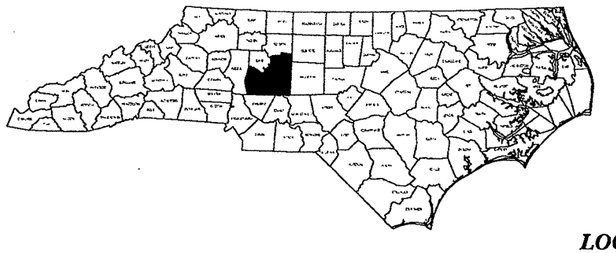
WBS: 41665.6A

CONTRACT NO.: C203121

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.6A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41665.6A	NA	PE	
41665.6A	NA	CONSTR.	

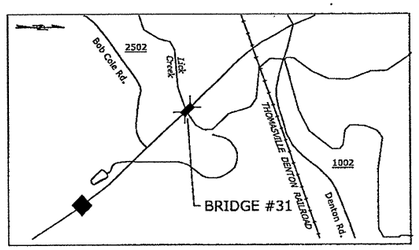


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

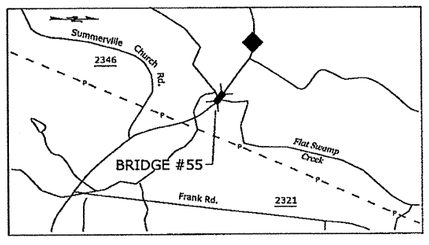
DAVIDSON AND ROWAN COUNTIES

LOCATION: *BRIDGE #31 ON NC 8 OVER LICK CREEK, DAVIDSON COUNTY*
BRIDGE #55 ON NC 47 OVER FLAT SWAMP CREEK, DAVIDSON COUNTY
BRIDGE #82 ON NC 47 OVER LICK CREEK, DAVIDSON COUNTY
BRIDGE #65 ON SR 1221 (OLD BEATTY FORD RD.) OVER I-85 /US 601, ROWAN COUNTY

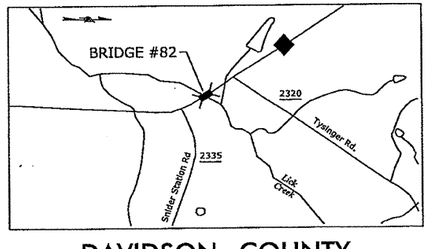
TYPE OF WORK: *BRIDGE PRESERVATION: SUPERSTRUCTURE REPLACEMENT, DECK REPLACEMENT, SUBSTRUCTURE REPAIR, CLEANING AND PAINTING OF EXISTING BRIDGE STRUCTURE*



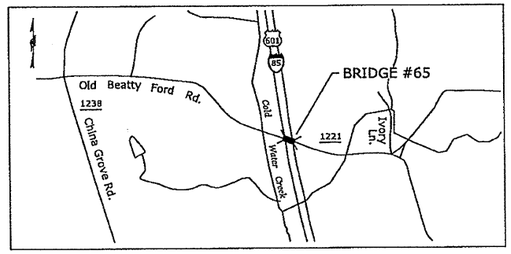
DAVIDSON COUNTY



DAVIDSON COUNTY



DAVIDSON COUNTY



ROWAN COUNTY

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC LICENSE NO. F-0991

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TRAFFIC DATA

BRIDGE #31	– ADT	=	720
BRIDGE #55	– ADT	=	1,200
BRIDGE #82	– ADT	=	1,400
BRIDGE #65	– ADT	=	1,800

PROJECT LENGTH

BRIDGE #31	.04 MILE
BRIDGE #55	.03 MILE
BRIDGE #82	.04 MILE
BRIDGE #65	.06 MILE

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

2012 STANDARD SPECIFICATIONS

LETTING DATE:
APRIL 16, 2013

PAUL KELLY, P.E.
PROJECT ENGINEER

RICK NELSON, P.E.
NCDOT PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA
2/26/13

FARZIN ASEFNIA P.E.
PROJECT DESIGN ENGINEER

WBS: 41665.6A

CONTRACT NO.: C203121

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41665.6A	1A	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
41665.6A	NA	PE
41665.6A	NA	CONSTR.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DAVIDSON AND ROWAN COUNTIES

LOCATION: *BRIDGE #31 ON NC 8 OVER LICK CREEK, DAVIDSON COUNTY*
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INDEX OF SHEETS

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC LICENSE NO. F-0991

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Prepared in the Office of:
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PAUL KELLY, P.E.
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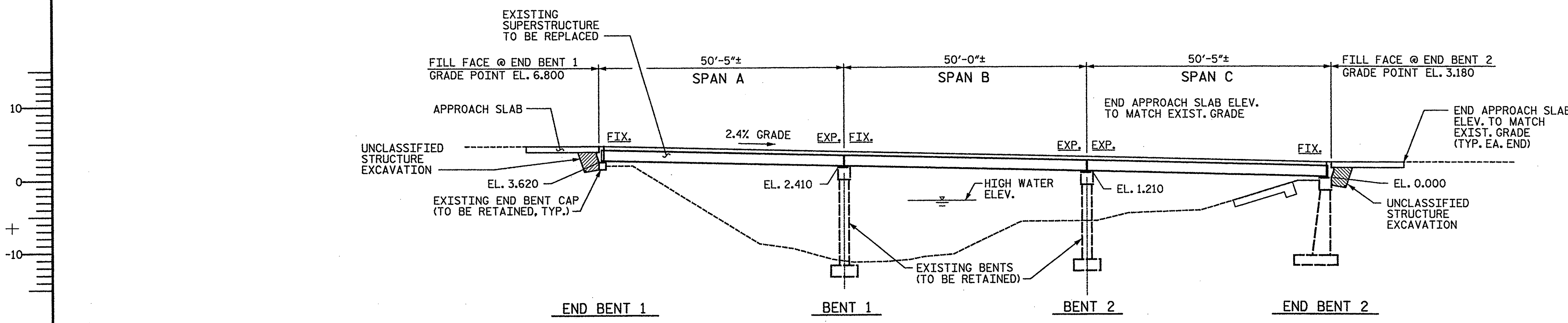
FARZIN ASEFNIA P.E.
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C203121

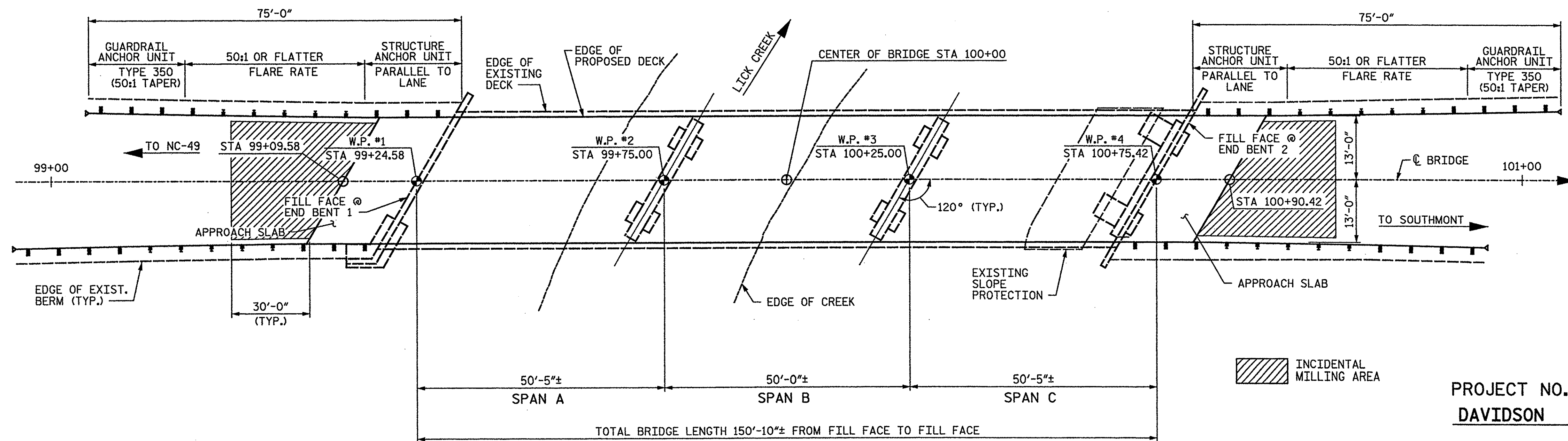
ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
1330000000-E	607	414	SY	INCIDENTAL MILLING
1525000000-E	610	67	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
1575000000-E	620	5	TON	ASPHALT BINDER FOR PLANT MIX
3030000000-E	862	175	LF	STEEL BM GUARDRAIL
3215000000-N	862	16	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	12	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
4400000000-E	1110	982	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	310	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	202	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	3	EA	FLASHING ARROW BOARD
4420000000-N	1120	1	EA	PORTABLE CHANGEABLE MESSAGE SIGN
4430000000-N	1130	30	EA	DRUMS
4445000000-E	1145	80	LF	BARRICADES (TYPE III)
4455000000-N	1150	12	DAY	FLAGGER
4480000000-N	1165	2	EA	TMA
4847000000-E	1205	4,200	LF	POLYUREA PAVEMENT MARKING LINES (4", **********) (STANDARD GLASS BEADS)
4900000000-N	1251	18	EA	PERMANENT RAISED PAVEMENT MARKERS
8154000000-E	420	18,140	SF	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC)
8161000000-E	420	17,698	SF	GROOVING BRIDGE FLOORS
8280000000-E	440	138,224	LS	APPROX ..... LBS STRUCTURAL STEEL
8296000000-N	442	Lump Sum		POLLUTION CONTROL
8440000000-E	454	92	SY	METHOD A WATERPROOFING
8468000000-E	460	1,132.7	LF	ONE BAR METAL RAIL
8522000000-E	460	1,132.7	LF	GENERIC STRUCTURE ITEM 1'-0" X 1'-6" CONCRETE PARAPET (SAND LIGHTWEIGHT CONC)
8608000000-E	876	54	TON	RIP RAP CLASS II (2'-0" THICK)
8622000000-E	876	79	SY	GEOTEXTILE FOR DRAINAGE
8657000000-N	430	Lump Sum		ELASTOMERIC BEARINGS
8660000000-E	SP	6	CF	CONCRETE REPAIRS
8678000000-E	SP	145	LF	EPOXY RESIN INJECTION
8692000000-N	SP	Lump Sum		FOAM JOINT SEALS
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM BRIDGE APPROACH SLABS AT BRIDGE #31
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM BRIDGE APPROACH SLABS AT BRIDGE #55
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM BRIDGE APPROACH SLABS AT BRIDGE #65
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM BRIDGE APPROACH SLABS AT BRIDGE #82
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM CLEANING & REPAINTING OF OF BRIDGE #65
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE #31
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE #55
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE #65
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE #82
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM STRUCTURAL STEEL MODIFICATION AT BRIDGE #65
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE #31

ItemNumber	Sec #	Quantity	Unit	Description
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE #55
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE #65
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE #82
8860000000-N	SP	Lump Sum		GENERIC STRUCTURE ITEM UNDER STRUCTURE WORK PLATFORM



SECTION ALONG ℄ BRIDGE ⚠

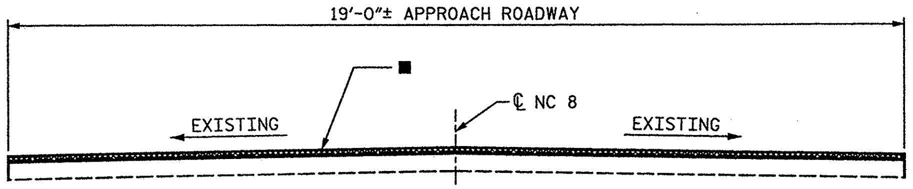
NOTE: ROADWAY BARRIER DETAILS ARE NOT SHOWN FOR CLARITY (SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)



INCIDENTAL MILLING AREA

PLAN

NOTE: ROADWAY BARRIER DETAILS ARE NOT SHOWN FOR CLARITY



TYPICAL ROADWAY SECTION ⚠

■ VARIABLE DEPTH MILLING 1½" - 3½". REPLACE WITH 1½" MIN. ASPHALT C1 TO TRANSITION TO EXISTING RIDING SURFACE

C1	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF 9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 1½" DEPTH.

NOTES:

ALL EXISTING STATIONS AND ELEVATIONS ARE AS PER THE AS-BUILT PLANS.

THE ORIGIN OF THE STATION ALONG CENTERLINE OF THE BRIDGE IS ASSUMED FOR PLAN PREPARATION.

THE VERTICAL DATUM IS ASSUMED FOR PLAN PREPARATION.

ALL EXISTING SUBSTRUCTURE AND FOOTINGS WILL REMAIN IN PLACE.

WATER LEVEL SHOWN IS THE APPROXIMATE HIGHWATER MARK (1910) AS IT APPEARS IN AS BUILT PLANS.

FOR LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS FOR SAND LIGHTWEIGHT CONCRETE.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON NC 8 OVER LICK CREEK

NORTH CAROLINA PROFESSIONAL SEAL 19765 ... E. KELLY ... 6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-1
1	STV	6-12	3				TOTAL SHEETS
2			4				89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

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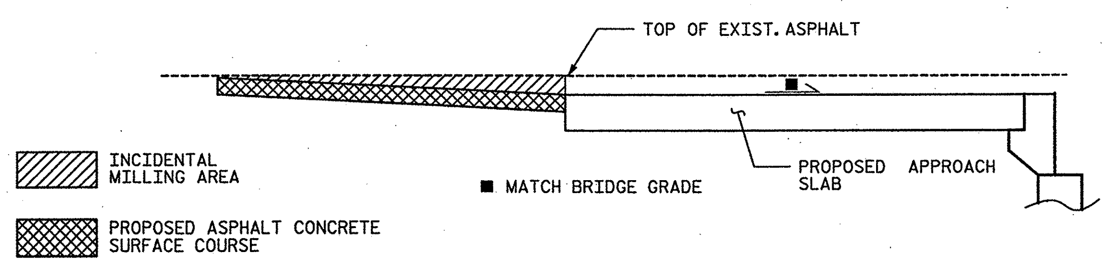
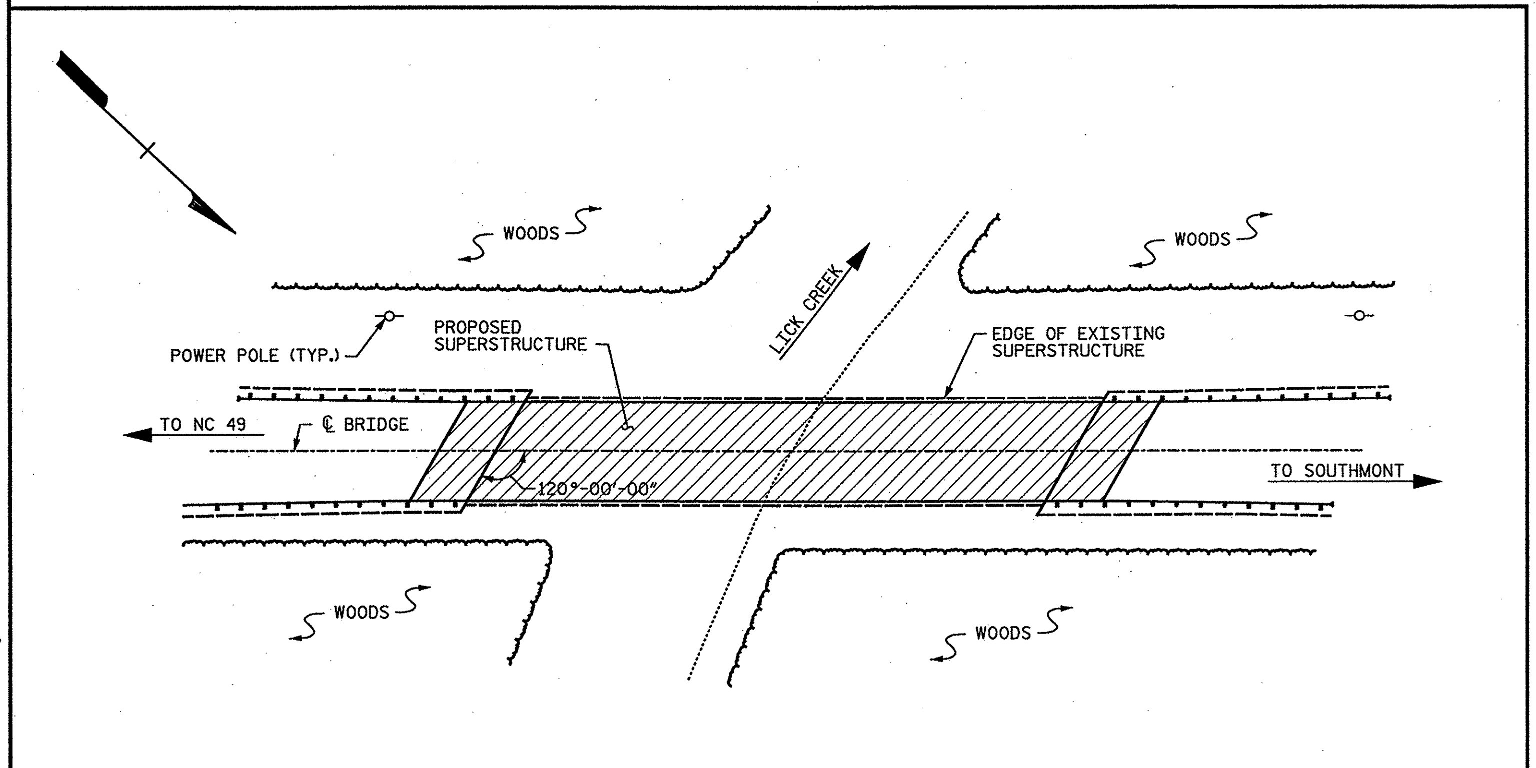
dlveycc

6/15/2012

TOTAL BILL OF MATERIAL ⚠															
	INCIDENTAL MILLING	ASPHALT CONCRETE SURFACE COURSE TYPE SF 9.5A	GUARDRAIL ANCHOR UNIT TYPE 350	STEEL BM GUARDRAIL	GUARDRAIL ANCHOR UNITS TYPE III	PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE 31	UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE 31	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONCRETE)	GROOVING BRIDGE FLOORS	BRIDGE APPROACH SLABS AT BRIDGE 31	STRUCTURAL STEEL	ONE BAR METAL RAIL	1'-0"X 1'-6" CONCRETE PARAPET (SAND LIGHTWEIGHT CONCRETE)	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	SQ. YDS.	TONS	EA.	LIN. FT.	EA.	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	LUMP SUM	APPROX. LBS.	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE								3954	3773		75,678	286.7	286.7		
TOTAL	150	13	4	25	4	LUMP SUM	LUMP SUM	3954	3773	LUMP SUM	75,678	286.7	286.7	LUMP SUM	LUMP SUM



BRIDGE TRANSITION



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HS-20 OR ALTERNATIVE LOADING.

THE PROPOSED BRIDGE SUPERSTRUCTURE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD IN ACCORDANCE WITH THE AASHTO LFD STANDARD SPECIFICATION FOR HIGHWAY BRIDGES 17TH EDITION, 2002.

THE EXISTING SUBSTRUCTURE WILL REMAIN IN PLACE. NO ANALYSIS OR DESIGN HAS BEEN PERFORMED TO EVALUATE THE CAPACITY OF THE SUBSTRUCTURE AND THE FOUNDATIONS. IF ANY DISRESS IS NOTICED DURING THE CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY STOP WORK AND NOTIFY THE DEPARTMENT OF TRANSPORTATION AND THE ENGINEER. THE WORK MAY NOT RESUME UNTIL THE CAUSE OF DISTRESS IS DETECTED AND RESOLVED.

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

FOR FALSEWORK AND FORMWORK, 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.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING SUPERSTRUCTURE AT EXISTING STATION 594+20".

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 16 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING SUPERSTRUCTURE CONSISTING OF ROLLED STEEL I-BEAMS @ 6'-9" CENTERS IN 3 SIMPLE SPANS OF 30'-0" WITH A CLEAR ROADWAY WIDTH OF 24'-0" SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SUPERSTRUCTURE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR GROUT FOR STRUCTURES SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY SEE SPECIAL PROVISIONS.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 — SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH AND TOTAL BILL OF MATERIALS

BRIDGE ON NC 47 OVER LICK CREEK

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER E. KELLY, JR. 2/25/13

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-2
1	STV	6-12	3			TOTAL SHEETS	89
2			4				

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. PER NCDOT COMMENTS

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guldool

2/25/2013

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	1.65	--	1.75	0.589	1.92	A	I	25	0.725	3.11	A	I	0	1.30	0.589	1.65	A	I	25	
		HL-93 (OPERATING)	N/A		2.14	--	1.35	0.589	3.36	A	I	25	0.725	5.44	A	I	0	1.00	0.589	2.14	A	I	25	
		HS-20 (INVENTORY)	36.00	2	2.04	73.440	1.75	0.589	2.38	A	I	25	0.725	3.67	A	I	0	1.30	0.589	2.04	A	I	25	
		HS-20 (OPERATING)	36.00		2.65	95.400	1.35	0.589	3.09	A	I	25	0.725	4.76	A	I	0	1.00	0.589	2.65	A	I	25	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.27	57.645	1.40	0.589	6.23	A	I	25	0.725	9.88	A	I	0	1.30	0.589	4.27	A	I	25	
		SNGARBS2	20.000		3.27	65.400	1.40	0.589	4.78	A	I	25	0.725	7.36	A	I	0	1.30	0.589	3.27	A	I	25	
		SNAGRIS2	22.000		3.13	68.860	1.40	0.589	4.57	A	I	25	0.725	6.96	A	I	0	1.30	0.589	3.13	A	I	25	
		SNCOTTS3	27.250		2.13	58.043	1.40	0.589	3.11	A	I	25	0.725	4.94	A	I	0	1.30	0.589	2.13	A	I	25	
		SNAGGRS4	34.925		1.84	64.262	1.40	0.589	2.68	A	I	25	0.725	4.48	A	I	0	1.30	0.589	1.84	A	I	25	
		SNS5A	35.550		1.81	64.346	1.40	0.589	2.65	A	I	25	0.725	4.65	A	I	0	1.30	0.589	1.81	A	I	25	
		SNS6A	39.950		1.70	67.915	1.40	0.589	2.48	A	I	25	0.725	4.30	A	I	0	1.30	0.589	1.70	A	I	25	
		SNS7B	42.000		1.61	67.620	1.40	0.589	2.35	A	I	25	0.725	4.24	A	I	0	1.30	0.589	1.61	A	I	25	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.06	67.980	1.40	0.589	3.00	A	I	25	0.725	4.94	A	I	0	1.30	0.589	2.06	A	I	25	
		TNT4A	33.075		2.06	68.135	1.40	0.589	3.01	A	I	25	0.725	4.88	A	I	0	1.30	0.589	2.06	A	I	25	
		TNT6A	41.600		1.72	71.552	1.40	0.589	2.52	A	I	25	0.725	4.52	A	I	0	1.30	0.589	1.72	A	I	25	
		TNT7A	42.000		1.75	73.500	1.40	0.589	2.56	A	I	25	0.725	4.22	A	I	0	1.30	0.589	1.75	A	I	25	
		TNT7B	42.000		1.79	75.180	1.40	0.589	2.62	A	I	25	0.725	4.21	A	I	0	1.30	0.589	1.79	A	I	25	
		TNAGRIT4	43.000		1.72	73.960	1.40	0.589	2.50	A	I	25	0.725	3.92	A	I	0	1.30	0.589	1.72	A	I	25	
		TNAGT5A	45.000		1.62	72.900	1.40	0.589	2.37	A	I	25	0.725	4.17	A	I	0	1.30	0.589	1.62	A	I	25	
		TNAGT5B	45.000	3	1.58	71.100	1.40	0.589	2.31	A	I	25	0.725	3.71	A	I	0	1.30	0.589	1.58	A	I	25	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		2.67																			

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. 1" OF FUTURE WEARING SURFACE ASSUMED FOR RATING.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

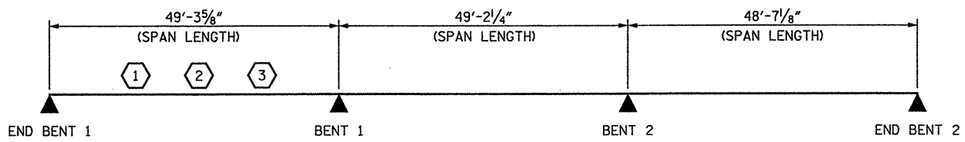
(2) DESIGN LOAD RATING (HS-20) **

(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. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 11-12
CHECKED BY : AC DATE : 11-12

STD. NO. LRFR3

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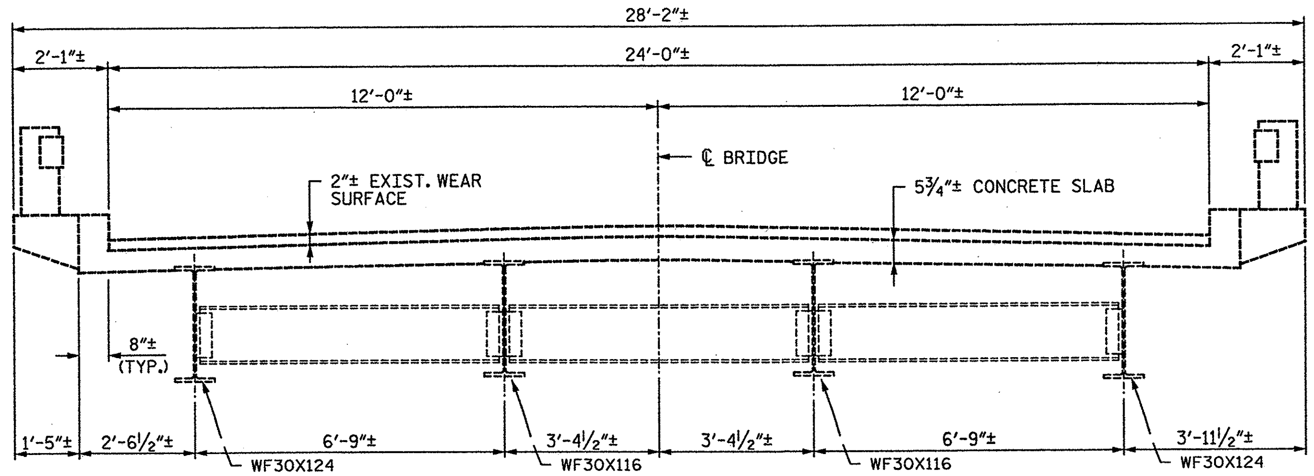
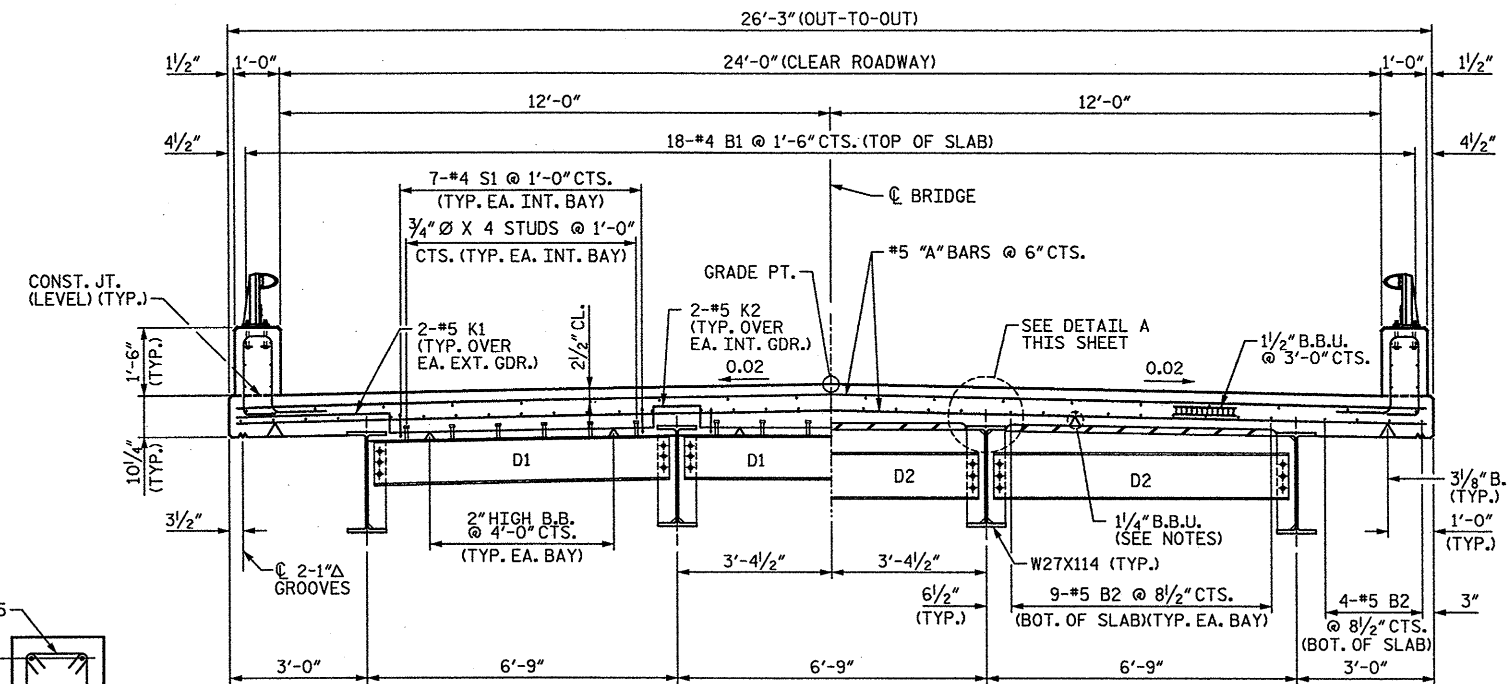
olveyac
11/28/2012

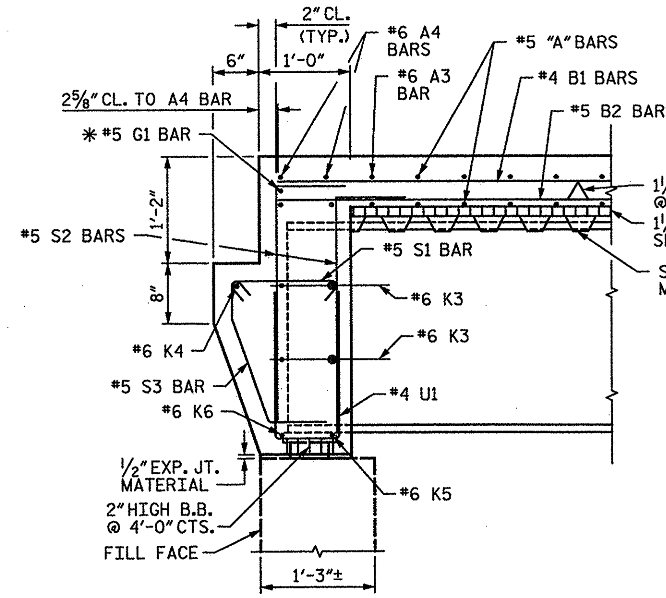


EXISTING SUPERSTRUCTURE SECTION



PARTIAL TYPICAL SECTION
SHOWING BENT DIAPHRAGMS

PARTIAL TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS



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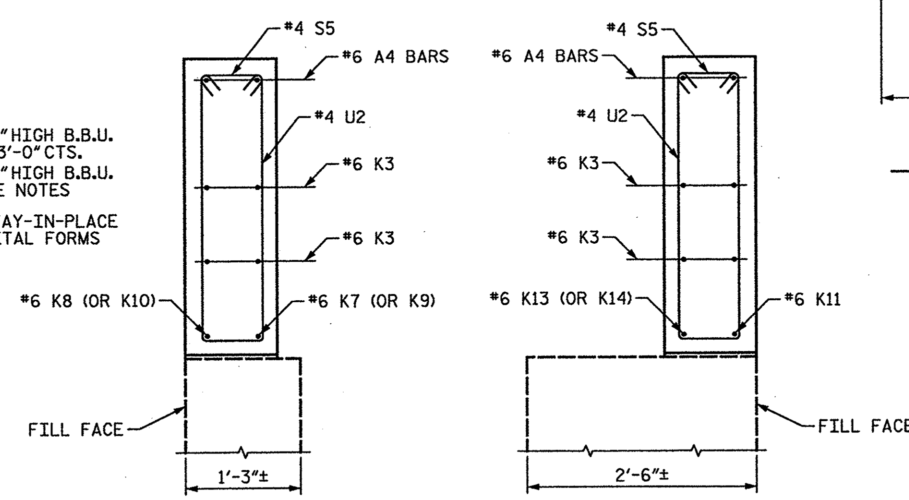
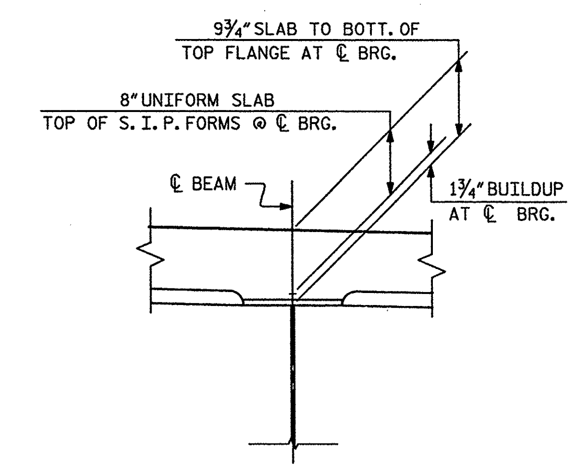


