TIP NO: 17BP.5.H.3

CONTRACT NO: C203512

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

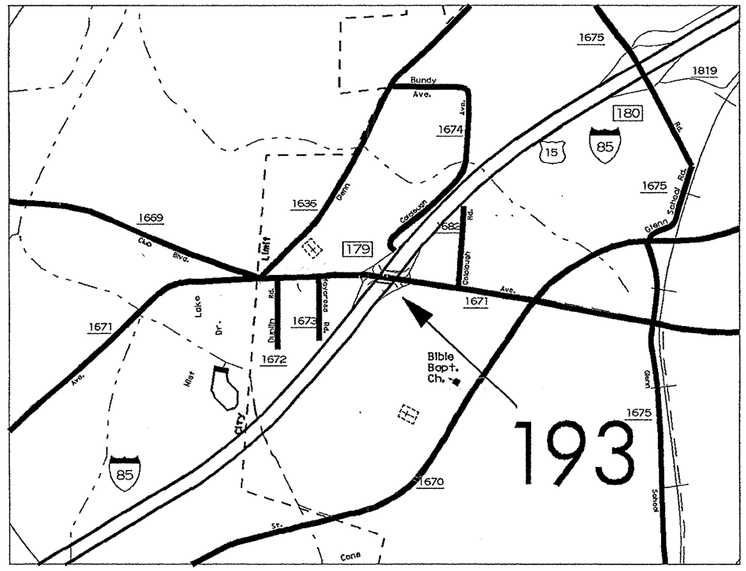
DURHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.H.3	1	

STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION
17BP.5.H.3		PE
17BP.5.H.3		CONSTR

LOCATION: BRIDGE #193 ON SR 1671 (EAST CLUB BLVD.) OVER I-85

TYPE OF WORK: BRIDGE REHABILITATION AND RECONSTRUCTION: SUPERSTRUCTURE AND DECK REPLACEMENT, PARTIAL SUBSTRUCTURE REPLACEMENT AND REPAIR OF EXISTING BRIDGE.



DESIGN DATA

#193 ADT 2012 = 8,700

PROJECT LENGTH

PROJECT LENGTH #193 = 0.034 MI

Prepared In the Office of:
STRUCTURES MANAGEMENT UNIT
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:
March 18, 2014

RICK NELSON, PE
PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

FARZIN ASEFNIA, PE
PROJECT DESIGN ENGINEER

$TIME$
$DATE$
$FILE$

TIP NO: 17BP.5.H.3

CONTRACT NO: C203512

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DURHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.H.3	1A	

STATE PROJECT NO.	F. A. PROJ. NO.	DESCRIPTION
17BP.5.H.3		PE
17BP.5.H.3		CONSTR

LOCATION: BRIDGE #193 ON SR 1671 (EAST CLUB BLVD.) OVER I-85

TYPE OF WORK: BRIDGE REHABILITATION AND RECONSTRUCTION: SUPERSTRUCTURE AND DECK REPLACEMENT, PARTIAL SUBSTRUCTURE REPLACEMENT AND REPAIR OF EXISTING BRIDGE.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

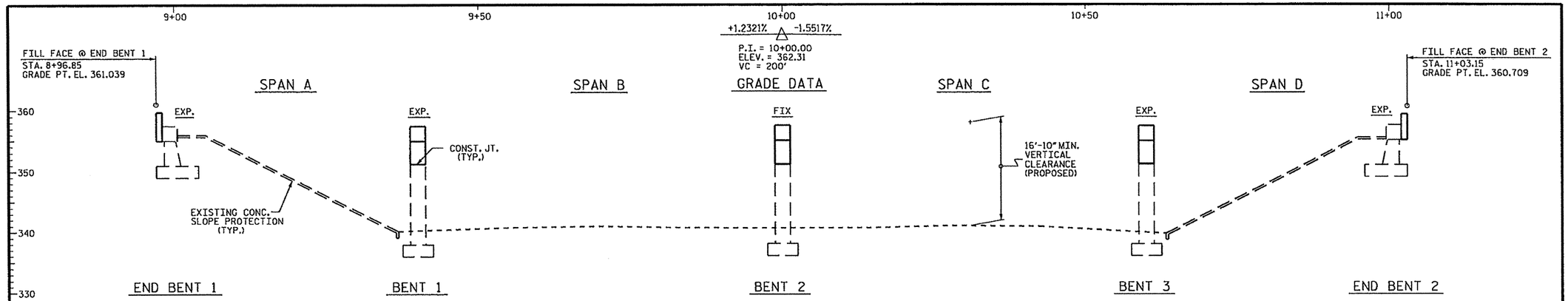
Prepared In the Office of:
STRUCTURES MANAGEMENT UNIT
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

LETTING DATE:
March 18, 2014

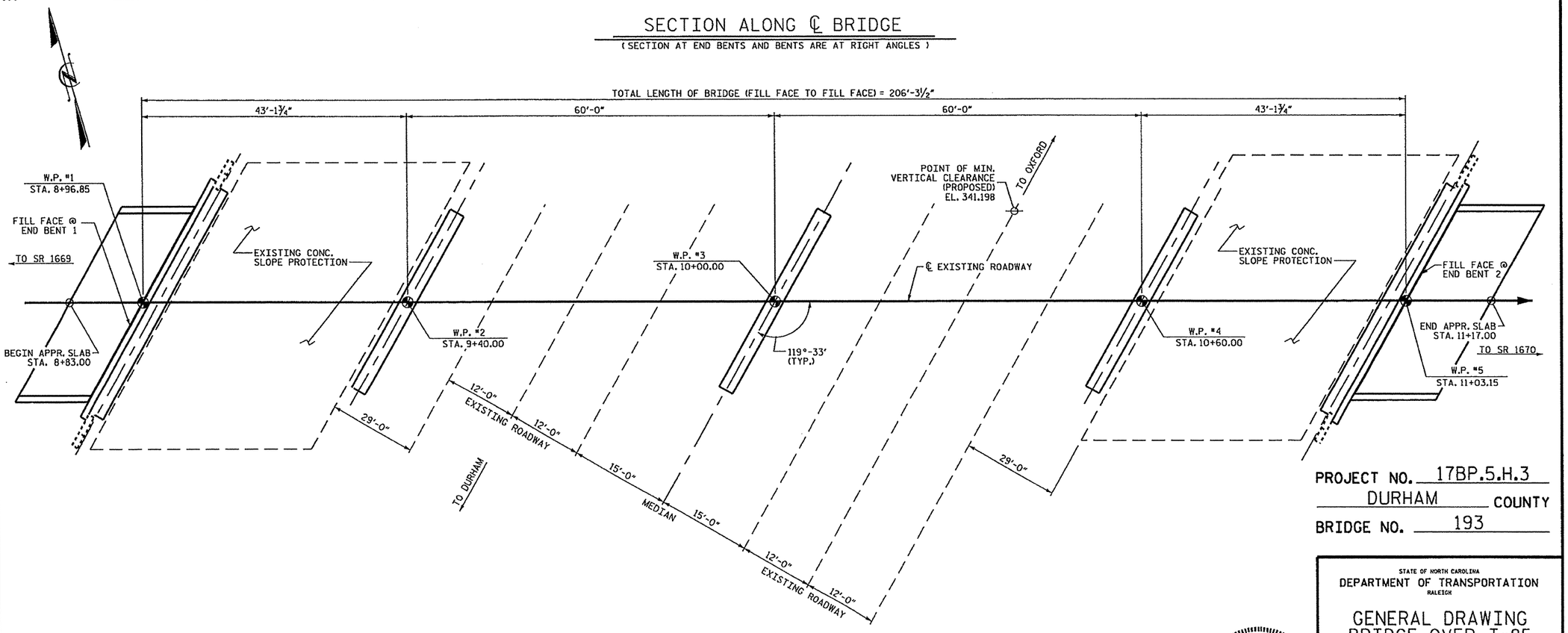
RICK NELSON, PE
PROJECT ENGINEER

FARZIN ASEFNIA P.E.
DESIGN ENGINEER



SECTION ALONG ℄ BRIDGE

(SECTION AT END BENTS AND BENTS ARE AT RIGHT ANGLES)



PLAN

(FOOTINGS NOT SHOWN FOR CLARITY)

DRAWN BY : D. PLATICA DATE : 07/13
CHECKED BY : J. YANNACCONE DATE : 01/14

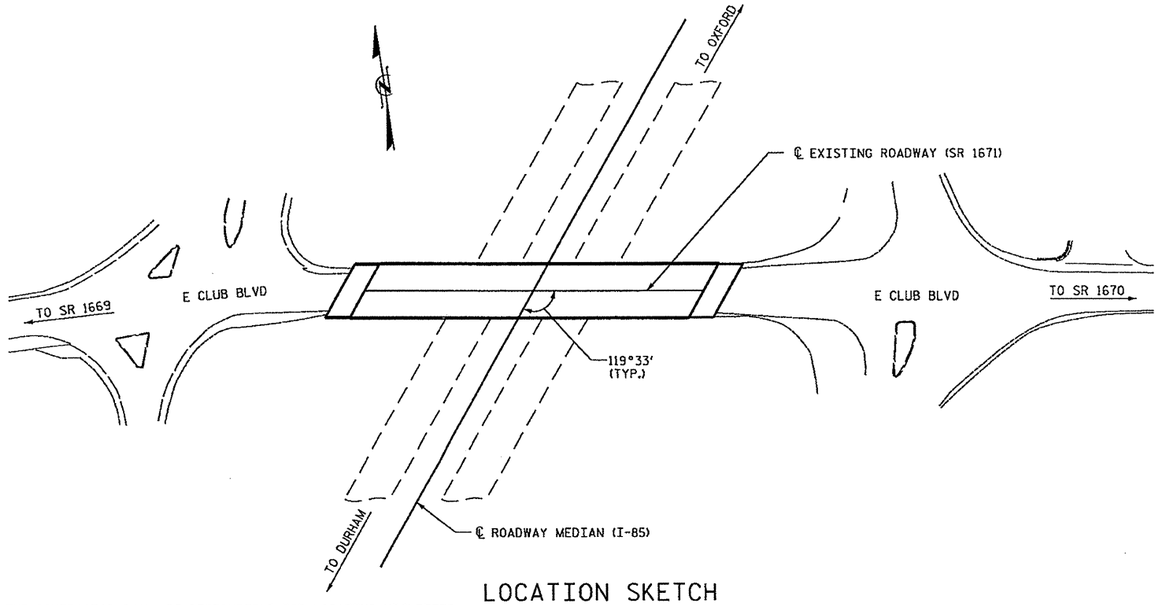
PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING BRIDGE OVER I-85 ON SR 1671 (E. CLUB BLVD.)

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFMA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			29



LOCATION SKETCH

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UTILITIES.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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.

ALL FALSEWORK AND FORMS FOR THE CAST-IN-PLACE DECK SLAB CONTINUOUS UNIT SHALL REMAIN IN PLACE UNTIL THE ENTIRE UNIT IS CAST AND CURED.

EXISTING DIMENSIONS AND BRIDGE CONDITION ARE FROM BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL FIELD VERIFY THE INFORMATION SHOWN ON THE PLANS AND NOTIFY THE ENGINEER IF ACTUAL DIMENSIONS AND CONDITIONS DIFFER.

THE EXISTING SUPERSTRUCTURE CONSISTING OF 5 LINES OF STEEL ROLLED BEAMS OVER 4 REINFORCED CONCRETE DECK SPANS (42', 60', 60' AND 42') WITH A 26'-0" CLEAR ROADWAY WIDTH AND THE EXISTING REINFORCED CONCRETE BENT CAPS SHALL BE REMOVED. THE PROPOSED SUPERSTRUCTURE CONSISTS OF 5 LINES OF CONTINUOUS STEEL ROLLED BEAMS OVER 4 REINFORCED CONCRETE DECK SPANS WITH A 31'-2" CLEAR ROADWAY WIDTH ATOP RECONSTRUCTED REINFORCED CONCRETE BENT CAPS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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.

PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE NO. 193."

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 FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" HIGHWAY DESIGN BRANCH - N.C. DEPARTMENT OF TRANSPORATION - RALEIGH, N.C., DATED JANUARY, 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED PART OF THESE PLANS:

STD. NO.	TITLE
DIVISION 6 - MAJOR STRUCTURES	
422.10	REINFORCED BRIDGE APPROACH FILLS
DIVISION 8 - INCIDENTALS	
862.01	GUARDRAIL PLACEMENT
862.02	GUARDRAIL INSTALLATION
862.03	STRUCTURE ANCHOR UNITS

TOTAL BILL OF MATERIAL

	INCIDENTAL MILLING	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	REINFORCED BRIDGE APPROACH FILL, STATION 10+00.00	GUARDRAIL ANCHOR UNITS, TYPE III	REMOVE & RESET EXISTING GUARDRAIL	REMOVE EXISTING GUARDRAIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	APPROX. 167,900 LBS STRUCTURAL STEEL	VERTICAL CONCRETE BARRIER RAIL	ELASTOMERIC BEARINGS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	FOAM JOINT SEALS	PARTIAL REMOVAL OF EXISTING STRUCTURE
	SQ. YDS.	TONS	LUMP SUM	EA.	LIN. FT.	LIN. FT.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LUMP SUM	LIN. FT.	LUMP SUM	CU. FT.	LIN. FT.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE							6,814	6,462		LUMP SUM		LUMP SUM	407.62	LUMP SUM			LUMP SUM	
END BENT 1			LUMP SUM						11.0		1,198							
BENT 1									11.1		2,945				10.3	16		
BENT 2									11.1		2,945				4.3	1		
BENT 3									11.1		2,945				6.5	39		
END BENT 2			LUMP SUM						11.0		1,198							
TOTAL	660	91	LUMP SUM	4	65	70	6,814	6,462	55.3	LUMP SUM	11,231	LUMP SUM	407.62	LUMP SUM	21.1	56	LUMP SUM	LUMP SUM

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER I-85
ON SR 1671
(E. CLUB BLVD.)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : D. PLATICA DATE : 07/13
CHECKED BY : J. YANNACCONE DATE : 01/14

NOTES

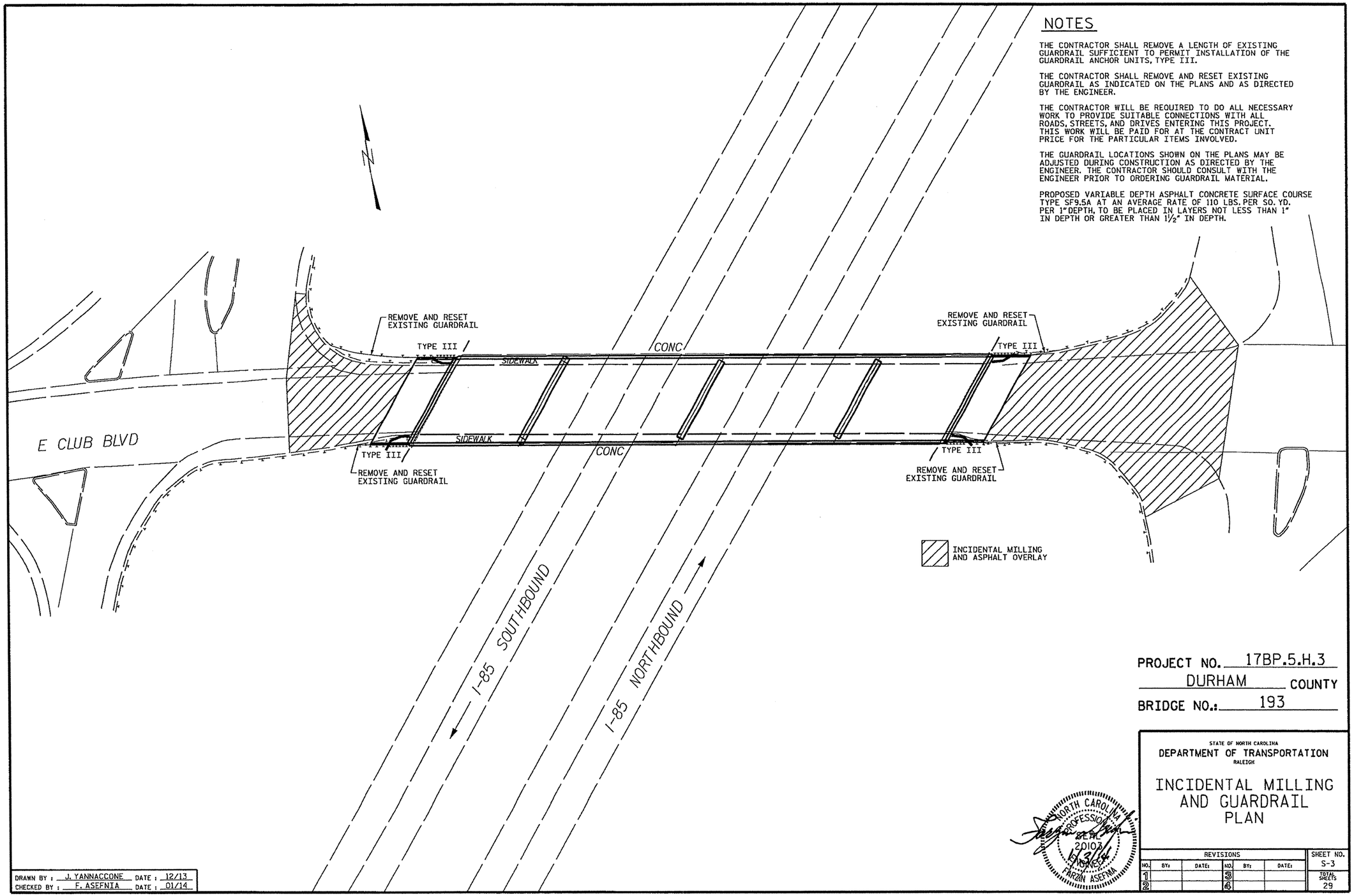
THE CONTRACTOR SHALL REMOVE A LENGTH OF EXISTING GUARDRAIL SUFFICIENT TO PERMIT INSTALLATION OF THE GUARDRAIL ANCHOR UNITS, TYPE III.

THE CONTRACTOR SHALL REMOVE AND RESET EXISTING GUARDRAIL AS INDICATED ON THE PLANS AND AS DIRECTED BY THE ENGINEER.

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1"DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1½" IN DEPTH.



PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INCIDENTAL MILLING AND GUARDRAIL PLAN

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA
1/31/14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 12/13
CHECKED BY : F. ASEFNIA DATE : 01/14

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	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)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.322	--	1.75	0.653	1.32	B	EL	60.00	0.869	2.45	C	I	0.00	1.30	0.653	1.44	B	EL	60.00	
		HL-93 (OPERATING)	N/A		1.714	--	1.35	0.653	1.71	B	EL	60.00	0.869	3.18	C	I	0.00	1.00	0.653	1.87	B	EL	60.00	
		HS-20 (INVENTORY)	36.00	(2)	2.309	83.124	1.75	0.626	2.31	A	I	40.56	0.863	3.09	C	I	60.00	1.30	0.626	3.26	A	I	40.56	
		HS-20 (OPERATING)	36.00		2.993	107.748	1.35	0.626	2.99	A	I	40.56	0.863	4.01	C	I	60.00	1.00	0.626	4.24	A	I	40.56	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		7.315	98.753	1.40	0.626	7.32	A	I	40.56	0.863	9.18	C	I	0.00	1.30	0.626	8.16	A	EL	40.56	
		SNGARBS2	20.000		4.944	98.880	1.40	0.626	4.94	A	I	40.56	0.863	6.51	C	I	0.00	1.30	0.626	5.58	A	I	40.56	
		SNAGRIS2	22.000		4.497	98.934	1.40	0.626	4.50	A	I	40.56	0.863	6.04	C	I	0.00	1.30	0.626	5.08	A	I	40.56	
		SNCOTTS3	27.250		3.535	96.329	1.40	0.626	3.53	A	I	40.56	0.863	4.56	C	I	0.00	1.30	0.626	3.99	A	I	40.56	
		SNAGGRS4	34.925		2.797	97.685	1.40	0.626	2.80	A	I	40.56	0.863	3.78	C	I	60.00	1.30	0.626	3.16	A	I	40.56	
		SNS5A	35.550		2.773	98.580	1.40	0.626	2.77	A	I	40.56	0.863	3.82	C	I	60.00	1.30	0.626	3.13	A	I	40.56	
		SNS6A	39.950		2.494	99.635	1.40	0.626	2.49	A	I	40.56	0.863	3.49	C	I	60.00	1.30	0.626	2.82	A	I	40.56	
		SNS7B	42.000		2.385	100.170	1.40	0.626	2.38	A	I	40.56	0.863	3.43	C	I	60.00	1.30	0.626	2.69	A	I	40.56	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.059	100.947	1.40	0.626	3.06	A	I	40.56	0.863	4.16	C	I	60.00	1.30	0.626	3.46	A	I	40.56	
		TNT4A	33.075		3.039	100.515	1.40	0.626	3.04	A	I	40.56	0.863	4.07	C	I	0.00	1.30	0.626	3.43	A	I	40.56	
		TNT6A	41.600		2.498	103.917	1.40	0.626	2.50	A	I	40.56	0.863	3.67	C	I	60.00	1.30	0.626	2.82	A	I	40.56	
		TNT7A	42.000		2.487	104.454	1.40	0.626	2.49	A	I	40.56	0.863	3.58	C	I	0.00	1.30	0.626	2.81	A	I	40.56	
		TNT7B	42.000		2.561	107.562	1.40	0.626	2.56	A	I	40.56	0.863	3.38	C	I	60.00	1.30	0.626	2.89	A	I	40.56	
		TNAGRIT4	43.000		2.391	102.813	1.40	0.626	2.39	A	I	40.56	0.863	3.26	C	I	60.00	1.30	0.626	2.7	A	I	40.56	
		TNAGT5A	45.000		2.329	104.805	1.40	0.626	2.33	A	I	40.56	0.863	3.24	C	I	60.00	1.30	0.626	2.63	A	I	40.56	
		TNAGT5B	45.000	(3)	2.242	100.890	1.40	0.626	2.24	A	I	40.56	0.863	3.09	C	I	60.00	1.30	0.626	2.53	A	I	40.56	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		——																			

LOAD FACTORS:

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

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

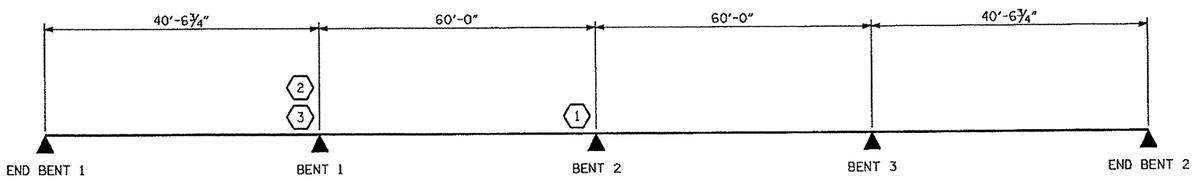
1.
2.
3.
4.

(#) 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. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

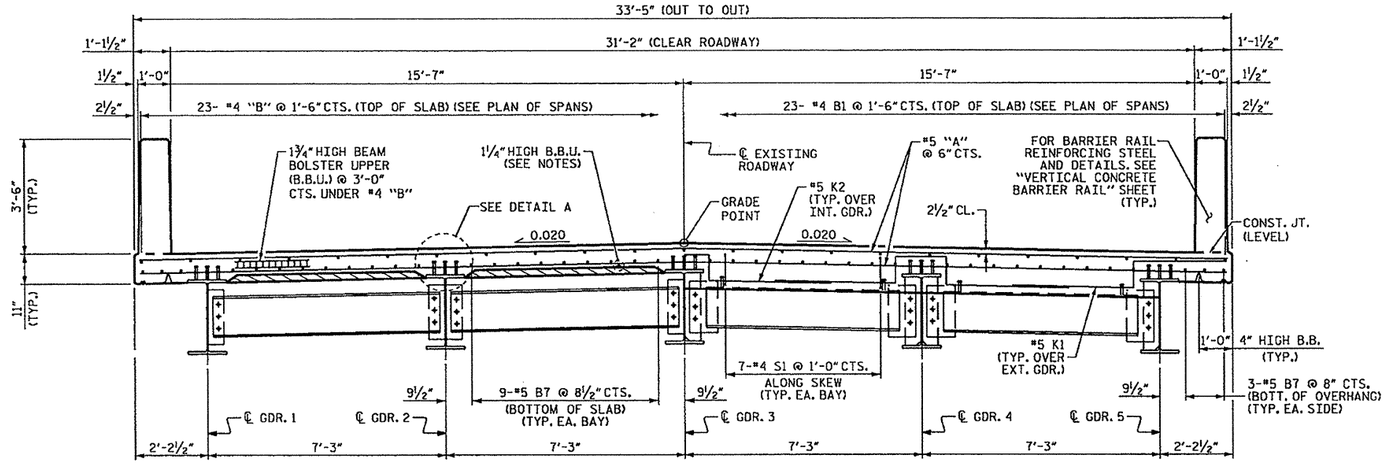
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFMA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			29

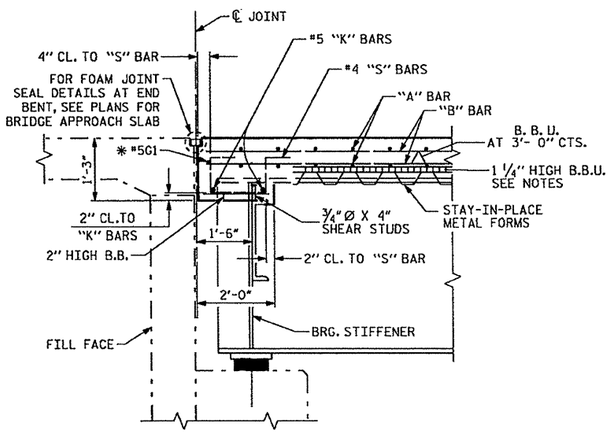
ASSEMBLED BY : D. JOYNER	DATE : 12/13
CHECKED BY : J. YANNACCONE	DATE : 12/13
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

STD. NO. LRFR3



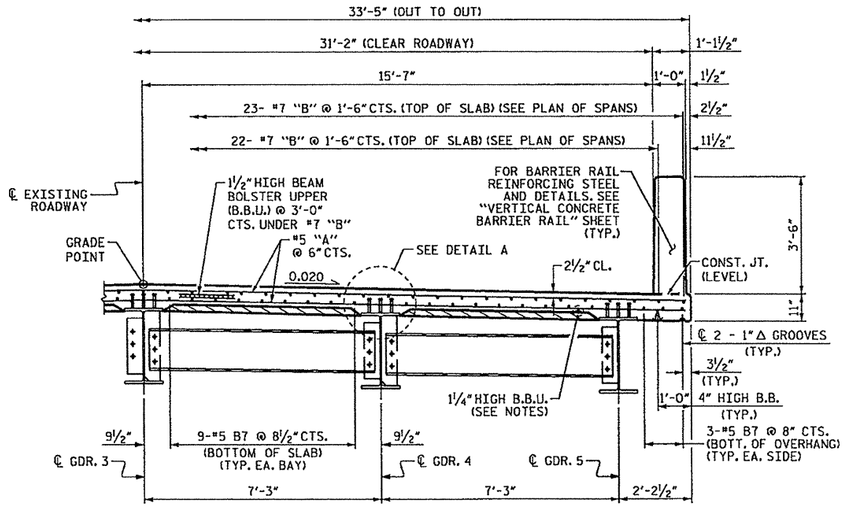
PART TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)

PART TYPICAL SECTION
(SHOWING END BENT DIAPHRAGMS)



SECTION AT END BENT

* #5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR DIAPHRAGM AND REINFORCING STEEL.



PART TYPICAL SECTION
(SHOWING BENT DIAPHRAGMS)

NOTES:

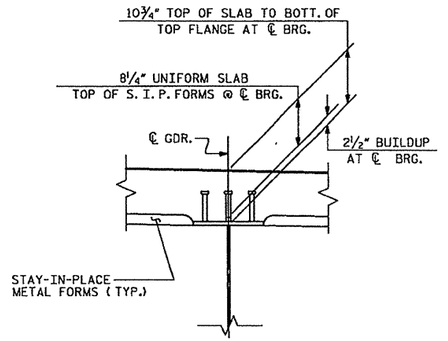
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CST. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.



DETAIL A

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

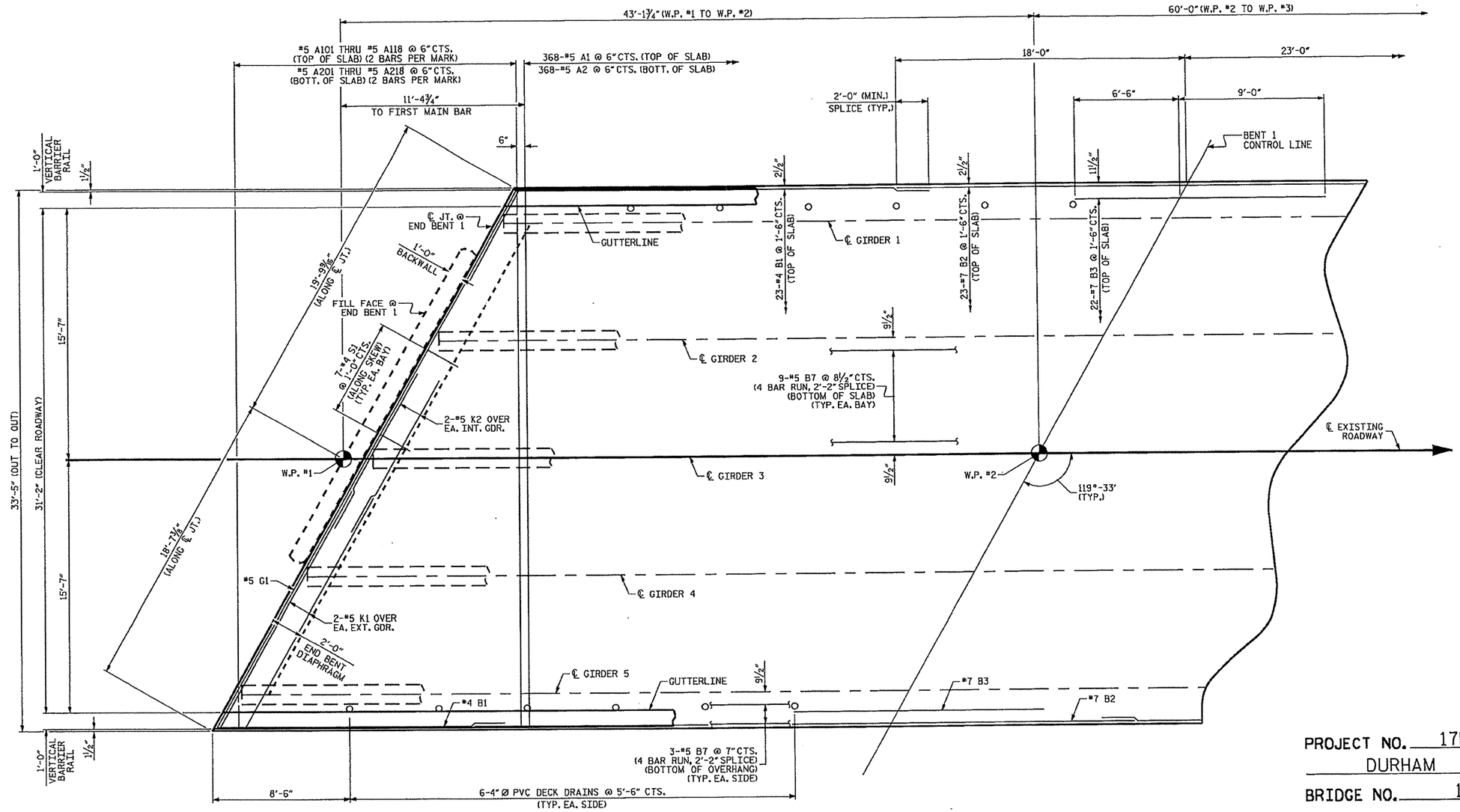
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : M.WELDON DATE : 07/13
CHECKED BY : J. YANNACCONE DATE : 07/13

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103 7/31/13 PARVIN ASEFNIA



SPAN A

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

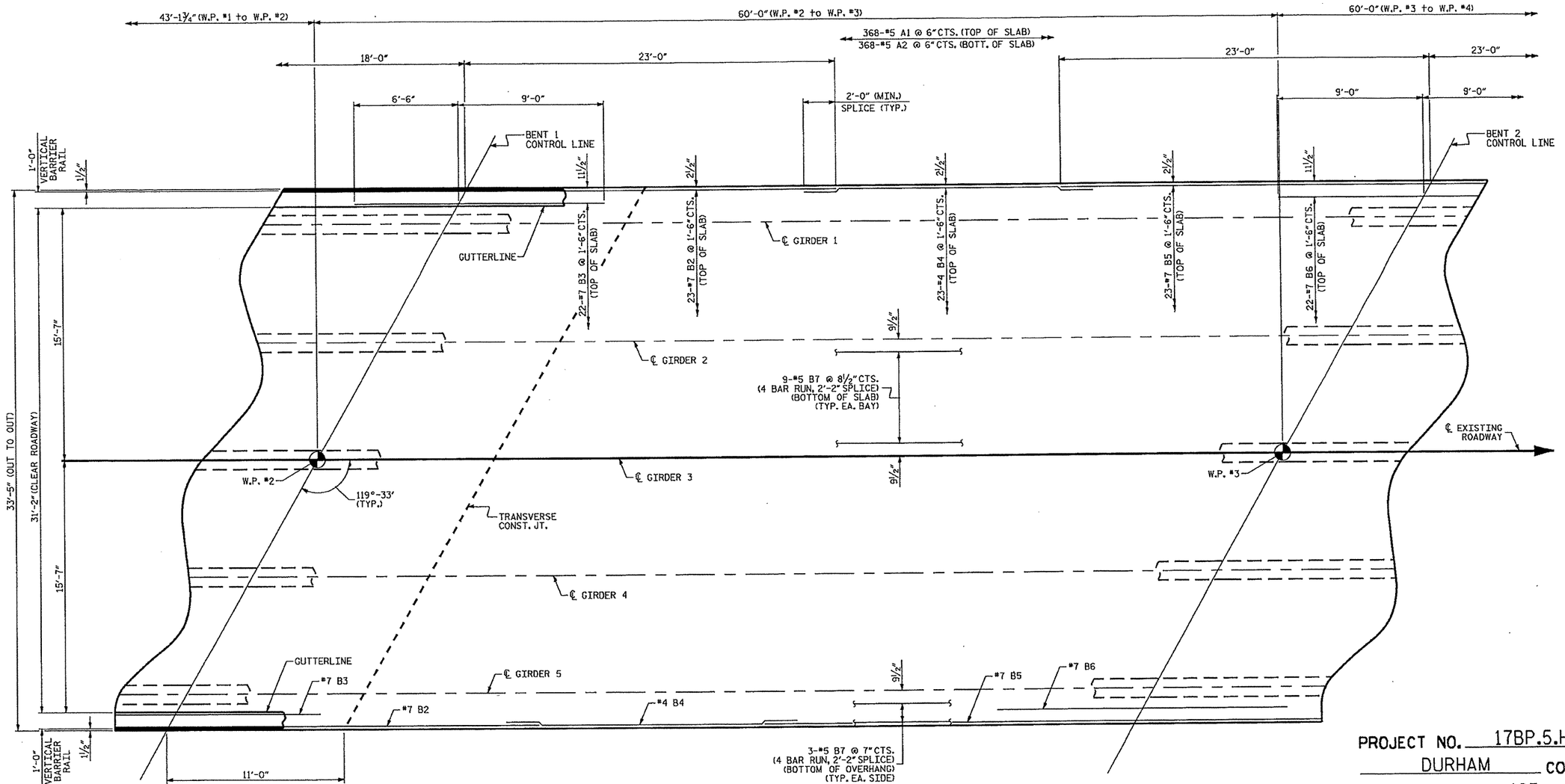
SUPERSTRUCTURE

PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 08/13
CHECKED BY : F. ASEFNIA DATE : 08/13



SPAN B

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

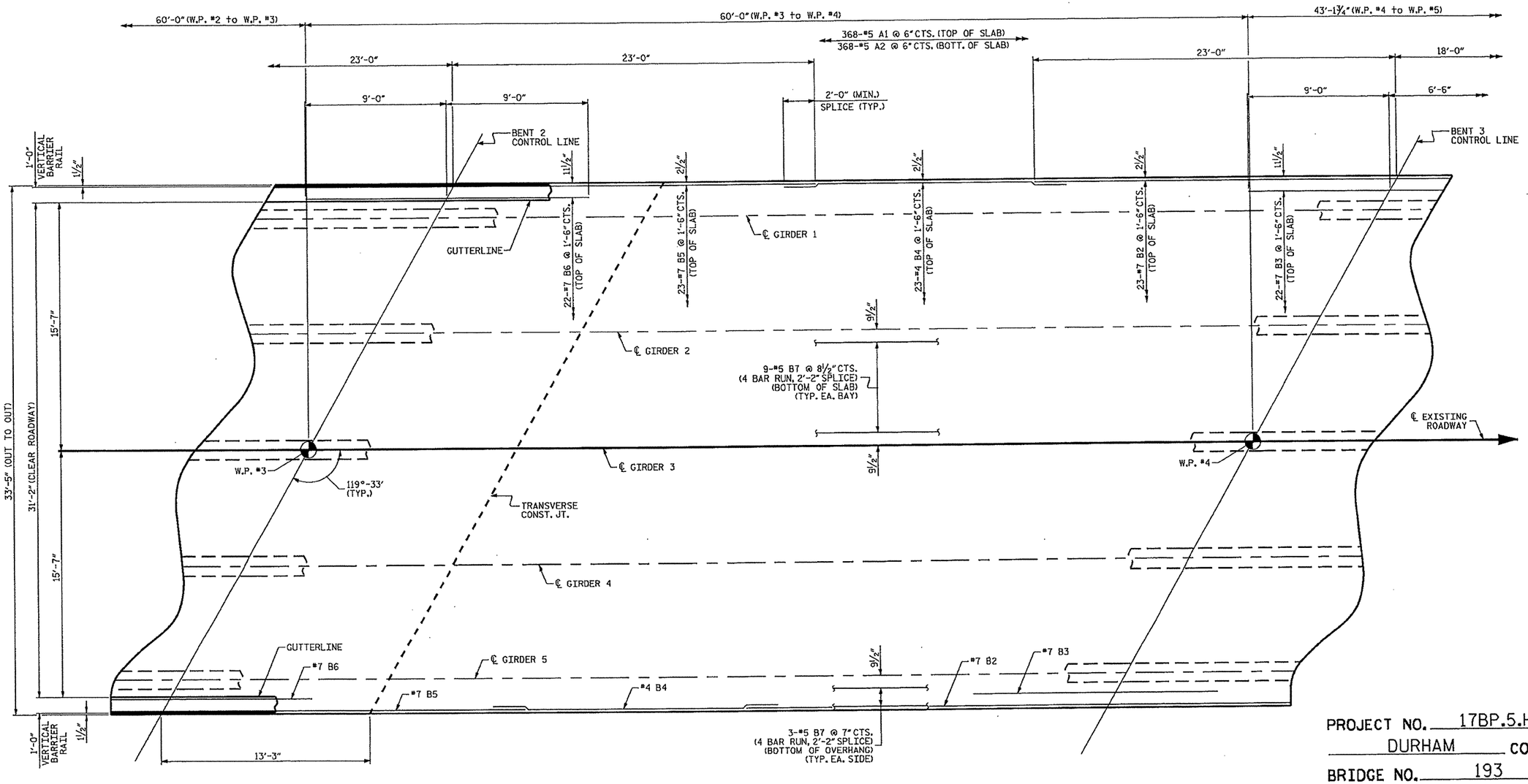
SUPERSTRUCTURE

PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 20102 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : D. JOYNER DATE : 08/13
CHECKED BY : J. YANNACCONE DATE : 08/13



