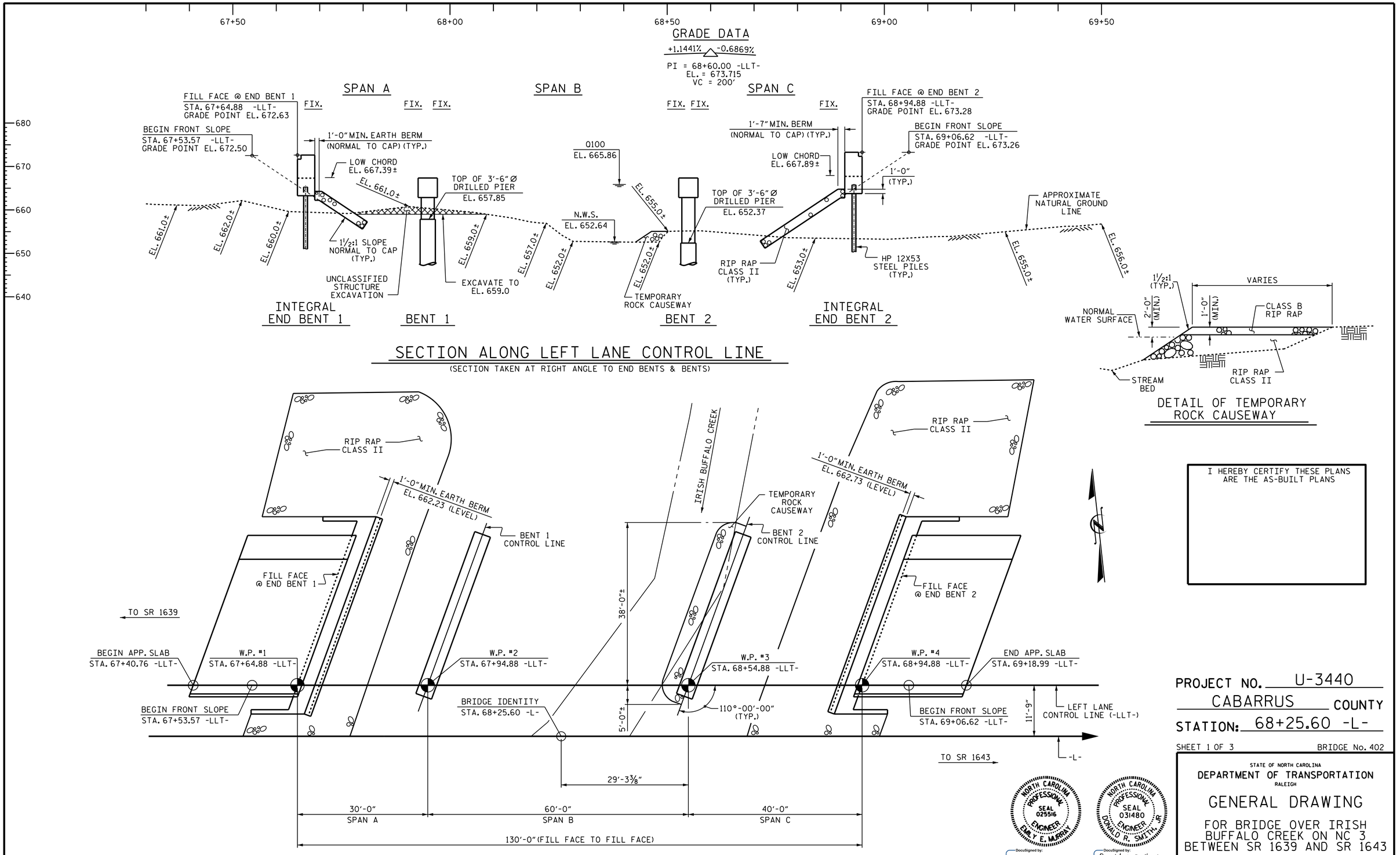
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INDEX

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

DRAWN BY : J.D. HAWK DATE : 3/24/16
CHECKED BY : D.R. SMITH DATE : 7/12/16

17-AUG-2016 09:53
R:\Structures\Plans\U3440_SD_Index.dgn
jdhawk



SECTION ALONG LEFT LANE CONTROL LINE

(SECTION TAKEN AT RIGHT ANGLE TO END BENTS & BENTS)

DETAIL OF TEMPORARY ROCK CAUSEWAY

PLAN

(PILES & COLUMNS NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 3 BRIDGE No. 402

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY

DocuSigned by: Emily E Murray CAEB97AEDC58460...
8/17/2016

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr EDC87706174B490...
8/17/2016

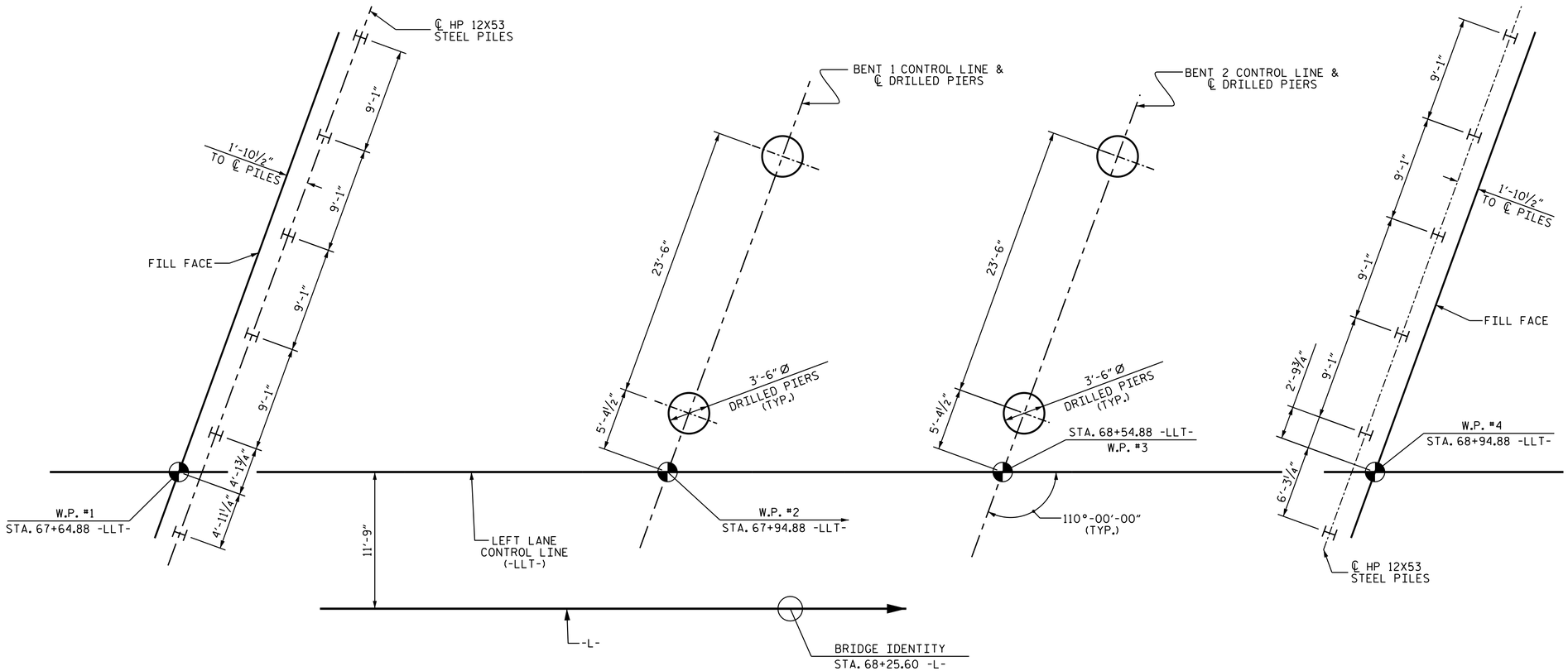
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-1
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : H. B. DESAI DATE : 4/7/16
CHECKED BY : R. P. PATEL DATE : 4/26/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U3440_SD_GD_01.dgn
jdhawk

STR. #1



INTEGRAL END BENT 1 | BENT 1 | BENT 2 | INTEGRAL END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES

NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 400.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25.0 TSF.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 626.5 FT.(LT) AND 630 FT.(RT) AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 16 FT. INTO WEATHERED ROCK AND ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 644 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 415 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25.0 TSF.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 604.5 FT.(LT) AND 616.5 FT.(RT) AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 14 FT. (LT) AND 16 FT. (RT) INTO WEATHERED ROCK AND ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, DO NOT EXTEND CASINGS BELOW ELEVATION 635.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL PERMANENT STEEL CASINGS AT BENT 2 BY VIBRATING, SCREWING OR DRIVING PERMANANT CASING BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 645.0 FT.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 643.0 FT. THE SCOUR CRITICAL ELEVATION ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENTS 1 AND 2. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 158 TONS PER PILE.

SPECIAL NOTES

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 1. TO VERIFY TOP OF THE WEATHERED ROCK AND TIP BEARING CAPACITY PERFORM SPTS AT ELEVATION 643± FT. (LT). AND 646± FT. (RT) TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 2. TO VERIFY TOP OF THE WEATHERED ROCK AND TIP BEARING CAPACITY PERFORM SPTS AT ELEVATION 619± FT. (LT). AND 633± FT. (RT) TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC8770617 4B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643

(LEFT LANE)

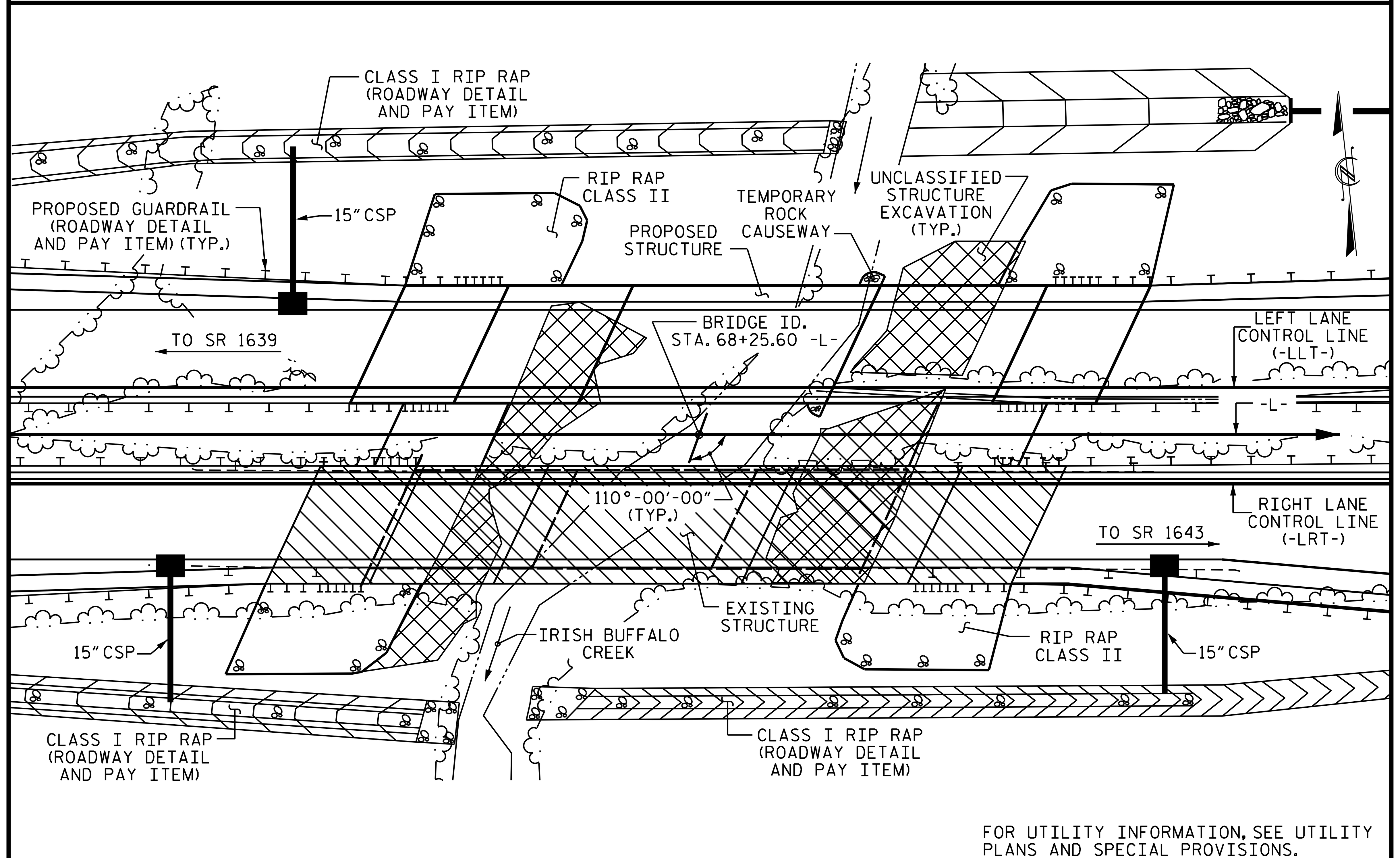
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			37

STR. #1

DRAWN BY :	H. B. DESAI	DATE : 04-05-16
CHECKED BY :	R. P. PATEL	DATE : 04-26-16
DESIGN ENGINEER OF RECORD:	T. R. PETERSON	DATE : 06-20-16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U3440_SD_GD_01.dgn
jdhawk

BM #8: 41.02' RIGHT OF STA. 68+67.09 -L-, EL. 667.83



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 68+25.60 -L-.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. LEFT AND 11.75 FT. RIGHT OF LEFT LANE CONTROL LINE AT END BENT 1 AND A DISTANCE OF 49 FT. LEFT OF LEFT LANE CONTROL LINE AT END BENT 2 AS DIRECTED BY THE ENGINEER.
THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATION. EXCAVATION AREA SHOULD BE SLOPED 2% TOWARDS CREEK.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 4,700 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 665.4
DRAINAGE AREA	= 16.4 SQ.MI.
BASE DISCHARGE (Q100)	= 5,200 C.F.S.
BASE HIGH WATER ELEVATION	= 665.86

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 13,200 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 670.5

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" DIA. DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE									5,124	4,930		LUMP SUM	
END BENT 1											39.0		4,920
BENT 1		9.5	50.0		2	4					30.5		8,430
BENT 2		58.0	26.0	39.1	2	4					33.6		11,122
END BENT 2											39.6		4,922
TOTAL	LUMP SUM	67.5	76.0	39.1	4	8	2	LUMP SUM	5,124	4,930	142.7	LUMP SUM	29,394

TOTAL BILL OF MATERIAL

	SPIRAL COLUMN REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS		HP 12X53 STEEL PILES		THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE		12	502.667			120.32	128.22			LUMP SUM
END BENT 1				6	120			175	195	
BENT 1	1,479									
BENT 2	2,237									
END BENT 2				6	240			170	185	
TOTAL	3,716	12	502.667	12	360	120.32	128.22	345	380	LUMP SUM

DRAWN BY : H. B. DESAI DATE : 4/7/16
CHECKED BY : R. P. PATEL DATE : 4/26/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U3440_SD_GD_01.dgn
jdhawk

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031480 DONALD R. SMITH, JR.
DocuSigned by: Donald R. Smith, Jr
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643

(LEFT LANE)

REVISIONS

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

SHEET NO. S1-3
TOTAL SHEETS 37

STR. #1

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.03	--	1.75	0.998	1.28	C	I	18.459	1.077	1.27	C	I	1.846	0.80	1.083	1.03	B	I	28.917	
		HL-93(Opr)	N/A	--	1.65	--	1.35	0.998	1.66	C	I	18.459	1.077	1.65	C	I	1.846	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.30	46.808	1.75	0.998	1.63	C	I	14.767	1.077	1.49	C	I	1.846	0.80	0.892	1.30	B	I	28.917	
		HS-20(Opr)	36.000		1.93	69.574	1.35	0.998	2.12	C	I	14.767	1.077	1.93	C	I	1.846	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500		2.78	37.588	1.40	0.998	3.68	C	I	18.459	1.077	3.90	C	I	14.767	0.80	0.892	2.78	B	I	28.917	
		SNGARBS2	20.000		2.14	42.757	1.40	0.998	3.05	C	I	14.767	1.077	2.95	C	I	1.846	0.80	0.892	2.14	B	I	28.917	
		SNAGRIS2	22.000		2.05	45.147	1.40	0.998	3.00	C	I	14.767	1.077	2.80	C	I	1.846	0.80	0.892	2.05	B	I	28.917	
		SNCOTTS3	27.250		1.39	37.804	1.40	0.998	1.84	C	I	18.459	1.077	1.98	C	I	1.846	0.80	0.892	1.39	B	I	28.917	
		SNAGGRS4	34.925		1.18	41.326	1.40	0.998	1.67	C	I	18.459	1.077	1.75	C	I	1.846	0.80	0.892	1.18	B	I	28.917	
		SNS5A	35.550		1.16	41.077	1.40	0.998	1.62	C	I	18.459	1.077	1.83	C	I	1.846	0.80	0.892	1.16	B	I	28.917	
		SNS6A	39.950		1.07	42.763	1.40	0.998	1.55	C	I	18.459	1.077	1.72	C	I	1.846	0.80	0.892	1.07	B	I	28.917	
		SNS7B	42.000		1.02	42.830	1.40	0.998	1.48	C	I	18.459	1.077	1.75	C	I	1.846	0.80	0.892	1.02	B	I	28.917	
	TTST	TNAGRIT3	33.000		1.31	43.177	1.40	0.998	1.92	C	I	18.459	1.077	2.01	C	I	1.846	0.80	0.892	1.31	B	I	28.917	
		TNT4A	33.075		1.32	43.560	1.40	0.998	1.94	C	I	18.459	1.077	1.90	C	I	1.846	0.80	0.892	1.32	B	I	28.917	
		TNT6A	41.600		1.09	45.216	1.40	0.998	1.66	C	I	18.459	1.077	1.87	C	I	1.846	0.80	0.892	1.09	B	I	28.917	
		TNT7A	42.000		1.10	46.109	1.40	0.998	1.70	C	I	18.459	1.077	1.73	C	I	1.846	0.80	0.892	1.10	B	I	28.917	
		TNT7B	42.000		1.15	48.154	1.40	0.998	1.72	C	I	18.459	1.077	1.67	C	I	1.846	0.80	0.892	1.15	B	I	28.917	
		TNAGRIT4	43.000		1.08	46.580	1.40	0.998	1.69	C	I	14.767	1.077	1.60	C	I	1.846	0.80	0.892	1.08	B	I	28.917	
		TNAGT5A	45.000		1.02	45.750	1.40	0.998	1.57	C	I	18.459	1.077	1.67	C	I	1.846	0.80	0.892	1.02	B	I	28.917	
		TNAGT5B	45.000	3	1.00	45.010	1.40	0.998	1.52	C	I	18.459	1.077	1.51	C	I	1.846	0.80	0.892	1.00	B	I	28.917	

LOAD FACTORS:

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

NOTES:

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

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

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

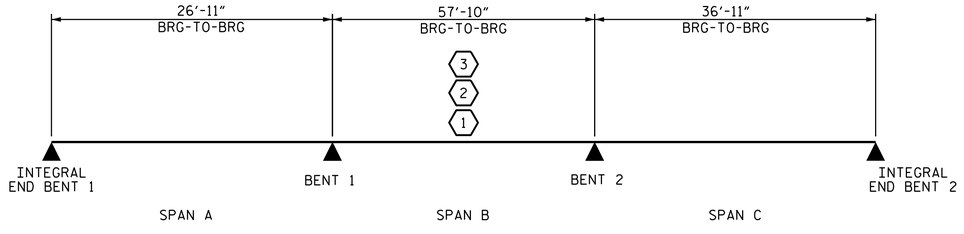
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-4
1			3			TOTAL SHEETS
2			4			37

STR. #1 STD. NO. LRFR1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

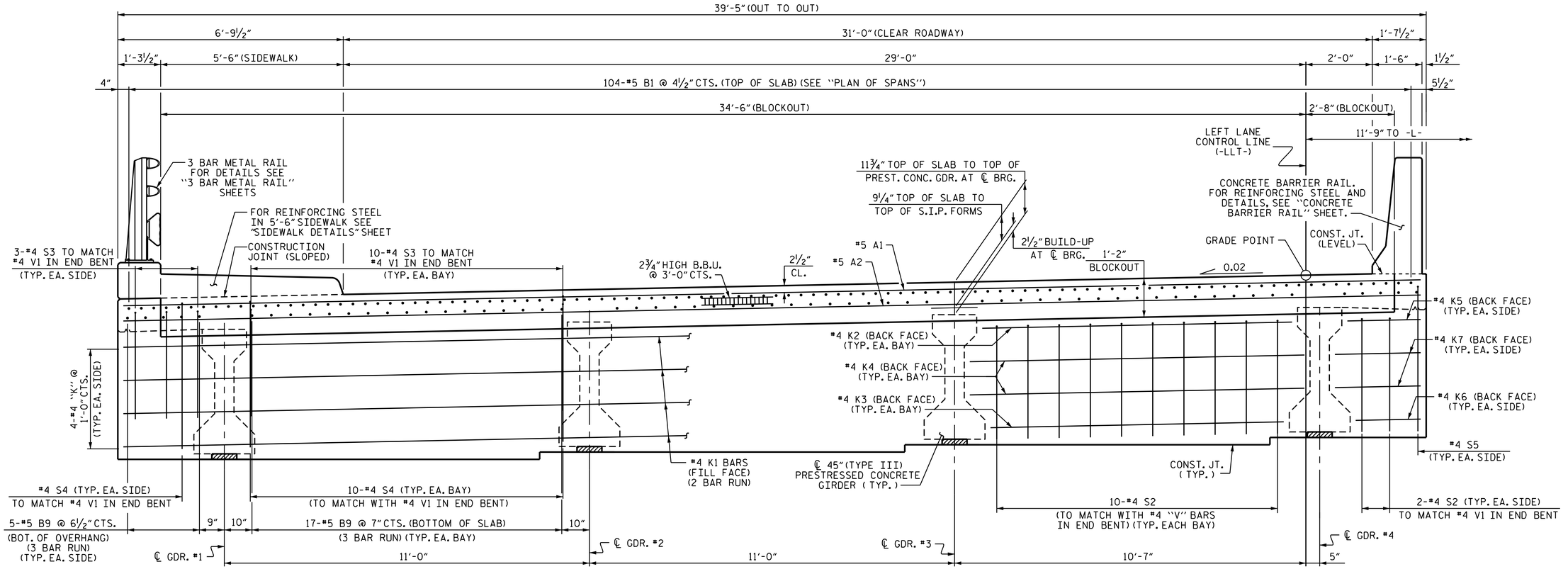
ASSEMBLED BY : J.D. HAWK DATE : 5/5/2016
CHECKED BY : D. R. SMITH DATE : 5/12/2016

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

DESIGN ENGINEER OF RECORD:
T.R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U3440_SMU_LR_01.dgn
jdhawk



TYPICAL SECTION @ INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

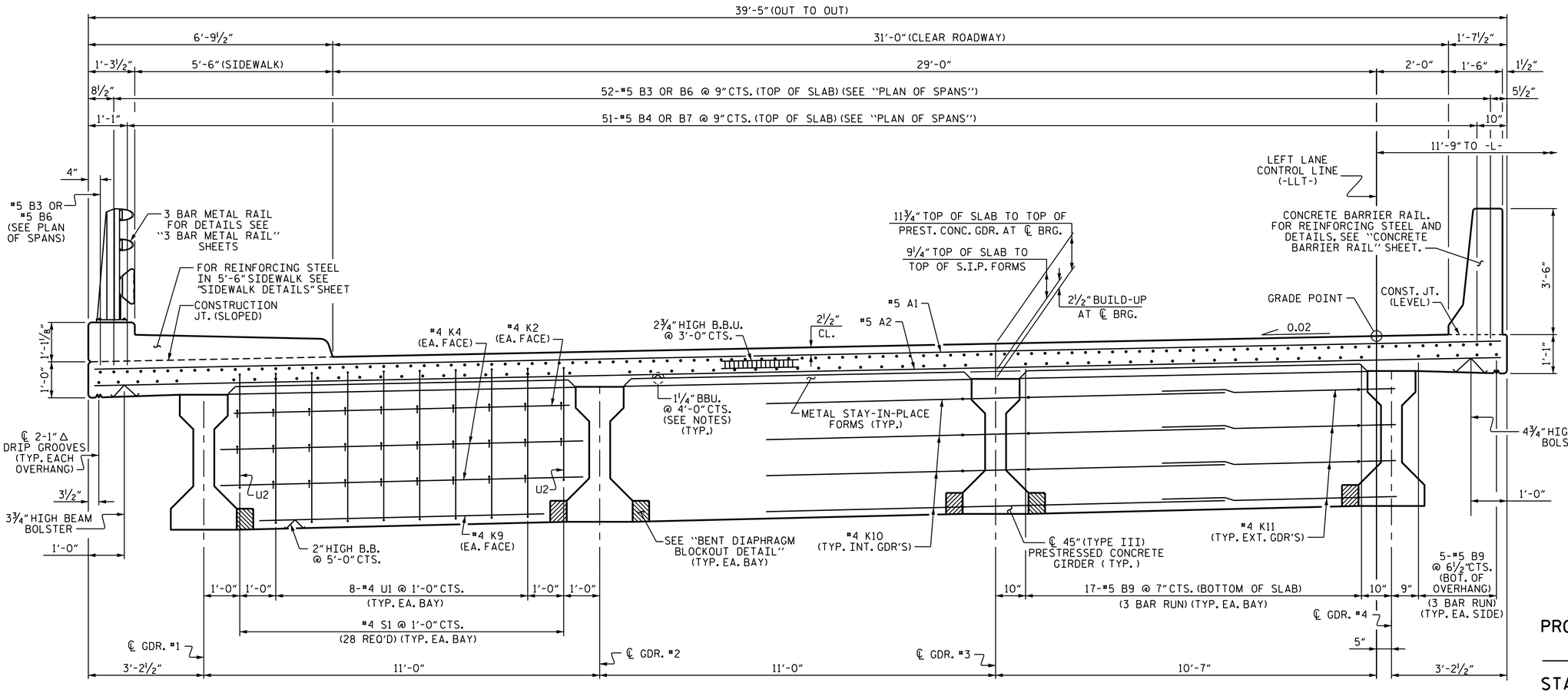
SHEET NO. S1-5

TOTAL SHEETS 37

DRAWN BY : K. D. LAYNE DATE : 11/24/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 06/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_TS_01.dgn
jdhawk

STR. #1



TYPICAL SECTION AT BENT DIAPHRAGM

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

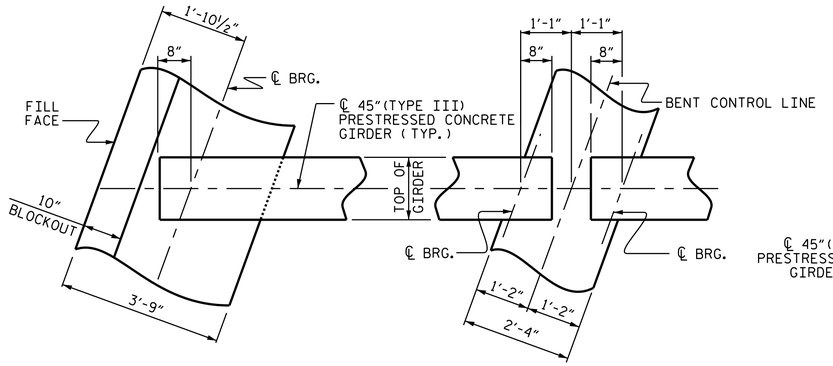
SHEET NO. S1-6

TOTAL SHEETS 37

DRAWN BY : K. D. LAYNE DATE : 11/24/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 06/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3440_SD_TS_01.dgn
jdhawk

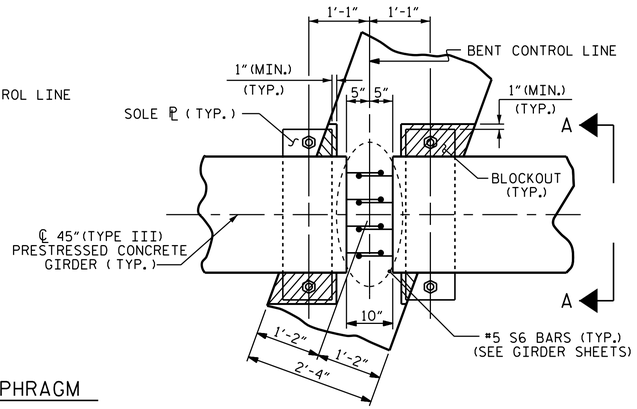
STR. #1



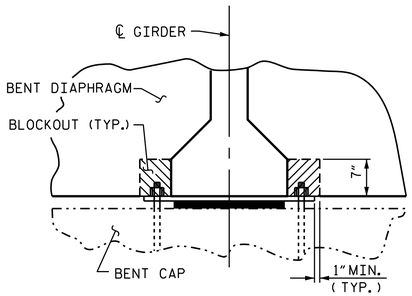
INTEGRAL END BENT

CONTINUOUS BENT DIAPHRAGM

PLAN OF GIRDER

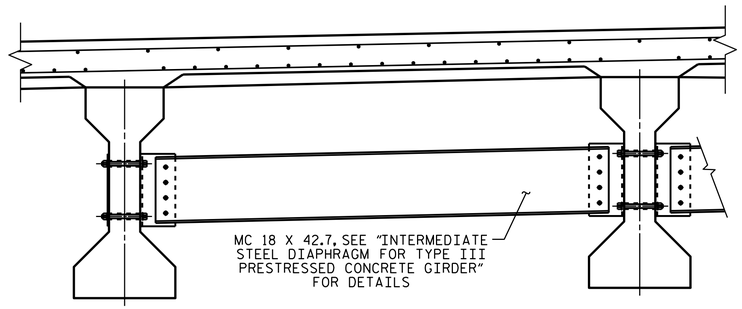


PLAN



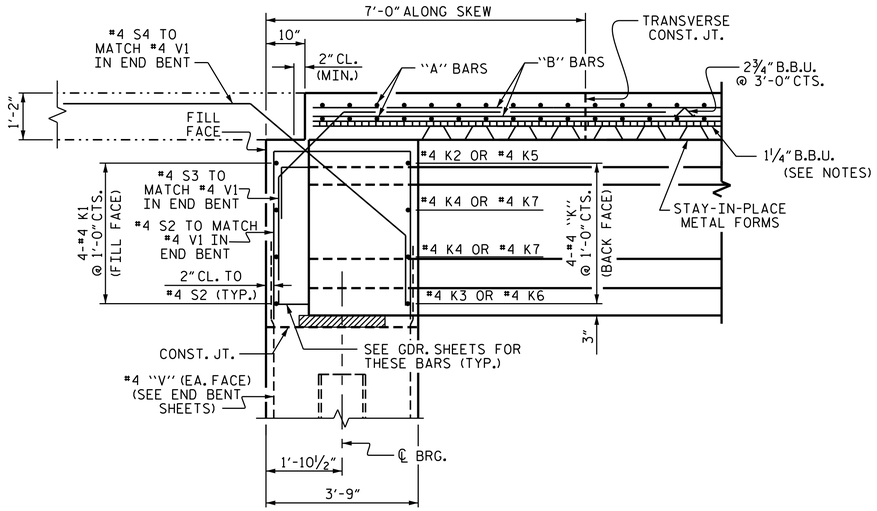
SECTION A-A

BENT DIAPHRAGM BLOCKOUT DETAIL

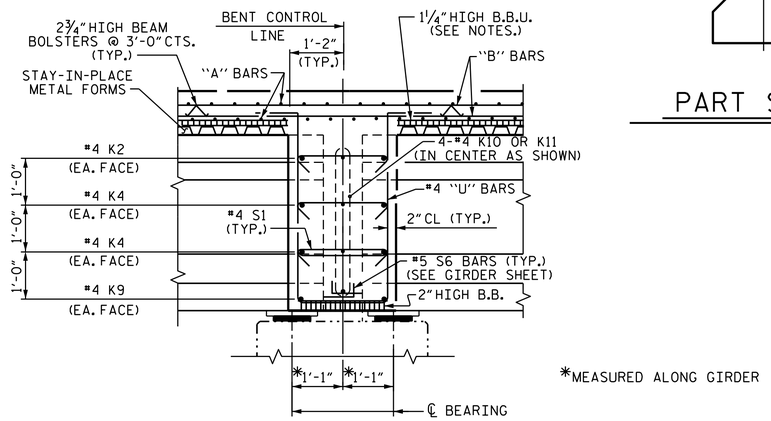


PART SECTION AT INTERMEDIATE DIAPHRAGM

(SEE PLAN OF SPANS FOR LOCATION)



SECTION THROUGH INTEGRAL END BENT



SECTION THROUGH BENT DIAPHRAGM

*MEASURED ALONG GIRDER

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

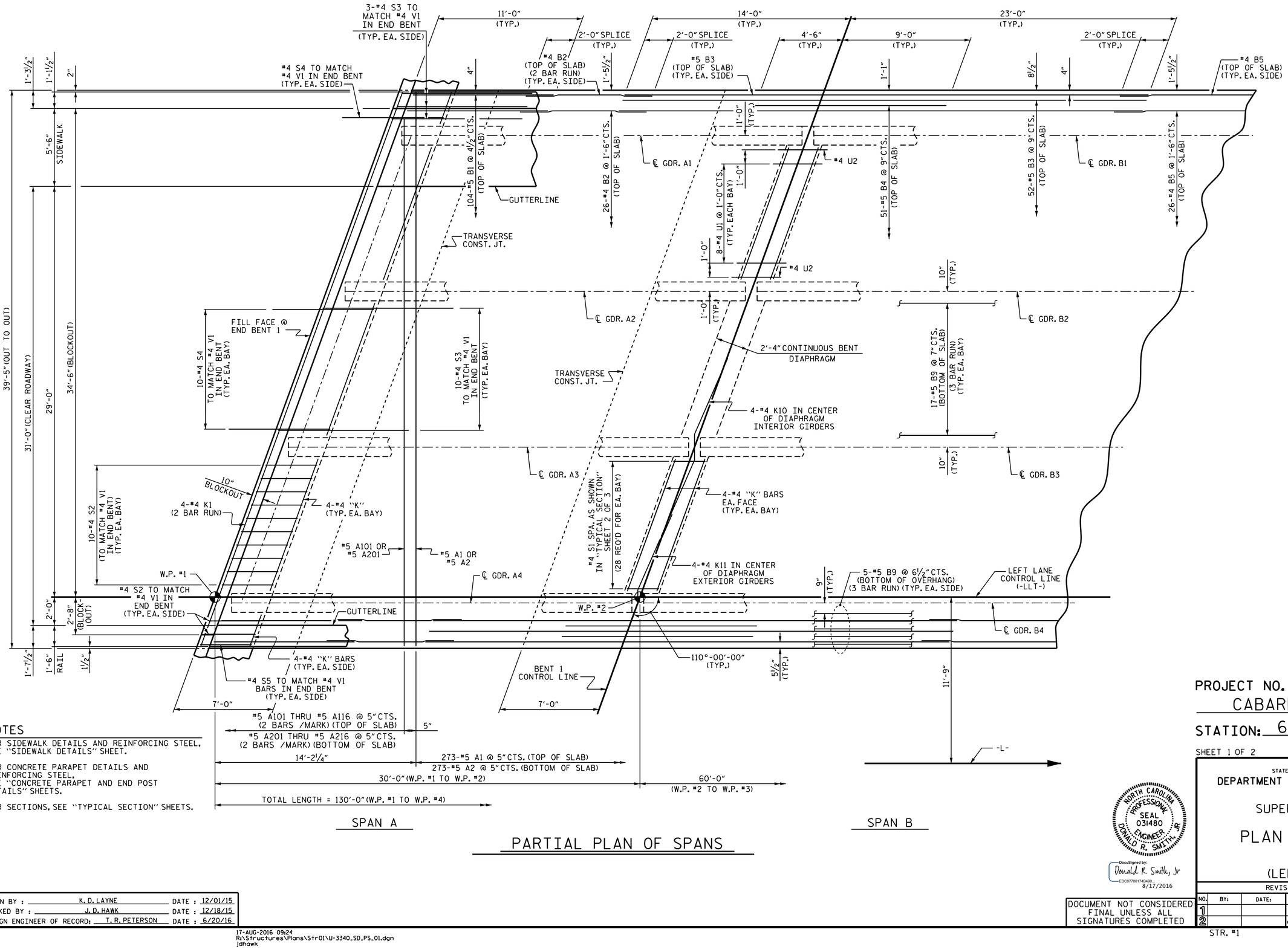
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-7
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	K. D. LAYNE	DATE : 11/24/15
CHECKED BY :	J. D. HAWK	DATE : 12/18/15
DESIGN ENGINEER OF RECORD:	T. R. PETERSON	DATE : 06/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_TS_01.dgn
jdhawk

STR. #1



PARTIAL PLAN OF SPANS

NOTES

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.

FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.

FOR SECTIONS, SEE "TYPICAL SECTION" SHEETS.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490... 8/17/2016

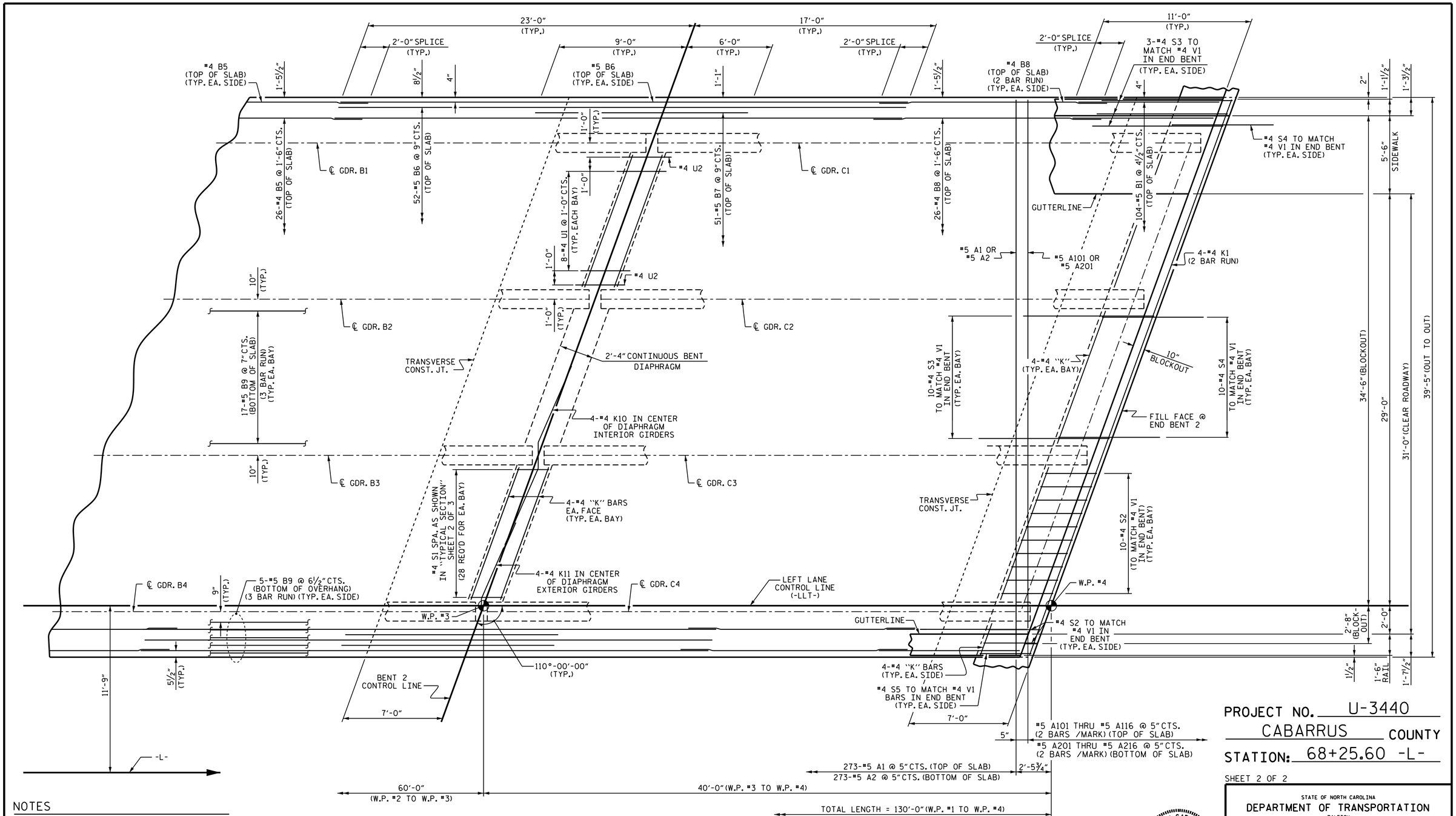
DRAWN BY : K. D. LAYNE DATE : 12/01/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PS_01.dgn
jdhawk

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			37

STR. #1



NOTES

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.

FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.

FOR SECTIONS, SEE "TYPICAL SECTION" SHEETS.

SPAN B

SPAN C

PARTIAL PLAN OF SPANS

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

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

SHEET NO. S1-9

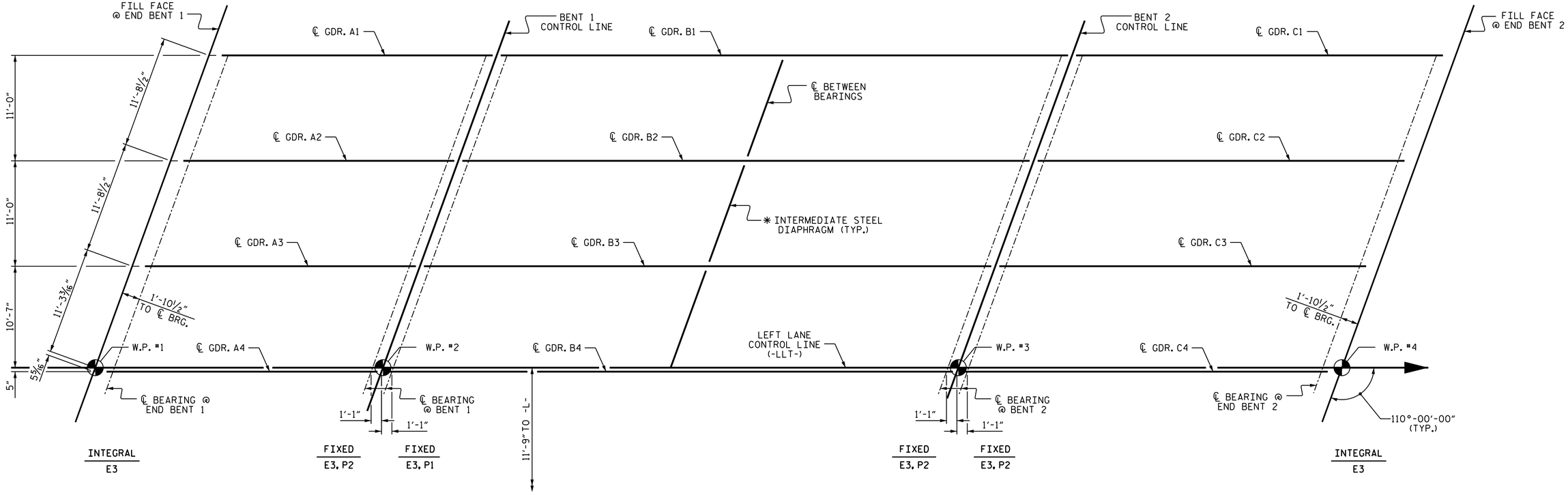
TOTAL SHEETS 37

DRAWN BY : K. D. LAYNE DATE : 12/01/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PS_01.dgn
jdhawk

STR. #1



GIRDER LAYOUT

*SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

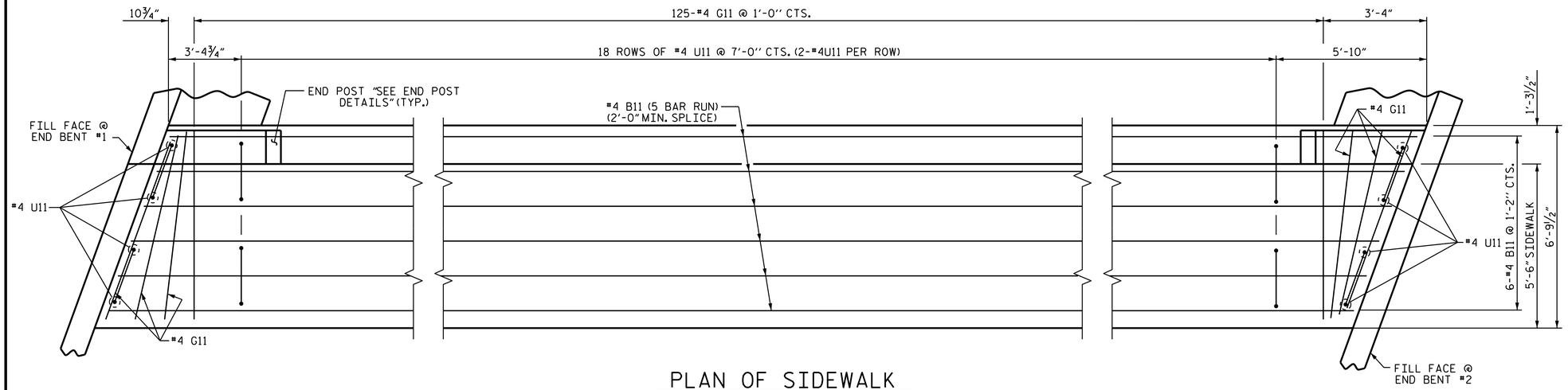
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : KEITH D. LAYNE DATE : 12/04/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3440_SD_FP_01.dgn
jdhawk

STR. #1



PLAN OF SIDEWALK

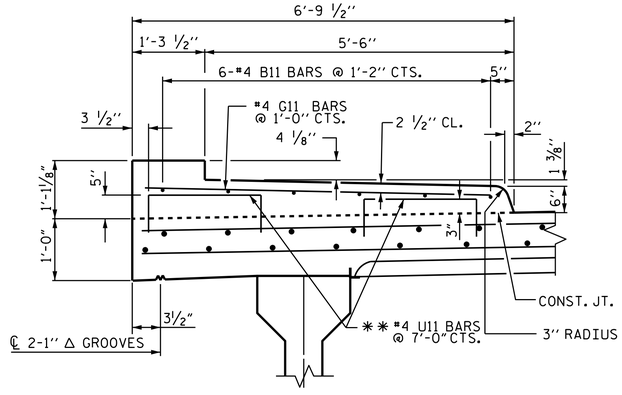
NOTES

THE SIDEWALK IN A CONTINOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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

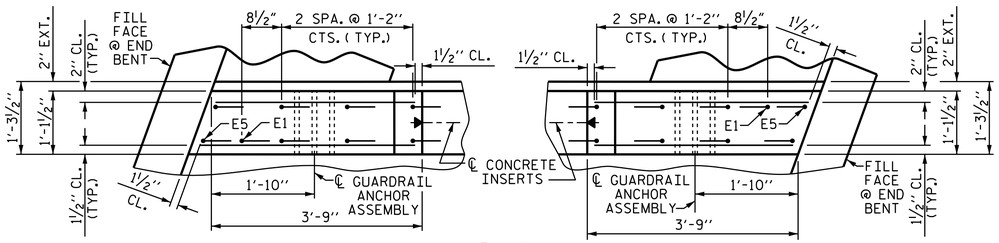
PAYMENT FOR SIDEWALK AND END POSTS SHALL BE INCLUDED IN UNIT PRICE FOR "REINFORCED CONCRETE DECK SLAB".

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

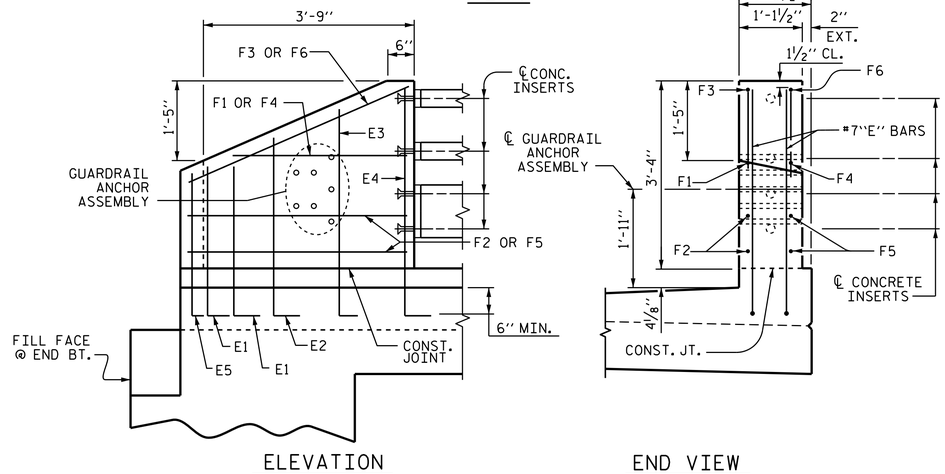


SECTION THRU SIDEWALK

** #4 U11 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.



PLAN



ELEVATION

END VIEW

END POST DETAILS

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR.