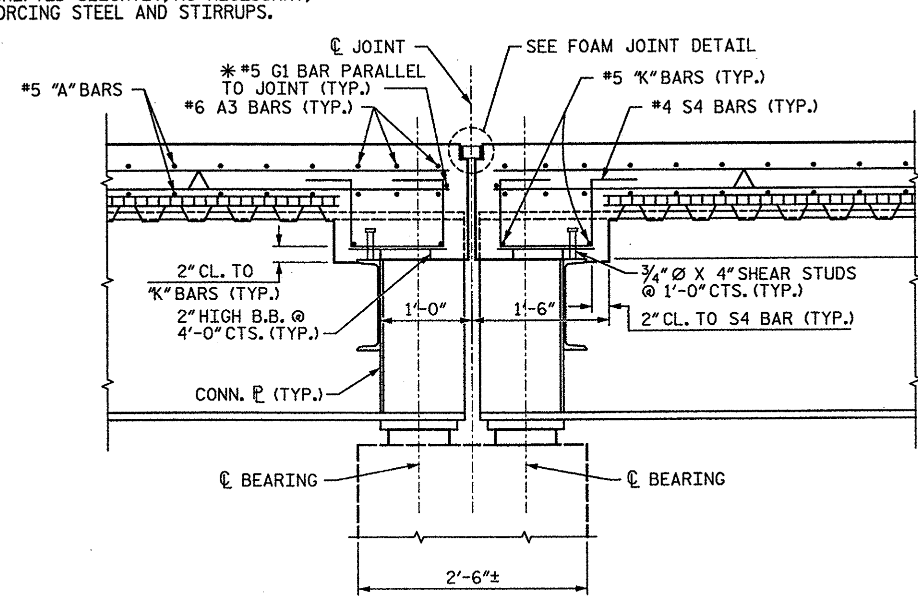
SECTION @ END BENT 1

SECTION @ END BENT 2

CURTAIN WALL OVERHANG



DETAIL A



SECTION @ BENT
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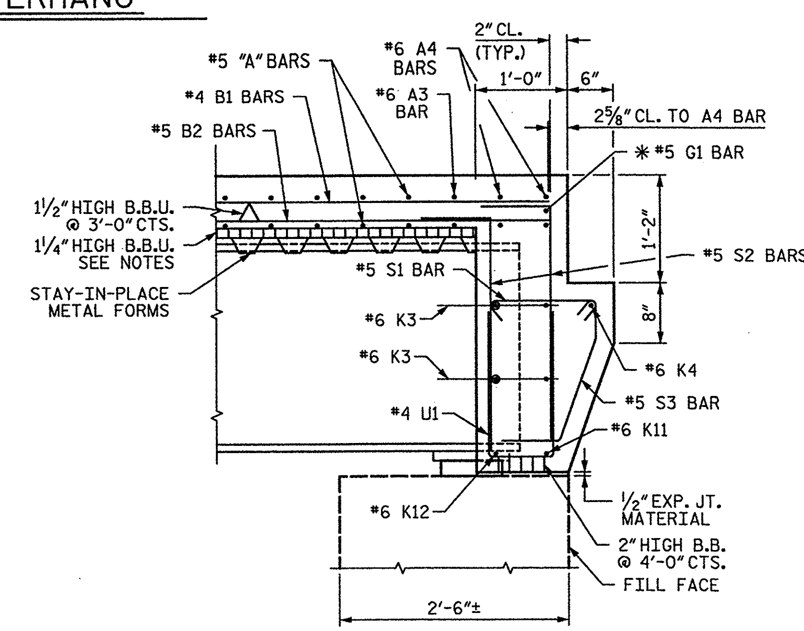

SECTION @ END BENT 2
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PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION AND DETAILS

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			89

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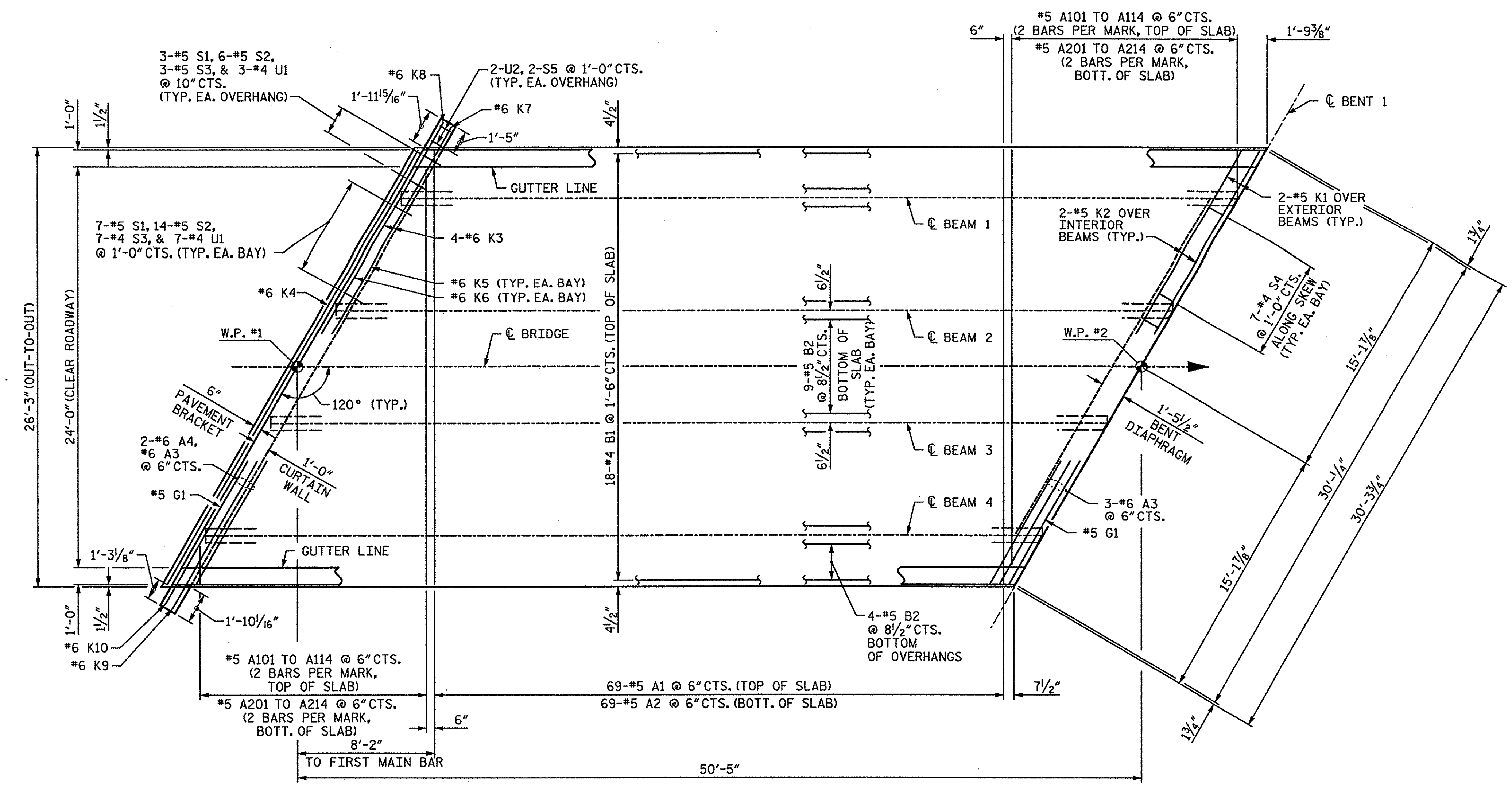
6/15/2012



PLAN OF SPAN A

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
SPAN A

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER E. KELLY, JR.
5/17/12

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-5
1			3				TOTAL SHEETS
2			4				89

DRAWN BY : AR DATE : 04-05
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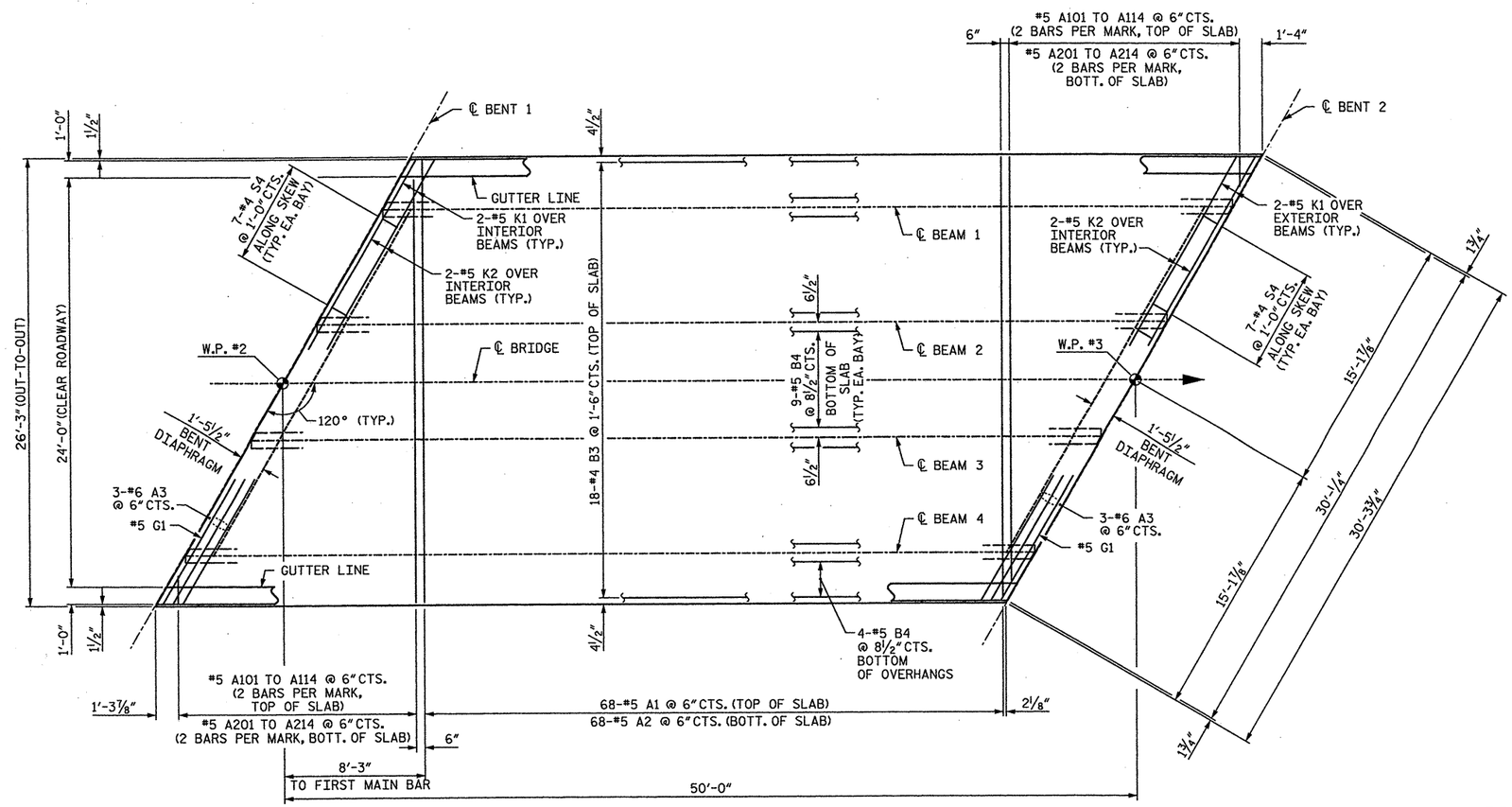
dveyco
5/17/2012



PLAN OF SPAN B

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 19755 ENGINEER
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
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2			4			89

DRAWN BY : AR DATE : 04-05
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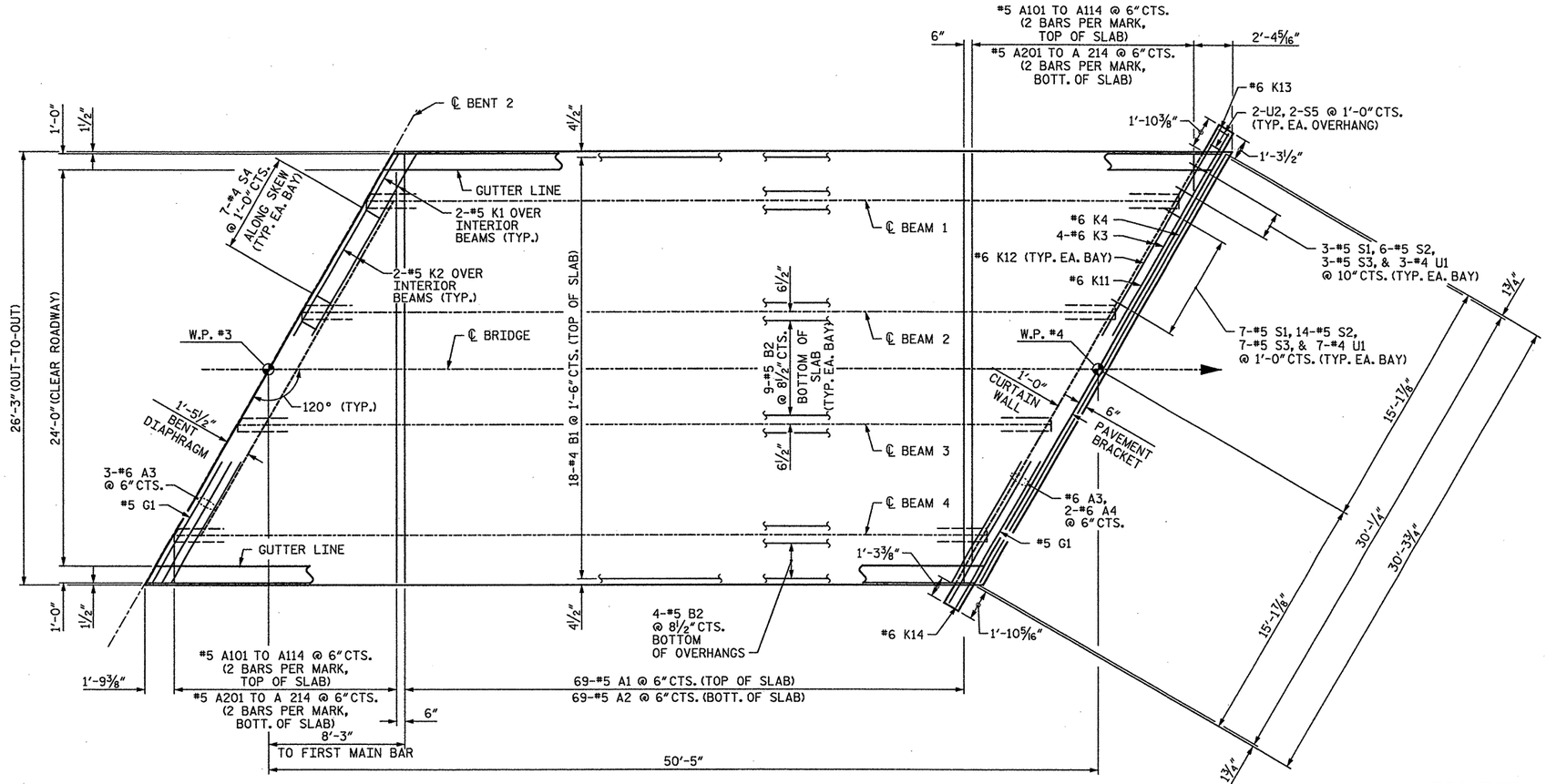

PLAN OF SPAN C

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS SPAN C

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER MATTHEW E. KELLAM
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 04-05
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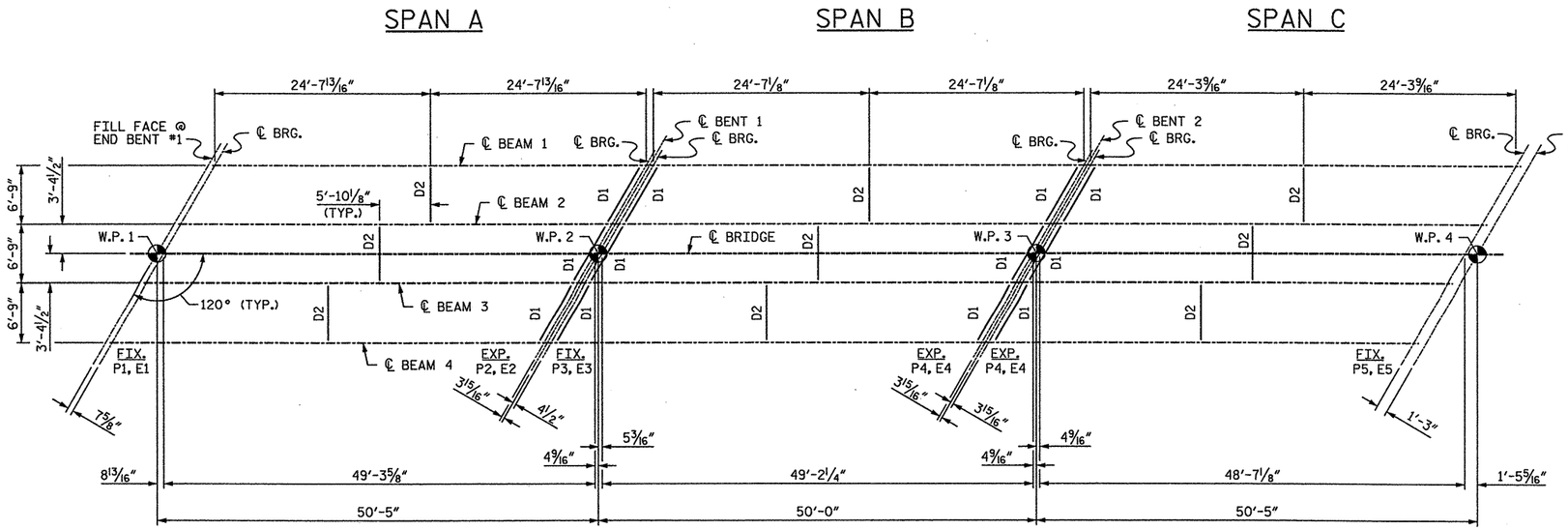
dveyao
5/17/2012



FRAMING PLAN

⚠ 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.

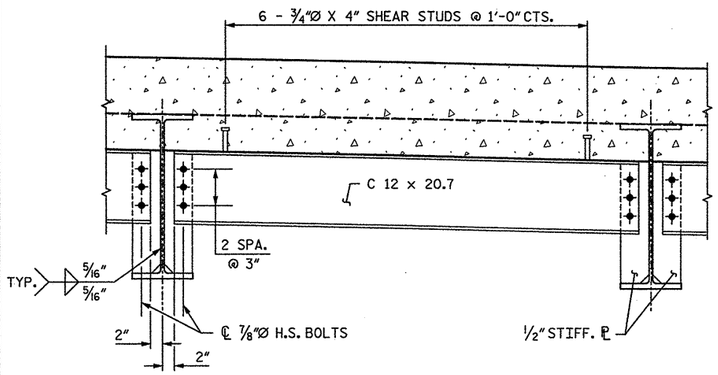
A CHARPY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS, COVER PLATES AND SPLICE PLATES AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

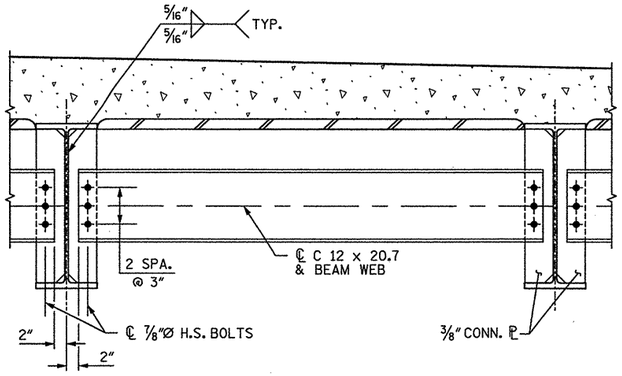
END OF BEAMS AND GIRDERS SHALL BE PLUMB.

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

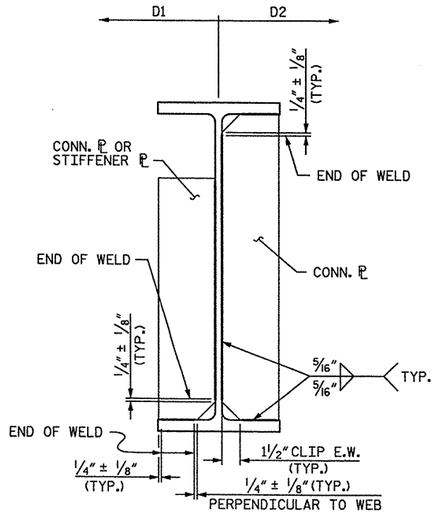
NEEDLE BEAM TYPE SUPPORTS ARE REQUIRED FOR THE OVERHANG FALSEWORK IN THE SPANS WITH 27″BEAMS OR SMALLER.



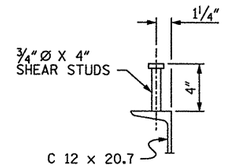
TYPICAL BENT DIAPHRAGM - D1 ⚠



TYPICAL INTERMEDIATE DIAPHRAGM - D2



TYPICAL CONNECTOR PLATE ⚠ CONNECTIONS



SHEAR STUD DETAIL
(ON CHANNEL)

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER MICHAEL E. KELLY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. CONNECTOR ℄ ADDED NOTES

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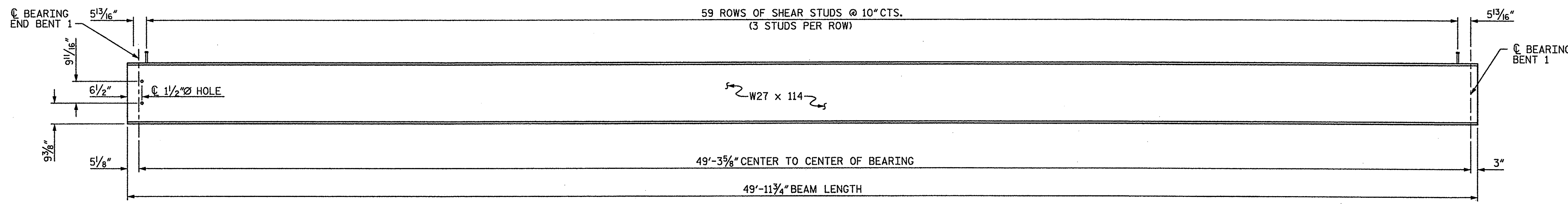
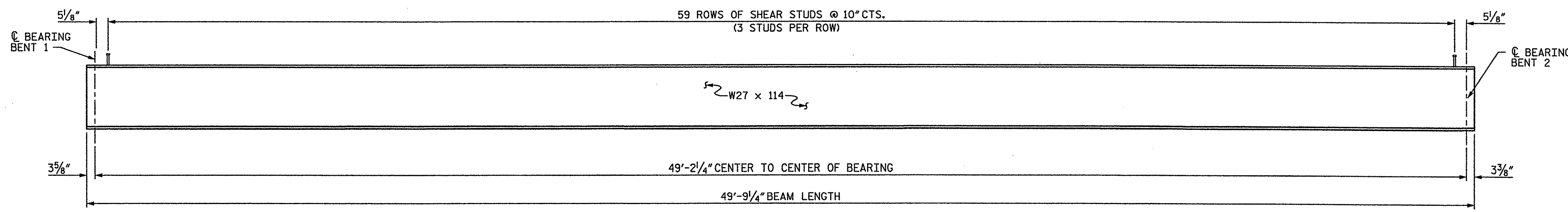
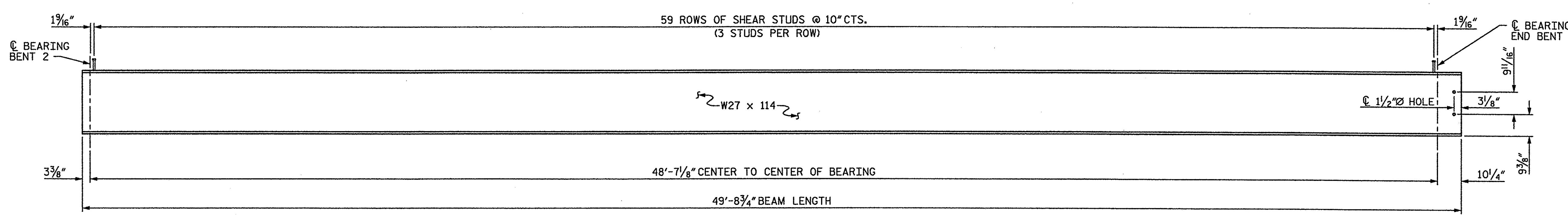
6/15/2012



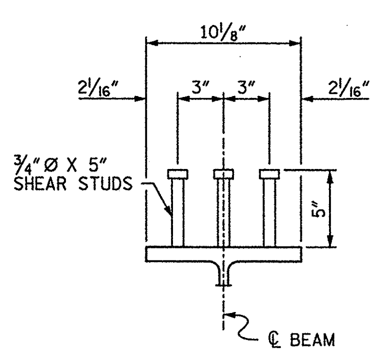
BEAM ELEVATION - SPAN A



BEAM ELEVATION - SPAN B

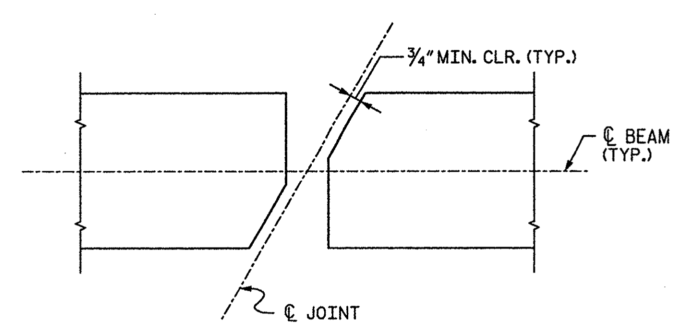


BEAM ELEVATION - SPAN C



SHEAR STUD DETAIL

(ON BEAMS)



TOP FLANGE CLIP DETAILS

(TOP FLANGE AT EXPANSION JOINT)

STRUCTURAL STEEL QUANTITIES	
APPROXIMATE TOTAL	75678 LBS

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KELLY, JR. 6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1			3				
2			4				

SHEET NO. S-9

TOTAL SHEETS 89

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diveyao

6/15/2012

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A										
	GIRDERS 1 & 4										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.019	0.037	0.050	0.059	0.062	0.059	0.050	0.037	0.019	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.026	0.050	0.068	0.080	0.084	0.080	0.068	0.050	0.026	0.000
REQUIRED CAMBER	0	5/16	5/8	13/16	15/16	1	15/16	13/16	5/8	5/16	0
	GIRDERS 2 & 3										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.021	0.039	0.054	0.063	0.066	0.063	0.054	0.039	0.021	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.028	0.053	0.072	0.084	0.089	0.072	0.062	0.045	0.024	0.000
REQUIRED CAMBER	0	5/16	5/8	7/8	1	1 1/16	1	7/8	5/8	5/16	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).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN C										
	GIRDERS 1 & 4										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.019	0.037	0.050	0.059	0.062	0.059	0.050	0.037	0.019	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.026	0.050	0.068	0.080	0.084	0.080	0.068	0.050	0.026	0.000
REQUIRED CAMBER	0	5/16	5/8	13/16	15/16	1	15/16	13/16	5/8	5/16	0
	GIRDERS 2 & 3										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.021	0.039	0.054	0.063	0.066	0.063	0.054	0.039	0.021	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.028	0.053	0.072	0.084	0.089	0.072	0.062	0.045	0.024	0.000
REQUIRED CAMBER	0	5/16	5/8	7/8	1	1 1/16	1	7/8	5/8	5/16	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).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN B										
	GIRDERS 1 & 4										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.019	0.037	0.050	0.059	0.062	0.059	0.050	0.037	0.019	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.026	0.050	0.068	0.080	0.084	0.080	0.068	0.050	0.026	0.000
REQUIRED CAMBER	0	5/16	5/8	13/16	15/16	1	15/16	13/16	5/8	5/16	0
	GIRDERS 2 & 3										
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✻	0.000	0.021	0.039	0.054	0.063	0.066	0.063	0.054	0.039	0.021	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.028	0.053	0.072	0.084	0.089	0.072	0.062	0.045	0.024	0.000
REQUIRED CAMBER	0	5/16	5/8	7/8	1	1 1/16	1	7/8	5/8	5/16	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).

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DEAD LOAD DEFLECTIONS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19768 ... E. KELLY, JR.
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
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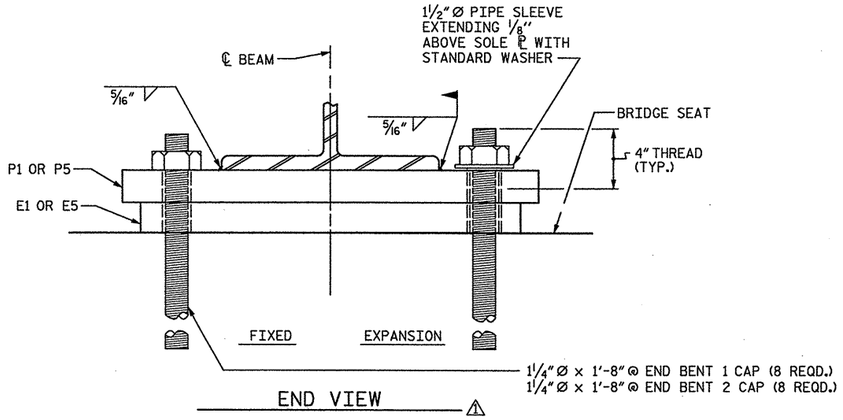
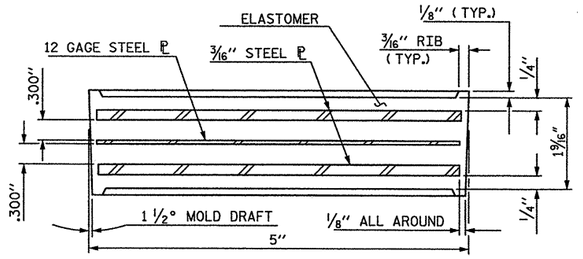
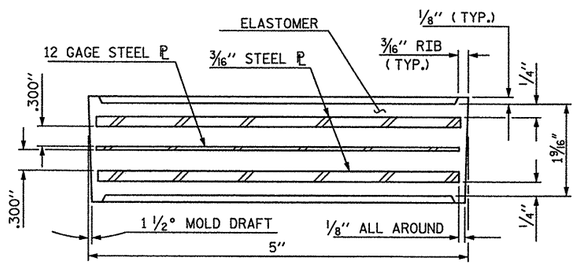
diveyco
5/17/2012



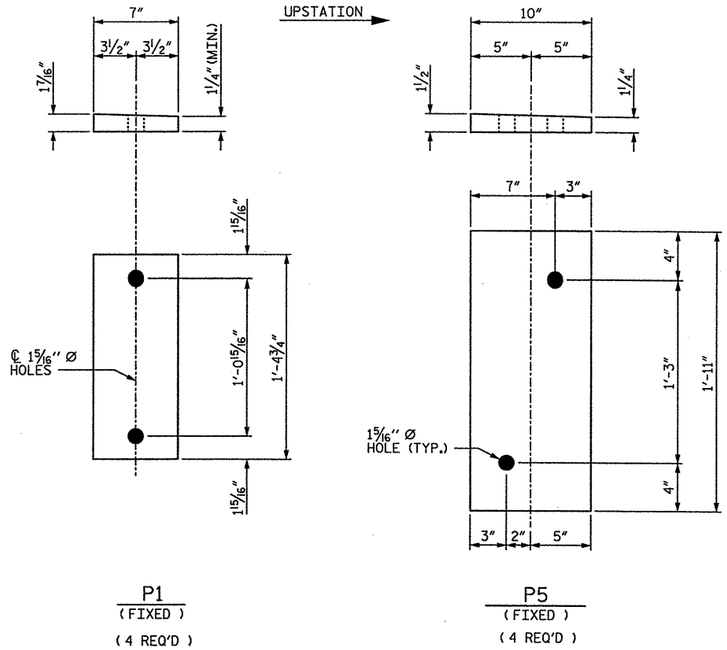
END VIEW ⚠



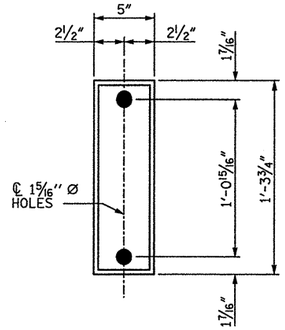
TYPICAL SECTION OF ELASTOMERIC BEARING E1



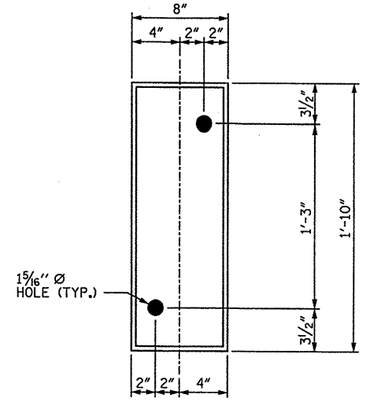
TYPICAL SECTION OF ELASTOMERIC BEARING E5



SOLE PLATE DETAILS ("P")



E1 (4 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING



E5 (4 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

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 1½" 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 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.

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031 SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

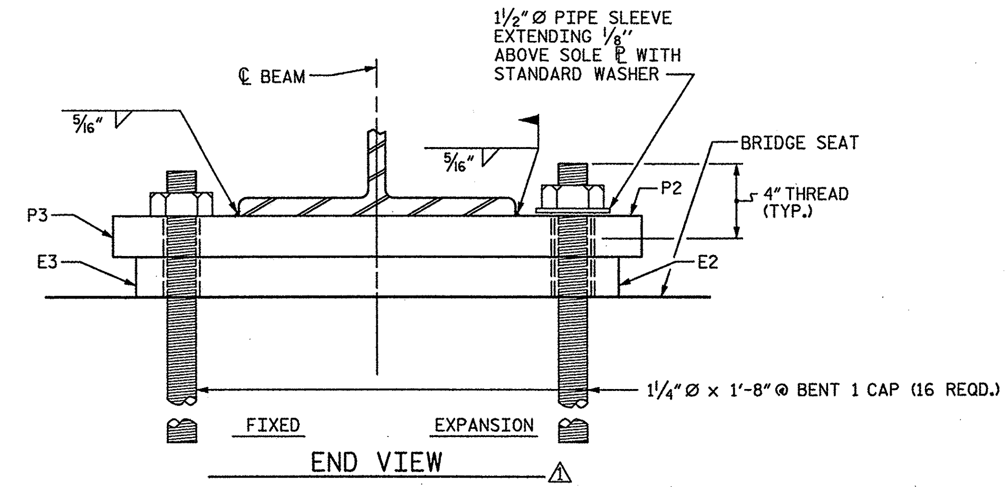
ELASTOMERIC BEARING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER RICHARD E. KELLY, JR. 6/15/12

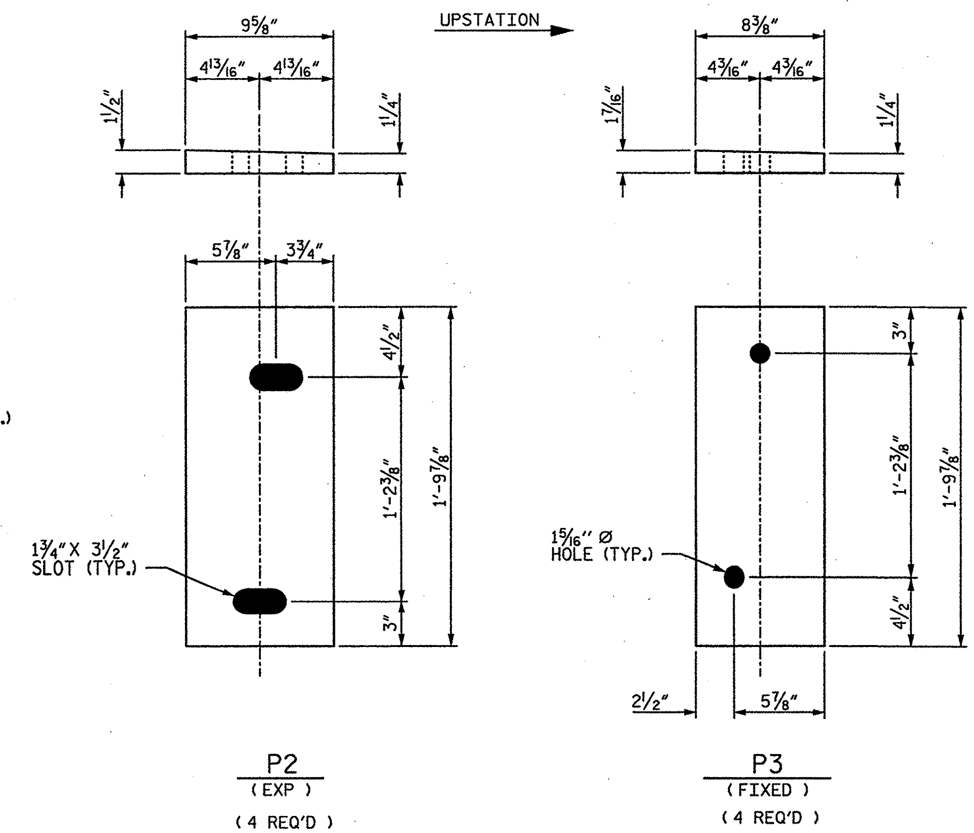
STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. ANCHOR BOLT



END VIEW ⚠



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.