SPAN C

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

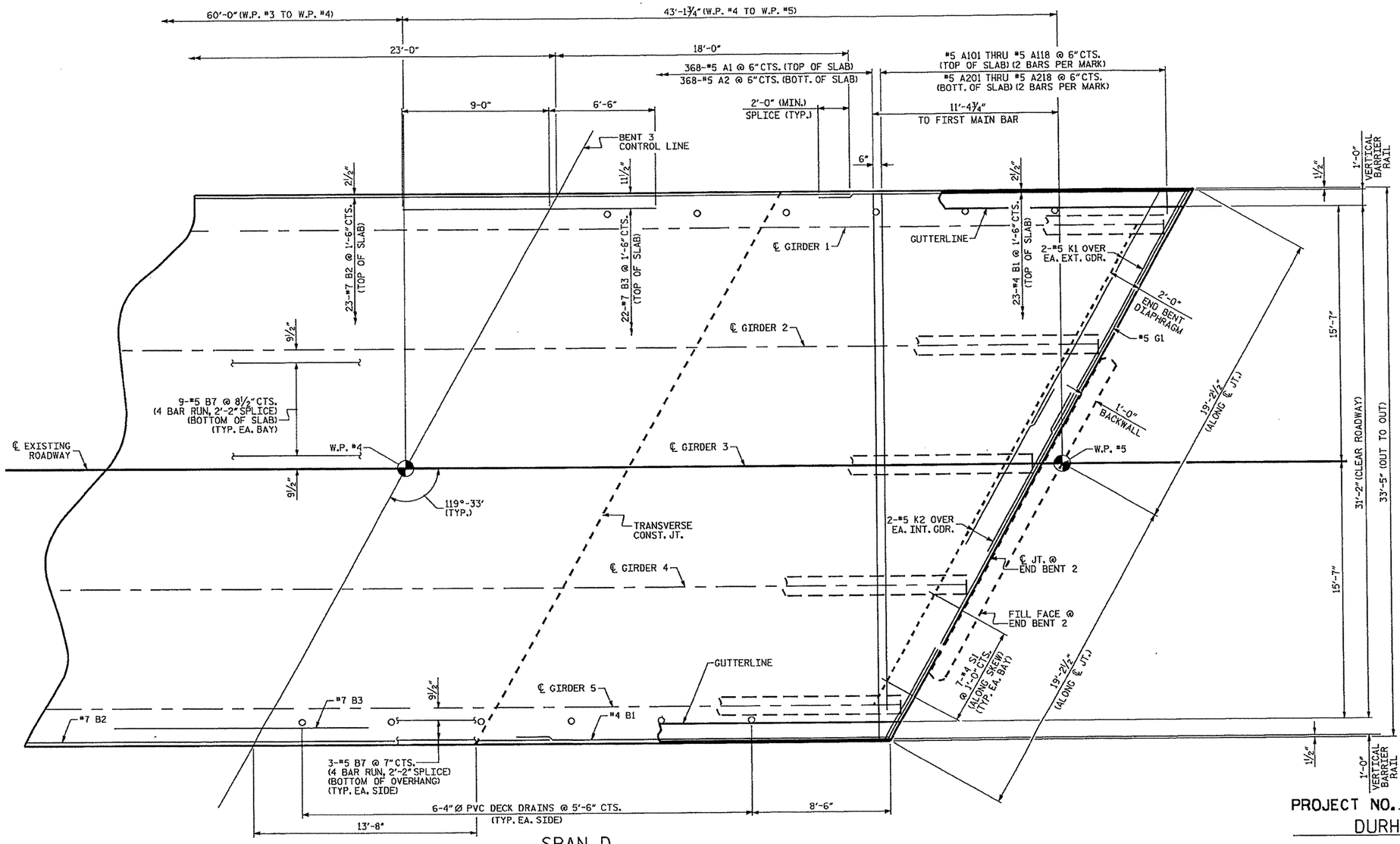
SUPERSTRUCTURE

PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : D. JOYNER DATE : 08/13
CHECKED BY : J. YANNACCONE DATE : 08/13



SPAN D

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

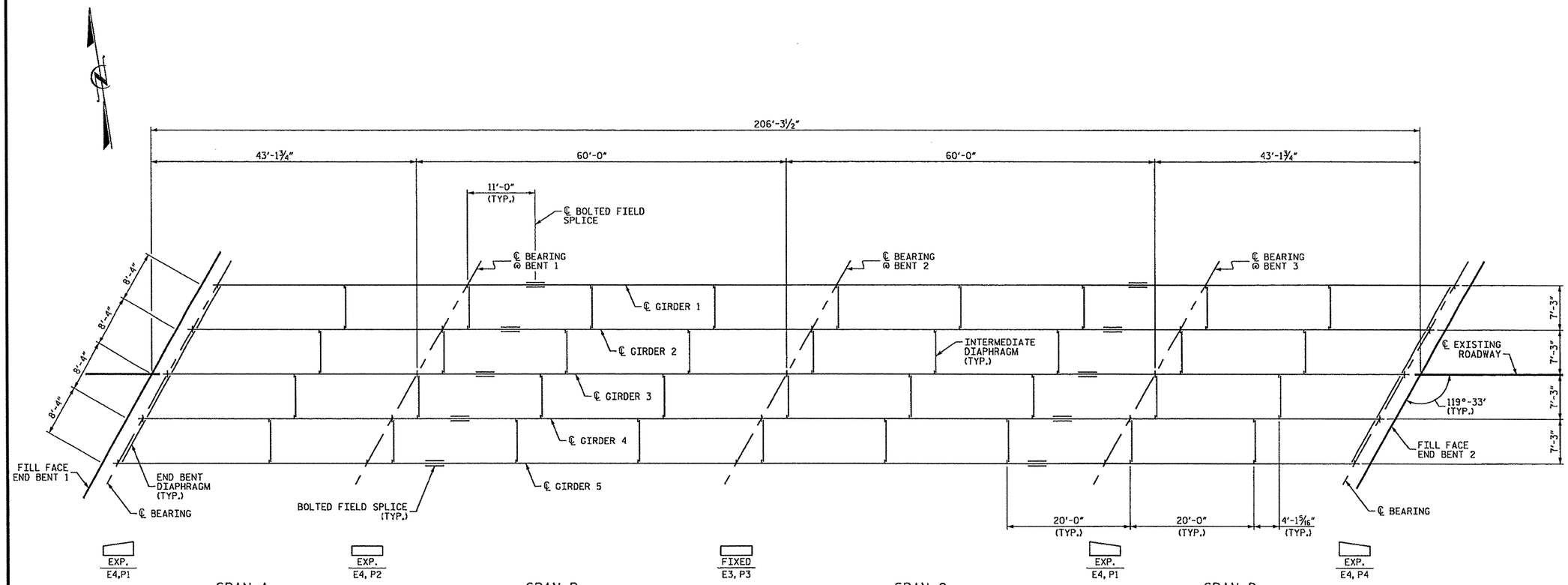
SUPERSTRUCTURE

PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : M. WELDON DATE : 08/13
CHECKED BY : J. YANNACCONE DATE : 08/13



FRAMING PLAN

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

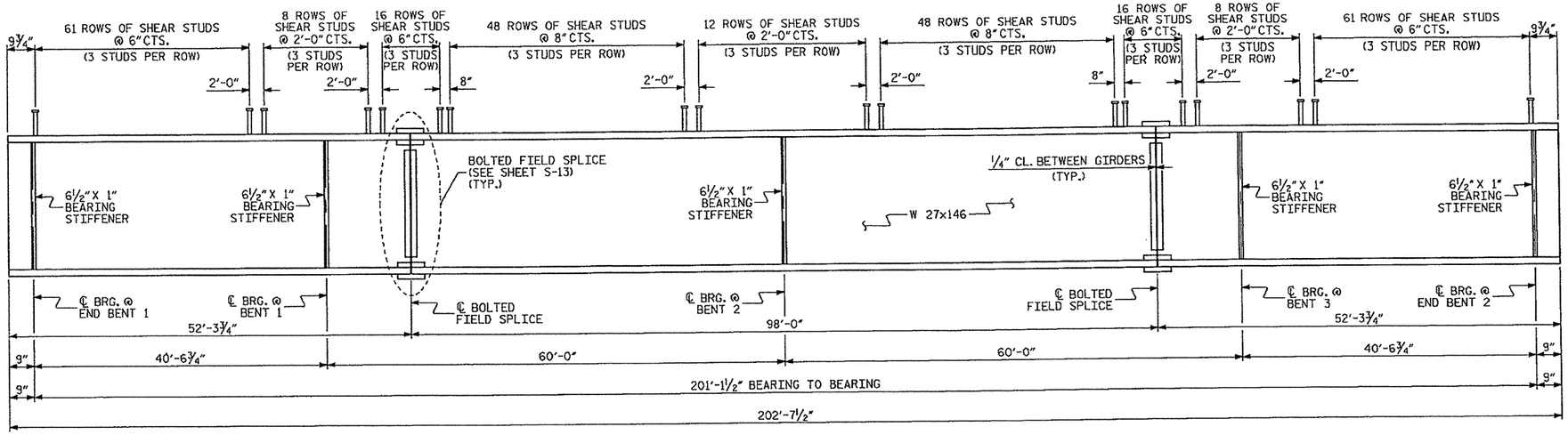
SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 20107 ENGINEER HARZIN ASEFMA

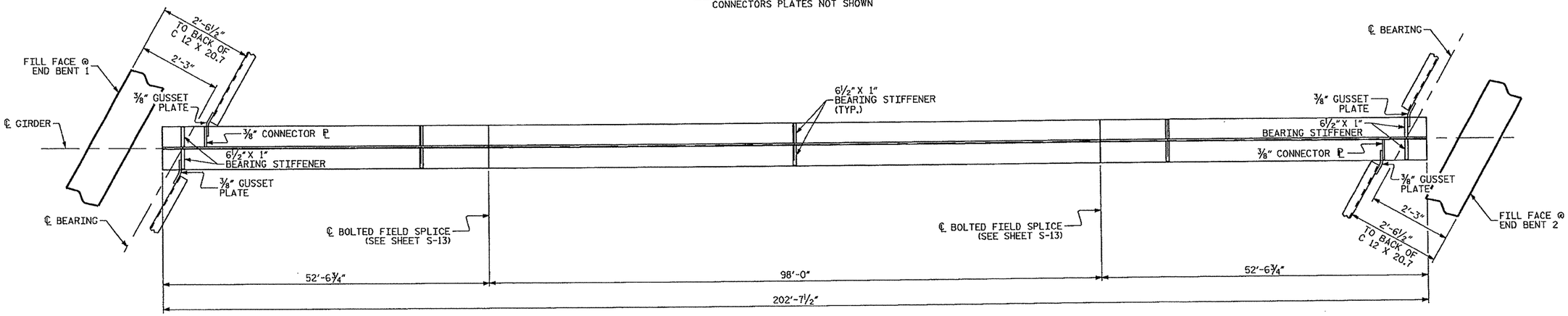
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 08/13
CHECKED BY : Z. WAFA DATE : 01/14

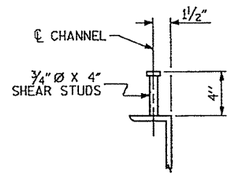


GIRDER ELEVATION

CONNECTORS PLATES NOT SHOWN

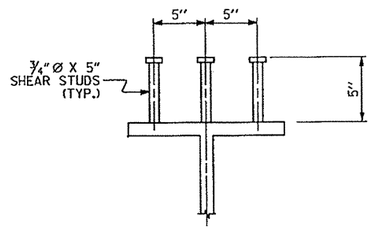


BOTTOM FLANGE DETAIL



SHEAR STUD DETAILS

(TYP. EACH END BENT DIAPHRAGM)



SHEAR STUD DETAILS

(TYP. EACH GIRDER)

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

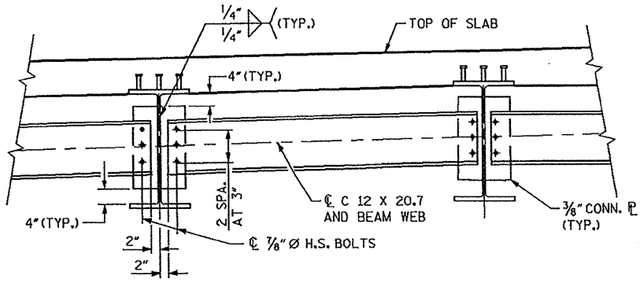
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL DETAILS

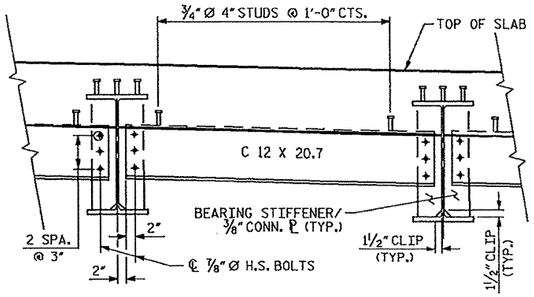
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			29

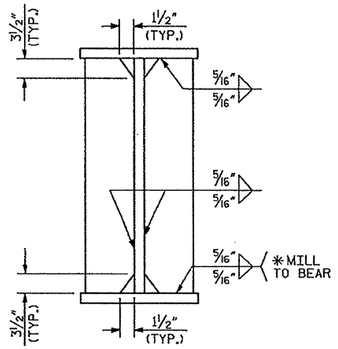
DRAWN BY : D. PLATICA DATE : 08/13
CHECKED BY : J. YANNACCONE DATE : 08/13



TYPICAL INTERMEDIATE DIAPHRAGM

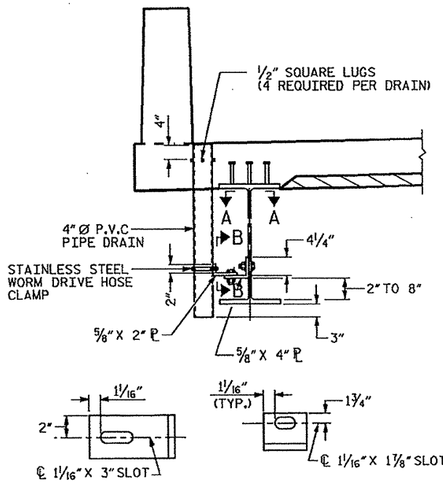


TYPICAL END BENT DIAPHRAGM



BEARING STIFFENER DETAILS

*WELD TO BOTTOM FLANGE IS ONLY REQUIRED WHEN BEARING STIFFENER IS ALSO CONNECTOR PLATE



SECTION A-A SECTION B-B

DRAIN CONNECTOR DETAIL

COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY ENGINEER.

TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

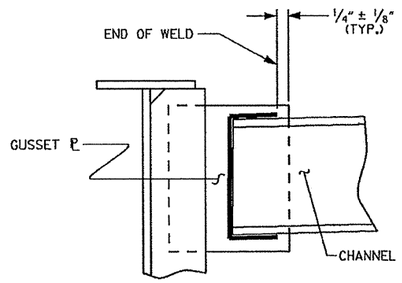
4- 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM HOSE CLAMP SHALL BE COMMERCIAL QUALITY.

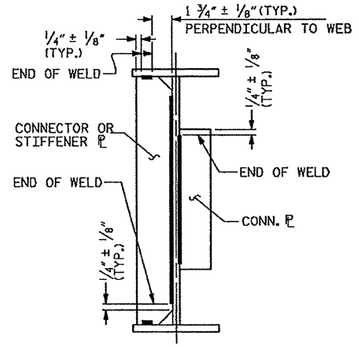
THE 4" Ø PVC PLASTIC PIPE AND FITTING SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

PVC DECK DRAINS SHALL BE PAINTED WITH TWO COATS OF BROWN PRIMER MEETING THE REQUIREMENTS OF ARTICLE 1080-11 OF THE STANDARD SPECIFICATIONS. EACH COAT SHALL BE 2 DRY MILS (0.050MM) THICK. DECK DRAINS SHALL BE ROUGHENED PRIOR TO PAINTING. NO SEPARATE PAYMENT SHALL BE MADE FOR PAINTING PVC DECK DRAINS AS THIS IS CONSIDERED INCIDENTAL TO THE PAY ITEM FOR REINFORCED CONCRETE DECK SLAB.

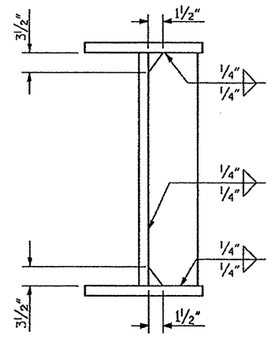
24 DRAIN AND DRAIN CONNECTOR ASSEMBLIES REQUIRED.



TYPICAL CHANNEL CONNECTION

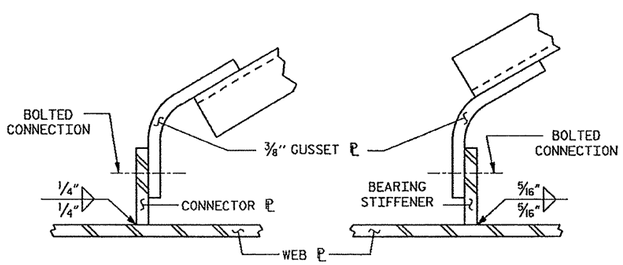


TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS



CONNECTOR PLATE DETAILS

WELD TERMINATION DETAILS



WITH CONNECTOR ℙ WITH BEARING STIFFENER

GUSSET PLATE DETAILS

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

STIFFENERS ARE NOT REQUIRED ON THE OUTSIDE OF EXTERIOR BEAMS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS, COVER PLATES AND SPLICE PLATES AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

END OF BEAMS AND GIRDERS SHALL BE PLUMB.