DocuSigned by: Donald R. Smith Jr
EDC87706174B490...
8/17/2016

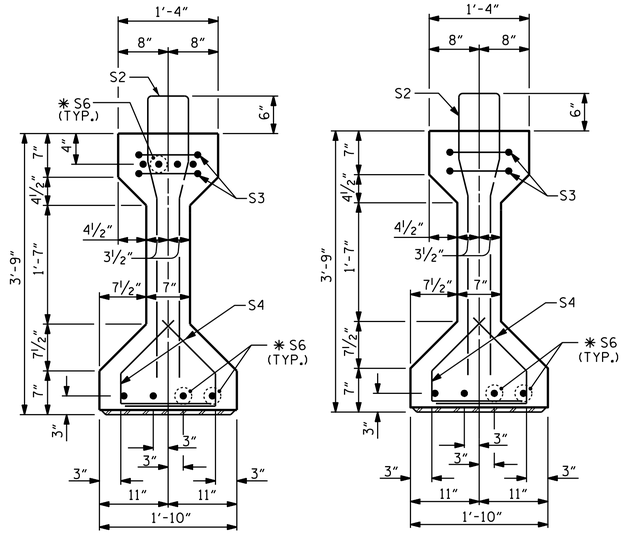
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : KEITH D. LAYNE DATE : 12/04/15
CHECKED BY : J. D. HAWK DATE : 12/18/15

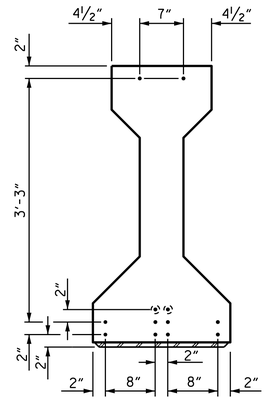
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_SW_01.dgn
jdhawk

STR. #1

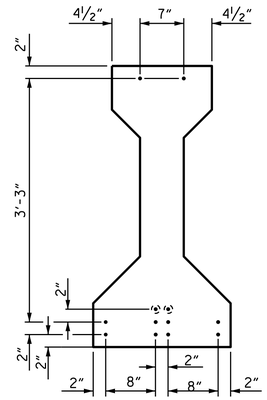


SECTION A-A

SECTION B-B



AT END OF GIRDER

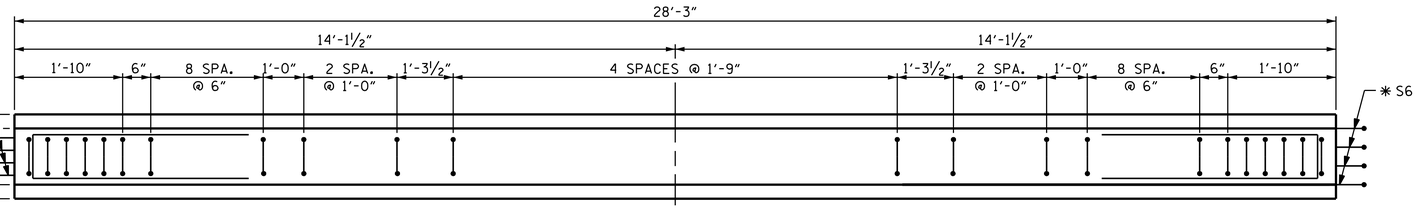


AT ℄ OF GIRDER

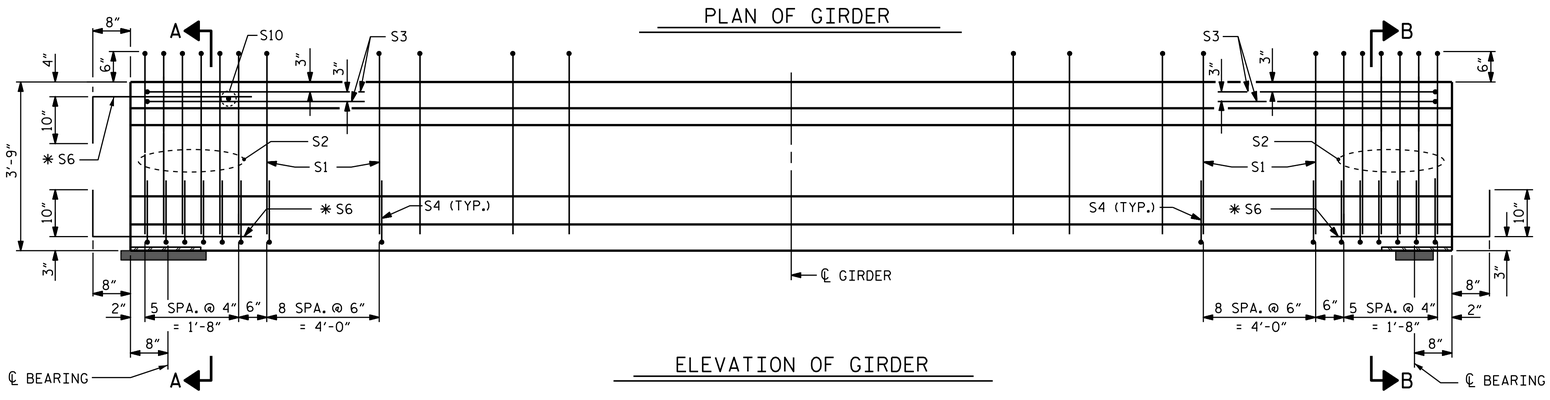
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- (●) OPTIONAL STRANDS (SEE NOTES)



PLAN OF GIRDER



ELEVATION OF GIRDER

INTEGRAL END BENT

FIX

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

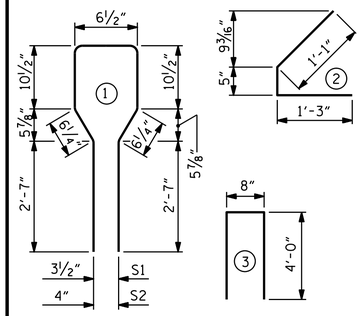
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	29	#4	1	8'-6"	165
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
✱S6	12	#5	STR	3'-8"	46
S10	1	#3	STR	1'-0"	1

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	5,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
	498	4.1	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	4	28'-3"	113'-0"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN A (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

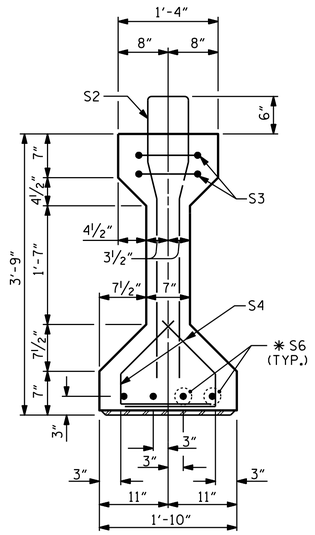
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
2			4			37

STR. #1

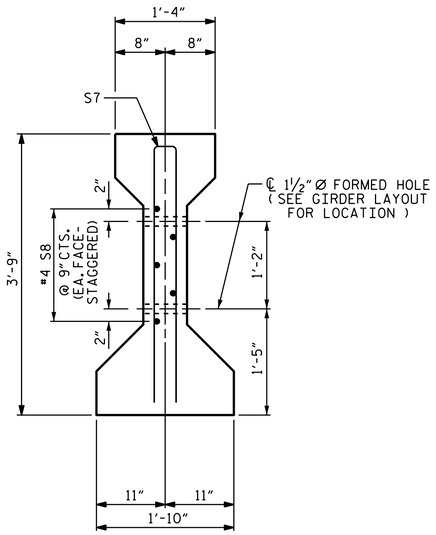
STD. NO. PCG5

ASSEMBLED BY : K.D.LAYNE	DATE : 12/07/15	
CHECKED BY : J.D.HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMC	

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PCG_01.dgn
jdhawk

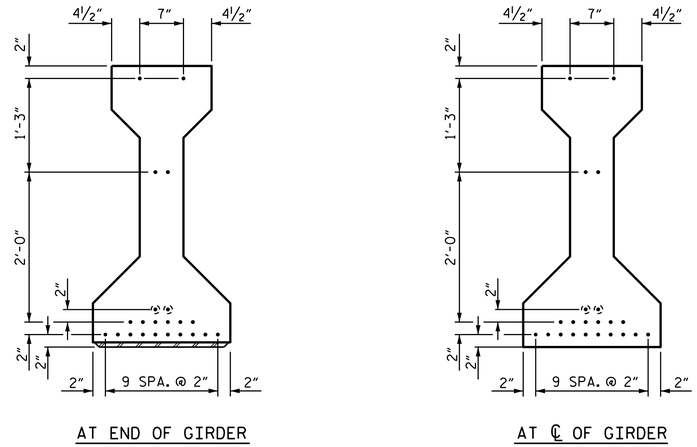


SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)



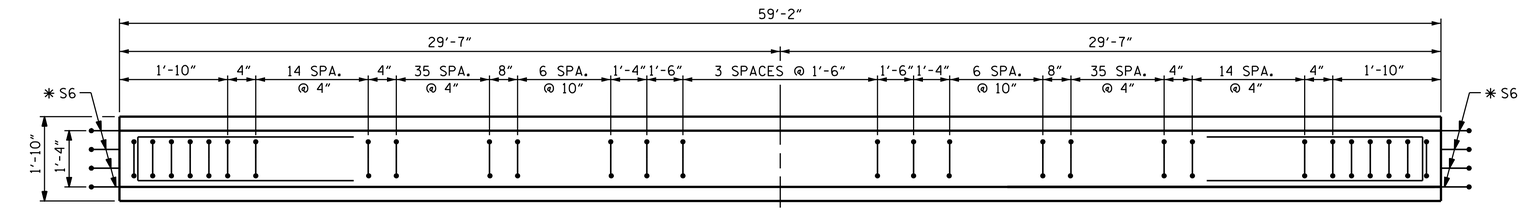
AT END OF GIRDER

AT ℄ OF GIRDER

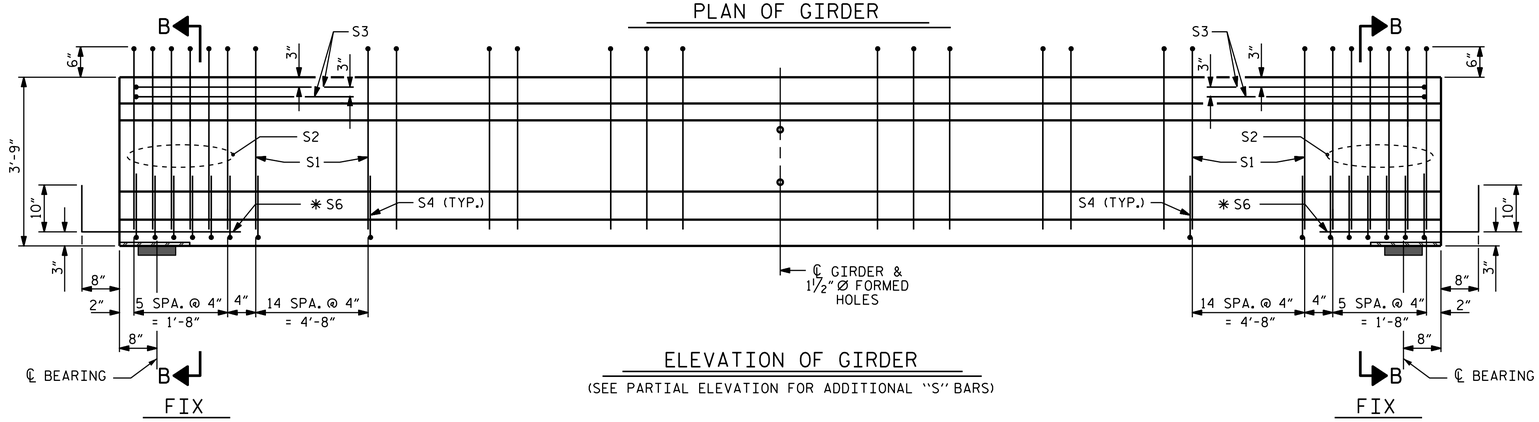
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⊙ OPTIONAL STRANDS (SEE NOTES)

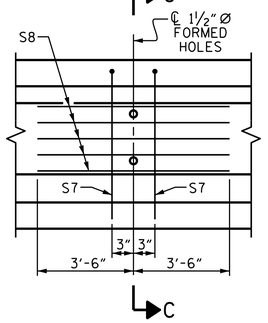


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS

0.6"Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

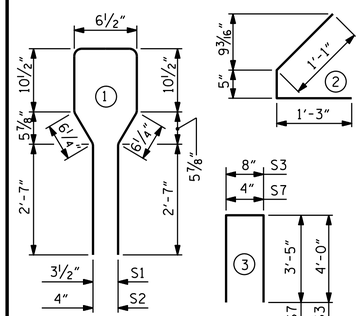
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	122	#4	1	8'-6"	693
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	84	#4	2	2'-9"	154
✱S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,500 PSI CONCRETE	0.6"Ø L. R. STRANDS
	LBS.	C.Y.	No.
	1,092	8.5	20

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN B	4	59'-2"	236'-8"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN B (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

Docusigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

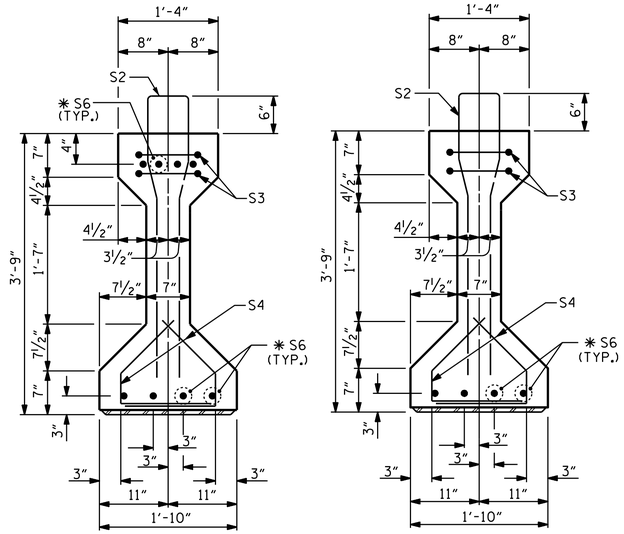
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS
2			4			37

STR. #1

STD. NO. PCG5

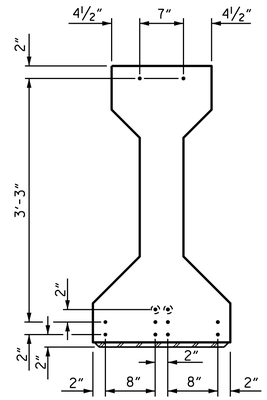
ASSEMBLED BY : K.D.LAYNE	DATE : 12/07/15	
CHECKED BY : J.D.HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMG	

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PCG_01.dgn
jdhawk

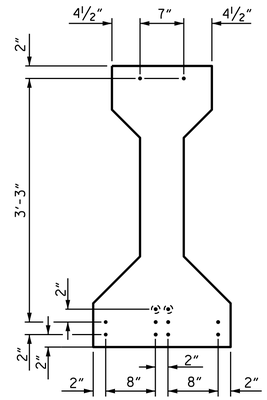


SECTION A-A

SECTION B-B



AT END OF GIRDER

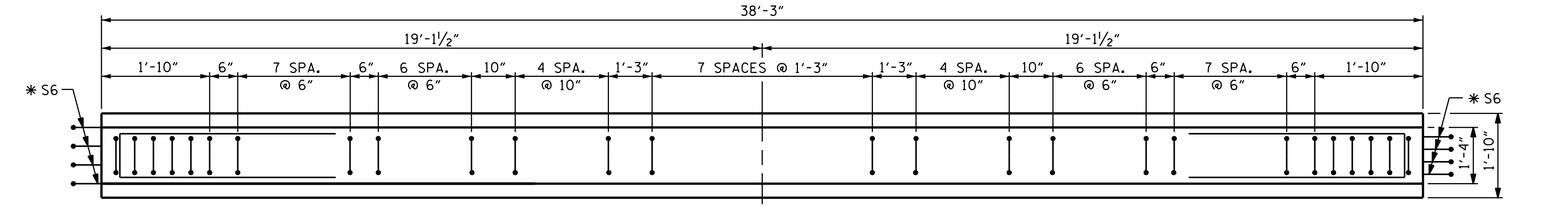


AT ℄ OF GIRDER

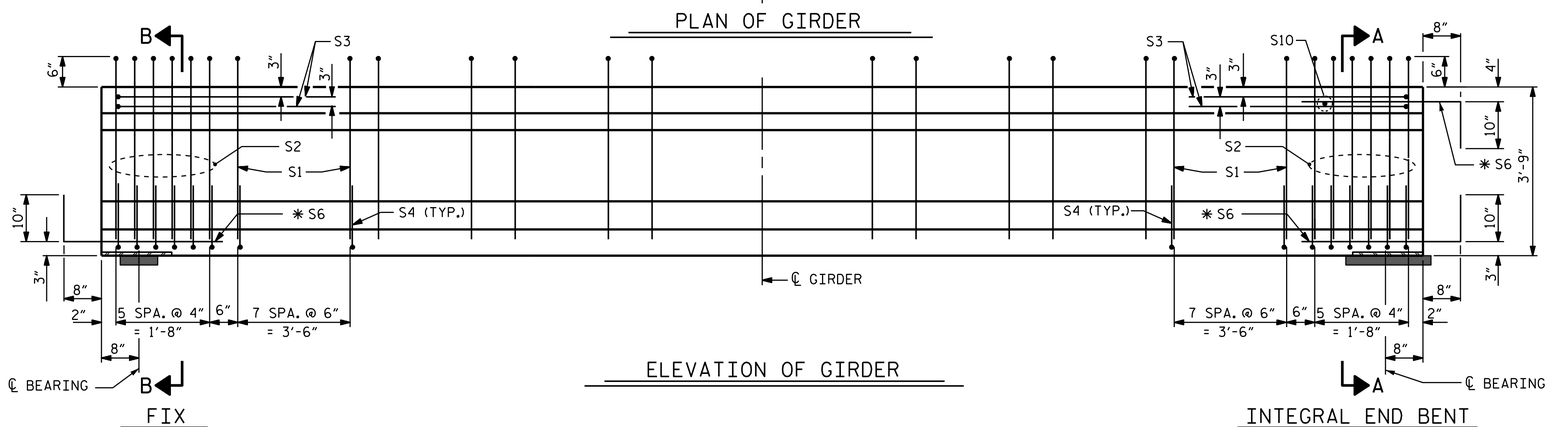
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⦿ OPTIONAL STRANDS (SEE NOTES)



PLAN OF GIRDER



FIX

ELEVATION OF GIRDER

INTEGRAL END BENT

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

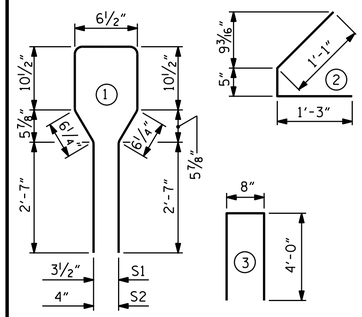
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	8'-6"	273
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
✱S6	12	#5	STR	3'-8"	46
S10	1	#3	STR	1'-0"	1

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	5,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
	599	5.5	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN C	4	38'-3"	153'-0"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

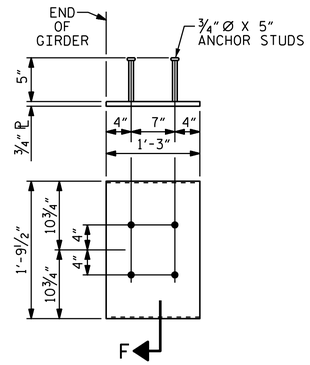
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-14
1			3			TOTAL SHEETS
2			4			37

STR. #1

STD. NO. PCG5

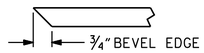
ASSEMBLED BY : K.D.LAYNE	DATE : 12/07/15	
CHECKED BY : J.D.HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMC	

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PCG_01.dgn
jdhawk



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE III GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

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 SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS.

OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI. FOR SPANS A & C AND 4,700 PSI. FOR SPAN B

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS SHOWN ON GIRDER SHEETS TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4,500 LBS.

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.011	0.008	0.004	0.000	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.011	0.008	0.004	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.001	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.001	0.000	0.000	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.001	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0

0.6" Ø LOW RELAXATION	SPAN B																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.031	0.058	0.079	0.092	0.097	0.092	0.079	0.058	0.031	0.000	0.000	0.031	0.058	0.079	0.092	0.097	0.092	0.079	0.058	0.031	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.016	0.029	0.040	0.047	0.049	0.047	0.040	0.029	0.016	0.000	0.000	0.018	0.035	0.047	0.058	0.058	0.058	0.047	0.035	0.018	0.000
FINAL CAMBER ↑	0	3/16"	5/16"	7/16"	9/16"	9/16"	9/16"	7/16"	5/16"	3/16"	0	0	1/8"	1/4"	3/8"	7/16"	7/16"	7/16"	3/8"	1/4"	1/8"	0

0.6" Ø LOW RELAXATION	SPAN C																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.006	0.012	0.017	0.019	0.020	0.019	0.017	0.012	0.006	0.000	0.000	0.006	0.012	0.017	0.019	0.020	0.019	0.017	0.012	0.006	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.003	0.006	0.008	0.009	0.009	0.009	0.008	0.006	0.003	0.000	0.000	0.003	0.007	0.009	0.011	0.011	0.011	0.009	0.007	0.003	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0	0	1/16"	1/16"	1/16"	1/8"	1/8"	1/8"	1/16"	1/16"	1/16"	0

* INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

ASSEMBLED BY : K.D.LAYNE DATE : 12/07/15
CHECKED BY : J.D.HAWK DATE : 12/18/15

DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 2/15 MAA/TMG

DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PCG_01.dgn
jdhawk

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

Docusigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

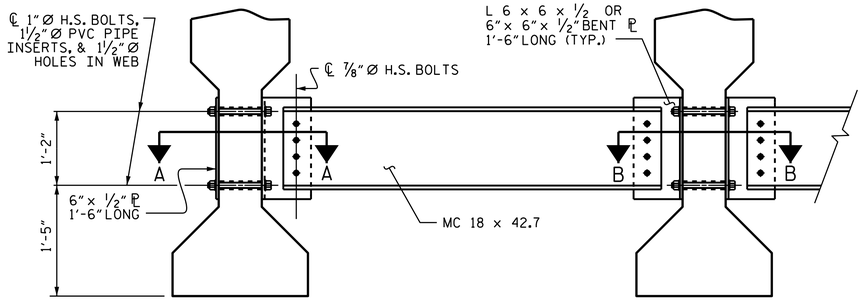
PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-15
1			3			TOTAL SHEETS
2			4			37

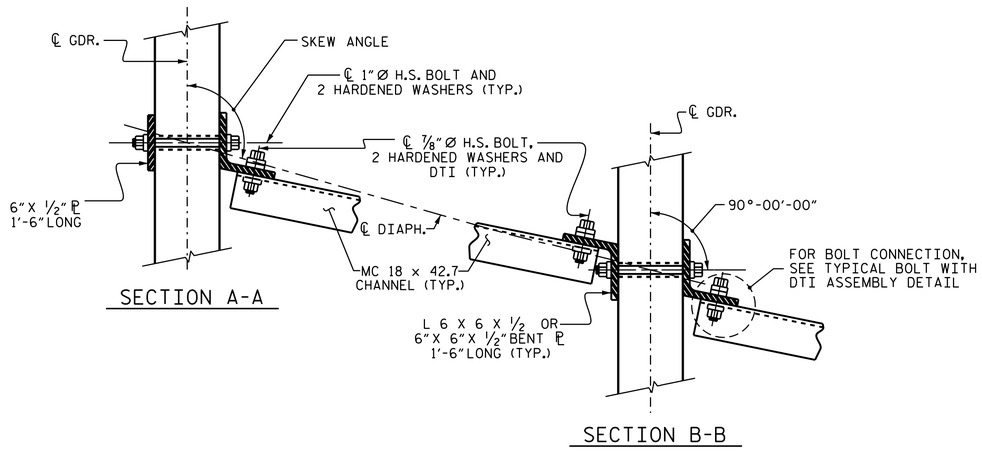
STR. #1

STD. NO. PCG9



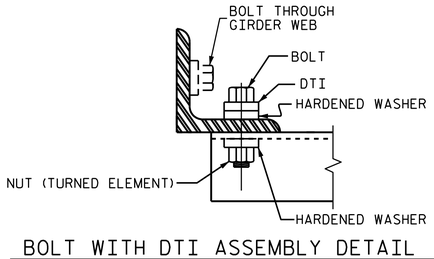
EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

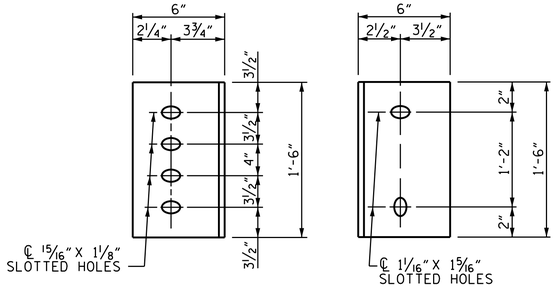


CONNECTION DETAILS

(FOR 70°≤ SKEW < 90° OR 90°< SKEW ≤ 110°)



BOLT WITH DTI ASSEMBLY DETAIL



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

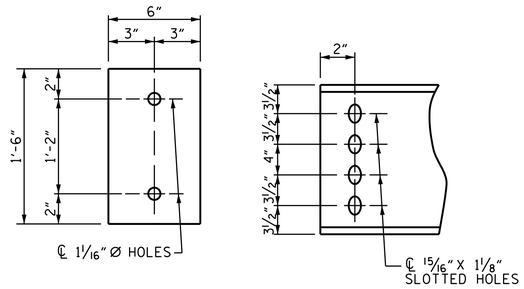


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR.

DocuSigned by: Donald R. Smith Jr
EDC87706174B496...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS

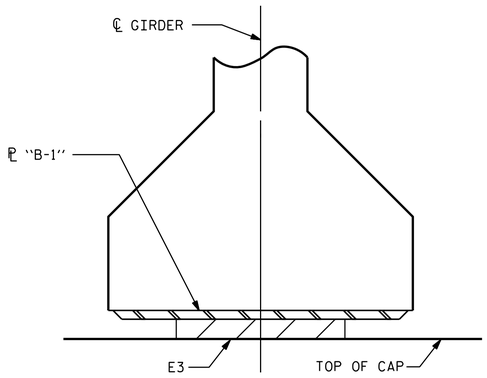
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			37

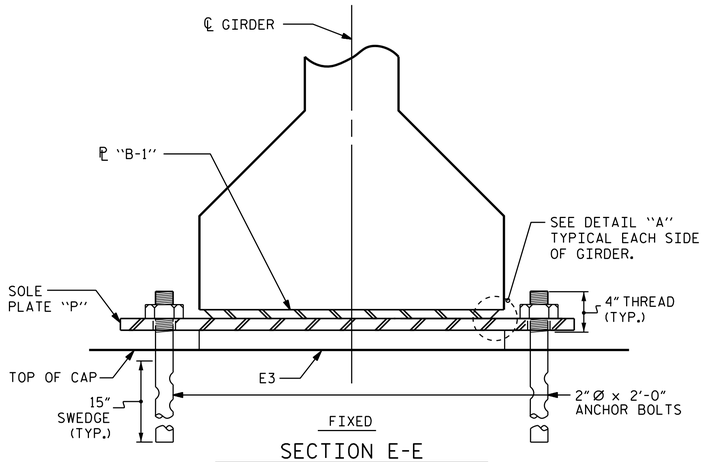
DRAWN BY : K. D. LAYNE DATE : 12/07/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_PCG_01.dgn
jdhawk

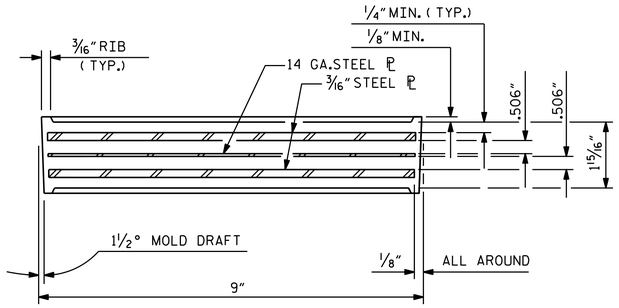
STR. #1 STD. NO. PCG10



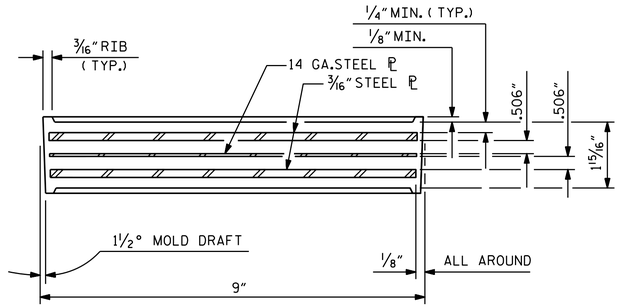
SECTION D-D



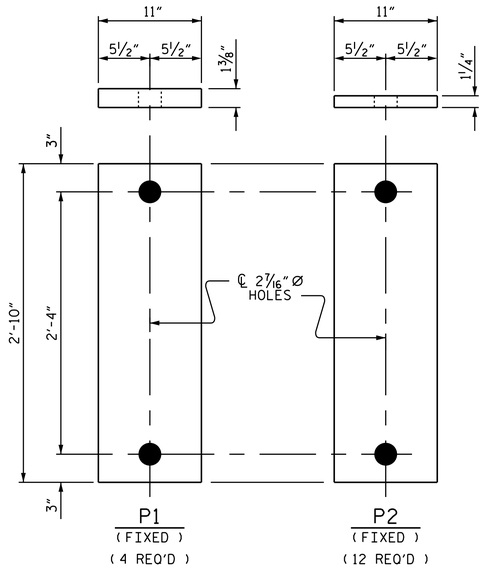
SECTION E-E



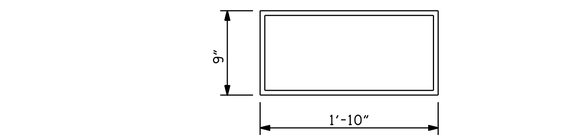
TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS



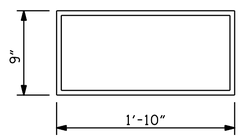
SOLE PLATE DETAILS



E3 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

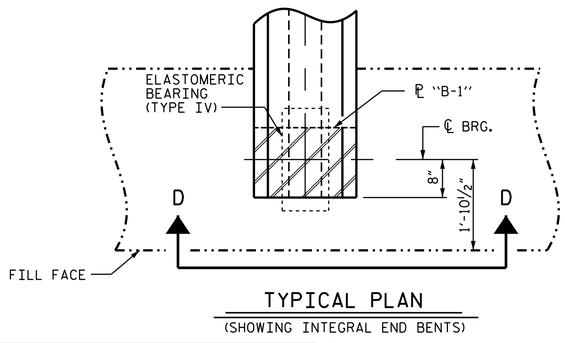
TYPE IV



E3 (16 REQ'D)

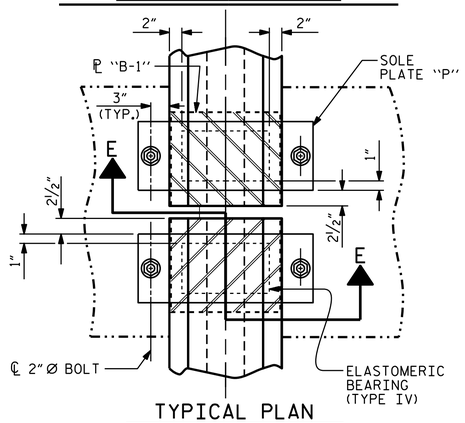
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



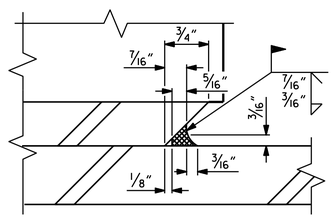
TYPICAL PLAN

(SHOWING INTEGRAL END BENTS)



TYPICAL PLAN

(SHOWING CONTINUOUS BENT)



DETAIL "A"

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

ASSEMBLED BY : K.D. LAYNE	DATE : 12/04/15
CHECKED BY : J.D. HAWK	DATE : 12/18/15

DRAWN BY : WJH 8/89	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 8/89	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG

DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

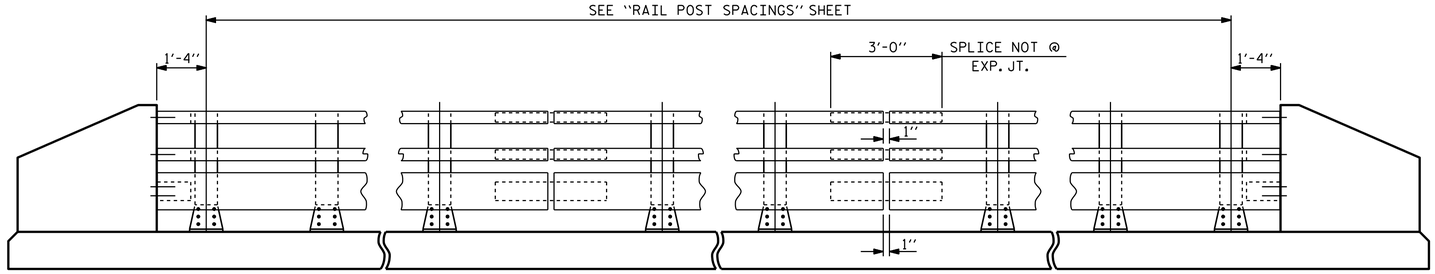
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_EB_01.dgn
jdhawk

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			37

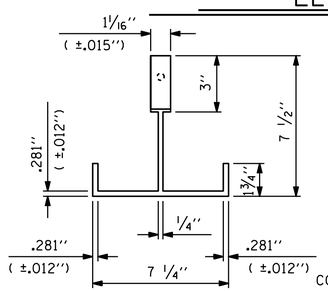
STR. #1

STD. NO. EB3

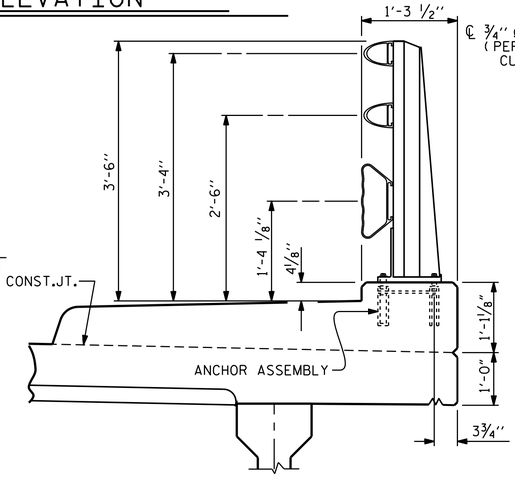


ELEVATION

NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

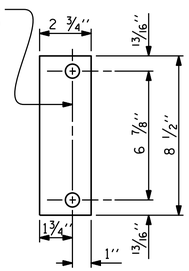


PLAN

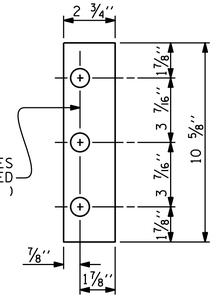


SECTION THRU RAIL

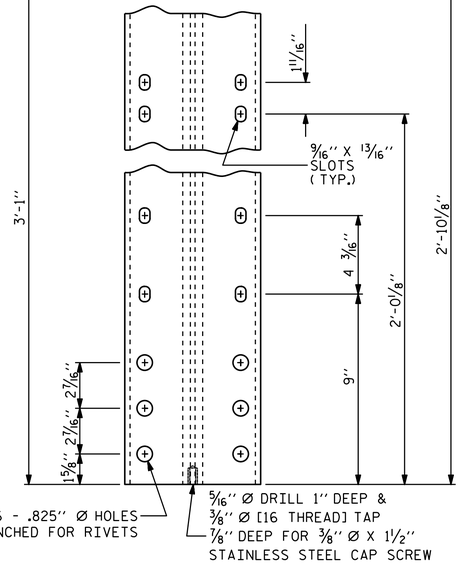
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



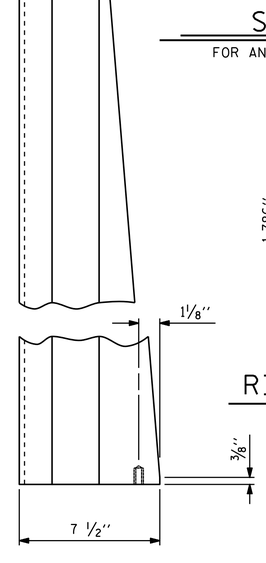
REAR PLATE



FRONT PLATE

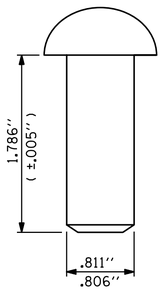


FRONT ELEVATION



SIDE ELEVATION

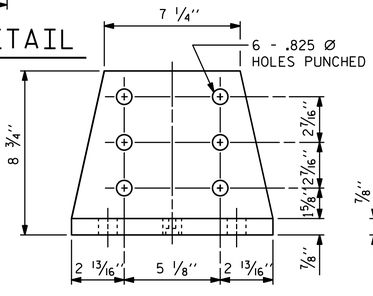
DETAILS OF POST



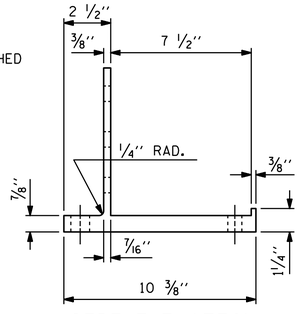
RIVET DETAIL

SHIM DETAILS

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



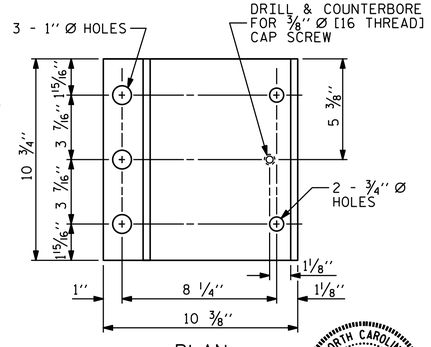
FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS

PAY LENGTH = 120.32 LIN.FT.



PLAN

NOTES

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

ASSEMBLED BY : KEITH D. LAYNE	DATE : 12/04/15
CHECKED BY : J. D. HAWK	DATE : 12/18/15

DRAWN BY : JMB 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

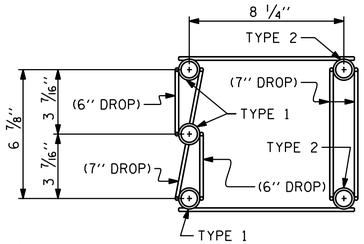
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-18
TOTAL SHEETS 37

STR. #1

STD. NO. BMR5

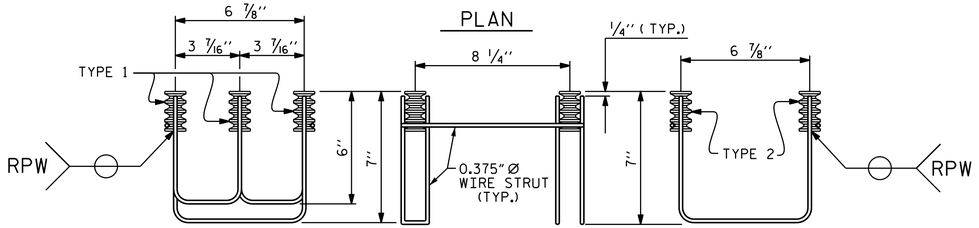
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_3MR_01.dgn
jdhawk



TYPE 1 FERRULE
THREADED STEEL FERRULES
WITH CLOSED BOTTOM TO FIT
3/4'' Ø BOLT WITH ROUND WASHER.

TYPE 2 FERRULE
THREADED STEEL FERRULES
WITH CLOSED BOTTOM TO FIT
5/8'' Ø BOLT WITH ROUND WASHER.

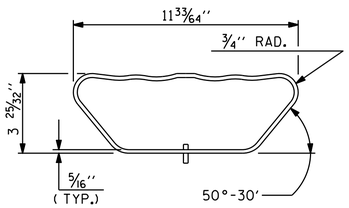
PLAN



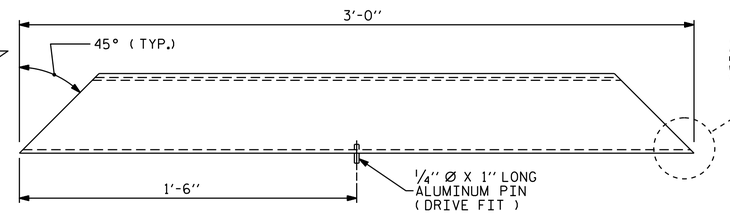
LEFT SIDE VIEW ELEVATION RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

(22 ASSEMBLIES REQUIRED)

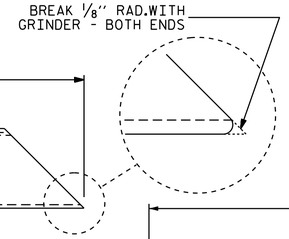


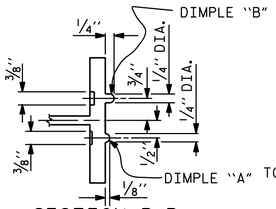
END VIEW



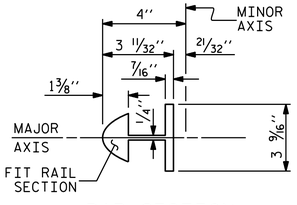
PLAN VIEW

BOTTOM RAIL EXPANSION BAR

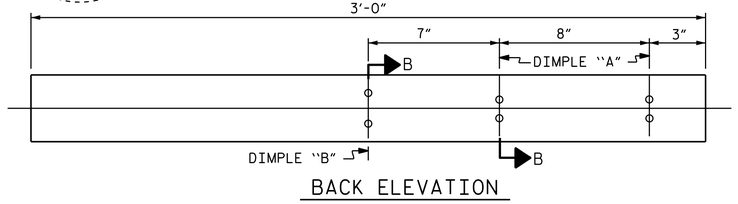




SECTION B-B

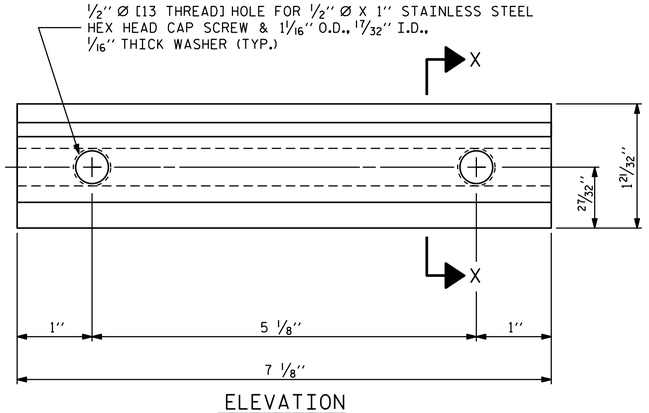


BAR SECTION

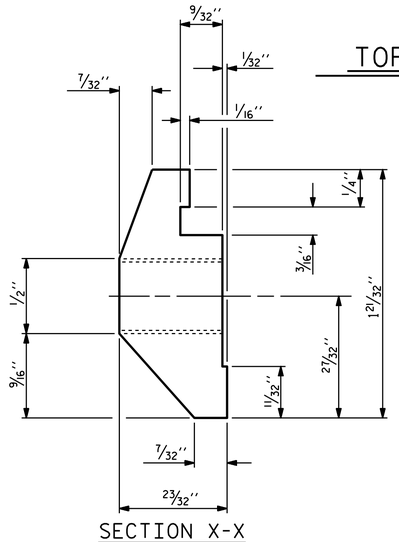


BACK ELEVATION

TOP & MIDDLE RAIL EXPANSION BAR



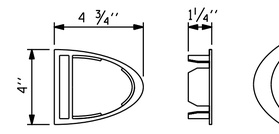
ELEVATION



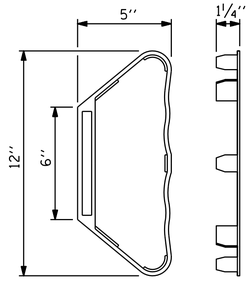
SECTION X-X

CLAMP BAR DETAIL

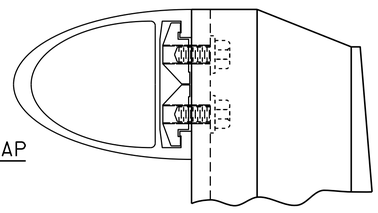
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

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 AND 1 3/4'' FOR 5/8'' FERRULES.

B. 3 - 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.

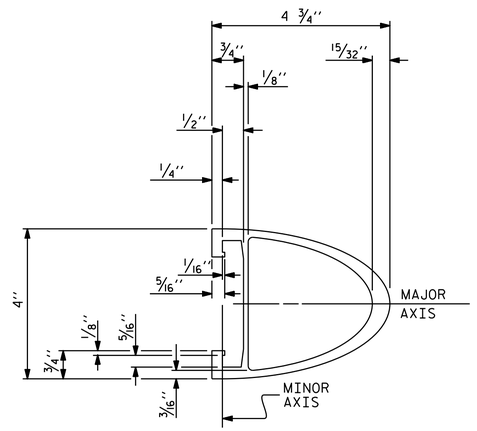
C. 2 - 5/8'' Ø X 2 1/4'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8'' Ø X 2 1/4'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

D. 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.

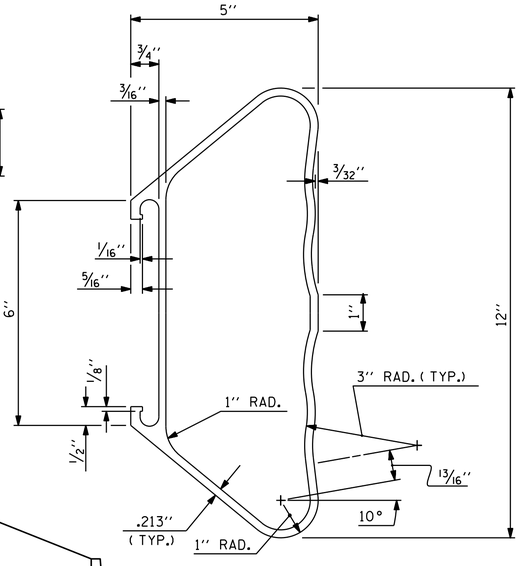
E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

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



TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITTY JR

DocuSigned by: Donald R. Smitty Jr EDC87706174B490...
8/17/2016

ASSEMBLED BY : KEITH D. LAYNE	DATE : 12/04/15
CHECKED BY : J. D. HAWK	DATE : 12/18/15

DRAWN BY : JMB	1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH	1/88	REV. 5/1/06 TLA/GM
		REV. 10/1/11 MAA/GM

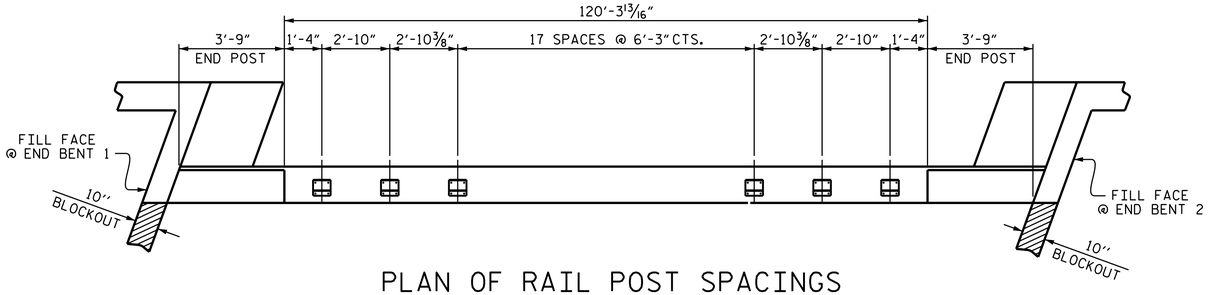
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS
2			4			37

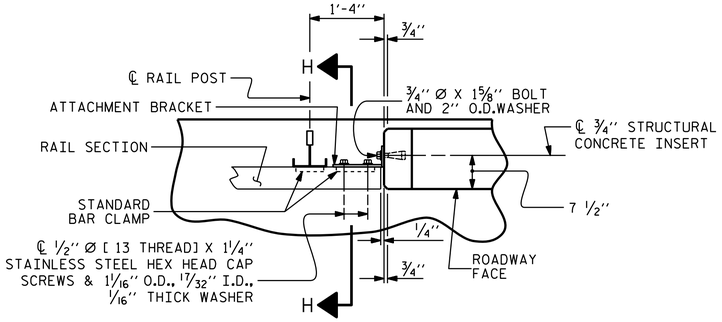
STR. #1

STD. NO. BMR6

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_3MR_01.dgn
jdhawk

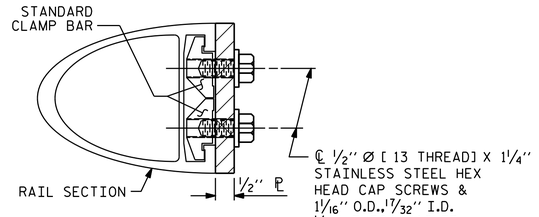


PLAN OF RAIL POST SPACINGS



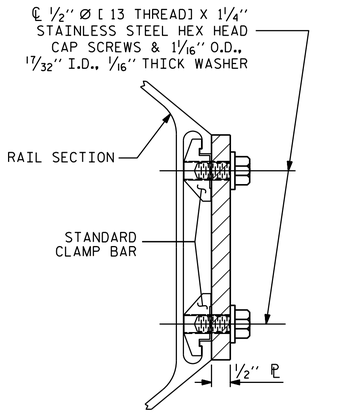
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" ℙ NOT SHOWN FOR CLARITY)



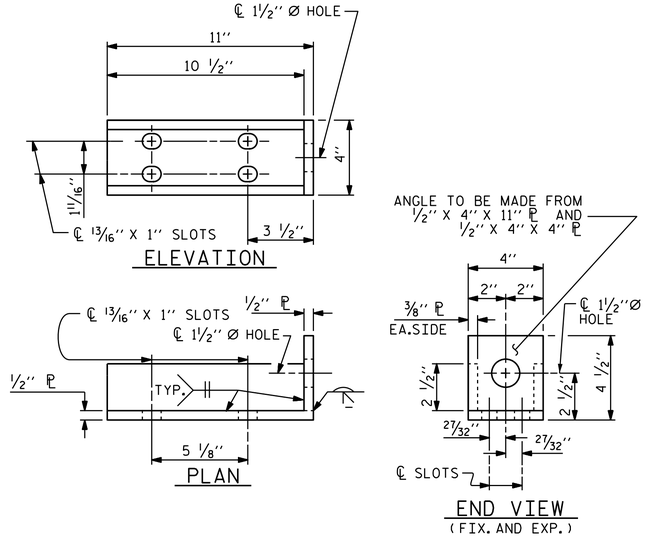
SECTION H-H

(FOR TOP & MIDDLE RAIL)



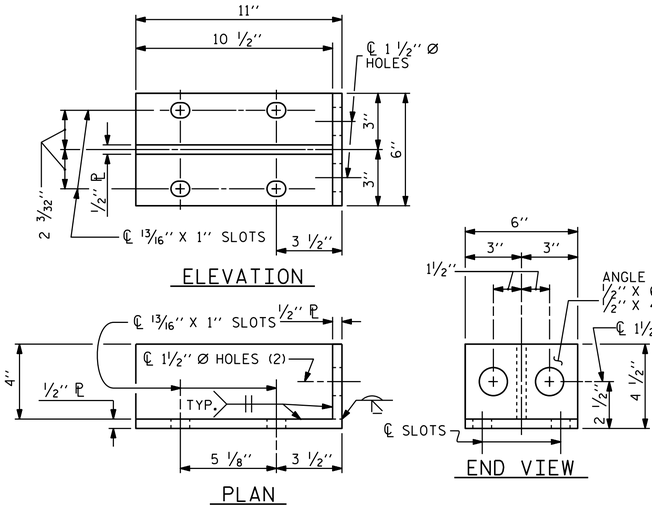
SECTION H-H

(FOR BOTTOM RAIL)



DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" 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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" 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 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

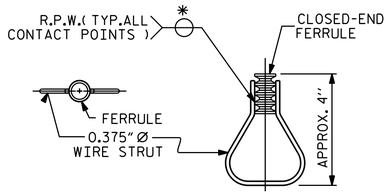
STRUCTURAL CONCRETE INSERT

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 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" 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.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/17/2016

ASSEMBLED BY : KEITH D. LAYNE	DATE : 12/04/15
CHECKED BY : J. D. HAWK	DATE : 12/18/15

DRAWN BY : JMB 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

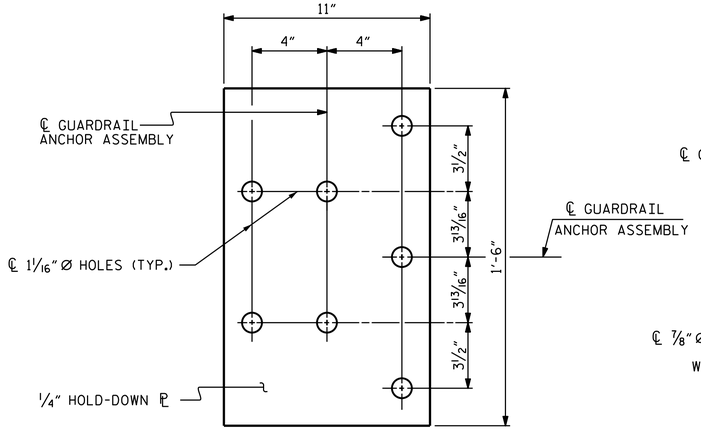
SHEET NO. S1-20

TOTAL SHEETS 37

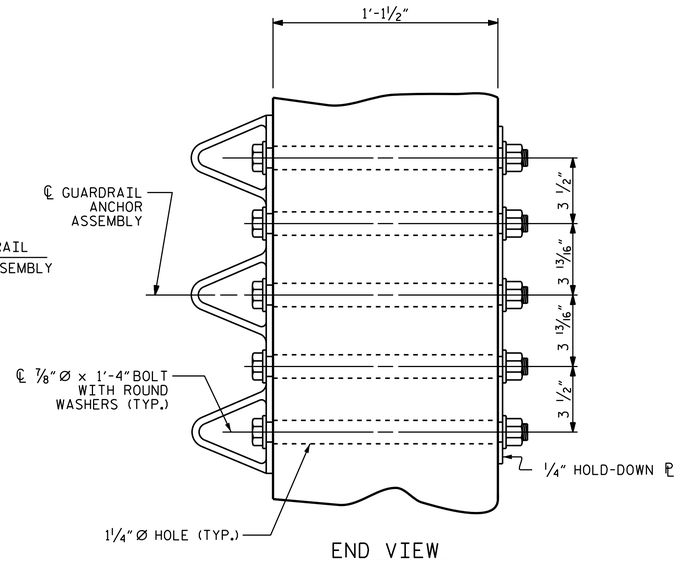
STR. #1

STD. NO. BMR7

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3440_SD_3MR_01.dgn
jdhawk



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

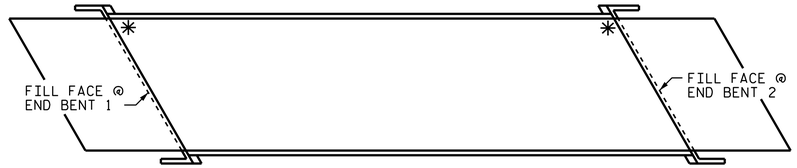
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

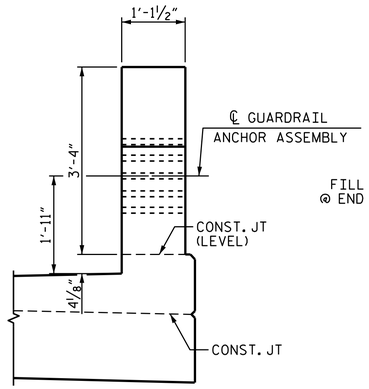
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

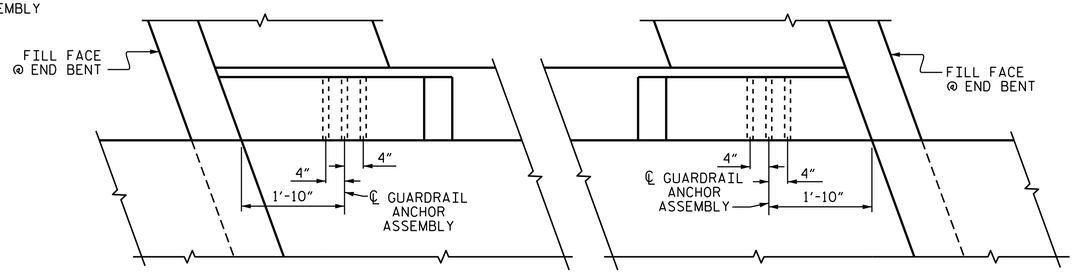


SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY



END VIEW



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

Docusigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

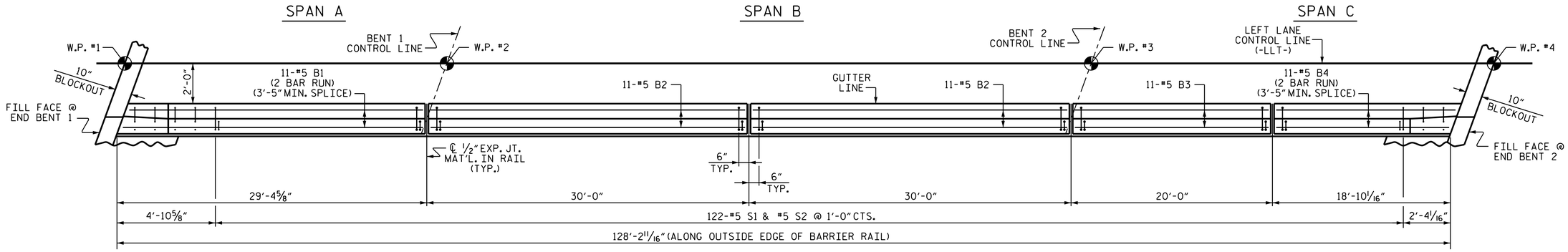
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-21
1			3			TOTAL SHEETS
2			4			37

STR. #1

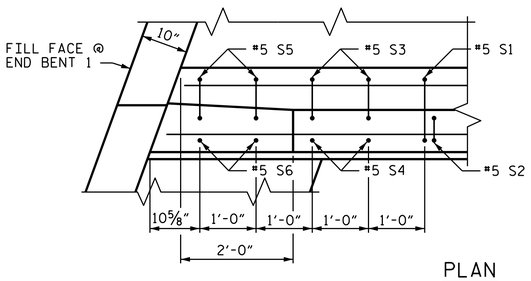
STD. NO. GRA3

ASSEMBLED BY : KEITH D. LAYNE	DATE : 12/04/15		
CHECKED BY : J. D. HAWK	DATE : 12/18/15		
DRAWN BY : MAA 5/10	REV. 12/5/11	MAA/GM	
CHECKED BY : GM 5/10	REV. 6/13	MAA/GM	
	REV. 1/15	MAA/TMG	