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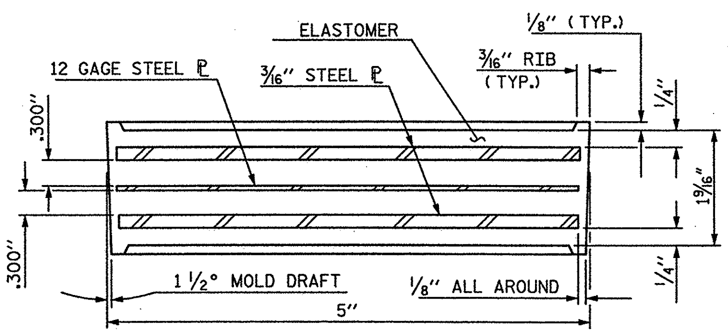
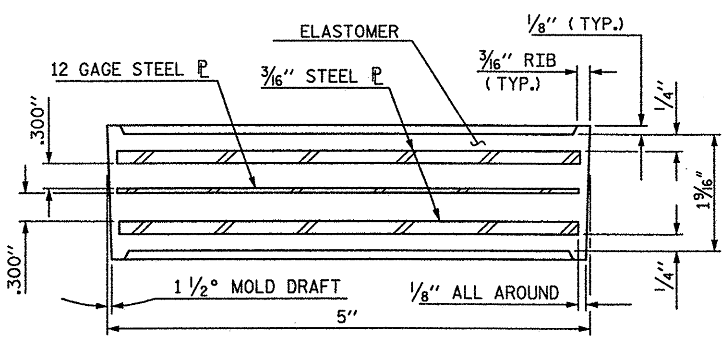
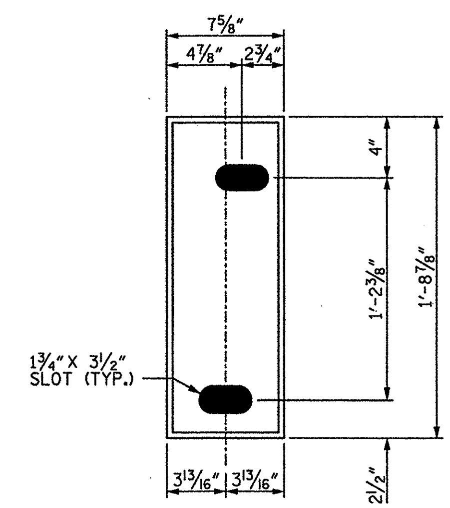


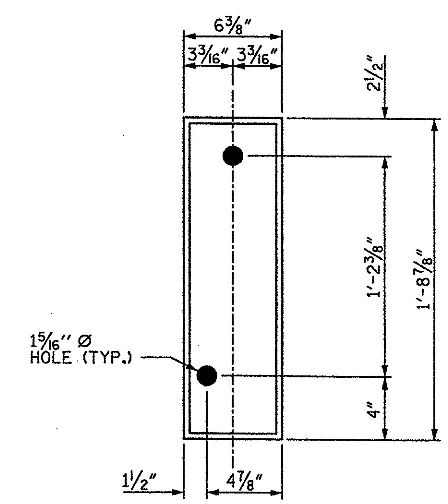
TYPICAL SECTION OF ELASTOMERIC BEARING E2



TYPICAL SECTION OF ELASTOMERIC BEARING E3



E2 (4 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING



E3 (4 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031 SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 9765 ENGINEER PAUL E. KELLY, JR. 6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

NO.	BY:	DATE:	NO.	BY:	DATE:
1	STV	6-12	3		
2			4		

REVISIONS

SHEET NO. S-12
TOTAL SHEETS 89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. ANCHOR BOLT

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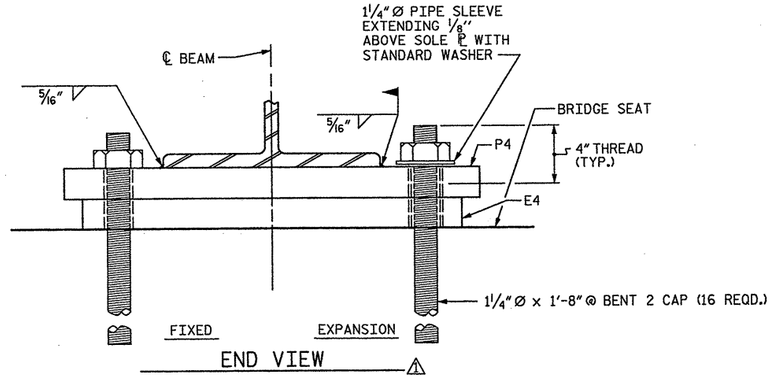
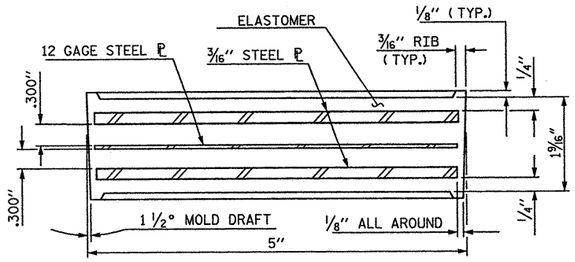
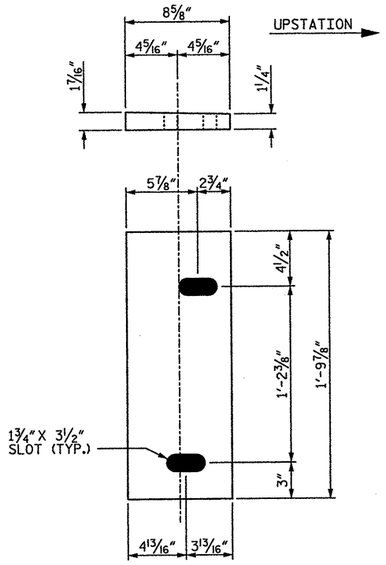
6/15/2012



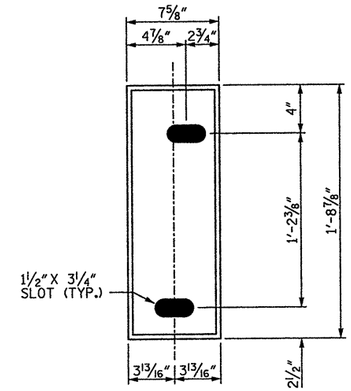


TYPICAL SECTION OF ELASTOMERIC BEARING E4



P4
(EXP)
(8 REQ'D)

SOLE PLATE DETAILS ("P")



E4 (8 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

NOTES

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PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031 SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER PAUL E. KELLY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. ANCHOR BOLT

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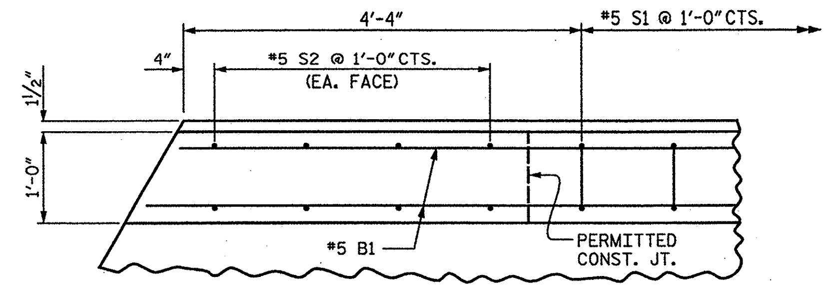
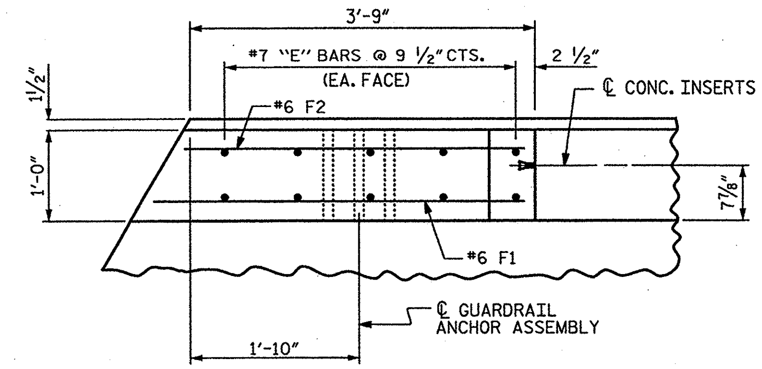
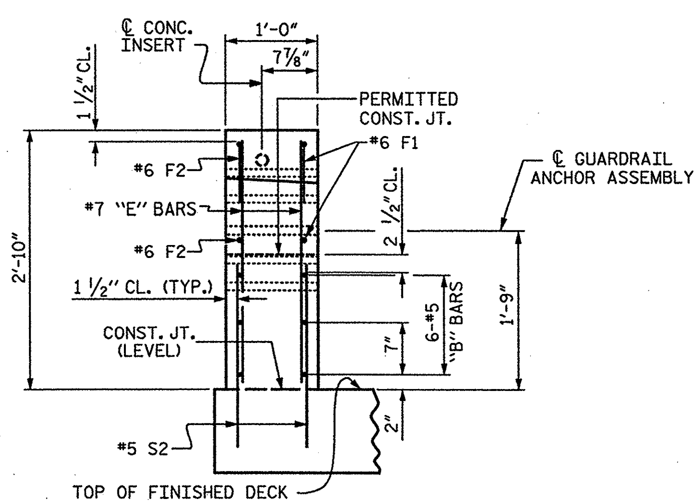
6/15/2012



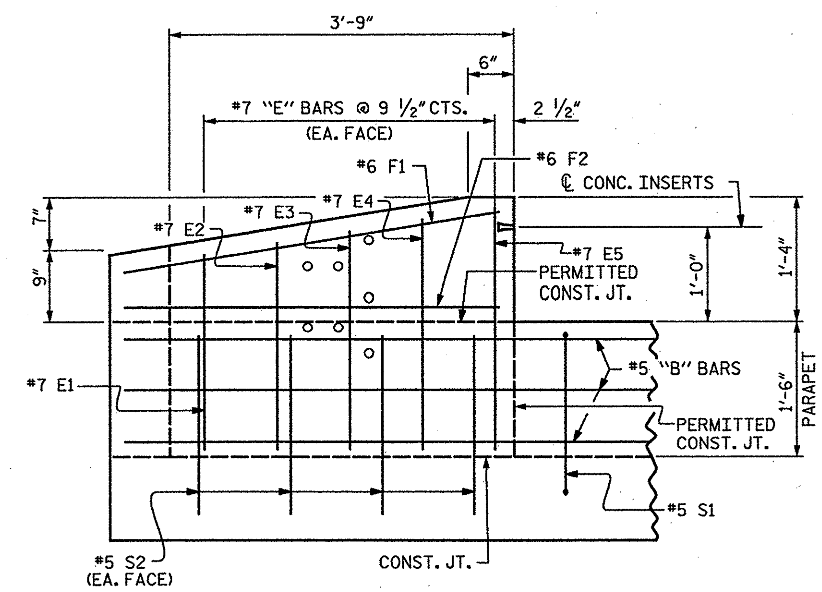
PLAN OF PARAPET



PLAN OF END POST



END VIEW



ELEVATION

PARAPET AND END POST FOR ONE BAR RAIL

ONE BAR METAL RAIL					
BILL OF MATERIAL FOR TWO END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*E1	4	#7	STR	2'-0"	16
*E2	4	#7	STR	2'-2"	18
*E3	4	#7	STR	2'-4"	19
*E4	4	#7	STR	2'-6"	20
*E5	4	#7	STR	2'-7"	21
*F1	4	#6	STR	7'-1"	43
*F2	4	#6	STR	7'-8"	46
*S2	16	#5	STR	2'-0"	33
*EPOXY COATED REINFORCING STEEL				LBS.	216
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	0.8

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PARAPET AND END POST DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 19766 ENGINEER P. E. KELLY, JR.

5/18/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1	STV	6-12	3				
2			4				

SHEET NO. S-14

TOTAL SHEETS 89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

△1 REV. PER NCDOT COMMENTS

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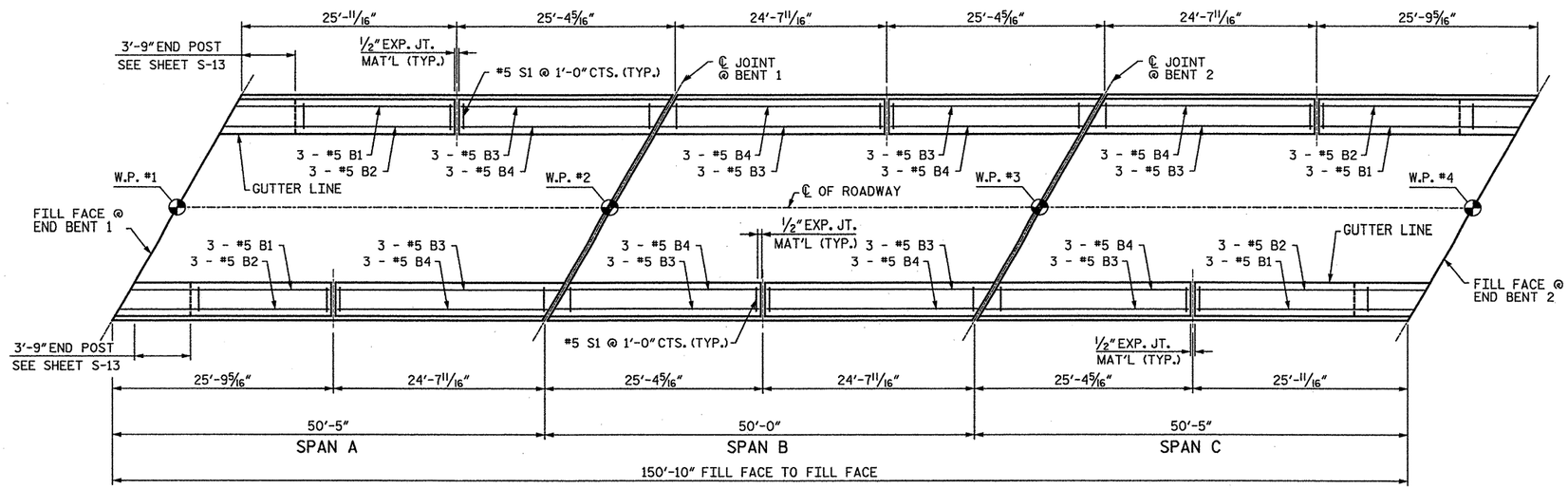
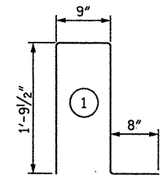
6/18/2012



PLAN OF CONCRETE PARAPET

BAR TYPES

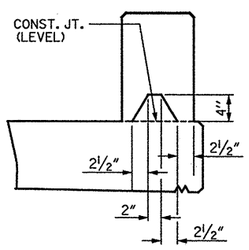


BILL OF MATERIAL

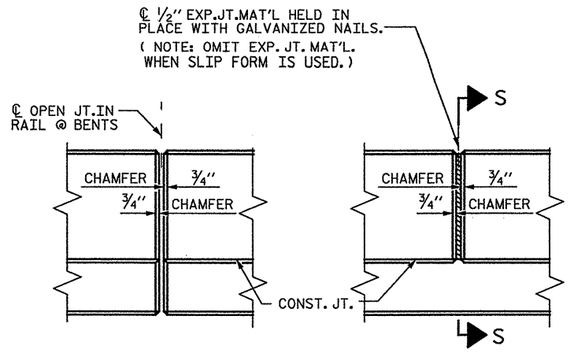
FOR CONCRETE PARAPET ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	12	#5	STR	25'-0"	313
✱ B2	12	#5	STR	25'-4"	317
✱ B3	24	#5	STR	24'-10"	622
✱ B4	24	#5	STR	24'-6"	614
✱ S1	288	#5	1	3'-5"	1,026

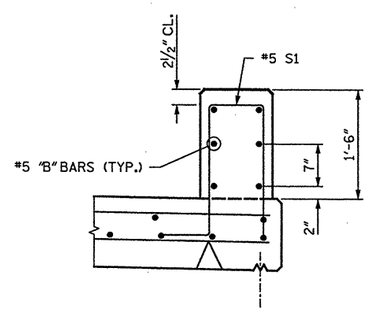
✱EPOXY COATED REINFORCING STEEL	LBS.	2,892
CLASS AA LIGHTWEIGHT CONCRETE	C. Y.	16.8
LIGHTWEIGHT CONCRETE PARAPET	L.F.	286.7



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



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

CONCRETE PARAPET DETAILS

NOTES:

THE CONCRETE PARAPET IN SPAN "A" SHALL NOT BE CAST UNTIL THE SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

CONCRETE PARAPETS SHALL BE SAND LIGHTWEIGHT CONCRETE.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

FOR END POST DETAILS, SEE SHEET S-13.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 31

REHAB. OF BRIDGE NO. 031 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER MICHAEL E. KELLY

6/5/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 04-12
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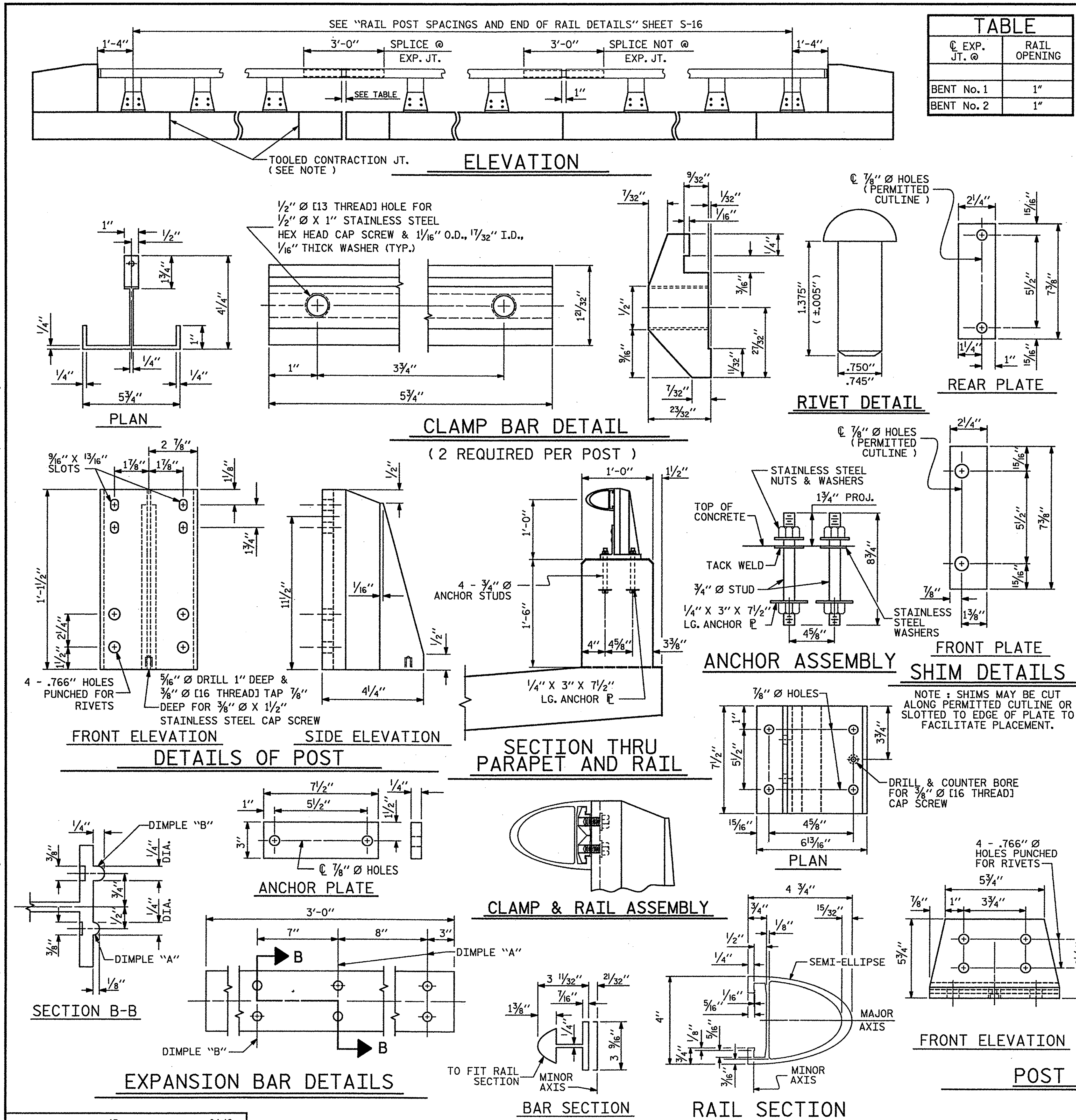
6/15/2012



TABLE

℄ EXP. JT. @	RAIL OPENING
BENT No. 1	1″
BENT No. 2	1″

NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

MATERIAL FOR ANCHOR STUDS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. STUDS TO BE EMBEDDED 7″ IN CONCRETE. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK, CLASS 2B THREAD, AND MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ANCHOR ℙ SHALL BE AASHTO M270 GRADE 36.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL.

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

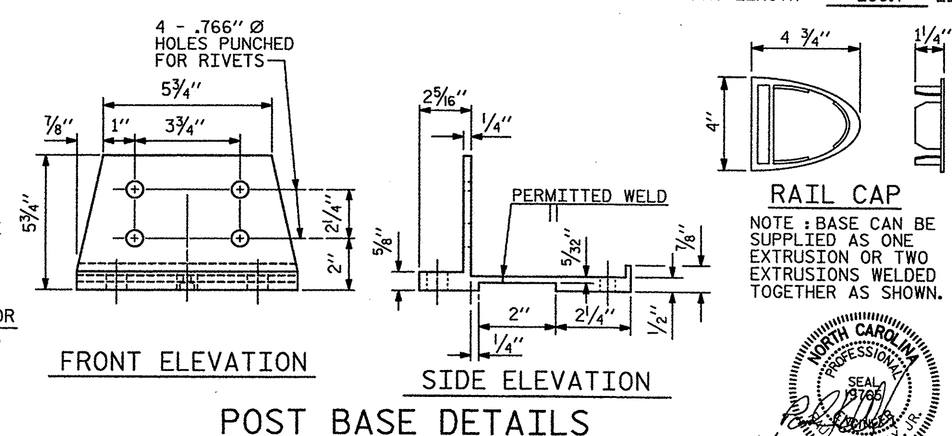
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾″Ø BOLT IS 10 KIPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS, NUTS AND WASHERS SHALL MEET THE SAME REQUIREMENTS AS THE ANCHOR STUDS, NUTS AND WASHERS FOR USE WITH THE ANCHOR ASSEMBLY.

GROOVED CONTRACTION JOINTS, ½″ IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 286.7 LIN. FT.



PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
1 BAR METAL RAIL

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

REVISIONS								SHEET NO.
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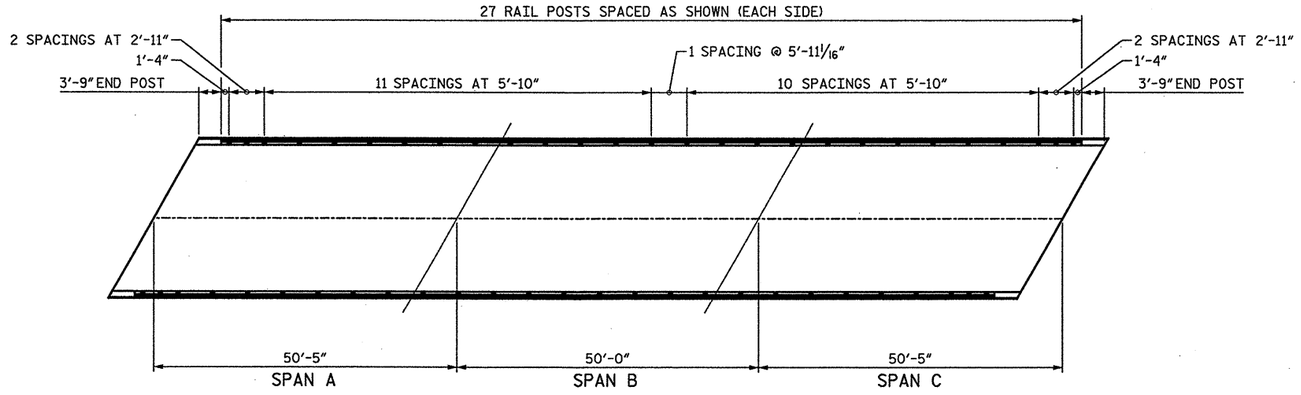
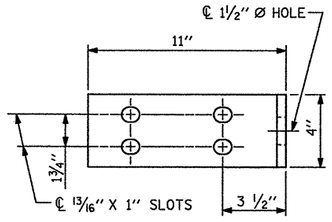
1			3					TOTAL SHEETS
2			4					89

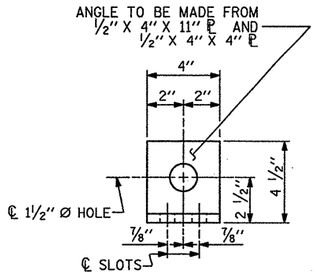
STD. NO. BMR1



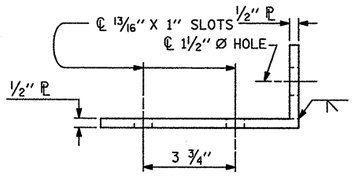
PLAN OF RAIL POST SPACINGS



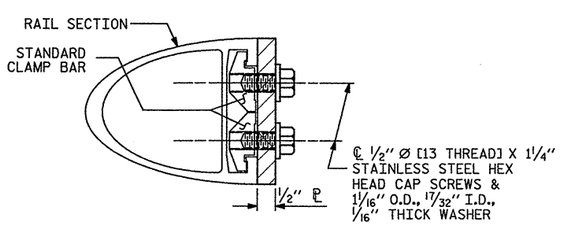
ELEVATION



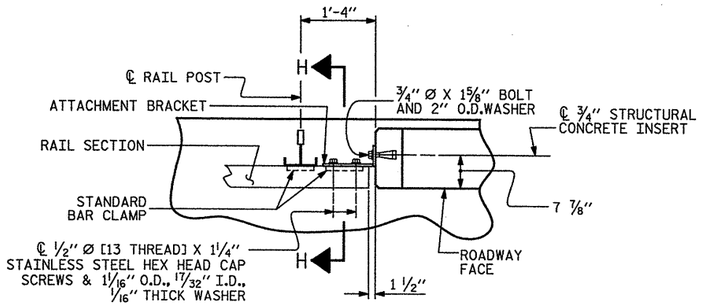
END VIEW (FIX AND EXP.)



TOP VIEW



SECTION H-H (FIX)



PLAN - RAIL AND END POST

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

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

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

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

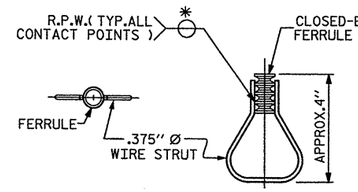
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 31

REHAB. OF BRIDGE NO. 031 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			89

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER
5/17/12

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License No. F-0991

STD. NO. BMR2

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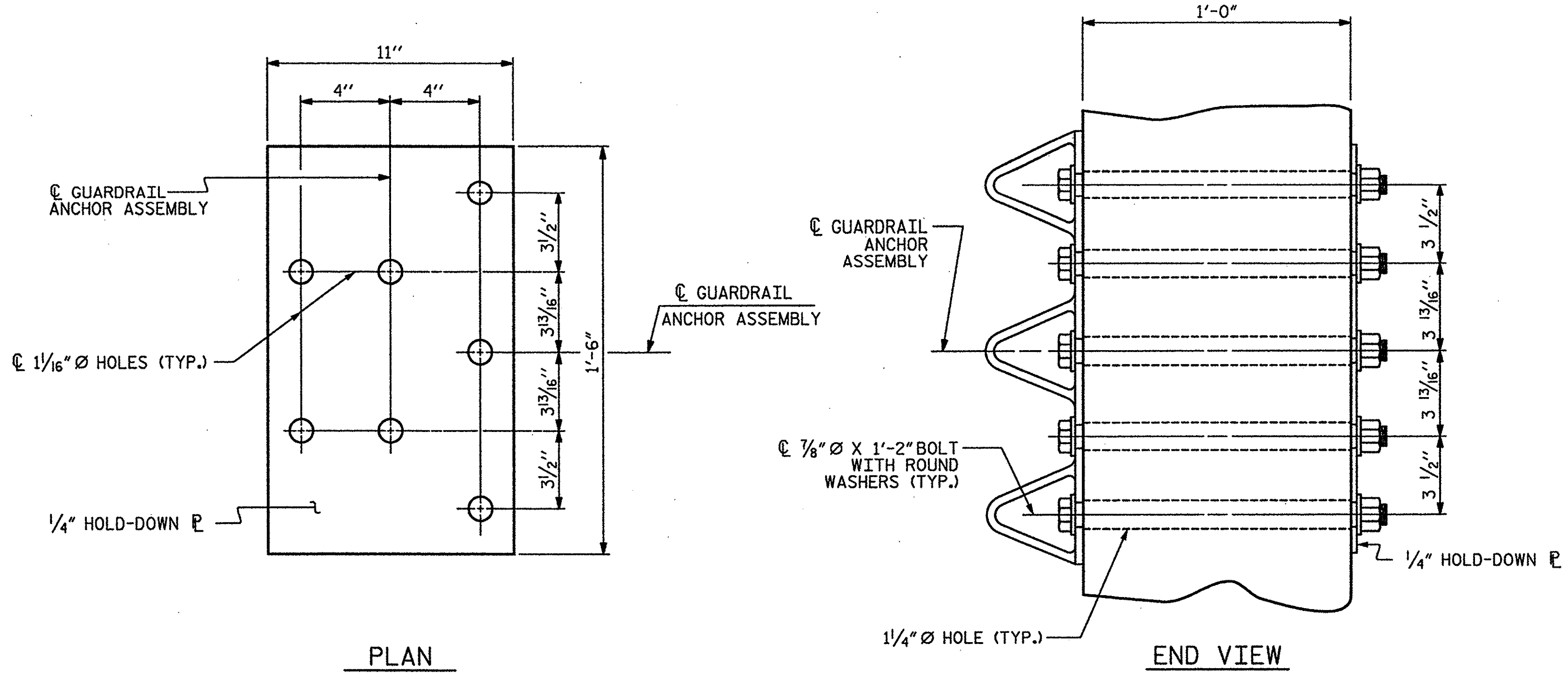
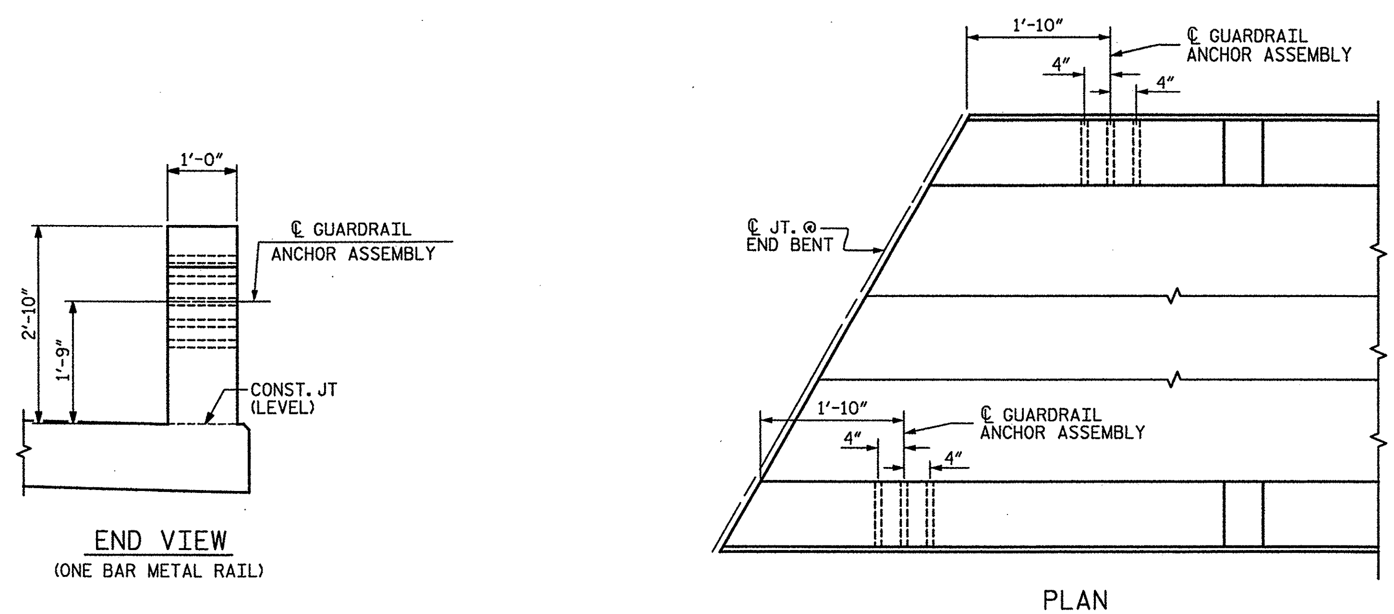


GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST

NOTES

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

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

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

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

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

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

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

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

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL ... E. KELLY, JR.
5/17/12

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Charlotte, NC 28208
NC License No. F-0991

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1			3			TOTAL SHEETS
2			4			89

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CHECKED BY :	MR	DATE :	04-12

STD. NO. GRA3

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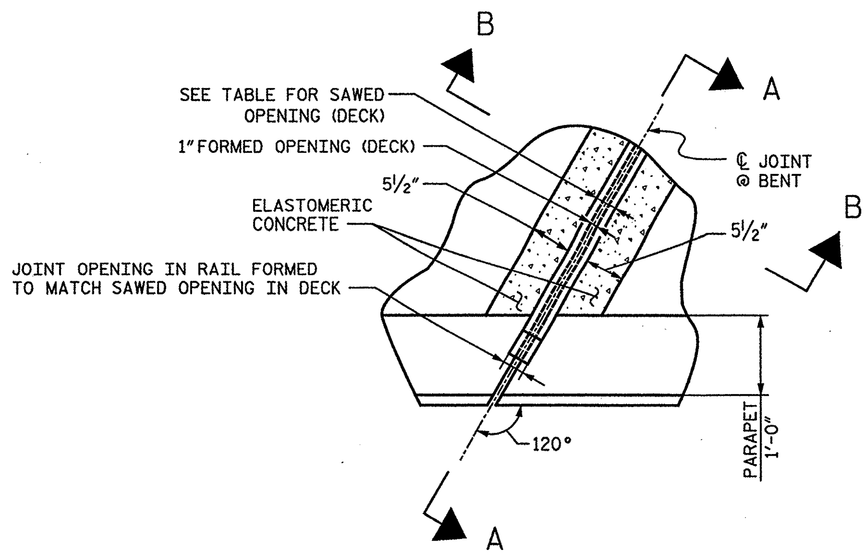
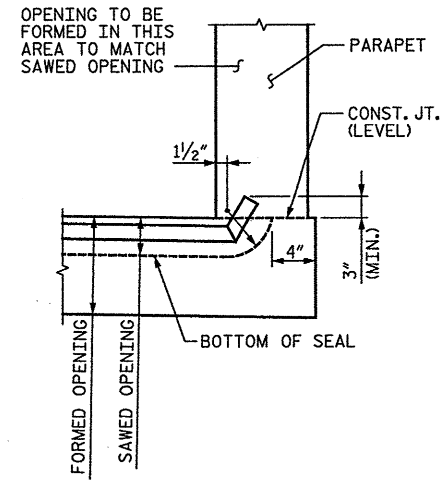
5/17/2012

NOTES:

1. SEE SPECIAL PROVISIONS FOR FOAM JOINT SEALS.
2. SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

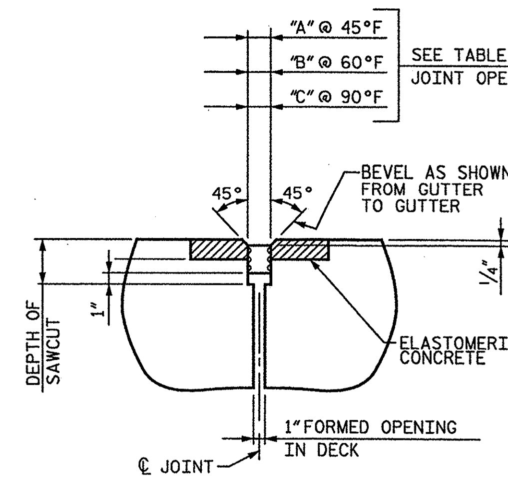


PLAN



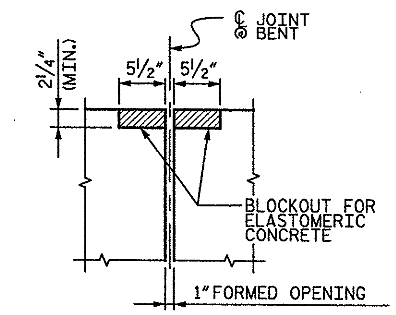
SECTION A-A

FOAM JOINT SEAL TO BE CUT, HEAT WELDED, AND TURNED UP AT A 60° ANGLE FROM THE BASE OF THE PARAPET.