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

NEEDLE BEAM TYPE SUPPORTS ARE REQUIRED FOR THE OVERHANG FALSEWORK IN THE SPANS WITH 27" BEAMS.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

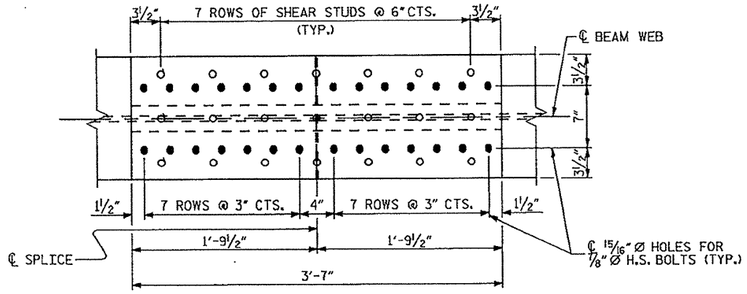
SUPERSTRUCTURE

STRUCTURAL DETAILS

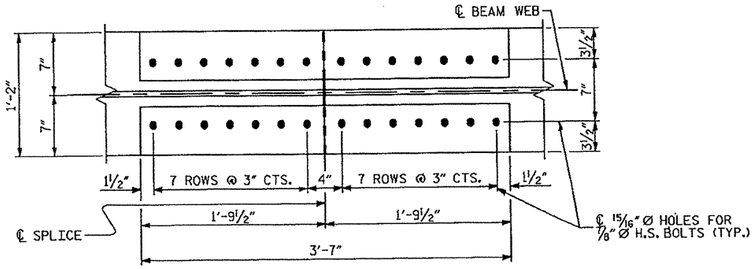
NORTH CAROLINA PROFESSIONAL SEAL 20003 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			29

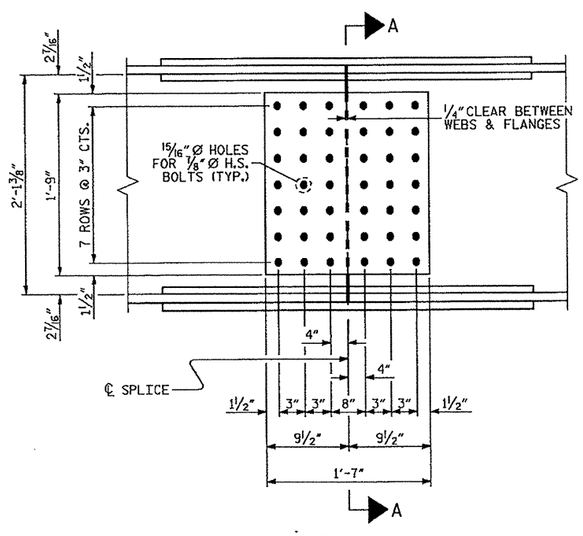
DRAWN BY : M. WELDON DATE : 10/13
CHECKED BY : J. YANNACCONE DATE : 10/13



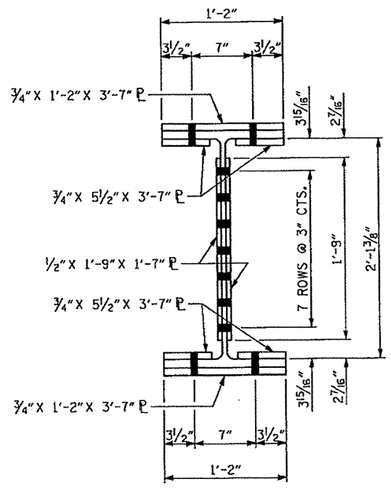
PLAN (TOP OF TOP FLANGE)



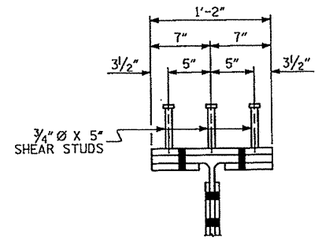
PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A



SHEAR STUD DETAIL
FOR TOP FLANGE SPLICE PLATE

BOLTED FIELD SPLICE DETAILS

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

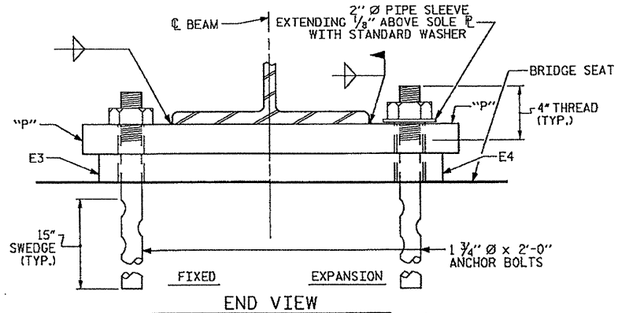
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

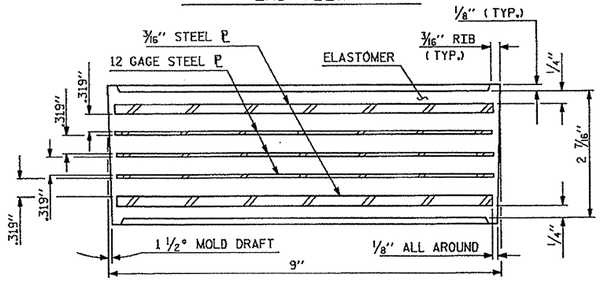
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			29

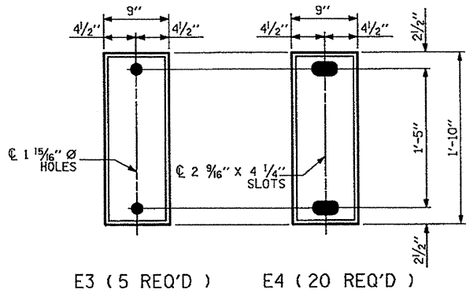
DRAWN BY : J. YANNACCONE DATE : 08/13
CHECKED BY : Z. WAFA DATE : 01/14



END VIEW



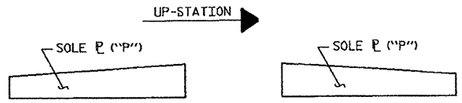
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (5 REQ'D) E4 (20 REQ'D)

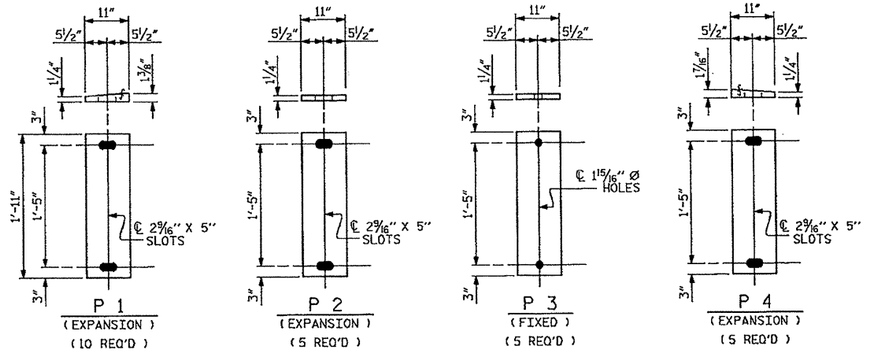
PLAN VIEW OF ELASTOMERIC BEARING

TYPE II



SOLE ℙ PLACEMENT DETAIL

(SEE "FRAMING PLAN" SHEET FOR SOLE ℙ PLACEMENT LOCATIONS)



SOLE PLATE DETAILS ("P")

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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 BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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

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.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	180 k

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

STEEL ROLLED BEAM SUPERSTRUCTURE

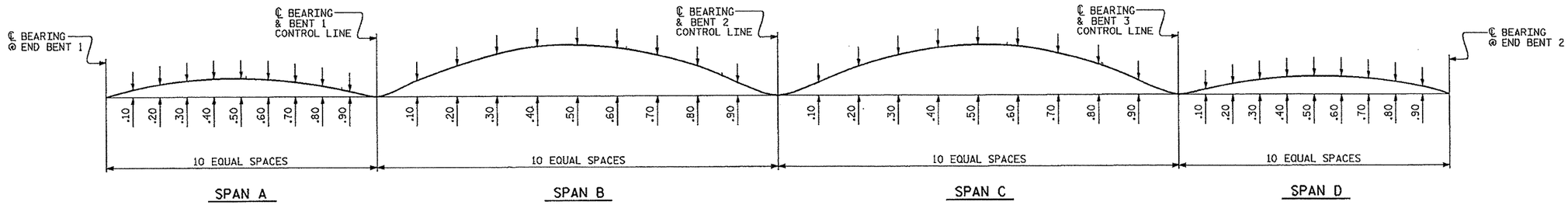
ASSEMBLED BY : D. PLATICA	DATE : 8/2013
CHECKED BY : J. YANNACCONE	DATE : 8/2013

DRAWN BY : JMB 11/87	REV. 5/1/06	TLA/GM
CHECKED BY : ARB 11/87	REV. 10/1/11	MAA/GM
	REV. 6/13	AAC/MAA

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEMA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			29

STD. NO. EB1



SCHEMATIC OF CAMBER ORDINATES

FOR CAMBER VALUES AT EACH GIRDER TENTH POINT, SEE TABLE BELOW.
SLOPE FOR ZERO CAMBER BASE LINE VARIES.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A GIRDERS 1 THRU 5											SPAN B GIRDERS 1 THRU 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.004	0.005	0.005	0.005	0.003	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.005	0.007	0.007	0.006	0.005	0.003	0.001	-0.001	0.000	0.000	0.005	0.013	0.021	0.026	0.027	0.025	0.018	0.011	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.006	0.006	0.006	0.004	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.007	0.010	0.010	0.008	0.007	0.004	0.001	-0.001	0.000	0.000	0.007	0.018	0.030	0.037	0.038	0.036	0.025	0.016	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.010	0.018	0.024	0.027	0.029	0.027	0.024	0.018	0.010	0.000	0.000	0.023	0.040	0.053	0.060	0.063	0.060	0.053	0.040	0.023	0.000
REQUIRED CAMBER	0	3/16"	5/16"	3/8"	7/16"	7/16"	7/16"	5/16"	1/4"	1/8"	0	0	3/8"	11/16"	1"	1 3/16"	1 3/16"	1 1/8"	15/16"	11/16"	5/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN C GIRDERS 1 THRU 5											SPAN D GIRDERS 1 THRU 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.003	0.005	0.005	0.005	0.004	0.002	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.011	0.018	0.025	0.027	0.026	0.021	0.013	0.005	0.000	0.000	-0.001	0.001	0.003	0.005	0.006	0.007	0.007	0.005	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.004	0.006	0.006	0.006	0.005	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.016	0.025	0.036	0.038	0.037	0.030	0.018	0.007	0.000	0.000	-0.001	0.001	0.005	0.007	0.008	0.010	0.010	0.007	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.023	0.040	0.053	0.060	0.063	0.060	0.053	0.040	0.023	0.000	0.000	0.010	0.018	0.024	0.027	0.029	0.027	0.024	0.018	0.010	0.000
REQUIRED CAMBER	0	5/16"	11/16"	15/16"	1 1/8"	1 3/16"	1 3/16"	1"	11/16"	3/8"	0	0	1/8"	1/4"	5/16"	7/16"	7/16"	7/16"	3/8"	5/16"	3/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " REQUIRED CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DRAWN BY : D.V. JOYNER DATE : 01/14
CHECKED BY : J. YANNACCONE DATE : 01/14

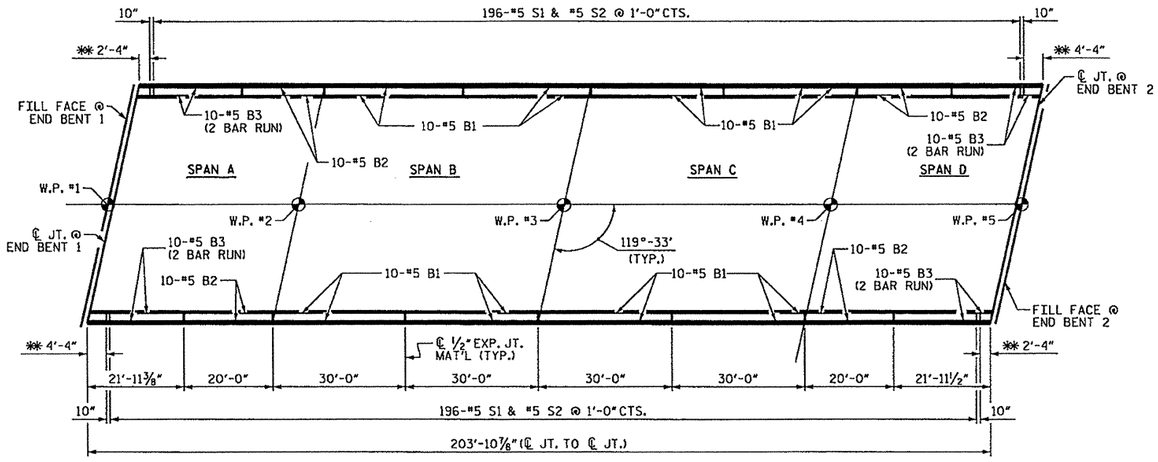
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA 1/14/14

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

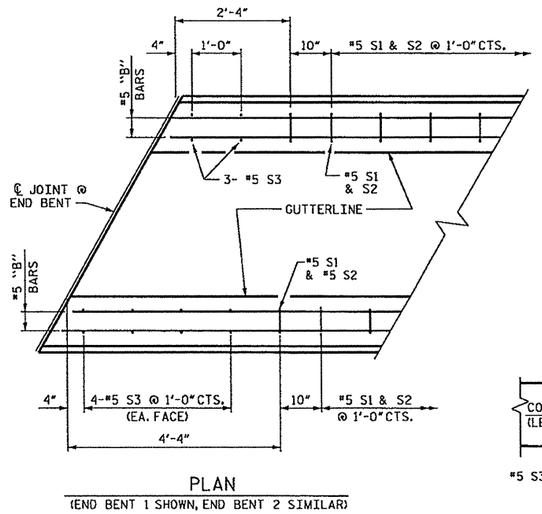
DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			29



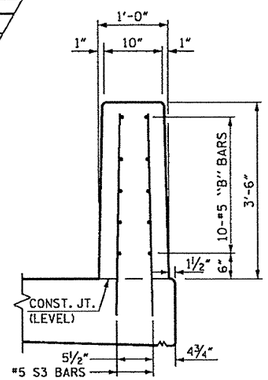
PLAN OF BARRIER RAIL

✱✱ SEE "END OF RAILS DETAILS - PLAN VIEW" FOR ADDITIONAL REINFORCING STEEL. DIMNESIONS ARE TYPICAL FOR EACH SIDE.



PLAN

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



END VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS.

NOTES

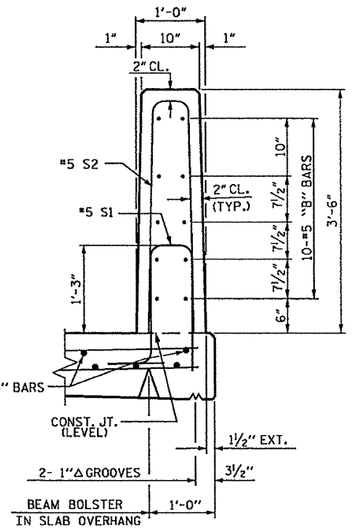
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF VERTICAL CONCRETE BARRIER RAIL.

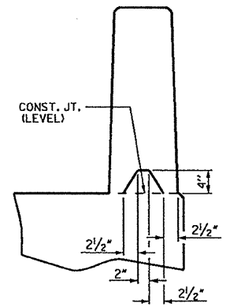
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 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.

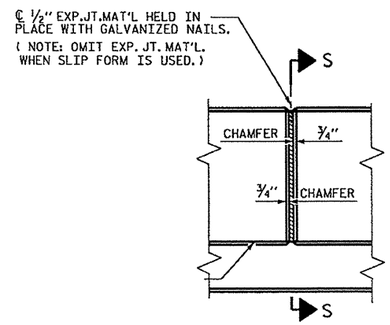


SECTION THRU RAIL



SECTION S-S

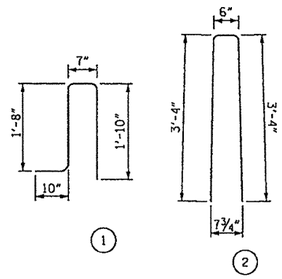
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	80	#5	STR	29'-7"	2468
✱ B2	40	#5	STR	19'-7"	817
✱ B3	80	#5	STR	12'-8"	1057
✱ S1	396	#5	1	4'-11"	2031
✱ S2	396	#5	2	7'-2"	2960
✱ S3	24	#5	STR	4'-0"	100

✱ EPOXY COATED REINFORCING STEEL	9433 LBS.
CLASS AA CONCRETE	48.4 CU. YDS.
VERTICAL CONCRETE BARRIER RAIL	407.62 LIN. FT.

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

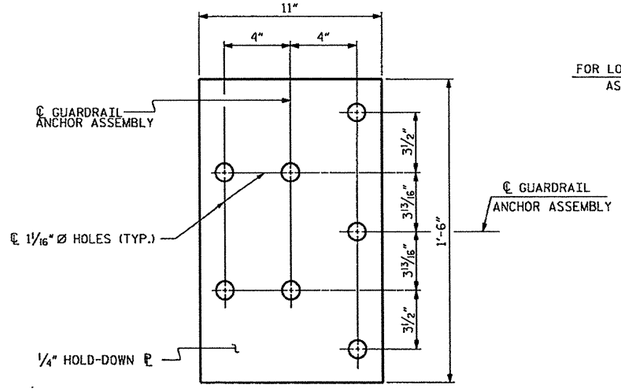
VERTICAL CONCRETE BARRIER RAIL

ASSEMBLED BY : D. PLATICA	DATE : 8/2013		
CHECKED BY : J. YANNACCONE	DATE : 8/2013		
DRAWN BY : MAA 5/10	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/10	REV. 12/5/11	MAA/GM	
	REV. 6/13	MAA/GM	

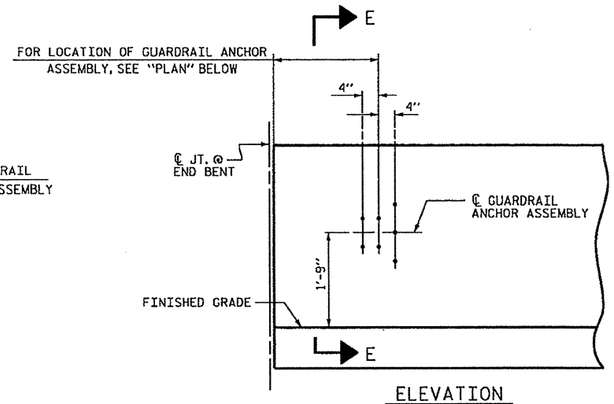
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			29

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

STD. NO. CBR2



PLAN



ELEVATION

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.)

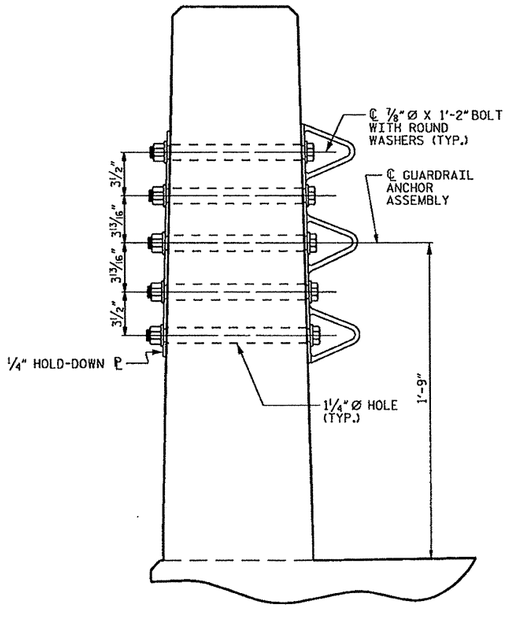
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 VERTICAL CONCRETE BARRIER RAIL.

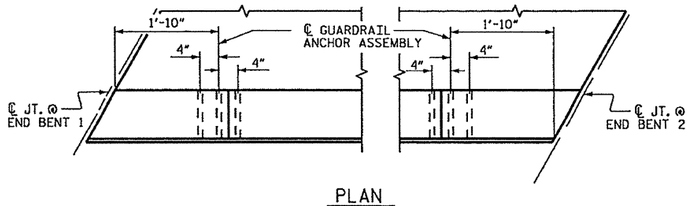
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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.