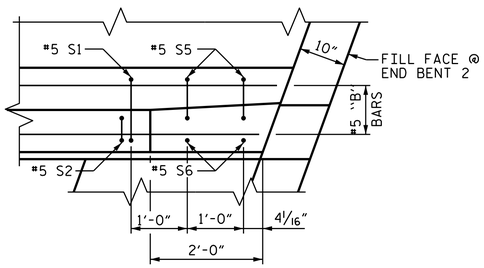
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_3MR_01.dgn
jdhawk

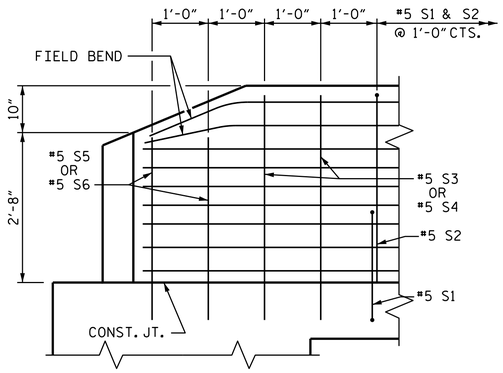


PLAN OF CONCRETE BARRIER RAIL

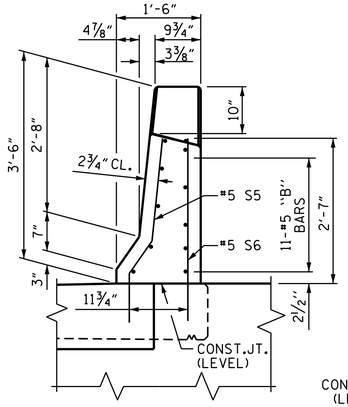


PLAN





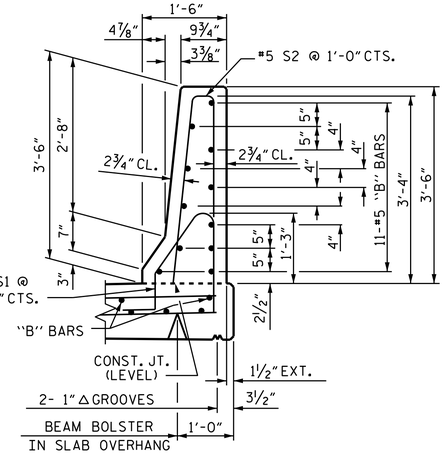
SIDE VIEW



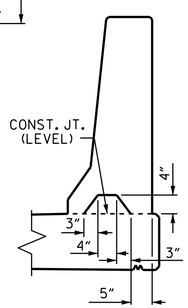
END VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

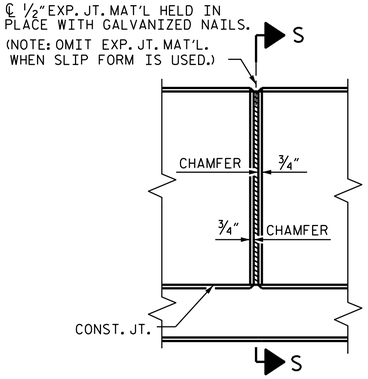


SECTION THROUGH RAIL



SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

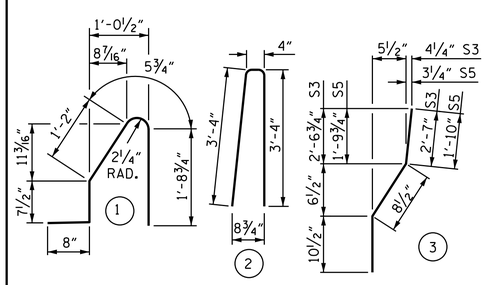
THE JOINT BETWEEN BRIDGE DECK AND APPROACH SLAB SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	16'-2"	371
* B2	22	#5	STR	29'-7"	679
* B3	11	#5	STR	19'-7"	225
* B4	22	#5	STR	11'-2"	256
* S1	122	#5	1	4'-8"	594
* S2	122	#5	2	7'-0"	891
* S3	2	#5	3	4'-2"	9
* S4	2	#5	STR.	4'-0"	8
* S5	4	#5	3	3'-5"	14
* S6	4	#5	STR.	3'-3"	14
* EPOXY COATED REINFORCING STEEL				LBS.	3,061
CLASS AA CONCRETE				C.Y.	17.5
CONCRETE BARRIER RAIL				LIN. FT.	128.22

PROJECT NO. U-3340

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC8770617 4B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-22

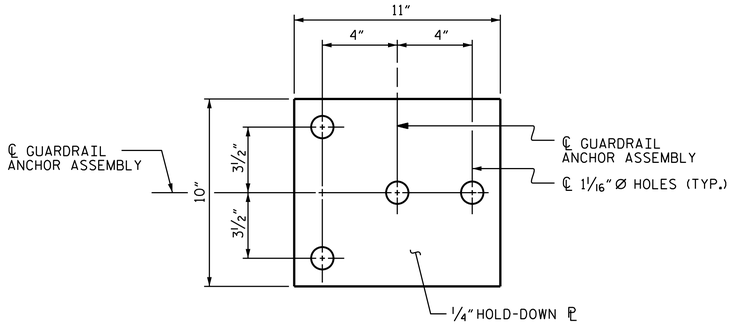
TOTAL SHEETS 37

STR. #1

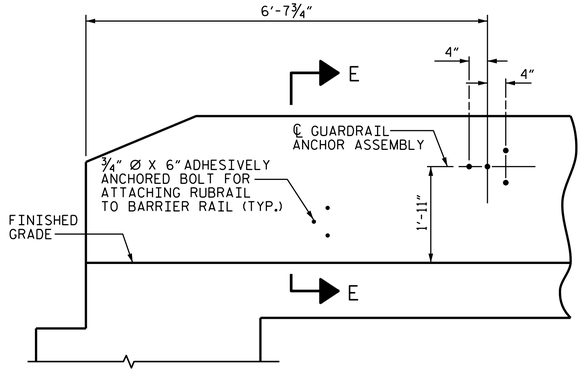
STD. NO. CBR1

ASSEMBLED BY : K. D. LAYNE	DATE : 12/4/15	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_CBR_01.dgn
jdhawk



PLAN



ELEVATION

NOTES

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

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

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

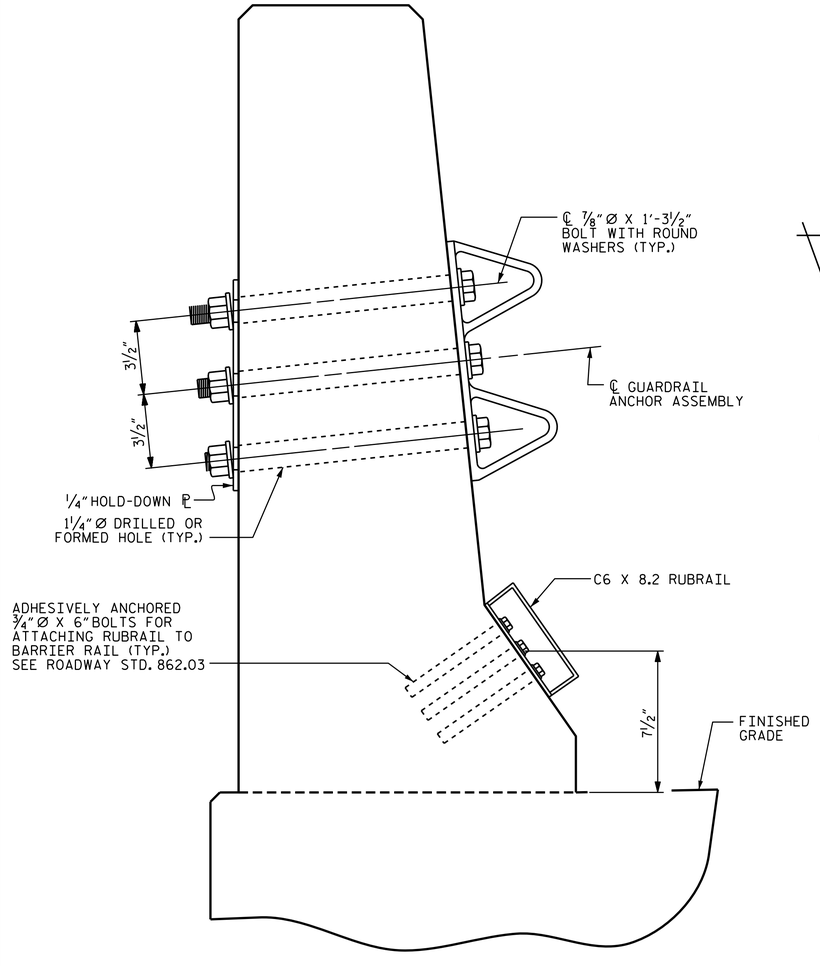
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

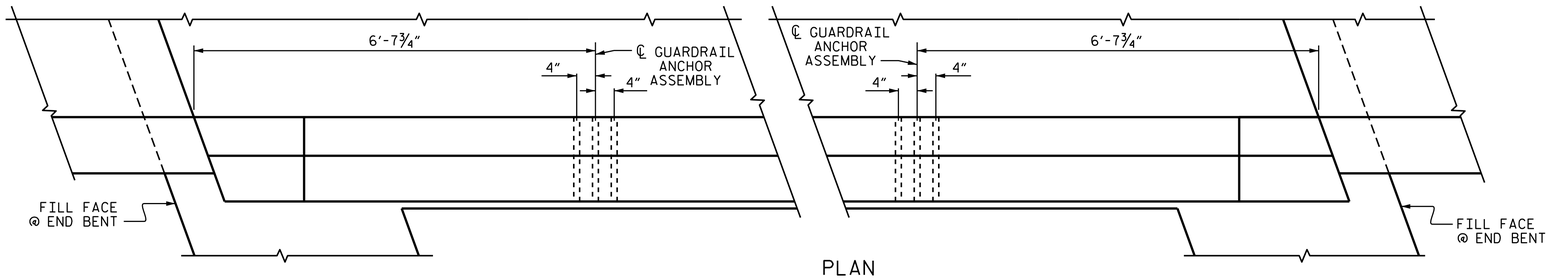
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



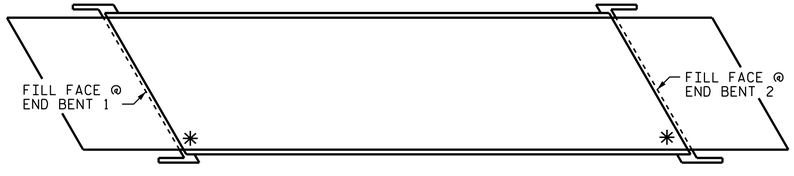
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3340

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

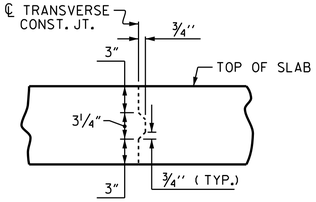
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			37

STR. #1

STD. NO. GRA2

ASSEMBLED BY : K. D. LAYNE	DATE : 12/4/15	
CHECKED BY : J. D. HAWK	DATE : 12/80/15	
DRAWN BY : TLA 5/06	REV. 10/1/11	MAA/GM
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_CBR_01.dgn
jdhawk



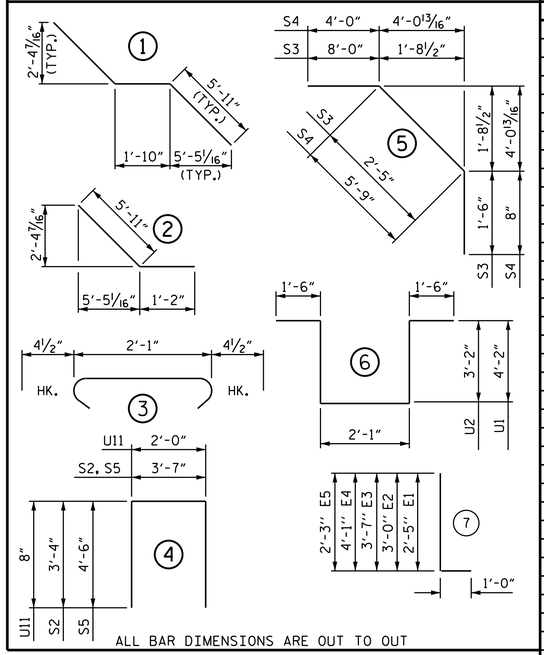
TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

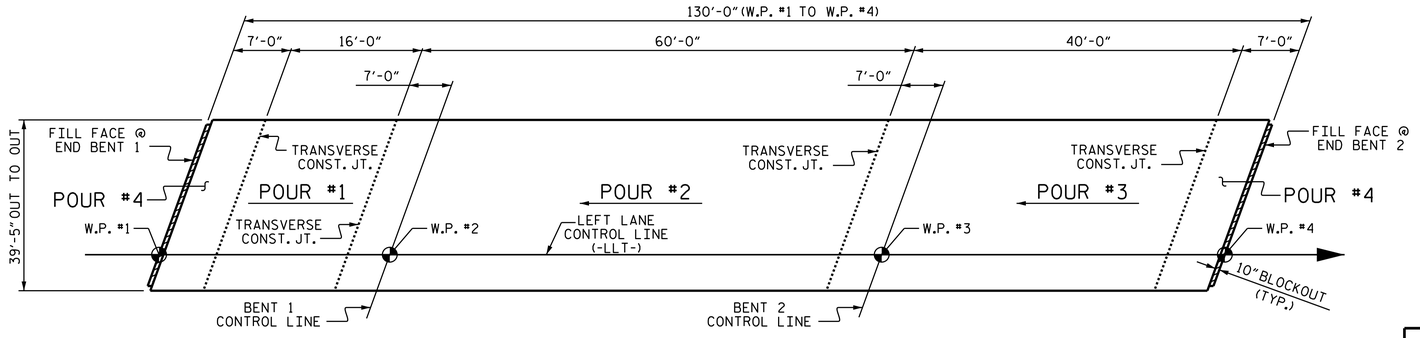
BAR TYPE



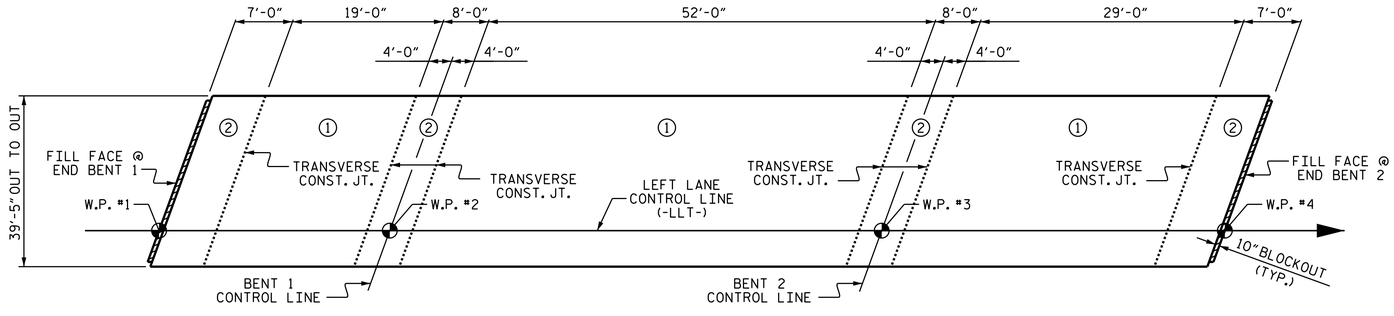
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	273	#5	STR	39'-1"	11129	✳B7	51	#5	STR	15'-0"	798
A2	273	#5	STR	39'-1"	11129	✳B8	27	#4	STR	15'-2"	274
						B9	183	#5	STR	44'-1"	8414
✳A101	4	#5	STR	37'-2"	155	✳B11	30	#4	STR	27'-3"	546
✳A102	4	#5	STR	34'-11"	146						
✳A103	4	#5	STR	32'-7"	136	✳G11	131	#4	STR	6'-3"	547
✳A104	4	#5	STR	30'-4"	127						
✳A105	4	#5	STR	28'-0"	117	✳E1	4	#7	7	3'-5"	28
✳A106	4	#5	STR	25'-9"	107	✳E2	4	#7	7	4'-0"	33
✳A107	4	#5	STR	23'-5"	98	✳E3	4	#7	7	4'-7"	37
✳A108	4	#5	STR	21'-2"	88	✳E4	4	#7	7	5'-1"	42
✳A109	4	#5	STR	18'-10"	79	✳E5	2	#7	7	3'-3"	13
✳A110	4	#5	STR	16'-7"	69						
✳A111	4	#5	STR	14'-3"	59	✳F1	2	#6	STR	3'-1"	9
✳A112	4	#5	STR	12'-0"	50	✳F2	4	#6	STR	3'-6"	21
✳A113	4	#5	STR	9'-8"	40	✳F3	2	#6	STR	4'-3"	13
✳A114	4	#5	STR	7'-5"	31	✳F4	2	#6	STR	3'-1"	9
✳A115	4	#5	STR	5'-2"	22	✳F5	4	#6	STR	3'-10"	23
✳A116	4	#5	STR	2'-10"	12	✳F6	2	#6	STR	3'-9"	11
A201	4	#5	STR	37'-2"	155	K1	16	#4	STR	21'-9"	232
A202	4	#5	STR	34'-11"	146	K2	18	#4	STR	10'-0"	120
A203	4	#5	STR	32'-7"	136	K3	6	#4	STR	9'-4"	37
A204	4	#5	STR	30'-4"	127	K4	36	#4	STR	10'-8"	257
A205	4	#5	STR	28'-0"	117	K5	4	#4	STR	2'-4"	6
A206	4	#5	STR	25'-9"	107	K6	4	#4	STR	2'-1"	6
A207	4	#5	STR	23'-5"	98	K7	8	#4	STR	2'-8"	14
A208	4	#5	STR	21'-2"	88	K9	12	#4	STR	8'-1"	65
A209	4	#5	STR	18'-10"	79	K10	16	#4	1	13'-8"	146
A210	4	#5	STR	16'-7"	69	K11	16	#4	2	7'-1"	76
A211	4	#5	STR	14'-3"	59						
A212	4	#5	STR	12'-0"	50	S1	168	#4	3	2'-10"	318
A213	4	#5	STR	9'-8"	40	S2	68	#4	4	10'-3"	466
A214	4	#5	STR	7'-5"	31	✳S3	72	#4	5	11'-11"	573
A215	4	#5	STR	5'-2"	22	✳S4	64	#4	5	10'-5"	445
A216	4	#5	STR	2'-10"	12	S5	4	#4	4	12'-7"	34
✳B1	208	#5	STR	10'-10"	2350	U1	48	#4	6	13'-5"	430
✳B2	27	#4	STR	8'-2"	147	U2	12	#4	6	11'-5"	92
✳B3	53	#5	STR	37'-0"	2045	✳U11	40	#4	4	3'-4"	89
✳B4	51	#5	STR	13'-6"	718						
✳B5	27	#4	STR	18'-0"	325	REINFORCING STEEL			LBS.		23,178
✳B6	53	#5	STR	40'-0"	2211	✳ EPOXY COATED REINFORCING STEEL			LBS.		23,772



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE (SQ. FT. = 5,124)



OPTIONAL DECK POURING DETAIL

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3,000 PSI

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	20.8	———	———
POUR #2	90.0	———	———
POUR #3	63.3	———	———
POUR #4	58.3	———	———
SIDEWALK	22.4	———	———
END POSTS	0.9	———	———
TOTAL ✳✳	255.7	23,178	23,772

✳✳QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,350 SQ. FT.
BRIDGE DECK	3,580 SQ. FT.
TOTAL	4,930 SQ. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH

Docusigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-24
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : K. D. LAYNE DATE : 12/04/15
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_BM_01.dgn
jdhawk

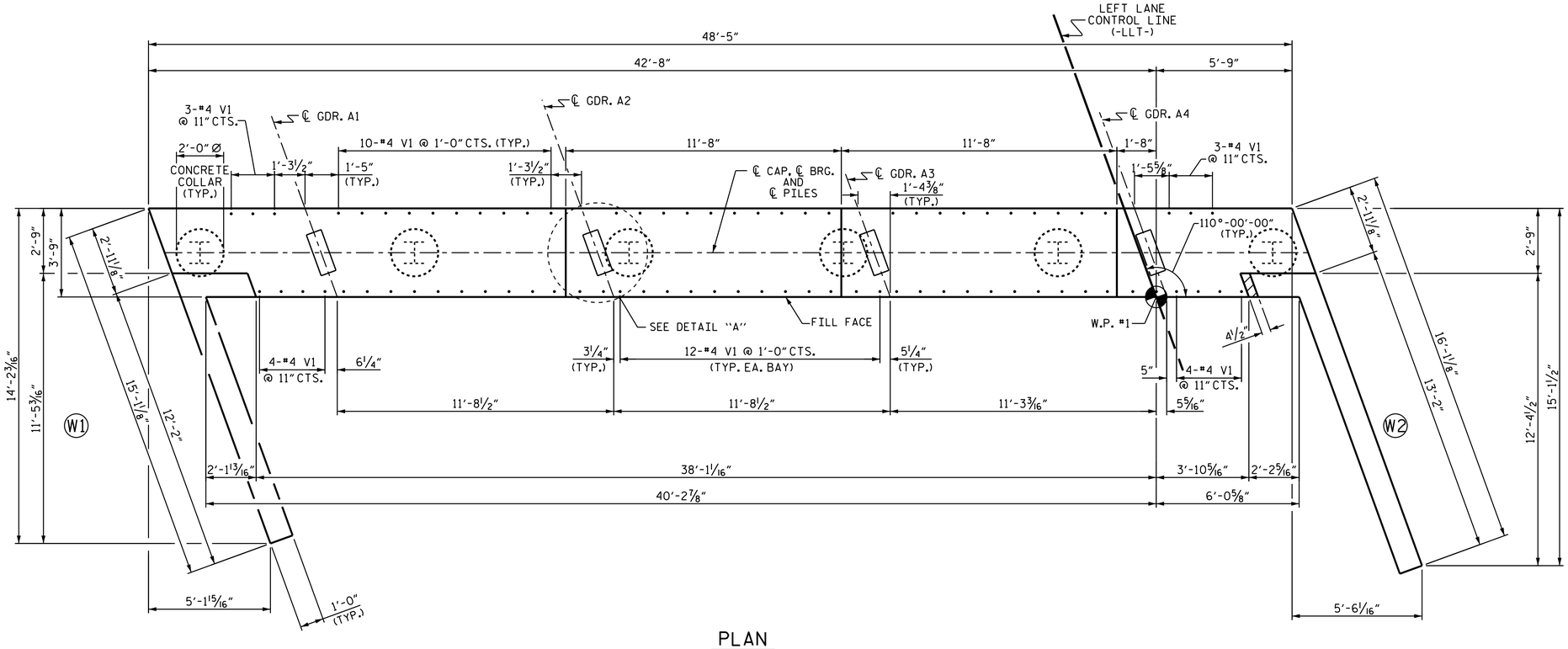
STR. #1

NOTES

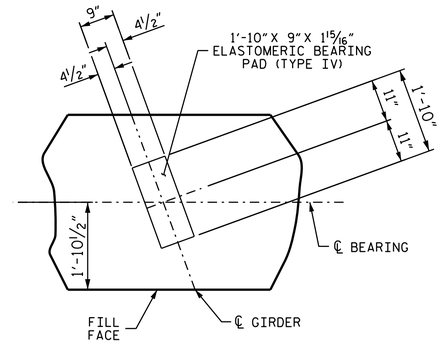
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

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

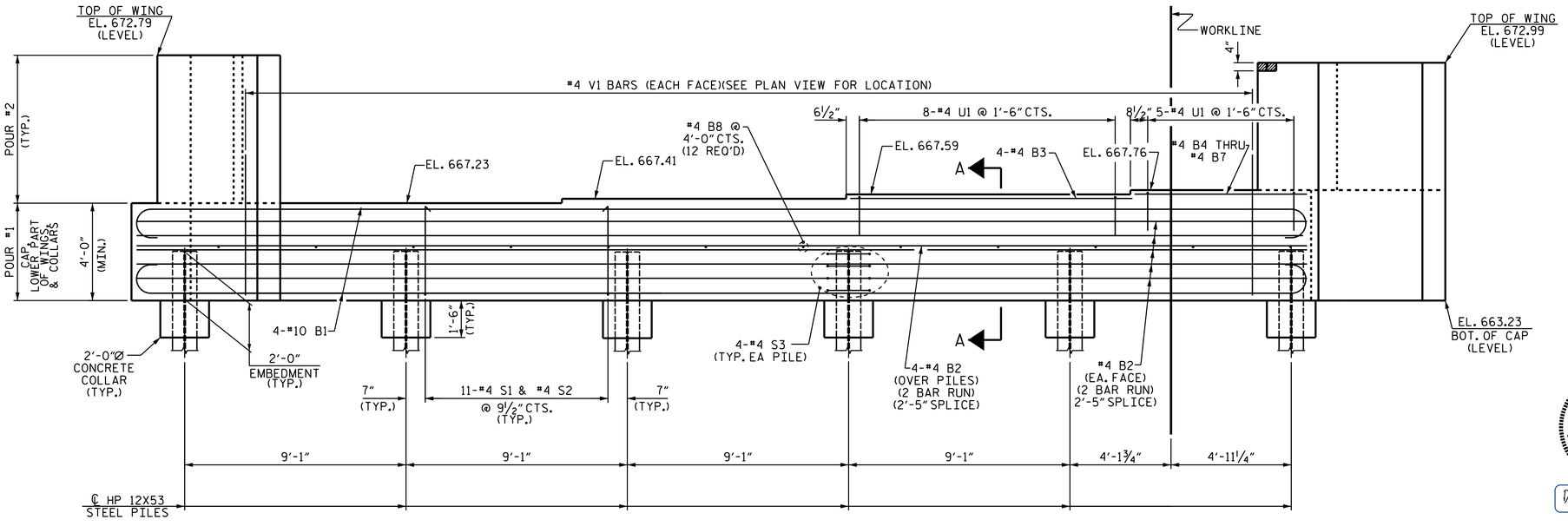
INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



PLAN



DETAIL "A"
(TYP. EACH GIRDER)



ELEVATION

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

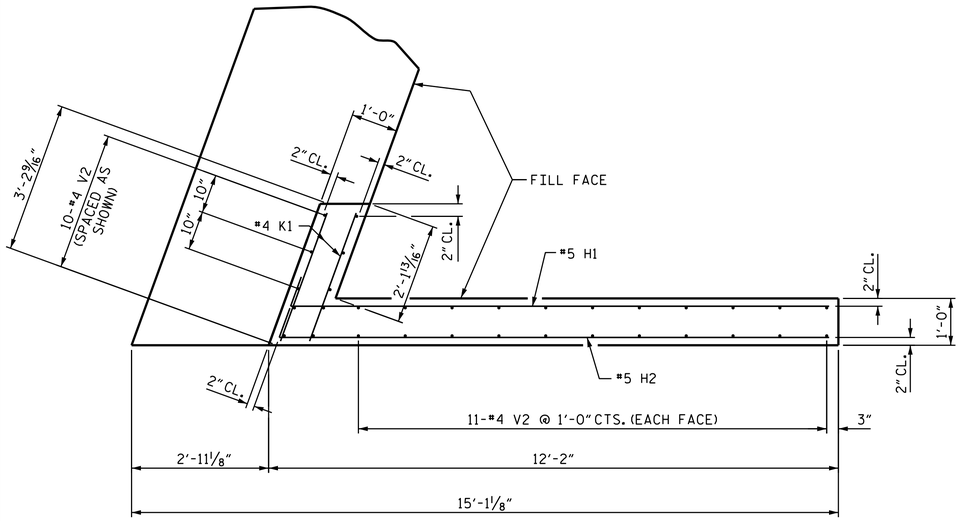
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-25
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

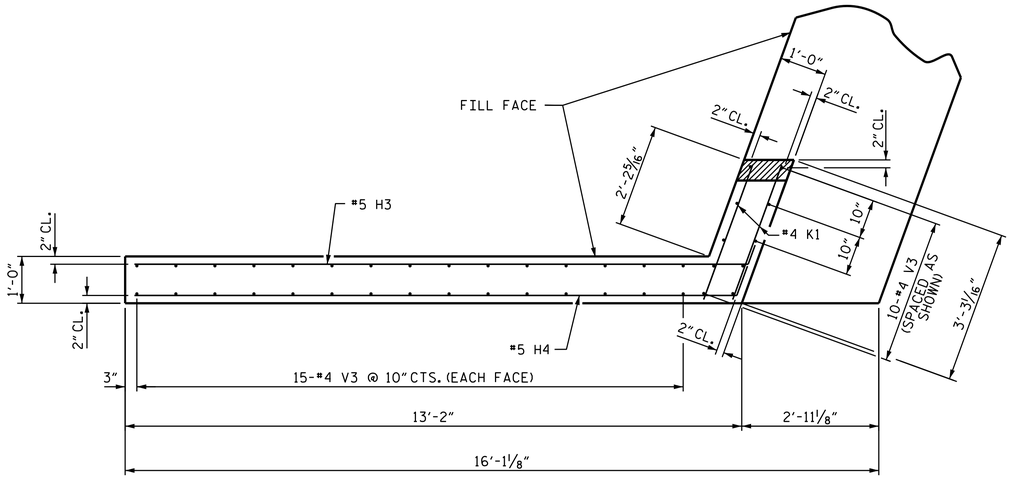
DRAWN BY :	J.D. HAWK	DATE :	4/2016
CHECKED BY :	K.D. LAYNE	DATE :	4/2016
DESIGN ENGINEER OF RECORD:	T.R. PETERSON	DATE :	6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

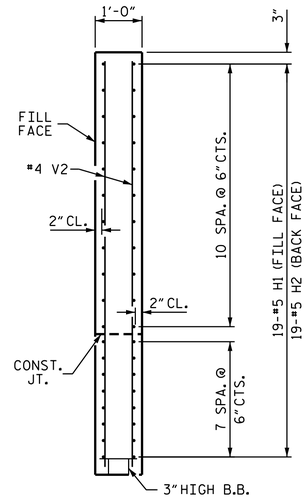
STR. #1



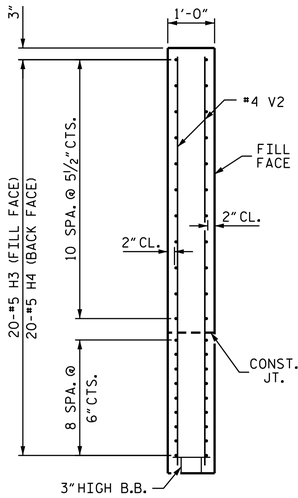
PLAN OF WING W1



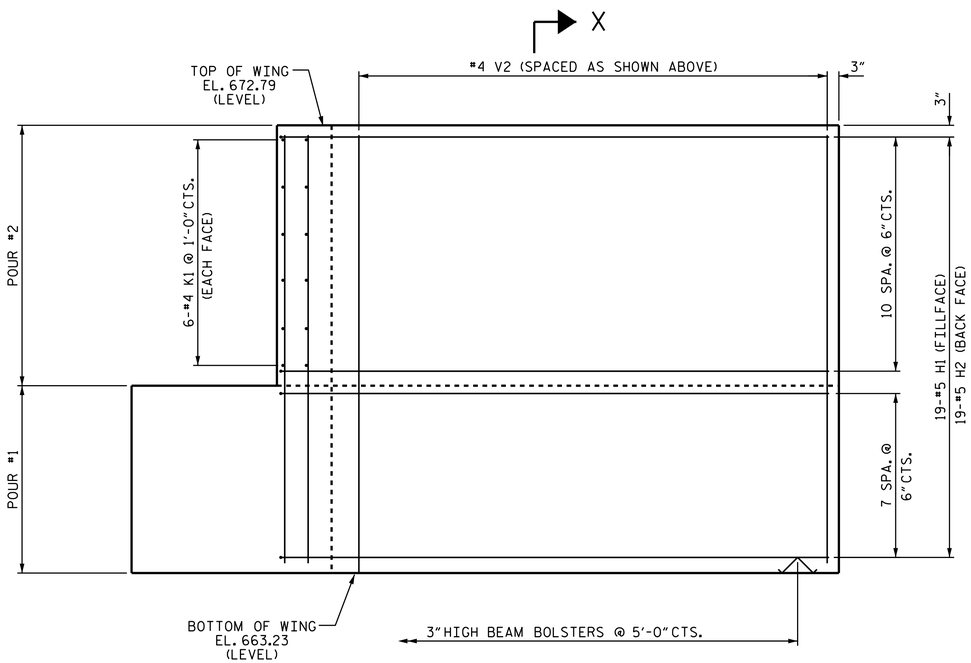
PLAN OF WING W2



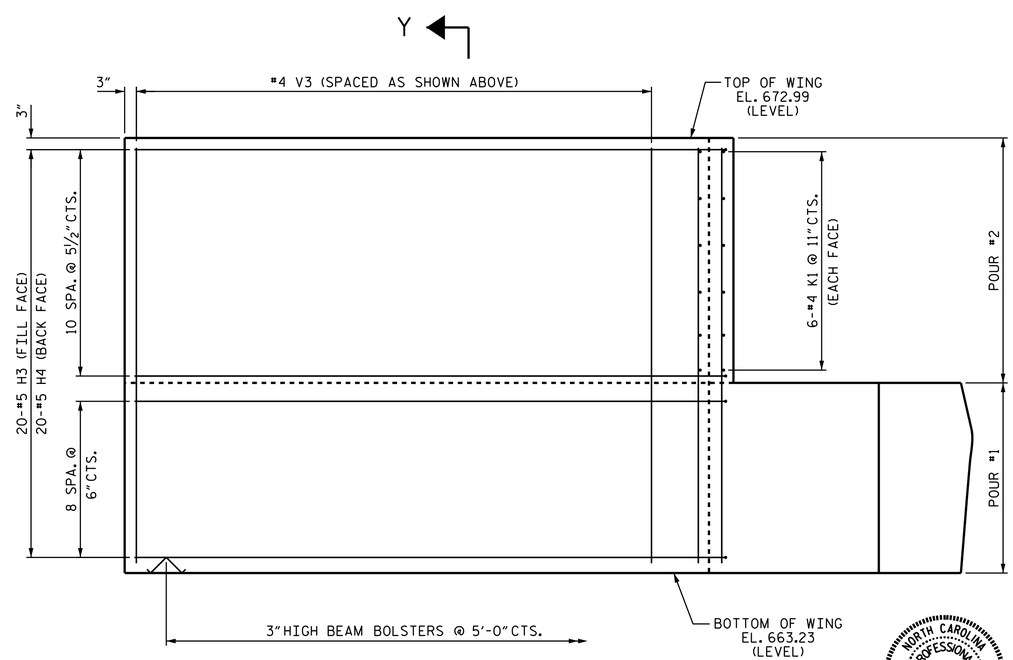
SECTION X-X



SECTION Y-Y



ELEVATION OF WING W1



ELEVATION OF WING W2

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

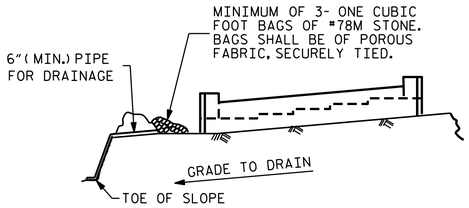
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

STR. #1

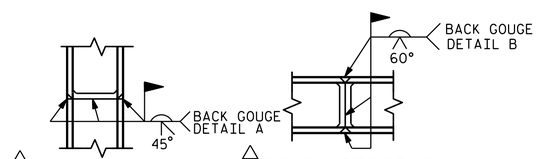


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

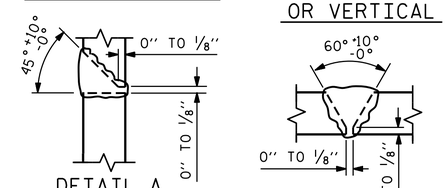
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



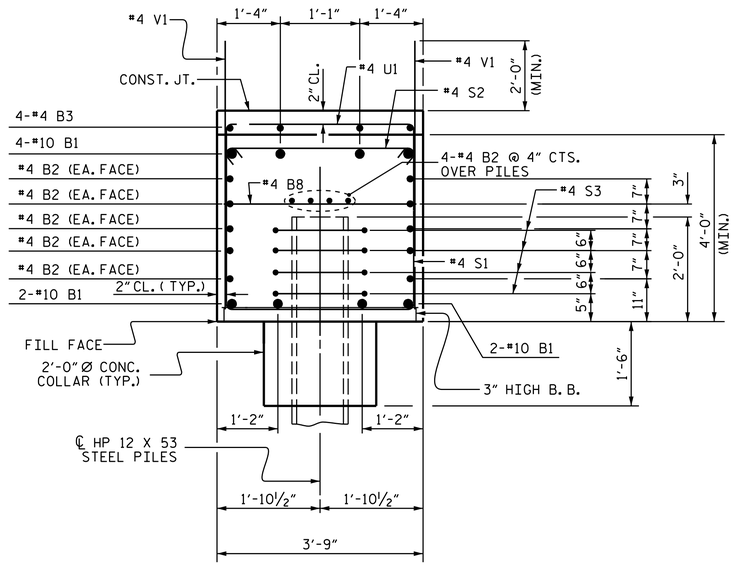
△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



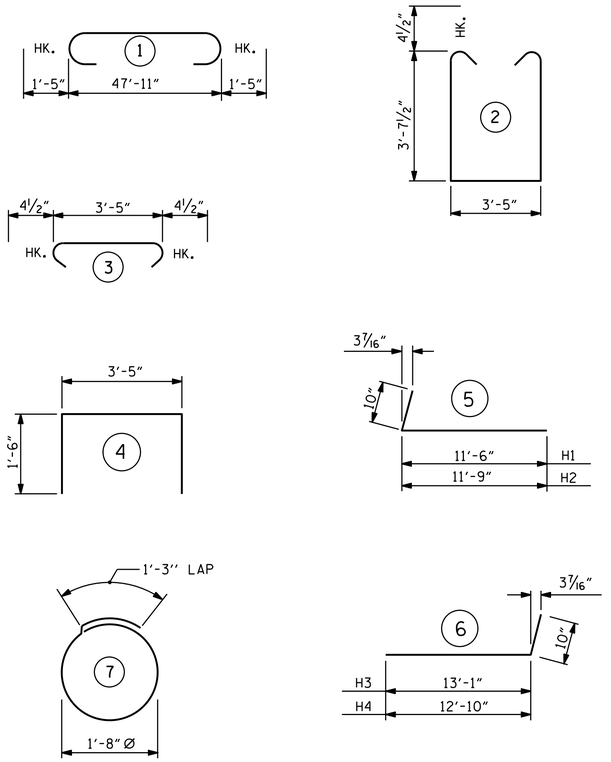
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	50'-9"	1747
B2	28	4	STR	25'-3"	472
B3	4	4	STR	11'-7"	31
B4	1	4	STR	8'-3"	6
B5	1	4	STR	7'-10"	5
B6	1	4	STR	7'-5"	5
B7	1	4	STR	7'-1"	5
B8	12	4	STR	3'-5"	27
H1	19	5	5	12'-4"	244
H2	19	5	5	12'-7"	249
H3	20	5	6	13'-11"	290
H4	20	5	6	13'-8"	285
K1	24	4	STR	2'-10"	45
S1	55	4	2	11'-5"	419
S2	55	4	3	4'-2"	153
S3	24	4	7	6'-6"	104
U1	13	4	4	6'-5"	56
V1	80	4	STR	6'-3"	334
V2	32	4	STR	9'-1"	194
V3	40	4	STR	9'-4"	249

REINFORCING STEEL 4,920 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	33.1 C.Y.
POUR #2	UPPER PART OF WINGS	5.9 C.Y.
TOTAL CLASS A CONCRETE		39.0 C.Y.

HP 12 X 53 STEEL PILES

No. 6 120 LIN. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr EDC87706174B490...

8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(LEFT LANE)

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

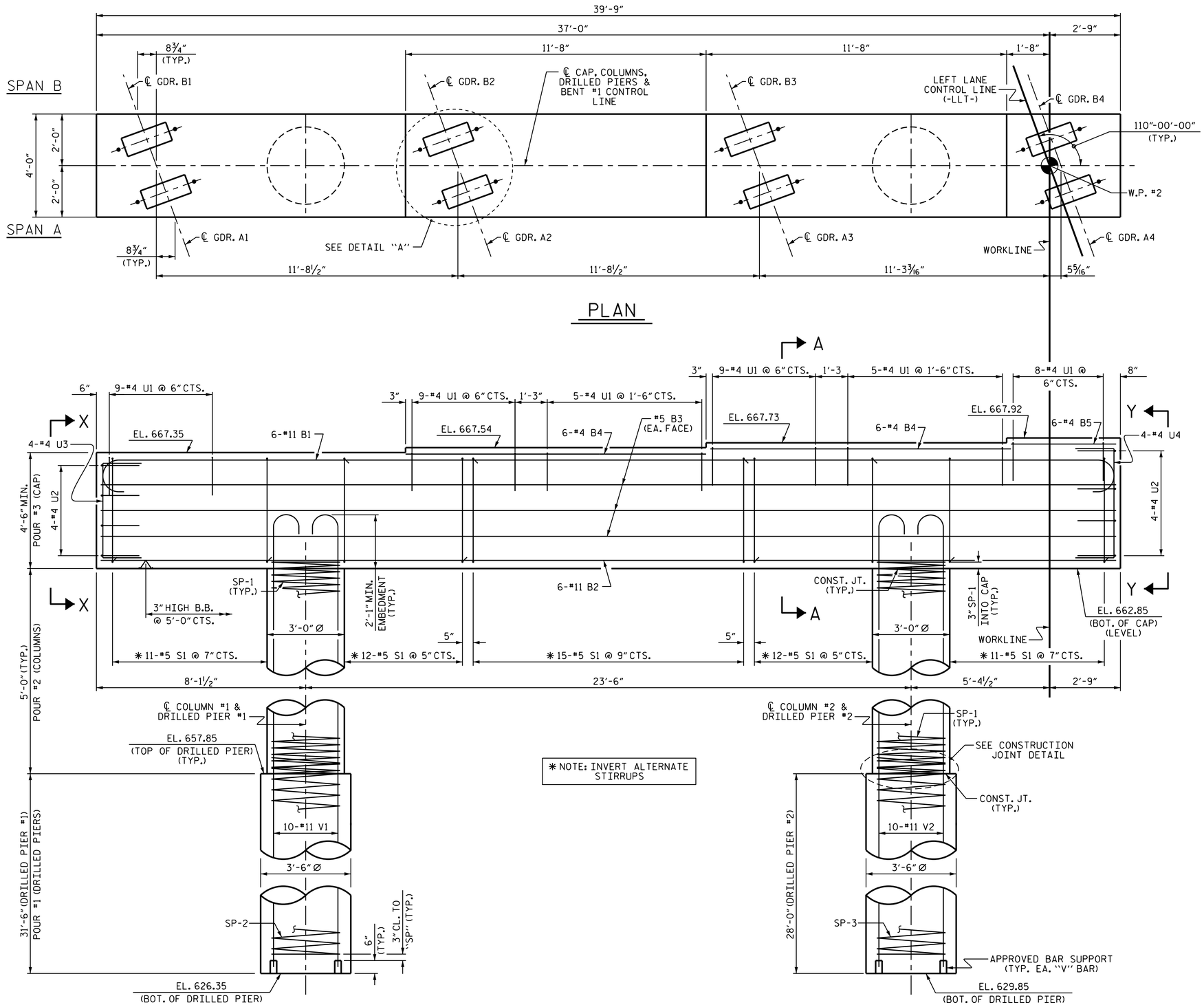
SHEET NO. S1-27

TOTAL SHEETS 37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

STR. #1



PLAN

✱NOTE: INVERT ALTERNATE STIRRUPS

ELEVATION

NOTES

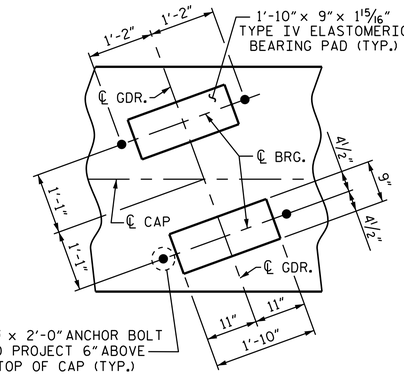
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

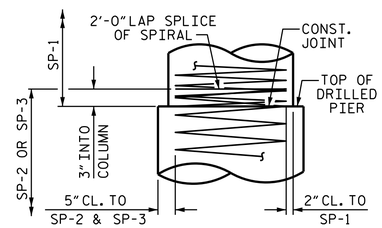
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIER IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



DETAIL "A"

(TYP. EA. BRIDGE SEAT)



CONSTRUCTION JOINT DETAIL

(TYP. EA. DRILLED PIER)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr EDC8770617 4B490... 8/17/2016

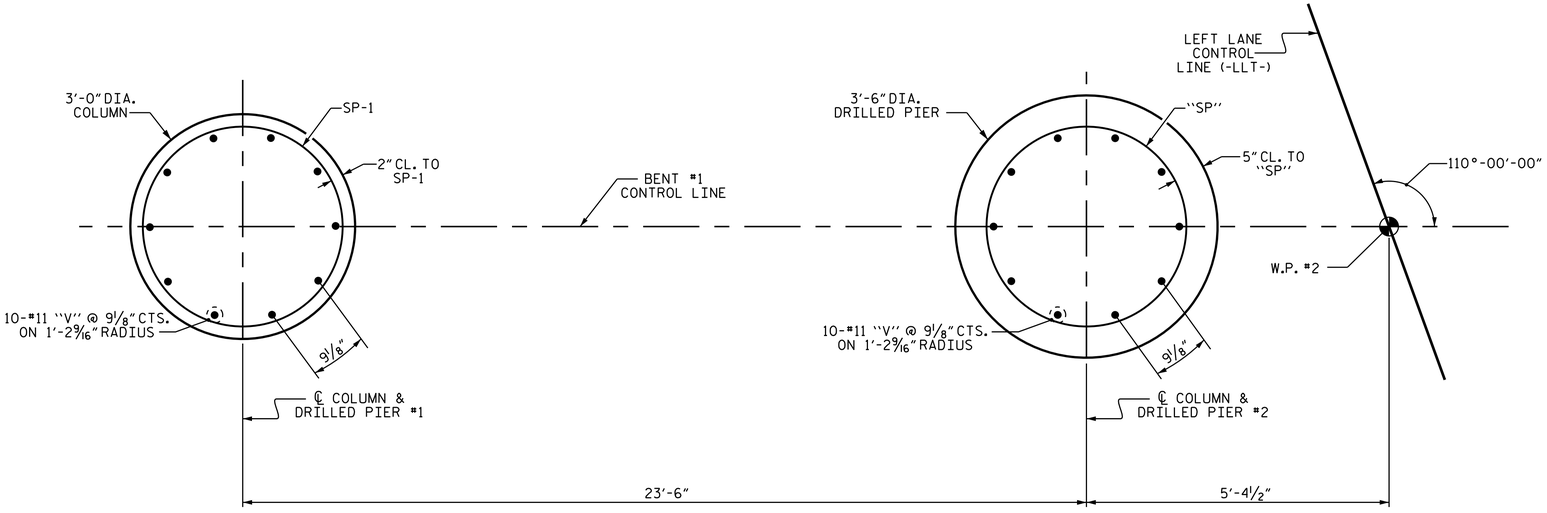
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-28
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. D. LAYNE DATE : 2/04/16
CHECKED BY : R. P. PATEL DATE : 2/09/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_Bts_01.dgn
jdhawk

STR. #1

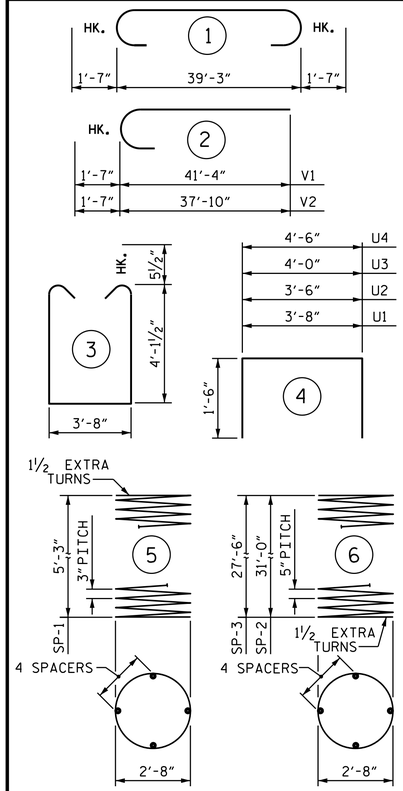


PLAN OF COLUMNS
(TYP.)

PLAN OF DRILLED PIERS
(TYP.)

PLAN OF COLUMNS AND DRILLED PIERS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	42'-5"	1352
B2	6	#11	STR	39'-5"	1257
B3	6	#5	STR	39'-5"	247
B4	12	#4	STR	11'-8"	94
B5	6	#4	STR	4'-1"	16
S1	61	#5	3	12'-10"	816
U1	45	#4	4	6'-8"	200
U2	8	#4	4	6'-6"	35
U3	4	#4	4	7'-0"	19
U4	4	#4	4	7'-6"	20
V1	10	#11	2	42'-11"	2280
V2	10	#11	2	39'-5"	2094
TOTAL REINFORCING STEEL LBS.					8,430
SP-1	2	**	5	185'-8"	248
SP-2	1	***	6	625'-1"	652
SP-3	1	***	6	555'-2"	579
SPIRAL COLUMN REINFORCING STEEL LBS.					1,479

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	2.6 C.Y.
POUR #3 (BENT CAP)	27.9 C.Y.
TOTAL	30.5 C.Y.

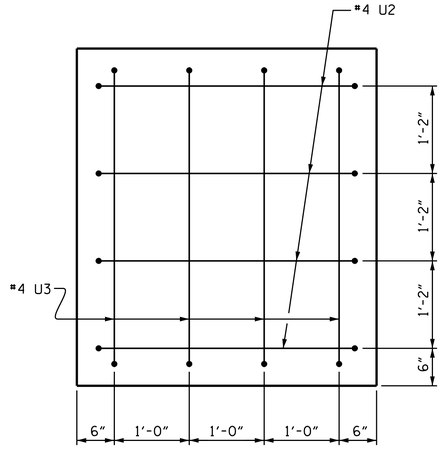
DRILLED PIER QUANTITIES

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	21.2 C.Y.
3'-6" DIA. DRILLED PIERS IN SOIL	9.5 LIN. FT.
3'-6" DIA. DRILLED PIERS NOT IN SOIL	50.0 LIN. FT.

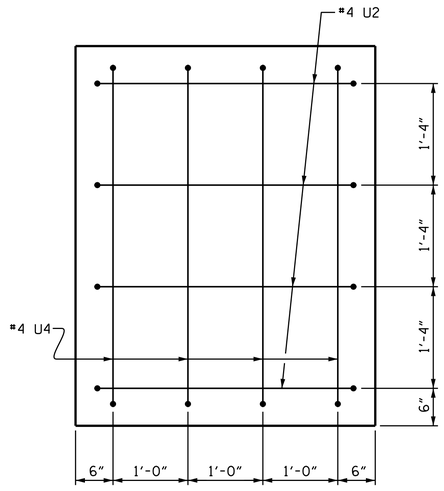
SID INSPECTION	2 EA.
SPT TESTING	4 EA.
CSL TUBES	250.0 LIN. FT.

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

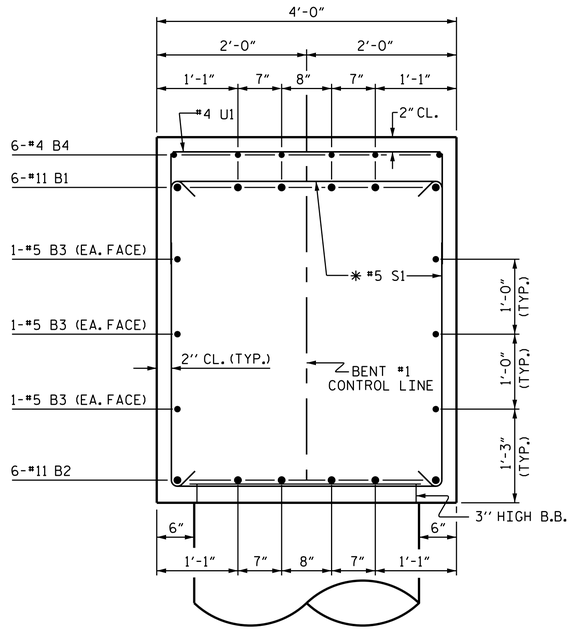
*** THE SP-2 AND SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.