SECTION B-B

FOAM JOINT SEAL



SECTION B-B

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENTIONS)

MOVEMENT AND SETTING AT FOAM JOINT

BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY.)	PERPENDICULAR JOINT OPENING AT 45°F ("A")	PERPENDICULAR JOINT OPENING AT 60°F ("B")	PERPENDICULAR JOINT OPENING AT 90°F ("C")
B1	120°	2½"	½"	1 15/16"	1⅞"	1¾"
B2	120°	2½"	1"	2"	1⅞"	1⅝"

BILL OF MATERIAL

BENT NO.	ELASTOMERIC CONCRETE * (CU.FT.)
EB1	4.8
B1	4.8
B2	4.8
EB2	4.8

* BASED ON MINIMUM BLOCKOUT SHOWN.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

JOINT SEAL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 18765 PAUL E. KELLY, JR.
5/17/12

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Charlotte, NC 28208
NC License No. F-0991

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2			4			89

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dveyco

5/17/2012

BILL OF MATERIAL

SPAN A OR C

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	69	#5	STR	25′-11″	1865
A2	69	#5	STR	25′-11″	1865
✱A3	4	#6	STR	29′-11″	180
✱A4	2	#6	STR	33′-3″	100
✱A101	4	#5	STR	2′-3″	9
✱A102	4	#5	STR	4′-0″	17
✱A103	4	#5	STR	5′-9″	24
✱A104	4	#5	STR	7′-5″	31
✱A105	4	#5	STR	9′-2″	38
✱A106	4	#5	STR	10′-11″	46
✱A107	4	#5	STR	12′-8″	53
✱A108	4	#5	STR	14′-5″	60
✱A109	4	#5	STR	16′-1″	67
✱A110	4	#5	STR	17′-10″	74
✱A111	4	#5	STR	19′-7″	82
✱A112	4	#5	STR	21′-4″	89
✱A113	4	#5	STR	23′-0″	96
✱A114	4	#5	STR	24′-10″	104
A201	4	#5	STR	2′-3″	9
A202	4	#5	STR	4′-0″	18
A203	4	#5	STR	5′-9″	24
A204	4	#5	STR	7′-5″	31
A205	4	#5	STR	9′-2″	38
A206	4	#5	STR	10′-11″	46
A207	4	#5	STR	12′-8″	53
A208	4	#5	STR	14′-5″	60
A209	4	#5	STR	16′-1″	67
A210	4	#5	STR	17′-10″	74
A211	4	#5	STR	19′-7″	82
A212	4	#5	STR	21′-4″	89
A213	4	#5	STR	23′-0″	96
A214	4	#5	STR	24′-10″	104
✱B1	18	#4	STR	50′-1″	602
B2	35	#5	STR	50′-1″	1828
✱G1	2	#5	STR	29′-11″	62

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱K1	4	#5	1	8′-10″	37
✱K2	4	#5	2	11′-2″	48
K3	4	#6	STR	33′-3″	200
K4	1	#6	STR	29′-11″	45
K5	3	#6	STR	6′-9″	31
K6	3	#6	STR	7′-4″	33
K7	1	#6	STR	4′-7″	7
K8	1	#6	STR	4′-4″	7
K9	1	#6	STR	4′-3″	7
K10	1	#6	STR	5′-0″	8
K11	1	#6	STR	33′-3″	50
K12	3	#6	STR	7′-2″	32
K13	1	#6	STR	5′-5″	8
K14	1	#6	STR	3′-8″	6
✱S1	27	#5	3	1′-7″	45
S2	54	#5	4	3′-4″	188
✱S3	27	#5	5	2′-7″	73
✱S4	21	#4	6	3′-5″	48
✱S5	4	#4	9	1′-3″	3
U1	27	#4	7	3′-9″	68
U2	4	#4	8	6′-0″	16

REINFORCING STEEL	5091 LBS.
✱EPOXY COATED REINF. STEEL	3853 LBS.
CLASS AA LIGHTWEIGHT CONCRETE	37.5 CU. YDS.

SPAN B

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	68	#5	STR	25′-11″	1838
A2	68	#5	STR	25′-11″	1838
✱A3	6	#6	STR	29′-11″	270
✱A101	4	#5	STR	2′-3″	9
✱A102	4	#5	STR	4′-0″	17
✱A103	4	#5	STR	5′-9″	24
✱A104	4	#5	STR	7′-5″	31
✱A105	4	#5	STR	9′-2″	38
✱A106	4	#5	STR	10′-11″	46
✱A107	4	#5	STR	12′-8″	53
✱A108	4	#5	STR	14′-5″	60
✱A109	4	#5	STR	16′-1″	67
✱A110	4	#5	STR	17′-10″	74
✱A111	4	#5	STR	19′-7″	82
✱A112	4	#5	STR	21′-4″	89
✱A113	4	#5	STR	23′-0″	96
✱A114	4	#5	STR	24′-10″	104
A201	4	#5	STR	2′-3″	9
A202	4	#5	STR	4′-0″	18
A203	4	#5	STR	5′-9″	24
A204	4	#5	STR	7′-5″	31
A205	4	#5	STR	9′-2″	38
A206	4	#5	STR	10′-11″	46
A207	4	#5	STR	12′-8″	53
A208	4	#5	STR	14′-5″	60
A209	4	#5	STR	16′-1″	67
A210	4	#5	STR	17′-10″	74
A211	4	#5	STR	19′-7″	82
A212	4	#5	STR	21′-4″	89
A213	4	#5	STR	23′-0″	96
A214	4	#5	STR	24′-10″	104
✱B3	18	#4	STR	49′-7″	596
B4	35	#5	STR	49′-7″	1810
✱G1	2	#5	STR	29′-11″	62
✱K1	8	#5	1	8′-10″	74
✱K2	8	#5	2	11′-2″	94
✱S4	42	#4	6	3′-5″	96

REINFORCING STEEL	4438 LBS.
✱EPOXY COATED REINF. STEEL	3820 LBS.
CLASS AA LIGHTWEIGHT CONCRETE	33.9 CU. YDS.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN A		5094	3850
POUR 1	37.5		
SPAN B		4438	3820
POUR 1	33.9		
SPAN C		5094	3850
POUR 1	37.5		
TOTALS✱✱	108.9	14626	11520

✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

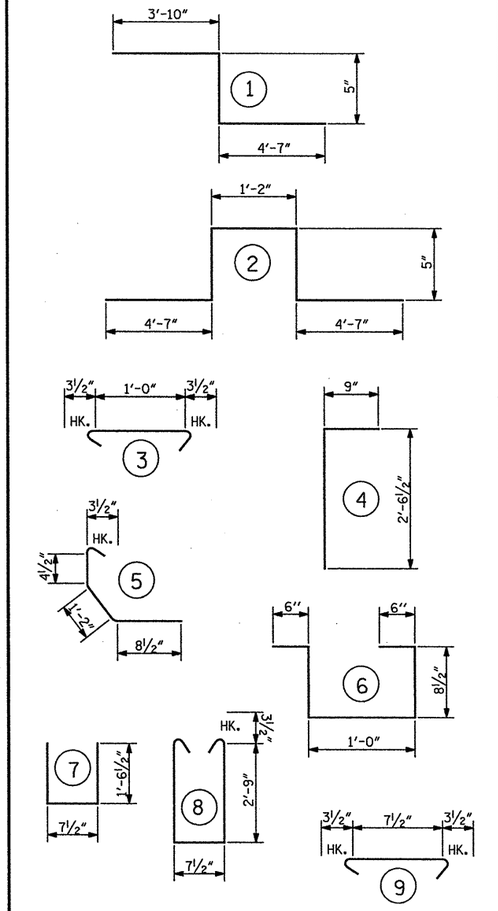
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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″			

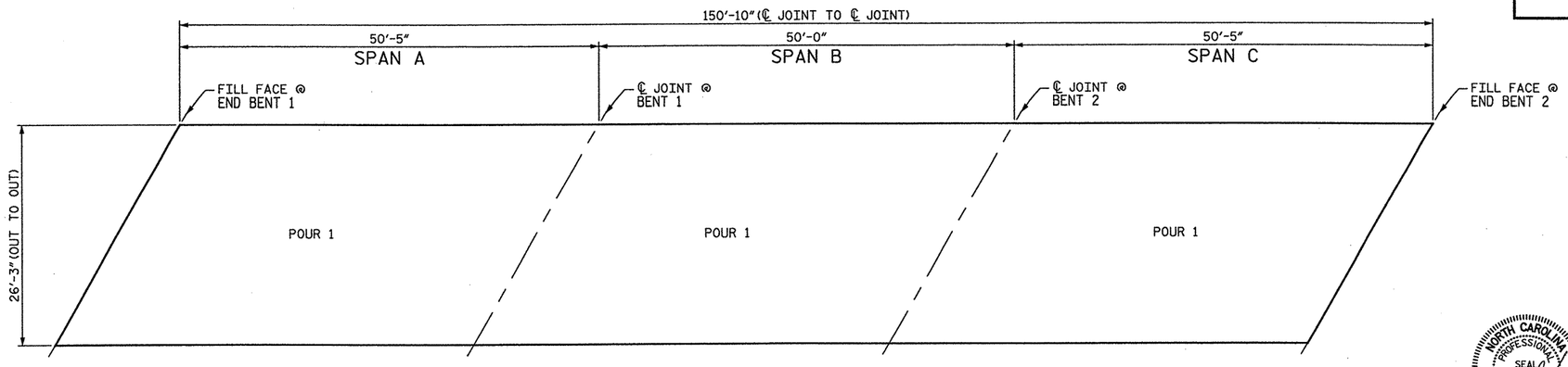
GROOVING BRIDGE FLOORS

APPROACH SLABS	616	SQ.FT.
BRIDGE DECK	3,157	SQ.FT.
TOTAL	3,773	SQ.FT.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

⚠ (SQ. FT. = 3,954)

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER JAMES C. KELLY, JR.

6/18/12

DRAWN BY : AFM DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	STV	6-12	3		
2			4		

SHEET NO. S-20
TOTAL SHEETS 89

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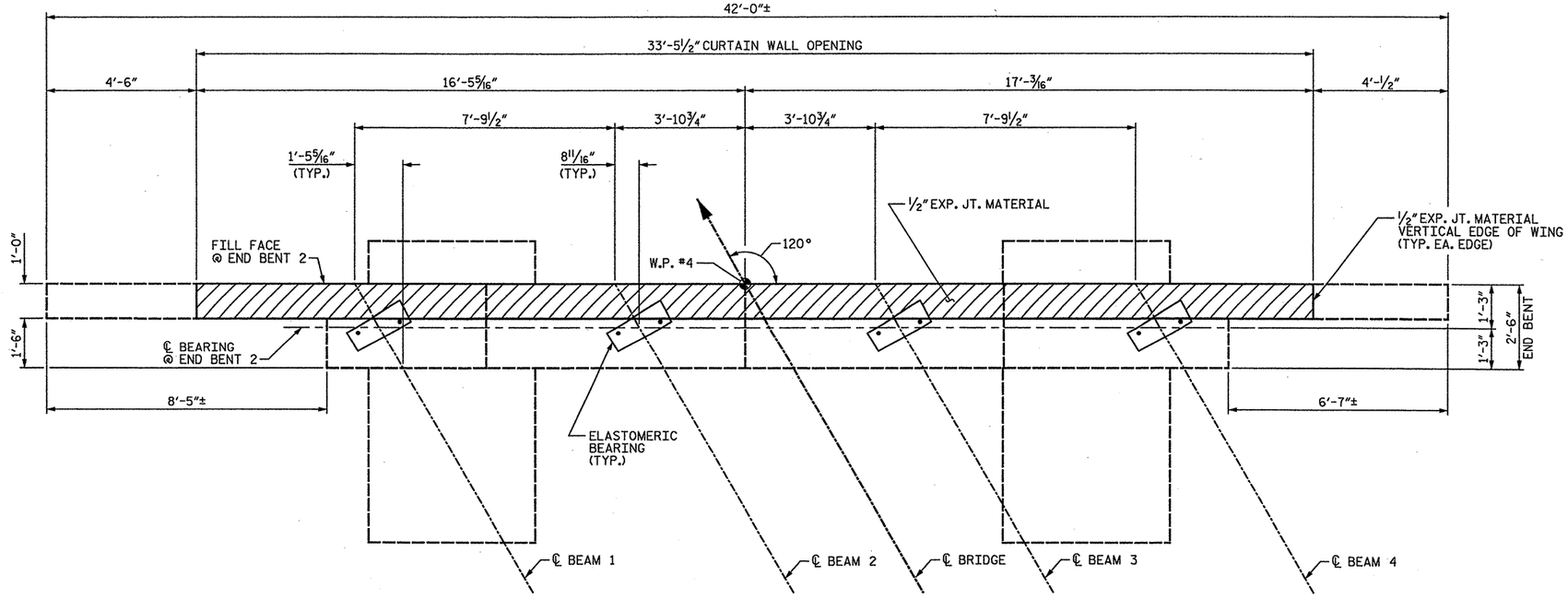
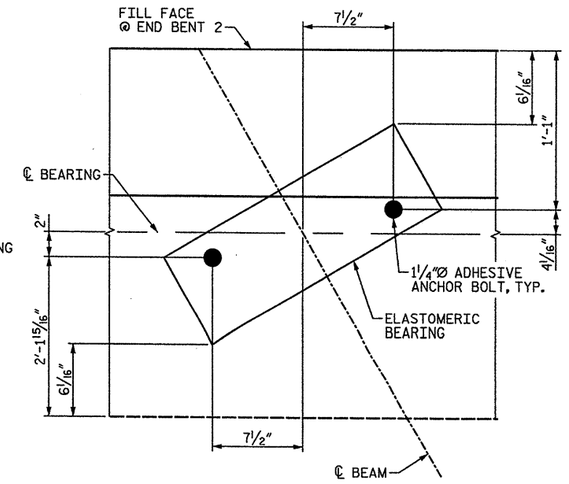
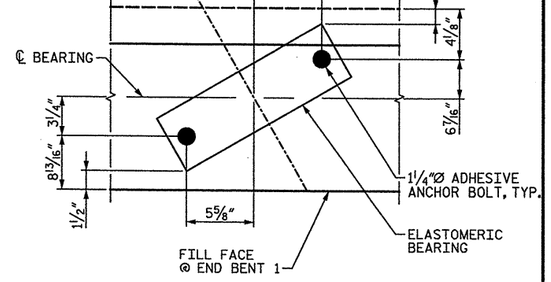


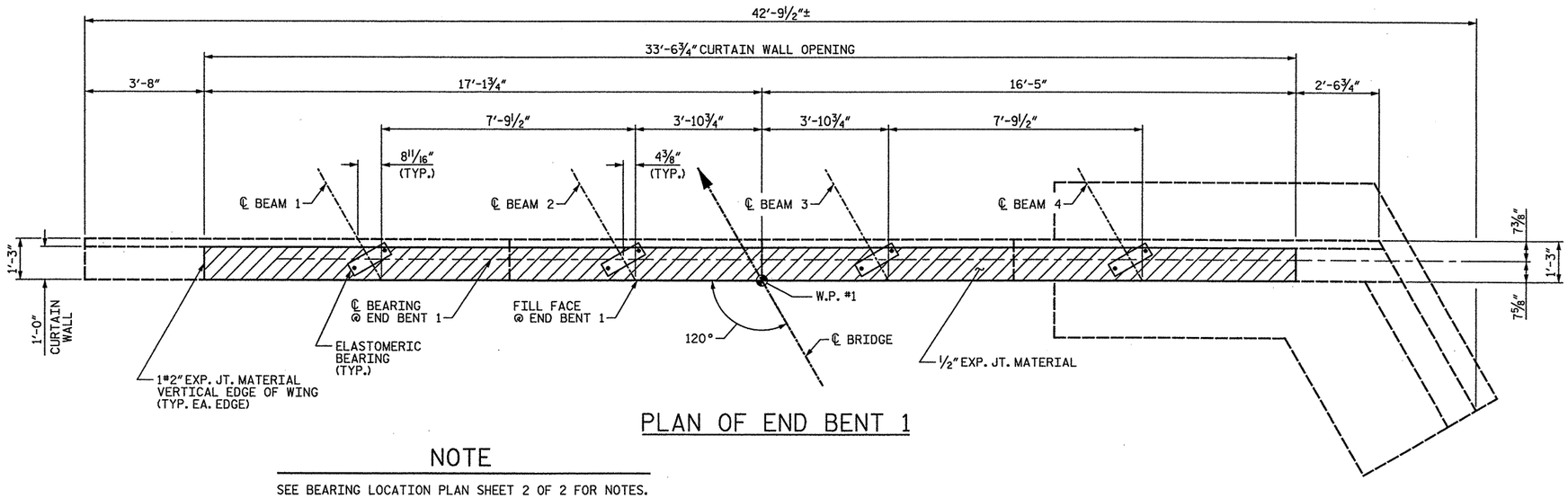
PLAN OF END BENT 2



ANCHOR BOLT PLACEMENT ⚠
DETAIL - END BENT 2



ANCHOR BOLT PLACEMENT ⚠
DETAIL - END BENT 1



PLAN OF END BENT 1

NOTE

SEE BEARING LOCATION PLAN SHEET 2 OF 2 FOR NOTES.

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 031
REHAB. OF BRIDGE NO. 031 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN - END BENTS 1&2

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER DAVID E. KELLY, JR.
6/15/12

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Charlotte, NC 28208
NC License No. F-0991

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1	STV	6-12	3			TOTAL SHEETS
2			4			89

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⚠ REV. ANCHOR BOLT

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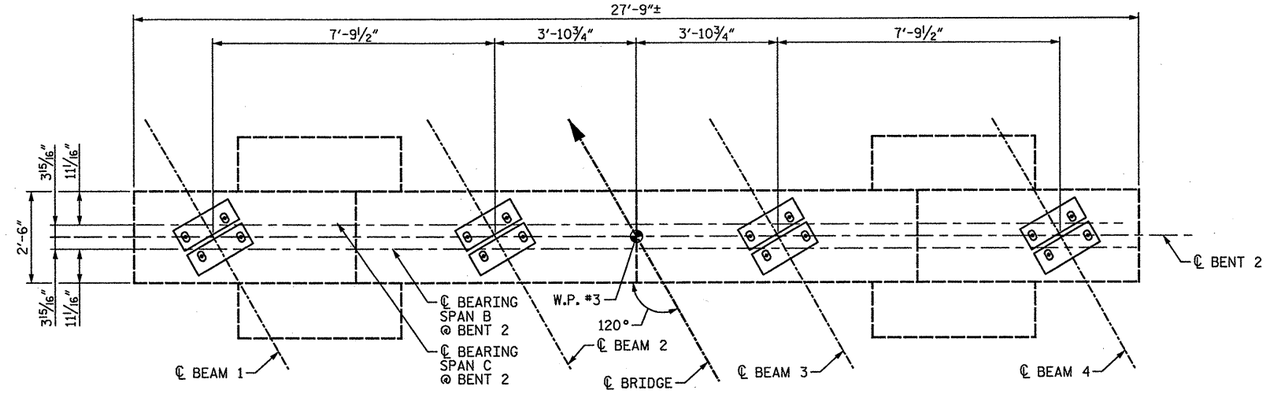

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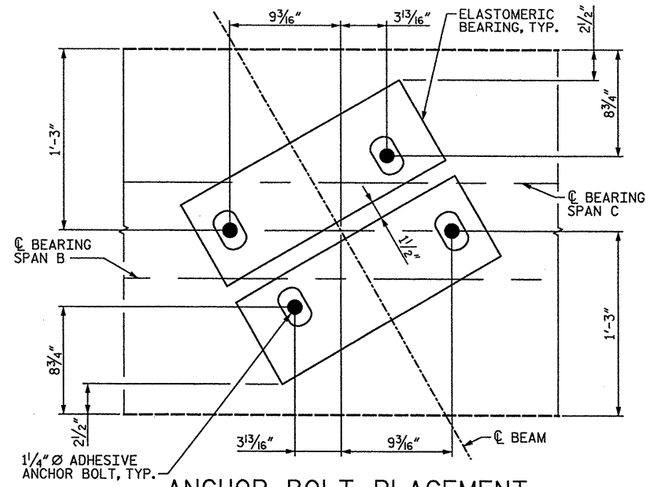
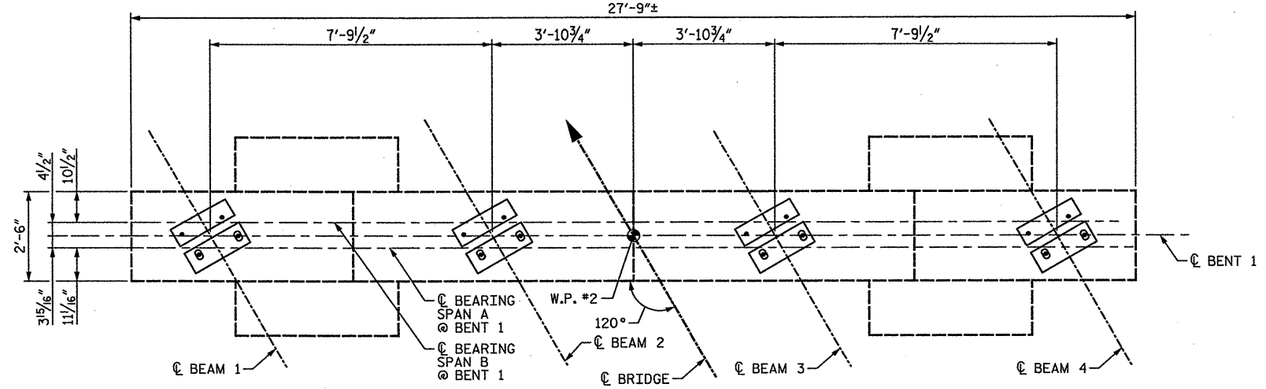
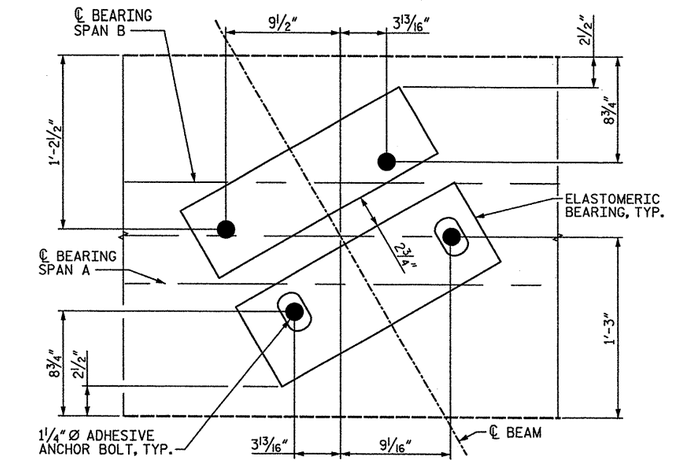


ANCHOR BOLT PLACEMENT DETAIL - BENT 2 ⚠



PLAN OF BENT 1



ANCHOR BOLT PLACEMENT DETAIL - BENT 1 ⚠

⚠ NOTES

EXTREME CARE MUST BE TAKEN WHILE PLACING THE ANCHOR BOLTS IN THE END BENT CAP TO AVOID DAMAGE TO THE EXISTING TIMBER PILES.

EXISTING ANCHOR BOLTS WILL BE CUT AND GROUND FLUSH WITH TOP OF CAP.

ADHESIVE ANCHOR BOLTS FOR BENT AND END BENT CAPS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH A SAFE WORKING LOAD OF 20 KIPS TENSION AND 12 KIPS SHEAR.

REMOVAL OF EXISTING ANCHOR BOLTS, INSTALLATION OF PROPOSED ADHESIVELY ANCHORED BOLTS, AND ALL WORK, MATERIAL AND EQUIPMENT NECESSARY TO COMPLETE THE ACCEPTED WORK, SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

APPLY AN EPOXY PROTECTIVE COATING TO TOP SURFACES OF BENT AND END BENT CAPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. PRIOR TO APPLICATION THE CAPS SHALL BE THOROUGHLY CLEANED BY POWER WASHING. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN - BENTS 1 & 2

NORTH CAROLINA PROFESSIONAL SEAL 19763 ENGINEER PAUL E. KALLAM

4/5/12

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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⚠ REV. ANCHOR BOLT, ADDED NOTES

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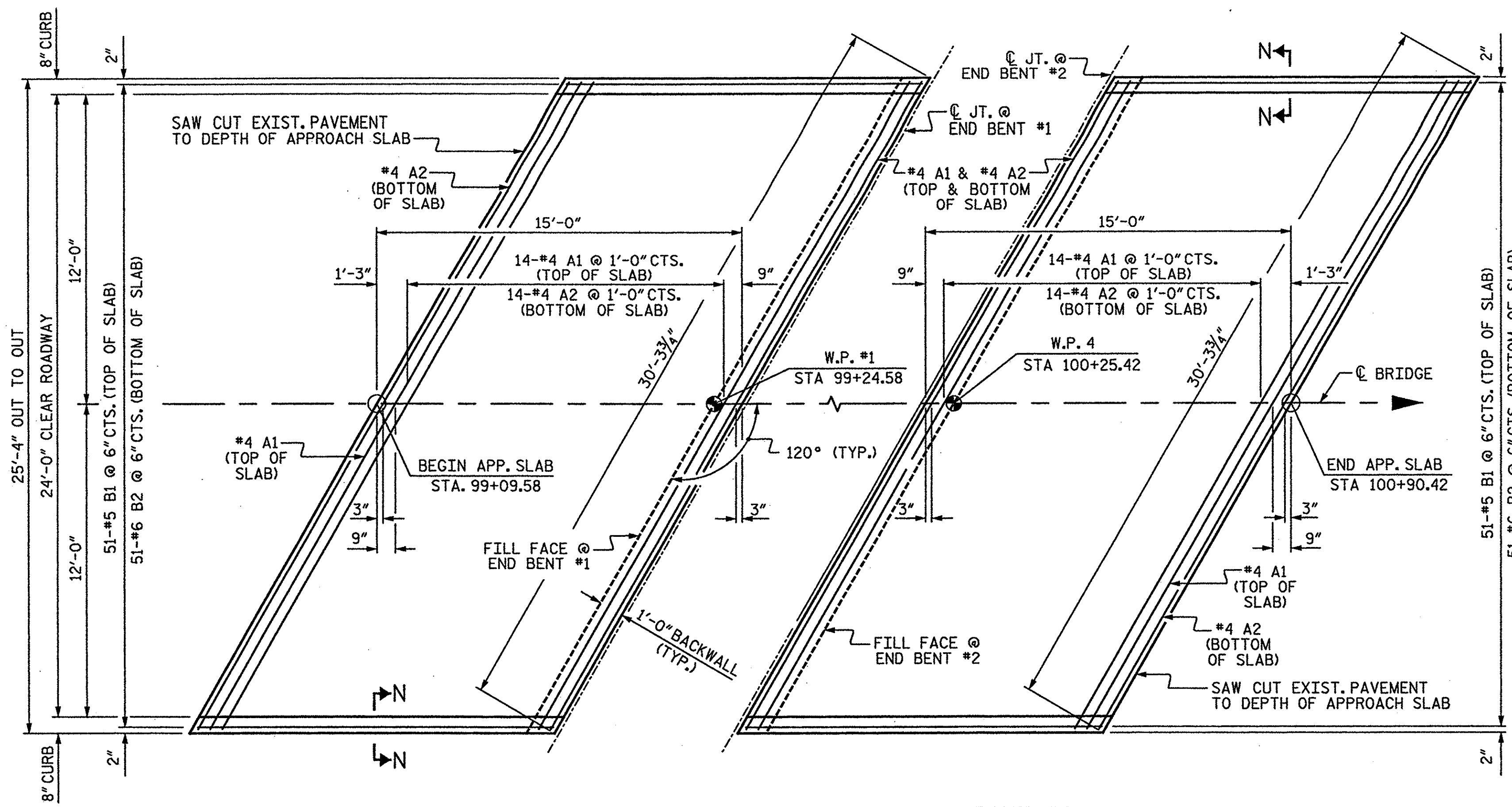
6/15/2012



PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, AND OUTLET PADS SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE BRIDGE APPROACH SLAB. NO EXTRA MEASUREMENT OR PAYMENT WILL BE MADE.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF END BENT FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

FOR OUTLET PAD SEE ROADWAY STANDARD DRAWING 815.03.

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

SAW CUT THE EXISTING PAVEMENT ALONG THE EDGE OF THE PROPOSED APPROACH SLAB AS SHOWN IN THE PLAN DETAILS. DEMOLISH AND EXCAVATE PAVEMENT AND SUBGRADE SOIL TO THE FULL DEPTH OF THE APPROACH SLAB.

DAMAGED PAVEMENT ALONG THE EDGE OF APPROACH SLAB SHALL BE REPAIRED TO PROVIDE A SMOOTH RIDING SURFACE TO THE SATISFACTION OF THE ENGINEER.