SECTION E-E

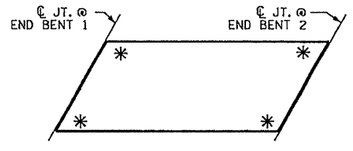
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

(TYP. EA. SIDE)



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

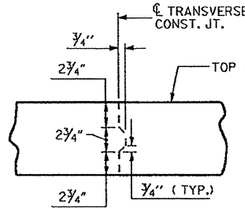
ASSEMBLED BY : D. PLATICA	DATE : 8/2013
CHECKED BY : J. YANNACCONE	DATE : 8/2013
DRAWN BY : MAA 5/10	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/10	REV. 12/5/11 MAA/GM
	REV. 6/13 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			29

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER MARTIN ASEFNIA

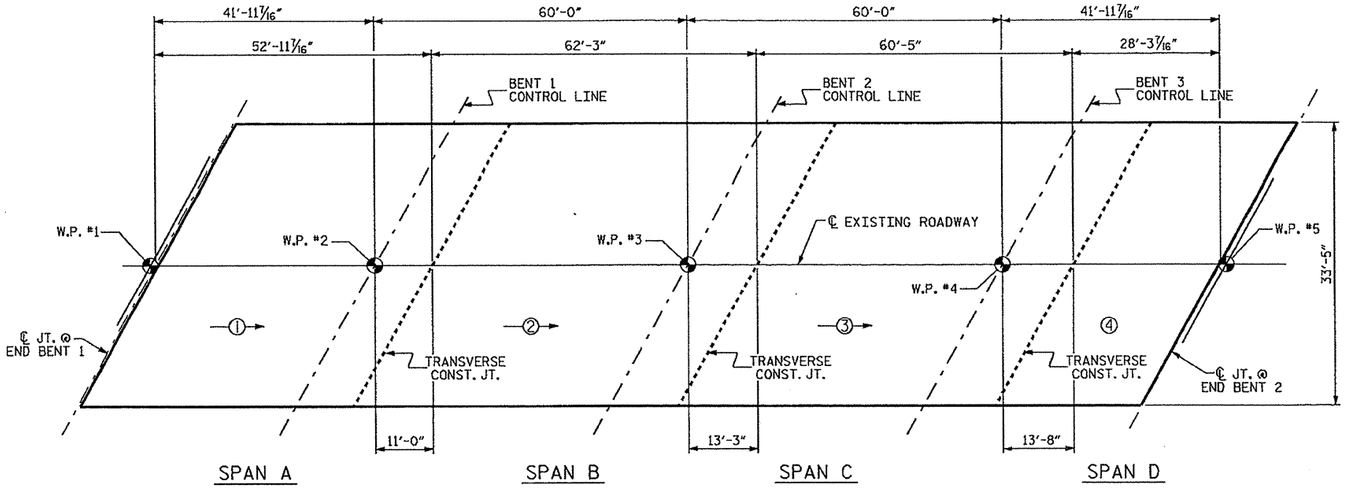
STD. NO. GRA3

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"			



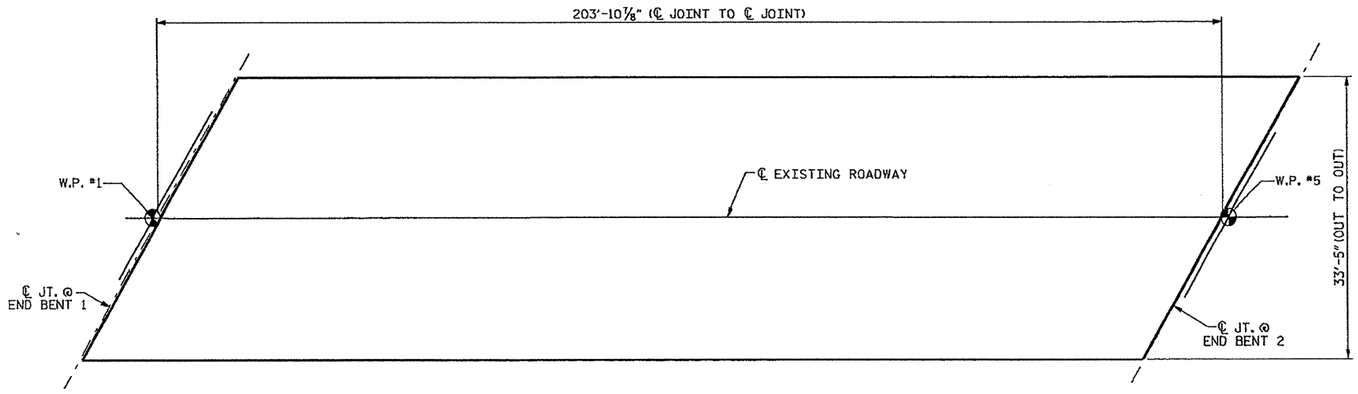
TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

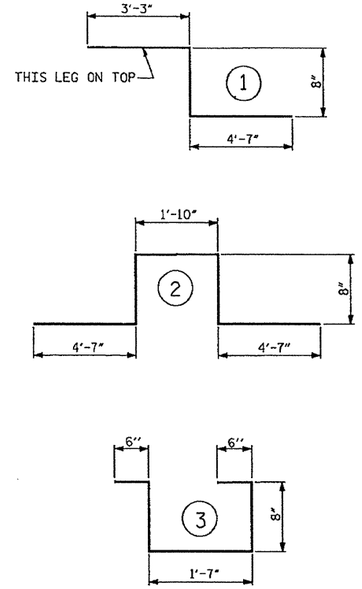


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 6,814)

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	368	#5	STR	33'-1"	12698
A2	368	#5	STR	33'-1"	12698
✳A101	4	#5	STR	31'-4"	131
✳A102	4	#5	STR	29'-7"	123
✳A103	4	#5	STR	27'-10"	116
✳A104	4	#5	STR	26'-1"	109
✳A105	4	#5	STR	24'-3"	101
✳A106	4	#5	STR	22'-6"	94
✳A107	4	#5	STR	20'-9"	87
✳A108	4	#5	STR	19'-0"	79
✳A109	4	#5	STR	17'-3"	72
✳A110	4	#5	STR	15'-6"	65
✳A111	4	#5	STR	13'-8"	57
✳A112	4	#5	STR	11'-11"	50
✳A113	4	#5	STR	10'-2"	42
✳A114	4	#5	STR	8'-5"	35
✳A115	4	#5	STR	6'-8"	28
✳A116	4	#5	STR	4'-11"	21
✳A117	4	#5	STR	3'-1"	13
✳A118	4	#5	STR	1'-4"	6
A201	4	#5	STR	32'-3"	135
A202	4	#5	STR	30'-6"	127
A203	4	#5	STR	28'-9"	120
A204	4	#5	STR	27'-0"	113
A205	4	#5	STR	25'-3"	105
A206	4	#5	STR	23'-5"	98
A207	4	#5	STR	21'-8"	90
A208	4	#5	STR	19'-11"	83
A209	4	#5	STR	18'-2"	76
A210	4	#5	STR	16'-5"	68
A211	4	#5	STR	14'-8"	61
A212	4	#5	STR	12'-10"	54
A213	4	#5	STR	11'-1"	46
A214	4	#5	STR	9'-4"	39
A215	4	#5	STR	7'-7"	32
A216	4	#5	STR	5'-10"	24
A217	4	#5	STR	4'-1"	17
A218	4	#5	STR	2'-3"	9
✳B1	46	#4	STR	25'-9"	791
✳B2	46	#7	STR	41'-0"	3855
✳B3	44	#7	STR	15'-6"	1394
✳B4	46	#4	STR	18'-0"	553
✳B5	23	#7	STR	46'-0"	2163
✳B6	22	#7	STR	18'-0"	809
B7	168	#5	STR	52'-6"	9199
✳G1	2	#5	STR	32'-11"	69
✳K1	8	#5	1	8'-6"	71
✳K2	12	#5	2	12'-4"	154
✳S1	56	#4	3	3'-11"	147
REINFORCING STEEL = 23,194 LBS					
✳EPOXY COATED REINF. STEEL= 23,933 LBS					

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

POUR NO.	CLASS AA CONCRETE (CU. YD.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
#1	56.6		
#2	65.8		
#3	63.9		
#4	30.5		
TOTALS ✳✳	216.8	23,194	23,933

✳✳ QUANTITIES FOR BARRIER RAIL NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	762 SQ. FT.
BRIDGE DECK	5700 SQ. FT.
TOTAL	6462 SQ. FT.

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER PARVIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : D.V. JOYNER DATE : 10/13
CHECKED BY : J. YANNACCONE DATE : 10/13

09-JAN-2014 16:17
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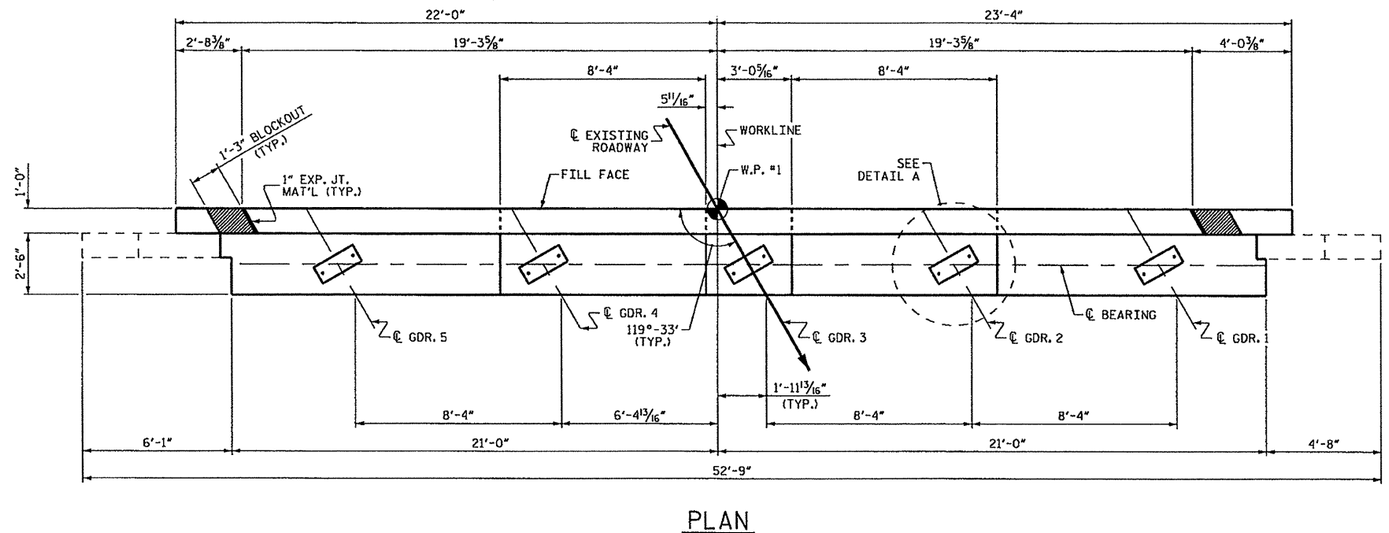
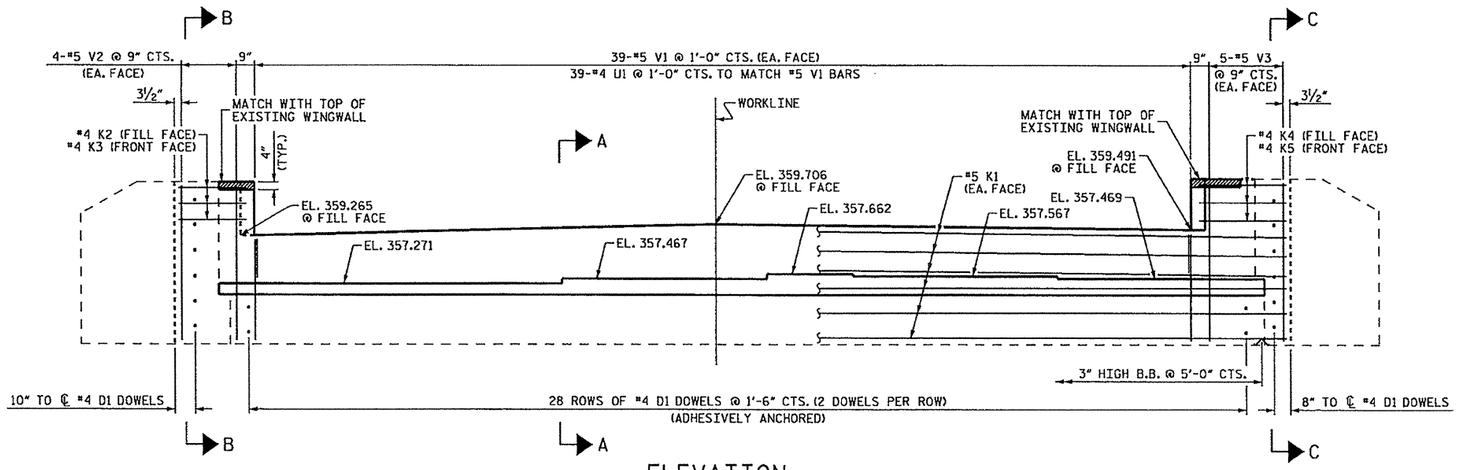
jayennaccone



PLAN



ELEVATION

NOTES

A SAW CUT APPROXIMATELY 1" IN DEPTH SHALL BE MADE IN THE END BENT CAP AND EXISTING CONCRETE REMOVED IN ACCORDANCE WITH PLAN DETAILS.

THE EXISTING REINFORCING STEEL TO REMAIN IN PLACE SHALL BE CLEANED AND BENT TO ITS ORIGINAL SHAPE.

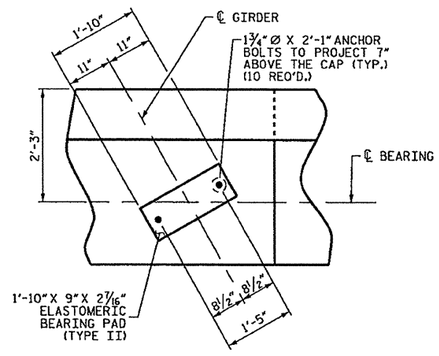
INSTALL D1 DOWELS INTO THE EXISTING END BENT CAP AND WINGWALLS USING AN ADHESIVE ANCHORING SYSTEM. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 12.0 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



DETAIL A
(TYP. EA. GDR.)

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

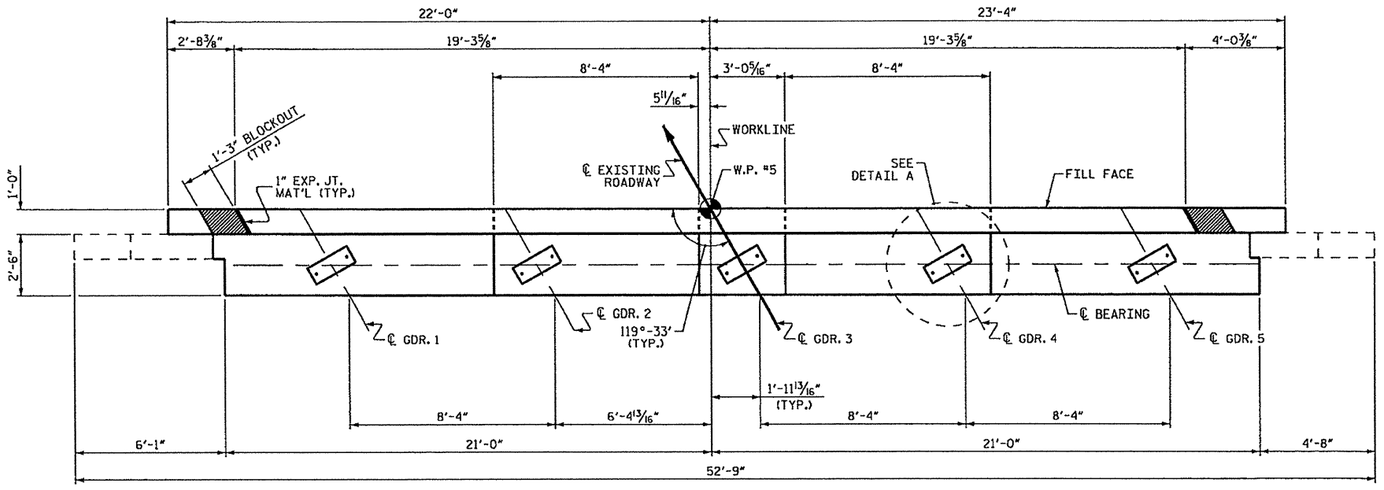
SUBSTRUCTURE

END BENT 1

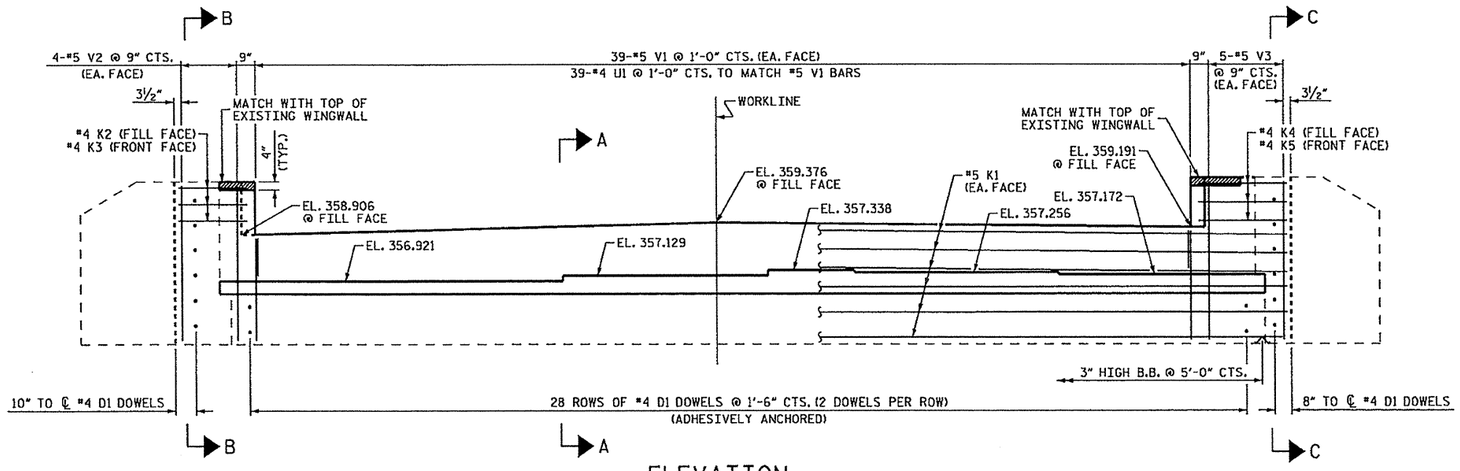
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEMA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 12/13
CHECKED BY : Z. WAFA DATE : 01/14



PLAN



ELEVATION

NOTES

A SAW CUT APPROXIMATELY 1" IN DEPTH SHALL BE MADE IN THE END BENT CAP AND EXISTING CONCRETE REMOVED IN ACCORDANCE WITH PLAN DETAILS.

THE EXISTING REINFORCING STEEL TO REMAIN IN PLACE SHALL BE CLEANED AND BENT TO ITS ORIGINAL SHAPE.