VIEW X-X



VIEW Y-Y



SECTION A-A
* INVERT ALTERNATE STIRRUPS

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

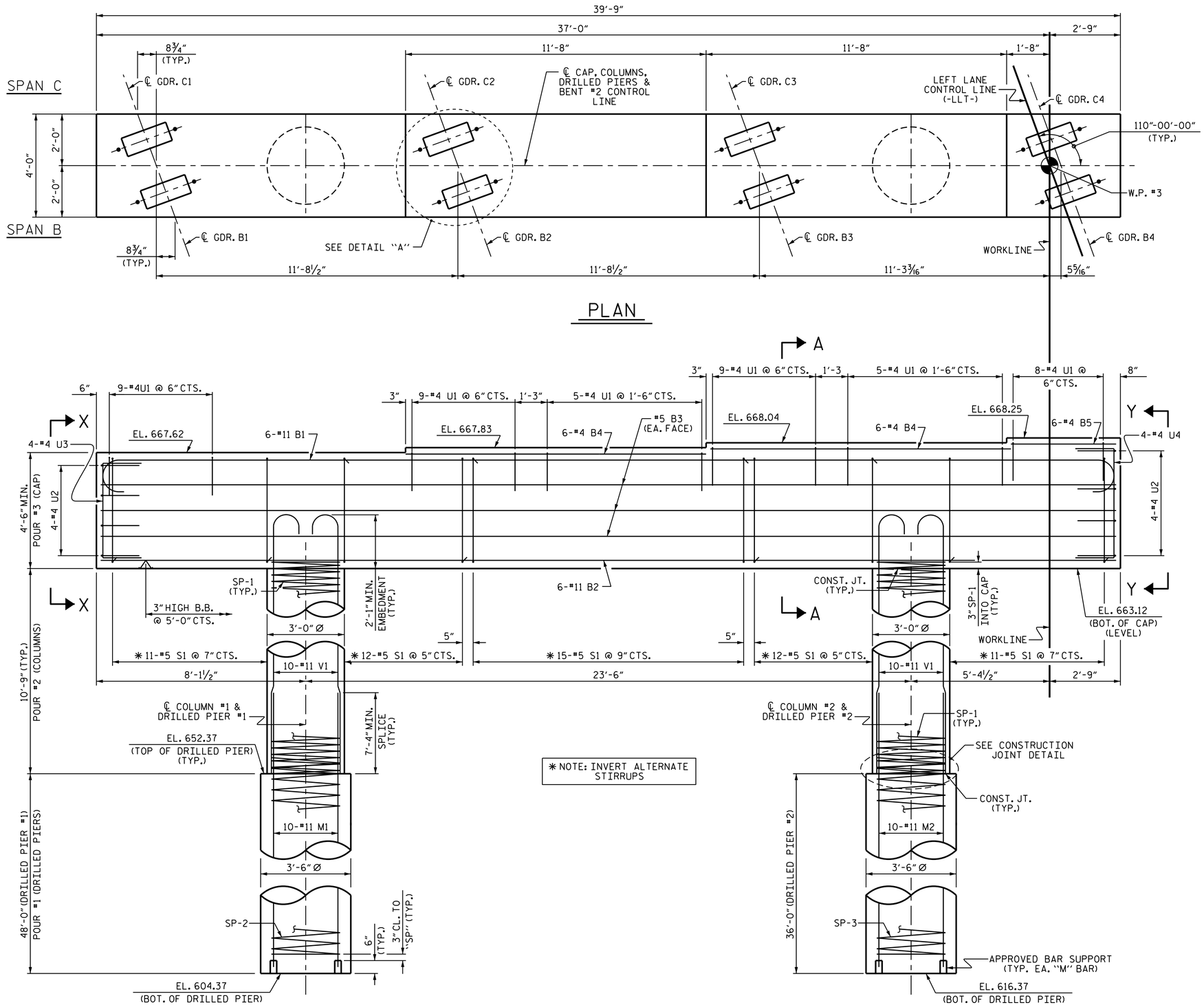
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S1-29
TOTAL SHEETS 37

STR. #1

DRAWN BY : K. D. LAYNE DATE : 2/04/16
CHECKED BY : R. P. PATEL DATE : 2/09/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_Bts_01.dgn
jdhawk



PLAN

✱NOTE: INVERT ALTERNATE STIRRUPS

ELEVATION

NOTES

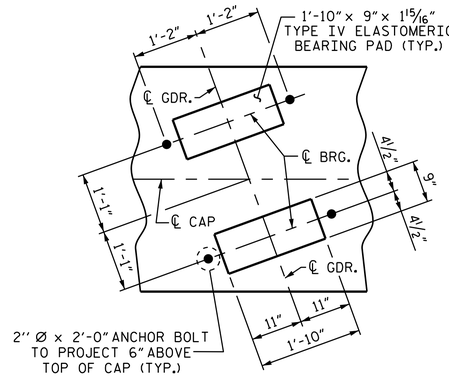
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

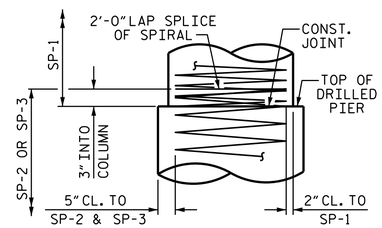
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIER IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



DETAIL "A"

(TYP. EA. BRIDGE SEAT)



CONSTRUCTION JOINT DETAIL

(TYP. EA. DRILLED PIER)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #2

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith Jr EDC8770617 4B490...
8/17/2016

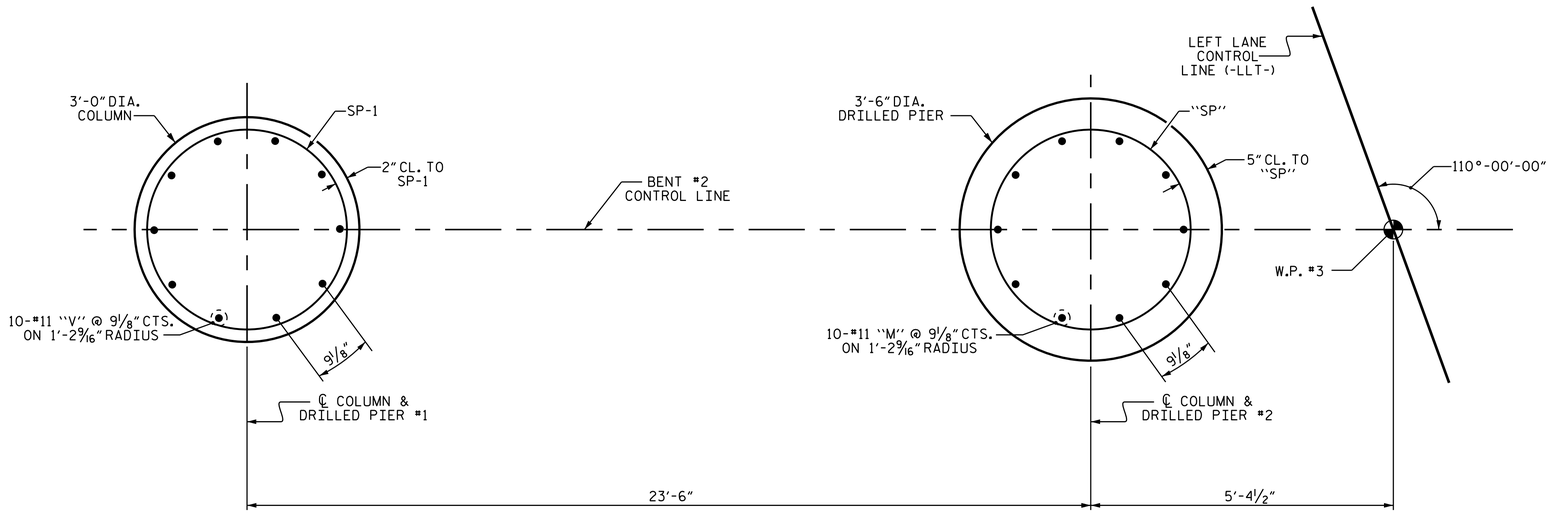
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-30
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. D. LAYNE DATE : 2/04/16
CHECKED BY : R. P. PATEL DATE : 2/09/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_Bts_01.dgn
jdhawk

STR. #1

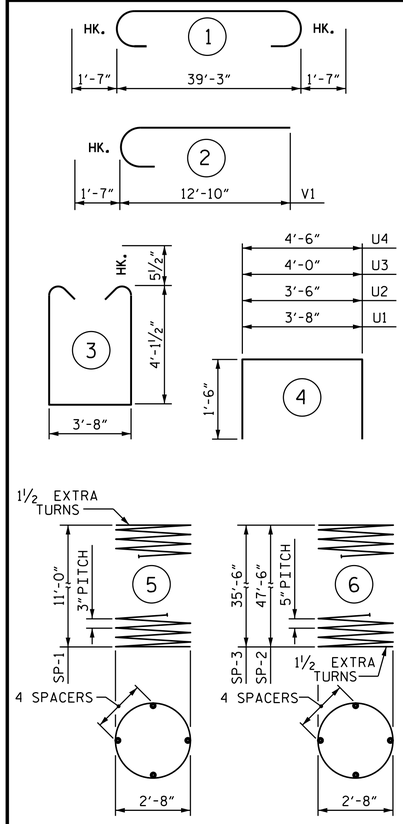


PLAN OF COLUMNS
(TYP.)

PLAN OF DRILLED PIERS
(TYP.)

PLAN OF COLUMNS AND DRILLED PIERS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	42'-5"	1352
B2	6	#11	STR	39'-5"	1257
B3	6	#5	STR	39'-5"	247
B4	12	#4	STR	11'-8"	94
B5	6	#4	STR	4'-1"	16
M1	10	#11	STR.	58'-1"	3086
M2	10	#11	STR.	46'-1"	2448
S1	61	#5	3	12'-10"	816
U1	45	#4	4	6'-8"	200
U2	8	#4	4	6'-6"	35
U3	4	#4	4	7'-0"	19
U4	4	#4	4	7'-6"	20
V1	20	#11	2	14'-5"	1532
TOTAL REINFORCING STEEL LBS.					11,122
SP-1	2	**	5	375'-5"	502
SP-2	1	***	6	950'-0"	991
SP-3	1	***	6	713'-6"	744
SPIRAL COLUMN REINFORCING STEEL LBS.					2,237

CLASS A CONCRETE BREAKDOWN

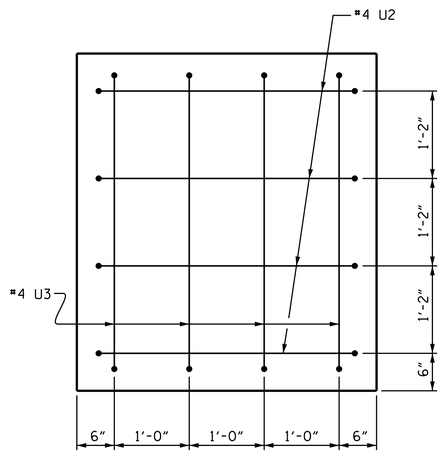
POUR #2 (COLUMNS)	5.6 C.Y.
POUR #3 (BENT CAP)	28.0 C.Y.
TOTAL	33.6 C.Y.

DRILLED PIER QUANTITIES

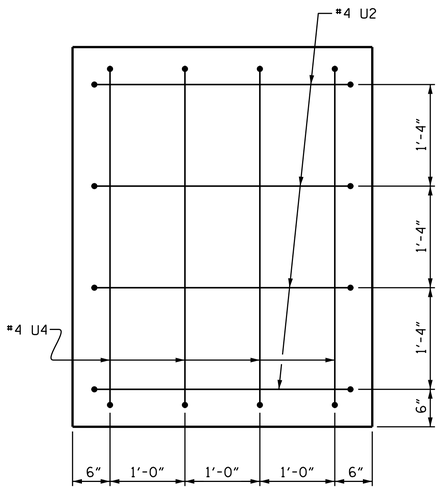
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	29.9 C.Y.
3'-6" DIA. DRILLED PIERS IN SOIL	58.0 LIN. FT.
3'-6" DIA. DRILLED PIERS NOT IN SOIL	26.0 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" DRILLED PIER	39.1 LIN. FT.
SID INSPECTION	2 EA.
SPT TESTING	4 EA.
CSL TUBES	348.0 LIN. FT.

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

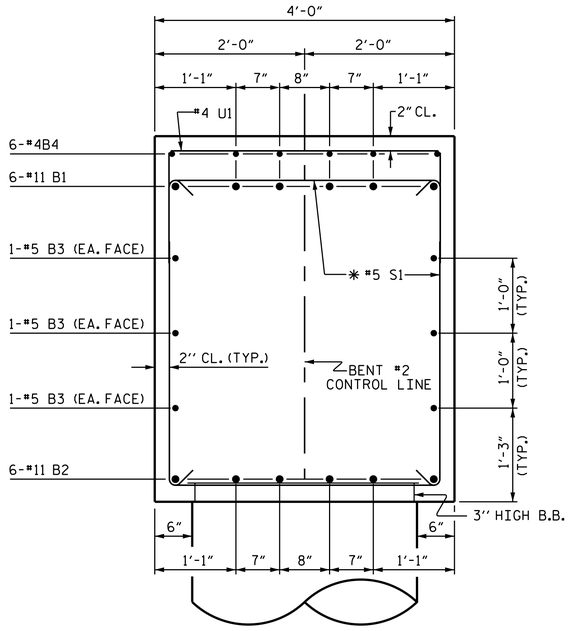
*** THE SP-2 AND SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.



VIEW X-X



VIEW Y-Y



SECTION A-A
* INVERT ALTERNATE STIRRUPS

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #2

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DRAWN BY : K. D. LAYNE DATE : 2/04/16
CHECKED BY : R. P. PATEL DATE : 2/09/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_Bts_01.dgn
jdhawk

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-31
TOTAL SHEETS 37

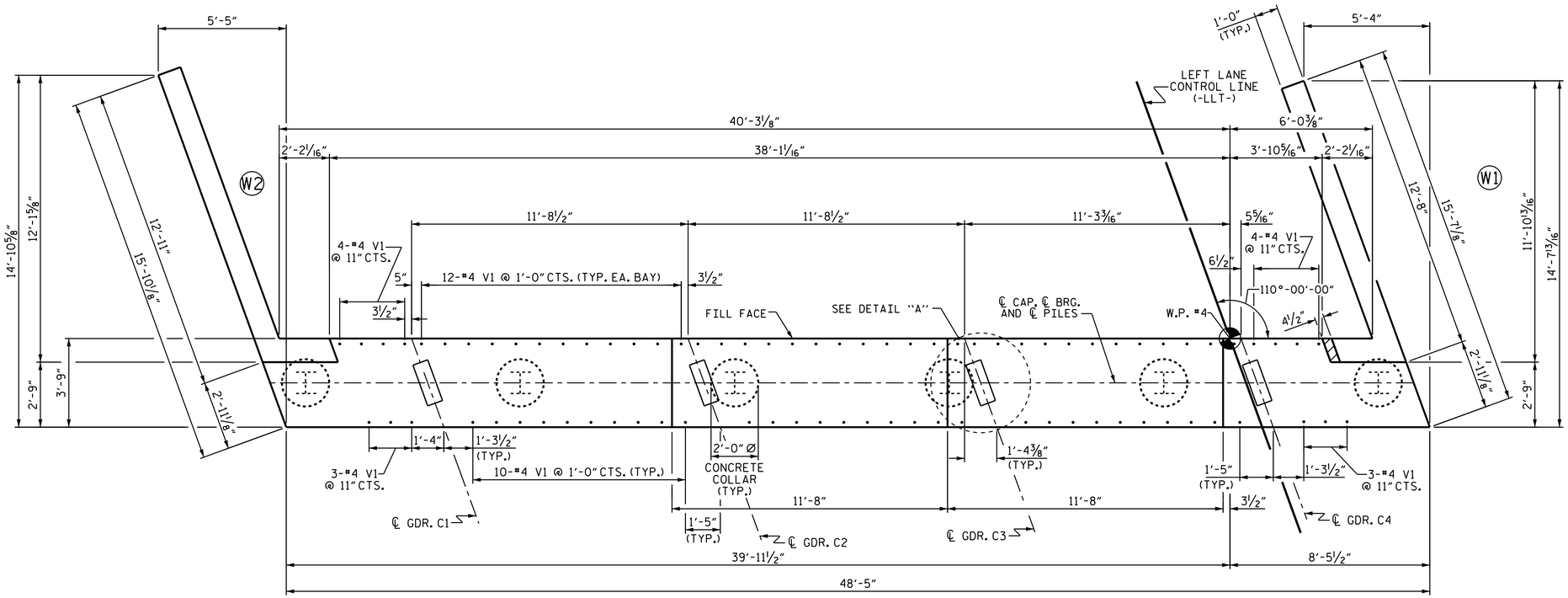
STR. #1

NOTES

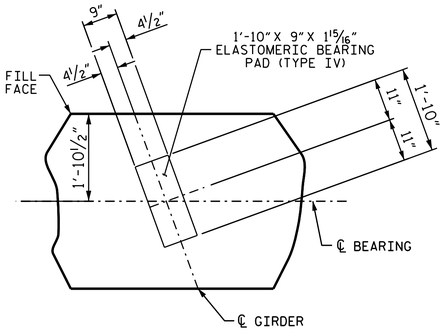
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

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

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

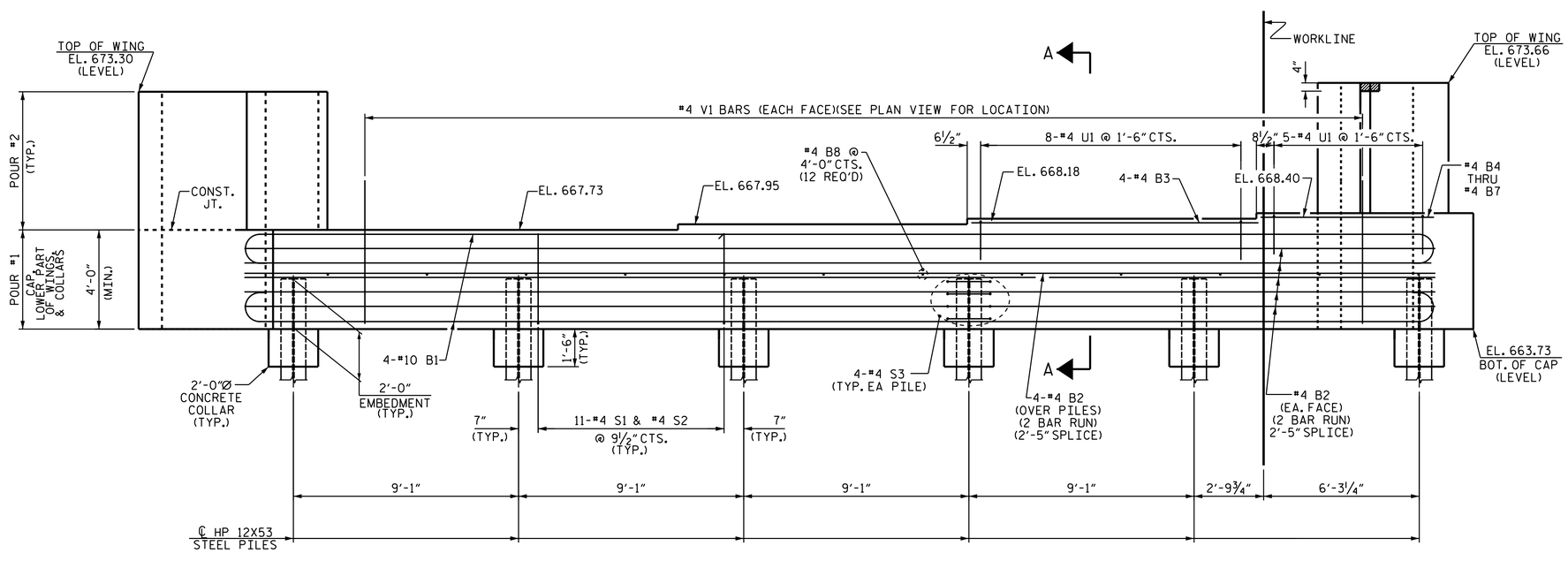


PLAN



DETAIL "A"

(TYP. EACH GIRDER)



ELEVATION

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B395...
8/17/2016

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

SHEET NO. S1-32

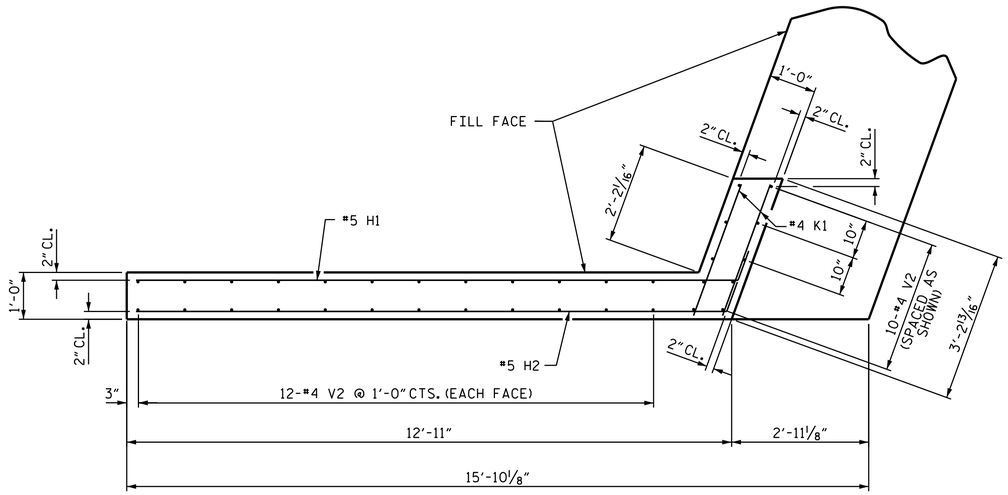
TOTAL SHEETS 37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/20/16

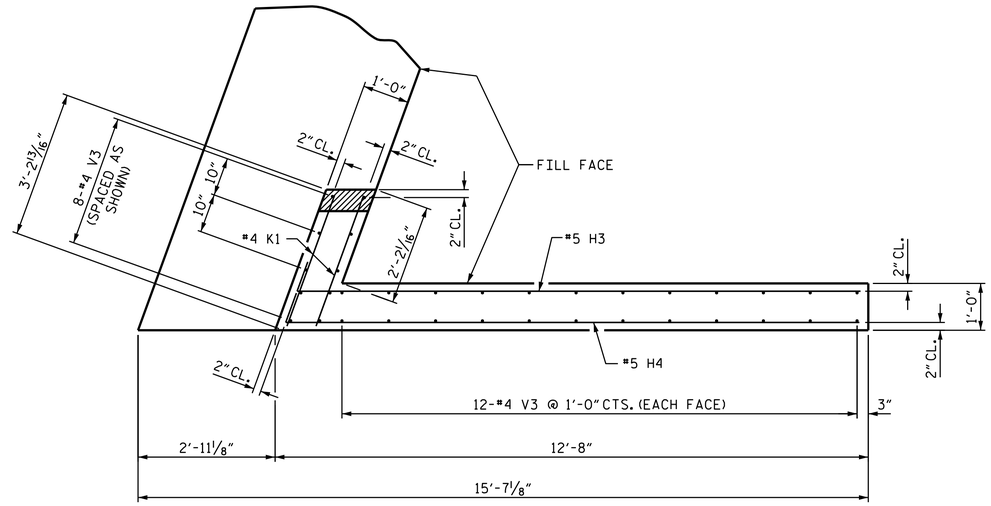
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

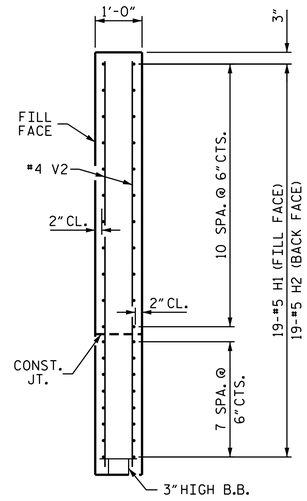
STR. #1



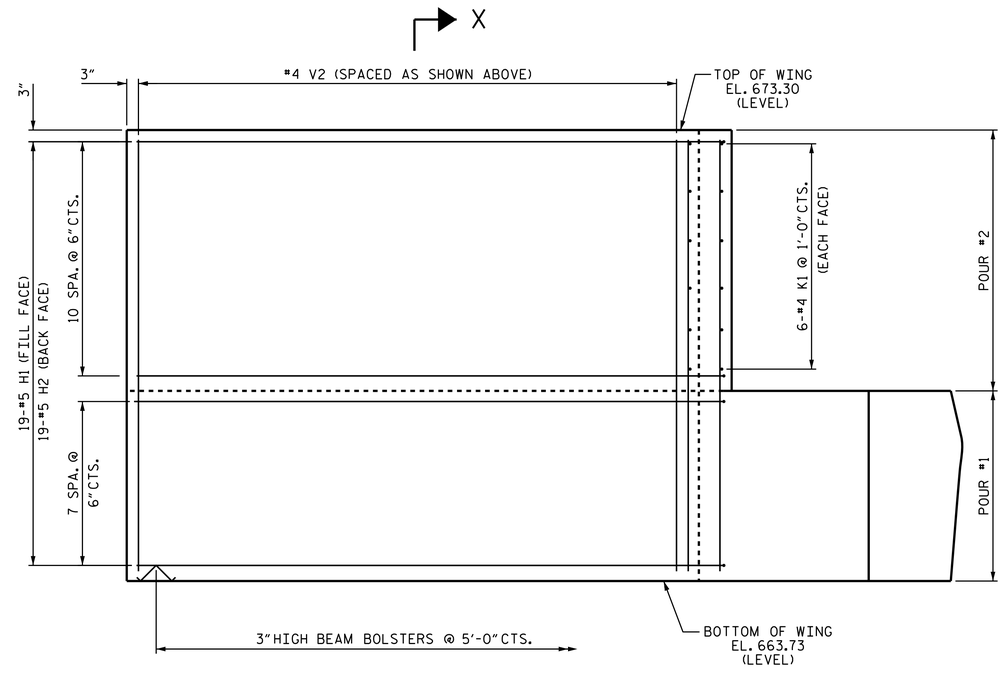
PLAN OF WING W2



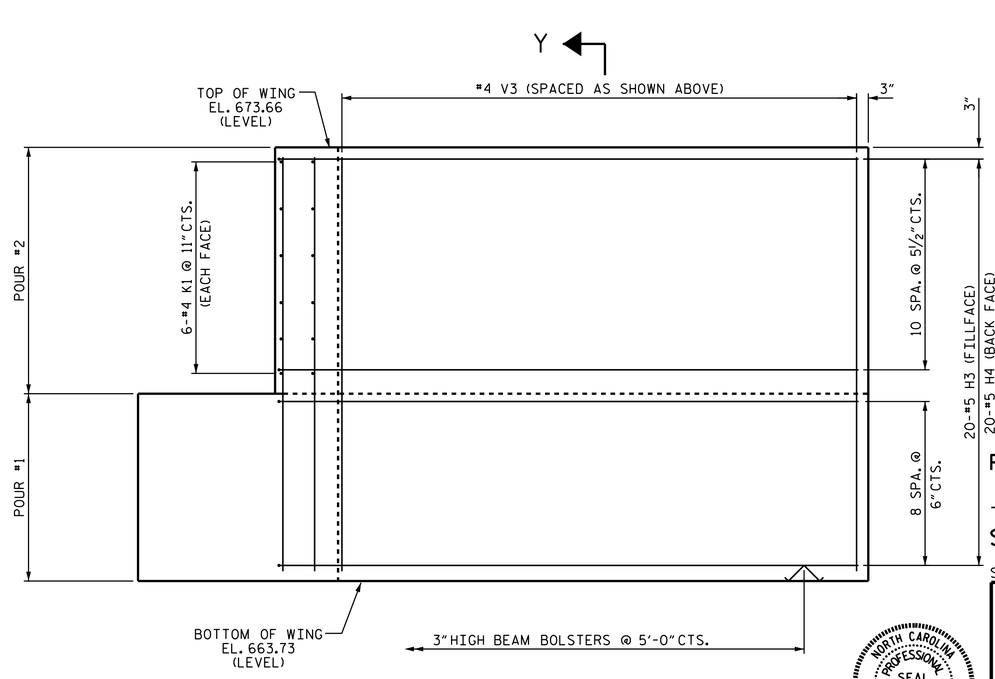
PLAN OF WING W1



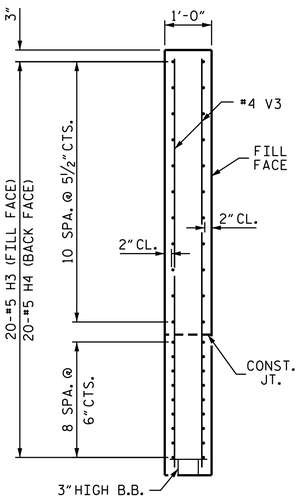
SECTION X-X



ELEVATION OF WING W2



ELEVATION OF WING W1



SECTION Y-Y

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DRAWN BY :	J.D. HAWK	DATE :	4/2016
CHECKED BY :	K.D. LAYNE	DATE :	4/2016
DESIGN ENGINEER OF RECORD:	T.R. PETERSON	DATE :	6/2016

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

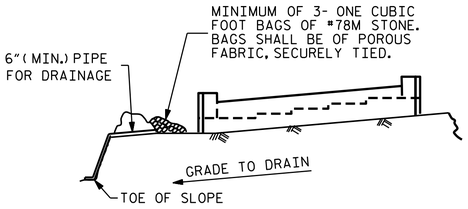
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-33

TOTAL SHEETS 37

STR. #1

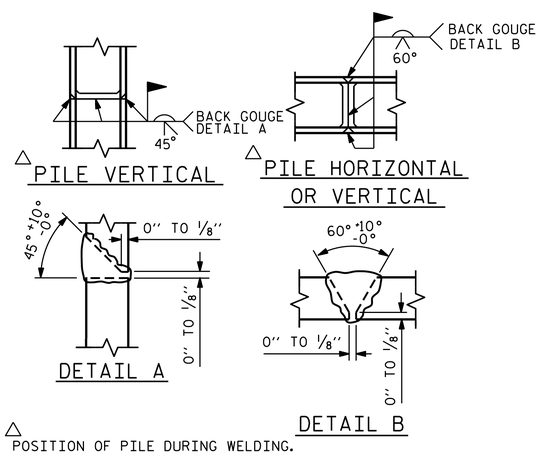


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

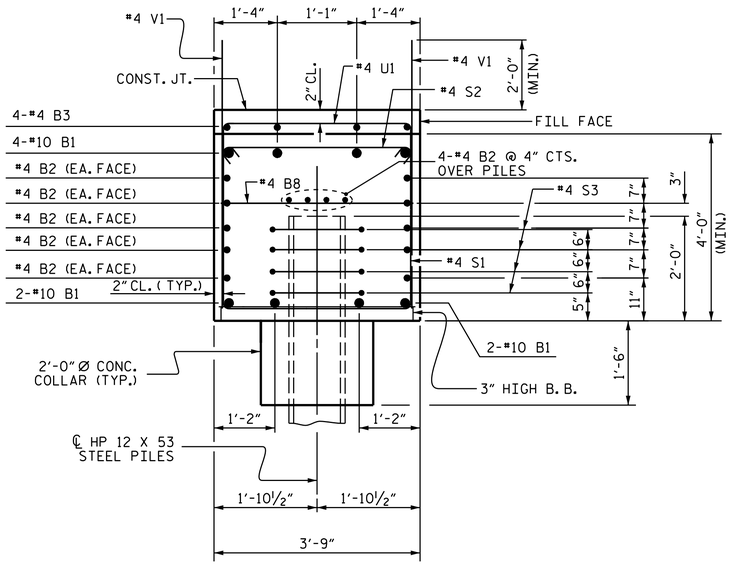
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



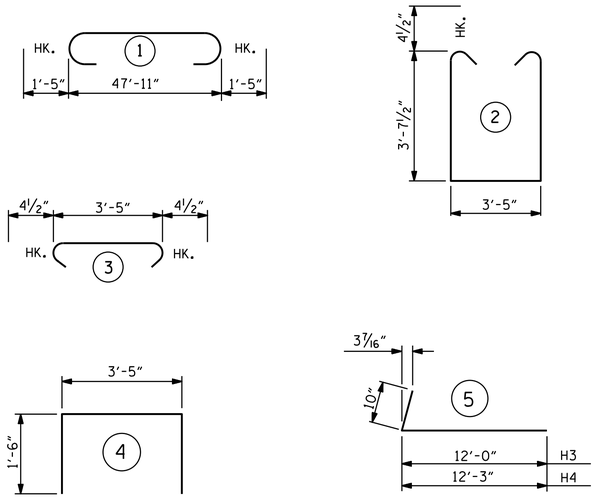
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	50'-9"	1747
B2	28	4	STR	25'-3"	472
B3	4	4	STR	11'-7"	31
B4	1	4	STR	8'-3"	6
B5	1	4	STR	7'-10"	5
B6	1	4	STR	7'-5"	5
B7	1	4	STR	7'-0"	5
B8	12	4	STR	3'-5"	27
H1	19	5	6	13'-8"	271
H2	19	5	6	13'-5"	266
H3	20	5	5	12'-10"	268
H4	20	5	5	13'-1"	273
K1	24	4	STR	2'-10"	45
S1	55	4	2	11'-5"	419
S2	55	4	3	4'-2"	153
S3	24	4	7	6'-6"	104
U1	13	4	4	6'-5"	56
V1	80	4	STR	6'-6"	347
V2	34	4	STR	9'-1"	206
V3	34	4	STR	9'-6"	216

REINFORCING STEEL 4,922 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	33.6 C.Y.
POUR #2	UPPER PART OF WINGS	6.0 C.Y.
TOTAL CLASS A CONCRETE		39.6 C.Y.

HP 12 X 53 STEEL PILES

No. 6 240 LIN. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr EDC87706174B490...

8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(LEFT LANE)

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

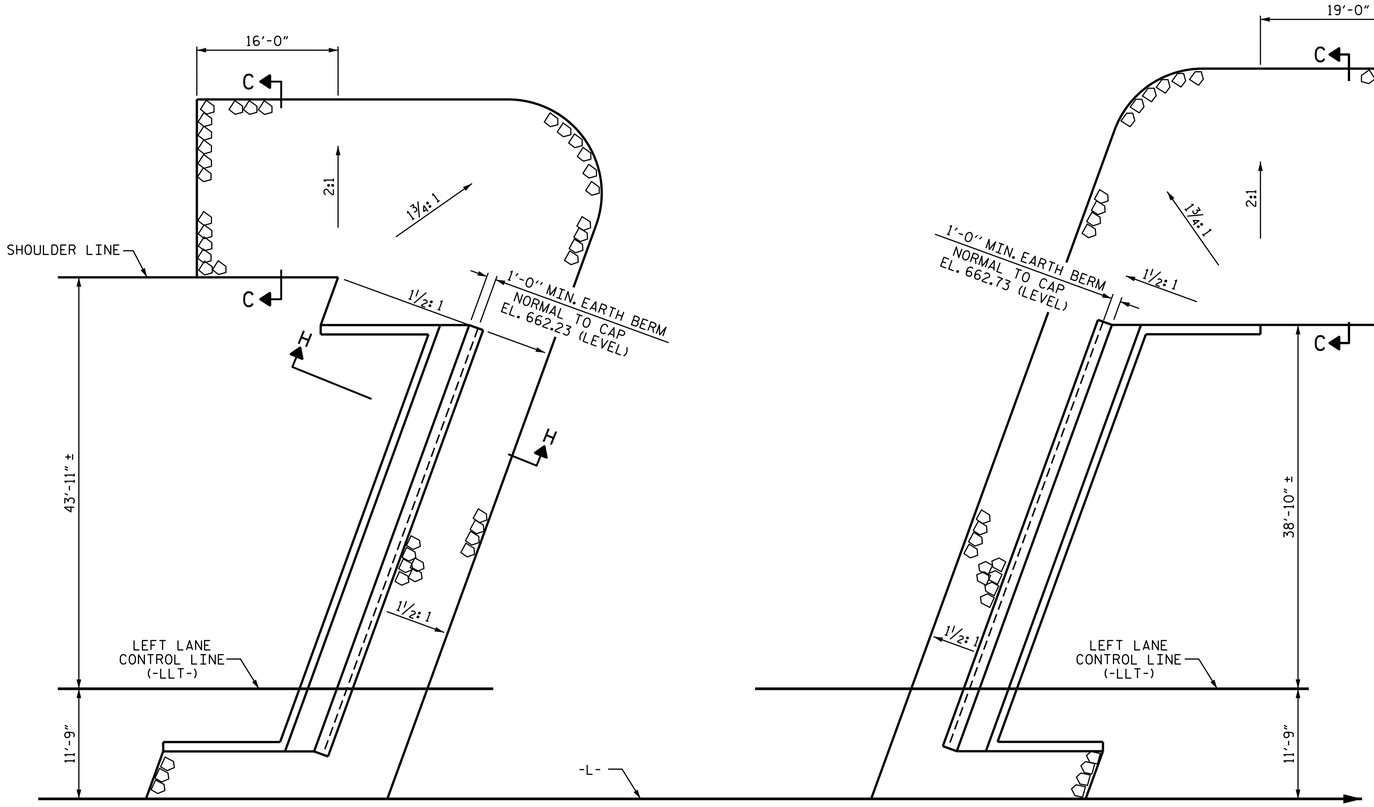
SHEET NO. S1-34

TOTAL SHEETS 37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

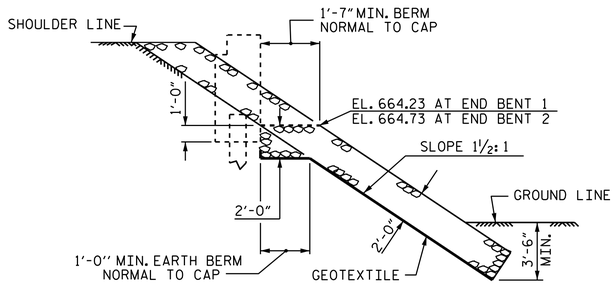
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_E*_01.dgn
jdhawk

STR. #1

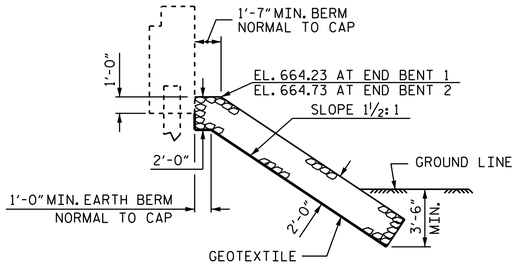


PLAN

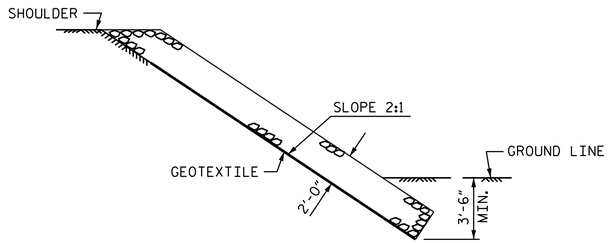
ESTIMATED QUANTITIES		
BRIDGE @ STA. 68+25.60 -L- (LEFT LANE)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	175	195
END BENT 2	170	185



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RIP RAP DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

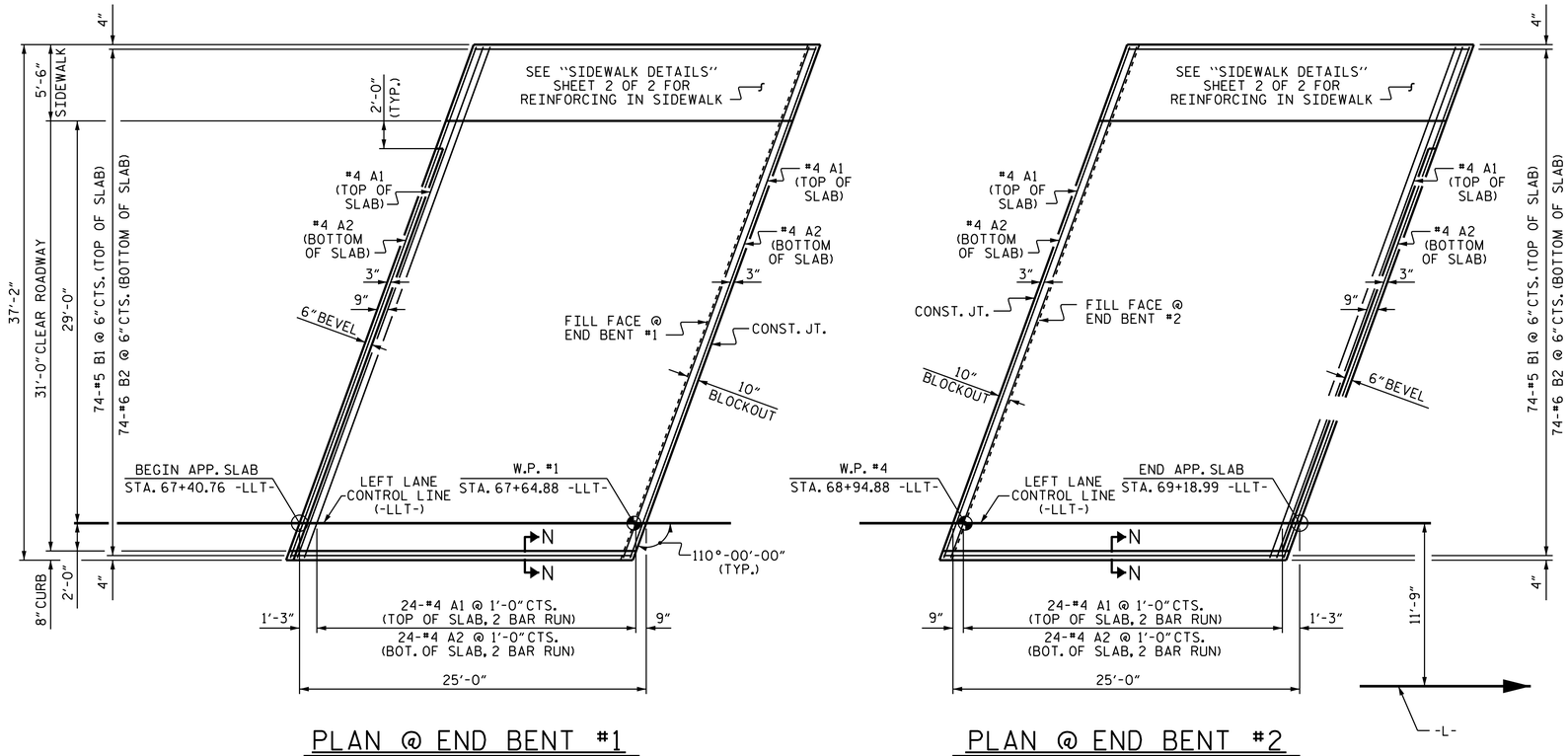
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-35
1			3			TOTAL SHEETS
2			4			37

ASSEMBLED BY : K. D. LAYNE	DATE : 01/06/16
CHECKED BY : R. P. PATEL	DATE : 03/01/16
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_SP_01.dgn
jdhawk

STR. #1

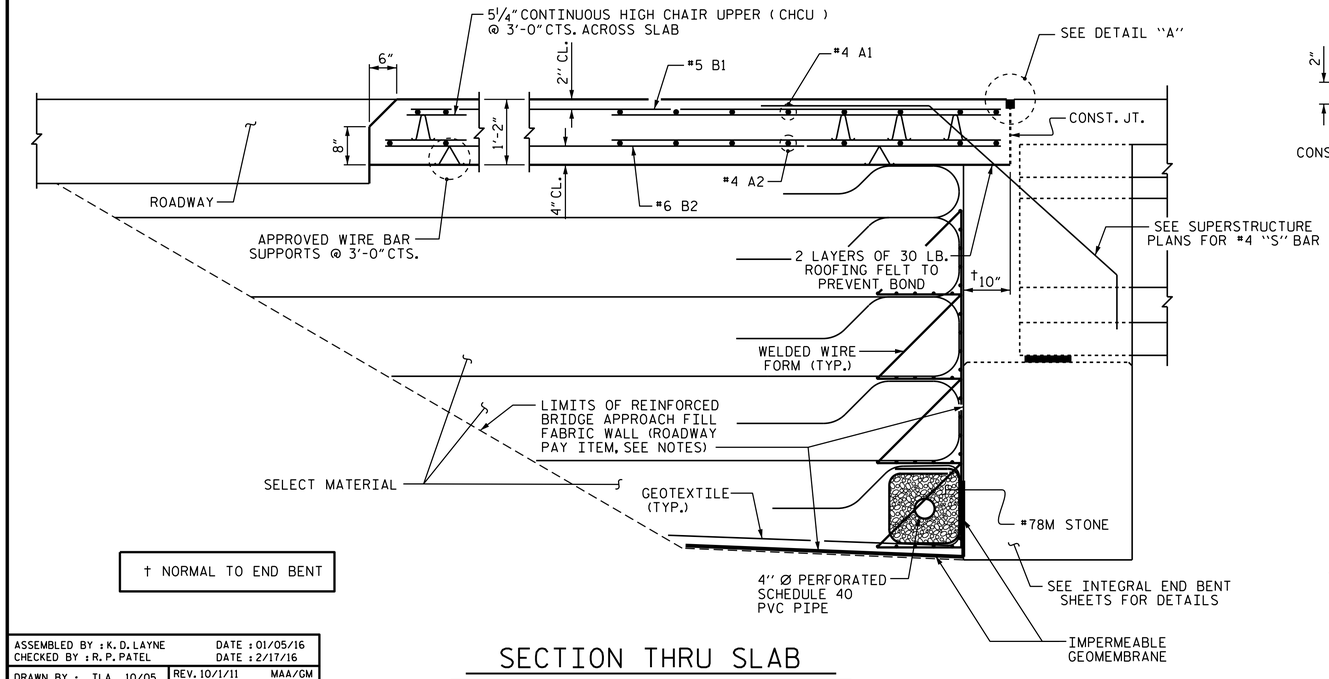
STD. NO. RR1



PLAN @ END BENT #1

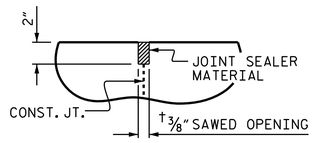
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

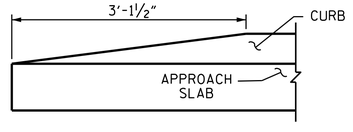


† NORMAL TO END BENT

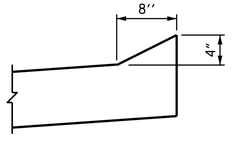
SECTION THRU SLAB



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

NOTES

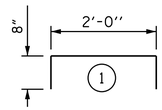
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

BAR TYPE



BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	52	#4	STR	20'-8"	718
A2	52	#4	STR	20'-6"	712
✱ B1	74	#5	STR	24'-1"	1859
B2	74	#6	STR	24'-7"	2732
✱ B3	5	#4	STR	24'-7"	82
✱ G1	25	#4	STR	5'-3"	88
✱ U1	8	#4	1	3'-4"	18
REINFORCING STEEL				LBS.	3,444
✱ EPOXY COATED REINFORCING STEEL				LBS.	2,765
CLASS AA CONCRETE					
APPROACH SLAB & CURB =				C. Y.	40.1
SIDEWALK =				C. Y.	3.1
TOTAL =				C. Y.	43.2

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

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-36

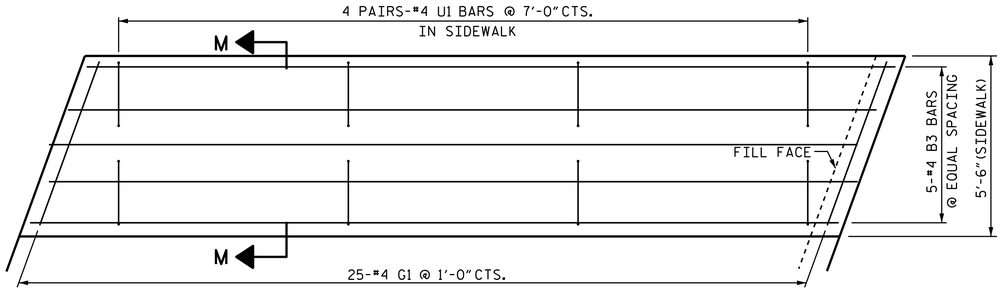
TOTAL SHEETS 37

ASSEMBLED BY : K. D. LAYNE	DATE : 01/05/16
CHECKED BY : R. P. PATEL	DATE : 2/17/16
DRAWN BY : TLA 10/05	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 12/21/11 MAA/GM
	REV. 6/13 MAA/GM

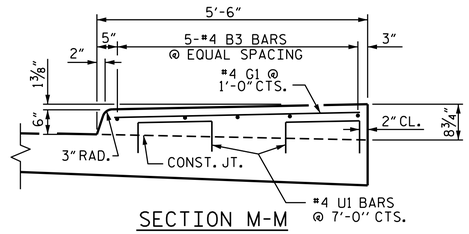
17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_AS_01.dgn
jdhawk

STR. #1

STD. NO. BAS5

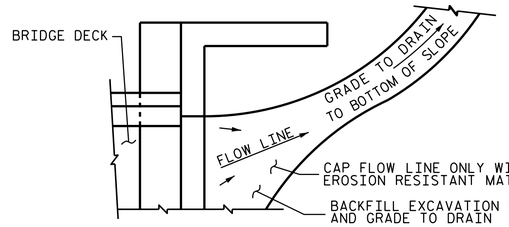


PLAN



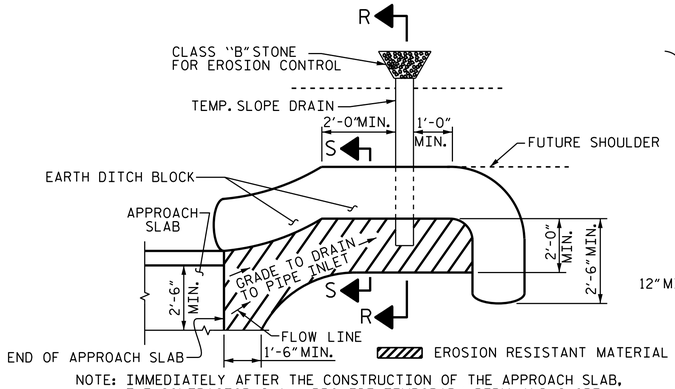
SECTION M-M

SIDEWALK DETAILS



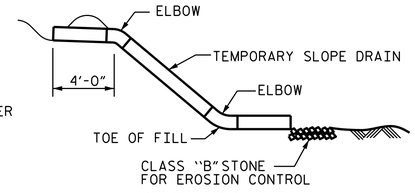
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

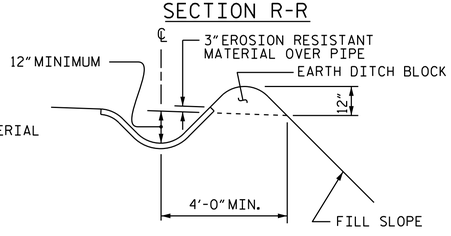


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY : K. D. LAYNE		DATE : 01/05/16
CHECKED BY : R. P. PATEL		DATE : 2/17/16
DRAWN BY : FCJ 11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ARB 11/88	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

17-AUG-2016 09:24
R:\Structures\Plans\Str01\U-3340_SD_AS_01.dgn
jdhawk

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-
SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B395...
8/17/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

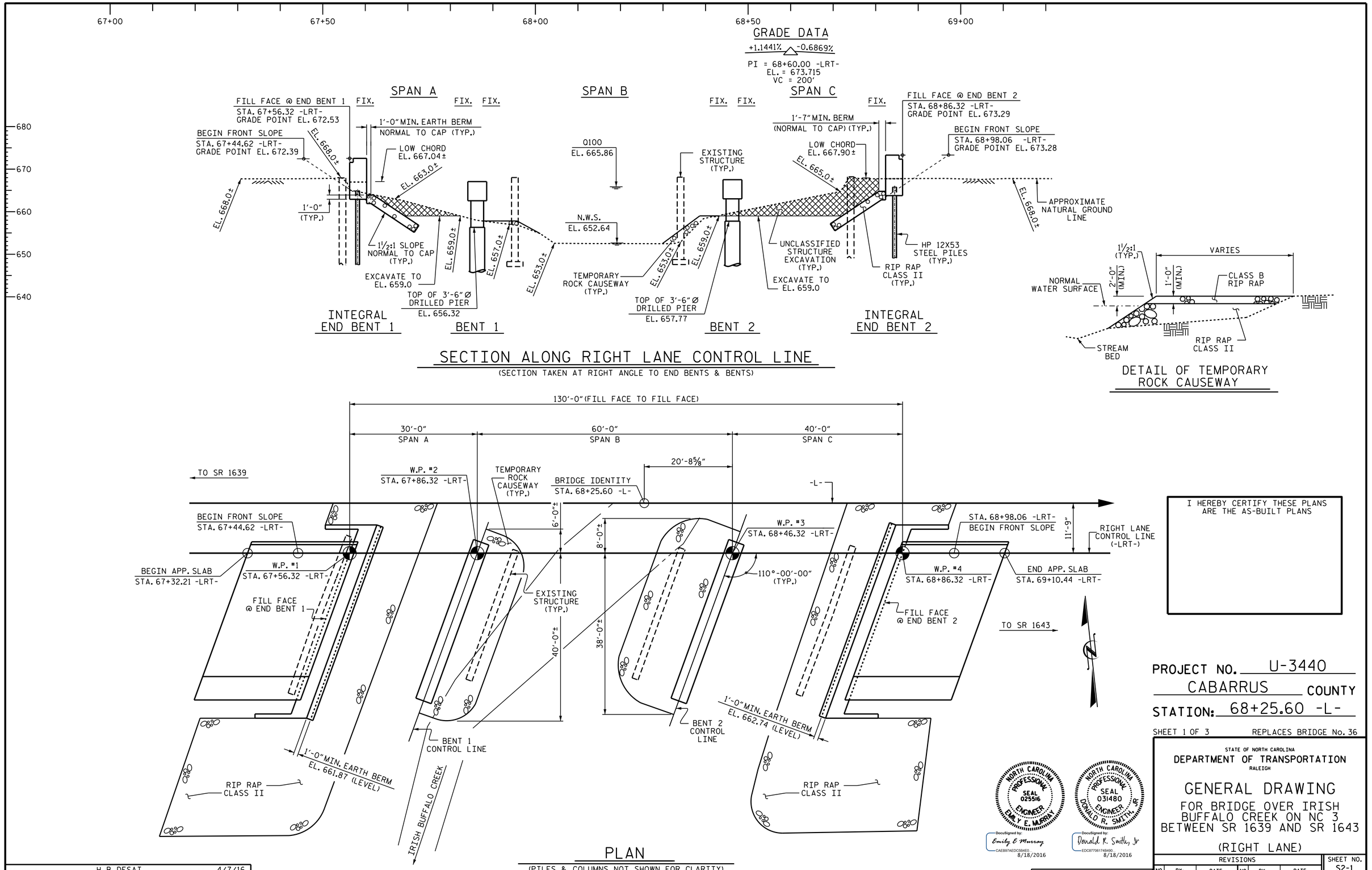
BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

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

SHEET NO. S1-37
TOTAL SHEETS 37

STR. #1 STD. NO. BAS4



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 36

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY

DocuSigned by: Emily E Murray CAEB97AEDC5B4E0...

8/18/2016

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr EDC87706174B490...