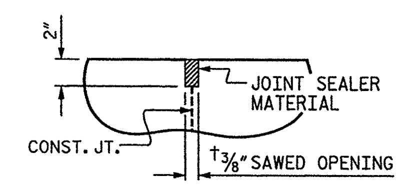
BILL OF MATERIAL

APPROACH SLAB AT EB #1

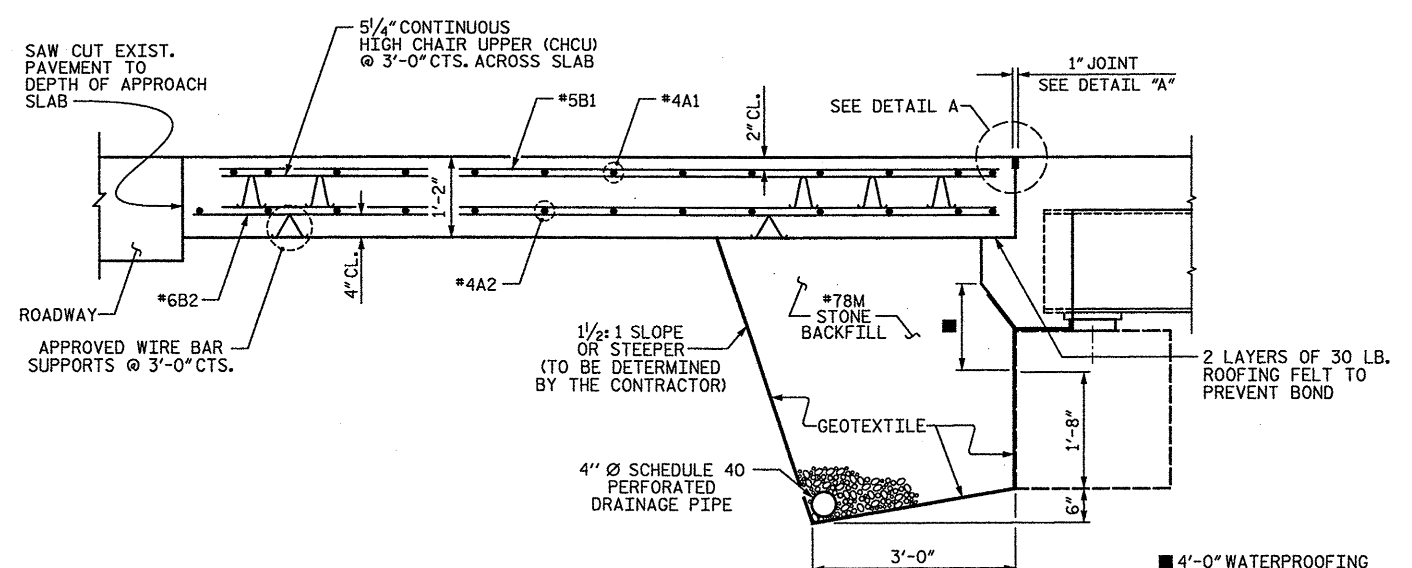
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	16	#4	STR	28'-10"	309
A2	16	#4	STR	28'-10"	309
* B1	51	#5	STR	14'-8"	781
B2	51	#6	STR	14'-8"	1124
REINFORCING STEEL				LBS.	1090
* EPOXY COATED REINFORCING STEEL				LBS.	1432
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	16.6

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A	16	#4	STR	28'-10"	309
A2	16	#4	STR	28'-10"	309
* B	51	#5	STR	14'-8"	781
B2	51	#6	STR	14'-8"	1124
REINFORCING STEEL				LBS.	1090
* EPOXY COATED REINFORCING STEEL				LBS.	1432
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	16.6

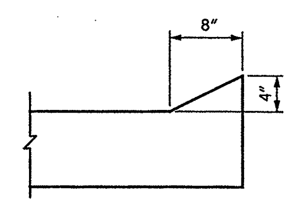


DETAIL "A"

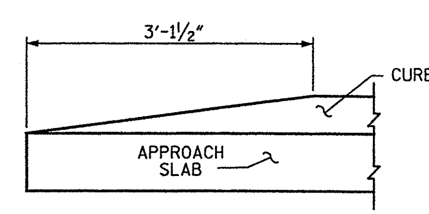


■ 4'-0" WATERPROOFING METHOD A. CENTER OVER CURTAIN WALL/CAP JOINT.

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

SPLICE LENGTHS

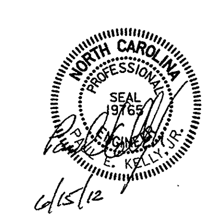
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB PLAN & SECTION

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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TOTAL SHEETS 89

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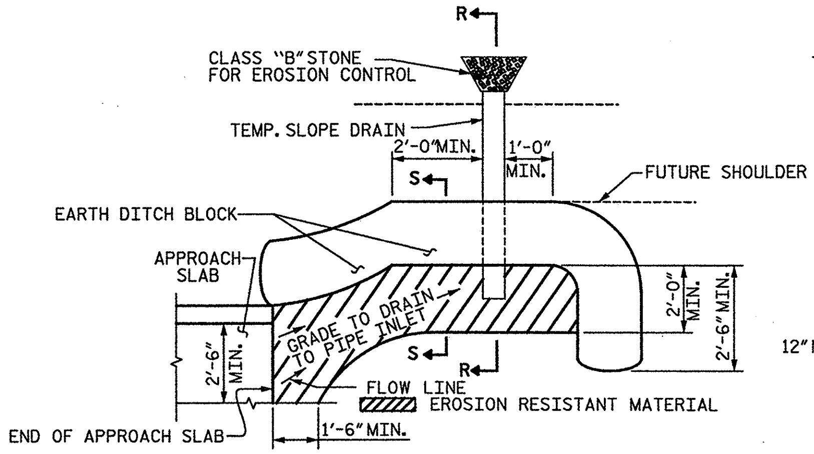
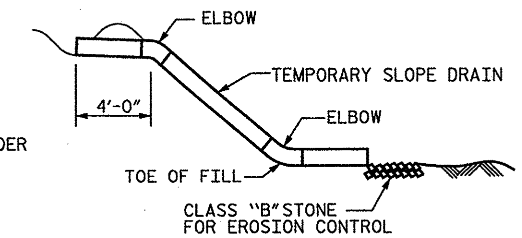
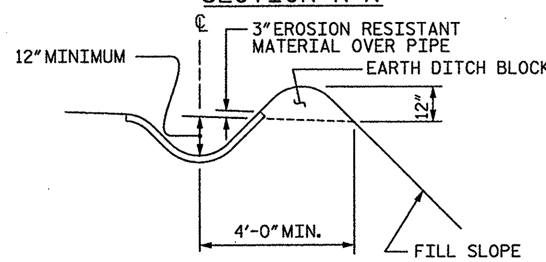


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



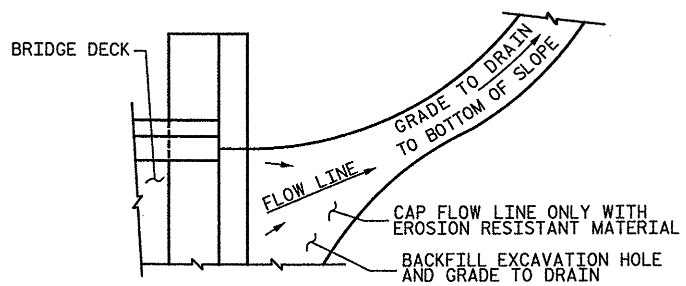
SECTION R-R



SECTION S-S

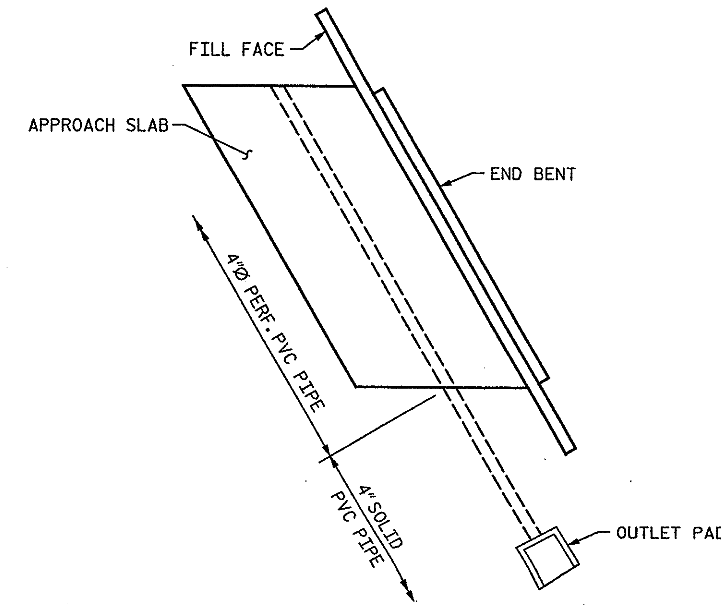
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

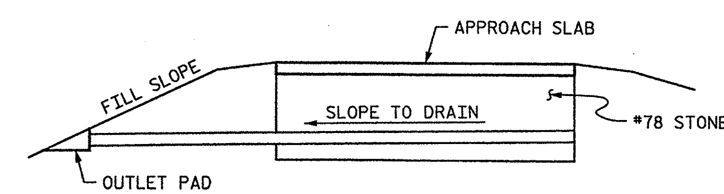


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



PIPE DRAIN AND OUTLET PLAN



PIPE DRAIN AND OUTLET ELEVATION

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 031

REHAB. OF BRIDGE NO. 031 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 18765 E. KELLY, JR. 5/17/12

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Charlotte, NC 28208
NC License No. F-0991

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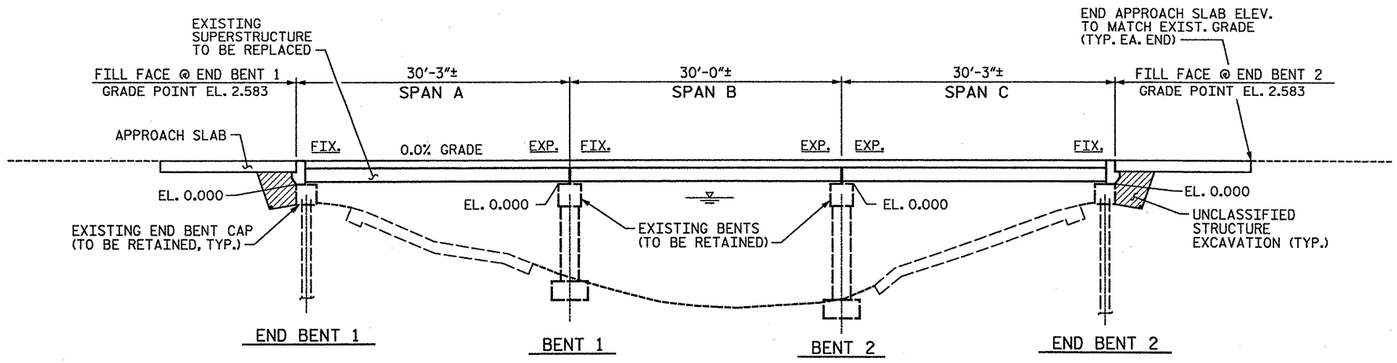


SECTION ALONG ℄ BRIDGE ⚠

NOTE: ROADWAY BARRIER DETAILS ARE NOT SHOWN FOR CLARITY

NOTES:

ALL EXISTING STATIONS AND ELEVATIONS ARE AS PER THE AS-BUILT PLANS.

THE ORIGIN OF THE STATION ALONG CENTERLINE OF THE BRIDGE IS ASSUMED FOR PLAN PREPARATION.

THE VERTICAL DATUM IS ASSUMED FOR PLAN PREPARATION.

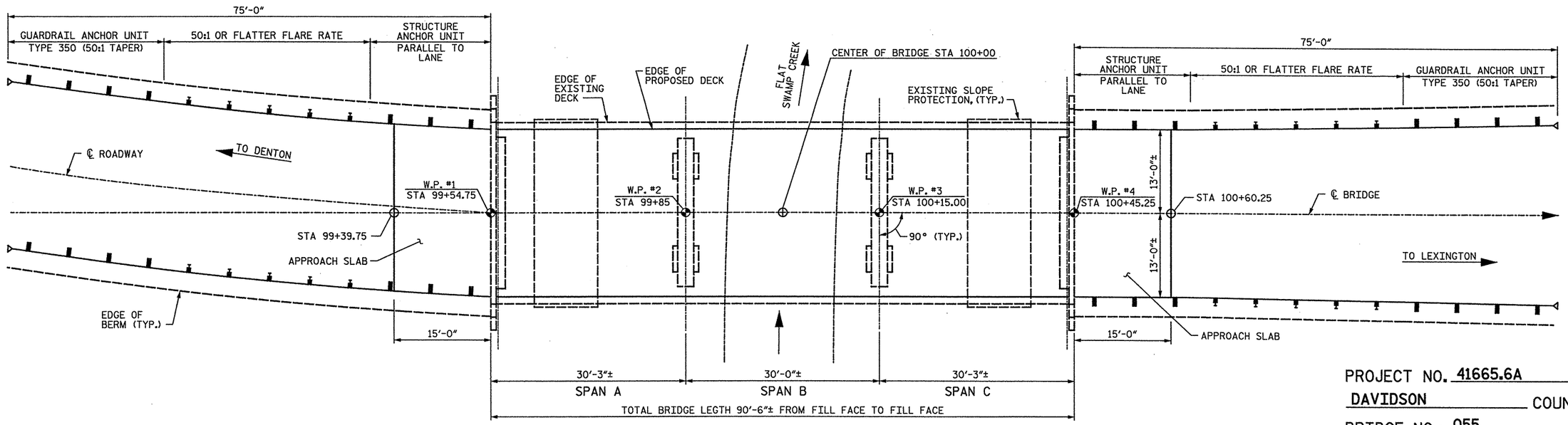
WORK INVOLVES REMOVAL OF EXISTING SUPERSTRUCTURE, CONSTRUCTION OF PROPOSED SUPERSTRUCTURE, DECK, BEARINGS, RAILINGS, APPROACHES AND SLOPE PROTECTION.

ALL EXISTING SUBSTRUCTURE AND FOOTINGS WILL REMAIN IN PLACE.

WATER LEVEL SHOWN IS THE APPROXIMATE HIGHWATER MARK AS IT APPEARS ON THE AS-BUILT PLANS.

THE HORIZONTAL CURVE IN THE APPROACH ROADWAY SHOWN ON THE PLAN IS SCHEMATIC. THE COTNRACTOR MUST FIELD VERIFY ALL GEOMETRY PRIOR TO CONSTRUCTION.

FOR LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS FOR SAND LIGHTWEIGHT CONCRETE.



PLAN

NOTE: ROADWAY BARRIER DETAILS ARE NOT SHOWN FOR CLARITY

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON NC 47
OVER FLAT SWAMP CREEK

NORTH CAROLINA PROFESSIONAL SEAL 19463 ENGINEER PAUL E. KELLY, JR.
4/5/12

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Charlotte, NC 28208
NC License No. F-0991

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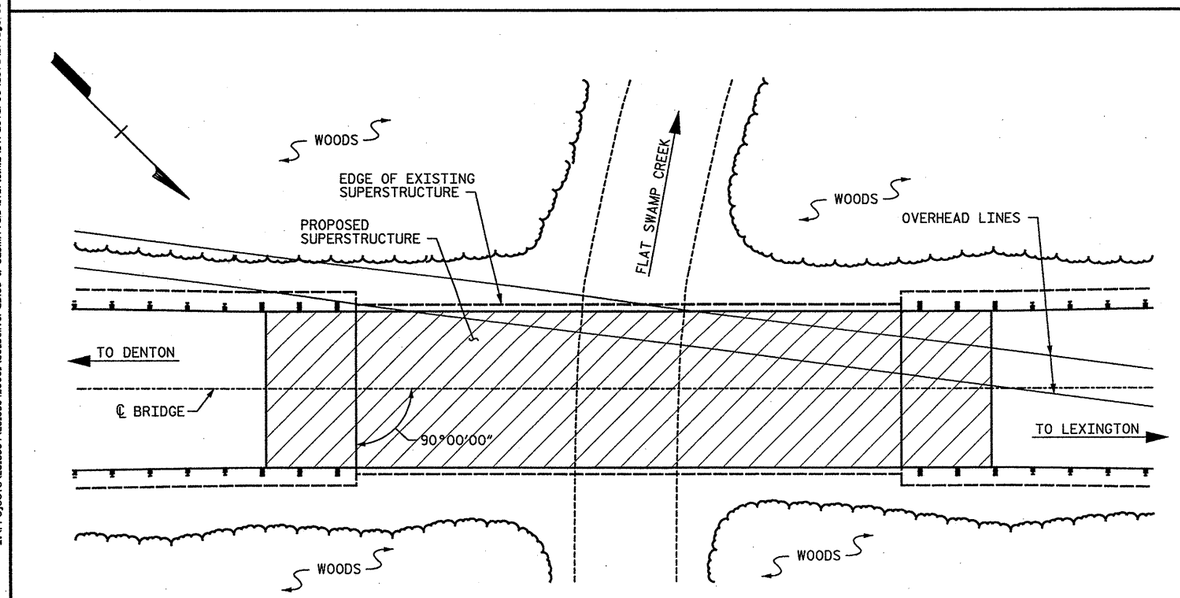
6/15/2012

TOTAL BILL OF MATERIAL ⚠

	GUARDRAIL ANCHOR UNIT TYPE 350	STEEL BM GUARDRAIL	GUARDRAIL ANCHOR UNITS TYPE III	PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE 55	UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE 55	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONCRETE)	GROOVING BRIDGE FLOORS (SQ. FT.)	BRIDGE APPROACH SLABS AT BRIDGE 55	STRUCTURAL STEEL	METHOD A WATERPROOFING	ONE BAR METAL RAIL	1'-0"x 1'-6" CONCRETE PARAPET (SAND LIGHTWEIGHT CONCRETE)	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	EA.	LIN. FT.	EA.	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	LUMP SUM	APPROX. LBS.	SQ. YD	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						2376	2506		26,220	25	166.0	166.0		
TOTAL	4	25	4	LUMP SUM	LUMP SUM	2376	2506	LUMP SUM	26,220	25	166.0	166.0	LUMP SUM	LUMP SUM



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HS-20 OR ALTERNATIVE LOADING.

THE PROPOSED BRIDGE SUPERSTRUCTURE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES 17TH EDITION, 2002.

THE EXISTING SUBSTRUCTURE WILL REMAIN IN PLACE. NO ANALYSIS OR DESIGN HAS BEEN PERFORMED TO EVALUATE THE CAPACITY OF THE SUBSTRUCTURE AND THE FOUNDATIONS. IF ANY DISTRESS IS NOTICED DURING THE CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY STOP WORK AND NOTIFY THE DEPARTMENT OF TRANSPORTATION AND THE ENGINEER. THE WORK MAY NOT RESUME UNTIL THE CAUSE OF DISTRESS IS DETECTED AND RESOLVED.

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

FOR FALSEWORK AND FORMWORK, 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.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 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 "REMOVAL OF EXISTING SUPERSTRUCTURE AT EXISTING STATION 227+75".

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 16 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING SUPERSTRUCTURE CONSISTING OF ROLLED STEEL I-BEAMS @ 6'-9" CENTERS IN 3 SIMPLE SPANS OF 30'-0" WITH A CLEAR ROADWAY WIDTH OF 24'-0" SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

ANY ALTERATION OF ROADWAY SURFACE PROFILE IS NOT ANTICIPATED DUE TO THIS PROJECT. IF ANY ROADWAY PROFILE/GRADE ADJUSTMENT IS REQUIRED FOR SUCCESSFUL COMPLETION OF THE PROJECT, THE CONTRACTOR MUST SUBMIT THE REQUEST WITH RECOMMENDED CHANGES TO THE DEPARTMENT OF TRANSPORTATION AND THE ENGINEER FOR APPROVAL.

REMOVAL OF THE EXISTING BRIDGE SUPERSTRUCTURE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR LIGHTWEIGHT CONCRETE SEE SPECIAL PROVISION FOR SAND LIGHTWEIGHT CONCRETE.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH AND TOTAL BILL OF MATERIALS

BRIDGE ON NC 47 OVER FLAT SWAMP CREEK

NORTH CAROLINA PROFESSIONAL SEAL 19768 ENGINEER MARK E. KECK, JR.
2/25/13

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : J.W.K. DATE : 04-12
CHECKED BY : M.R. DATE : 04-12
⚠ REV. PER NCDOT COMMENTS

I:\Projects\2515384\2515384_0001\50_Deliverables & Submittals\TRP-BJH-2\Structures\usta\Bridge 55 Davidson\02 pBR-055 Plans.dgn
gufdool
2/25/2013

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	1.36	--	1.75	0.600	1.78	B	I	15	0.725	1.70	B	I	0	1.30	0.600	1.36	B	I	15	
		HL-93 (OPERATING)	N/A		1.77	--	1.35	0.600	3.11	B	I	15	0.725	2.98	B	I	0	1.00	0.600	1.77	B	I	15	
		HS-20 (INVENTORY)	36.00	2	1.80	64.800	1.75	0.600	2.35	B	I	15	0.725	2.00	B	I	0	1.30	0.600	1.80	B	I	15	
		HS-20 (OPERATING)	36.00		2.34	84.240	1.35	0.600	3.04	B	I	15	0.725	2.59	B	I	0	1.00	0.600	2.34	B	I	15	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.10	41.850	1.40	0.600	5.04	B	I	15	0.725	4.62	B	I	0	1.30	0.600	3.10	B	I	15	
		SNGARBS2	20.000		2.65	53.000	1.40	0.600	4.31	B	I	15	0.725	3.73	B	I	0	1.30	0.600	2.65	B	I	15	
		SNAGRIS2	22.000		2.64	58.080	1.40	0.600	4.28	B	I	12	0.725	3.65	B	I	0	1.30	0.600	2.64	B	I	15	
		SNCOTTS3	27.250		1.56	42.510	1.40	0.600	2.53	B	I	15	0.725	2.34	B	I	0	1.30	0.600	1.56	B	I	15	
		SNAGGRS4	34.925		1.47	51.340	1.40	0.600	2.39	B	I	15	0.725	2.31	B	I	0	1.30	0.600	1.47	B	I	15	
		SNS5A	35.550		1.46	51.903	1.40	0.600	2.38	B	I	15	0.725	2.38	B	I	0	1.30	0.600	1.46	B	I	15	
		SNS6A	39.950		1.38	55.131	1.40	0.600	2.25	B	I	15	0.725	2.25	B	I	0	1.30	0.600	1.38	B	I	15	
		SNS7B	42.000	3	1.31	55.020	1.40	0.600	2.14	B	I	15	0.725	2.20	B	I	0	1.30	0.600	1.31	B	I	15	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.75	57.750	1.40	0.600	2.85	B	I	15	0.725	2.72	B	I	0	1.30	0.600	1.75	B	I	15	
		TNT4A	33.075		1.68	55.566	1.40	0.600	2.74	B	I	15	0.725	2.53	B	I	0	1.30	0.600	1.68	B	I	15	
		TNT6A	41.600		1.52	63.232	1.40	0.600	2.47	B	I	15	0.725	2.39	B	I	0	1.30	0.600	1.52	B	I	15	
		TNT7A	42.000		1.57	65.940	1.40	0.600	2.56	B	I	15	0.725	2.31	B	I	0	1.30	0.600	1.57	B	I	15	
		TNT7B	42.000		1.49	62.580	1.40	0.600	2.43	B	I	15	0.725	2.28	B	I	0	1.30	0.600	1.49	B	I	15	
		TNAGRIT4	43.000		1.51	64.930	1.40	0.600	2.46	B	I	15	0.725	2.20	B	I	0	1.30	0.600	1.51	B	I	15	
		TNAGT5A	45.000		1.48	66.600	1.40	0.600	2.41	B	I	15	0.725	2.30	B	I	0	1.30	0.600	1.48	B	I	15	
		TNAGT5B	45.000		1.40	63.000	1.40	0.600	2.27	B	I	15	0.725	2.06	B	I	0	1.30	0.600	1.40	B	I	15	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		1.56																			

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. 1" OF FUTURE WEARING SURFACE ASSUMED FOR RATING.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) ✱✱

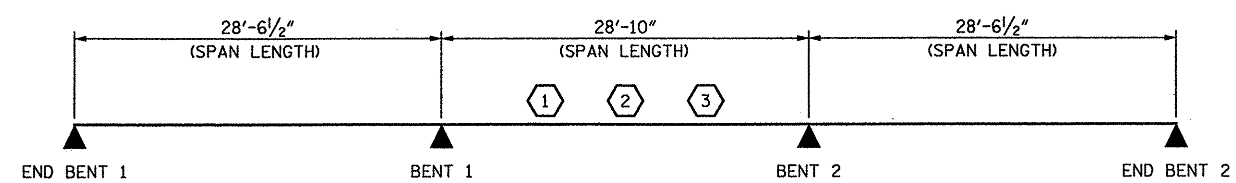
(2) DESIGN LOAD RATING (HS-20) ✱✱

(3) LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

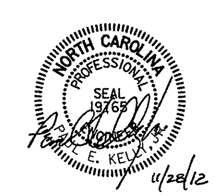


LRFR SUMMARY

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

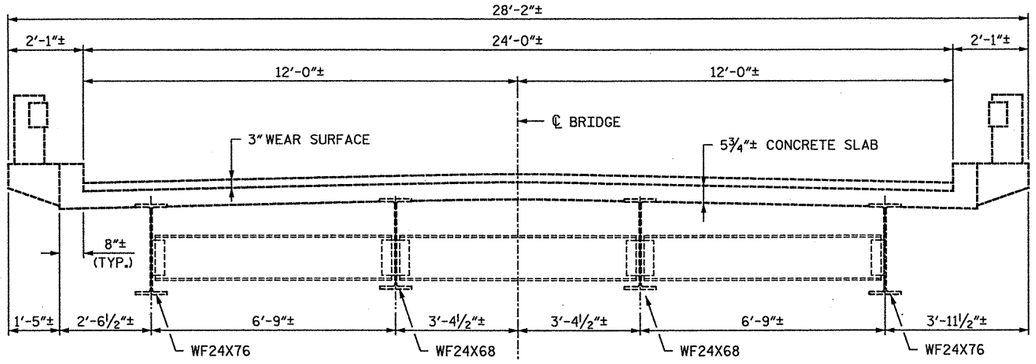
LRFR SUMMARY FOR STEEL GIRDERS (NON-INTERSTATE TRAFFIC)

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

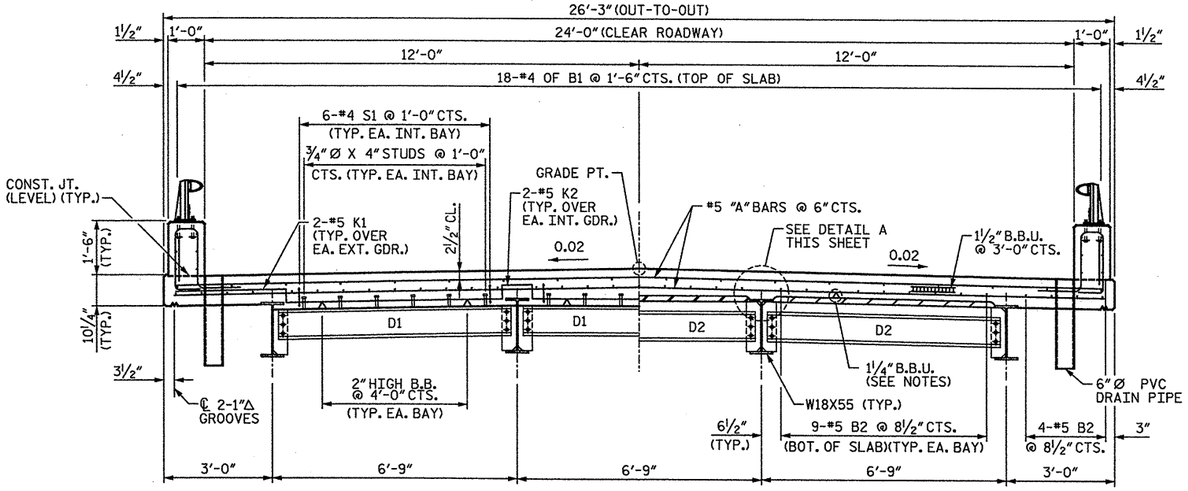
REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-27
1				3				TOTAL SHEETS 89
2				4				

DRAWN BY : AR DATE : 11-12
CHECKED BY : AC DATE : 11-12

STD. NO. LRFR3

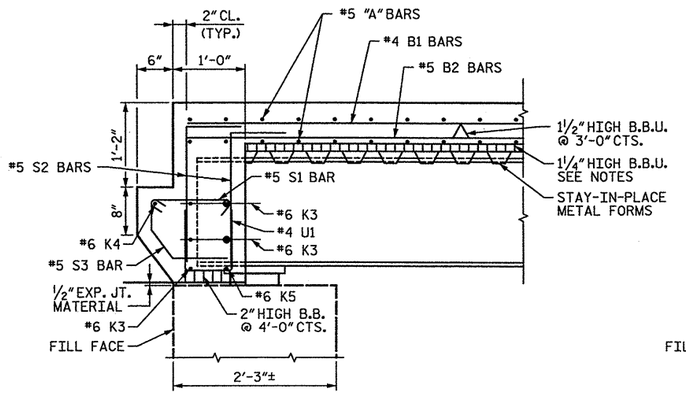


EXISTING SUPERSTRUCTURE SECTION



PARTIAL TYPICAL SECTION
SHOWING BENT DIAPHRAGMS

PARTIAL TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS



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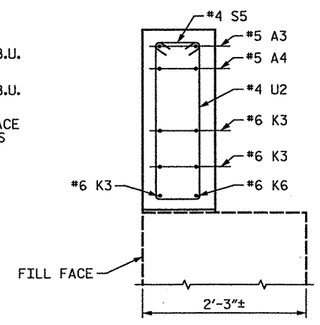

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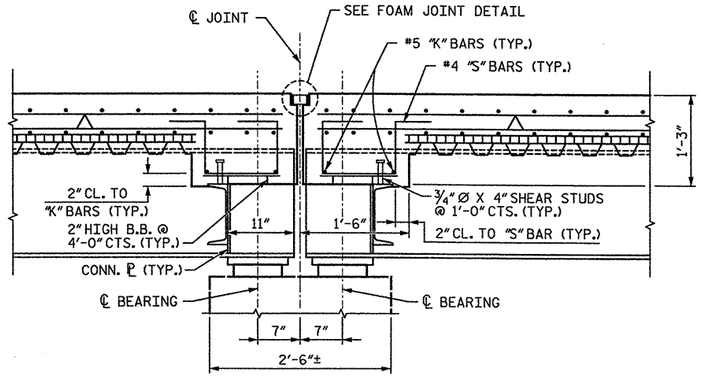

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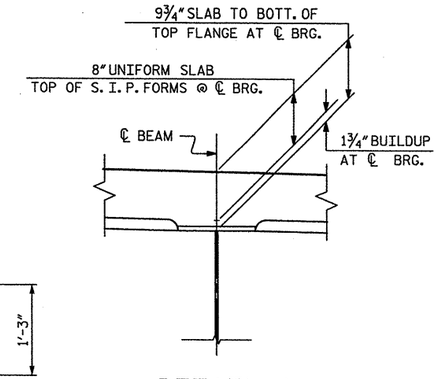


DETAIL A

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION AND DETAILS

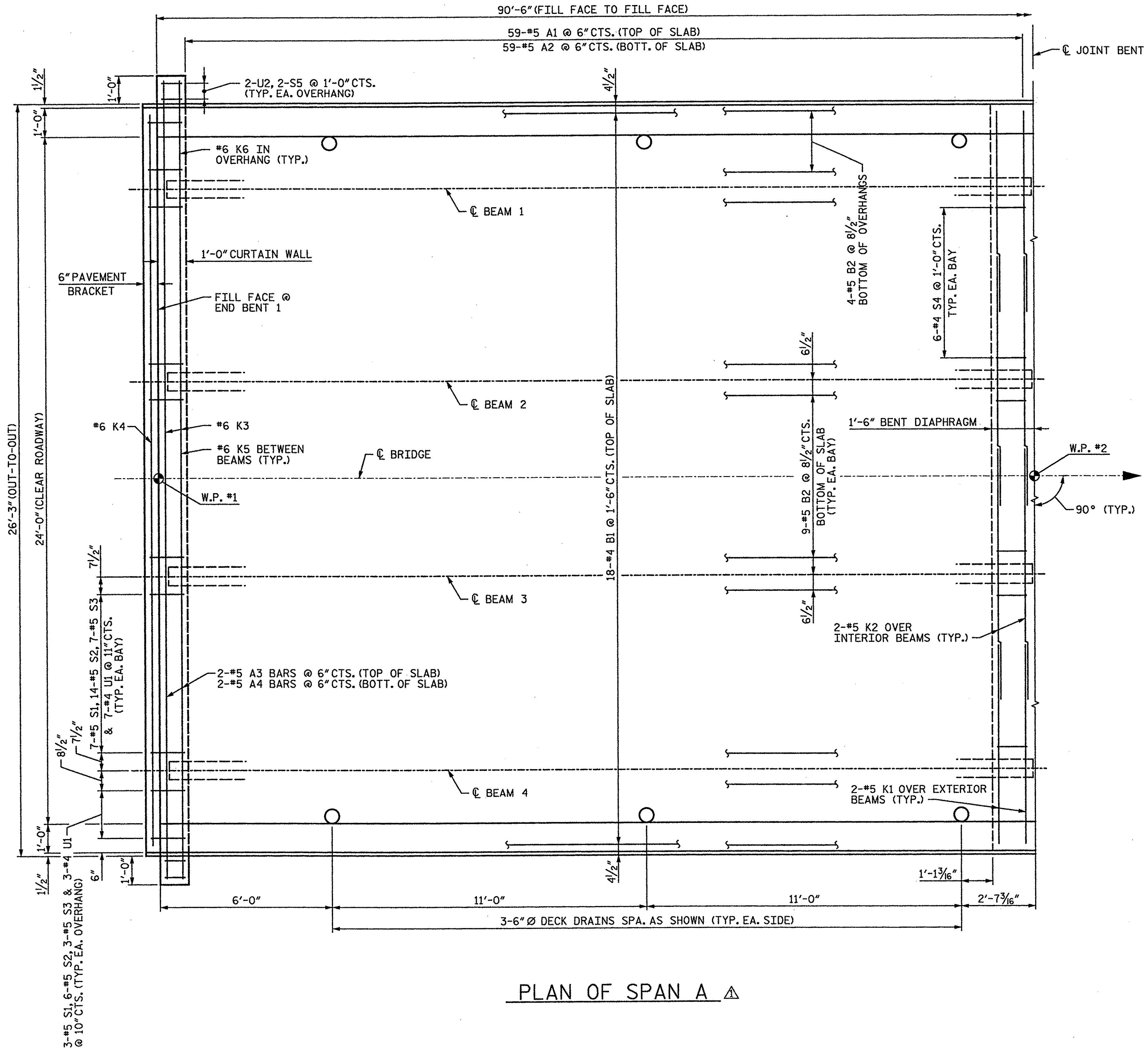
NORTH CAROLINA PROFESSIONAL SEAL 18765 ENGINEER Ralph E. Kelly, Jr.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. DETAIL

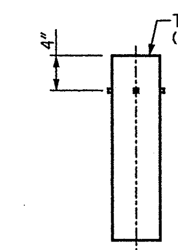
I:\Projects\2515384\2515384_0001\50_Deliverables & Submittals\TIBP-9.H.2\Structures\usta\Br 55 Davidson\03 pBR-055 Plans.dgn
wuvm
6/15/2012



PLAN OF SPAN A ⚠

NOTES:

1. TOP OF FLOOR DRAINS TO BE SET ⅜" BELOW SURFACE OF SLAB.
2. 4 - ½" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
3. THE 6" Ø PVC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.
4. COUPLING IN THE DRAIN PIPE SHALL BE PERMITTED AS APPROVED BY THE ENGINEER.
5. SET TO MATCH SLOPE OF TOP OF SLAB.