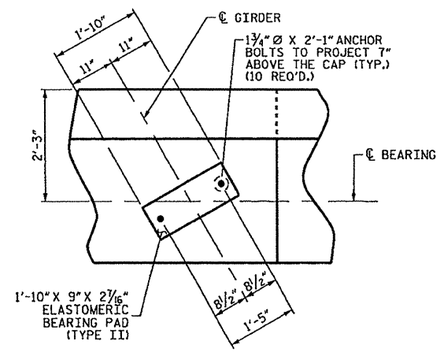
INSTALL D1 DOWELS INTO THE EXISTING END BENT CAP AND WINGWALLS USING AN ADHESIVE ANCHORING SYSTEM. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 12.0 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



DETAIL A
(TYP. EA. GDR.)

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

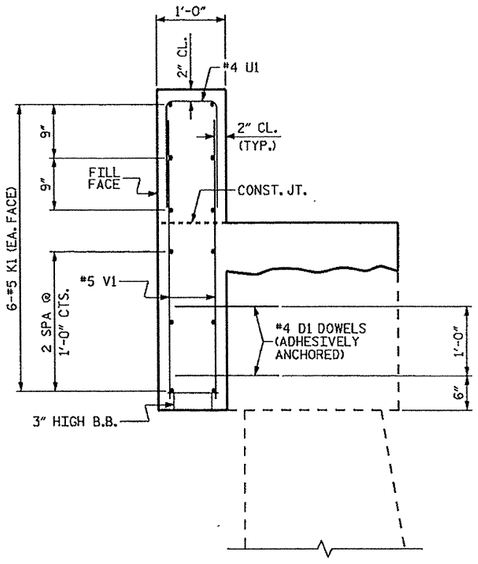
SUBSTRUCTURE

END BENT 2

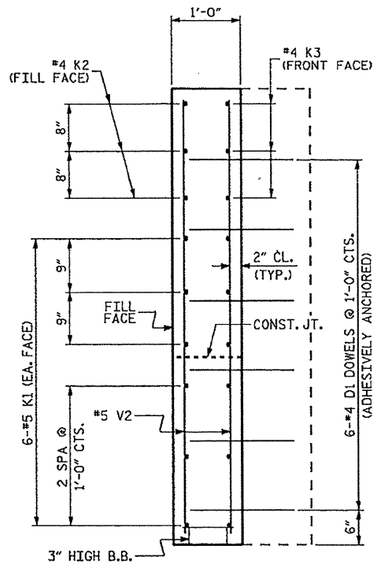
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			29

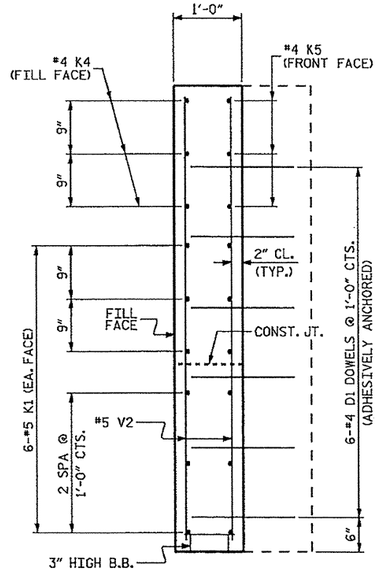
DRAWN BY : J. YANNACCONE DATE : 12/13
CHECKED BY : Z. WAFA DATE : 01/14



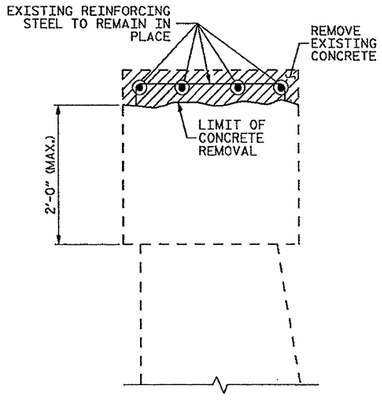
SECTION A-A
(PROPOSED)



SECTION B-B



SECTION C-C



SECTION A-A
(EXISTING)

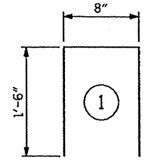
BILL OF MATERIAL
FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	68	#4	STR	1'-9"	79
K1	12	#5	STR	45'-0"	563
K2	3	#4	STR	2'-9"	6
K3	3	#4	STR	2'-5"	5
K4	3	#4	STR	3'-6"	7
K5	3	#4	STR	3'-2"	6
U1	39	#4	1	3'-8"	96
V1	78	#5	STR	3'-11"	319
V2	8	#5	STR	6'-2"	51
V3	10	#5	STR	6'-4"	66

REINFORCING STEEL LBS. 1198

CLASS A CONCRETE
POUR #1 - CAP & LOWER BACKWALL CU. YDS. 7.2
POUR #2 - UPPER BACKWALL CU. YDS. 3.8
TOTAL CU. YDS. 11.0

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. 17BP.5,H.3
DURHAM COUNTY
BRIDGE NO.: 193

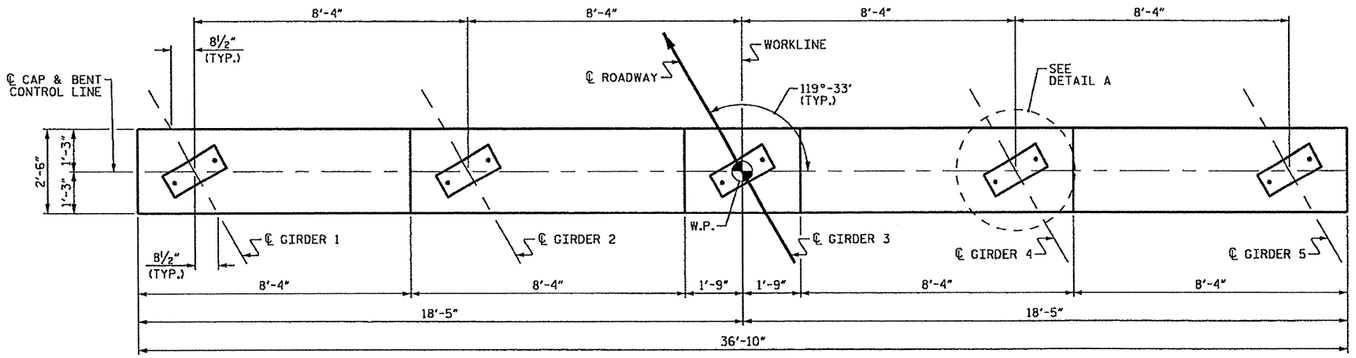
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

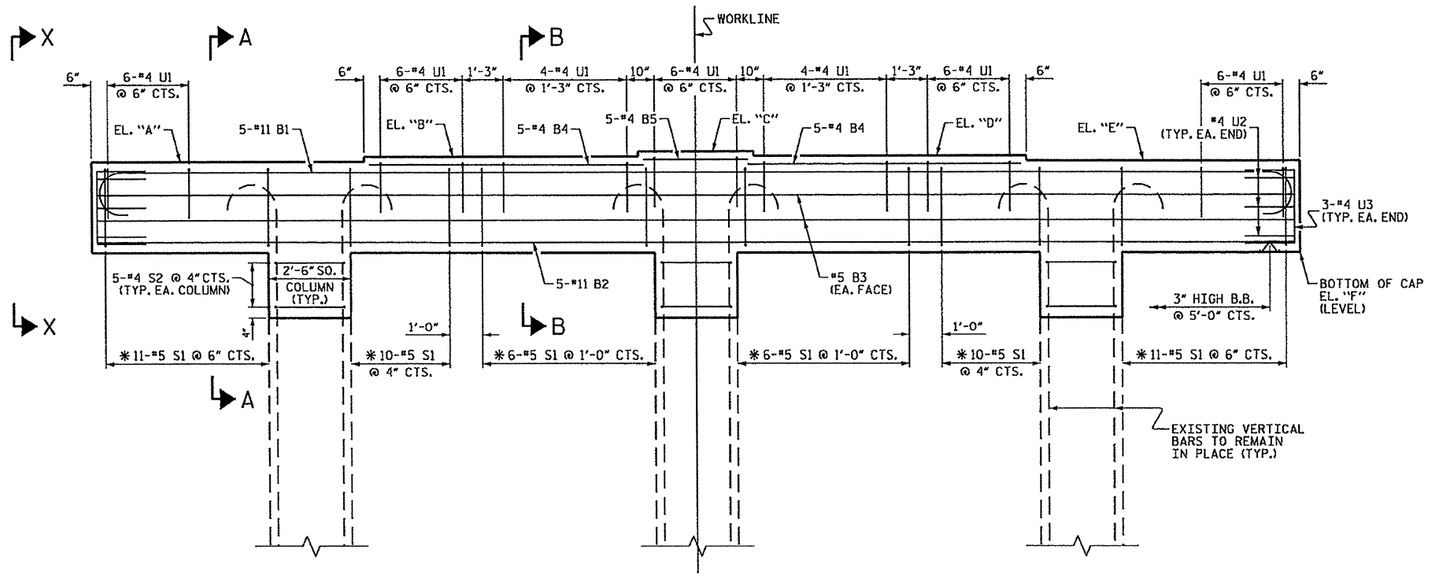
END BENT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 01/14
CHECKED BY : Z. WAFA DATE : 01/14



PLAN



ELEVATION

* INVERT ALTERNATE STIRRUPS AS SHOWN.

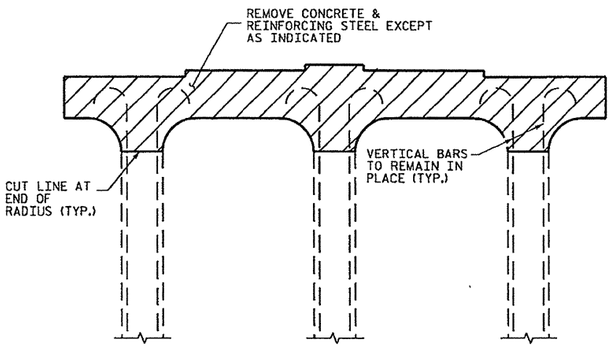
CAP ELEVATIONS			
LOCATION	BENT 1	BENT 2	BENT 3
A	357.817	357.903	357.482
B	357.937	358.058	357.672
C	358.056	358.211	357.859
D	357.882	358.071	357.754
E	357.706	357.929	357.646
F	354.956	355.153	354.732

NOTES

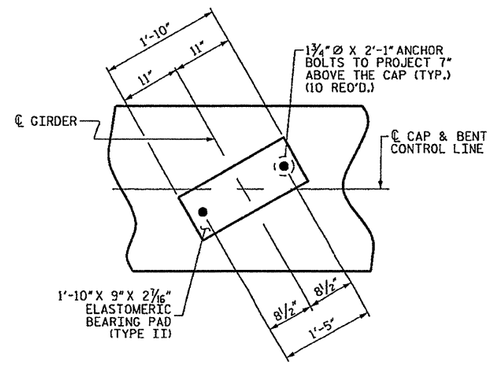
A SAW CUT APPROXIMATELY 1" IN DEPTH SHALL BE MADE IN THE COLUMNS AND EXISTING CONCRETE REMOVED IN ACCORDANCE WITH PLAN DETAILS.

THE EXISTING VERTICAL BARS TO REMAIN IN PLACE SHALL BE CLEANED AND BENT TO THEIR ORIGINAL SHAPE.

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



EXISTING BENT CAP DEMOLITION



DETAIL A
(TYP. EA. GDR.)

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

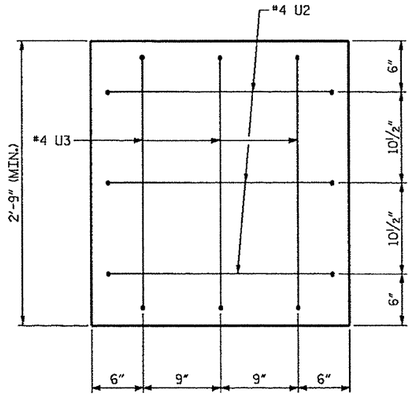
SUBSTRUCTURE

BENTS 1, 2 & 3

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

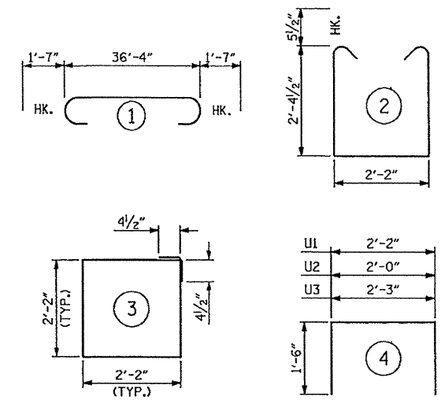
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : M. WELDON DATE : 10/13
CHECKED BY : J. YANNACCONE DATE : 10/13



VIEW X-X
(TYP. EA. END)

BAR TYPES



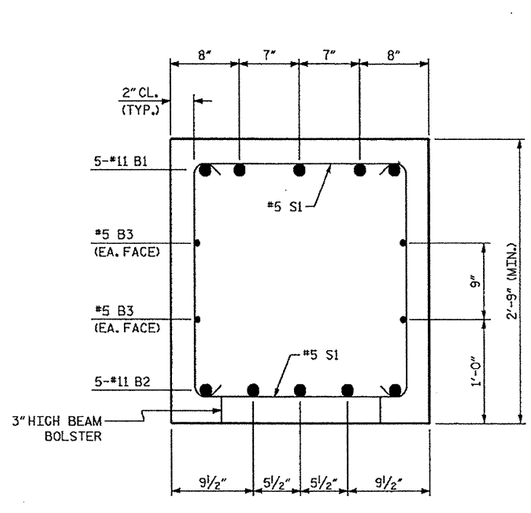
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

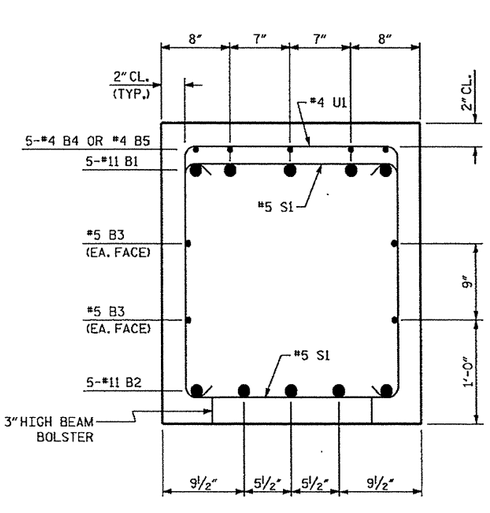
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	1	39'-6"	1049
B2	5	#11	STR	36'-6"	970
B3	4	#5	STR	36'-6"	152
B4	10	#4	STR	8'-4"	56
B5	5	#4	STR	3'-2"	11
S1	54	#5	2	7'-10"	441
S2	15	#4	3	9'-5"	94
U1	38	#4	4	5'-2"	131
U2	6	#4	4	5'-0"	20
U3	6	#4	4	5'-3"	21

REINFORCING STEEL 2945 LBS.

CLASS A CONCRETE:
CAP & COLUMNS 11.1 C.Y.



SECTION A-A



SECTION B-B

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 1, 2 & 3 DETAILS

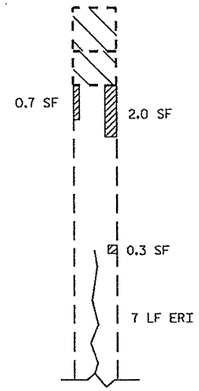
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			29

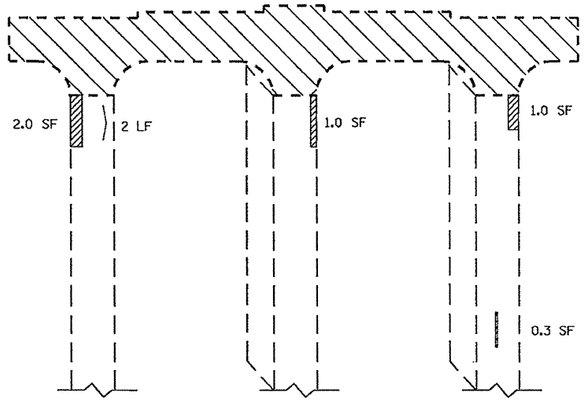
DRAWN BY : M.WELDON DATE : 10/13
CHECKED BY : J. YANNACCONE DATE : 10/13

NOTE:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.

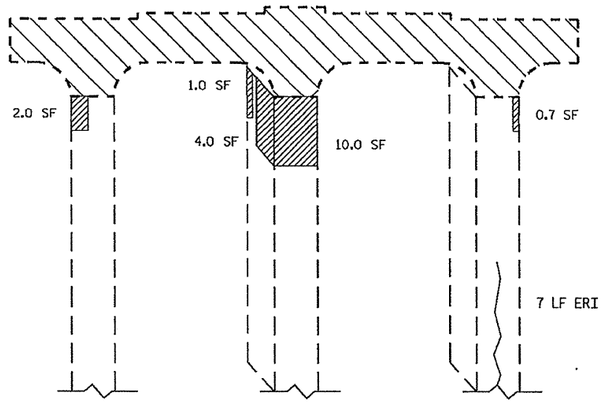


END VIEW
SOUTH FACE



ELEVATION
EAST FACE

END VIEW
NORTH FACE



ELEVATION
WEST FACE

CONCRETE REMOVAL, SEE 'BENTS 1, 2 & 3" SHEET

CONCRETE REPAIR

SHOTCRETE REPAIR

ERI – EPOXY RESIN INJECTION

REPAIR QUANTITY TABLE				
REPAIRS BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
COLUMN (VERTICAL FACE)	27.0	10.3		
CONCRETE REPAIRS	0.0	0.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
COLUMN		16		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

DRAWN BY : M.WELDON DATE : 7/2013
CHECKED BY : J. YANNACCONE DATE : 7/2013

PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

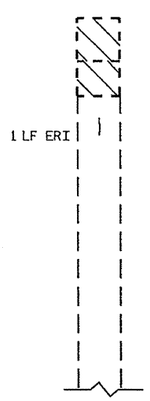
BENT 1 REPAIRS

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

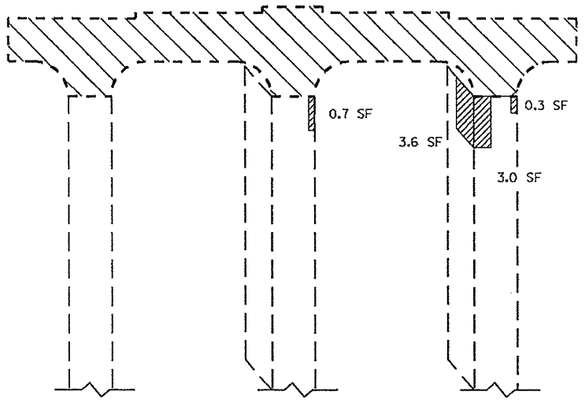
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			29

NOTE:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.