8/18/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643

(RIGHT LANE)

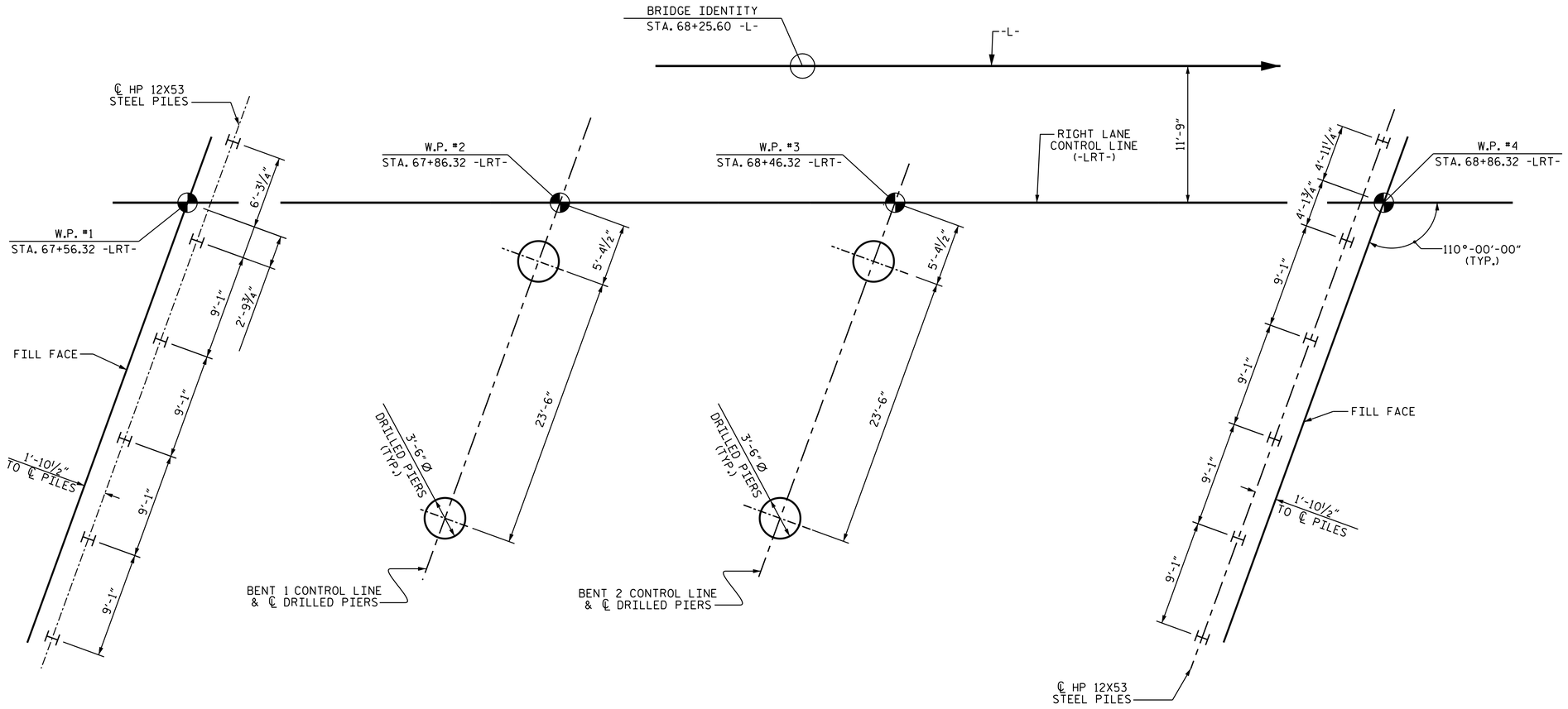
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-1
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : H. B. DESAI DATE : 4/7/16
CHECKED BY : R. P. PATEL DATE : 4/26/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U3440_SD_GD_02.dgn
jpadams

STR. #2



INTEGRAL END BENT 1 | BENT 1 | BENT 2 | INTEGRAL END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES

NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 400.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25.0 TSF.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 630.0 FT. WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 16 FT. INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND CASINGS BELOW ELEVATION 647.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 645 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 415 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 25.0 TSF.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 616.5 FT. (LT) AND 626.5 FT. (RT) AND WITH THE REQUIRED TIP RESISTANCE AND PENETRATION OF AT LEAST 16 FT. (RT) INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 642.0 FT. THE SCOUR CRITICAL ELEVATION ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENTS 1 AND 2. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 158 TONS PER PILE.

SPECIAL NOTES

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 1. TO VERIFY TOP OF THE WEATHERED ROCK AND TIP BEARING CAPACITY PERFORM SPTS AT ELEVATION 645 FT. TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

TO VERIFY BEARING STRATA, STANDARD PENETRATION TESTING (SPT) IS REQUIRED FOR DRILLED PIERS AT BENT 2. TO VERIFY TOP OF THE WEATHERED ROCK AND TIP BEARING CAPACITY PERFORM SPTS AT ELEVATION 632.7 FT. TO VERIFY TOP OF PARTIALLY WEATHERED ROCK AND AGAIN AT THE FINAL TIP ELEVATION INDICATED. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DRAWN BY : H. B. DESAI DATE : 04-05-16
CHECKED BY : R. P. PATEL DATE : 04-26-16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 06-20-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U3440_SD_GD_02.dgn
jpadams

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 3

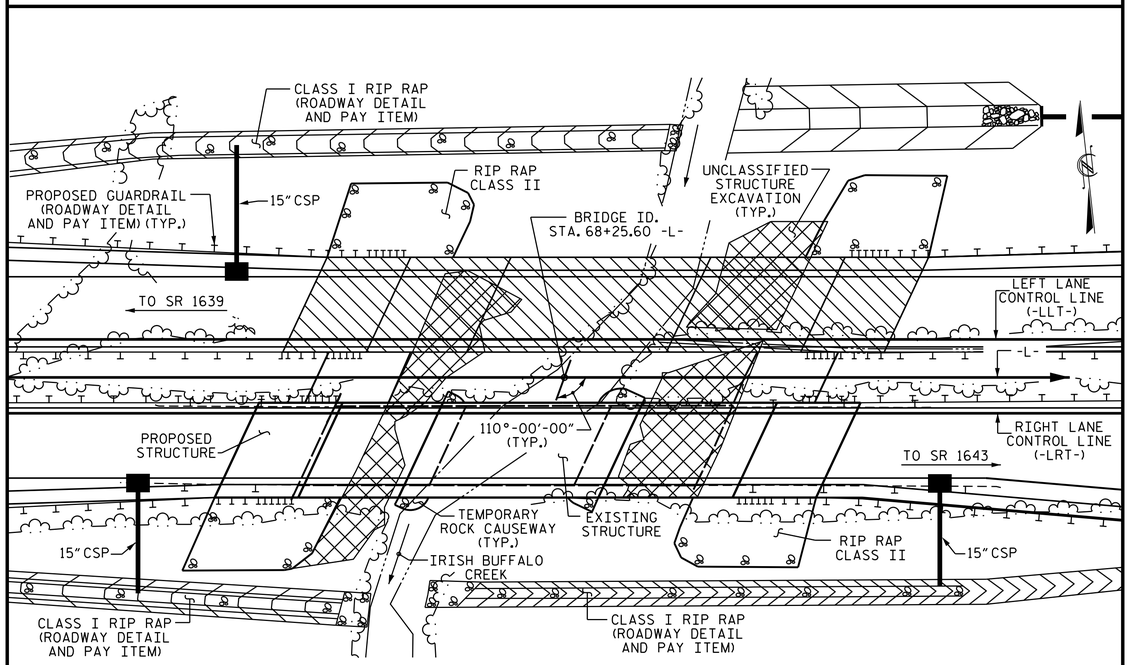
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-2
1			3			TOTAL SHEETS
2			4			37

STR. #2

BM #8: 41.02' RIGHT OF STA. 68+67.09 -L-, EL. 667.83



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 68+25.60 -L-".

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 63 FT. RIGHT AND 11.75 FT. LEFT OF RIGHT LANE CONTROL LINE AT END BENT 1 AND A DISTANCE OF 35 FT. RIGHT AND 23.5 FT. LEFT OF RIGHT LANE CONTROL LINE AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATION. EXCAVATION AREA SHOULD BE SLOPED 2% TOWARDS CREEK.

THE EXISTING STRUCTURE CONSISTING OF 3 SIMPLE SPANS @ 40' EACH WITH A CLEAR ROADWAY WIDTH OF 26'-0" AND CONCRETE DECK ON I-BEAMS; SUBSTRUCTURE: END BENTS CONSISTING OF CONCRETE CAP ON STEEL PILES; INTERIOR BENTS CONSISTING OF CONCRETE CAP, COLUMNS AND FOOTINGS LOCATED AT THE PROPOSED SITE SHALL BE REMOVED. THE EXISITNG BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAYS, THE CLASS II RIP RAP USED IN THE CAUSEWAYS MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 68+25.60 -L-.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 4,700 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 665.4
DRAINAGE AREA	= 16.4 SQ.MI.
BASE DISCHARGE (Q100)	= 5,200 C.F.S.
BASE HIGH WATER ELEVATION	= 665.86

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 13,200 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 670.5

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	3'-6" DIA. DRILLED PIERS IN SOIL	3'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" DIA. DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE										5,124	4,930		LUMP SUM	
END BENT 1												40.0		5,003
BENT 1			4.0	49.0	23.2	2	4					31.7		8,624
BENT 2			46.0	27.0		2	4					30.9		9,578
END BENT 2												40.5		4,949
TOTAL	LUMP SUM	LUMP SUM	50.0	76.0	23.2	4	8	2	LUMP SUM	5,124	4,930	143.1	LUMP SUM	28,154

TOTAL BILL OF MATERIAL

	SPIRAL COLUMN REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS		HP 12X53 STEEL PILES		THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		12	502.667			120.32	128.22			LUMP SUM	LUMP SUM
END BENT 1				6	90			160	180		
BENT 1	1,401										
BENT 2	1,769										
END BENT 2				6	165			145	160		
TOTAL	3,170	12	502.667	12	255	120.32	128.22	305	340	LUMP SUM	LUMP SUM

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER IRISH BUFFALO CREEK ON NC 3 BETWEEN SR 1639 AND SR 1643

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-3
1			3			TOTAL SHEETS
2			4			37

STR. #2

DRAWN BY : H. B. DESAI DATE : 4/7/16
CHECKED BY : R. P. PATEL DATE : 4/26/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U3440_SD_GD_02.dgn
jpadams

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.03	--	1.75	0.998	1.28	C	I	18.459	1.077	1.27	C	I	1.846	0.80	1.083	1.03	B	I	28.917	
		HL-93(Opr)	N/A		1.65	--	1.35	0.998	1.66	C	I	18.459	1.077	1.65	C	I	1.846	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.30	46.808	1.75	0.998	1.63	C	I	14.767	1.077	1.49	C	I	1.846	0.80	0.892	1.30	B	I	28.917	
		HS-20(Opr)	36.000		1.93	69.574	1.35	0.998	2.12	C	I	14.767	1.077	1.93	C	I	1.846	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500		2.78	37.588	1.40	0.998	3.68	C	I	18.459	1.077	3.90	C	I	14.767	0.80	0.892	2.78	B	I	28.917	
		SNGARBS2	20.000		2.14	42.757	1.40	0.998	3.05	C	I	14.767	1.077	2.95	C	I	1.846	0.80	0.892	2.14	B	I	28.917	
		SNAGRIS2	22.000		2.05	45.147	1.40	0.998	3.00	C	I	14.767	1.077	2.80	C	I	1.846	0.80	0.892	2.05	B	I	28.917	
		SNCOTTS3	27.250		1.39	37.804	1.40	0.998	1.84	C	I	18.459	1.077	1.98	C	I	1.846	0.80	0.892	1.39	B	I	28.917	
		SNAGGRS4	34.925		1.18	41.326	1.40	0.998	1.67	C	I	18.459	1.077	1.75	C	I	1.846	0.80	0.892	1.18	B	I	28.917	
		SNS5A	35.550		1.16	41.077	1.40	0.998	1.62	C	I	18.459	1.077	1.83	C	I	1.846	0.80	0.892	1.16	B	I	28.917	
		SNS6A	39.950		1.07	42.763	1.40	0.998	1.55	C	I	18.459	1.077	1.72	C	I	1.846	0.80	0.892	1.07	B	I	28.917	
		SNS7B	42.000		1.02	42.830	1.40	0.998	1.48	C	I	18.459	1.077	1.75	C	I	1.846	0.80	0.892	1.02	B	I	28.917	
	TTST	TNAGRIT3	33.000		1.31	43.177	1.40	0.998	1.92	C	I	18.459	1.077	2.01	C	I	1.846	0.80	0.892	1.31	B	I	28.917	
		TNT4A	33.075		1.32	43.560	1.40	0.998	1.94	C	I	18.459	1.077	1.90	C	I	1.846	0.80	0.892	1.32	B	I	28.917	
		TNT6A	41.600		1.09	45.216	1.40	0.998	1.66	C	I	18.459	1.077	1.87	C	I	1.846	0.80	0.892	1.09	B	I	28.917	
		TNT7A	42.000		1.10	46.109	1.40	0.998	1.70	C	I	18.459	1.077	1.73	C	I	1.846	0.80	0.892	1.10	B	I	28.917	
		TNT7B	42.000		1.15	48.154	1.40	0.998	1.72	C	I	18.459	1.077	1.67	C	I	1.846	0.80	0.892	1.15	B	I	28.917	
		TNAGRIT4	43.000		1.08	46.580	1.40	0.998	1.69	C	I	14.767	1.077	1.60	C	I	1.846	0.80	0.892	1.08	B	I	28.917	
		TNAGT5A	45.000		1.02	45.750	1.40	0.998	1.57	C	I	18.459	1.077	1.67	C	I	1.846	0.80	0.892	1.02	B	I	28.917	
		TNAGT5B	45.000	3	1.00	45.010	1.40	0.998	1.52	C	I	18.459	1.077	1.51	C	I	1.846	0.80	0.892	1.00	B	I	28.917	

LOAD FACTORS:

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

NOTES:

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

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

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

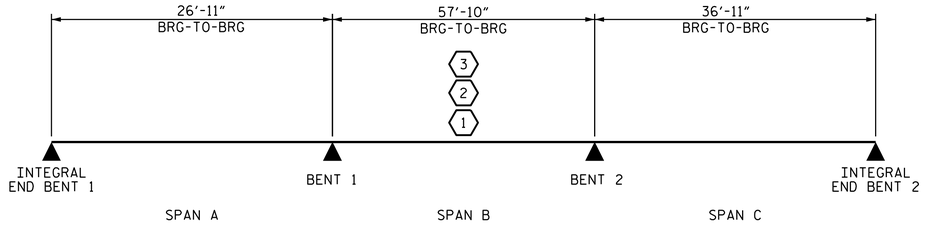
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

Docusigned by: Donald R. Smith, Jr. EDC877061748490... 8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS
2			4			37

STR. #2 STD. NO. LRFR1

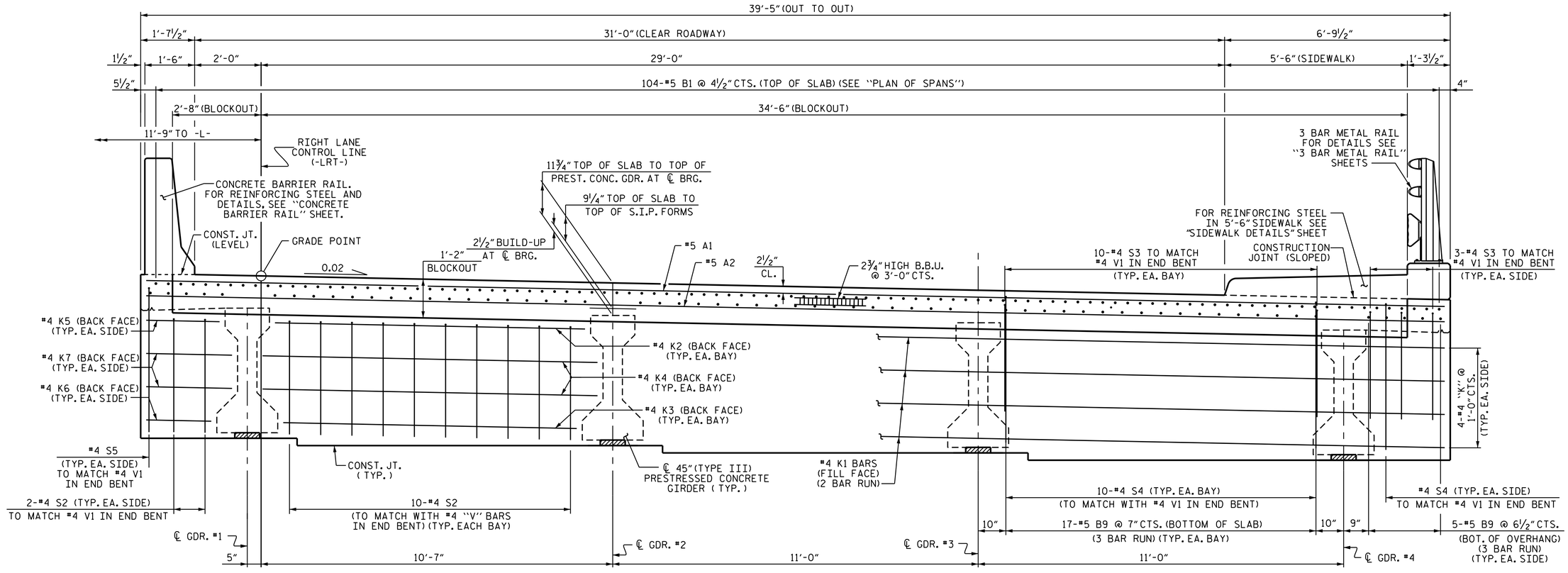
ASSEMBLED BY : J.D. HAWK DATE : 8/5/2014
CHECKED BY : D. R. SMITH DATE : 5/12/2016

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

DESIGN ENGINEER OF RECORD:
T.R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U3440_SMU_LR_02.dgn
jpadams



TYPICAL SECTION @ INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-5
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. D. LAYNE DATE : 1/20/16
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_TS_02.dgn
jpadams

STR. #2

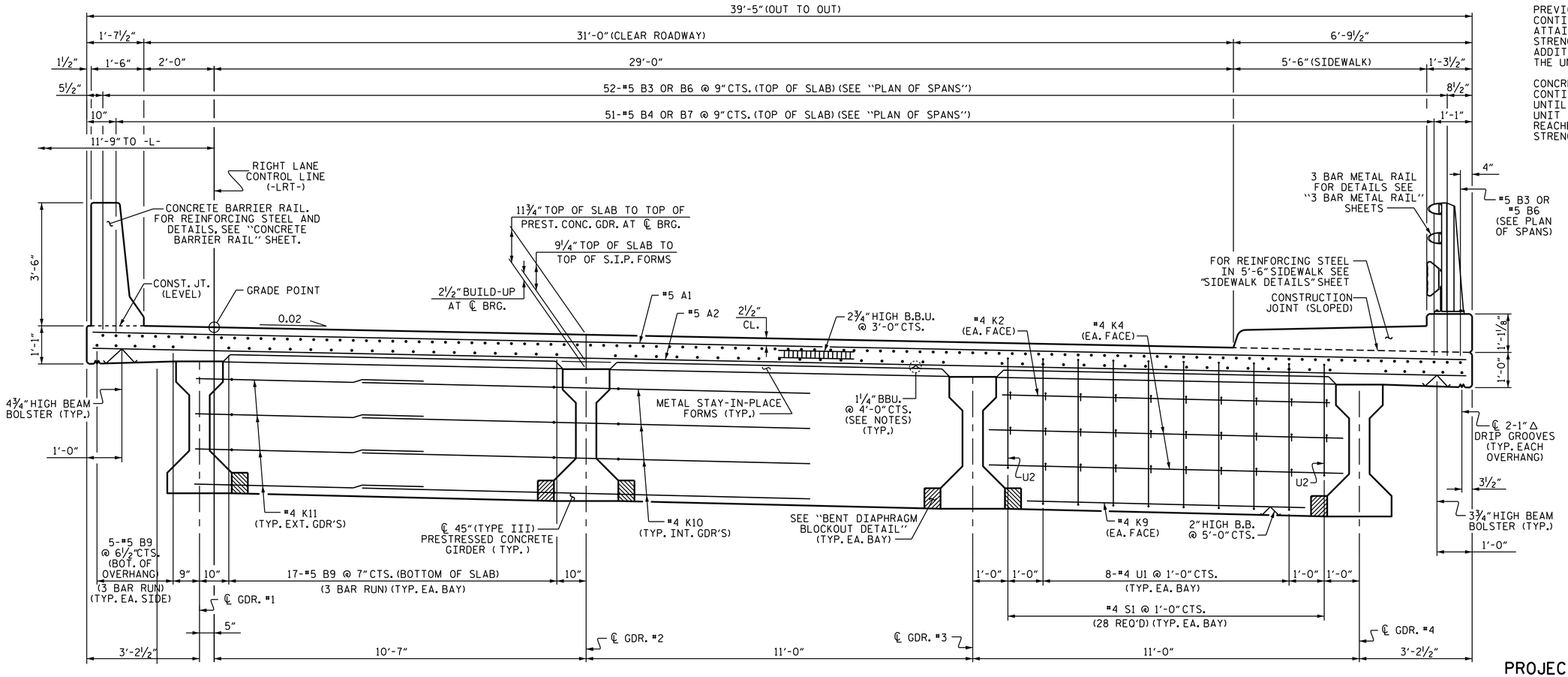
NOTES

PROVIDE 1¼"HIGH BEAM BOLSTERS UPPER AT 4'-0"CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0"CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.



TYPICAL SECTION AT BENT DIAPHRAGM

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B480...
8/18/2016

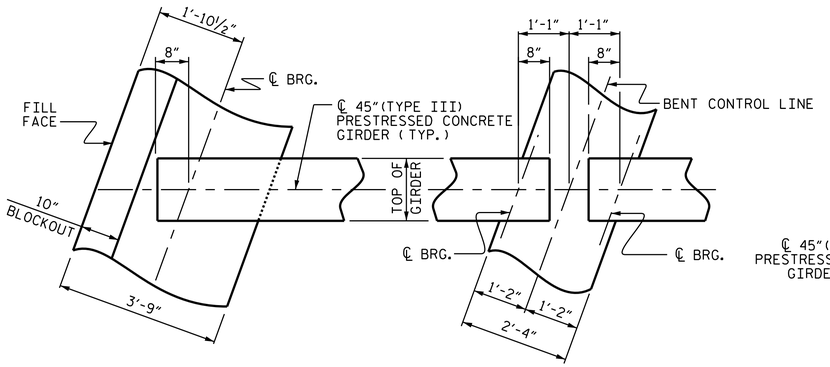
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-6
1			3			TOTAL SHEETS
2			4			37

DRAWN BY :	K. D. LAYNE	DATE : 1/20/16
CHECKED BY :	J. D. HAWK	DATE : 12/18/15
DESIGN ENGINEER OF RECORD:	T. R. PETERSON	DATE : 6/20/16

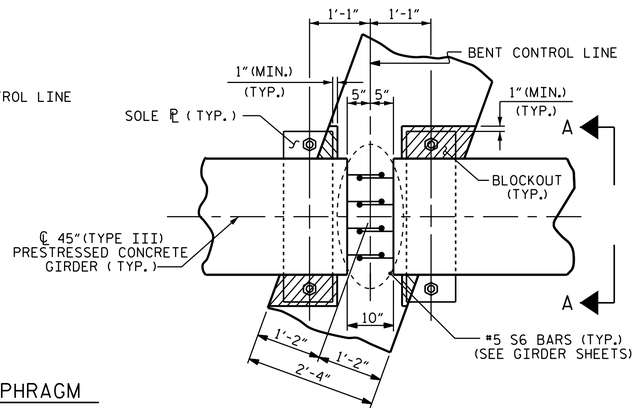
17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_TS_02.dgn
jpadams

STR. #2

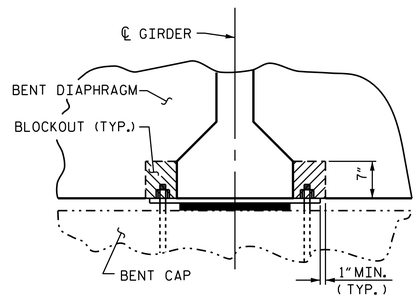


INTEGRAL END BENT CONTINUOUS BENT DIAPHRAGM

PLAN OF GIRDER

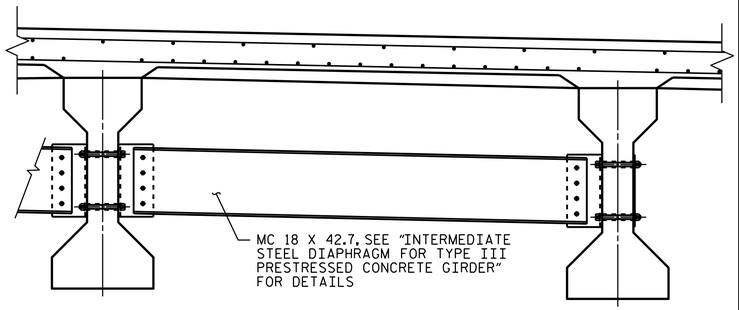


PLAN



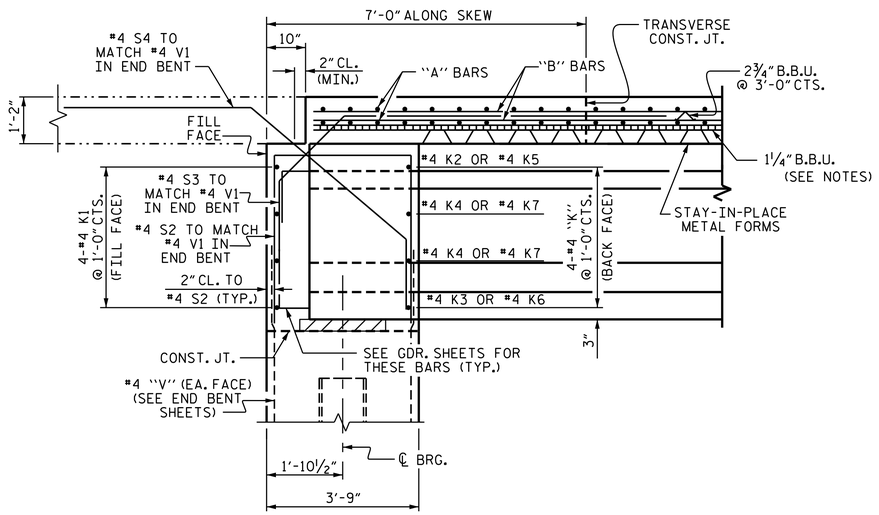
SECTION A-A

BENT DIAPHRAGM BLOCKOUT DETAIL

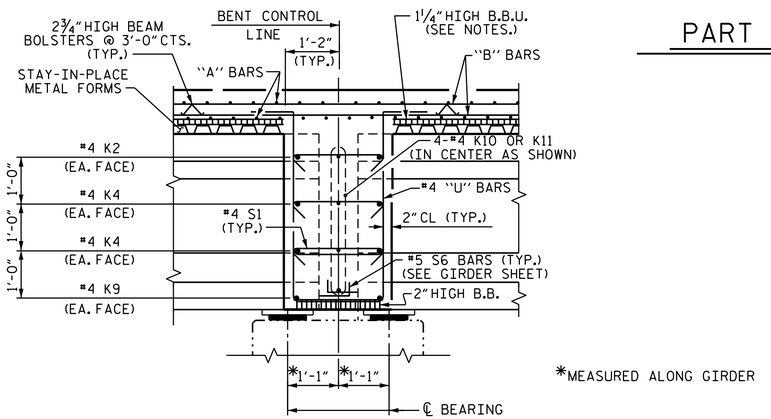


PART SECTION AT INTERMEDIATE DIAPHRAGM

(SEE PLAN OF SPANS FOR LOCATION)



SECTION THROUGH INTEGRAL END BENT



SECTION THROUGH BENT DIAPHRAGM

*MEASURED ALONG GIRDER

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

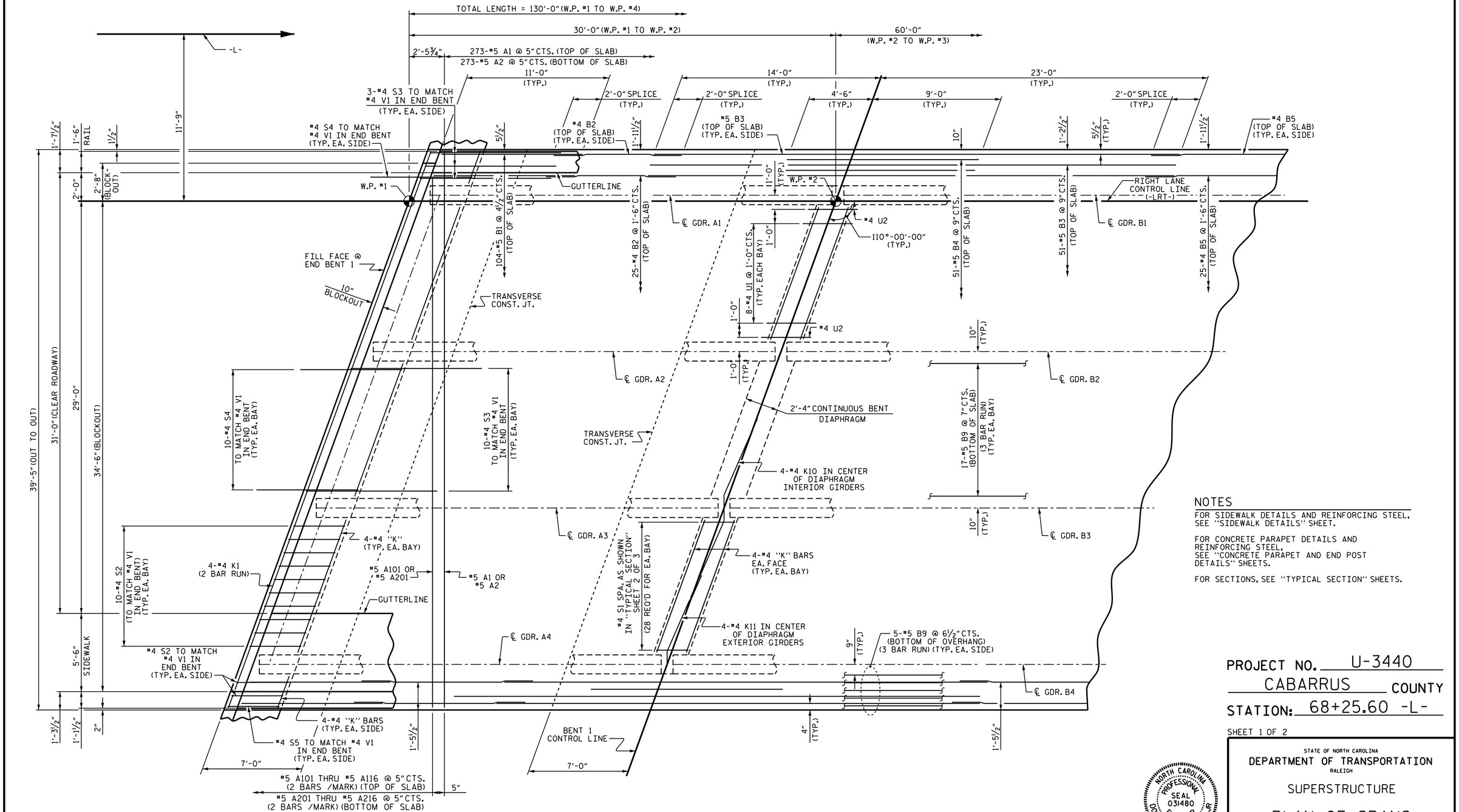
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-7
1			3			TOTAL SHEETS
2			4			37

STR. #2

DRAWN BY :	K. D. LAYNE	DATE : 1/20/16
CHECKED BY :	J. D. HAWK	DATE : 12/18/15
DESIGN ENGINEER OF RECORD:	T. R. PETERSON	DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_TS_02.dgn
jpadams



SPAN A

SPAN B

PARTIAL PLAN OF SPANS

NOTES

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.

FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.

FOR SECTIONS, SEE "TYPICAL SECTION" SHEETS.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490... 8/18/2016

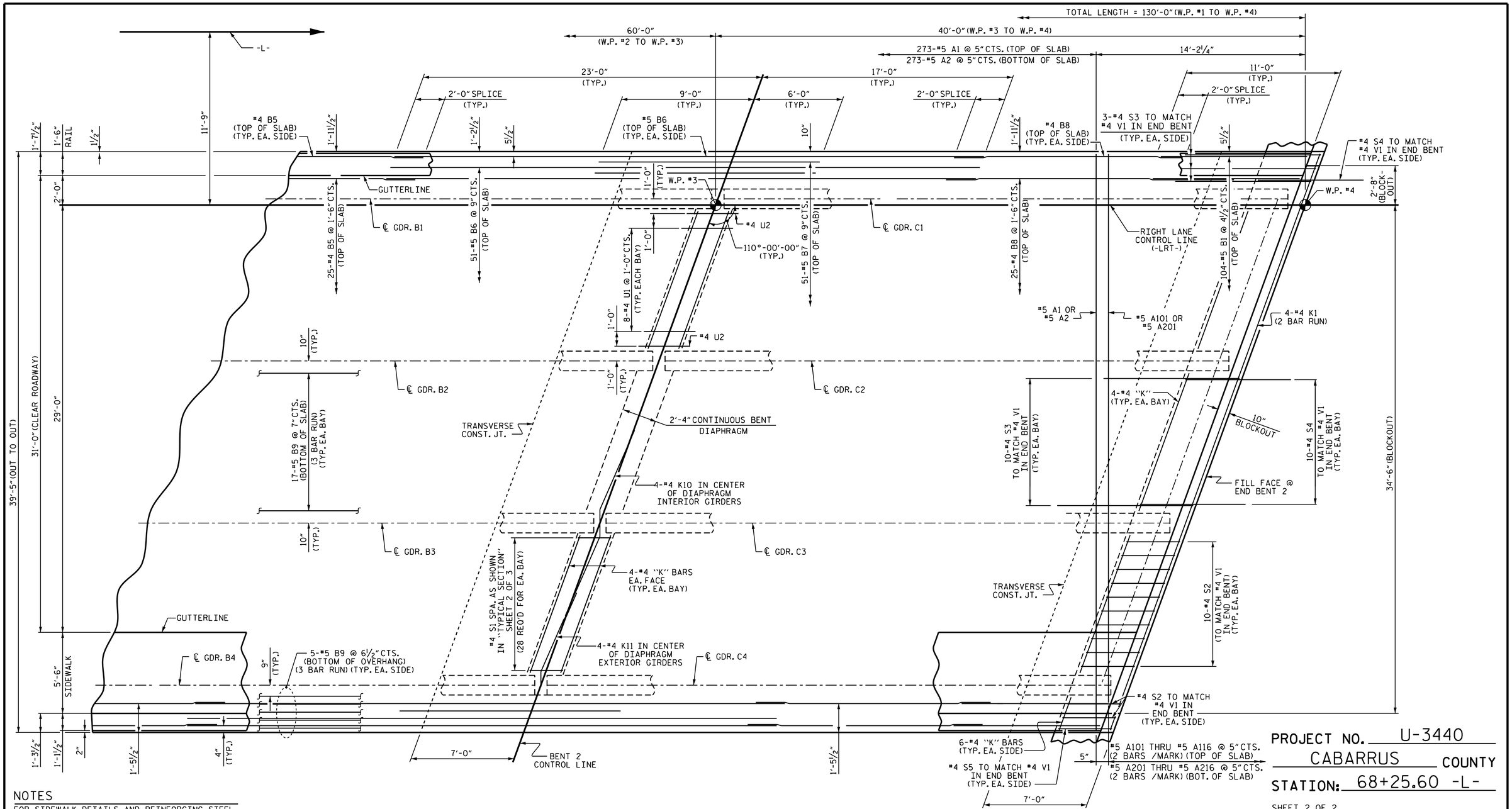
DRAWN BY : K. D. LAYNE DATE : 1/20/16
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8
1			3			TOTAL SHEETS
2			4			37

STR. #2

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PS_02.dgn
jpadams



SPAN B

SPAN C

PARTIAL PLAN OF SPANS

NOTES

FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.

FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.

FOR SECTIONS, SEE "TYPICAL SECTION" SHEETS.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

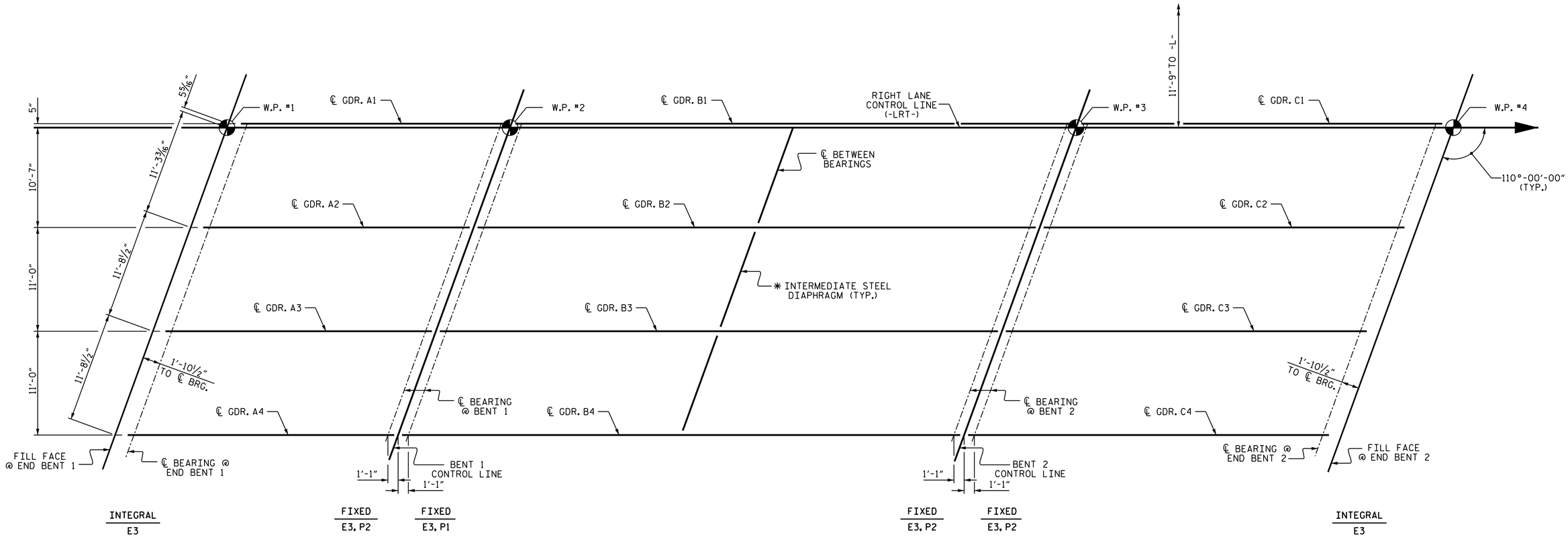
SHEET NO. S2-9

TOTAL SHEETS 37

DRAWN BY : K. D. LAYNE DATE : 1/20/16
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PS_02.dgn
jpadams

STR. #2



GIRDER LAYOUT

✱ SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

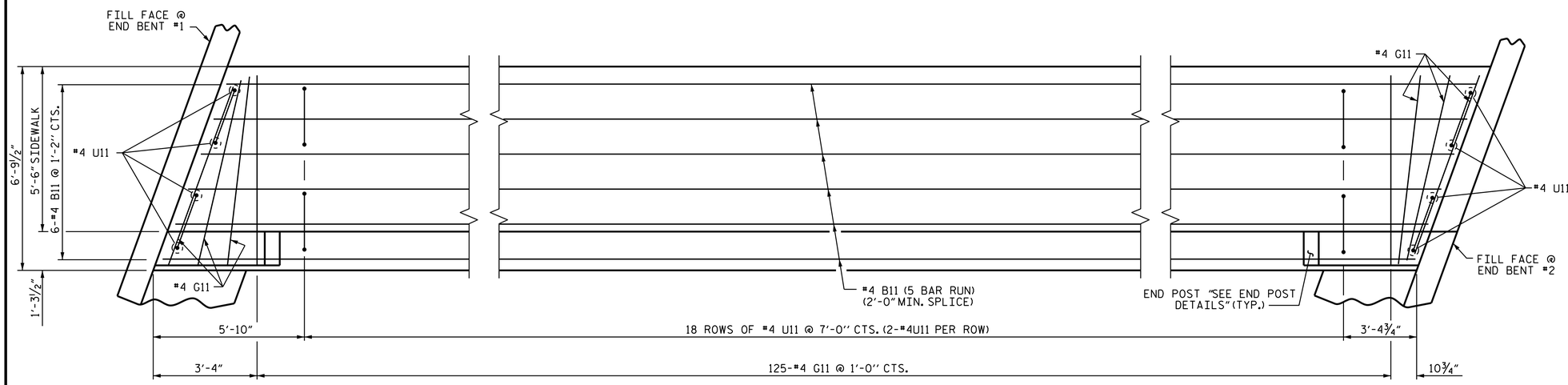
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : KEITH D. LAYNE DATE : 1/20/16
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_FP_02.dgn
jpadams

STR. #2



NOTES

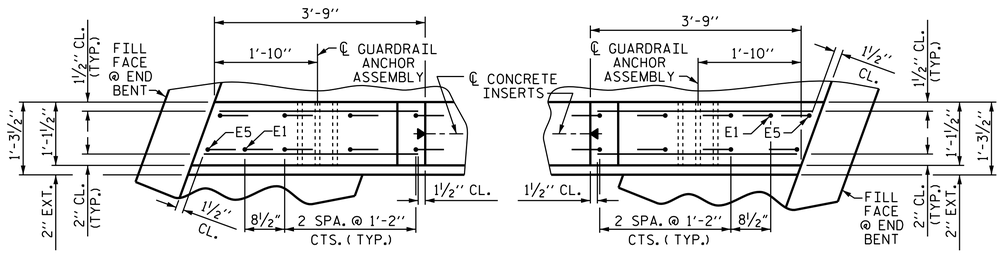
THE SIDEWALK IN A CONTINOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

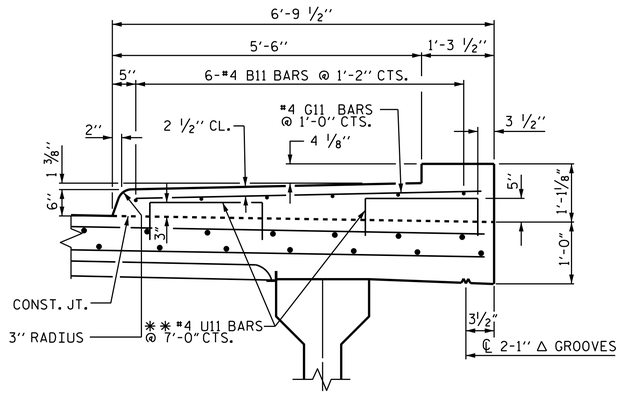
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK AND MEDIAN ISLAND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS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

PAYMENT FOR SIDEWALK AND END POSTS SHALL BE INCLUDED IN UNIT PRICE FOR "REINFORCED CONCRETE DECK SLAB".

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

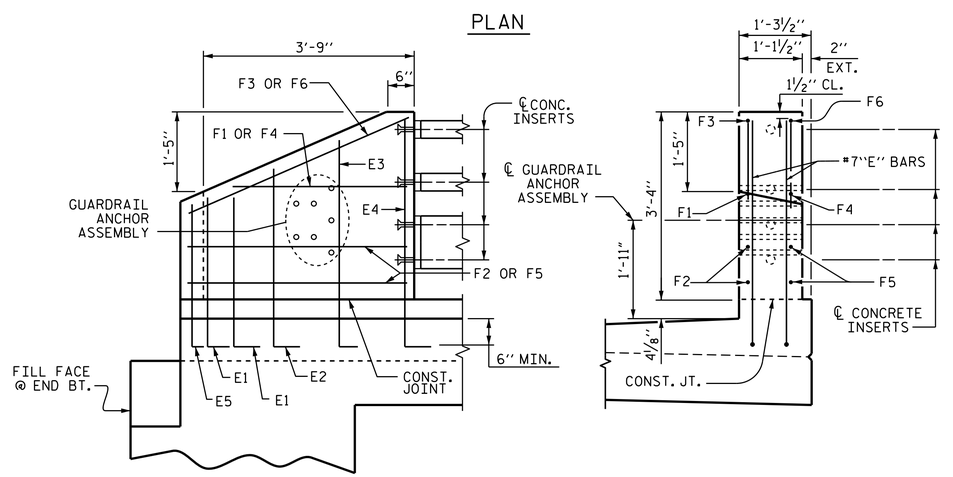
PLAN OF SIDEWALK





SECTION THRU SIDEWALK

** #4 U11 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.



END POST DETAILS

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

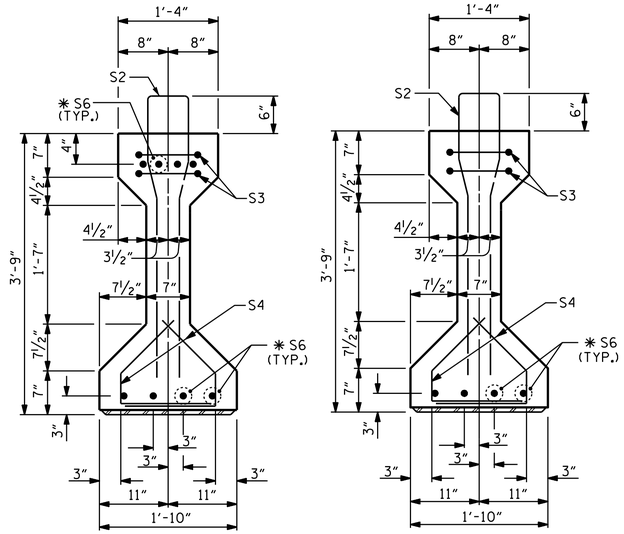
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : KEITH D. LAYNE DATE : 12/04/15
CHECKED BY : J. D. HAWK DATE : 12/18/15

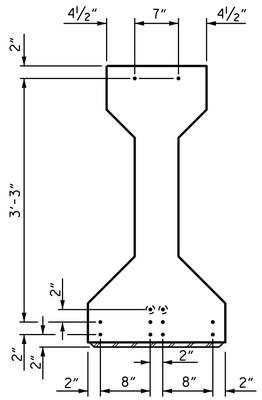
17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_SW_02.dgn
jpadams

STR. #2

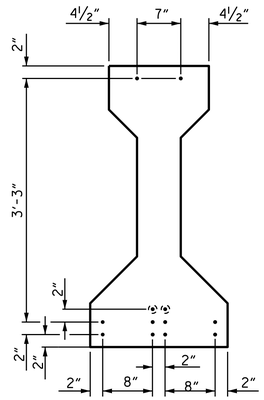


SECTION A-A

SECTION B-B



AT END OF GIRDER

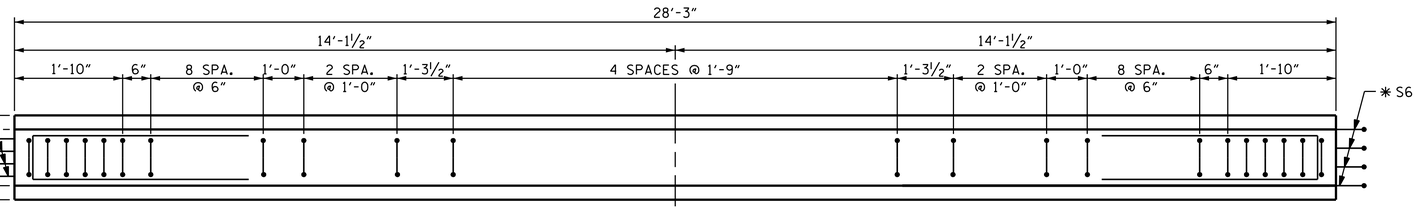


AT ℄ OF GIRDER

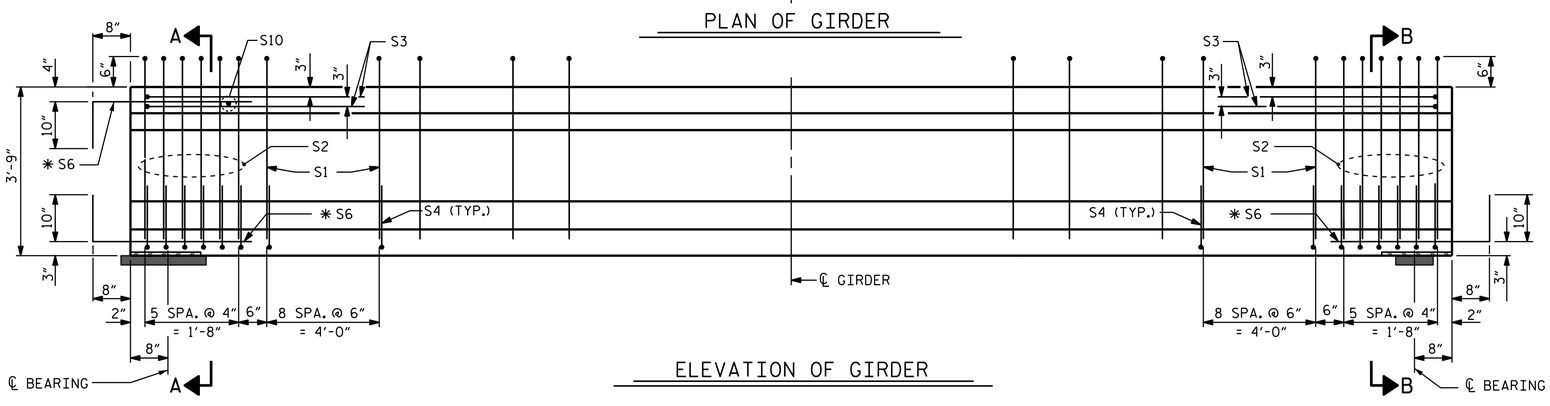
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- (●) OPTIONAL STRANDS (SEE NOTES)



PLAN OF GIRDER



ELEVATION OF GIRDER

INTEGRAL END BENT

FIX

0.6"Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

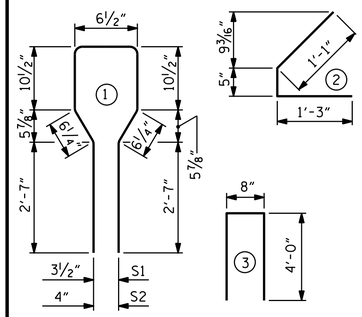
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	29	#4	1	8'-6"	165
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	60	#4	2	2'-9"	110
✱S6	12	#5	STR	3'-8"	46
S10	1	#3	STR	1'-0"	1

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	5,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
	498	4.1	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	4	28'-3"	113'-0"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN A (RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

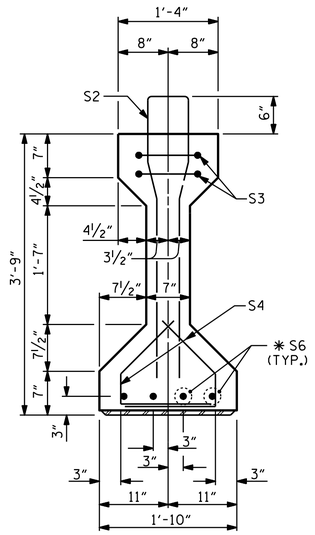
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			37

STR. #2

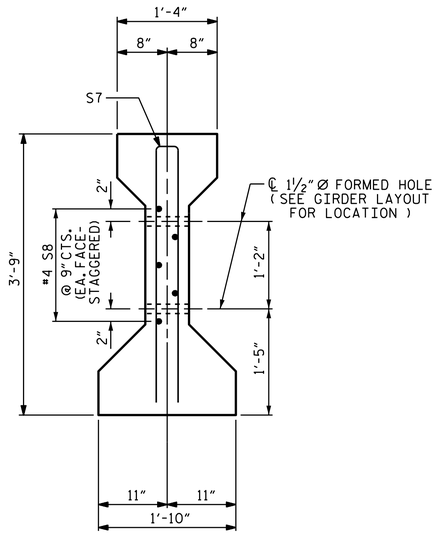
STD. NO. PCG5

ASSEMBLED BY : K.D.LAYNE	DATE : 1/20/16	
CHECKED BY : J.D.HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMC	

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PCG_02.dgn
jpadams

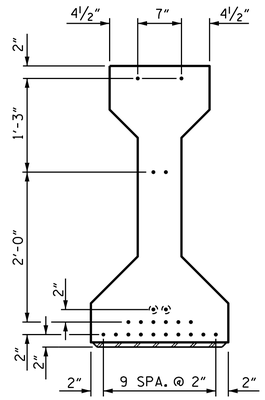


SECTION B-B

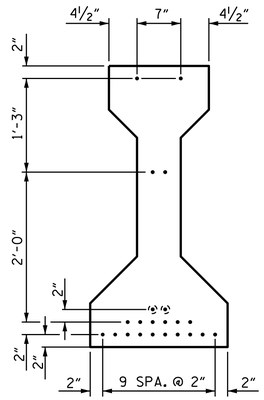


SECTION C-C

(S1 BARS NOT SHOWN)



AT END OF GIRDER

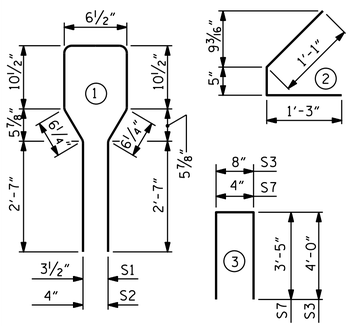


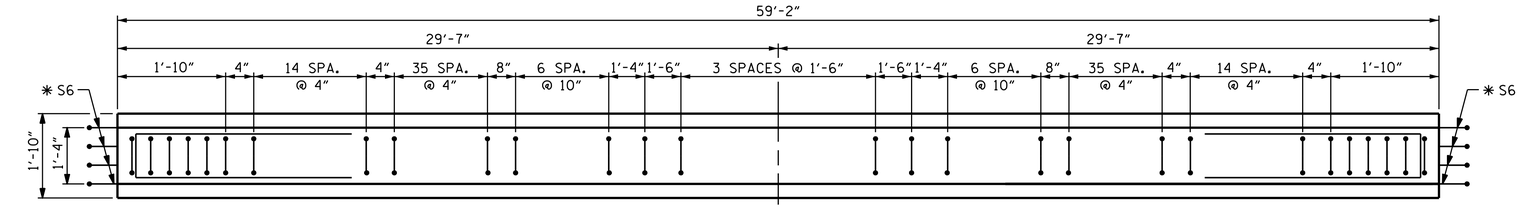
AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