6" Ø PVC DECK DRAIN DETAIL

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
SPAN A

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	STV	6-12	3		
2			4		

SHEET NO. S-29
TOTAL SHEETS 89

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER

DRAWN BY: JWK DATE: 04-05
CHECKED BY: MR DATE: 04-05

⚠ REV. DETAIL

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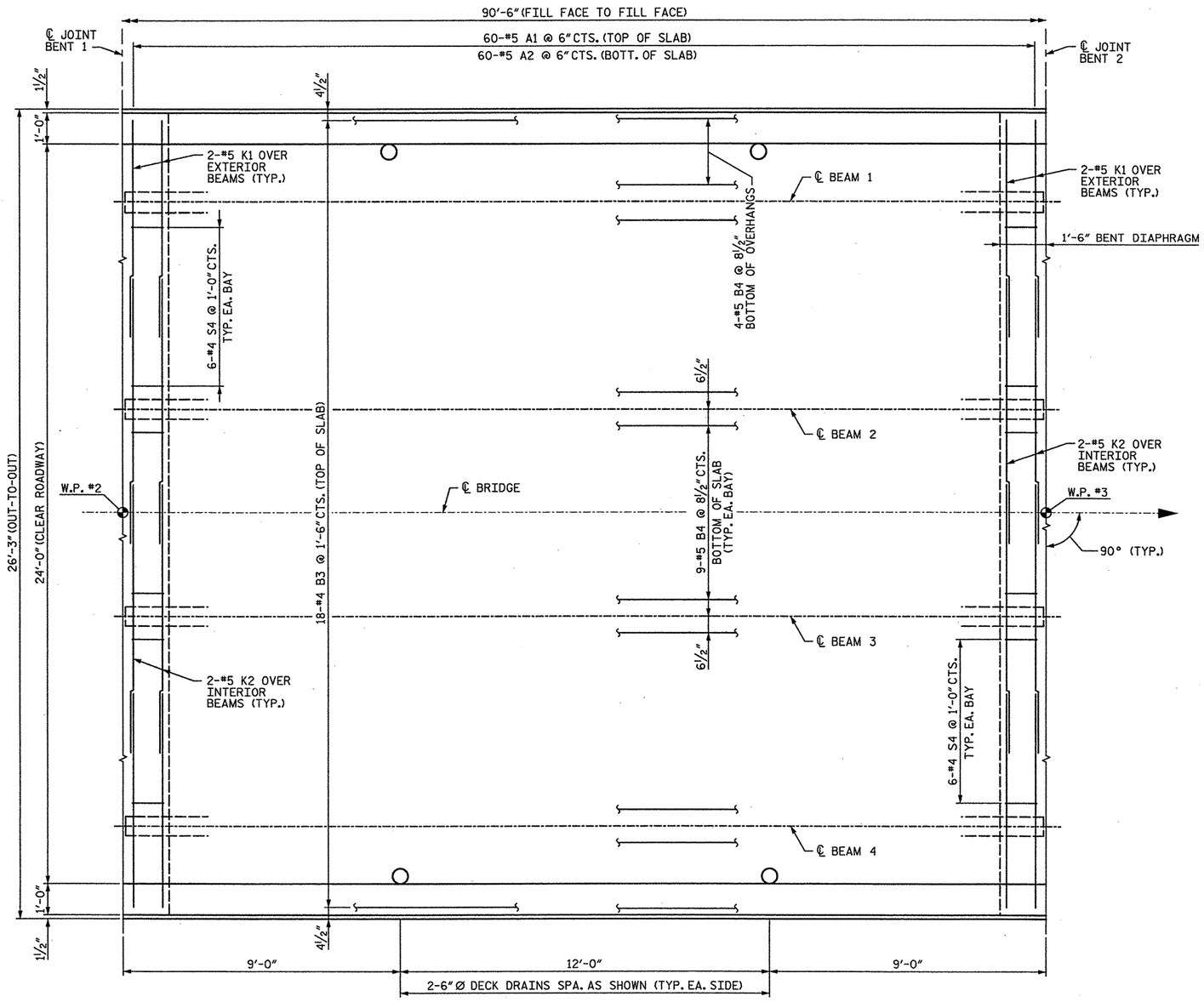
6/15/2012



PLAN OF SPAN B

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER PAUL E. KELLY, JR.
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-05
CHECKED BY : MR DATE : 04-05

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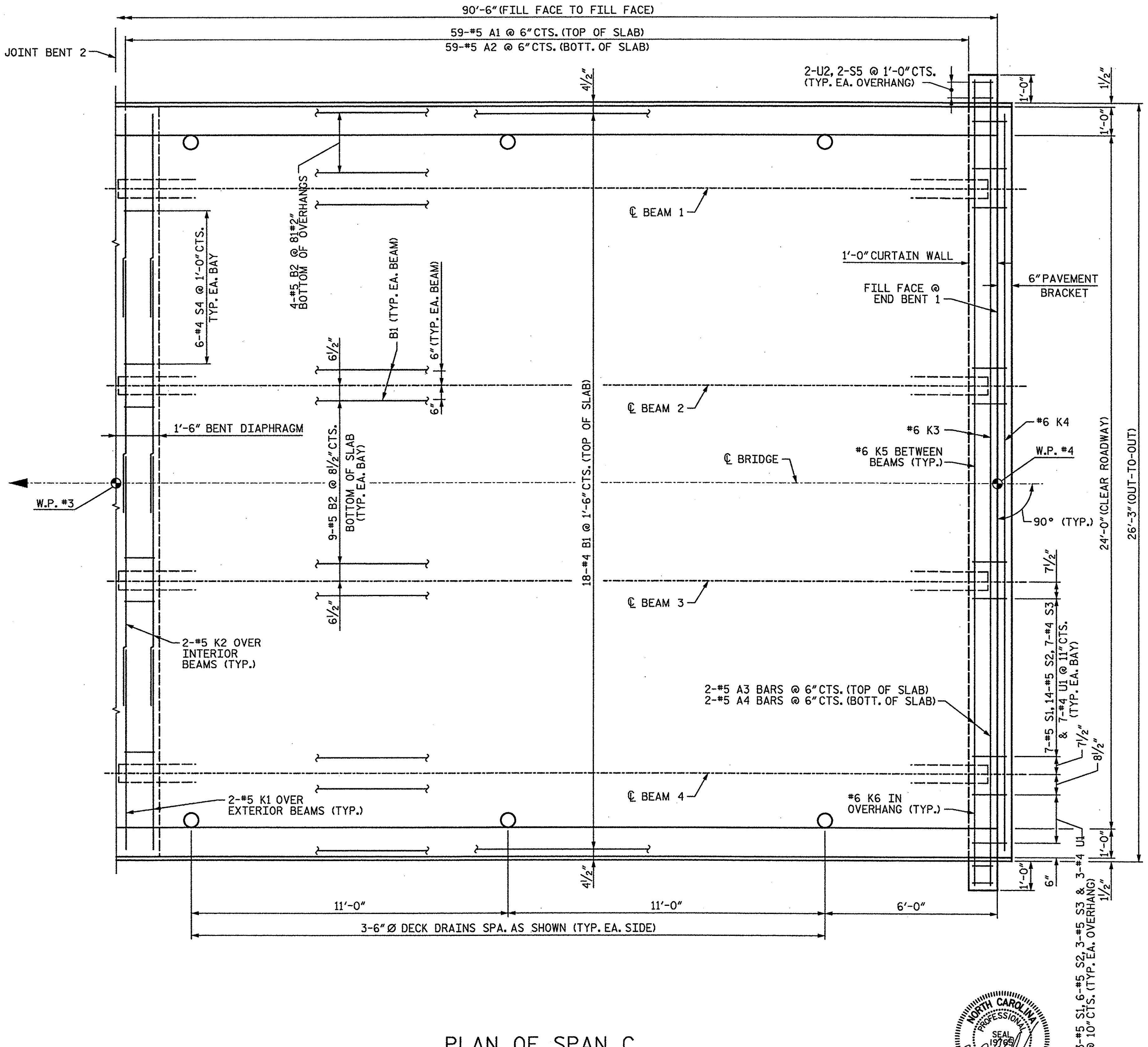
5/17/2012



PLAN OF SPAN C

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
SPAN C

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-31
1				3				TOTAL SHEETS
2				4				89

DRAWN BY : JWK DATE : 04-05
CHECKED BY : MR DATE : 04-05

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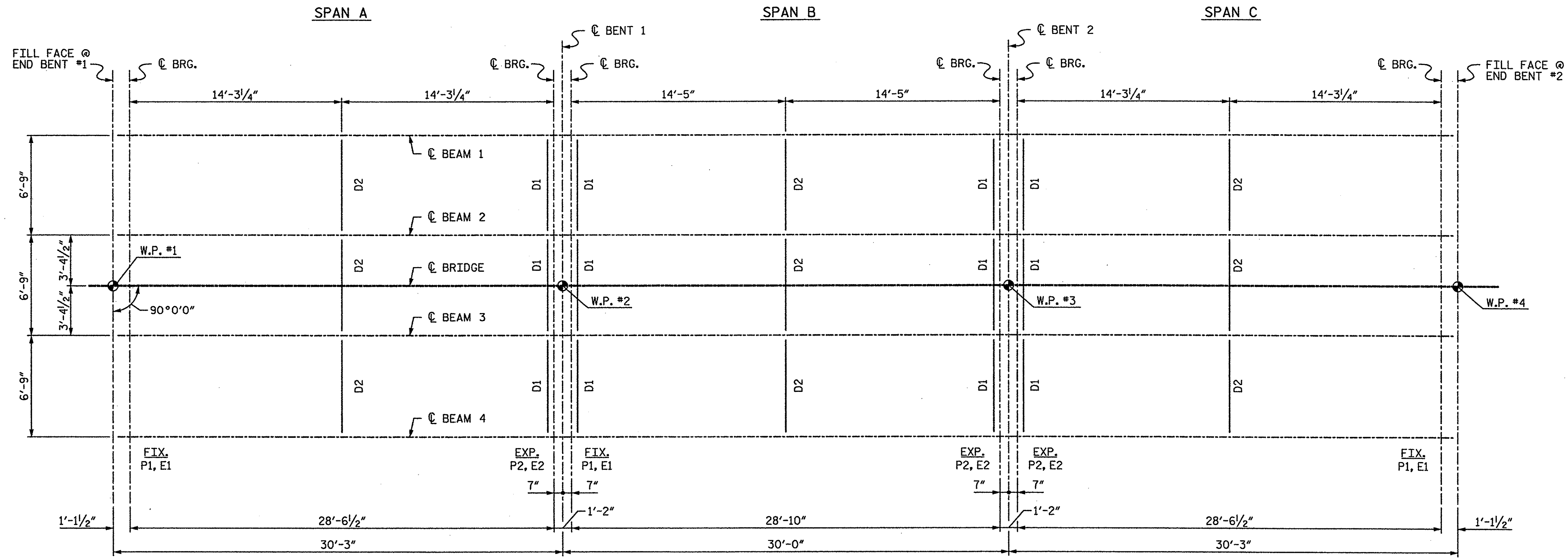
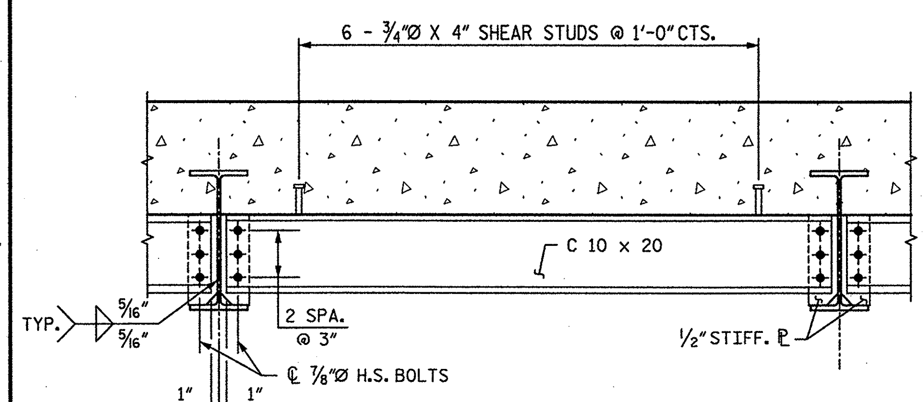
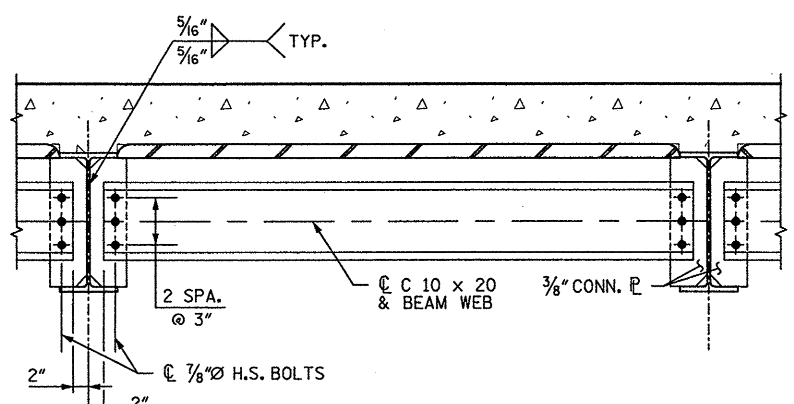


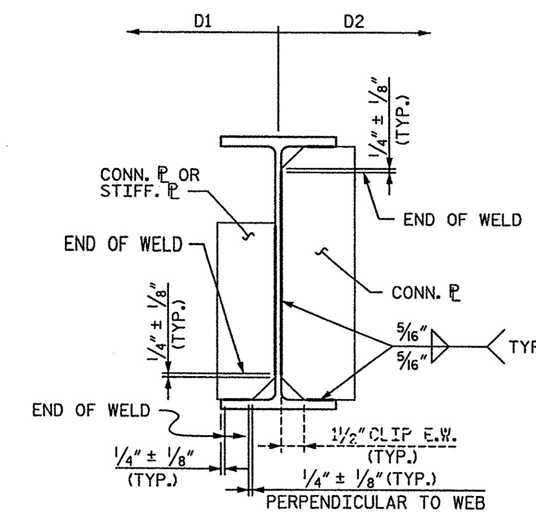
FRAMING PLAN



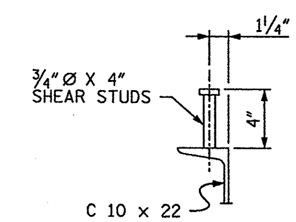
TYPICAL BENT DIAPHRAGM - D1 ⚠



TYPICAL INTERMEDIATE DIAPHRAGM - D2



TYPICAL CONNECTOR PLATE ⚠ CONNECTIONS



SHEAR STUD DETAIL
(ON CHANNEL)

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 055
REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER ... E. KELLY, JR.
6/15/12

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-32
1	STV	6-12	3					TOTAL SHEETS
2			4					89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. CONN. ℙ

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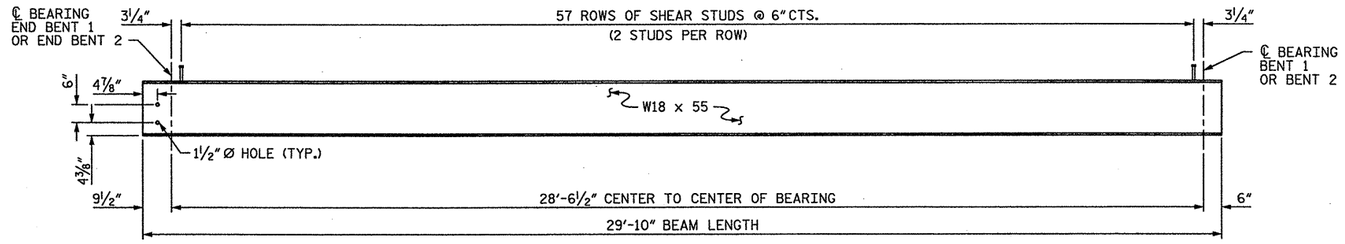
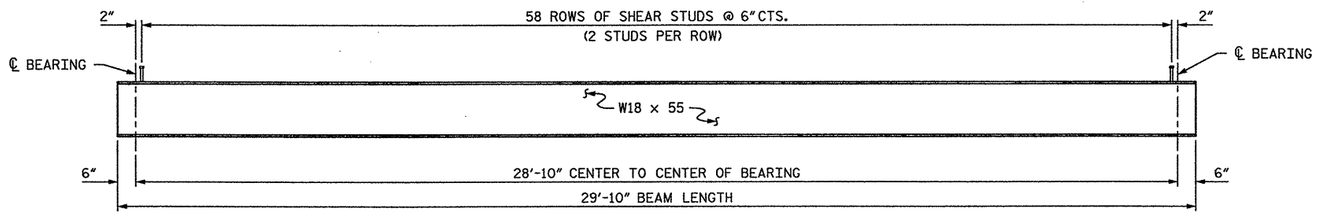
wuvm
6/15/2012



BEAM ELEVATION - SPANS A & C ⚠



BEAM ELEVATION - SPAN B ⚠

⚠ NOTES:

NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.

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.

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.

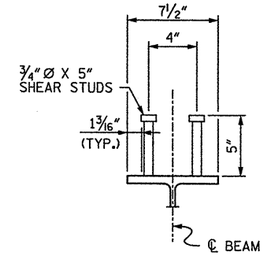
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

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 OR SMALLER.

STRUCTURAL STEEL QUANTITIES	
APPROXIMATE TOTAL	26,220 LBS



SHEAR STUD DETAIL
(ON BEAMS)

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER PAUL E. KELLY, JR.
6/15/12

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ DELETED STIFF., ADDED NOTES

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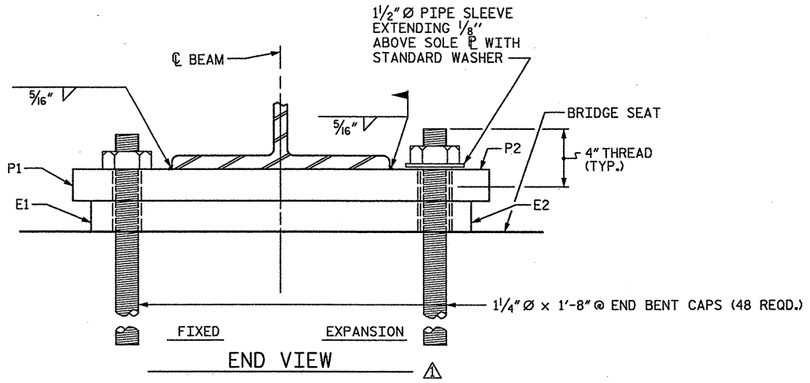
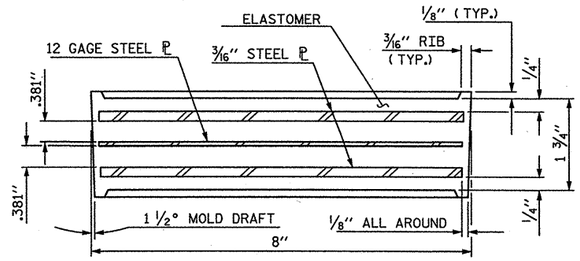
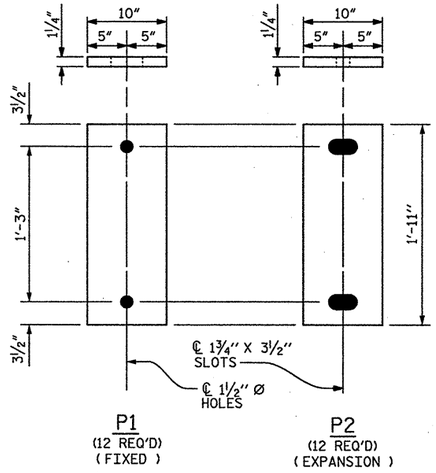
wuvm
6/15/2012



END VIEW ⚠



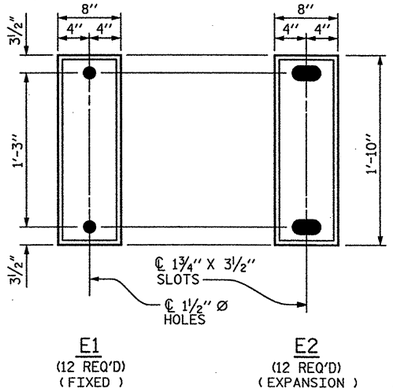
TYPICAL SECTION OF ELASTOMERIC BEARINGS



P1 (12 REQ'D) (FIXED)

P2 (12 REQ'D) (EXPANSION)

SOLE PLATE DETAILS ("P")



E1 (12 REQ'D) (FIXED)

E2 (12 REQ'D) (EXPANSION)

PLAN VIEW OF ELASTOMERIC BEARING

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 1½" 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 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.

EXTREME CARE MUST BE TAKEN WHILE PLACING THE ANCHOR BOLTS IN THE END BENT CAP TO AVOID DAMAGE TO THE EXISTING TIMBER PILES.

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS

LOAD RATING	
	MAX. D/L. + L.L.
TYPE I	91.3 K

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19768 ENGINEER T. C. KG

4/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. ANCHOR BOLT

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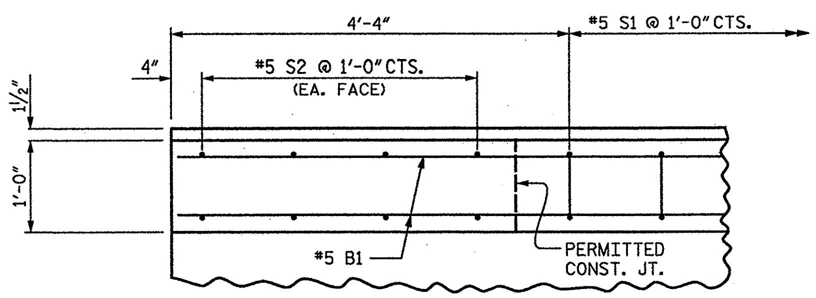
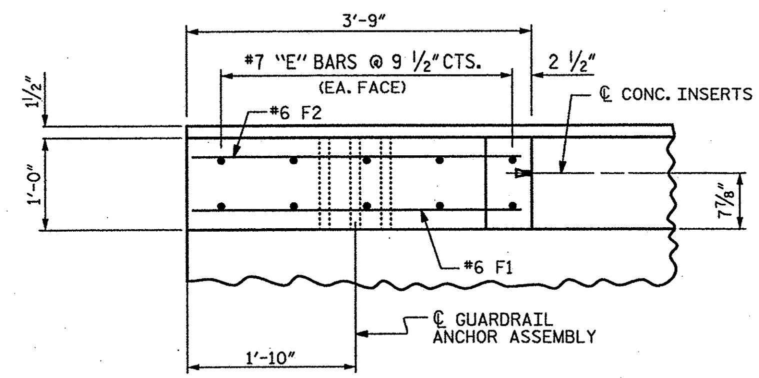
wuvm
6/15/2012



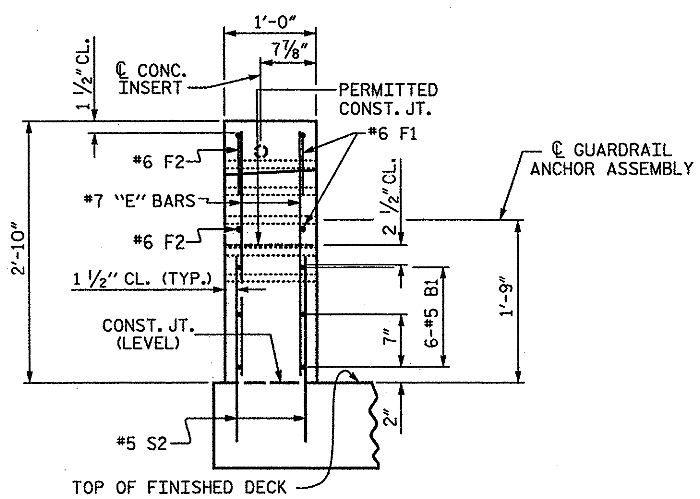
PLAN OF PARAPET



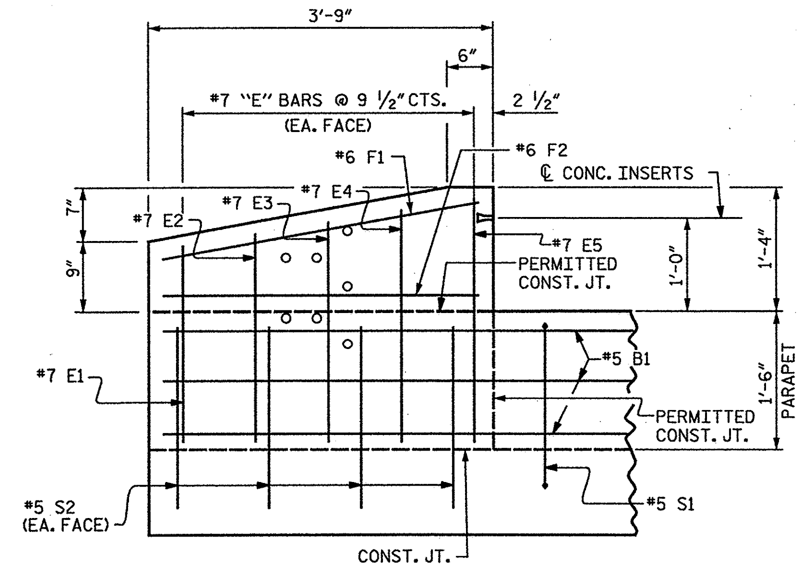
PLAN OF END POST

ONE BAR METAL RAIL					
BILL OF MATERIAL FOR PARAPET AND TWO END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	12	#5	STR	90'-2"	1129
✱E1	4	#7	STR	2'-0"	16
✱E2	4	#7	STR	2'-2"	18
✱E3	4	#7	STR	2'-4"	19
✱E4	4	#7	STR	2'-6"	20
✱E5	4	#7	STR	2'-7"	21
✱F1	4	#6	STR	6'-11"	42
✱F2	4	#6	STR	6'-11"	42
✱S1	166	#5	1	5'-0"	866
✱S2	16	#5	STR	2'-0"	33
✱EPOXY COATED REINFORCING STEEL				LBS.	2206
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	0.8

NOTE: ONLY CONCRETE QUANTITIES FOR END POST ARE SHOWN. SEE "CONCRETE PARAPET" SHEET FOR CONCRETE PARAPET QUANTITIES.



END VIEW



ELEVATION

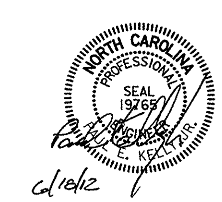
PARAPET AND END POST FOR ONE BAR RAIL

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PARAPET AND END POST DETAILS

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-35
1	STV	6-12		3				TOTAL SHEETS
2				4				89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

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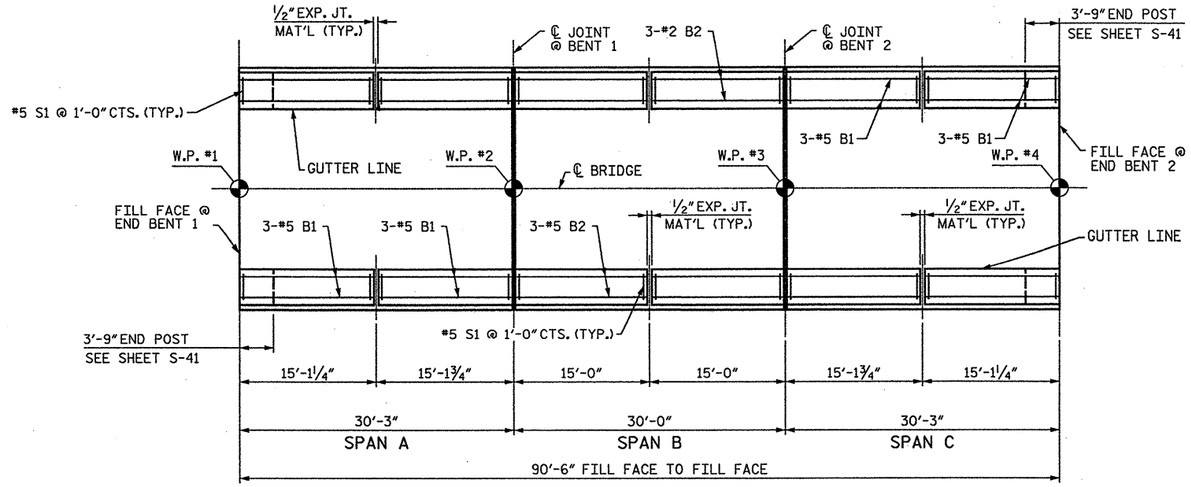
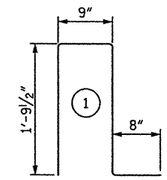
dveyac

6/18/2012



PLAN OF CONCRETE PARAPET

BAR TYPES

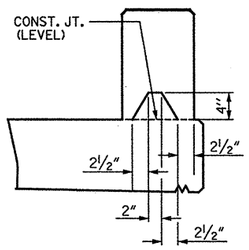


BILL OF MATERIAL

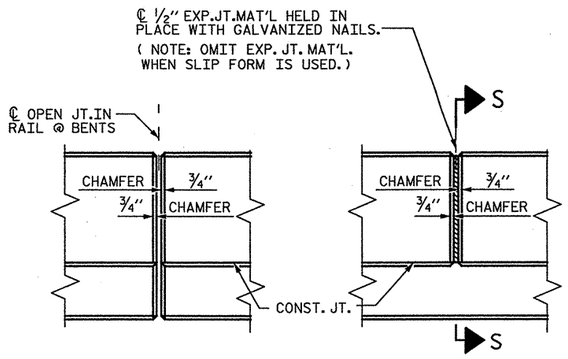
FOR CONCRETE PARAPET ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	48	#5	STR	14'-9"	739
✳B2	24	#5	STR	14'-7"	365
✳S1	192	#5	①	3'-5"	685

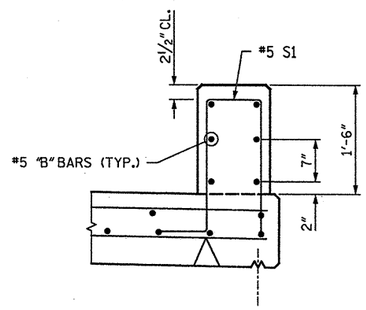
✳EPOXY COATED REINFORCING STEEL	LBS.	1,789
CLASS AA LIGHTWEIGHT CONCRETE	C. Y.	16.8
LIGHTWEIGHT CONCRETE PARAPET	L.F.	166.0



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



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

CONCRETE PARAPET DETAILS

NOTES:

THE CONCRETE PARAPET IN SPAN "A" SHALL NOT BE CAST UNTIL THE SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

CONCRETE PARAPET WILL BE SAND LIGHTWEIGHT CONCRETE.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

VERTICAL GROOVED CONTRACTION JOINTS, ½ IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. 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.

FOR END POST DETAILS, SEE SHEET S-43.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 55

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET

NORTH CAROLINA PROFESSIONAL SEAL 19766 ENGINEER T. C. KELLY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AFM DATE : 04-12
CHECKED BY : MR DATE : 04-12

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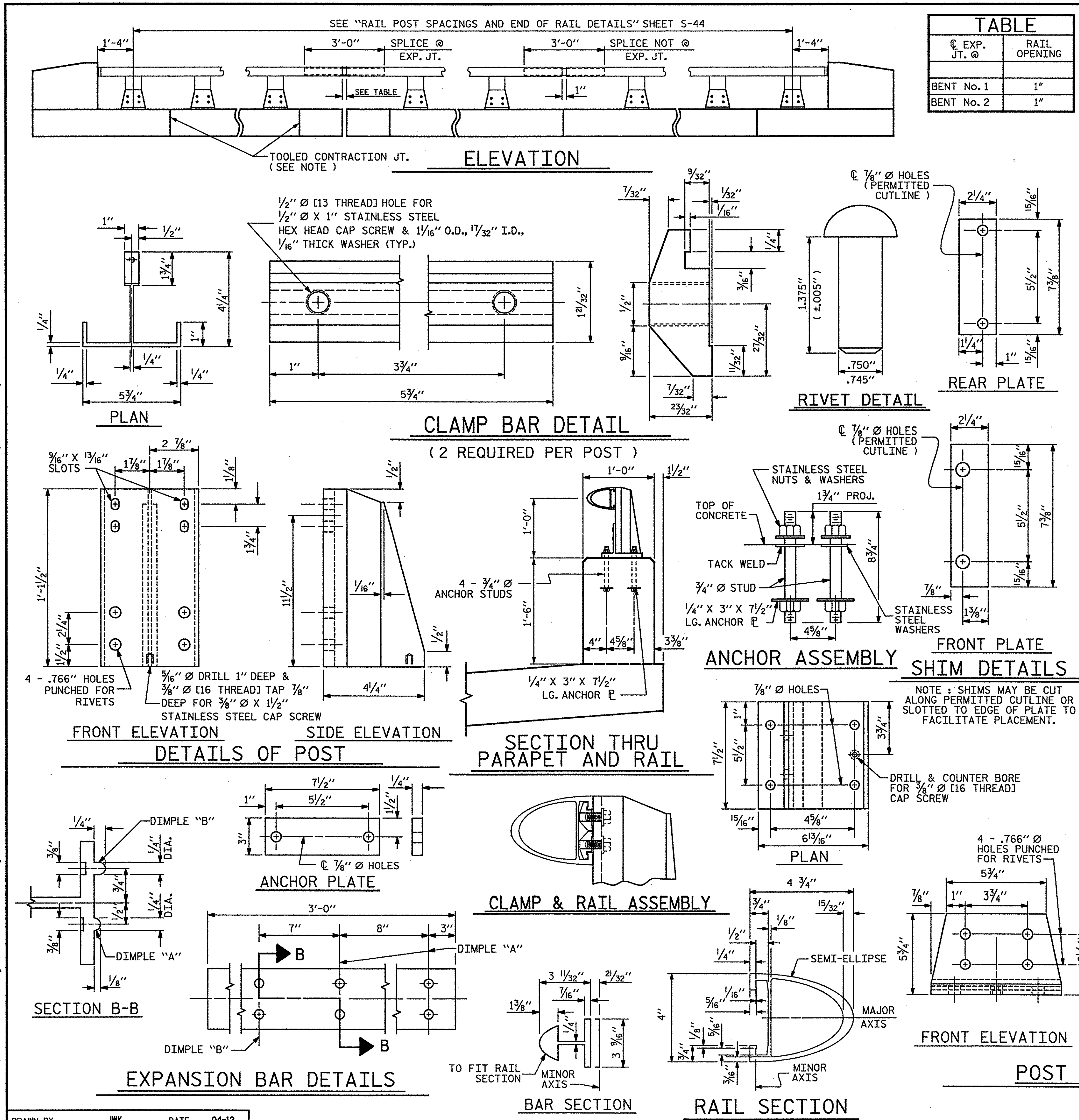
6/15/2012



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

NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

MATERIAL FOR ANCHOR STUDS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. STUDS TO BE EMBEDDED 7" IN CONCRETE. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK, CLASS 2B THREAD, AND MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ANCHOR ℙ SHALL BE AASHTO M270 GRADE 36.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL.