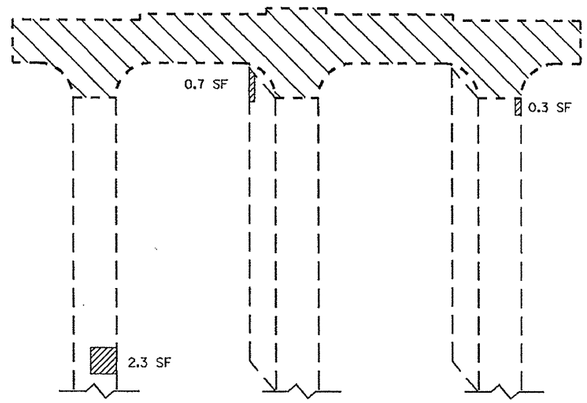


END VIEW
SOUTH FACE



ELEVATION
EAST FACE

END VIEW
NORTH FACE



ELEVATION
WEST FACE

CONCRETE REMOVAL, SEE "BENTS 1, 2 & 3" SHEET

CONCRETE REPAIR

SHOTCRETE REPAIR

ERI – EPOXY RESIN INJECTION

REPAIR QUANTITY TABLE				
REPAIRS BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
COLUMN (VERTICAL FACE)	11.2	4.3		
CONCRETE REPAIRS	0.0	0.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
COLUMN		1		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2
REPAIRS

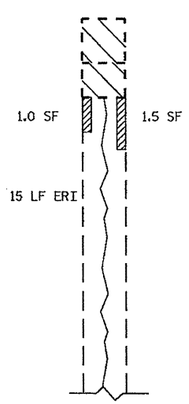
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103 PARVIN ASEMA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			29

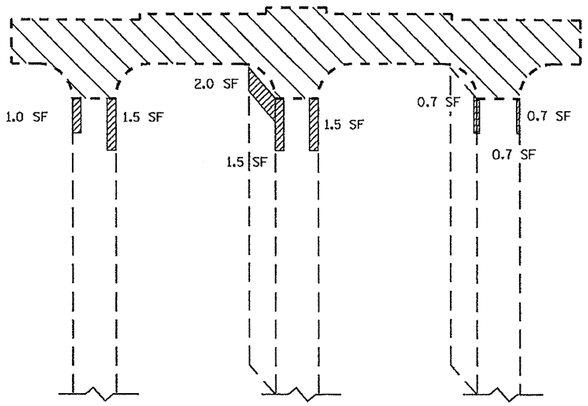
DRAWN BY : M.WELDON DATE : 7/2013
CHECKED BY : J. YANNACCONE DATE : 7/2013

NOTE:

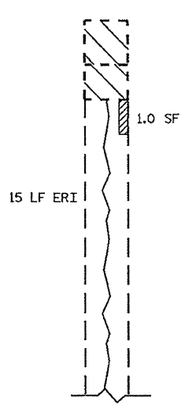
REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.



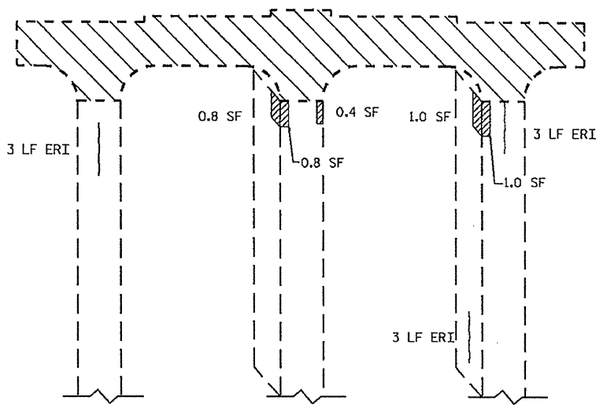
END VIEW
SOUTH FACE



ELEVATION
EAST FACE



END VIEW
NORTH FACE



ELEVATION
WEST FACE

CONCRETE REMOVAL, SEE "BENTS 1, 2 & 3" SHEET

CONCRETE REPAIR

SHOTCRETE REPAIR

ERI – EPOXY RESIN INJECTION

REPAIR QUANTITY TABLE				
REPAIRS BENT 3	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
COLUMN (VERTICAL FACE)	17.1	6.5		
CONCRETE REPAIRS	0.0	0.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
COLUMN		39		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

DRAWN BY : M.WELDON DATE : 7/2013
CHECKED BY : J. YANNACCONE DATE : 7/2013

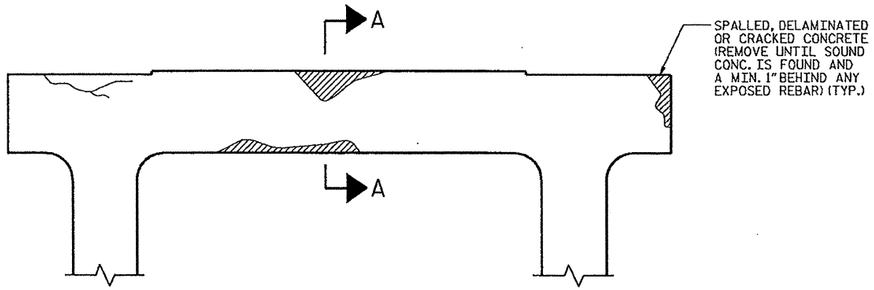
PROJECT NO. 17BP.5.H.3
DURHAM COUNTY
BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

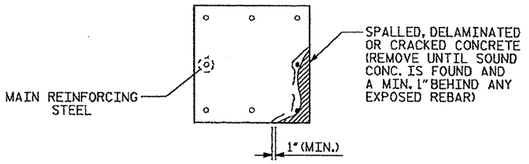
SUBSTRUCTURE

BENT 3 REPAIRS

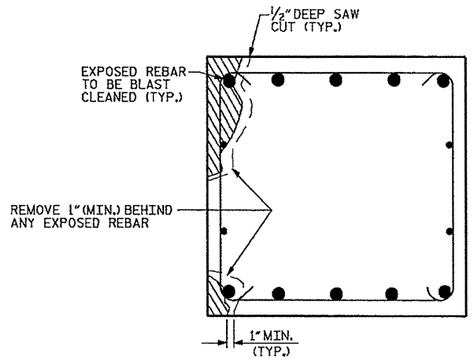
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			29



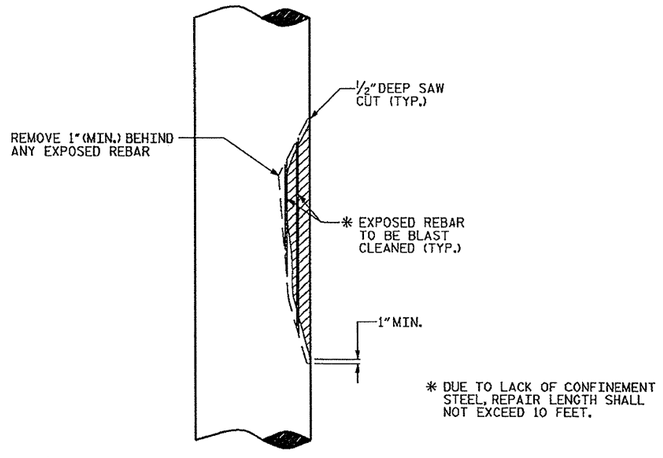
BENT CAP REPAIRS



PLAN OF COLUMN



SECTION THRU CAP



ELEVATION OF CAP

CAP REPAIR

COLUMN REPAIR

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

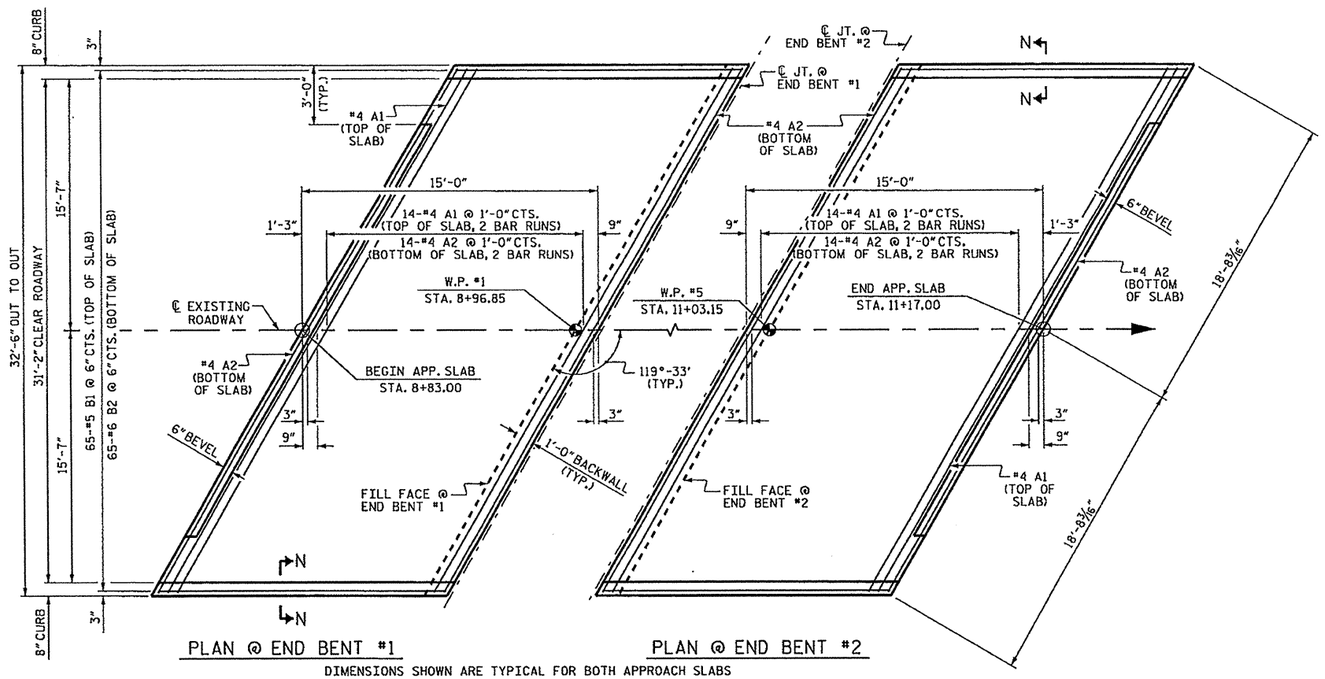
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL CAP AND COLUMN REPAIR DETAILS

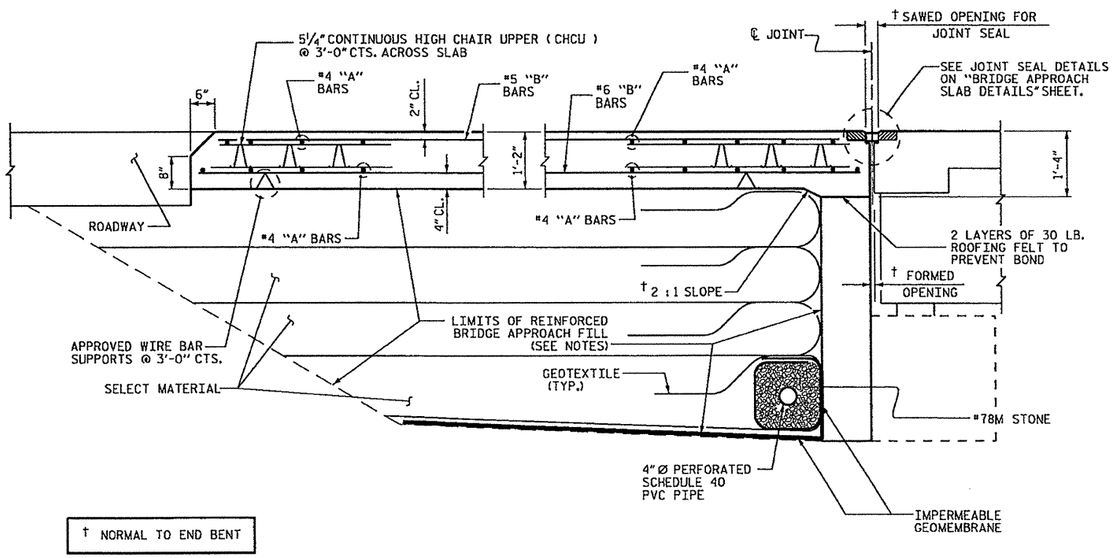
NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			29

DRAWN BY : J. YANNACCONE DATE : 5/13
CHECKED BY : F. ASEFNIA DATE : 5/13

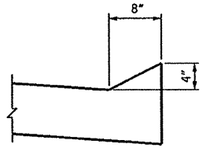


DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

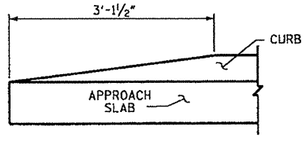


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	19'-6"	391
A2	32	#4	STR	19'-5"	415
* B1	65	#5	STR	13'-7"	921
B2	65	#6	STR	14'-6"	1416
REINFORCING STEEL				LBS.	1831
* EPOXY COATED REINFORCING STEEL				LBS.	1312
CLASS AA CONCRETE				C. Y.	21.3
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	19'-6"	391
A2	32	#4	STR	19'-5"	415
* B1	65	#5	STR	13'-7"	921
B2	65	#6	STR	14'-6"	1416
REINFORCING STEEL				LBS.	1831
* EPOXY COATED REINFORCING STEEL				LBS.	1312
CLASS AA CONCRETE				C. Y.	21.3

NOTES

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

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

THE ROADWAY SHOULDER BEHIND THE WINGWALL SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY STANDARD DRAWINGS.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

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

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO. 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

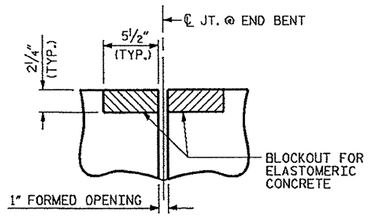
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103 TARIN ASSEFA

ASSEMBLED BY : D.V. JOYNER	DATE : 10/13
CHECKED BY : J. YANNACCONE	DATE : 10/13
DRAWN BY : EEW 3/95	REV. 10/1/18 MAA/GM
CHECKED BY : VAP 3/95	REV. 12/21/18 MAA/GM
	REV. 6/13 MAA/GM

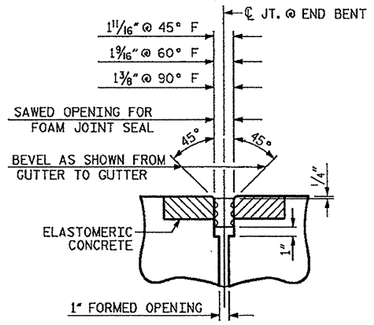
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			29

STD. NO. BAS2



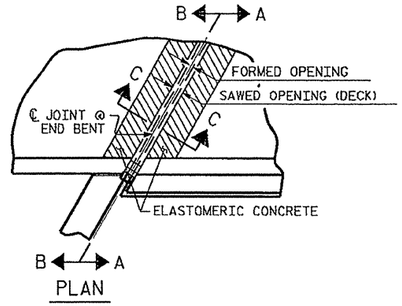
SECTION C-C

FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)

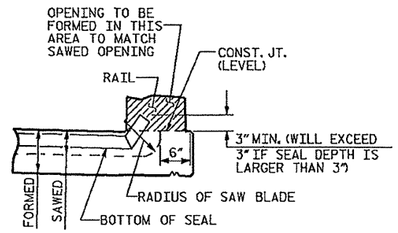


SECTION C-C

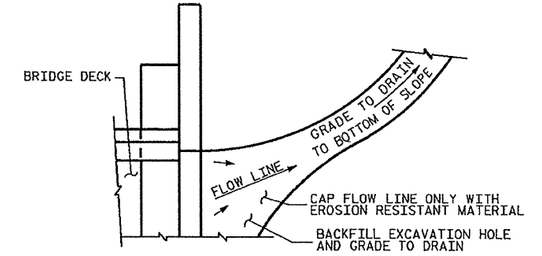
FOAM JOINT SEAL
(EXPANSION)



PLAN



SECTION A-A

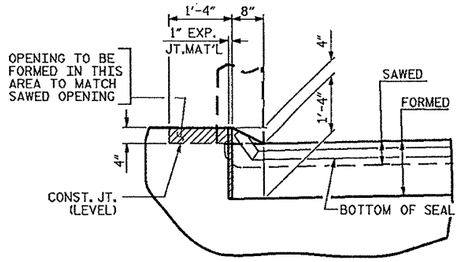


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.2
2	6.2
TOTAL	12.4

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION B-B

JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

PROJECT NO. 17BP.5.H.3

DURHAM COUNTY

BRIDGE NO.: 193

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH
SLAB DETAILS

ASSEMBLED BY : D.V. JOYNER	DATE : 10/13
CHECKED BY : J. YANNACCONE	DATE : 10/13
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

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

SHEET NO. S-29

TOTAL SHEETS 29

STD. NO. BAS4

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

REV. 6-16-95 EEM (J) RGW REV. 5-7-03 RWW (J) JTE REV. 10-1-11 MAA (J) GM
REV. 8-16-99 RWW (J) LES REV. 5-1-06 TLA (J) GM

ENGLISH

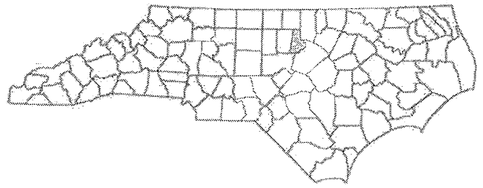
JANUARY, 1990

STD. NO. SN

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

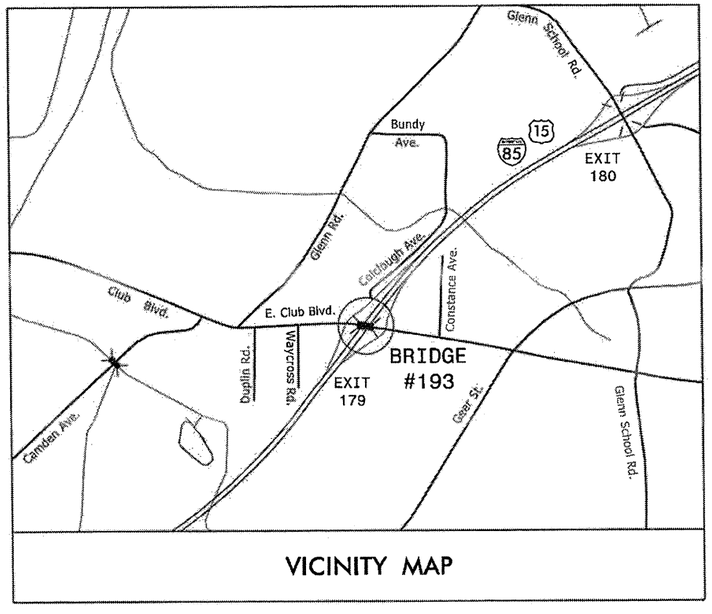
TRANSPORTATION MANAGEMENT PLAN

DURHAM COUNTY



BRIDGE REHABILITATION

DURHAM BRIDGE #193 – SR 1671 (E. CLUB BLVD.) OVER I-85/US 15



VICINITY MAP

INDEX OF SHEETS

SHEET NO.
TMP-1

WBS 17BP.5.H.3

WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL LIST OF CONTACTS
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

JOSEPH ISHAK, P.E. — *CENTRAL WORK ZONE TRAFFIC CONTROL ENGINEER*
MIKE STEELMAN — *TRAFFIC CONTROL PROJECT DESIGN ENGINEER*

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

PLAN PREPARED BY:
Stantec Consulting Services Inc.
801 Jones Franklin Road-Suite 300
Raleigh, NC 27606
Tel. 919.851.6666
Fax. 919.851.7024
www.stantec.com

BETSY L. WATSON, P.E.
TRAFFIC ENGINEER
REGINA CULLEN, E.I.
TRANSPORTATION DESIGNER

APPROVED: Betsy L Watson
DATE: 12/2/13

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29449 ENGINEER BETSY L. WATSON

12/2/2013
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PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-1A

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.06	WARNING SIGNS FOR BLASTING ZONES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1160.01	TEMPORARY CRASH CUSHION
1165.01	WORK VEHICLE LIGHTING SYSTEMS AND TMA DELINEATION
1170.01	PORTABLE CONCRETE BARRIER
1180.01	SKINNY - DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.03	PAVEMENT MARKINGS - EXITS AND ENTRANCE RAMPS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.06	PAVEMENT MARKINGS - LANE DROPS
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1205.10	PAVEMENT MARKINGS - SCHOOL AREAS
1205.11	PAVEMENT MARKINGS - RAILROAD CROSSINGS
1205.12	PAVEMENT MARKINGS - BRIDGES
1205.13	PAVEMENT MARKINGS - LANE REDUCTIONS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - (PERMANENT AND TEMPORARY)
1253.01	RAISED PAVEMENT MARKERS - SNOWPLOWABLE
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION
1264.01	OBJECT MARKERS - TYPES
1264.02	OBJECT MARKERS - INSTALLATION

LEGEND

EXIST. PVMT.
PROPOSED PVMT.
NORTH ARROW
DIRECTION OF TRAFFIC FLOW
DIRECTION OF PEDESTRIAN TRAFFIC FLOW
WORK AREA
PAVEMENT REMOVAL
TEMPORARY PAVEMENT
TYPE III BARRICADE
CONE
DRUM
SKINNY DRUM
TUBULAR MARKER
CHANGEABLE MESSAGE SIGN (CMS)
FLAGGER
AUTOMATED FLAGGER ASSISTANCE DEVICE (AFAD)
FLASHING ARROW BOARD(TYPE C)
LAW ENFORCEMENT
TRUCK MOUNTED ATTENUATOR (TMA)
WORK ZONE SIGN-PORTABLE
WORK ZONE SIGN-STATIONARY
WORK ZONE SIGN-STATIONARY OR PORTABLE
TEMPORARY SHORING
TEMPORARY CRASH CUSHION
PORTABLE CONCRETE BARRIER (PCB)

SIGNALS

EXISTING
PROPOSED
TEMP TEMPORARY

PAVEMENT MARKINGS

DOUBLE YELLOW CENTER LINE
SKIP LINES
MINI-SKIP LINES
SOLID LINES
EXISTING PAVEMENT MARKING (GRAY)

PAVEMENT MARKERS

CRYSTAL/CRYSTAL
CRYSTAL/RED
YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS
EXISTING PAVEMENT MARKING SYMBOLS (HOLLOW)
ONLY PAVEMENT MARKING ALPHANUMERIC CHARACTERS

Stantec
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801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
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Fax. (919) 851-7024
www.stantec.com
License No. F-0672

APPROVED:_______ DATE:_______

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029449 BETSY L. WATSON
12/2/13

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

ROADWAY STANDARD DRAWINGS & LEGEND

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PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-2

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
I-85	6:00 A.M.- 7:00 P.M. MONDAY THRU SUNDAY

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME
I-85

HOLIDAY

1) FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.