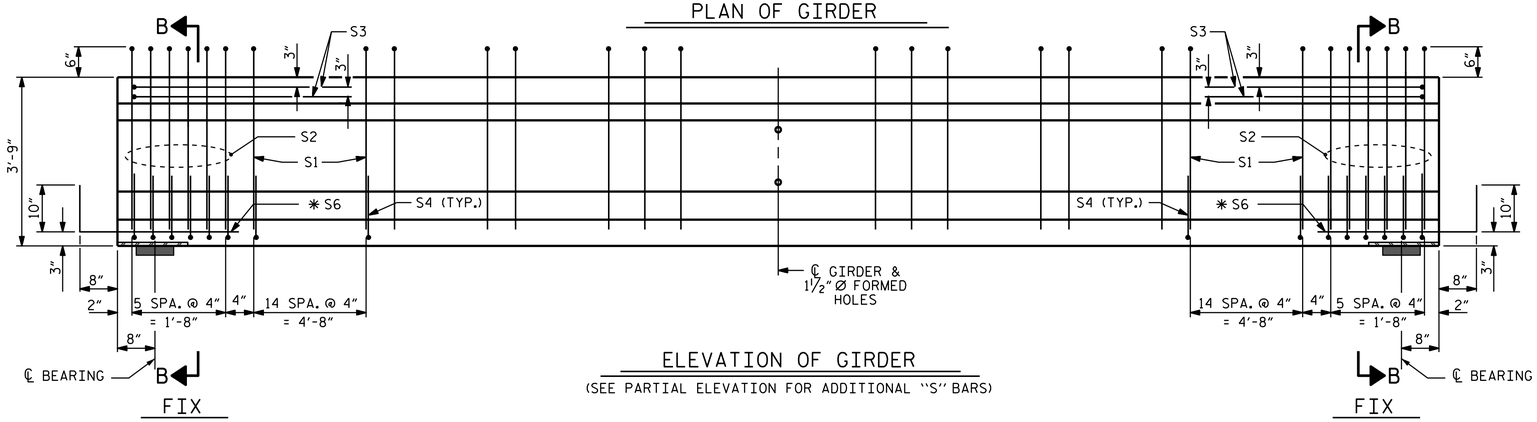
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⊙ OPTIONAL STRANDS (SEE NOTES)



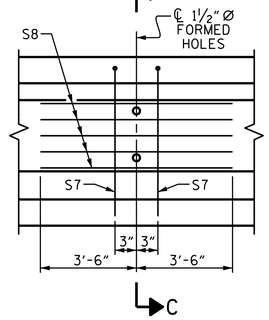


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS

0.6"Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	122	#4	1	8'-6"	693
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	84	#4	2	2'-9"	154
✱S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,500 PSI CONCRETE	0.6"Ø L. R. STRANDS
	LBS.	C.Y.	No.
	1,092	8.5	20

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN B	4	59'-2"	236'-8"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN B (RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

Docusigned by: Donald R. Smith, Jr. EDC877061748d90... 8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

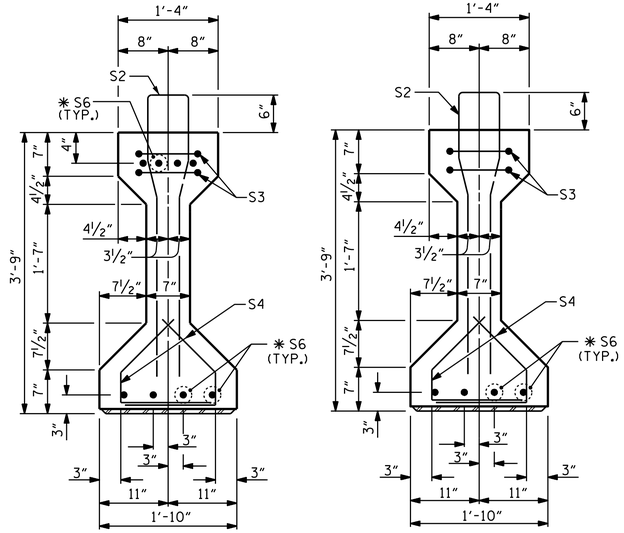
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-13
1			3			TOTAL SHEETS
2			4			37

STR. #2

STD. NO. PCG5

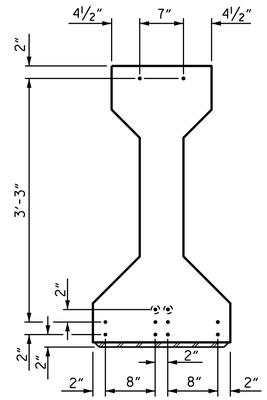
ASSEMBLED BY : K. D. LAYNE	DATE : 1/20/16	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMG	

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PCG_02.dgn
jpadams

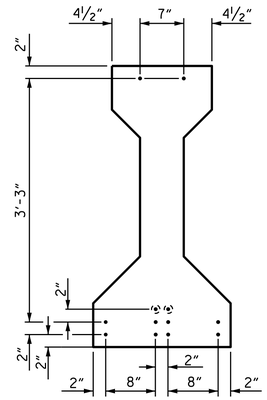


SECTION A-A

SECTION B-B



AT END OF GIRDER

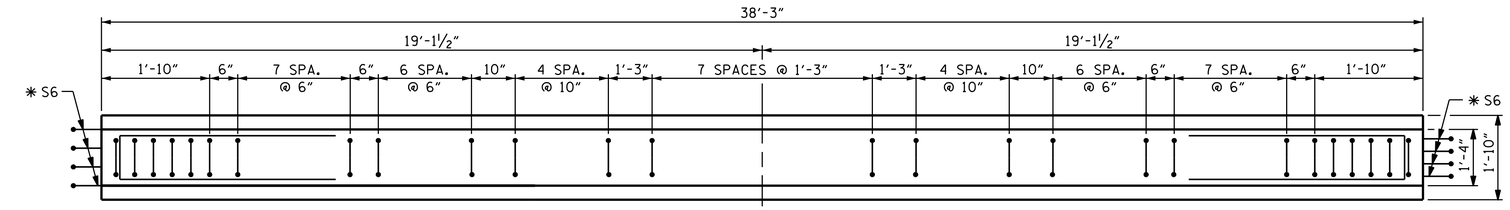


AT ℄ OF GIRDER

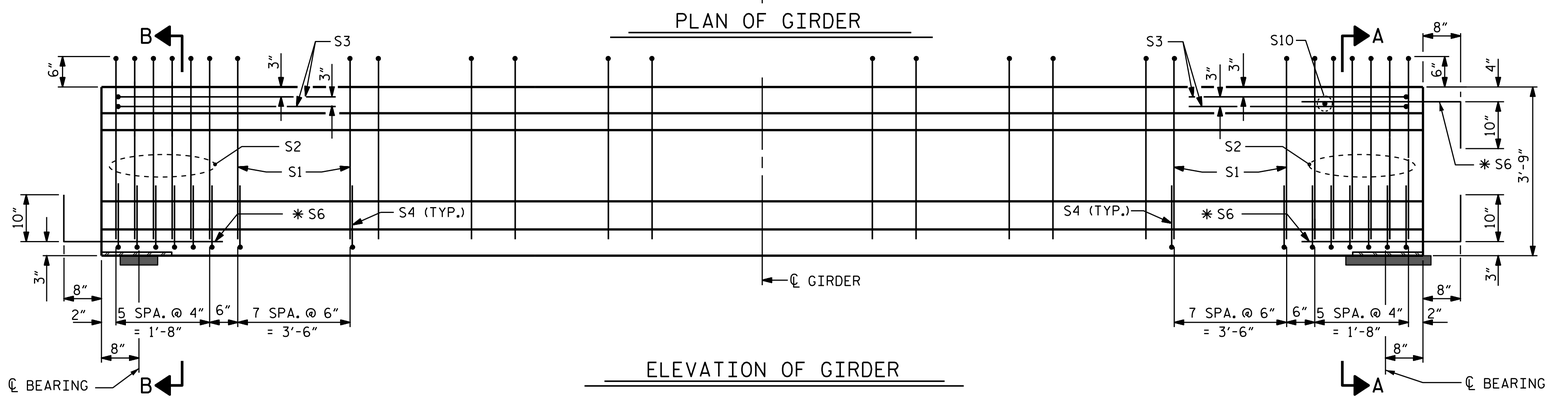
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◉ OPTIONAL STRANDS (SEE NOTES)



PLAN OF GIRDER



ELEVATION OF GIRDER

FIX

INTEGRAL END BENT

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

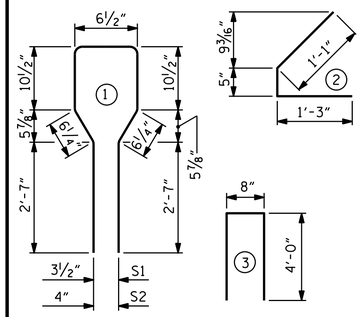
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	8'-6"	273
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
✱S6	12	#5	STR	3'-8"	46
S10	1	#3	STR	1'-0"	1

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LBS.	5,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
	599	5.5	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN C	4	38'-3"	153'-0"

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C (RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC877061748490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

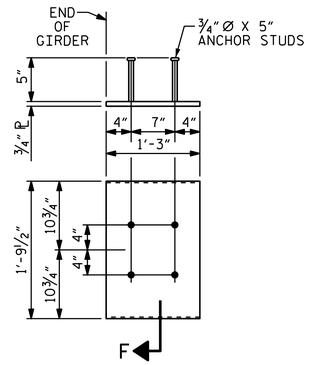
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-14
1			3			TOTAL SHEETS
2			4			37

STR. #2

STD. NO. PCG5

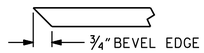
ASSEMBLED BY : K.D.LAYNE	DATE : 1/20/16	
CHECKED BY : J.D.HAWK	DATE : 12/18/15	
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM	T. R. PETERSON DATE : 6/20/16
	REV. 1/15 MAA/TMC	

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PCG_02.dgn
jpadams



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE III GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

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 SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS.

OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI. FOR SPANS A & C AND 4,700 PSI. FOR SPAN B

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS SHOWN ON GIRDER SHEETS TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4,500 LBS.

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.011	0.008	0.004	0.000	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.011	0.008	0.004	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.001	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.001	0.000	0.000	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.001	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0
0.6" Ø LOW RELAXATION	SPAN B																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.031	0.058	0.079	0.092	0.097	0.092	0.079	0.058	0.031	0.000	0.000	0.031	0.058	0.079	0.092	0.097	0.092	0.079	0.058	0.031	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.016	0.029	0.040	0.047	0.049	0.047	0.040	0.029	0.016	0.000	0.000	0.018	0.035	0.047	0.058	0.058	0.058	0.047	0.035	0.018	0.000
FINAL CAMBER ↑	0	3/16"	5/16"	7/16"	9/16"	9/16"	9/16"	7/16"	5/16"	3/16"	0	0	1/8"	1/4"	3/8"	7/16"	7/16"	7/16"	3/8"	1/4"	1/8"	0
0.6" Ø LOW RELAXATION	SPAN C																					
	EXTERIOR GIRDERS 1 & 4											INTERIOR GIRDERS 2 & 3										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.006	0.012	0.017	0.019	0.020	0.019	0.017	0.012	0.006	0.000	0.000	0.006	0.012	0.017	0.019	0.020	0.019	0.017	0.012	0.006	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.003	0.006	0.008	0.009	0.009	0.009	0.008	0.006	0.003	0.000	0.000	0.003	0.007	0.009	0.011	0.011	0.011	0.009	0.007	0.003	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0	0	1/16"	1/16"	1/16"	1/8"	1/8"	1/8"	1/16"	1/16"	1/16"	0

* INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

ASSEMBLED BY : K.D.LAYNE DATE : 1/20/16
CHECKED BY : J.D.HAWK DATE : 12/18/15

DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 2/15 MAA/TMG

DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PCG_02.dgn
jpadams

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

Docusigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

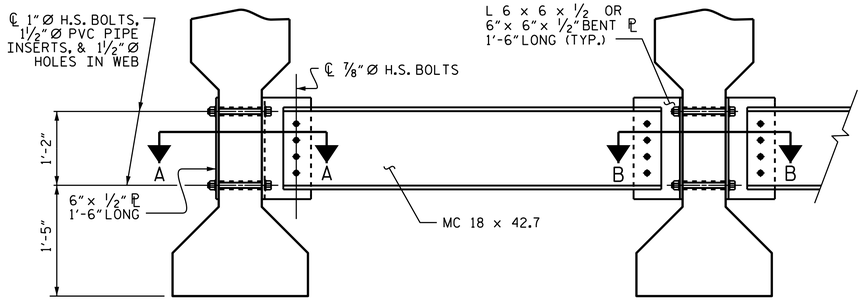
PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-15
1			3			TOTAL SHEETS
2			4			37

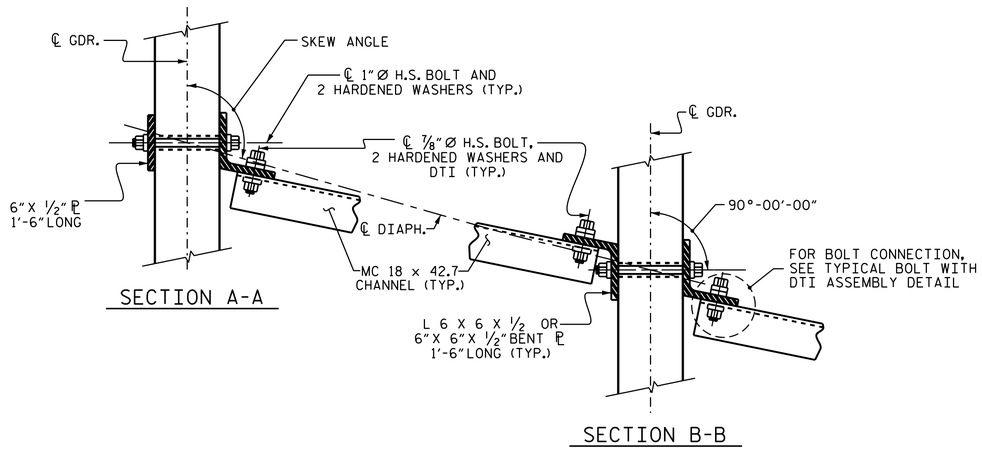
STR. #2

STD. NO. PCG9



EXTERIOR GIRDER INTERIOR GIRDER

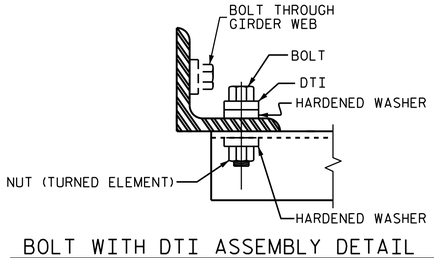
PART SECTION AT INTERMEDIATE DIAPHRAGM



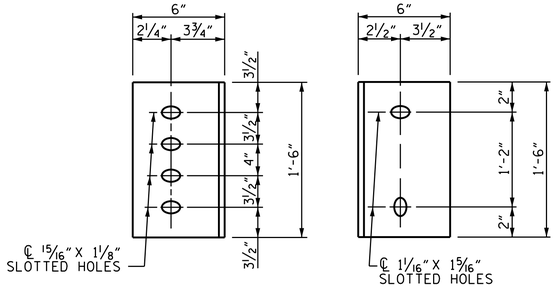
SECTION A-A SECTION B-B

CONNECTION DETAILS

(FOR 70°≤ SKEW < 90° OR 90°< SKEW ≤ 110°)



BOLT WITH DTI ASSEMBLY DETAIL



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

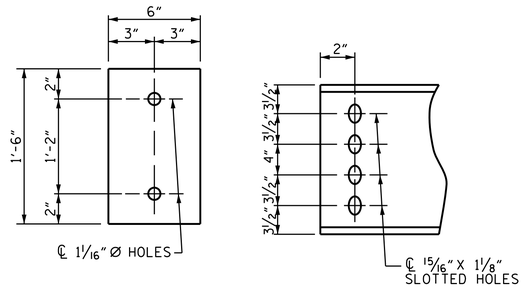


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490...

8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS

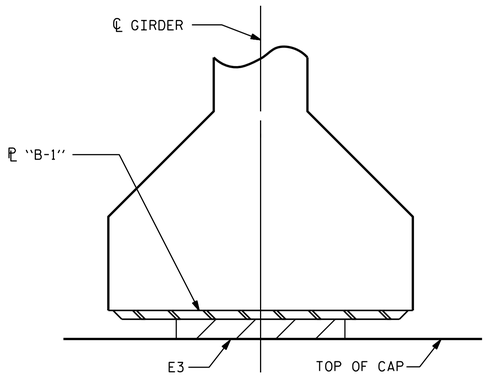
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-16
1			3			TOTAL SHEETS
2			4			37

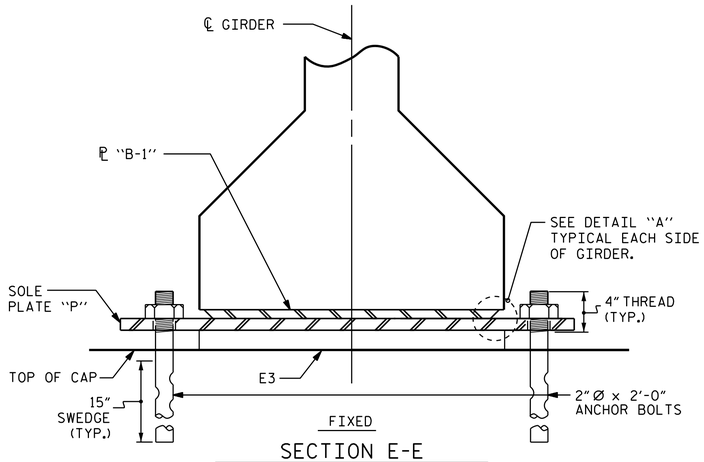
DRAWN BY : K.D.LAYNE DATE : 1/20/16
CHECKED BY : J.D.HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T.R.PETERSON DATE : 6/20/16

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_PCG_02.dgn
jpadams

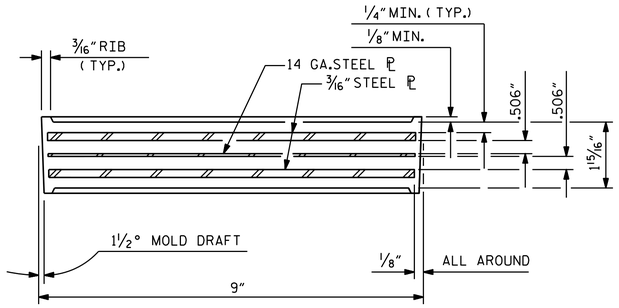
STR. #2 STD. NO. PCG10



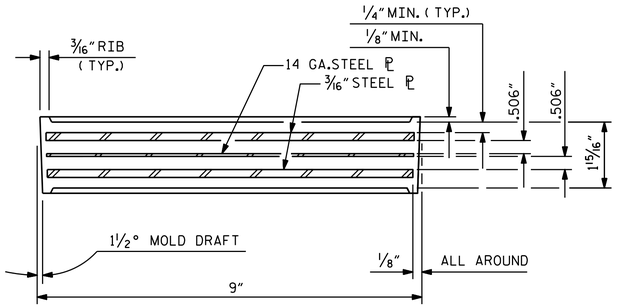
SECTION D-D



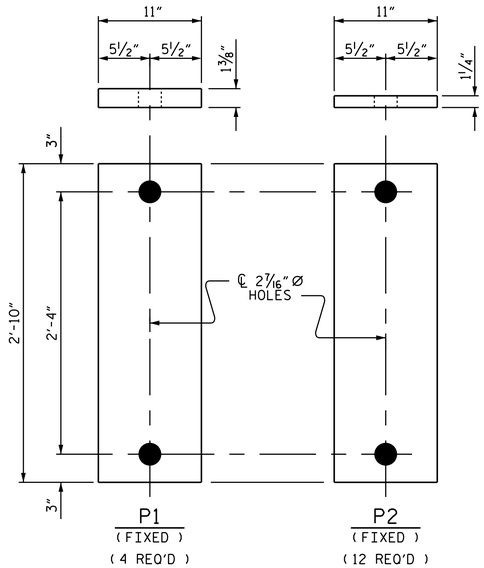
SECTION E-E



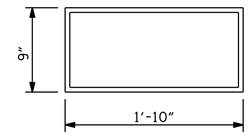
TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS



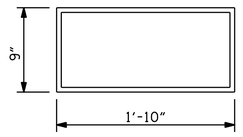
SOLE PLATE DETAILS



E3 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

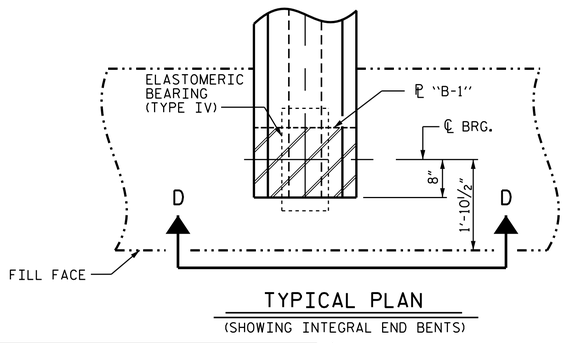
TYPE IV



E3 (16 REQ'D)

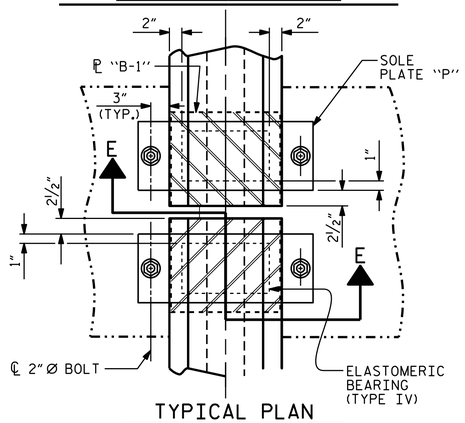
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



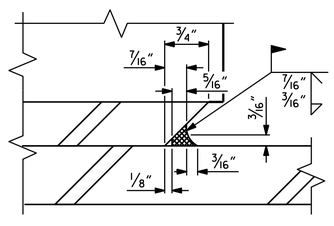
TYPICAL PLAN

(SHOWING INTEGRAL END BENTS)



TYPICAL PLAN

(SHOWING CONTINUOUS BENT)



DETAIL "A"

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr EDC877061748490...

8/18/2016

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			37

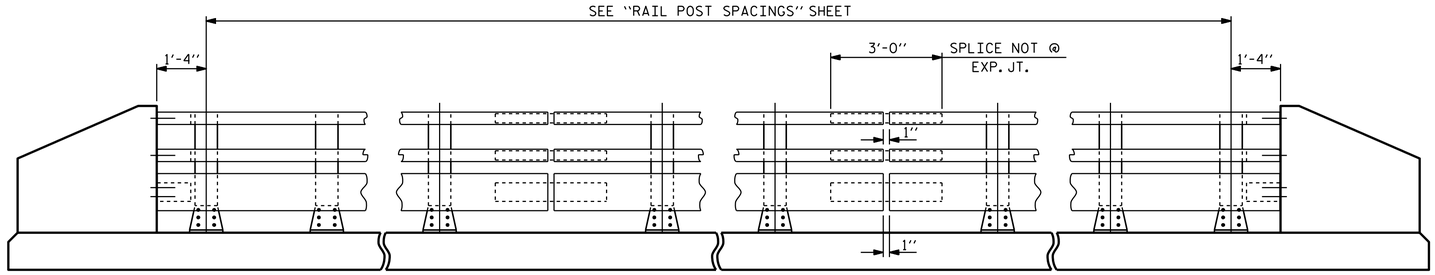
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STR. #2

STD. NO. EB3

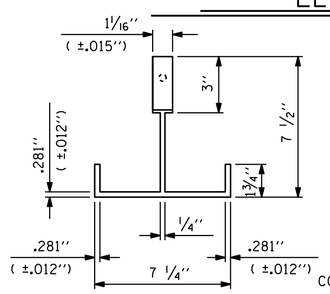
ASSEMBLED BY : K.D. LAYNE	DATE : 1/20/16		
CHECKED BY : J.D. HAWK	DATE : 12/18/15		
DRAWN BY : WJH 8/89	REV. 10/1/11	MAA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : CRK 8/89	REV. 6/13	AAC/MAA	T. R. PETERSON DATE : 6/20/16
	REV. 1/15	MAA/TMG	

17-AUG-2016 08:52
R:\Structures\Plans\Str02\U-3340_SD_EB_02.dgn
jpadams

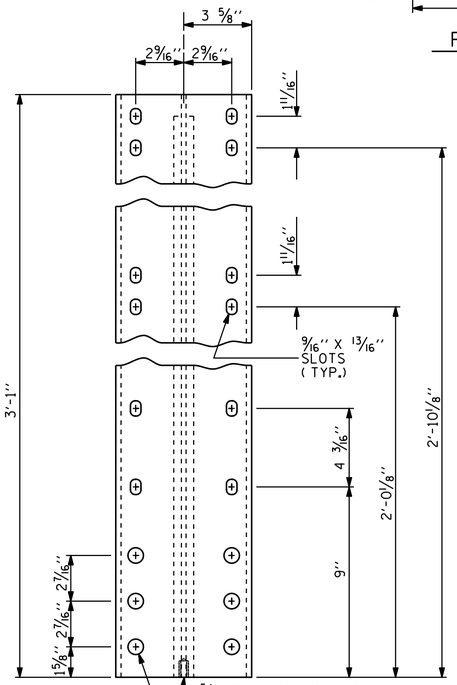


NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

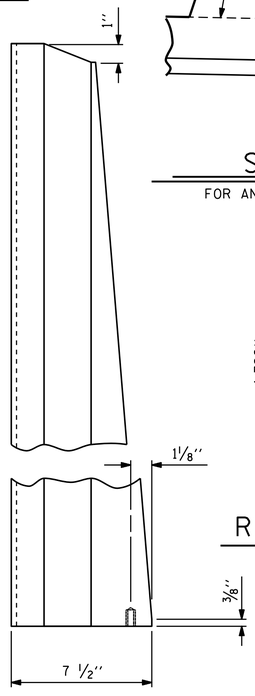
ELEVATION



PLAN

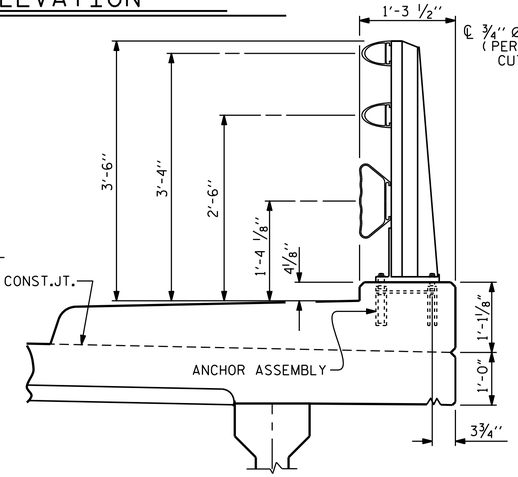


FRONT ELEVATION



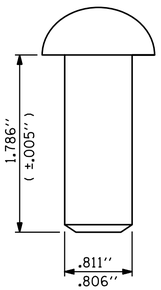
SIDE ELEVATION

DETAILS OF POST

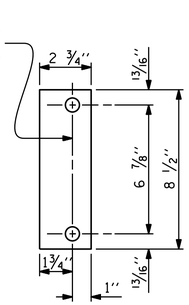


SECTION THRU RAIL

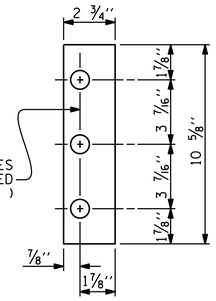
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



RIVET DETAIL



REAR PLATE

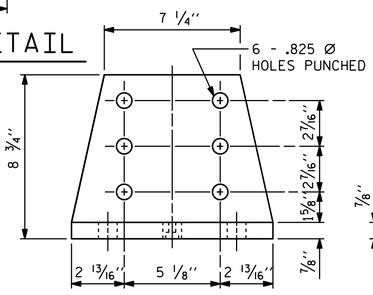


FRONT PLATE

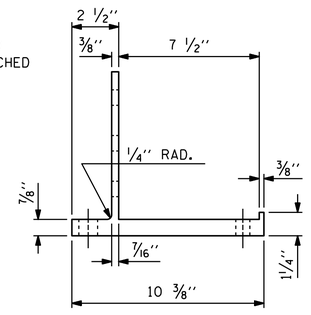
SHIM DETAILS

℄ 1" Ø HOLES (PERMITTED CUTLINE)

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



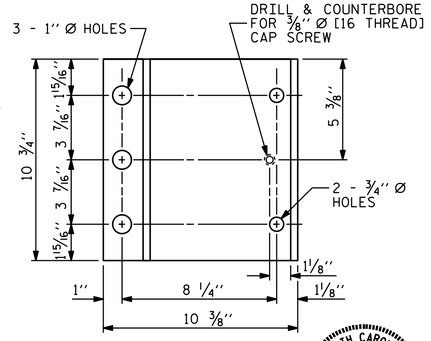
FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS

PAY LENGTH = 120.32 LIN.FT.



PLAN

NOTES

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by:
Donald R. Smith, Jr
EDC877061748490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

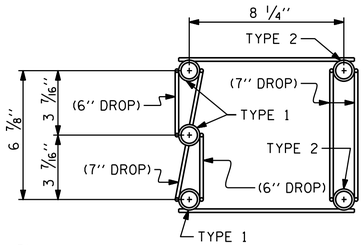
SHEET NO. S2-18
TOTAL SHEETS 37

ASSEMBLED BY : KEITH D. LAYNE	DATE : 1/20/16	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : JMB 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_3MR_02.dgn
jpadams

STR. #2

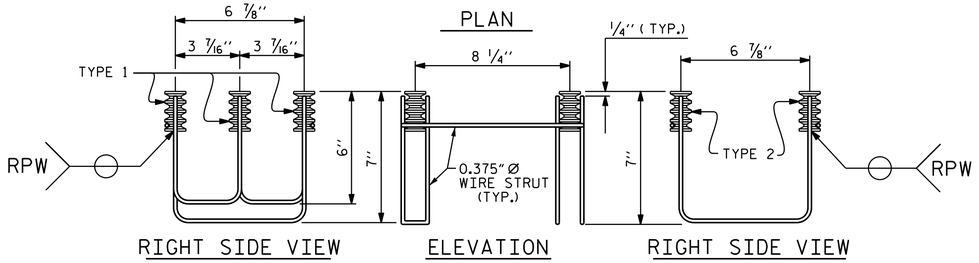
STD. NO. BMR5



TYPE 1 FERRULE
THREADED STEEL FERRULES
WITH CLOSED BOTTOM TO FIT
3/4'' Ø BOLT WITH ROUND WASHER.

TYPE 2 FERRULE
THREADED STEEL FERRULES
WITH CLOSED BOTTOM TO FIT
5/8'' Ø BOLT WITH ROUND WASHER.

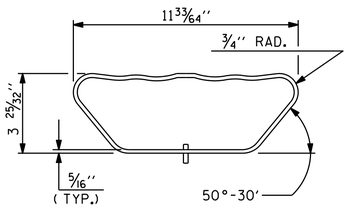
PLAN



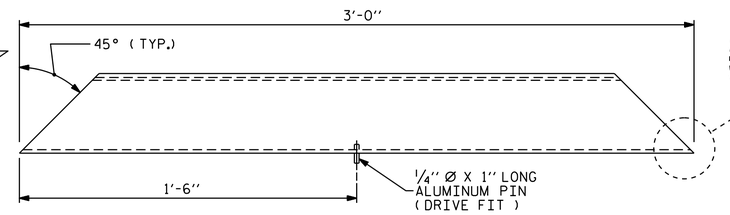
RIGHT SIDE VIEW ELEVATION RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

(22 ASSEMBLIES REQUIRED)

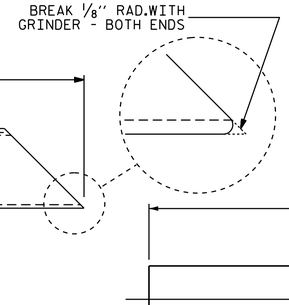


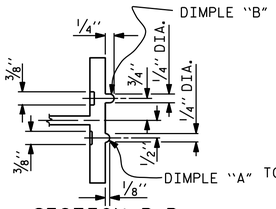
END VIEW



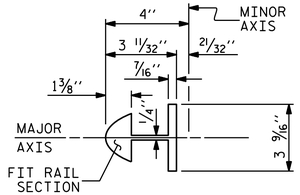
PLAN VIEW

BOTTOM RAIL EXPANSION BAR

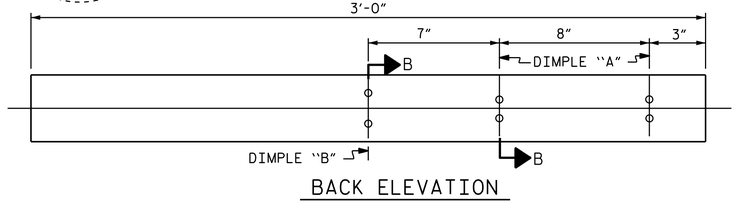




SECTION B-B

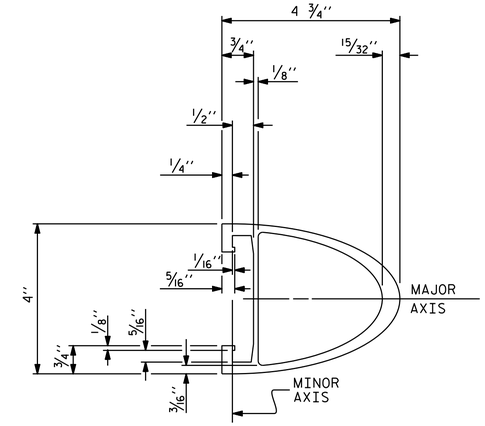


BAR SECTION

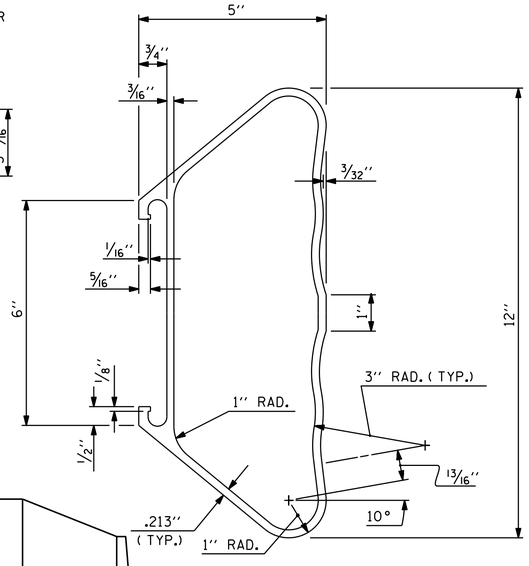


BACK ELEVATION

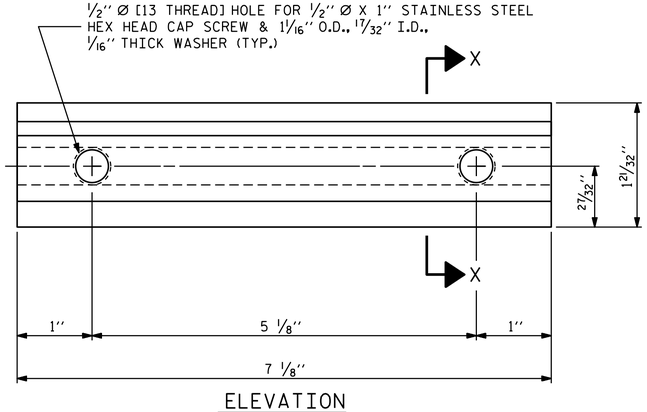
TOP & MIDDLE RAIL EXPANSION BAR



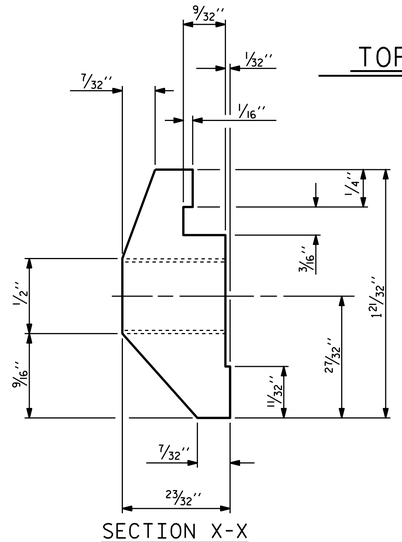
TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION



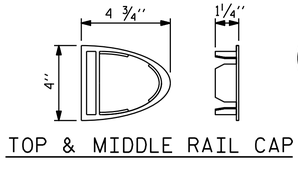
ELEVATION



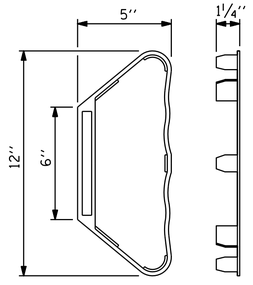
SECTION X-X

CLAMP BAR DETAIL

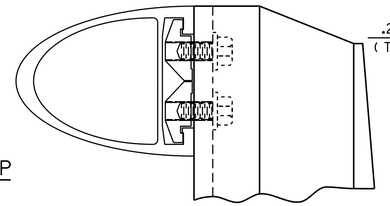
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

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 AND 1 3/4'' FOR 5/8'' FERRULES.

B. 3 - 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. 2 - 5/8'' Ø X 2 1/4'' 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 5/8'' Ø X 2 1/4'' 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.

D. 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.

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

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

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

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith Jr
EDC877061748490...
8/18/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			37

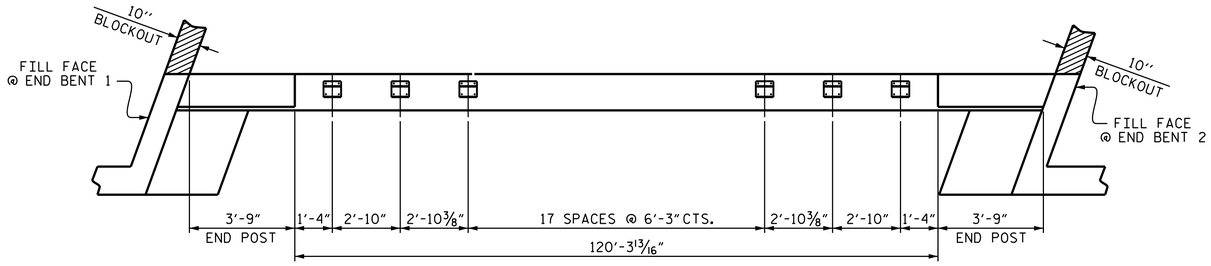
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STR. #2

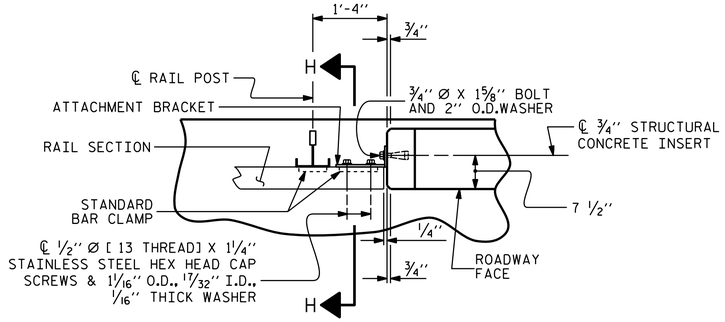
STD. NO. BMR6

ASSEMBLED BY : KEITH D. LAYNE	DATE : 1/20/16		
CHECKED BY : J. D. HAWK	DATE : 12/18/15		
DRAWN BY : JMB 1/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : GGH 1/88	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_3MR_02.dgn
jpadams

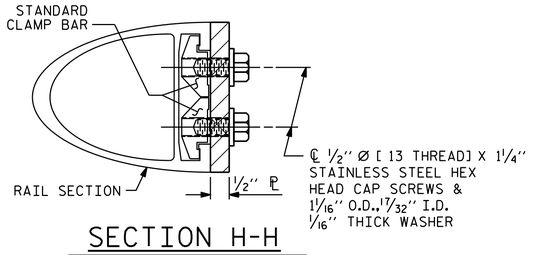


PLAN OF RAIL POST SPACINGS



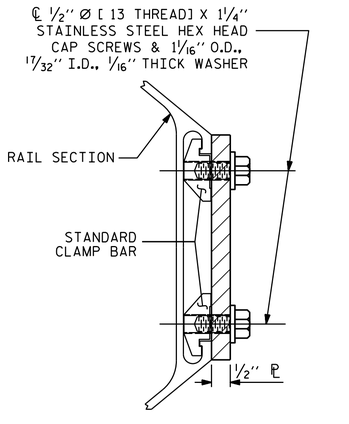
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" ℄ NOT SHOWN FOR CLARITY)



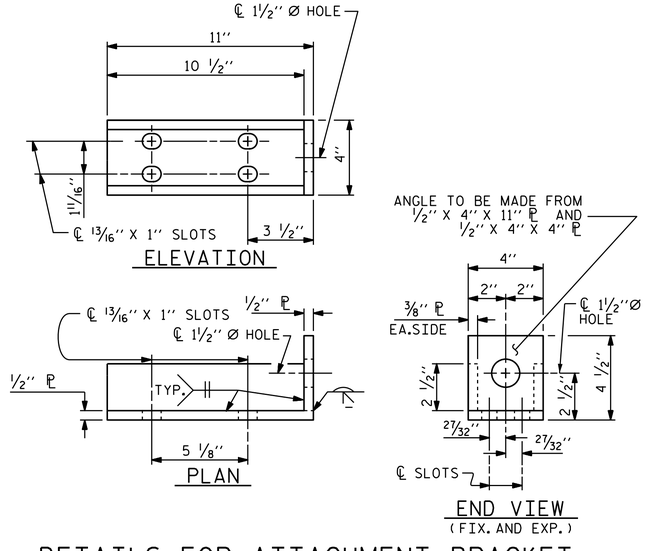
SECTION H-H

(FOR TOP & MIDDLE RAIL)



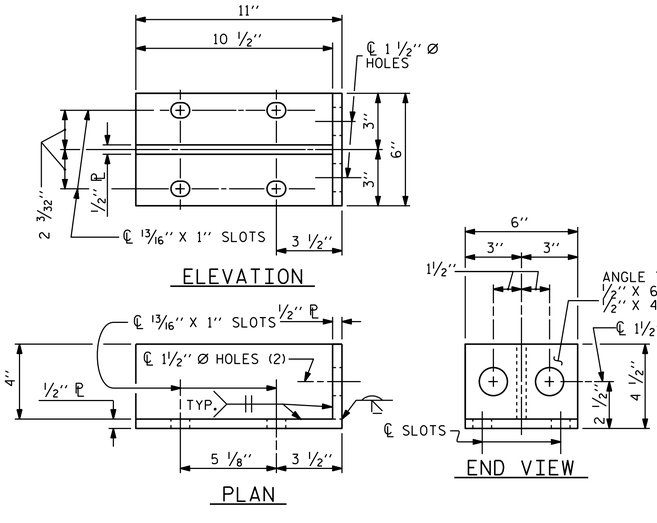
SECTION H-H

(FOR BOTTOM RAIL)



DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" 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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" 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 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

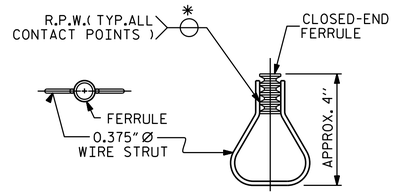
STRUCTURAL CONCRETE INSERT

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 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" 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.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-20
1			3			TOTAL SHEETS
2			4			37

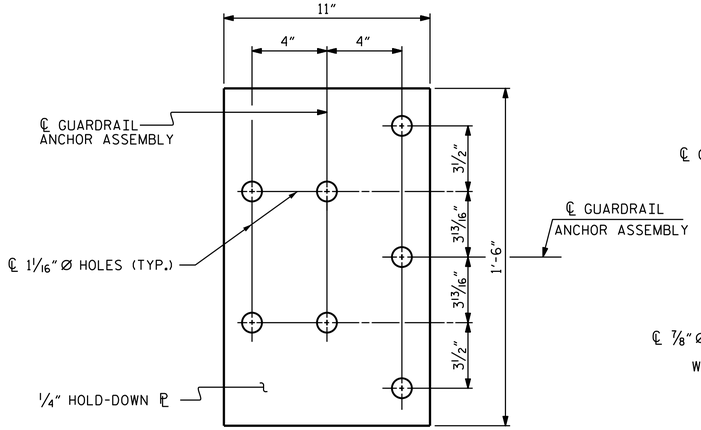
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : KEITH D. LAYNE	DATE : 1/20/16	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : JMB 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

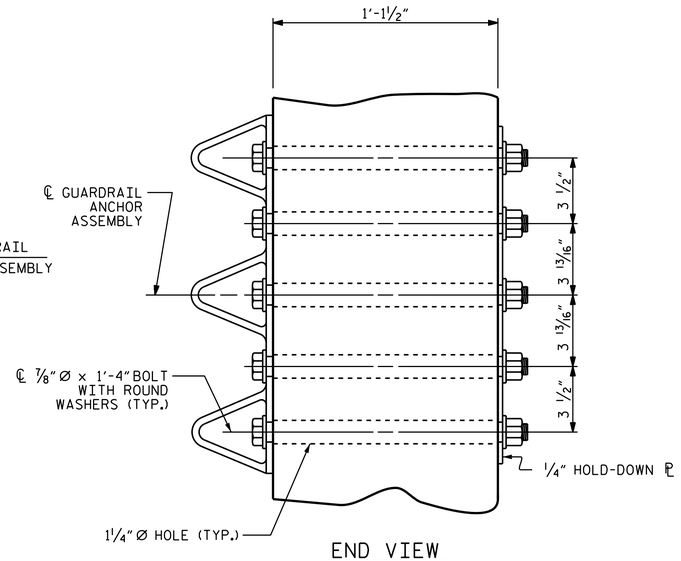
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_3MR_02.dgn
jpadams

STR. #2

STD. NO. BMR7



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

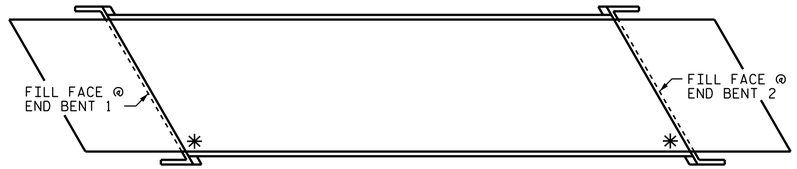
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

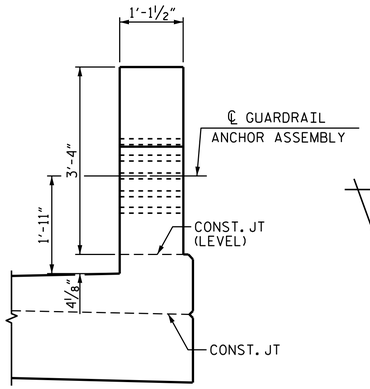
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

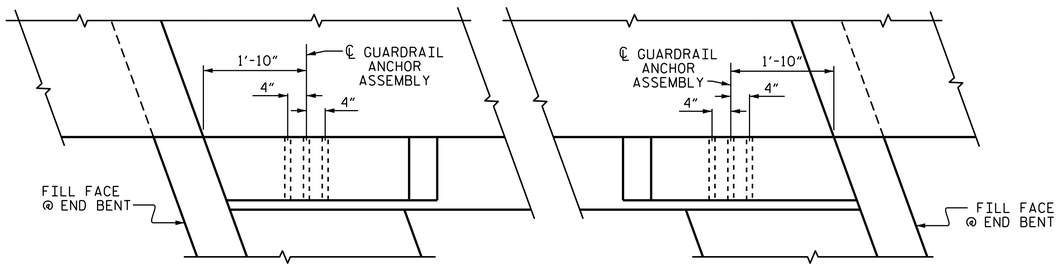


SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY



END VIEW



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

Docusigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

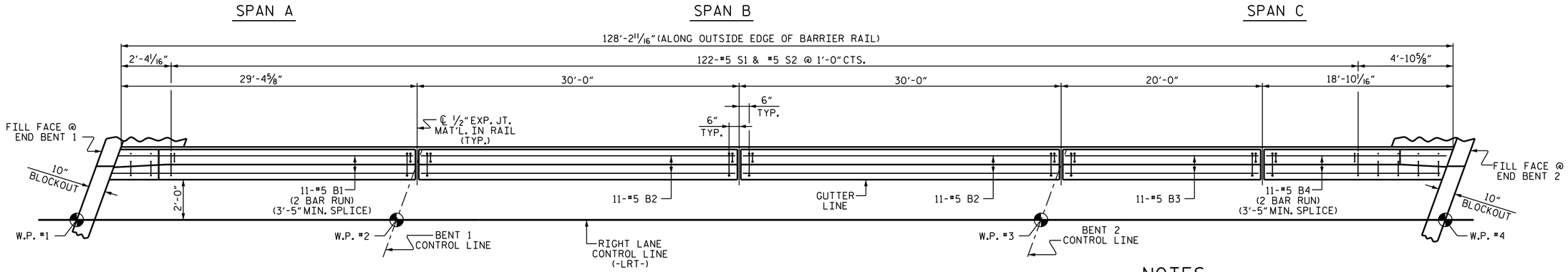
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-21
1			3			TOTAL SHEETS
2			4			37

STR. #2

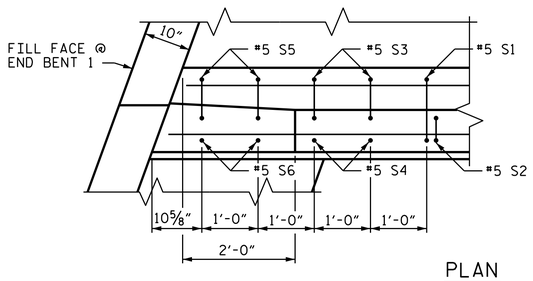
STD. NO. GRA3

ASSEMBLED BY : KEITH D. LAYNE	DATE : 1/20/16	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : MAA 5/10	REV. 12/5/11	MAA/GM
CHECKED BY : GM 5/10	REV. 6/13	MAA/GM
	REV. 1/15	MAA/TMG

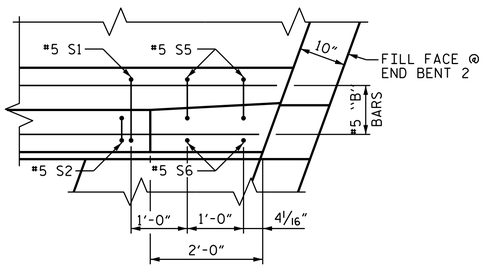
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_3MR_02.dgn
jpadams



PLAN OF CONCRETE BARRIER RAIL



PLAN

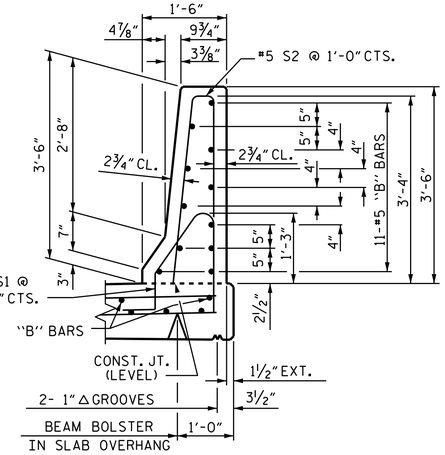


SIDE VIEW

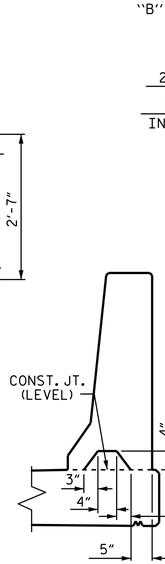
END VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

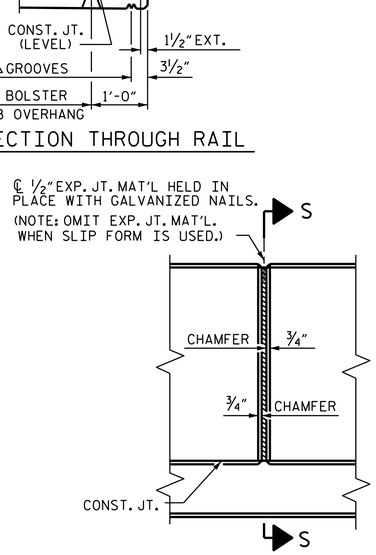


SECTION THROUGH RAIL



SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

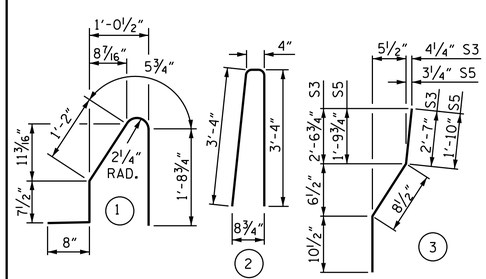
THE JOINT BETWEEN BRIDGE DECK AND APPROACH SLAB SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	16'-2"	371
* B2	22	#5	STR	29'-7"	679
* B3	11	#5	STR	19'-7"	225
* B4	22	#5	STR	11'-2"	256
* S1	122	#5	1	4'-8"	594
* S2	122	#5	2	7'-0"	891
* S3	2	#5	3	4'-2"	9
* S4	2	#5	STR.	4'-0"	8
* S5	4	#5	3	3'-5"	14
* S6	4	#5	STR.	3'-3"	14
* EPOXY COATED REINFORCING STEEL				LBS.	3,061
CLASS AA CONCRETE				C.Y.	17.5
CONCRETE BARRIER RAIL				LIN. FT.	128.22

PROJECT NO. U-3340

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC8770617AB490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S2-22

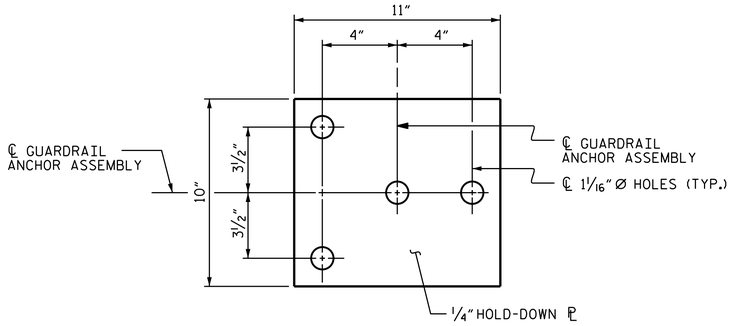
TOTAL SHEETS 37

ASSEMBLED BY : K. D. LAYNE	DATE : 1/20/16	
CHECKED BY : J. D. HAWK	DATE : 12/18/15	
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