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

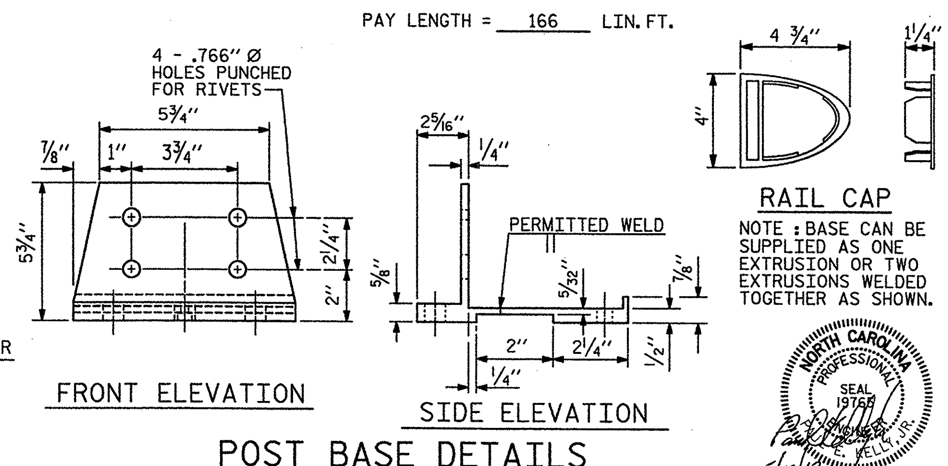
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS, NUTS AND WASHERS SHALL MEET THE SAME REQUIREMENTS AS THE ANCHOR STUDS, NUTS AND WASHERS FOR USE WITH THE ANCHOR ASSEMBLY.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 166 LIN. FT.



PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 055
REHAB. OF BRIDGE NO. 055 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
1 BAR METAL RAIL

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-37
1			3			TOTAL SHEETS	89
2			4				

STV / Ralph Whitehead Associates, Inc.
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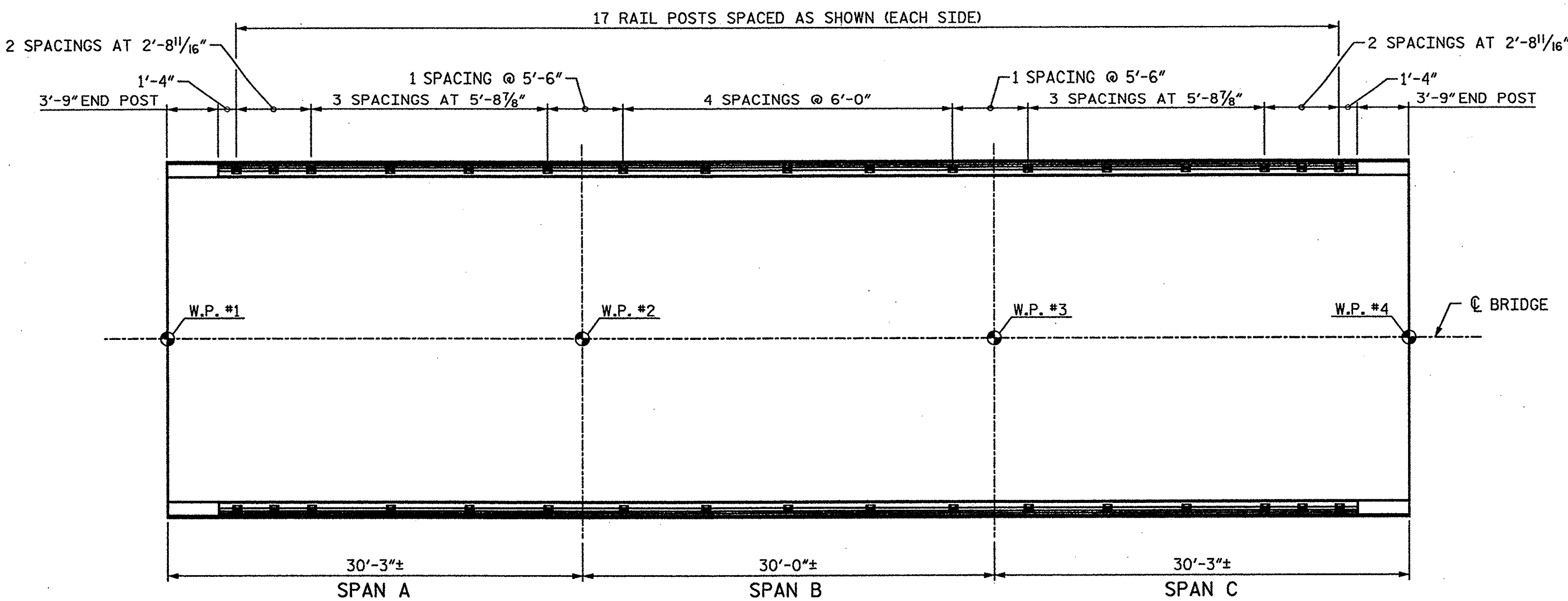
Charlotte, NC 28208
NC License No. F-0991

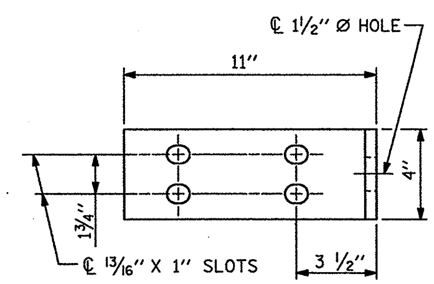
DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

STD. NO. BMR1

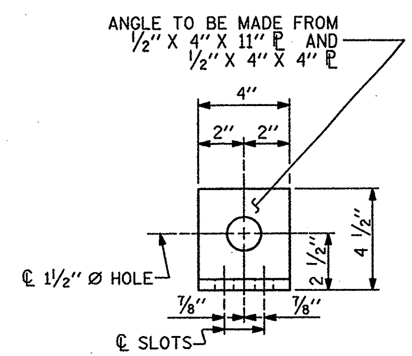
5/17/2012



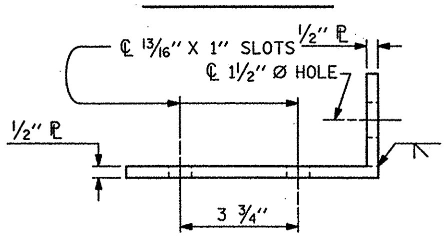
PLAN OF RAIL POST SPACINGS



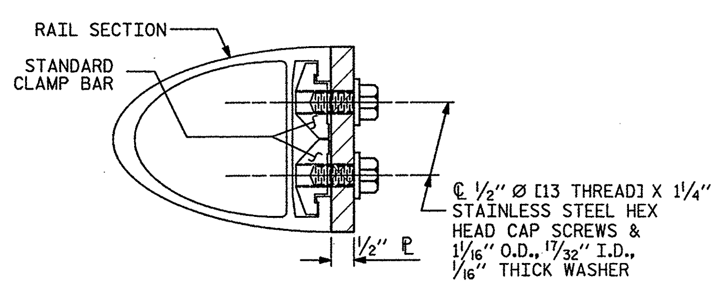
ELEVATION



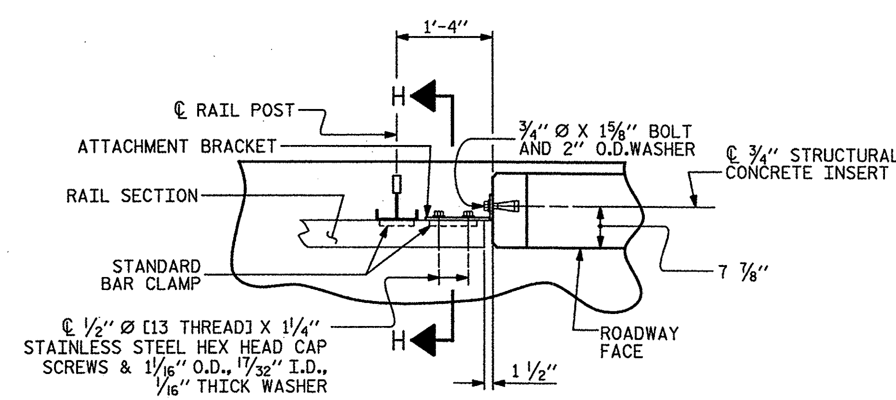
END VIEW (FIX AND EXP.)



TOP VIEW



SECTION H-H (FIX)



PLAN - RAIL AND END POST

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

NOTES

METAL RAIL TO END POST CONNECTION

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

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

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4"Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4"Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

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

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

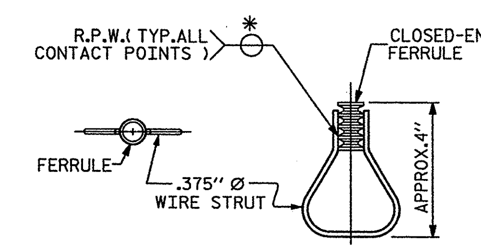
E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

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

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4"Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4"Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							SHEET NO.
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1			3				TOTAL SHEETS
2			4				89

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STD. NO. BMR2

5/17/2012

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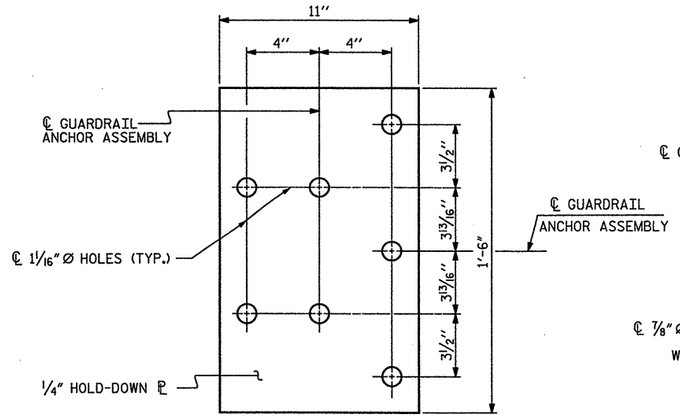
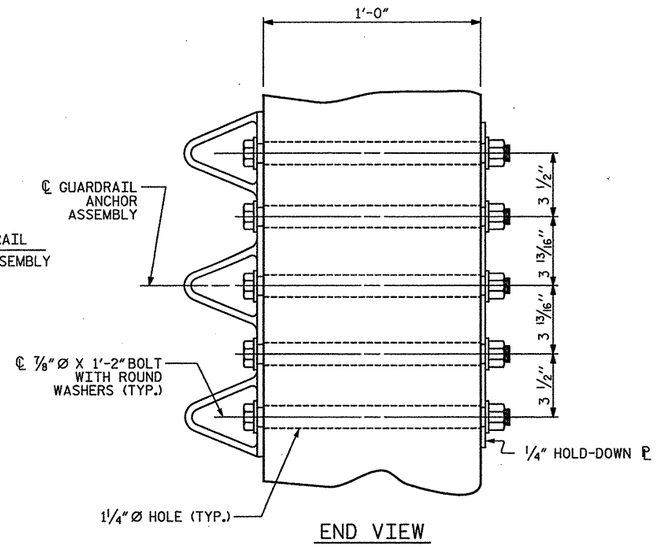


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

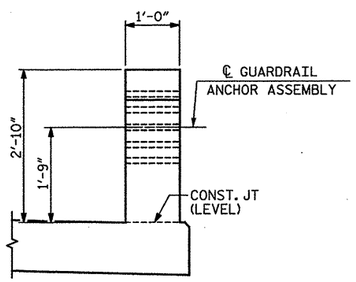
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

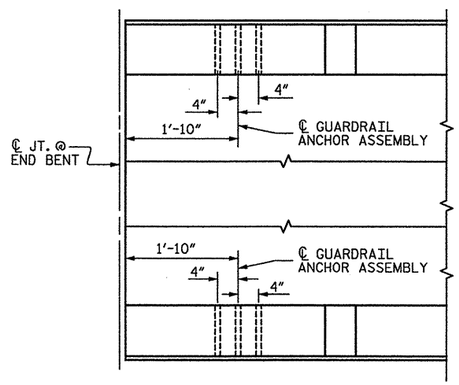
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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



END VIEW
(ONE BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL 37679 ENGINEER JAMES E. KELLY, JR.
5/17/12

STV / Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License No. F-0991

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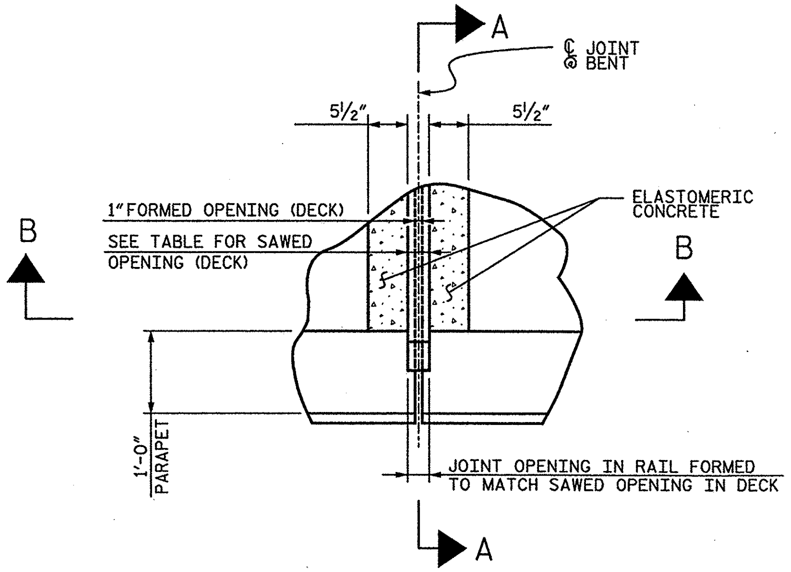
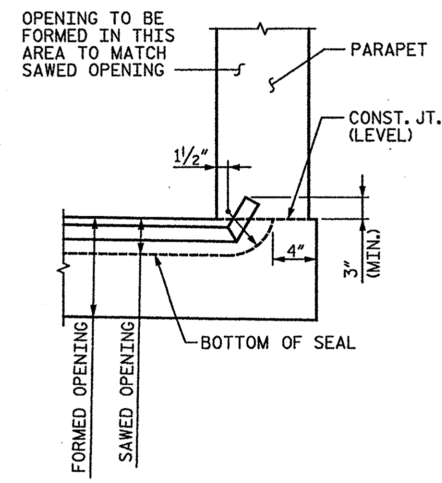
STD. NO. GRA3

NOTES:

1. SEE SPECIAL PROVISIONS FOR FOAM JOINT SEALS.
2. SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

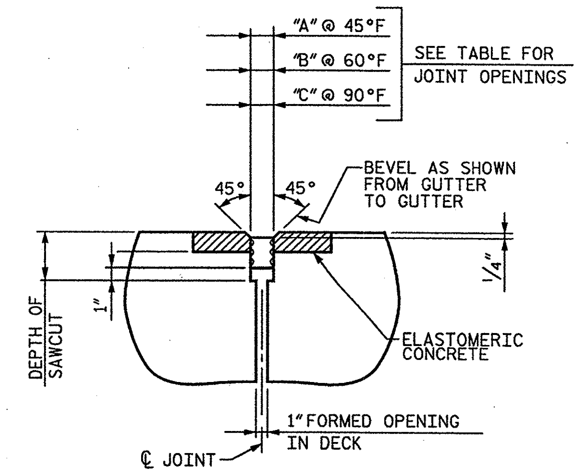


PLAN



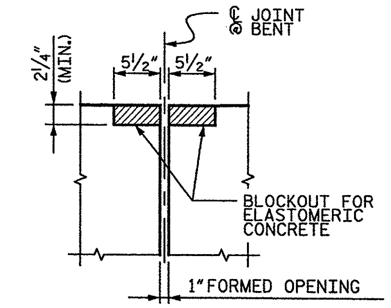
SECTION A-A

FOAM JOINT SEAL TO BE CUT, HEAT WELDED, AND TURNED UP AT A 60° ANGLE FROM THE BASE OF THE PARAPET.



SECTION B-B

FOAM JOINT SEAL



SECTION B-B

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENTIONS)

MOVEMENT AND SETTING AT FOAM JOINT						
BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY.)	PERPENDICULAR JOINT OPENING AT 45°F ("A")	PERPENDICULAR JOINT OPENING AT 60°F ("B")	PERPENDICULAR JOINT OPENING AT 90°F ("C")
B1	90°-00'-00"	2½"	5/16"	1 15/16"	1⅞"	1 13/16"
B2	90°-00'-00"	2½"	⅝"	1 15/16"	1⅞"	1 11/16"

BILL OF MATERIAL	
BENT NO.	ELASTOMERIC CONCRETE * (CU.FT.)
EB1	4.2
B1	4.2
B2	4.2
EB2	4.2

BASED ON MINIMUM BLOCKOUT SHOWN.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

JOINT SEAL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19769 ... E. KELLY, JR.
5/17/12

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Charlotte, NC 28208
NC License No. F-0991

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alveyco
5/17/2012

BILL OF MATERIAL

SPAN A OR C

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	59	#5	STR	25′-11″	1596
A2	59	#5	STR	25′-11″	1596
✱A3	2	#5	STR	27′-11″	58
A4	2	#5	STR	27′-11″	58
✱B1	18	#4	STR	30′-2″	363
B2	35	#5	STR	30′-2″	1101
✱K1	4	#5	①	7′-11″	33
✱K2	4	#5	②	10′-1″	42
K3	5	#6	STR	27′-11″	210
K4	1	#6	STR	25′-11″	39
K5	3	#6	STR	5′-8″	26
K6	2	#6	STR	2′-11″	9
✱S1	27	#5	③	1′-7″	45
S2	54	#5	④	2′-8″	150
✱S3	27	#5	⑤	1′-9″	49
✱S4	18	#4	⑥	3′-5″	41
✱S5	4	#4	⑦	1′-1″	3
U1	27	#4	⑧	2′-4″	42
U2	4	#4	⑨	5′-5″	14

REINFORCING STEEL 3245 LBS.
✱EPOXY COATED REINF. STEEL 2230 LBS.
CLASS AA LIGHTWEIGHT CONCRETE 19.6 CU. YDS.

SPAN B

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	60	#5	STR	25′-11″	1622
A2	60	#5	STR	25′-11″	1622
✱B3	18	#4	STR	29′-7″	356
B4	35	#5	STR	29′-7″	1080
✱K1	8	#5	①	7′-11″	66
✱K2	8	#5	②	10′-1″	84
✱S1	36	#4	⑥	3′-5″	82

REINFORCING STEEL 2702 LBS.
✱EPOXY COATED REINF. STEEL 2210 LBS.
CLASS AA LIGHTWEIGHT CONCRETE 19.5 CU. YDS.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA LIGHTWEIGHT CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN A		3245	2230
POUR 1	19.6		
SPAN B		2702	2210
POUR 1	19.5		
SPAN C		3245	2230
POUR 1	19.6		
TOTALS✱✱	58.7	9192	6670

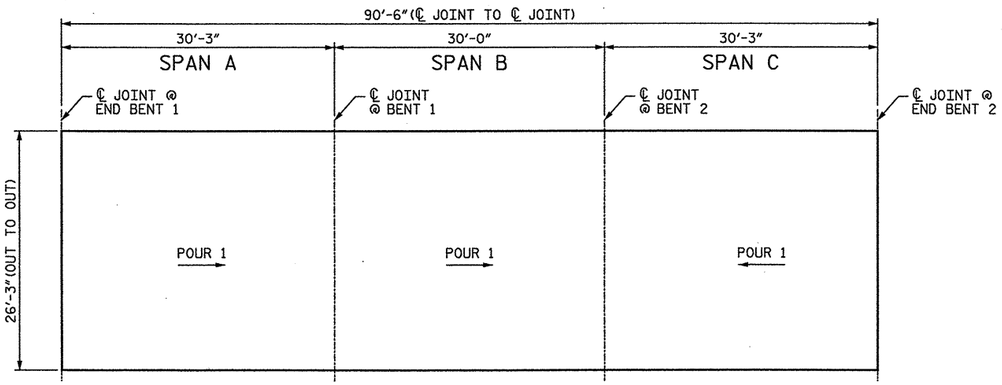
✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

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″			

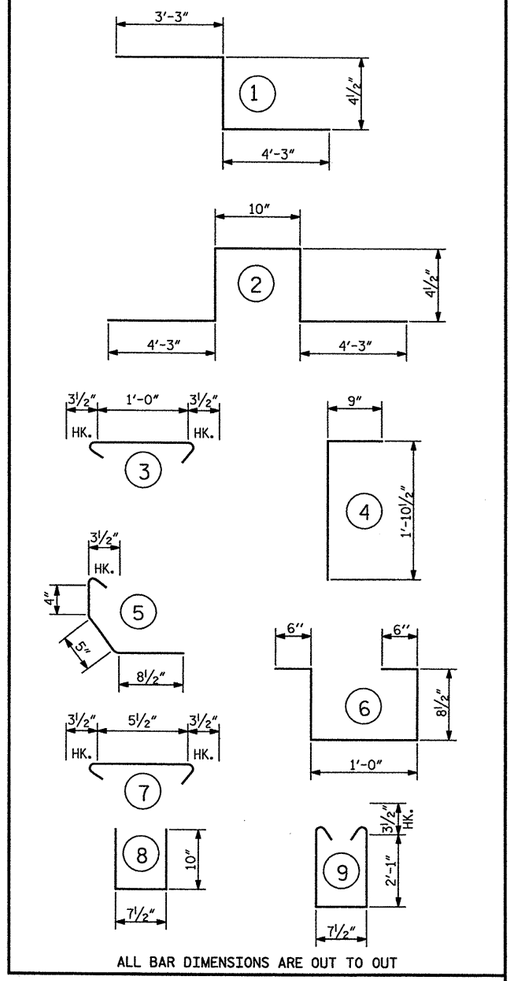
GROOVING BRIDGE FLOORS

APPROACH SLABS	616 SQ.FT.
BRIDGE DECK	1,890 SQ.FT.
TOTAL	2,506 SQ.FT.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 2,376)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 055
REHAB. OF BRIDGE NO. 055

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER A. E. KEAR
5/7/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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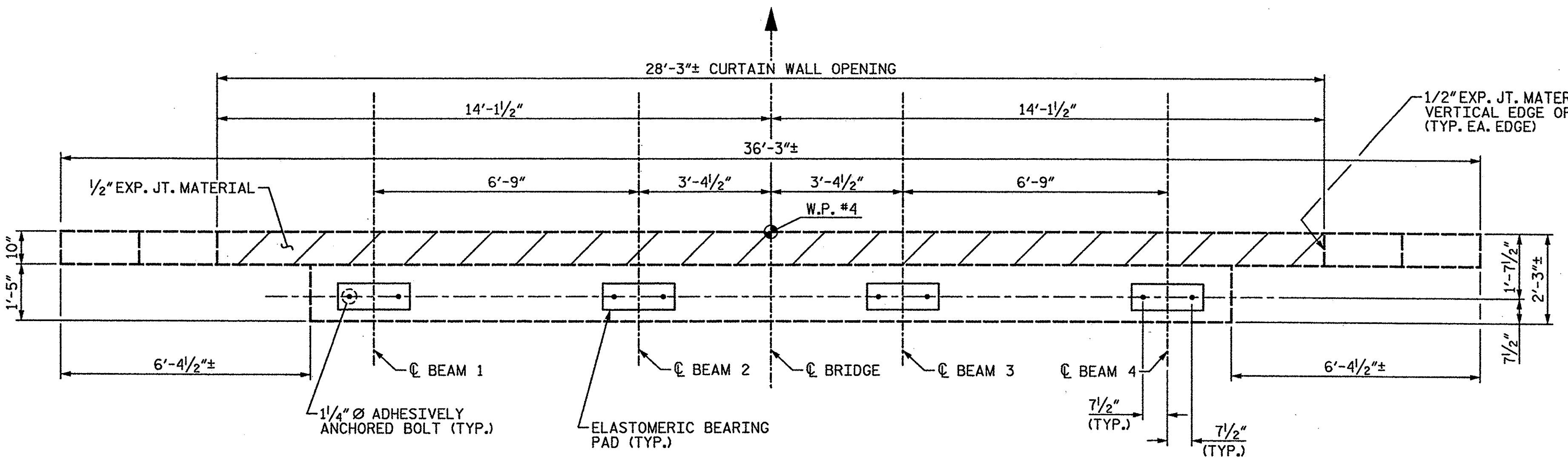


PLAN OF END BENT 2 ⚠

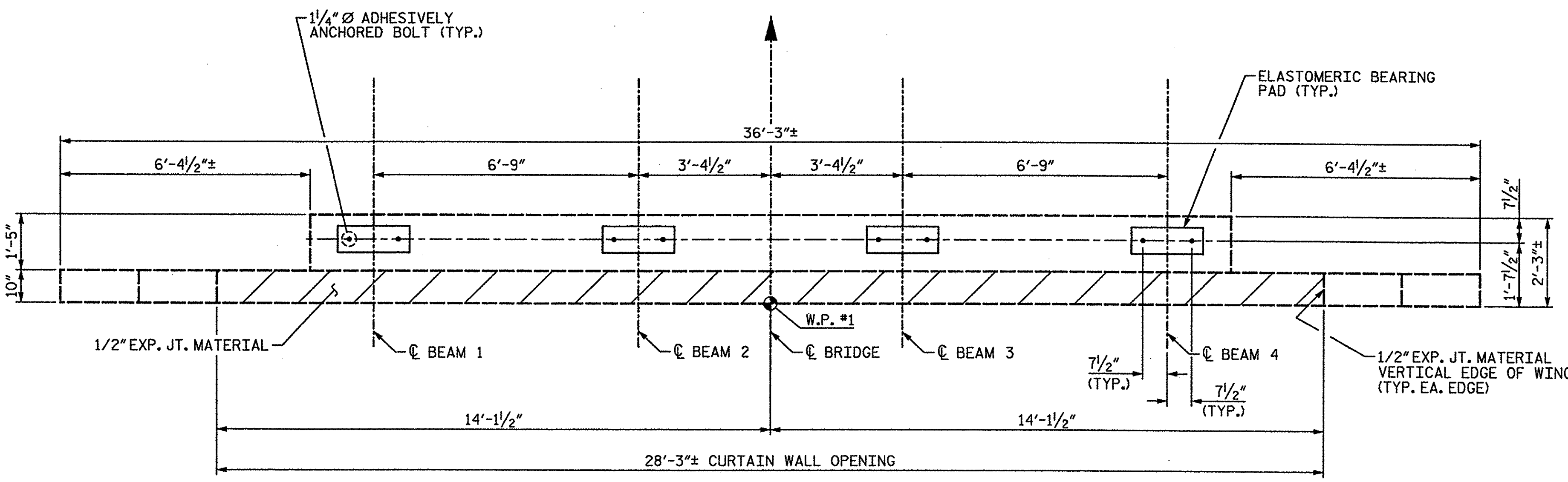
⚠ NOTES

EXISTING ANCHOR BOLTS WILL BE CUT AND GROUND FLUSH WITH TOP OF CAP.

ADHESIVE ANCHOR BOLTS FOR BENT AND END BENT CAPS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH A SAFE WORKING LOAD OF 20 KIPS TENSION AND 12 KIPS SHEAR.

REMOVAL OF EXISTING ANCHOR BOLTS, INSTALLATION OF PROPOSED ADHESIVELY ANCHORED BOLTS, AND ALL WORK, MATERIAL AND EQUIPMENT NECESSARY TO COMPLETE THE ACCEPTED WORK, SHALL BE CONSIDERED INCIDENTAL TO THE STRUCTURAL STEEL INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

APPLY AN EPOXY PROTECTIVE COATING TO TOP SURFACES OF BENT AND END BENT CAPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. PRIOR TO APPLICATION THE CAPS SHALL BE THOROUGHLY CLEANED BY POWER WASHING. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.



PLAN OF END BENT 1 ⚠

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN END BENTS 1 & 2

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER
6/15/12

STV/Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License No. F-0991

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NO.	BY:	DATE:	NO.	BY:	DATE:		S-42
1	STV	6-12	3				TOTAL SHEETS
2			4				89

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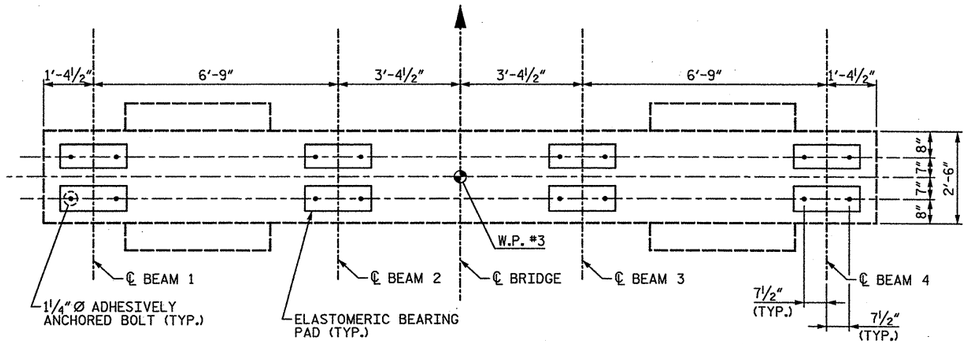
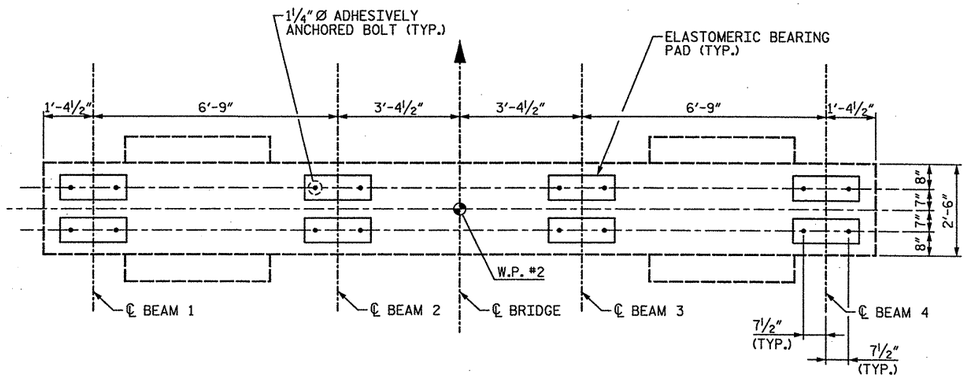
⚠ NOTES

SEE BEARING LOCATION PLANS SHEET 1 OF 2 FOR NOTES.



PLAN OF BENT 2 ⚠



PLAN OF BENT 1 ⚠

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN BENTS 1 & 2

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER JOSEPH E. KELLY, JR.

6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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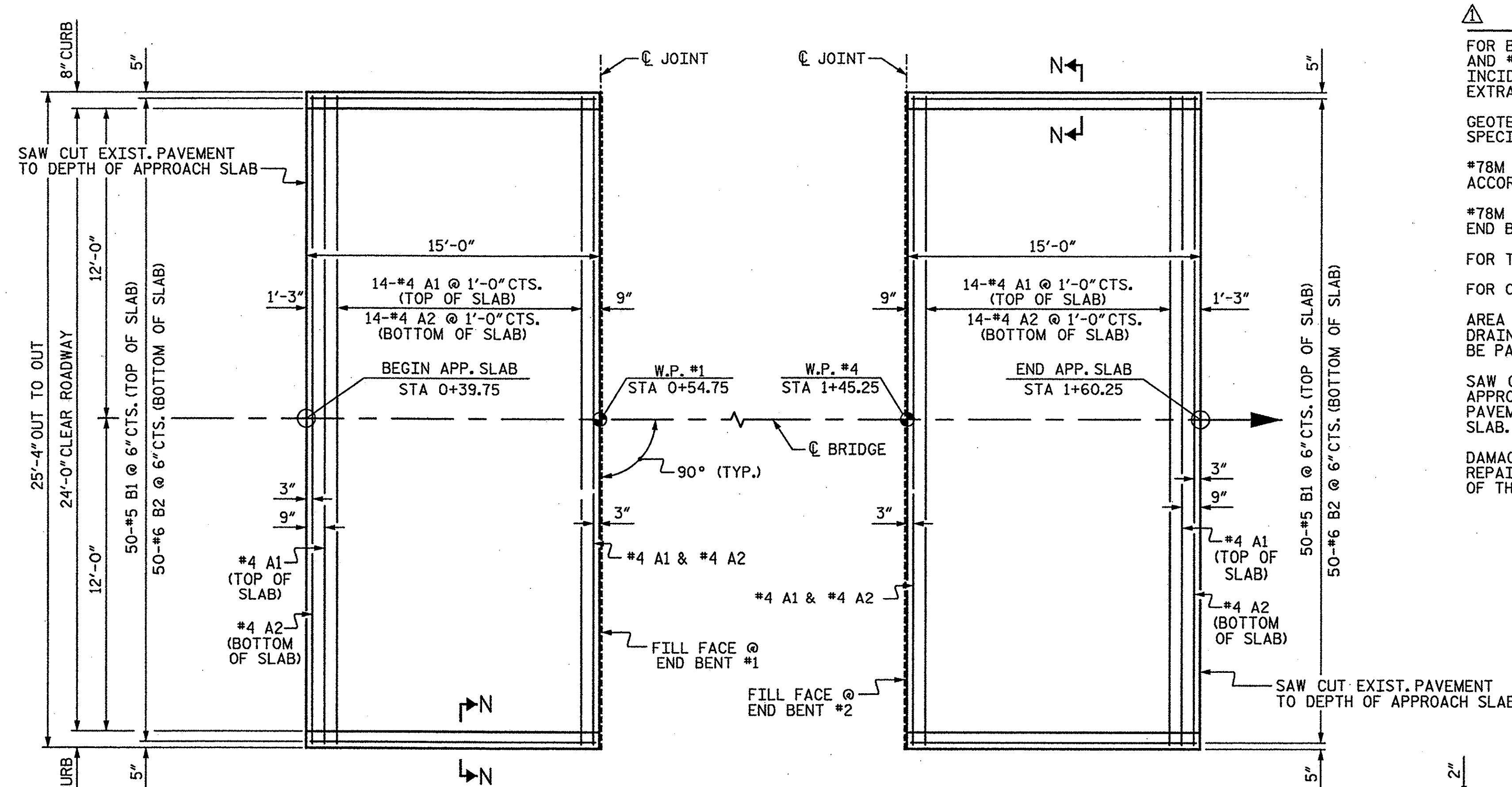


⚠ PLAN @ END BENT #1

PLAN @ END BENT #2 ⚠

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

⚠ NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4"Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, AND OUTLET PADS SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE BRIDGE APPROACH SLAB. NO EXTRA MEASUREMENT OR PAYMENT WILL BE MADE.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF END BENT FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

FOR OUTLET PAD SEE ROADWAY STANDARD DRAWING 815.03.

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

SAW CUT THE EXISTING PAVEMENT ALONG THE EDGE OF THE PROPOSED APPROACH SLAB AS SHOWN IN THE PLAN DETAILS. DEMOLISH AND EXCAVATE PAVEMENT AND SUBGRADE SOIL TO THE FULL DEPTH OF THE APPROACH SLAB.