2) FOR NEW YEAR'S, BETWEEN THE HOURS OF 6:00 A.M. DECEMBER 31ST TO 7:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 7:00 P.M. THE FOLLOWING TUESDAY.

3) FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 7:00 P.M. MONDAY.

4) FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 7:00 P.M. TUESDAY.

5) FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE DAY AFTER INDEPENDENCE DAY. IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY; THEN BETWEEN THE HOURS OF 6:00 A.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.

6) FOR LABOR DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY AND 7:00 P.M. TUESDAY.

7) FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 6:00 A.M. TUESDAY TO 7:00 P.M. MONDAY.

8) FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 7:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

C) DO NOT CLOSE ROADS AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS	OPERATION
I-85	6:00 A.M.- 7:00 P.M. MONDAY THRU SUNDAY	GIRDER REMOVAL AND INSTALLATION

D) DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

E) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

G) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

H) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

I) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

J) DO NOT INSTALL MORE THAN ONE LANE CLOSURE IN ANY ONE DIRECTION ON I-85.

TRAFFIC PATTERN ALTERATIONS

K) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

L) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

M) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRANSPORTATION MANAGEMENT PLANS.

AND

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRANSPORTATION MANAGEMENT PLANS.

N) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

AND

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

O) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

P) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH), EXCEPT 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

Q) PLACE TYPE III BARRICADES WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

R) PLACE ADDITIONAL SETS OF THREE CHANNELIZING DEVICES (DRUMS OR SKINNY DRUMS) PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 500 FT CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

PAVEMENT MARKINGS AND MARKERS

S) INSTALL FINAL PAVEMENT MARKINGS AND FINAL PAVEMENT MARKERS ON PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING MARKER
SR 1671	PAINT

T) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

MISCELLANEOUS

U) USE LAW ENFORCEMENT TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND OR INTERSECTIONS AS SHOWN IN PLANS OR DIRECTED BY THE ENGINEER.

V) MAINTAIN VEHICULAR ACCESS TO ALL DRIVEWAYS DURING THE LIFE OF THE CONTRACT, UNLESS OTHERWISE NOTED IN THE PHASING OR DIRECTED BY THE ENGINEER.

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APPROVED:_____ DATE:_____

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 29449 ENGINEER BETSY L. WATSON
12/2/13

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

PROJECT NOTES

GENERAL NOTES

PHASING

STEP 1:
INSTALL OFFSITE DETOUR SIGNING FOR THE CLOSURE OF SR 1671 (E. CLUB BLVD.) ACCORDING TO TMP-6 AND COVER SIGNS AS APPROPRIATE. USING ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9, AND SHEET TMP-5, INSTALL AND COVER ROAD CLOSURE SIGNS.

STEP 2:
IN ONE CONTINUOUS WORK PERIOD, UNCOVER OFFSITE DETOUR SIGNS AND ROAD CLOSURE SIGNS, AND INSTALL DEVICES TO CLOSE SR 1671 (E. CLUB BLVD.) PER ROADWAY STANDARD DRAWING 1101.03 SHEET 1 OF 9, ROAD CLOSURE BEYOND DETOUR POINT, TO IMPLEMENT OFF-SITE DETOUR OF SR 1671 (E. CLUB BLVD.). SEE TMP-5 FOR ROAD CLOSURE DETAIL AT I-85 INTERCHANGE. NOTE THE LAYOUT OF EXISTING MARKINGS ON SR 1671 (E. CLUB BLVD) FOR PLACEMENT OF FINAL MARKINGS BACK IN THE EXISTING PATTERN, AS DESCRIBED IN STEP 3.

STEP 3:
PERFORM REMOVAL AND REPLACEMENT OF SUPERSTRUCTURE ON BRIDGE #193, USING LANE CLOSURES AND ROAD CLOSURES ALONG I-85 DURING ALLOWABLE OVERNIGHT PERIODS AS DESCRIBED IN NOTES A, B, AND C ON TMP-2. FOR LANE CLOSURES ON I-85, SEE ROADWAY STANDARD DRAWING 1101.02 SHEETS 4, 5, 6 AND 10. FOR ROAD CLOSURES ON I-85, IMPLEMENT "ALL TRAFFIC EXIT" CONDITION AT EXIT #179, WITH TRAFFIC BEING DETOURED VIA THE INTERCHANGE RAMPS, PER ROADWAY STANDARD DRAWING 1101.03 SHEET 7 OF 9 AND TMP-4. DURING ROAD CLOSURES, USE LAW ENFORCEMENT AT RAMPS TO DIRECT TRAFFIC AND TO MAINTAIN RESIDENTIAL ACCESS OFF OF I-85 NB EXIT RAMP. AT THE END OF EACH WORK PERIOD, RESTORE I-85 TRAFFIC TO ITS EXISTING 4-LANE, 2-WAY PATTERN. AT THE END OF EACH WORK PERIOD, BRIDGE #193 WILL REMAIN CLOSED TO TRAFFIC AND OFFSITE DETOUR OF SR 1671 (E. CLUB BLVD.) WILL REMAIN IN PLACE.

PERFORM SUBSTRUCTURE REPAIRS TO BRIDGE #193 USING LANE CLOSURES ON I-85 PER ROADWAY STANDARD DRAWING 1101.02 SHEETS 4, 5, 6, 8, 10 AND SHOULDER CLOSURES ON I-85 PER ROADWAY STANDARD DRAWING 1101.04 SHEET 1 OF 1.

PERFORM MILLING AND PAVING ON SR 1671 (E. CLUB BLVD.) UP THROUGH THE FINAL LAYER OF SURFACE COURSE AS SHOWN IN THE STRUCTURE AND/OR ROADWAY PLANS. PLACE FINAL PAVEMENT MARKINGS (PAINT) ON SR 1761 (E. CLUB BLVD.) IN EXISTING PATTERN OR AS DIRECTED BY THE ENGINEER.

STEP 4:
REMOVE DEVICES AND SIGNS CLOSING SR 1671 (E. CLUB BLVD.) AND RE-OPEN BRIDGE #193 TO TRAFFIC. REMOVE OFFSITE DETOUR SIGNING.

12/2/2013
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APPROVED: DATE:

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL BETSY L. WATSON
12/2/13

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

PHASING

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-4

COLCLOUGH AVE. LOCAL ACCESS IS VIA GLENN RD./BUNDY AVE. DURING THIS OPERATION

FOR CLOSURE OF I-85 SOUTHBOUND USE "ALL TRAFFIC EXIT" AS SHOWN IN RSD 1101.03 SHEET 7 OF 9

SIGNAL TO BE PLACED ON FLASH AND LAW ENFORCEMENT TO DIRECT TRAFFIC DURING "ALL TRAFFIC EXIT" OPERATIONS

LAW ENFORCEMENT TO MAINTAIN RESIDENTIAL ACCESS OFF OF I-85 NORTHBOUND EXIT RAMP

COLCLOUGH AVE.

I-85 SOUTHBOUND EXIT RAMP

I-85 SOUTHBOUND

I-85 NORTHBOUND

I-85 NORTHBOUND ENTRANCE RAMP

BRIDGE #193

SR 1671 (E. CLUB BLVD.)

I-85 SOUTHBOUND ENTRANCE RAMP

I-85 NORTHBOUND EXIT RAMP

LAW ENFORCEMENT

ROAD CLOSED AHEAD W20-3 48" X 48"

ROAD CLOSED 1000 FT W20-3 48" X 48"

W3-1A 48" X 48"

STOP R1-1

ROAD CLOSED W20-3 48" X 24"

W3-5 48" X 48"

1/2 MILE

500'

ROAD CLOSED 500 FT W20-3 48" X 48"

ROAD CLOSED 1000 FT W20-3 48" X 48"

ROAD CLOSED AHEAD W20-3 48" X 48"

ROAD CLOSED 500' W20-3 48" X 24"

W1-6R 48" X 24" BARRICADE MOUNTED

SEE SHEET TMP-6 FOR SR 1671 (E. CLUB BLVD.) DETOUR ROUTE

FOR CLOSURE OF I-85 NORTHBOUND USE "ALL TRAFFIC EXIT" AS SHOWN IN RSD 1101.03 SHEET 7 OF 9

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APPROVED: _____ DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049 JAMES L. WATSON

12/12/13

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

I-85 EXIT #179

ALL TRAFFIC EXIT DETAIL

12/2/2013
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PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-5

ADDITIONAL SIGNS ASSOCIATED WITH ROADWAY STANDARD DRAWING 1101.03, SHEET 1 OF 9, INSTALLED IN ADVANCE OF THE DETOUR ARE NOT SHOWN IN THE PLANS, BUT SHALL BE INSTALLED.

COLCLOUGH AVE.

I-85 SOUTHBOUND EXIT RAMP

I-85 SOUTHBOUND

I-85 NORTHBOUND

I-85 NORTHBOUND ENTRANCE RAMP

BRIDGE #193

SR 1671 (E. CLUB BLVD.)

I-85 SOUTHBOUND ENTRANCE RAMP

I-85 NORTHBOUND EXIT RAMP

EXIST

ROAD CLOSED AHEAD W20-3 48" X 48"

1/2 MILE

ROAD CLOSED 1000 FT W20-3 48" X 48"

500'

W3-1A 48" X 48"

ROAD CLOSED W20-3 48" X 48"

STOP R1-1

ROAD CLOSED R11-2 48" X 30"

ROAD CLOSED 500 FT W20-3 48" X 48"

ROAD CLOSED W20-3 48" X 48"

R9-2 24" X 24"

SEE SHEET TMP-6 FOR SR 1671 (E. CLUB BLVD.) DETOUR ROUTE

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SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
BETSY L. WATSON
10/13

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

I-85 EXIT #179

SR 1761 (E. CLUB BLVD.) ROAD CLOSURE DETAIL AT INTERCHANGE

12/2/2013
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rcullen

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-6

Ⓐ DETOUR — M4-8, 24" X 12" / E CLUB BLVD / M5-1 R, 21" X 15"

Ⓑ DETOUR — M4-8, 24" X 12" / E CLUB BLVD / M6-1, 21" X 15"

Ⓒ DETOUR — M4-8, 24" X 12" / E CLUB BLVD / M5-1, 21" X 15"

Ⓓ DETOUR — M4-8, 24" X 12" / E CLUB BLVD / M6-1 L, 21" X 15"

Ⓔ DETOUR — M4-8, 24" X 12" / E CLUB BLVD / M6-3, 21" X 15"

Ⓕ END DETOUR — M4-8 A, 24" X 18"

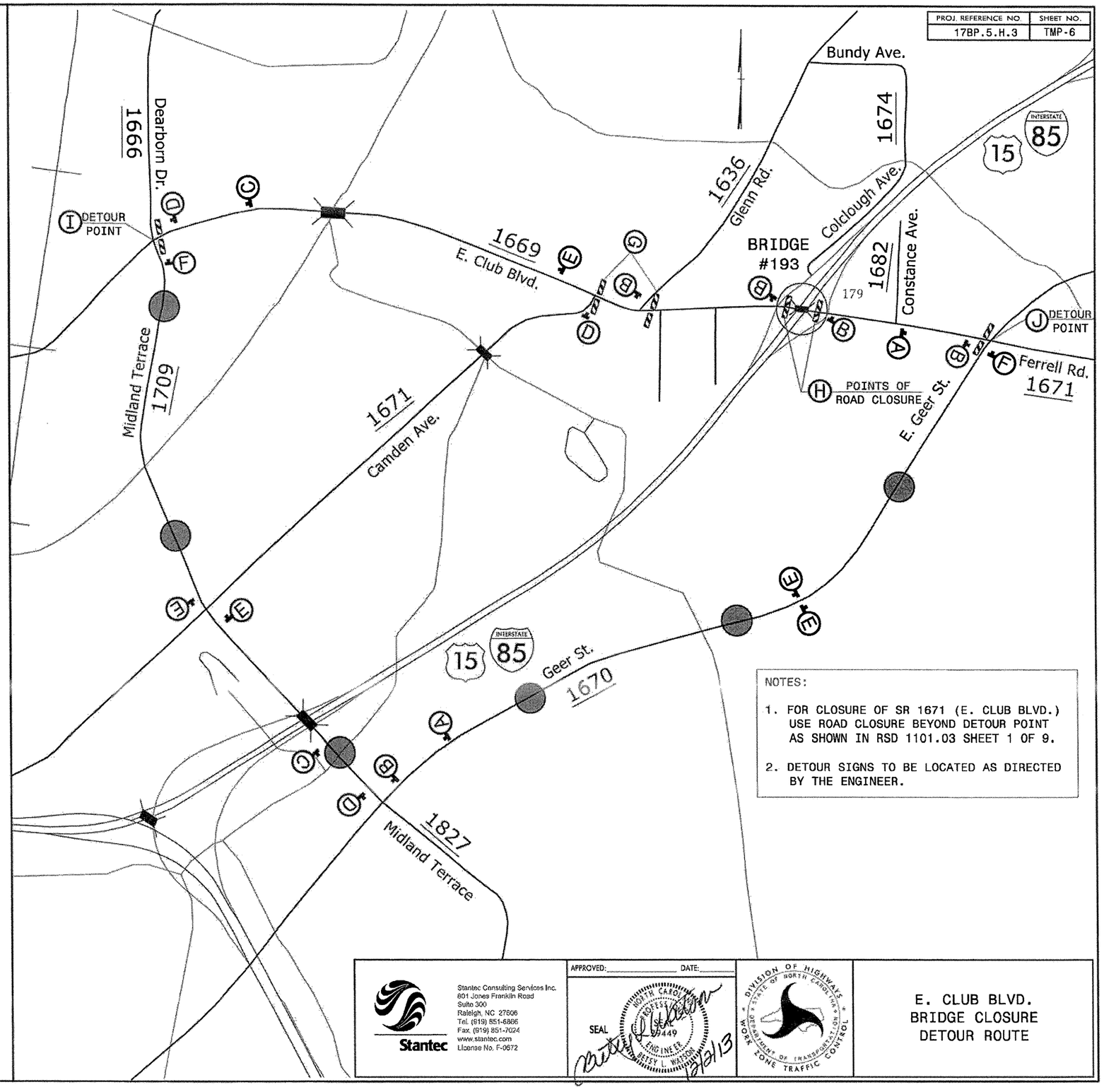
Ⓖ R11-4 (60"X30") — ROAD CLOSED TO THRU TRAFFIC — TYPE III BARRICADE

Ⓗ R11-2, 48" x 30" — ROAD CLOSED — TYPE III BARRICADE

Ⓘ R11-4 (60"X30") — ROAD CLOSED TO THRU TRAFFIC / DETOUR — M4-10R(48"X18") — TYPE III BARRICADE

Ⓙ R11-4 (60"X30") — ROAD CLOSED TO THRU TRAFFIC / DETOUR — M4-10L(48"X18") — TYPE III BARRICADE

SEE SHEET TMP-7 FOR SPECIAL SIGN DESIGN.



NOTES:

1. FOR CLOSURE OF SR 1671 (E. CLUB BLVD.) USE ROAD CLOSURE BEYOND DETOUR POINT AS SHOWN IN RSD 1101.03 SHEET 1 OF 9.
2. DETOUR SIGNS TO BE LOCATED AS DIRECTED BY THE ENGINEER.

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SEAL — NORTH CAROLINA PROFESSIONAL 29449 ENGINEER BETSY L. WATSON — 5/23/13

DIVISION OF HIGHWAYS — STATE OF NORTH CAROLINA — DEPARTMENT OF TRANSPORTATION — WORK ZONE TRAFFIC CONTROL

E. CLUB BLVD. BRIDGE CLOSURE DETOUR ROUTE

12/4/2013
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cwatson

PROJ. REFERENCE NO.	SHEET NO.
17BP.5.H.3	TMP-7

SIGN NUMBER: SD-1
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 30"
HEIGHT: 24"
TOTAL AREA: 5.0 Sq.Ft.

BORDER TYPE: RECESSED
RADII: 1.5"
WIDTH: 0.63"
RECESS: 0.38"

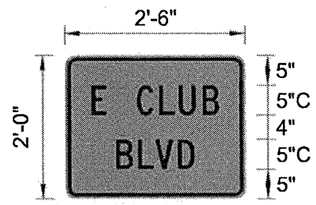
NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.063" (1.6MM) ALUMINUM

DESIGN BY: RRH CHECKED BY: BLW
PROJECT ID: 17BP.5.H.3 DIV: 5
DATE: Oct 23, 2013



BORDER 4.35" 21.3" 4.35"
R=1.5"
TH=0.63"
IN=0.38"

Spacing Factor is 1 unless specified otherwise

USE NOTES

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B Fluorescent Orange retroreflective sheeting.

LETTER POSITIONS

Letter spacings are to start of next letter

																					Series/Size Text Length
	E		C	L	U	B															C 2000
4.4	2.6	5	3.8	3.3	3.9	2.8	4.4														21.3
	B	L	V	D																	C 2000
8.5	3.7	2.9	3.8	2.8	8.5																13.1

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APPROVED: _____ DATE: _____

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SPECIAL SIGN DESIGN