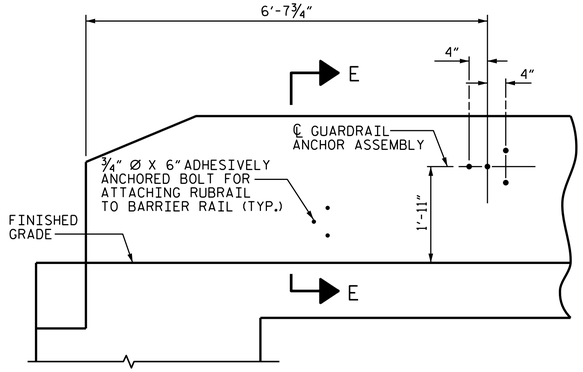
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_CBR_02.dgn
jpadams

STR. #2

STD. NO. CBR1



PLAN



ELEVATION

NOTES

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

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

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

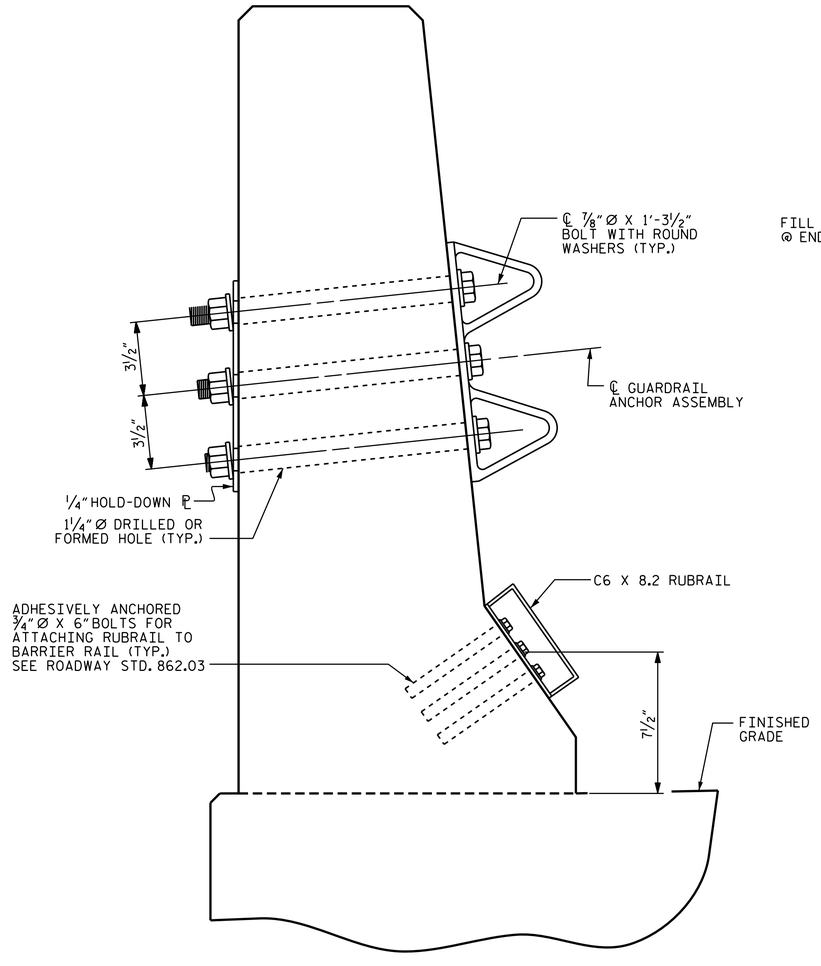
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

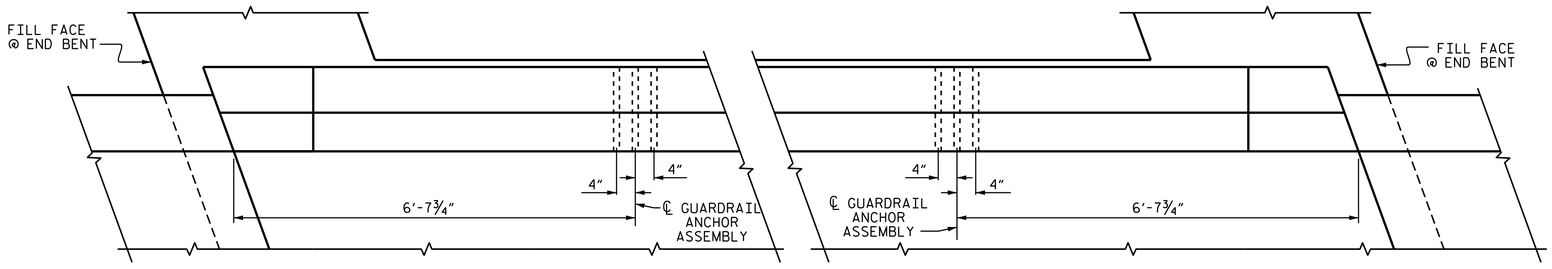
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



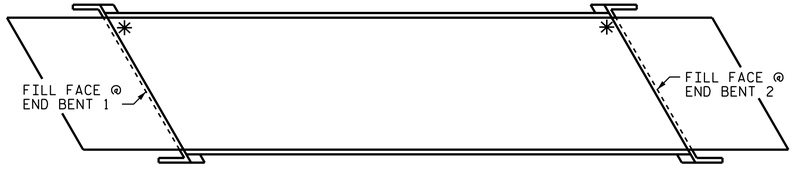
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3340

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

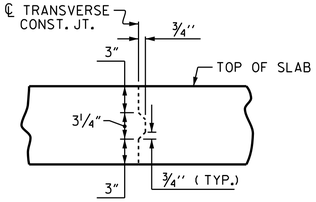
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-23
1			3			TOTAL SHEETS
2			4			37

STR. #2

STD. NO. GRA2

ASSEMBLED BY : K. D. LAYNE		DATE : 1/20/16	
CHECKED BY : J. D. HAWK		DATE : 12/80/15	
DRAWN BY : TLA 5/06	REV. 10/1/11		MAA/GM
CHECKED BY : GM 5/06	REV. 7/12		MAA/GM
	REV. 6/13		MAA/GM

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_CBR_02.dgn
jpadams



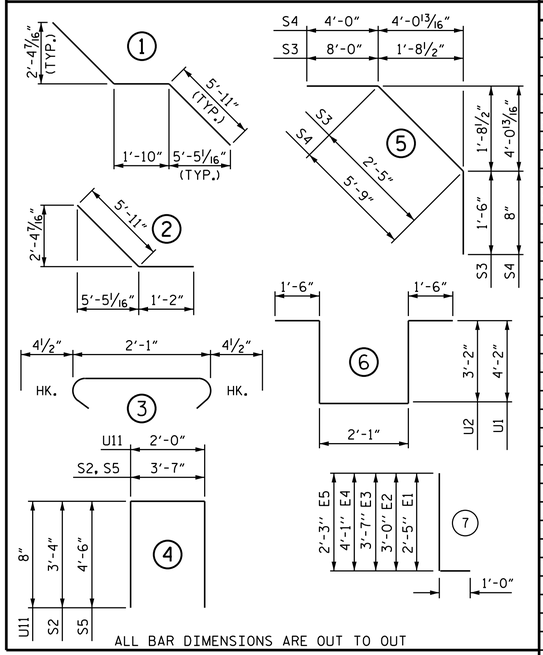
TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

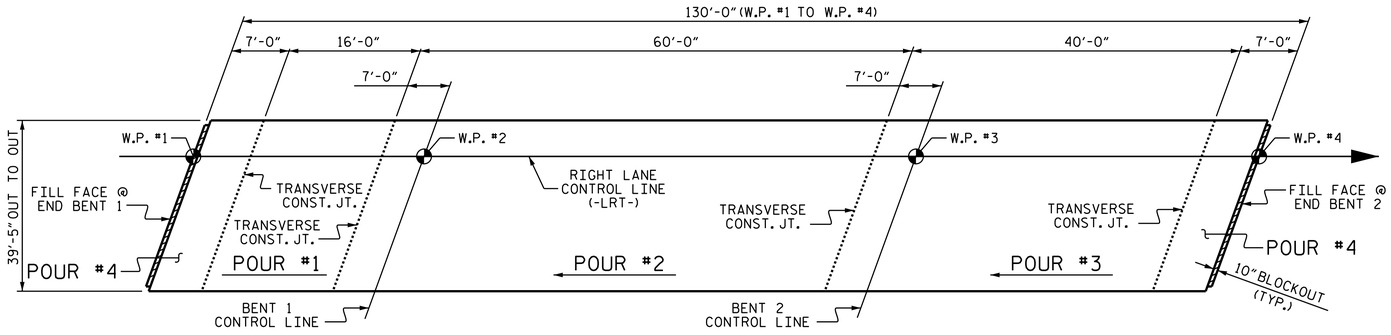
BAR TYPE



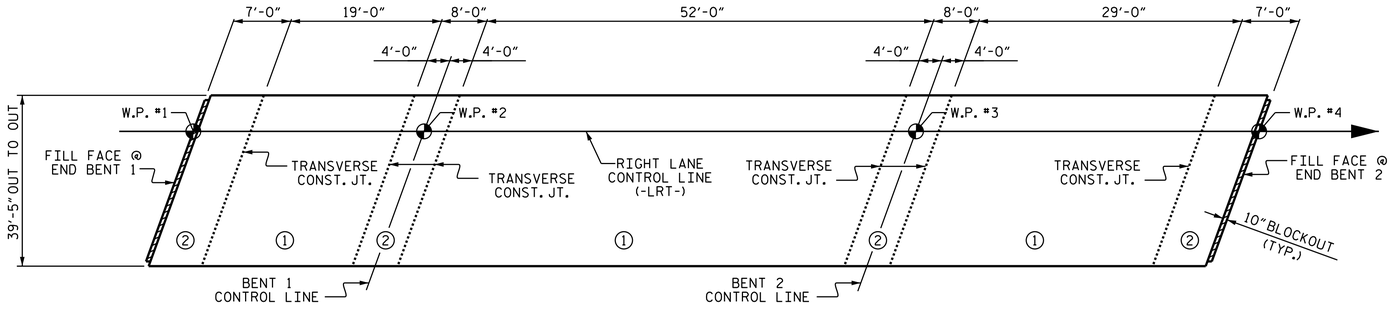
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	273	#5	STR	39'-1"	11129	✳B7	51	#5	STR	15'-0"	798
A2	273	#5	STR	39'-1"	11129	✳B8	27	#4	STR	15'-2"	274
						B9	183	#5	STR	44'-1"	8414
✳A101	4	#5	STR	37'-2"	155	✳B11	30	#4	STR	27'-3"	546
✳A102	4	#5	STR	34'-11"	146						
✳A103	4	#5	STR	32'-7"	136	✳G11	131	#4	STR	6'-3"	547
✳A104	4	#5	STR	30'-4"	127						
✳A105	4	#5	STR	28'-0"	117	✳E1	4	#7	7	3'-5"	28
✳A106	4	#5	STR	25'-9"	107	✳E2	4	#7	7	4'-0"	33
✳A107	4	#5	STR	23'-5"	98	✳E3	4	#7	7	4'-7"	37
✳A108	4	#5	STR	21'-2"	88	✳E4	4	#7	7	5'-1"	42
✳A109	4	#5	STR	18'-10"	79	✳E5	2	#7	7	3'-3"	13
✳A110	4	#5	STR	16'-7"	69						
✳A111	4	#5	STR	14'-3"	59	✳F1	2	#6	STR	3'-1"	9
✳A112	4	#5	STR	12'-0"	50	✳F2	4	#6	STR	3'-6"	21
✳A113	4	#5	STR	9'-8"	40	✳F3	2	#6	STR	4'-3"	13
✳A114	4	#5	STR	7'-5"	31	✳F4	2	#6	STR	3'-1"	9
✳A115	4	#5	STR	5'-2"	22	✳F5	4	#6	STR	3'-10"	23
✳A116	4	#5	STR	2'-10"	12	✳F6	2	#6	STR	3'-9"	11
A201	4	#5	STR	37'-2"	155	K1	16	#4	STR	21'-9"	232
A202	4	#5	STR	34'-11"	146	K2	18	#4	STR	10'-0"	120
A203	4	#5	STR	32'-7"	136	K3	6	#4	STR	9'-4"	37
A204	4	#5	STR	30'-4"	127	K4	36	#4	STR	10'-8"	257
A205	4	#5	STR	28'-0"	117	K5	4	#4	STR	2'-4"	6
A206	4	#5	STR	25'-9"	107	K6	4	#4	STR	2'-1"	6
A207	4	#5	STR	23'-5"	98	K7	8	#4	STR	2'-8"	14
A208	4	#5	STR	21'-2"	88	K9	12	#4	STR	8'-1"	65
A209	4	#5	STR	18'-10"	79	K10	16	#4	1	13'-8"	146
A210	4	#5	STR	16'-7"	69	K11	16	#4	2	7'-1"	76
A211	4	#5	STR	14'-3"	59						
A212	4	#5	STR	12'-0"	50	S1	168	#4	3	2'-10"	318
A213	4	#5	STR	9'-8"	40	S2	68	#4	4	10'-3"	466
A214	4	#5	STR	7'-5"	31	✳S3	72	#4	5	11'-11"	573
A215	4	#5	STR	5'-2"	22	✳S4	64	#4	5	10'-5"	445
A216	4	#5	STR	2'-10"	12	S5	4	#4	4	12'-7"	34
✳B1	208	#5	STR	10'-10"	2350	U1	48	#4	6	13'-5"	430
✳B2	27	#4	STR	8'-2"	147	U2	12	#4	6	11'-5"	92
✳B3	53	#5	STR	37'-0"	2045	✳U11	40	#4	4	3'-4"	89
✳B4	51	#5	STR	13'-6"	718						
✳B5	27	#4	STR	18'-0"	325	REINFORCING STEEL				LBS.	23,178
✳B6	53	#5	STR	40'-0"	2211	✳ EPOXY COATED REINFORCING STEEL				LBS.	23,772



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE (SQ. FT. = 5,124)



OPTIONAL DECK POURING DETAIL

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3,000 PSI

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	20.8	———	———
POUR #2	90.0	———	———
POUR #3	63.3	———	———
POUR #4	58.3	———	———
SIDEWALK	22.4	———	———
END POSTS	0.9	———	———
TOTAL ✳✳	255.7	23,178	23,772

✳✳ QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,350 SQ. FT.
BRIDGE DECK	3,580 SQ. FT.
TOTAL	4,930 SQ. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH

DocuSigned by: Donald R. Smith, Jr. EDC87706174B490...

8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

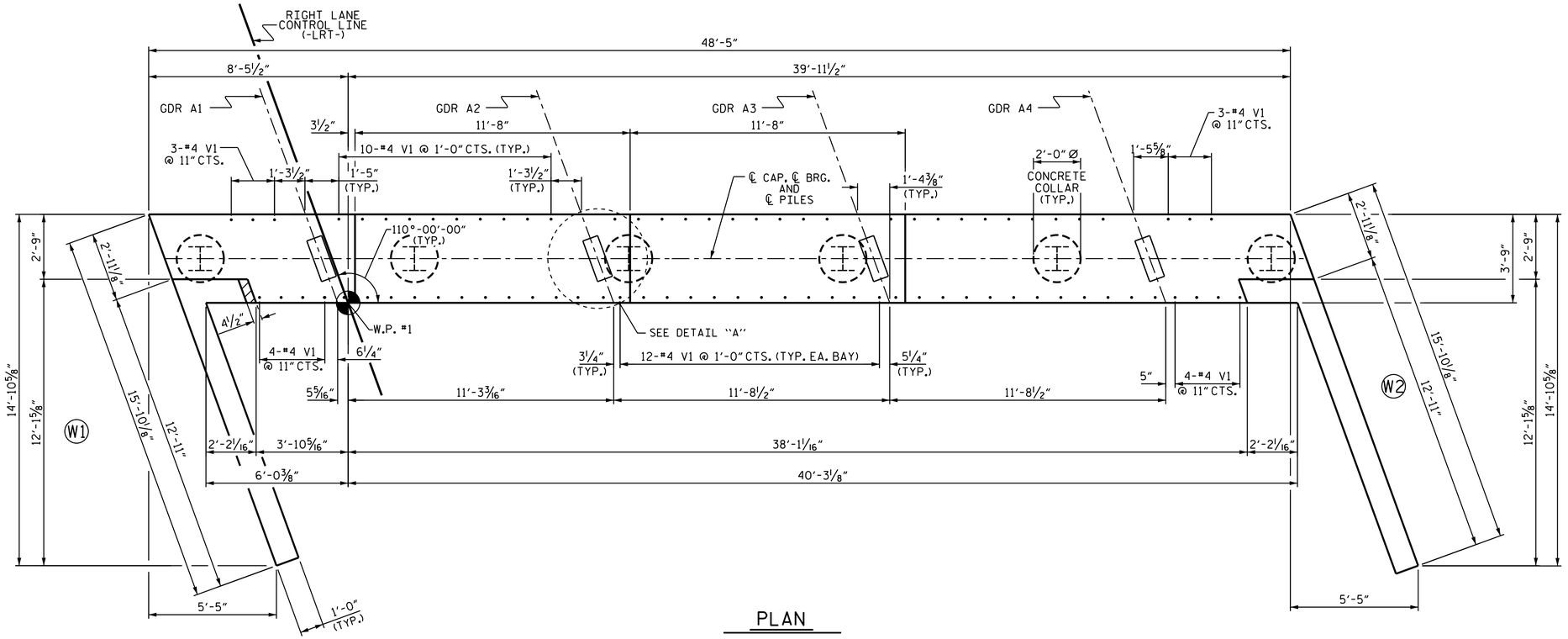
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-24
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : K. D. LAYNE DATE : 1/20/16
CHECKED BY : J. D. HAWK DATE : 12/18/15
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_BM_02.dgn
jpadams

STR. #2



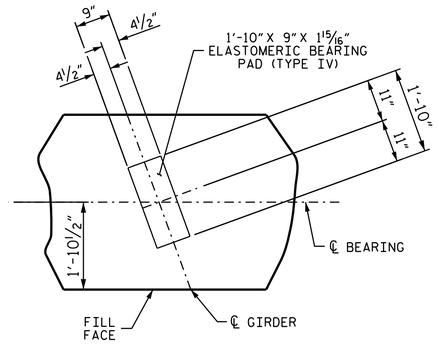
PLAN

NOTES

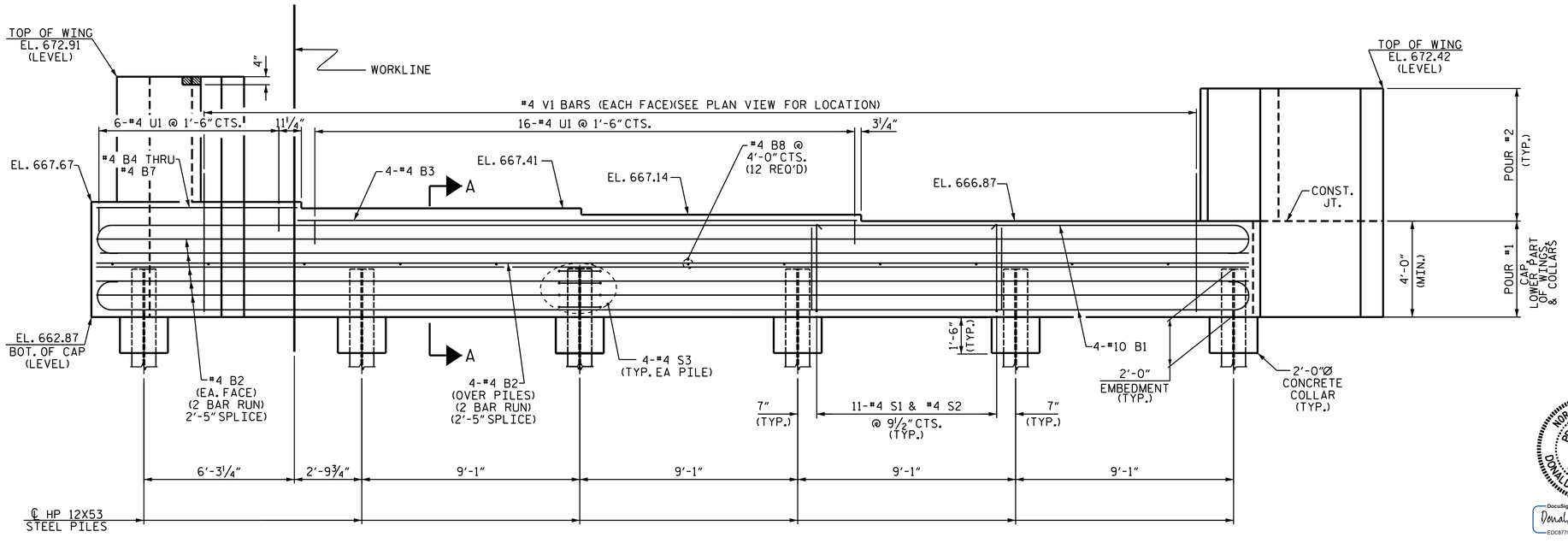
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

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

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



DETAIL "A"
(TYP. EACH GIRDER)



ELEVATION

PROJECT NO. U-3440
CABARRUS COUNTY
BRIDGE NO. 68+25.60 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

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

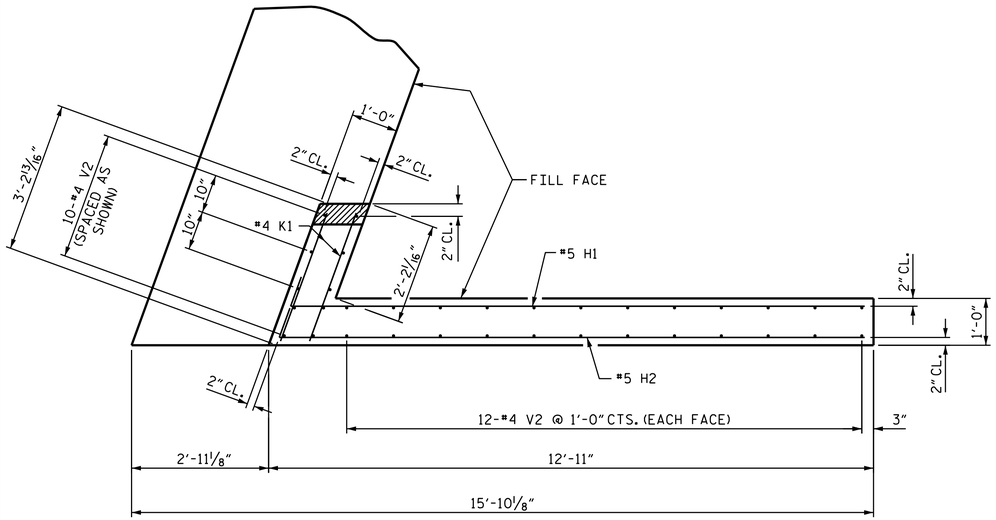
SHEET NO. S2-25
TOTAL SHEETS 37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PEIERSON DATE : 6/20/16

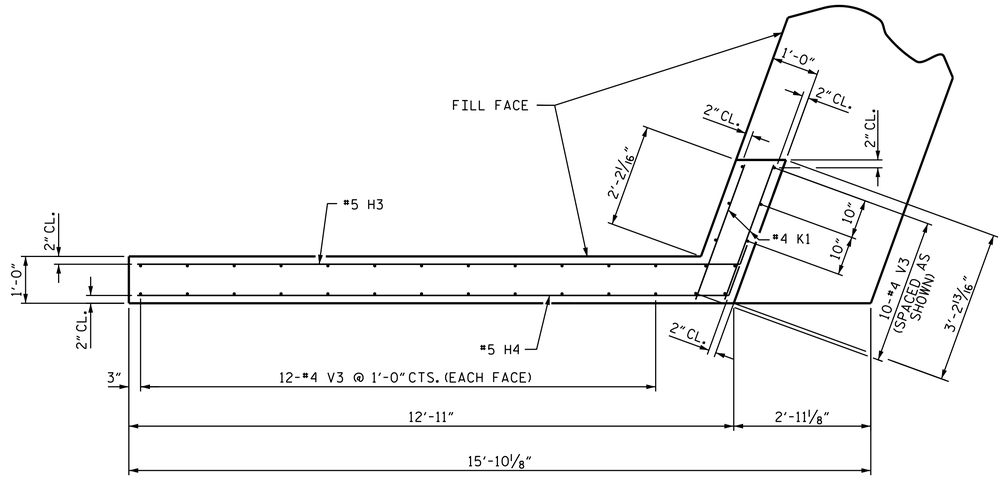
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams

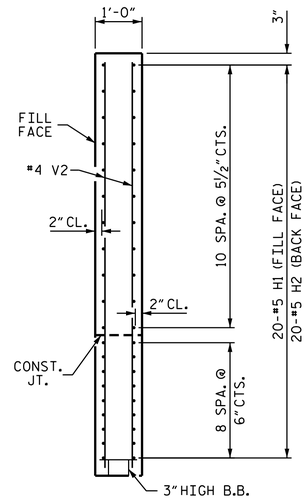
STR. #2



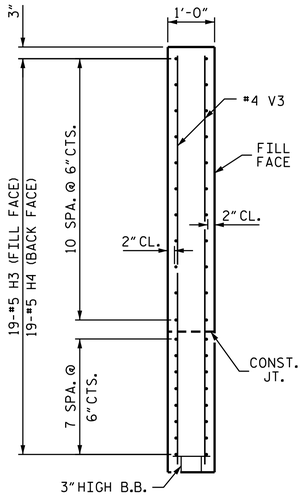
PLAN OF WING W1



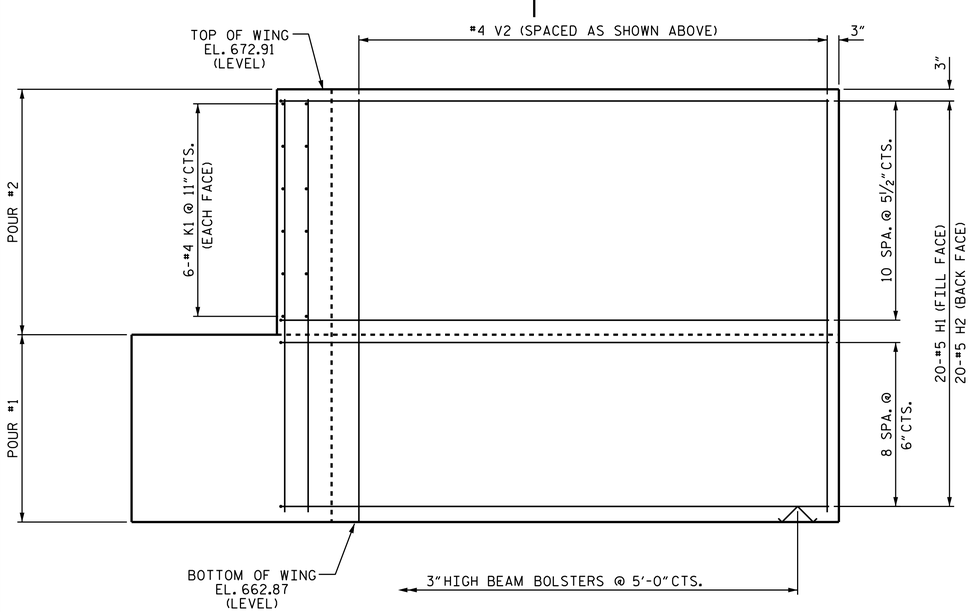
PLAN OF WING W2



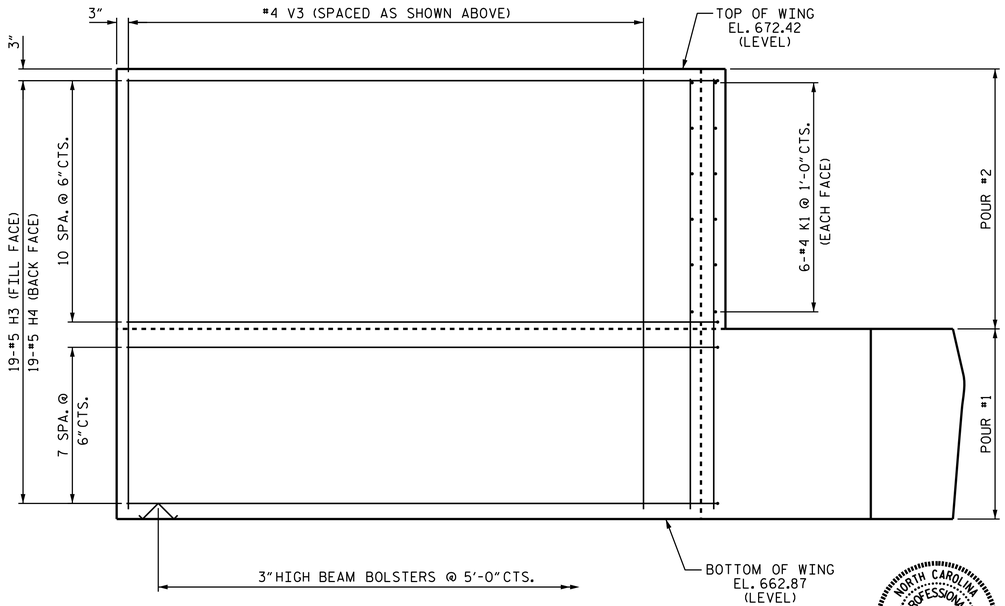
SECTION X-X



SECTION Y-Y



ELEVATION OF WING W1



ELEVATION OF WING W2

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC877061748490... 8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

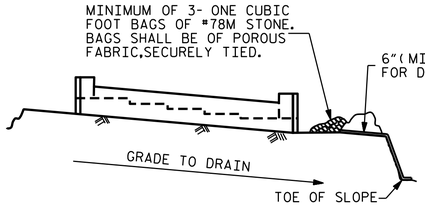
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams

STR. #2

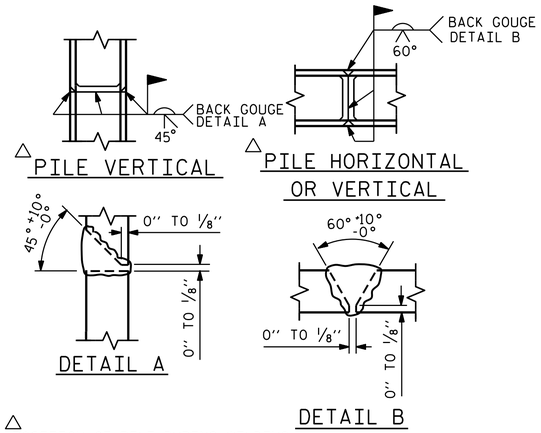


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

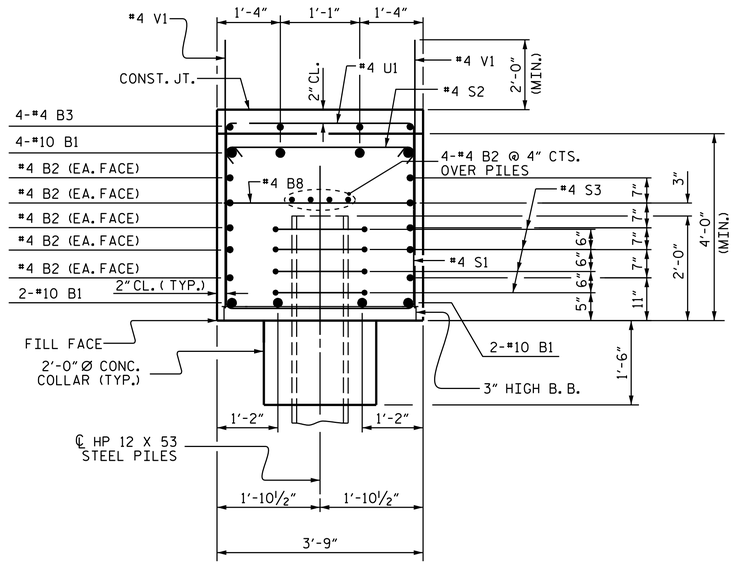
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



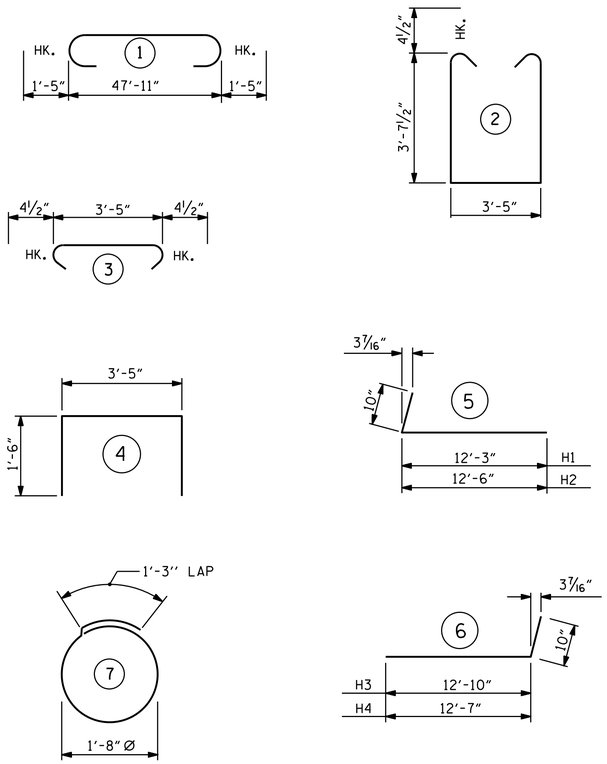
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	50'-9"	1747
B2	28	4	STR	25'-3"	472
B3	4	4	STR	23'-4"	62
B4	1	4	STR	8'-3"	6
B5	1	4	STR	7'-10"	5
B6	1	4	STR	7'-5"	5
B7	1	4	STR	7'-0"	5
B8	12	4	STR	3'-5"	27
H1	20	5	5	13'-1"	273
H2	20	5	5	13'-4"	278
H3	19	5	6	13'-8"	271
H4	19	5	6	13'-5"	266
K1	24	4	STR	2'-10"	45
S1	55	4	2	11'-5"	419
S2	55	4	3	4'-2"	153
S3	24	4	7	6'-6"	104
U1	22	4	4	6'-5"	94
V1	80	4	STR	6'-6"	347
V2	34	4	STR	9'-7"	218
V3	34	4	STR	9'-1"	206

REINFORCING STEEL 5,003 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	34.0 C.Y.
POUR #2	UPPER PART OF WINGS	6.0 C.Y.
TOTAL CLASS A CONCRETE		40.0 C.Y.

HP 12 X 53 STEEL PILES

No. 6 90 LIN. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

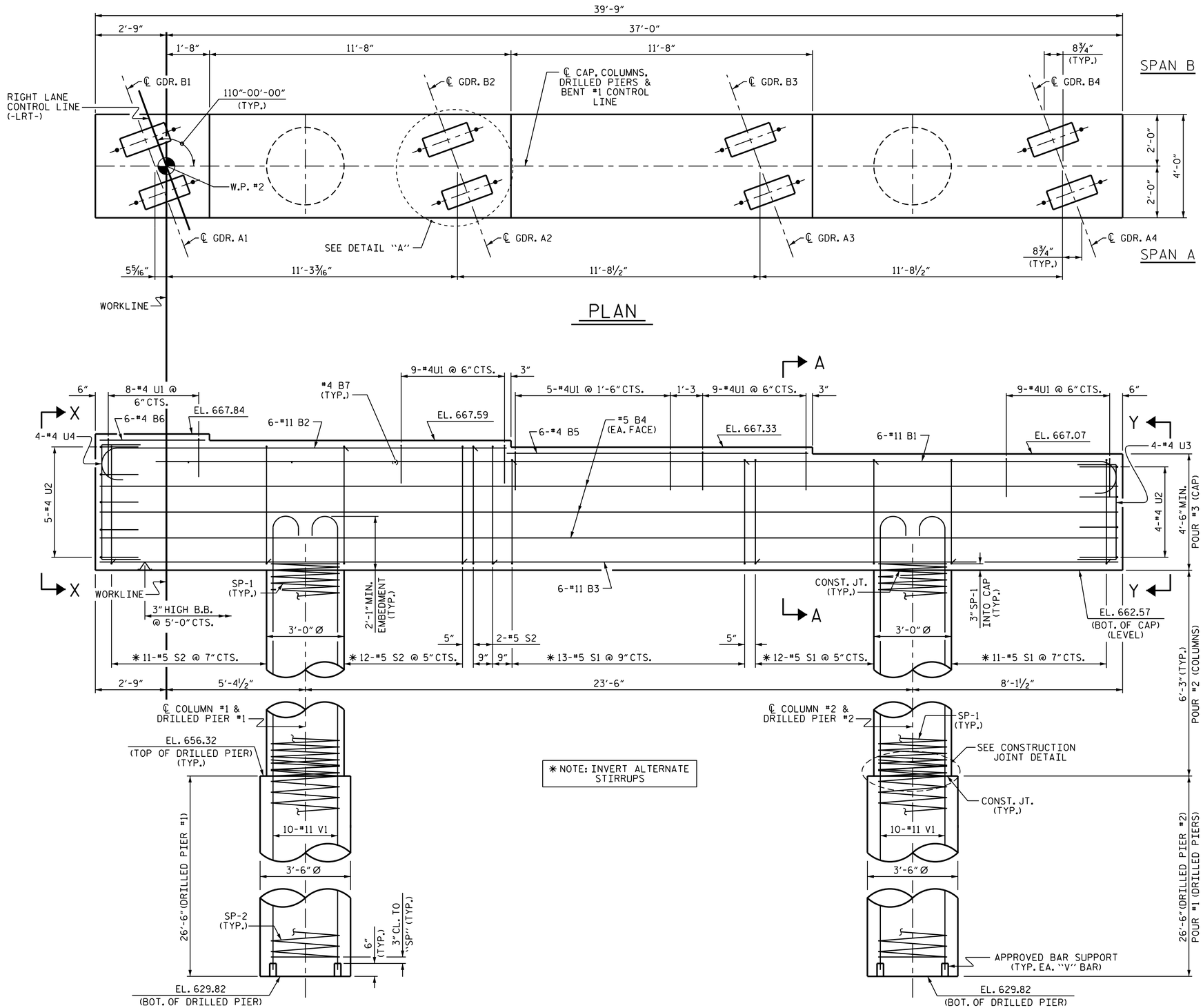
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			37

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams

STR. #2



✱ NOTE: INVERT ALTERNATE STIRRUPS

ELEVATION

NOTES

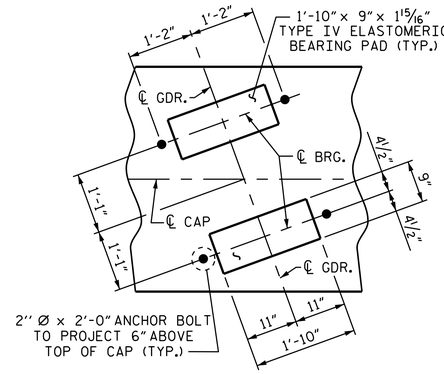
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

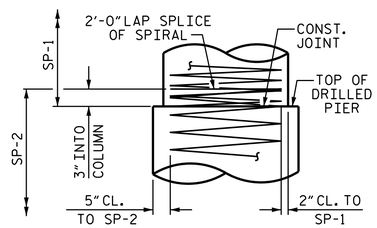
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIER IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



DETAIL "A"

(TYP. EA. BRIDGE SEAT)



CONSTRUCTION JOINT DETAIL

(TYP. EA. DRILLED PIER)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr. EDC8770617 4B490...
8/18/2016

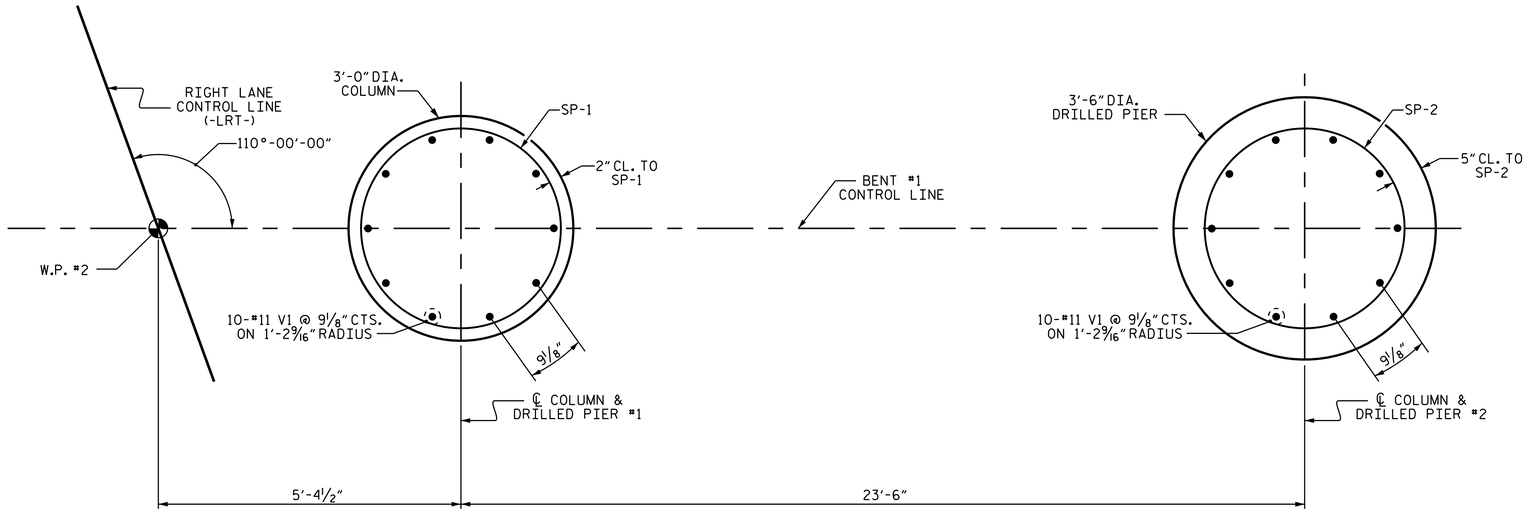
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-28
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : K. D. LAYNE DATE : 2/09/16
CHECKED BY : R. P. PATEL DATE : 2/10/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_Bts_02.dgn
jpadams

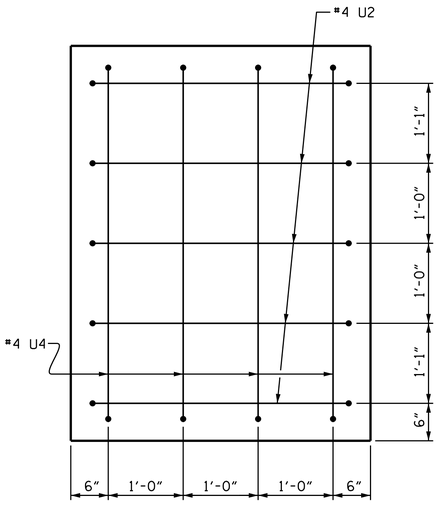
STR. #2



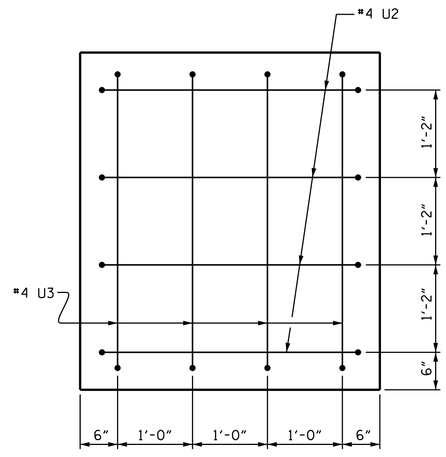
PLAN OF COLUMNS
(TYP.)

PLAN OF DRILLED PIERS
(TYP.)

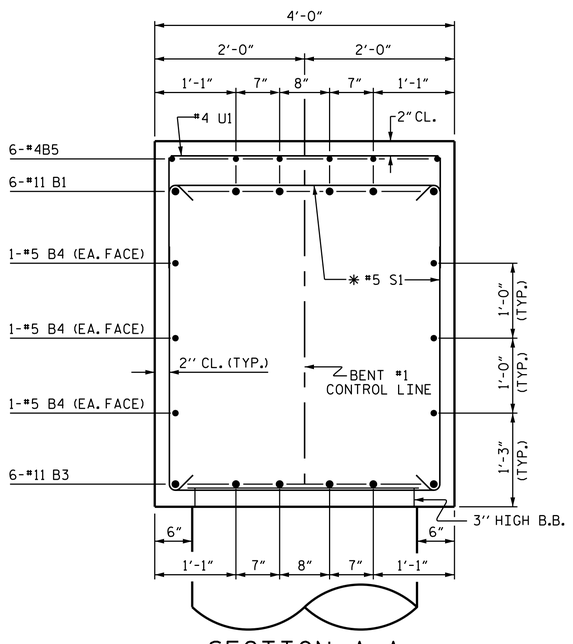
PLAN OF COLUMNS AND DRILLED PIERS



VIEW X-X

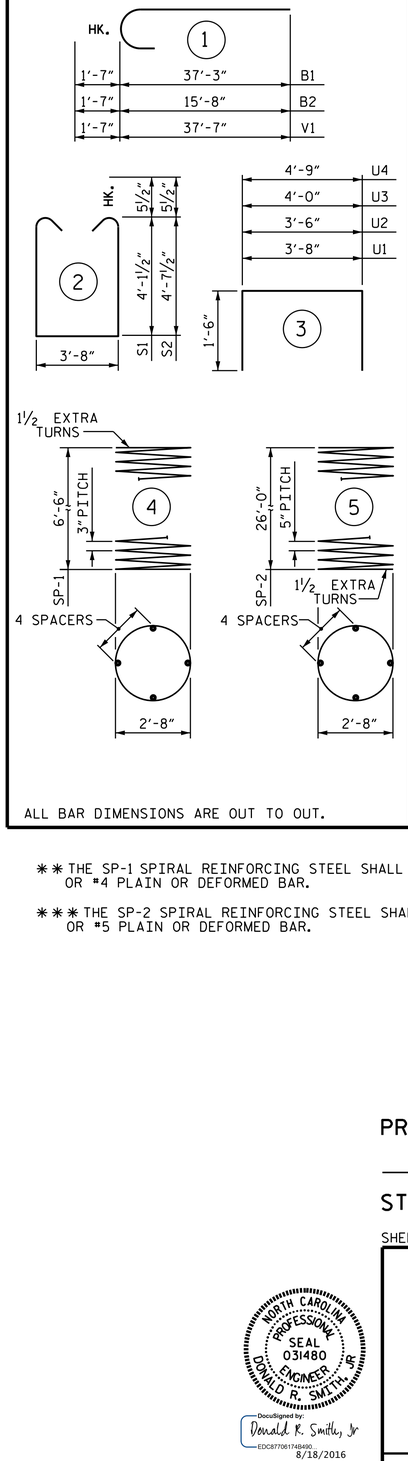


VIEW Y-Y



SECTION A-A
* INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	38'-10"	1238
B2	6	#11	1	17'-3"	550
B3	6	#11	STR	39'-5"	1257
B4	6	#5	STR	39'-5"	247
B5	6	#4	STR	11'-8"	47
B6	6	#4	STR	4'-1"	16
B7	3	#4	STR	3'-8"	7
S1	36	#5	2	12'-10"	482
S2	25	#5	2	13'-10"	361
U1	40	#4	3	6'-8"	178
U2	9	#4	3	6'-6"	39
U3	4	#4	3	7'-0"	19
U4	4	#4	3	7'-9"	21
V1	20	#11	1	39'-2"	4162
TOTAL REINFORCING STEEL LBS.					8,624
SP-1	2	**	4	226'-11"	303
SP-2	2	***	5	526'-5"	1098
SPIRAL COLUMN REINFORCING STEEL LBS.					1,401

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	3.3 C.Y.
POUR #3 (BENT CAP)	28.4 C.Y.
TOTAL	31.7 C.Y.

DRILLED PIER QUANTITIES

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	18.9 C.Y.
3'-6" DIA. DRILLED PIERS IN SOIL	4.0 LIN. FT.
3'-6" DIA. DRILLED PIERS NOT IN SOIL	49.0 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" DRILLED PIER	23.2 LIN. FT.
SID INSPECTION	2 EA.
SPT TESTING	4 EA.
CSL TUBES	224.0 LIN. FT.

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

*** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLDDRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

(RIGHT LANE)

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

SHEET NO. S2-29

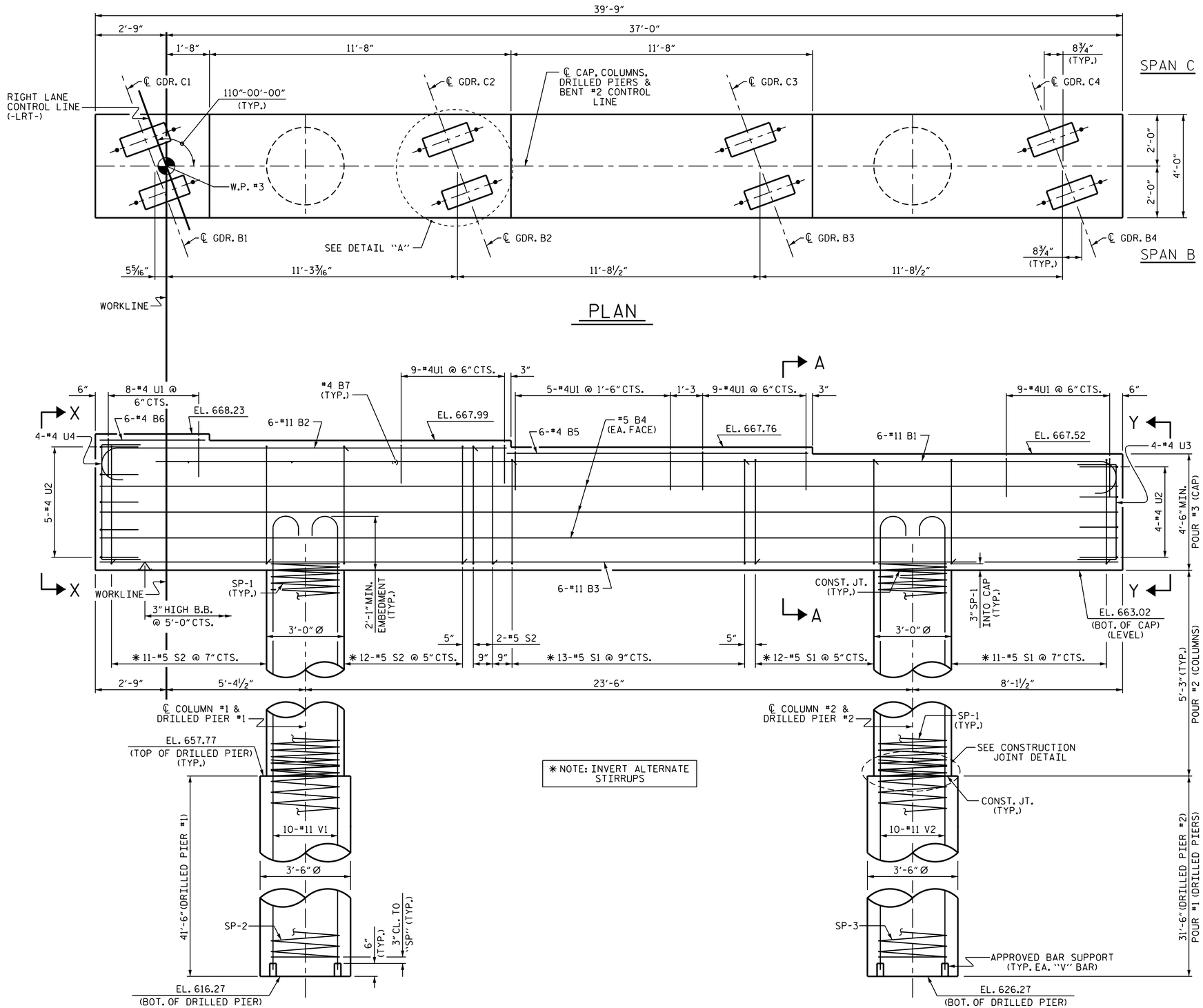
TOTAL SHEETS 37

DRAWN BY : K. D. LAYNE DATE : 2/09/16
CHECKED BY : R. P. PATEL DATE : 2/10/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_Bts_02.dgn
jpadams

STR. #2



✱ NOTE: INVERT ALTERNATE STIRRUPS

ELEVATION

NOTES

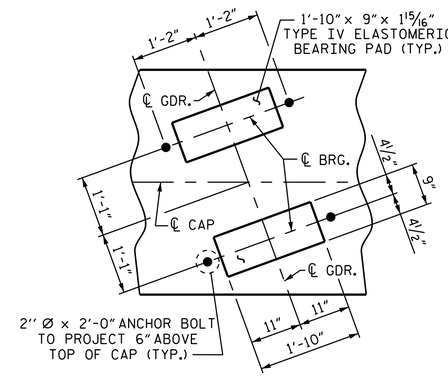
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

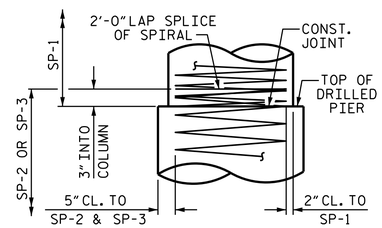
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIER IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.



DETAIL "A"

(TYP. EA. BRIDGE SEAT)



CONSTRUCTION JOINT DETAIL

(TYP. EA. DRILLED PIER)

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #2

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR

DocuSigned by: Donald R. Smith, Jr. EDC8770617 4B490... 8/18/2016

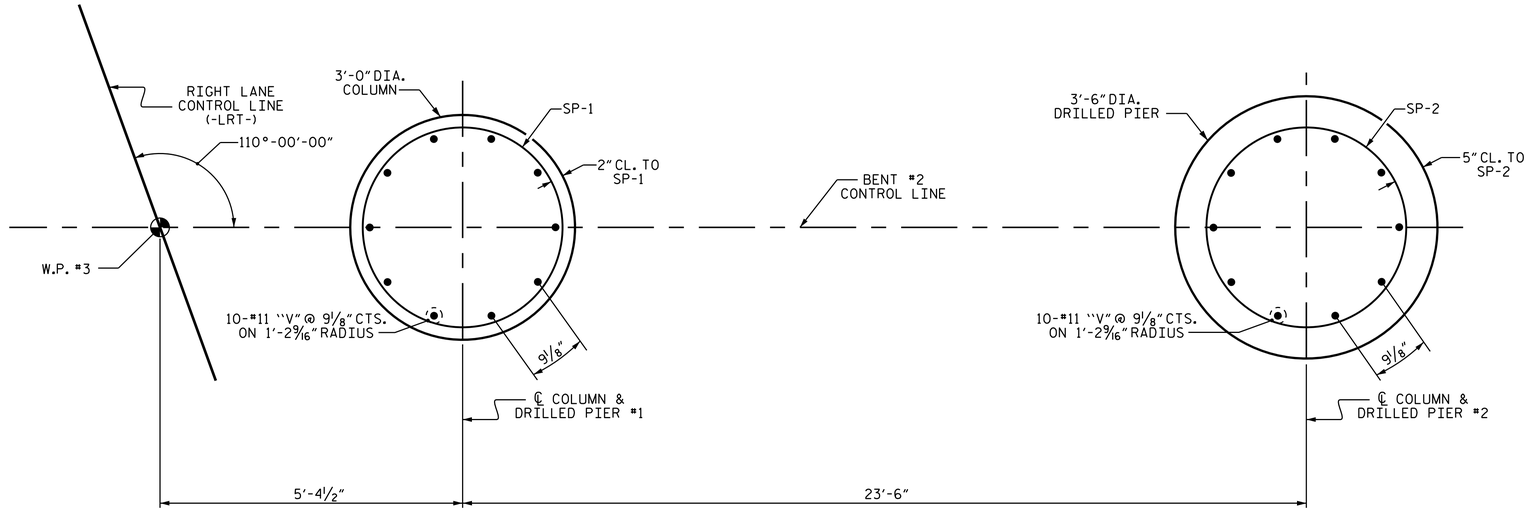
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-30
1			3			TOTAL SHEETS
2			4			37

DRAWN BY :	K. D. LAYNE	DATE : 2/09/16
CHECKED BY :	R. P. PATEL	DATE : 2/10/16
DESIGN ENGINEER OF RECORD:	T. R. PETERSON	DATE : 6/20/16

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_Bts_02.dgn
jpadams

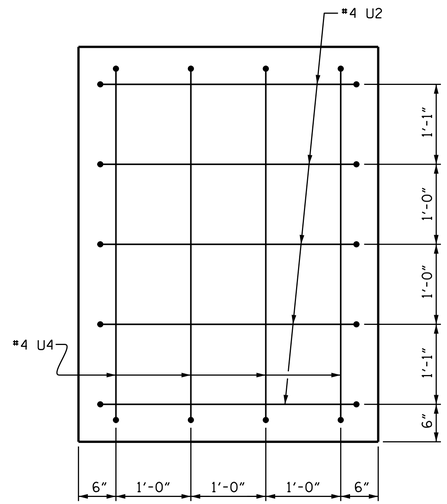
STR. #2



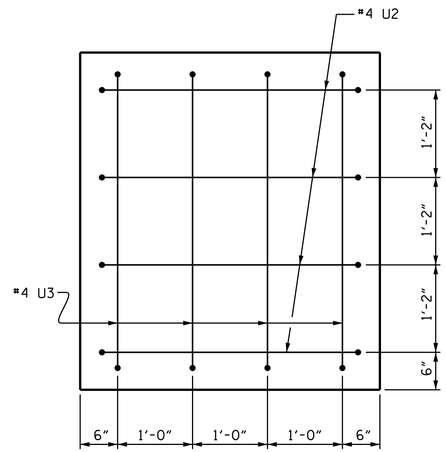
PLAN OF COLUMNS
(TYP.)

PLAN OF DRILLED PIERS
(TYP.)

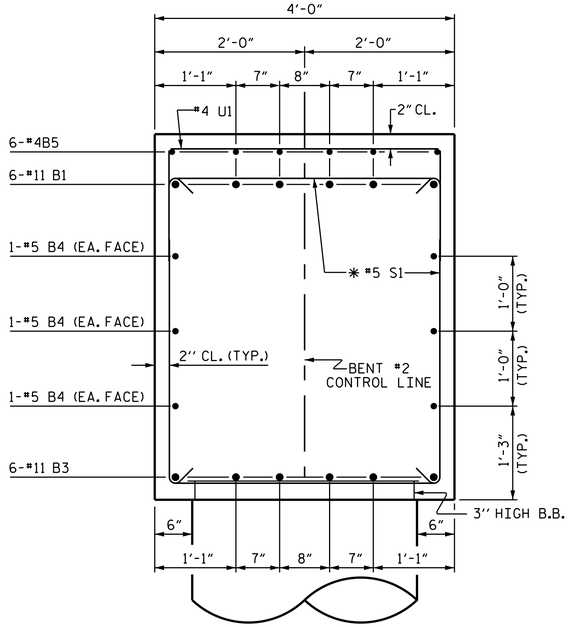
PLAN OF COLUMNS AND DRILLED PIERS



VIEW X-X

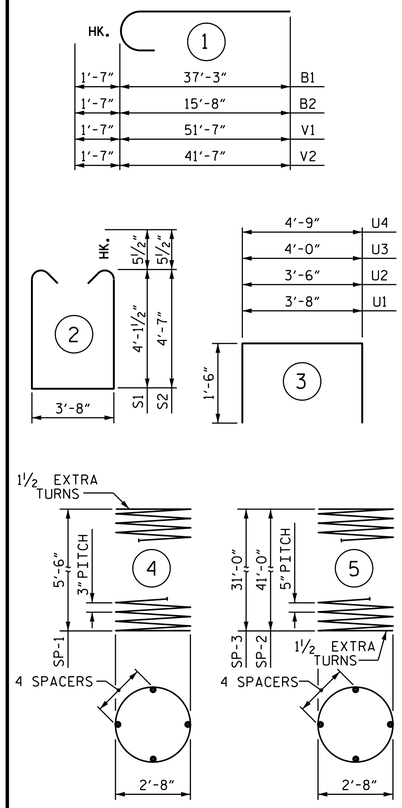


VIEW Y-Y



SECTION A-A
✱ INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	38'-10"	1238
B2	6	#11	1	17'-3"	550
B3	6	#11	STR	39'-5"	1257
B4	6	#5	STR	39'-5"	247
B5	6	#4	STR	11'-8"	47
B6	6	#4	STR	4'-1"	16
B7	3	#4	STR	3'-8"	7
S1	36	#5	2	12'-10"	482
S2	25	#5	2	13'-9"	359
U1	40	#4	3	6'-8"	178
U2	9	#4	3	6'-6"	39
U3	4	#4	3	7'-0"	19
U4	4	#4	3	7'-9"	21
V1	10	#11	1	53'-2"	2825
V2	10	#11	1	43'-2"	2293
TOTAL REINFORCING STEEL LBS.					9,578
SP-1	2	✱✱	4	193'-11"	259
SP-2	1	✱✱✱	5	822'-6"	858
SP-3	1	✱✱✱	5	625'-1"	652
SPIRAL COLUMN REINFORCING STEEL LBS.					1,769

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	2.7 C.Y.
POUR #3 (BENT CAP)	28.2 C.Y.
TOTAL	30.9 C.Y.

DRILLED PIER QUANTITIES

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	26.0 C.Y.
3'-6" DIA. DRILLED PIERS IN SOIL	46.0 LIN. FT.
3'-6" DIA. DRILLED PIERS NOT IN SOIL	27.0 LIN. FT.

SID INSPECTION	2 EA.
SPT TESTING	4 EA.
CSL TUBES	304.0 LIN. FT.

✱✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

✱✱✱ THE SP-2 AND SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #2

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH JR
DocuSigned by: Donald R. Smith, Jr
EDC877061748490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-31
1			3			TOTAL SHEETS
2			4			37

STR. #2

DRAWN BY : K. D. LAYNE DATE : 2/09/16
CHECKED BY : R. P. PATEL DATE : 2/10/16
DESIGN ENGINEER OF RECORD: T. R. PETERSON DATE : 6/20/16

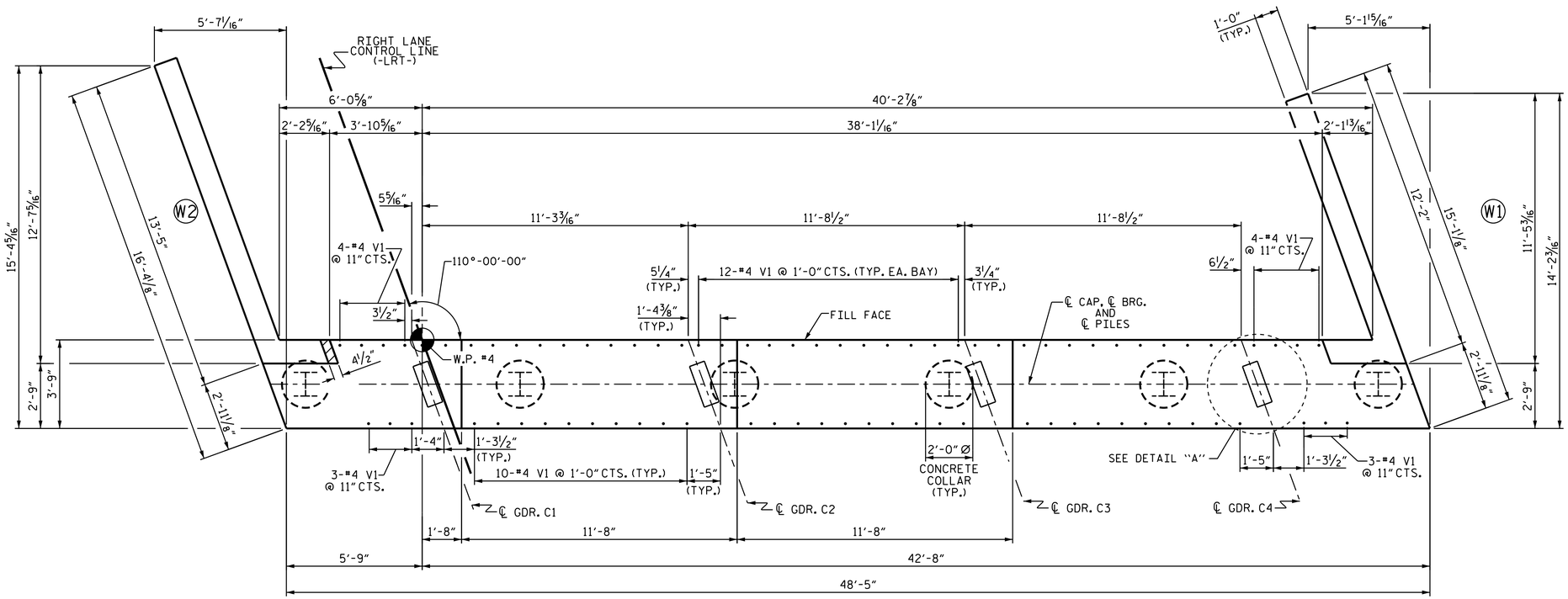
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_Bts_02.dgn
jpadams

NOTES

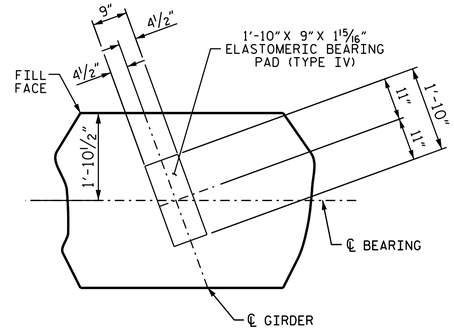
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

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

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE ROADWAY PLANS. REINFORCING STEEL IN THE WING MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

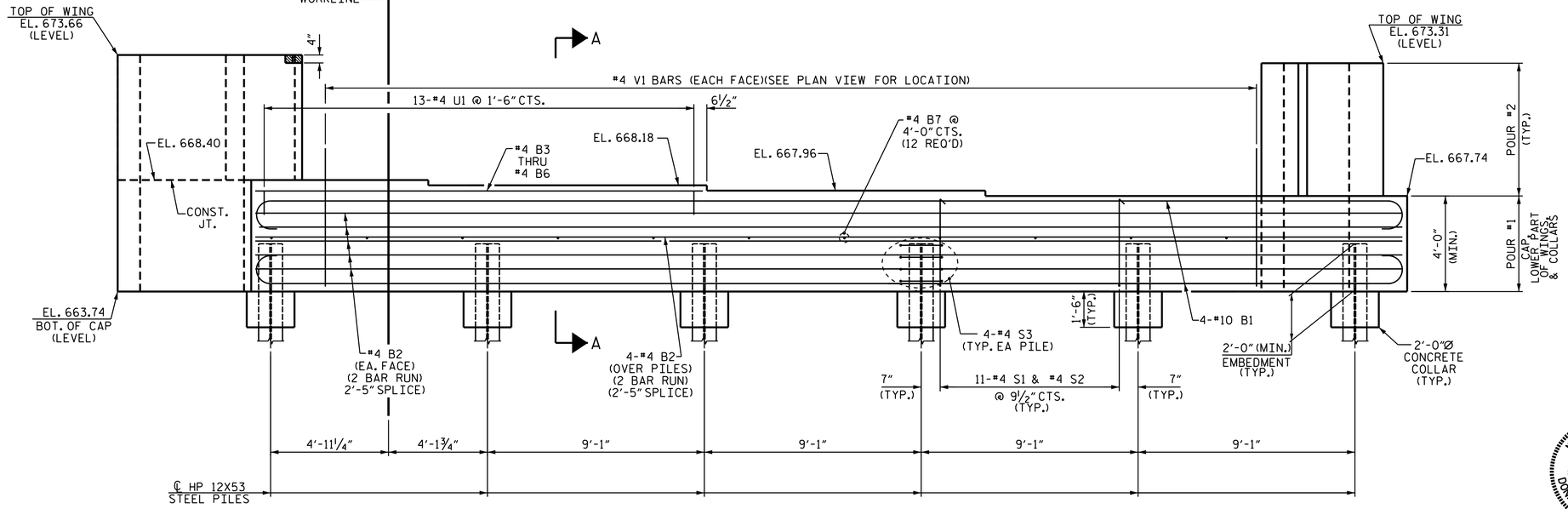


PLAN



DETAIL "A"

(TYP. EACH GIRDER)



ELEVATION

PROJECT NO. U-3440

CABARRUS COUNTY

BRIDGE NO. 68+25.60-L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

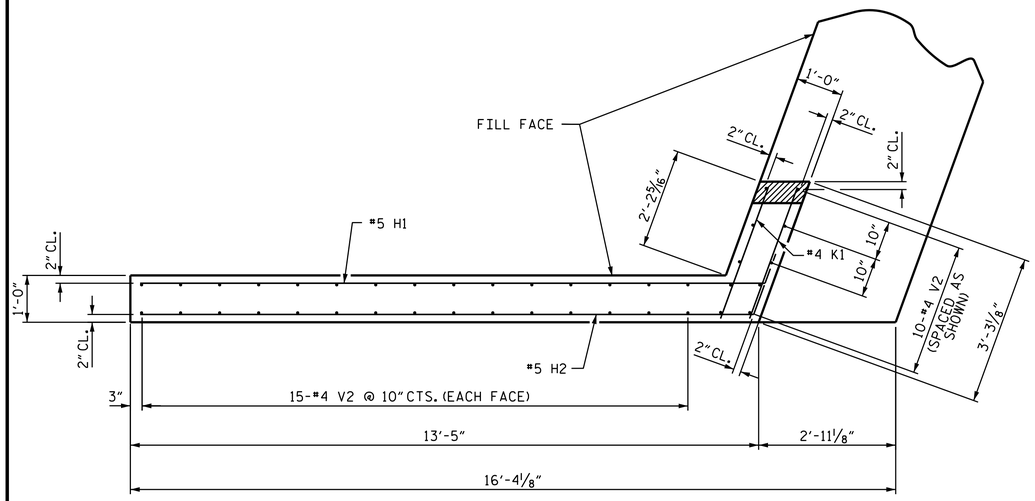
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-32
1			3			TOTAL SHEETS
2			4			37

STR. #2

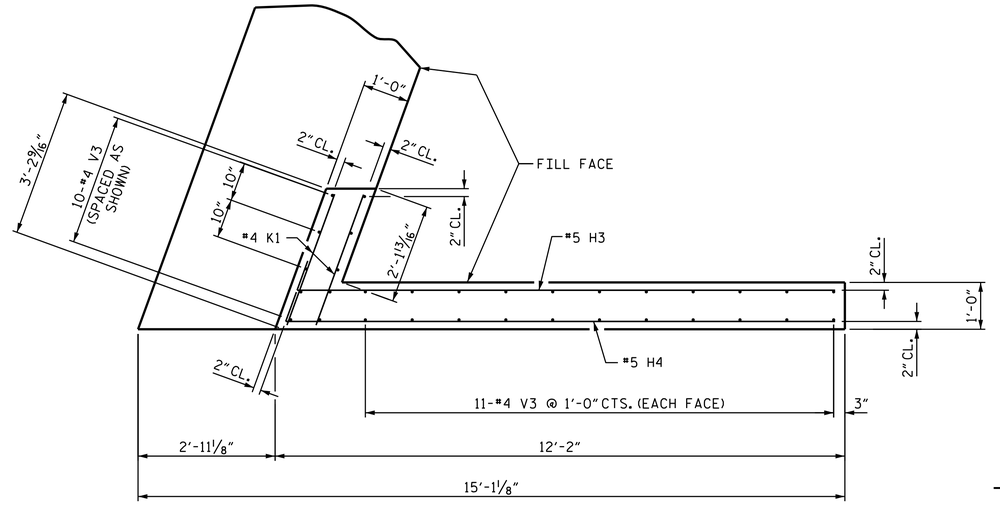
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	J.D.HAWK	DATE : 4/2016
CHECKED BY :	K.D. LAYNE	DATE : 4/2016
DESIGN ENGINEER OF RECORD:	T.R. PETERSON	DATE : 6/2016

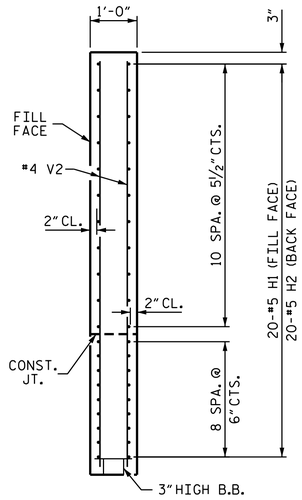
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams



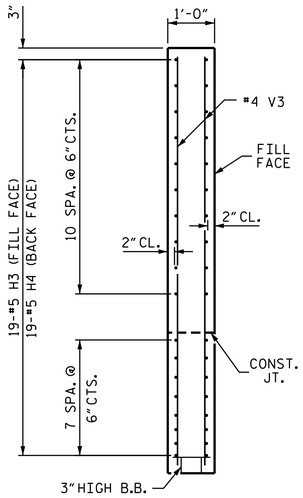
PLAN OF WING (W2)



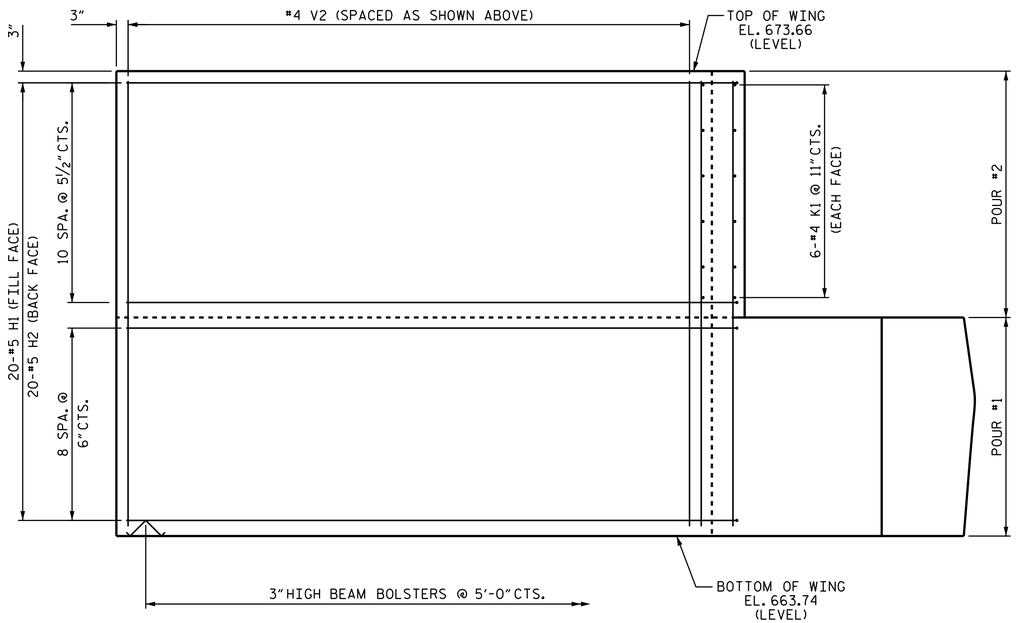
PLAN OF WING (W1)



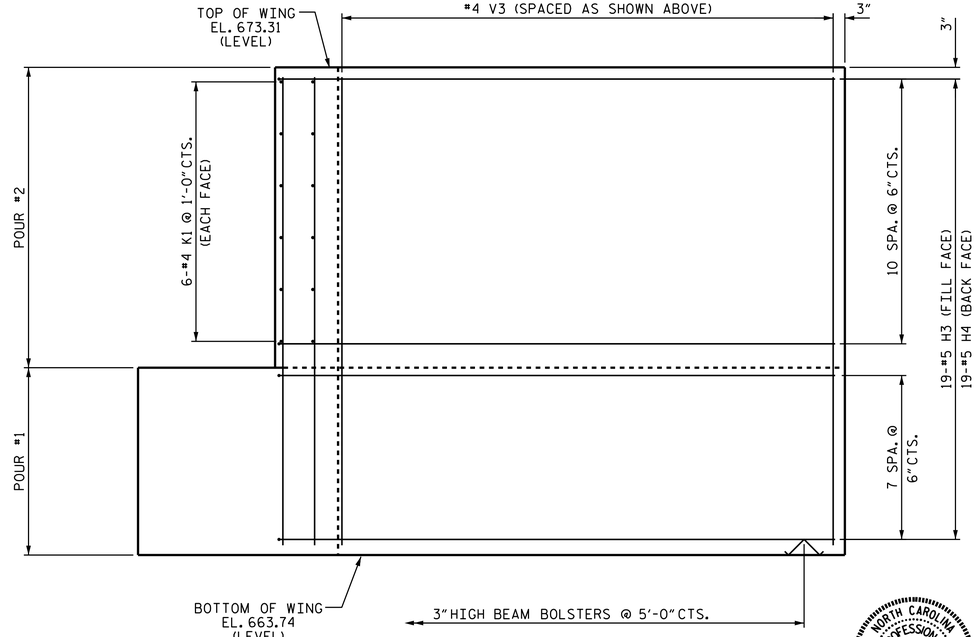
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W2)



ELEVATION OF WING (W1)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR

DocuSigned by: Donald R. Smith, Jr
EDC8770617 4B490...
8/18/2016

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

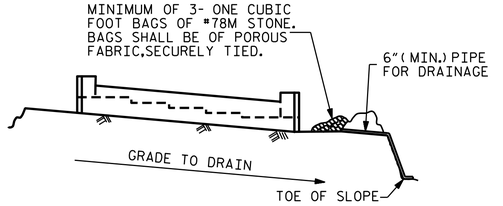
SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-33
1			3			TOTAL SHEETS
2			4			37

STR. #2

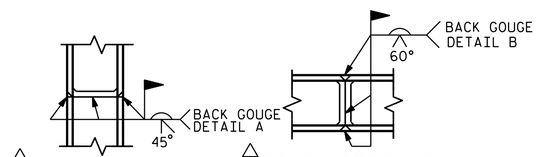


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

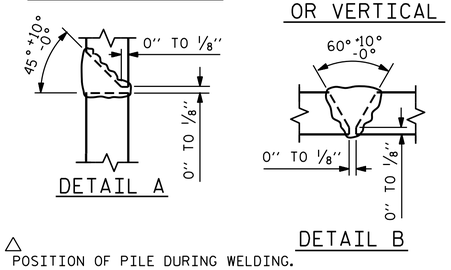
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



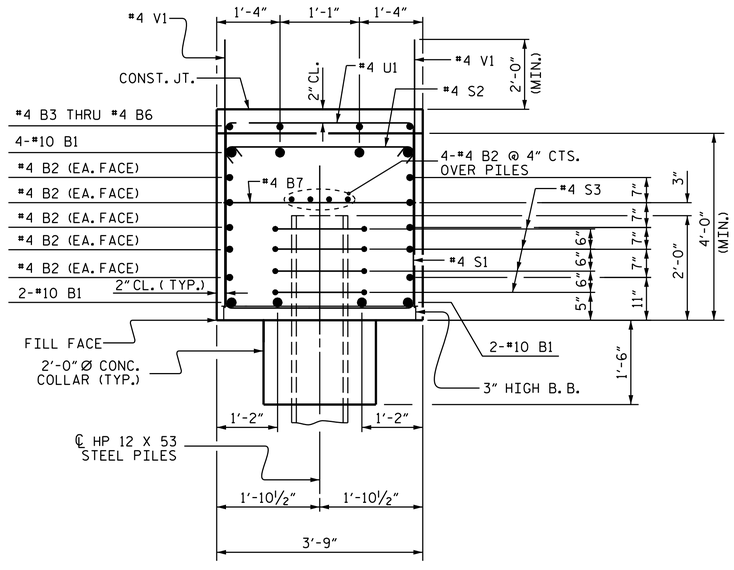
△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



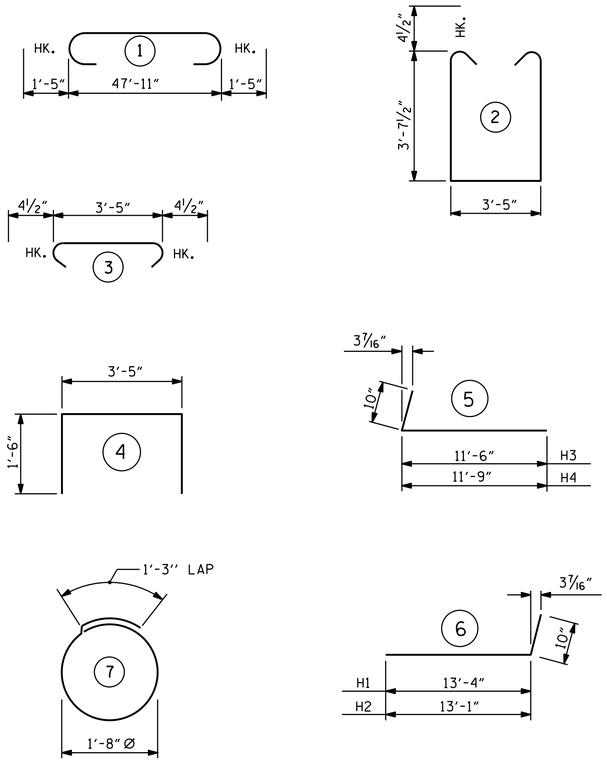
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	50'-9"	1747
B2	28	4	STR	25'-3"	472
B3	1	4	STR	19'-11"	13
B4	1	4	STR	19'-6"	13
B5	1	4	STR	19'-1"	13
B6	1	4	STR	18'-9"	13
B7	12	4	STR	3'-5"	27
H1	20	5	6	14'-2"	296
H2	20	5	6	13'-11"	290
H3	19	5	5	12'-4"	244
H4	19	5	5	12'-7"	249
K1	24	4	STR	2'-10"	45
S1	55	4	2	11'-5"	419
S2	55	4	3	4'-2"	153
S3	24	4	7	6'-6"	104
U1	13	4	4	6'-5"	56
V1	80	4	STR	6'-6"	347
V2	40	4	STR	9'-6"	254
V3	32	4	STR	9'-1"	194

REINFORCING STEEL 4,949 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	34.5 C.Y.
POUR #2	UPPER PART OF WINGS	6.0 C.Y.
TOTAL CLASS A CONCRETE		40.5 C.Y.

HP 12 X 53 STEEL PILES

No. 6 165 LIN. FT.

PROJECT NO. U-3440

CABARRUS COUNTY

STATION: 68+25.60 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

Docusigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

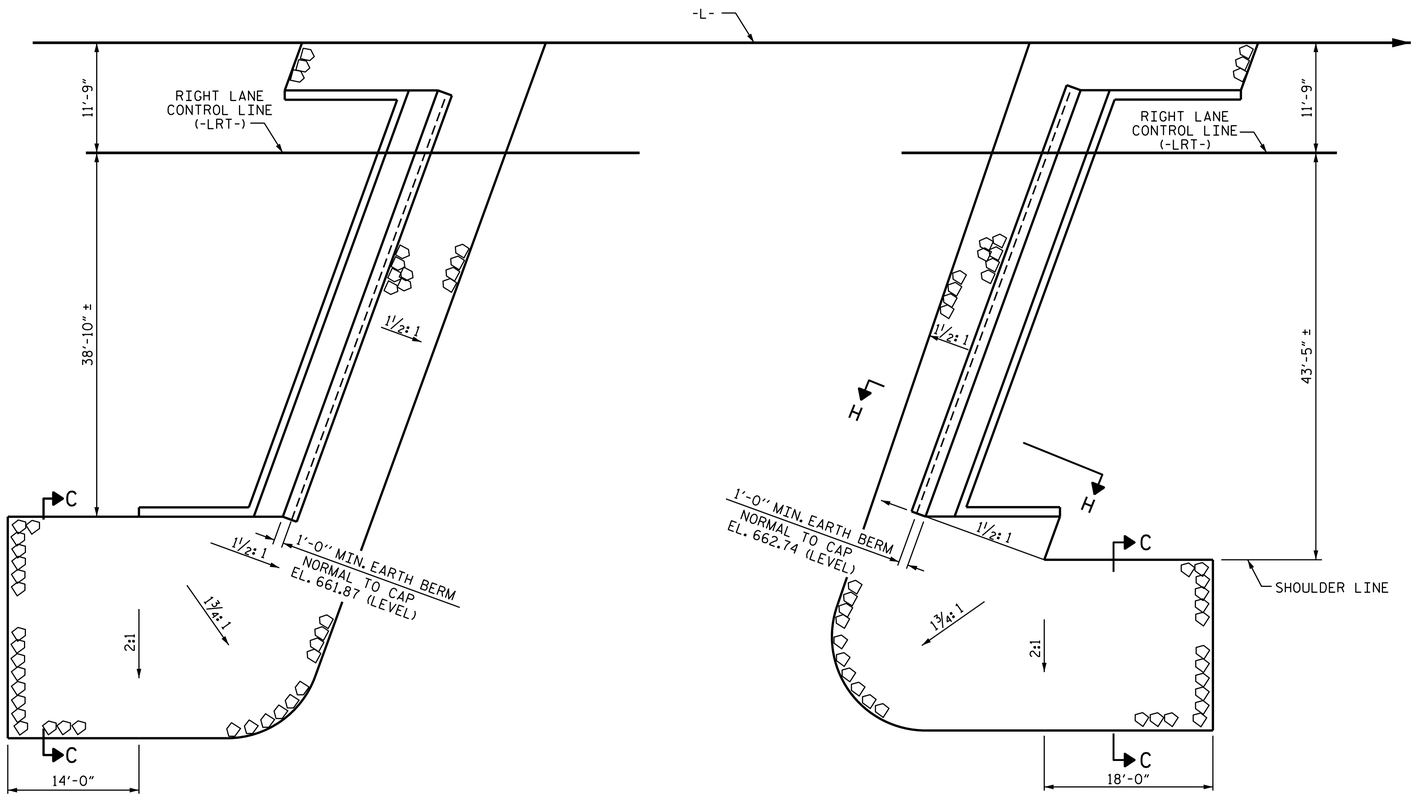
SHEET NO. S2-34

TOTAL SHEETS 37

DRAWN BY : J.D. HAWK DATE : 4/2016
CHECKED BY : K.D. LAYNE DATE : 4/2016
DESIGN ENGINEER OF RECORD: T.R. PETERSON DATE : 6/2016

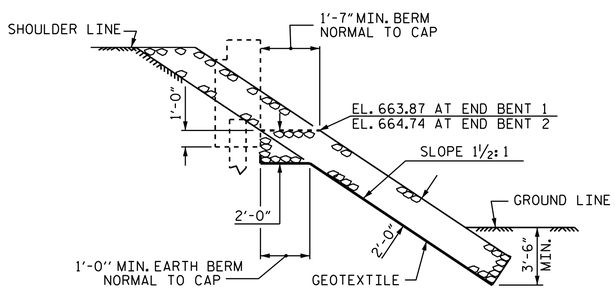
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_E*_02.dgn
jpadams

STR. #2

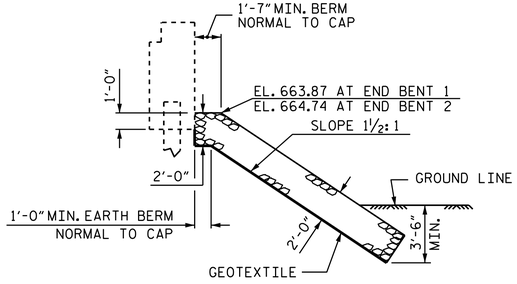


PLAN

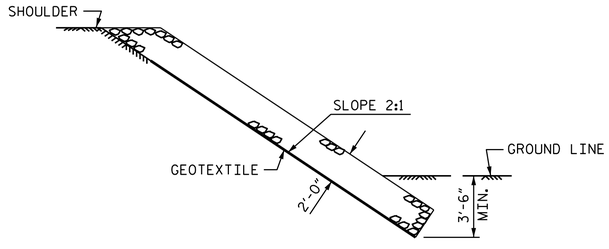
ESTIMATED QUANTITIES		
BRIDGE @ STA. 68+25.60 -L- (RIGHT LANE)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	160	180
END BENT 2	145	160



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RIP RAP DETAILS
(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.
Docusigned by: Donald R. Smith, Jr
EDC87706174B490...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

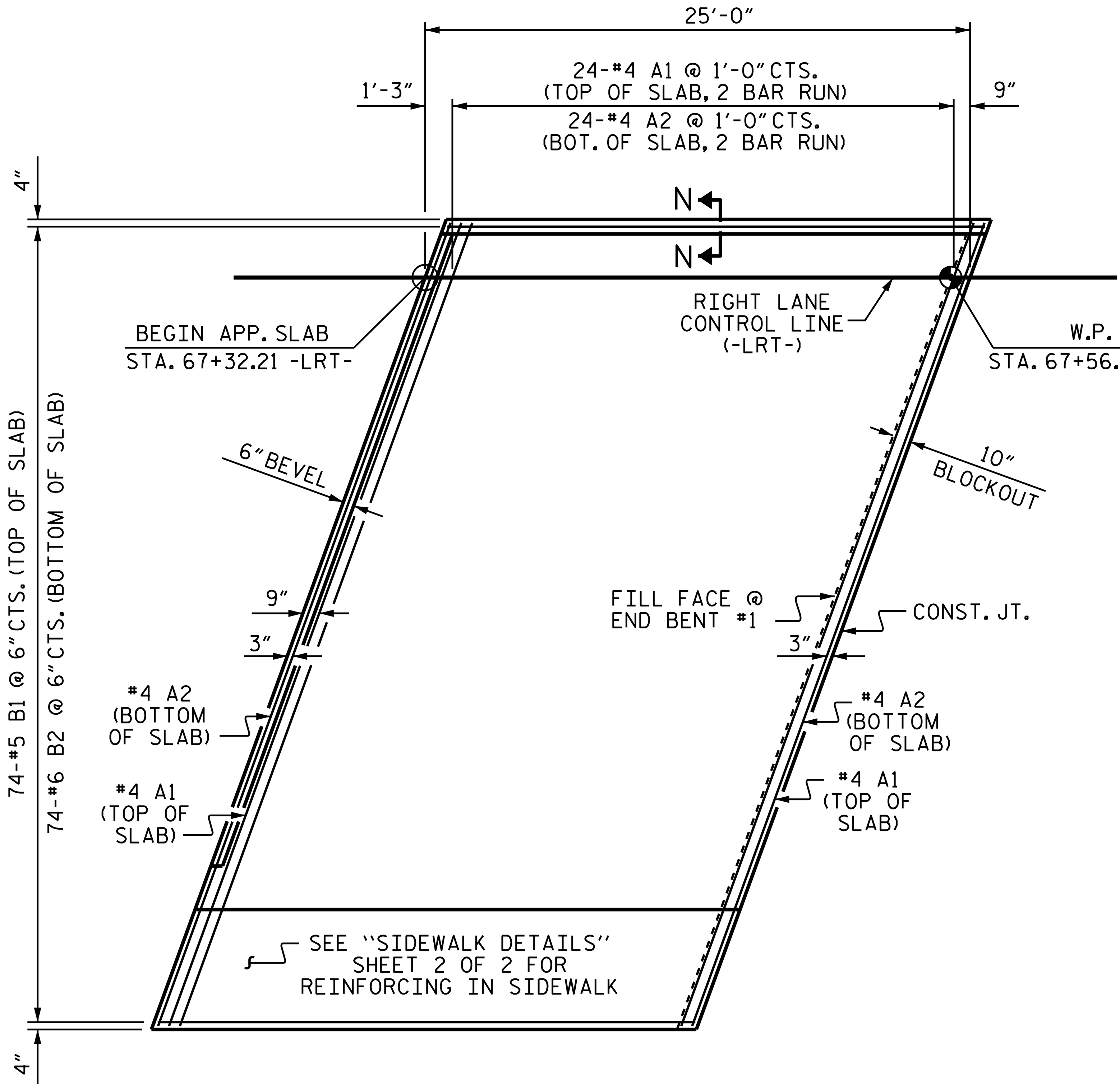
SHEET NO. S2-35
TOTAL SHEETS 37

ASSEMBLED BY : K. D. LAYNE DATE : 01/27/16
CHECKED BY : R. P. PATEL DATE : 03/01/16
DRAWN BY : REK 1/84
CHECKED BY : RDU 1/84
REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/21/11 MAA/GM

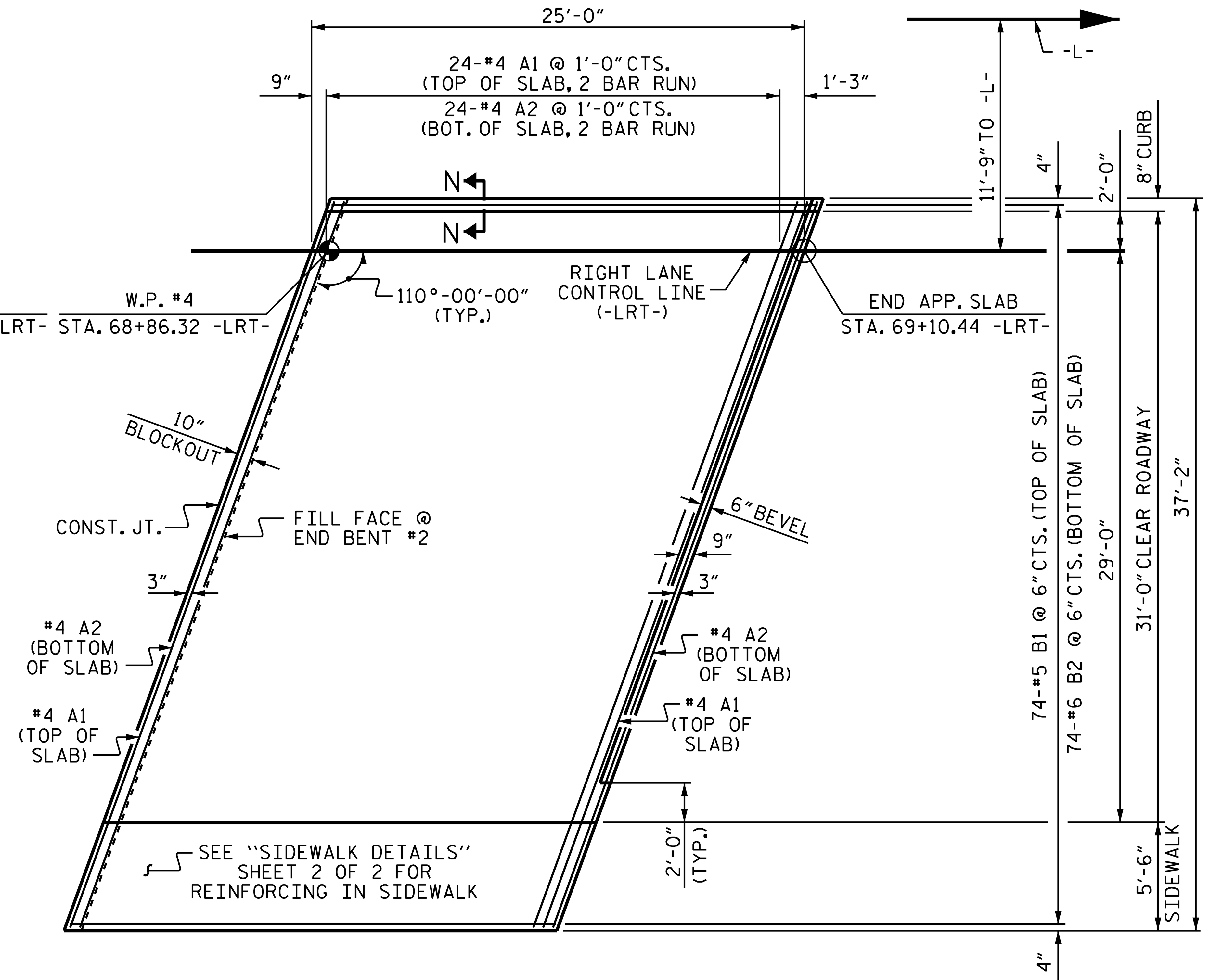
17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_SP_02.dgn
jpadams

STR. #2

STD. NO. RR1

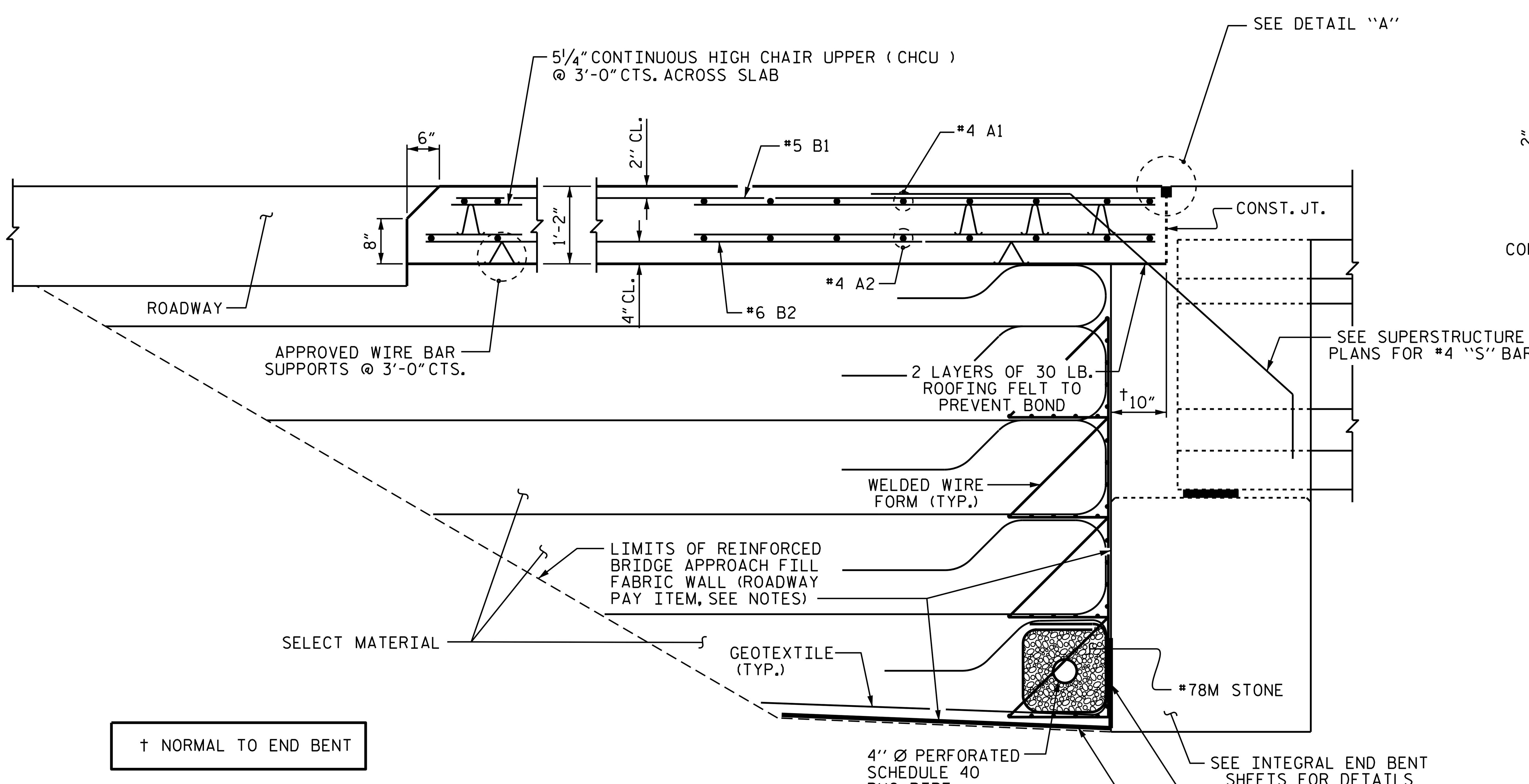


PLAN @ END BENT #1



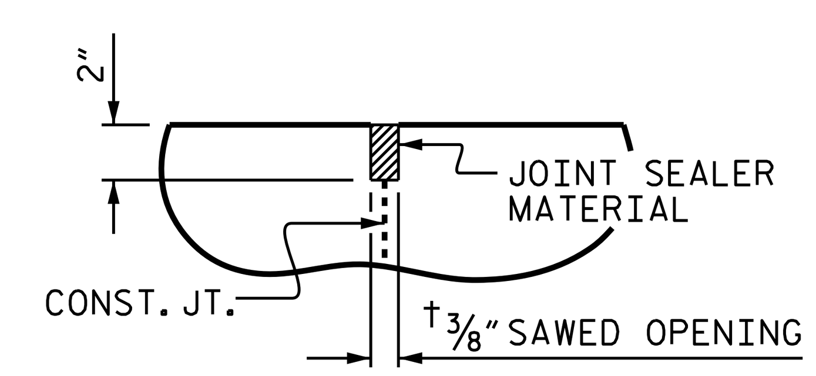
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

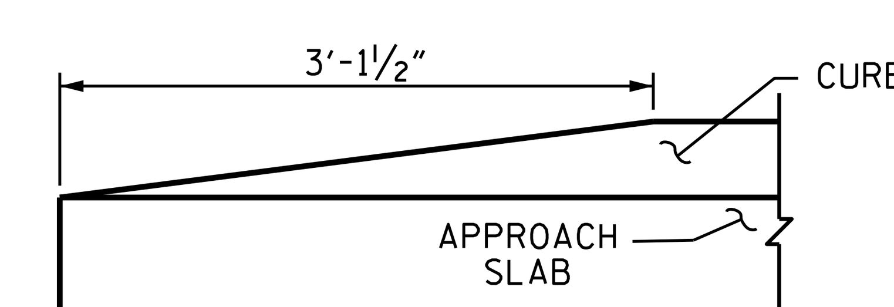


† NORMAL TO END BENT

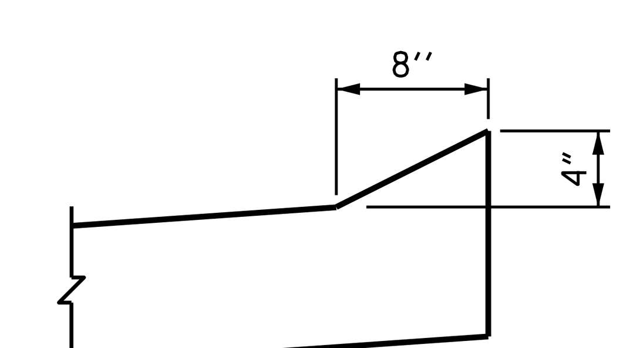
SECTION THRU SLAB



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

NOTES

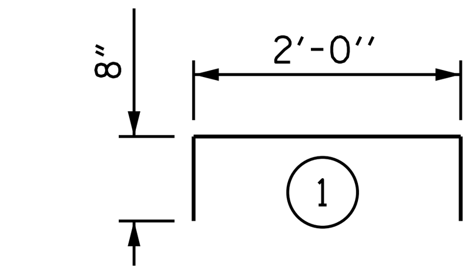
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

BAR TYPE



BILL OF MATERIAL

FOR ONE APPROACH SLAB
(2 REQ'D)

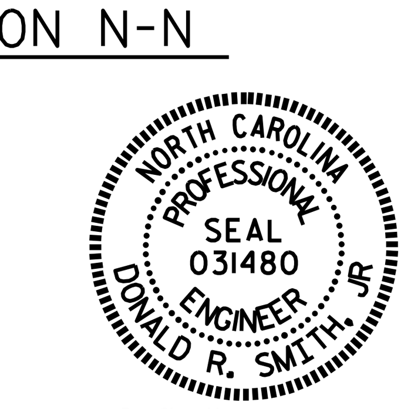
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✻ A1	52	#4	STR	20'-8"	718
A2	52	#4	STR	20'-6"	712
✻ B1	74	#5	STR	24'-1"	1859
B2	74	#6	STR	24'-7"	2732
✻ B3	5	#4	STR	24'-7"	82
✻ G1	25	#4	STR	5'-3"	88
✻ U1	8	#4	1	3'-4"	18
REINFORCING STEEL				LBS.	3,444
✻ EPOXY COATED REINFORCING STEEL				LBS.	2,765
CLASS AA CONCRETE					
APPROACH SLAB & CURB =				C. Y.	40.1
SIDEWALK =				C. Y.	3.1
TOTAL =				C. Y.	43.2

SPLICE LENGTHS

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

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 1 OF 2



DocuSigned by:
Donald R. Smith, Jr
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

(RIGHT LANE)

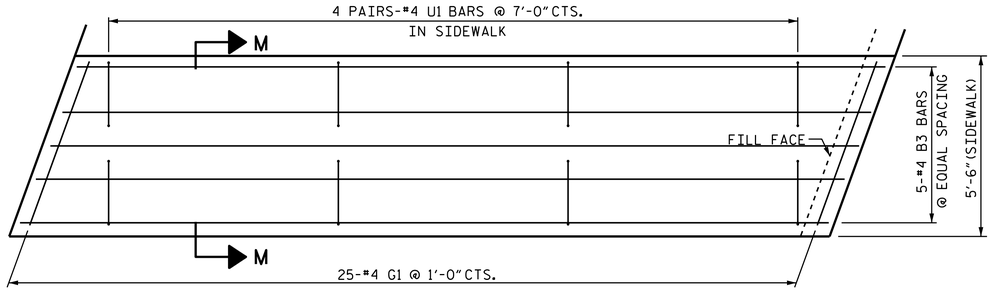
REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S2-36
1			3				TOTAL SHEETS
2			4				37

STR. #2

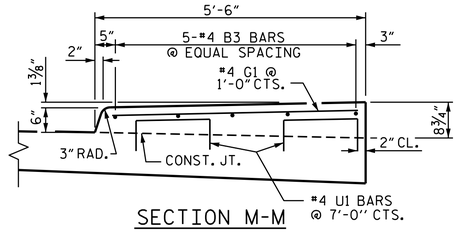
STD. NO. BAS5

ASSEMBLED BY : K. D. LAYNE		DATE : 1/28/16
CHECKED BY : R. P. PATEL		DATE : 2/17/16
DRAWN BY : TLA 10/05	REV. 10/1/11	MAA/GM
CHECKED BY : GM 5/06	REV. 12/21/11	MAA/GM
	REV. 6/13	MAA/GM

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_AS_02.dgn
jpadams

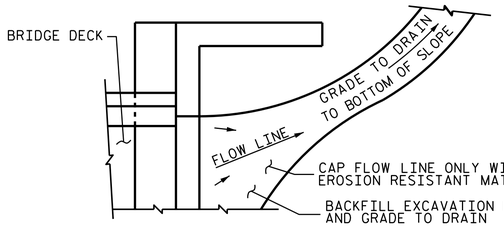


PLAN



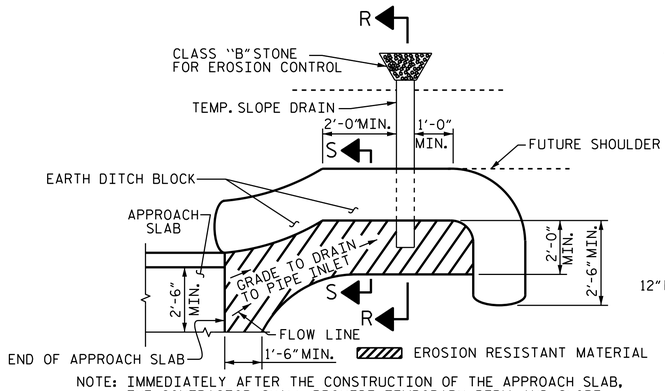
SECTION M-M

SIDEWALK DETAILS



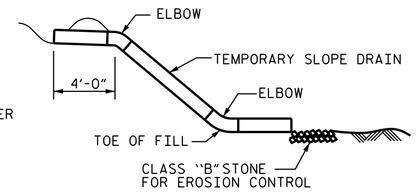
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

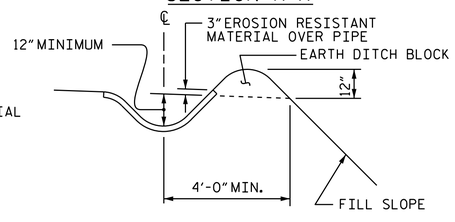


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY : K. D. LAYNE		DATE : 1/28/16	
CHECKED BY : R. P. PATEL		DATE : 2/17/16	
DRAWN BY : FCJ	11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ARB	11/88	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

17-AUG-2016 08:51
R:\Structures\Plans\Str02\U-3340_SD_AS_02.dgn
jpadams

PROJECT NO. U-3440
CABARRUS COUNTY
STATION: 68+25.60 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR.

DocuSigned by: Donald R. Smith, Jr
EDC87706174B496...
8/18/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

(RIGHT LANE)

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

SHEET NO. S2-37
TOTAL SHEETS 37

STR. #2 STD. NO. BAS4