DAMAGED PAVEMENT ALONG THE EDGE OF APPROACH SLAB SHALL BE REPAIRED TO PROVIDE A SMOOTH RIDING SURFACE TO THE SATISFACTION OF THE ENGINEER.

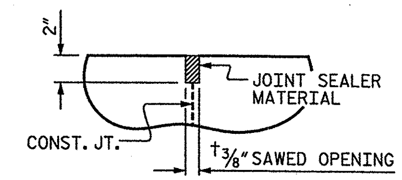
BILL OF MATERIAL

APPROACH SLAB AT EB #1

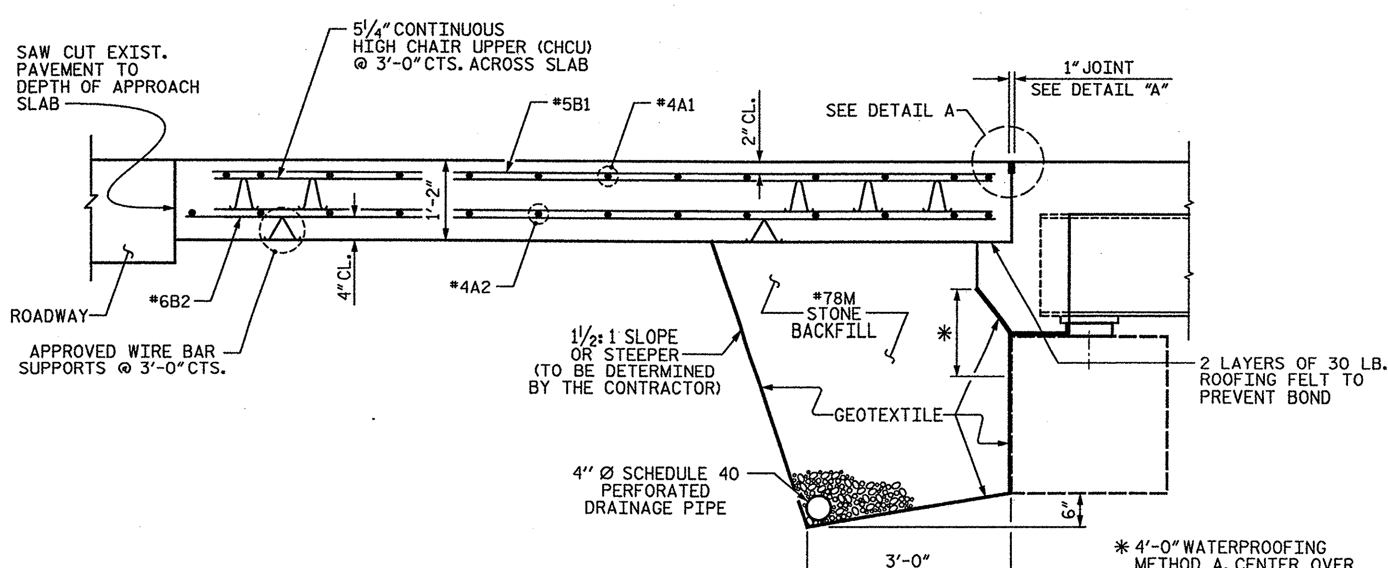
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	14	#4	STR	25'-0"	234
A2	14	#4	STR	25'-0"	234
*B1	50	#5	STR	14'-6"	756
B2	50	#6	STR	14'-6"	1089
REINFORCING STEEL				LBS.	1323
*EPOXY COATED REINFORCING STEEL				LBS.	990
CLASS AA CONCRETE				C.Y.	16.3

APPROACH SLAB AT EB #2

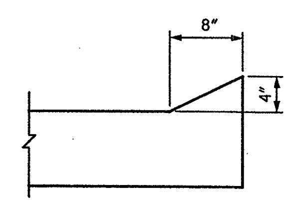
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A	14	#4	STR	25'-0"	234
A2	14	#4	STR	25'-0"	234
*B	50	#5	STR	14'-6"	756
B2	50	#6	STR	14'-6"	1089
REINFORCING STEEL				LBS.	1323
*EPOXY COATED REINFORCING STEEL				LBS.	990
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	16.3



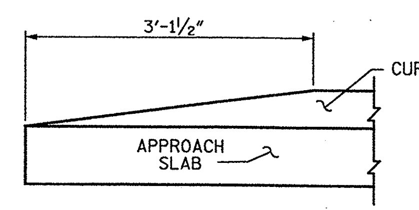
DETAIL "A"



SECTION THRU SLAB ⚠



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

SPLICE LENGTHS

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

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 1 OF 2

STATE OF NORTH CAROLINA
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RALEIGH

BRIDGE APPROACH SLAB PLAN & SECTION

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KELLY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1	STV	6-12	3			TOTAL SHEETS	89
2			4				

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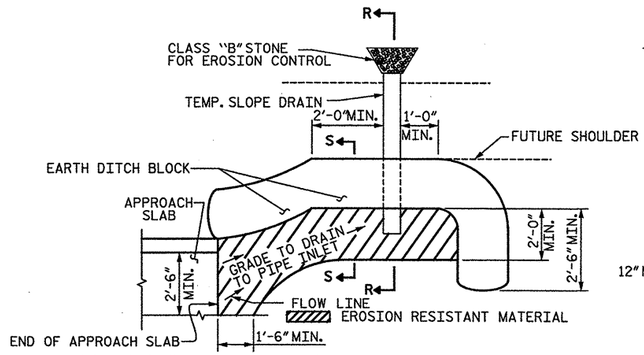
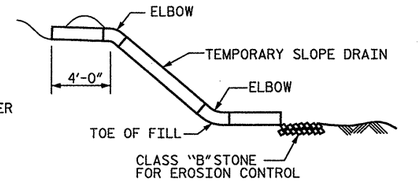
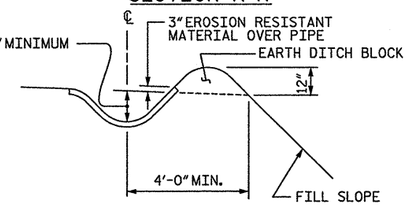


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



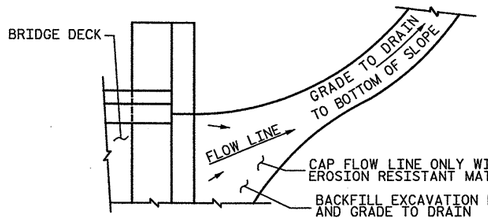
SECTION R-R



SECTION S-S

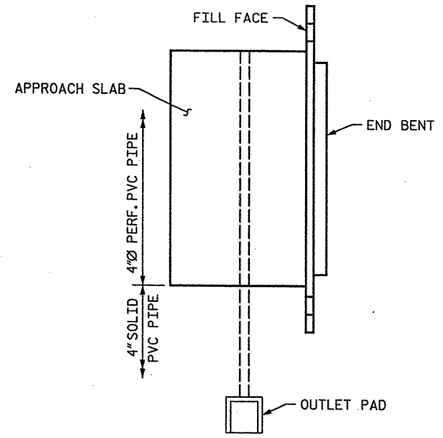
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

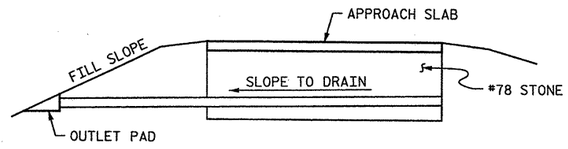


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



PIPE DRAIN AND OUTLET PLAN



PIPE DRAIN AND OUTLET ELEVATION

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 055

REHAB. OF BRIDGE NO. 055 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19768 ENGINEER WILLIAM E. KEALY

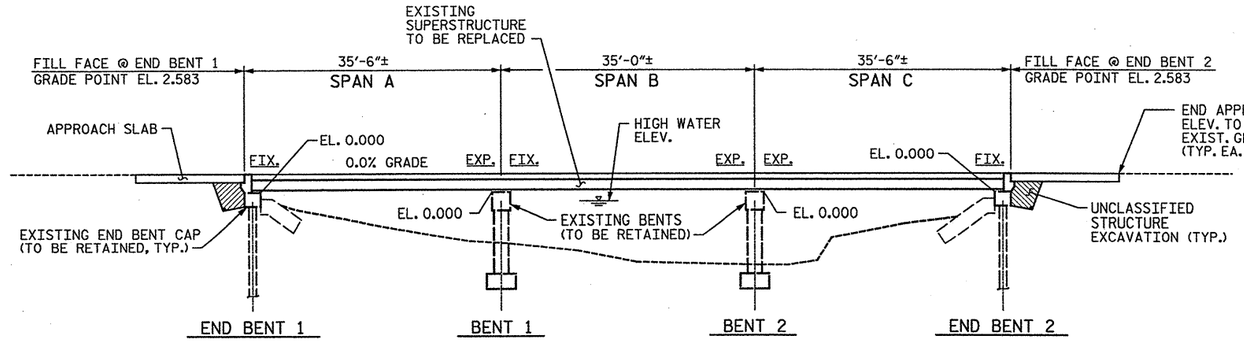
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

5/17/2012 dveyac I:\Projects\2515384\2515384.000\S0_Deliverables & Submittals\TBP.9.H.2\Structures\usr\Br-55 Davidson\17 pBR-055 Plans.dgn



SECTION ALONG ℄ BRIDGE ⚠

NOTE: BRIDGE BARRIER DETAILS ARE NOT SHOWN FOR CLARITY
(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)

NOTES:

ALL EXISTING STATIONS AND ELEVATIONS ARE AS PER THE AS-BUILT PLANS.

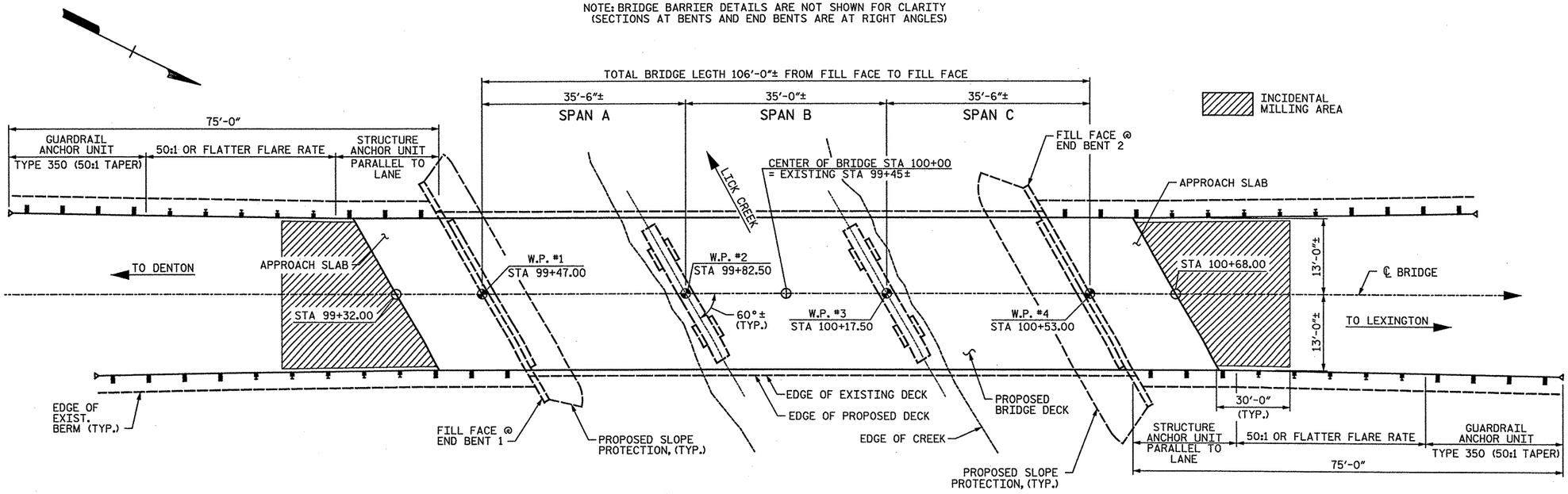
THE ORIGIN OF THE STATION ALONG CENTERLINE OF THE BRIDGE IS ASSUMED FOR PLAN PREPARATION.

THE VERTICAL DATUM IS ASSUMED FOR PLAN PREPARATION.

ALL EXISTING SUBSTRUCTURE AND FOOTINGS WILL REMAIN IN PLACE.

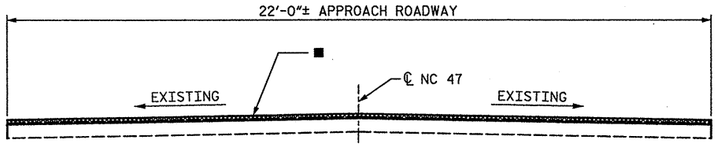
WATER LEVEL SHOWN IS THE APPROXIMATE HIGHWATER MARK AS IT APPEARS IN THE AS BUILT PLANS.

FOR LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS FOR SAND LIGHTWEIGHT CONCRETE.



PLAN ⚠

NOTE: BRIDGE BARRIER DETAILS ARE NOT SHOWN FOR CLARITY



TYPICAL ROADWAY MILLING SECTION ⚠

■ VARIABLE DEPTH MILLING 1½"- 2¾". REPLACE WITH 1½" MIN. ASPHALT C1 TO TRANSITION TO EXISTING RIDING SURFACE

C1	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF 9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 1½" DEPTH.

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON NC 47
OVER LICK CREEK

NORTH CAROLINA PROFESSIONAL SEAL 18755 ENGINEER MARK E. KELLER
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1	STV	6-12	3			TOTAL SHEETS
2			4			89

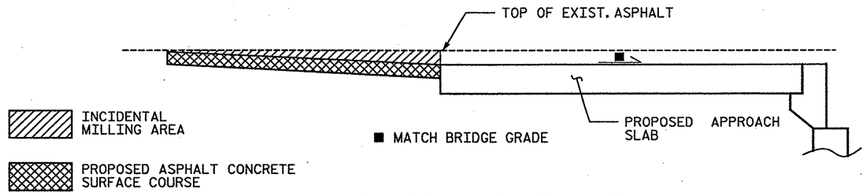
DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

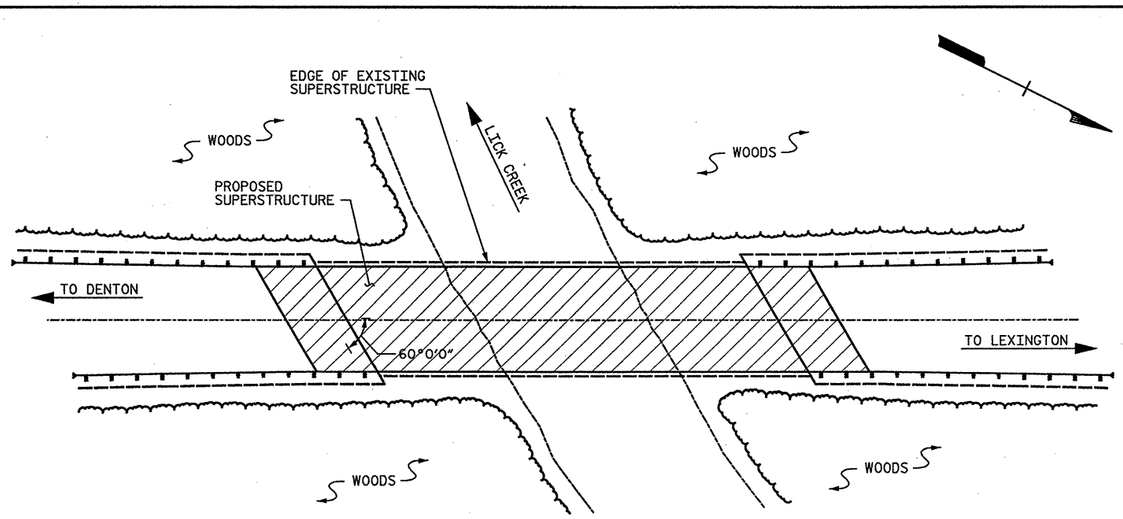
I:\Projects\2515384\2515384.0001\50.Deliverables & Submittals\TBP.SJH.2\Structures\ust\Br 82 Davidson\01 pBR-082 Plans.dgn
wuvm
6/15/2012

TOTAL BILL OF MATERIAL ⚠

	INCIDENTAL MILLING	ASPHALT CONCRETE SURFACE COURSE TYPE SF 9.5A	GUARDRAIL ANCHOR UNIT TYPE 350	STEEL BM GUARDRAIL	GUARDRAIL ANCHOR UNITS TYPE III	PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE 82	UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE 82	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONCRETE)	GROOVING BRIDGE FLOORS (SQ. FT.)	BRIDGE APPROACH SLABS AT BRIDGE 82	STRUCTURAL STEEL	METHOD A WATERPROOFING	ONE BAR METAL RAIL	1'-0" x 1'-6" CONCRETE PARAPET (SAND LIGHTWEIGHT CONCRETE)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	SQ. YDS.	TONS	EA.	LIN. FT.	EA.	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	LUMP SUM	APPROX. LBS.	SQ. YD	LIN. FT.	LIN. FT.	TON	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE								2783	2832		36,326	30	197.0	197.0	54	79		
TOTAL	178	15	4	25	4	LUMP SUM	LUMP SUM	2783	2832	LUMP SUM	36,326	30	197.0	197.0	54	79	LUMP SUM	LUMP SUM



BRIDGE TRANSITION



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HS-20 OR ALTERNATIVE LOADING.

THE PROPOSED BRIDGE SUPERSTRUCTURE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES 17TH EDITION, 2002.

THE EXISTING SUBSTRUCTURE WILL REMAIN IN PLACE. NO ANALYSIS OR DESIGN HAS BEEN PERFORMED TO EVALUATE THE CAPACITY OF THE SUBSTRUCTURE AND THE FOUNDATIONS. IF ANY DISTRESS IS NOTICED DURING THE CONSTRUCTION, THE CONTRACTOR MUST IMMEDIATELY STOP WORK AND NOTIFY THE DEPARTMENT OF TRANSPORTATION AND THE ENGINEER. THE WORK MAY NOT RESUME UNTIL THE CAUSE OF DISTRESS IS DETECTED AND RESOLVED.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 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 "REMOVAL OF EXISTING SUPERSTRUCTURE AT EXISTING STATION 227+75".

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 16 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING SUPERSTRUCTURE CONSISTING OF ROLLED STEEL I-BEAMS @ 6'-9" CENTERS IN 3 SIMPLE SPANS OF 35' WITH A CLEAR ROADWAY WIDTH OF 24'-0" SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

ANY ALTERATION OF ROADWAY SURFACE PROFILE IS NOT ANTICIPATED DUE TO THIS PROJECT. IF ANY ROADWAY PROFILE/GRADE ADJUSTMENT IS REQUIRED FOR SUCCESSFUL COMPLETION OF THE PROJECT, THE CONTRACTOR MUST SUBMIT THE REQUEST WITH RECOMMENDED CHANGES TO THE DEPARTMENT OF TRANSPORTATION AND THE ENGINEER FOR APPROVAL.

REMOVAL OF THE EXISTING BRIDGE SUPERSTRUCTURE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR LIGHTWEIGHT CONCRETE SEE SPECIAL PROVISION FOR SAND LIGHTWEIGHT CONCRETE.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LOCATION SKETCH AND TOTAL BILL OF MATERIALS
BRIDGE ON NC 47 OVER FLAT SWAMP CREEK

NORTH CAROLINA PROFESSIONAL SEAL 19764 ENGINEER J. E. KECK

4/25/13

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : J.W.K. DATE : 04-12
CHECKED BY : M.R. DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

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quldool
2/25/2013

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: LIVE-LOAD FACTORS (γ_{LL})	MOMENT: DISTRIBUTION FACTORS (DF)	MOMENT: RATING FACTOR	MOMENT: SPAN	MOMENT: GIRDER LOCATION	MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	SHEAR: DISTRIBUTION FACTORS (DF)	SHEAR: RATING FACTOR	SHEAR: SPAN	SHEAR: GIRDER LOCATION	SHEAR: DISTANCE FROM LEFT END OF SPAN (ft)	SERVICE II LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	MOMENT: DISTRIBUTION FACTORS (DF)	MOMENT: RATING FACTOR	MOMENT: SPAN	MOMENT: GIRDER LOCATION	MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	COMMENT NUMBER
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.40	--	1.75	0.575	1.78	B	EL	17.5	0.725	2.06	B	I	0	1.30	0.575	1.40	B	EL	17.5	
DESIGN LOAD RATING		HL-93 (OPERATING)	N/A		1.82	--	1.35	0.575	3.11	B	EL	17.5	0.725	3.60	B	I	0	1.00	0.575	1.82	B	EL	17.5	
DESIGN LOAD RATING		HS-20 (INVENTORY)	36.00	2	1.76	63.360	1.75	0.590	2.29	B	I	17.5	0.725	2.40	B	I	0	1.30	0.590	1.76	B	I	17.5	
DESIGN LOAD RATING		HS-20 (OPERATING)	36.00		2.29	82.440	1.35	0.590	2.97	B	I	17.5	0.725	3.12	B	I	0	1.00	0.590	2.29	B	I	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.20	43.200	1.40	0.575	5.10	B	EL	17.5	0.725	5.95	B	I	0	1.30	0.590	3.20	B	I	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNGARBS2	20.000		2.66	53.200	1.40	0.575	4.30	B	EL	17.5	0.725	4.63	B	I	0	1.30	0.590	2.66	B	I	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGRIS2	22.000		2.62	57.640	1.40	0.590	4.25	B	I	17.5	0.725	4.44	B	I	0	1.30	0.590	2.62	B	I	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNCOTTS3	27.250		1.60	43.600	1.40	0.575	2.55	B	EL	17.5	0.725	2.99	B	I	0	1.30	0.575	1.60	B	EL	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGGRS4	34.925		1.47	51.340	1.40	0.575	2.34	B	EL	17.5	0.725	2.79	B	I	35	1.30	0.575	1.47	B	EL	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS5A	35.550		1.44	51.192	1.40	0.575	2.29	B	EL	17.5	0.725	3.00	B	I	35	1.30	0.575	1.44	B	EL	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS6A	39.950		1.39	55.531	1.40	0.575	2.21	B	EL	17.5	0.725	2.83	B	I	35	1.30	0.575	1.39	B	EL	17.5	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS7B	42.000	3	1.32	55.440	1.40	0.575	2.10	B	EL	17.5	0.725	2.74	B	I	0	1.30	0.575	1.32	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.70	56.100	1.40	0.575	2.71	B	EL	17.5	0.725	3.25	B	I	0	1.30	0.575	1.70	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT4A	33.075		1.71	56.558	1.40	0.575	2.71	B	EL	17.5	0.725	3.20	B	I	0	1.30	0.575	1.71	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT6A	41.600		1.48	61.658	1.40	0.575	2.36	B	EL	17.5	0.725	2.95	B	I	35	1.30	0.575	1.48	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7A	42.000		1.54	64.680	1.40	0.575	2.45	B	EL	17.5	0.725	2.77	B	I	0	1.30	0.575	1.54	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7B	42.000		1.51	63.420	1.40	0.575	2.41	B	EL	17.5	0.725	2.75	B	I	35	1.30	0.575	1.51	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT4	43.000		1.50	64.500	1.40	0.575	2.40	B	EL	17.5	0.725	2.60	B	I	0	1.30	0.575	1.50	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5A	45.000		1.41	63.450	1.40	0.575	2.24	B	EL	17.5	0.725	2.83	B	I	35	1.30	0.575	1.41	B	EL	17.5	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5B	45.000		1.36	61.200	1.40	0.575	2.16	B	EL	17.5	0.725	2.45	B	I	0	1.30	0.575	1.36	B	EL	17.5	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		1.62																			

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. 1" OF FUTURE WEARING SURFACE ASSUMED FOR RATING.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

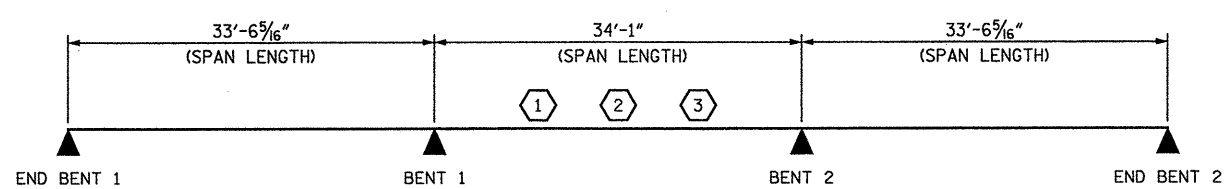
(2) DESIGN LOAD RATING (HS-20) **

(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. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR STEEL GIRDERS (NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 18795 ... E. KELLY, JR. 11/28/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-48
1				3				TOTAL SHEETS
2				4				89

DRAWN BY : AR DATE : 11-12
CHECKED BY : AC DATE : 11-12

STD. NO. LRFR3

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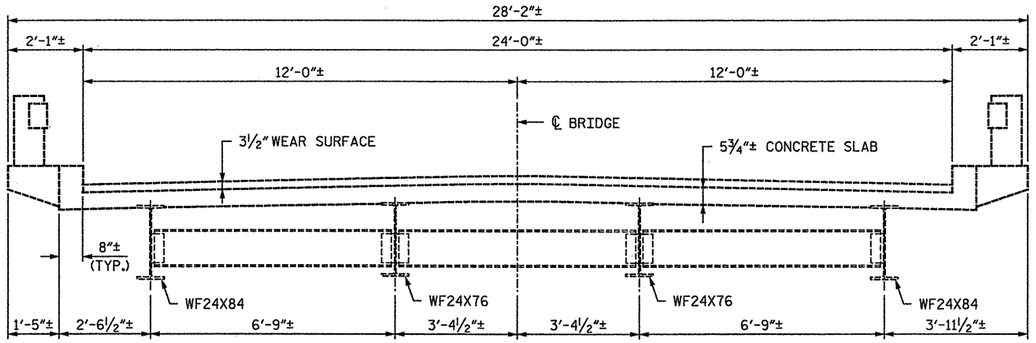
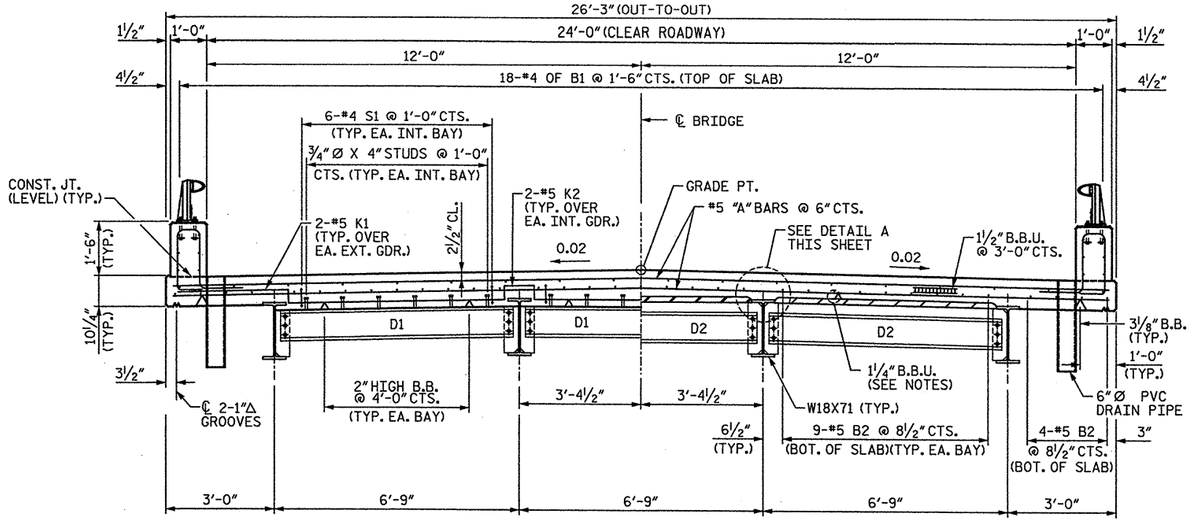
11/28/2012

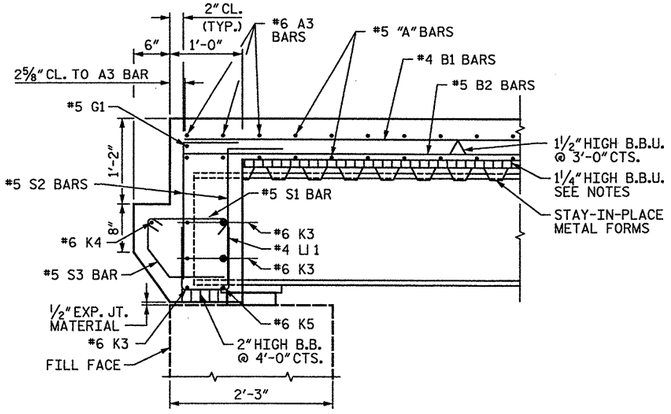


EXISTING SUPERSTRUCTURE SECTION



PARTIAL TYPICAL SECTION
SHOWING BENT DIAPHRAGMS

PARTIAL TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS



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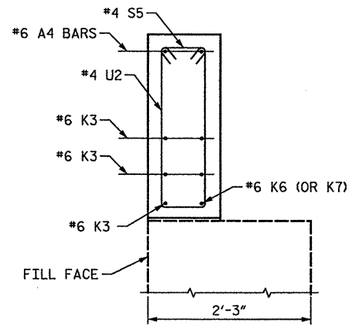

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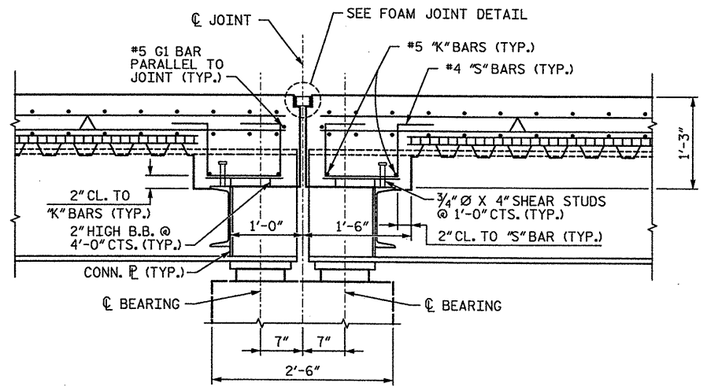

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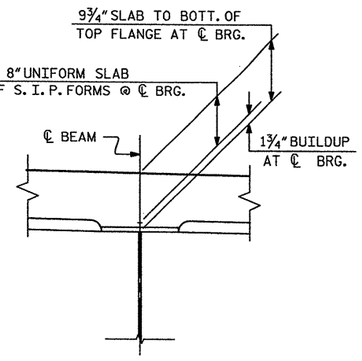

DETAIL A

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER J. C. KEY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12
⚠ REV. DETAIL

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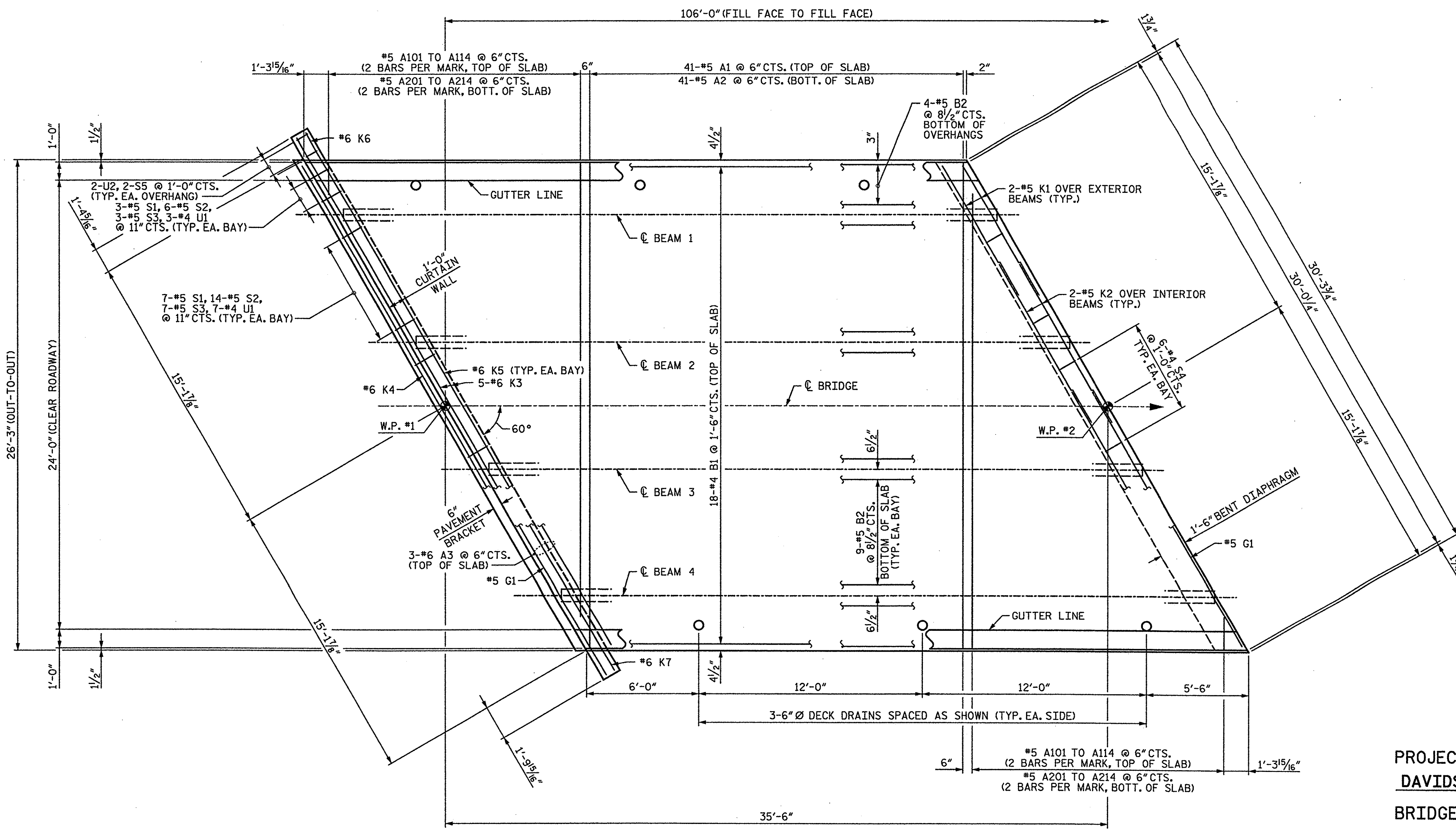

PLAN OF SPAN A

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			89

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

NORTH CAROLINA PROFESSIONAL SEAL 18767 P. E. KELLY, JR.
5/17/12

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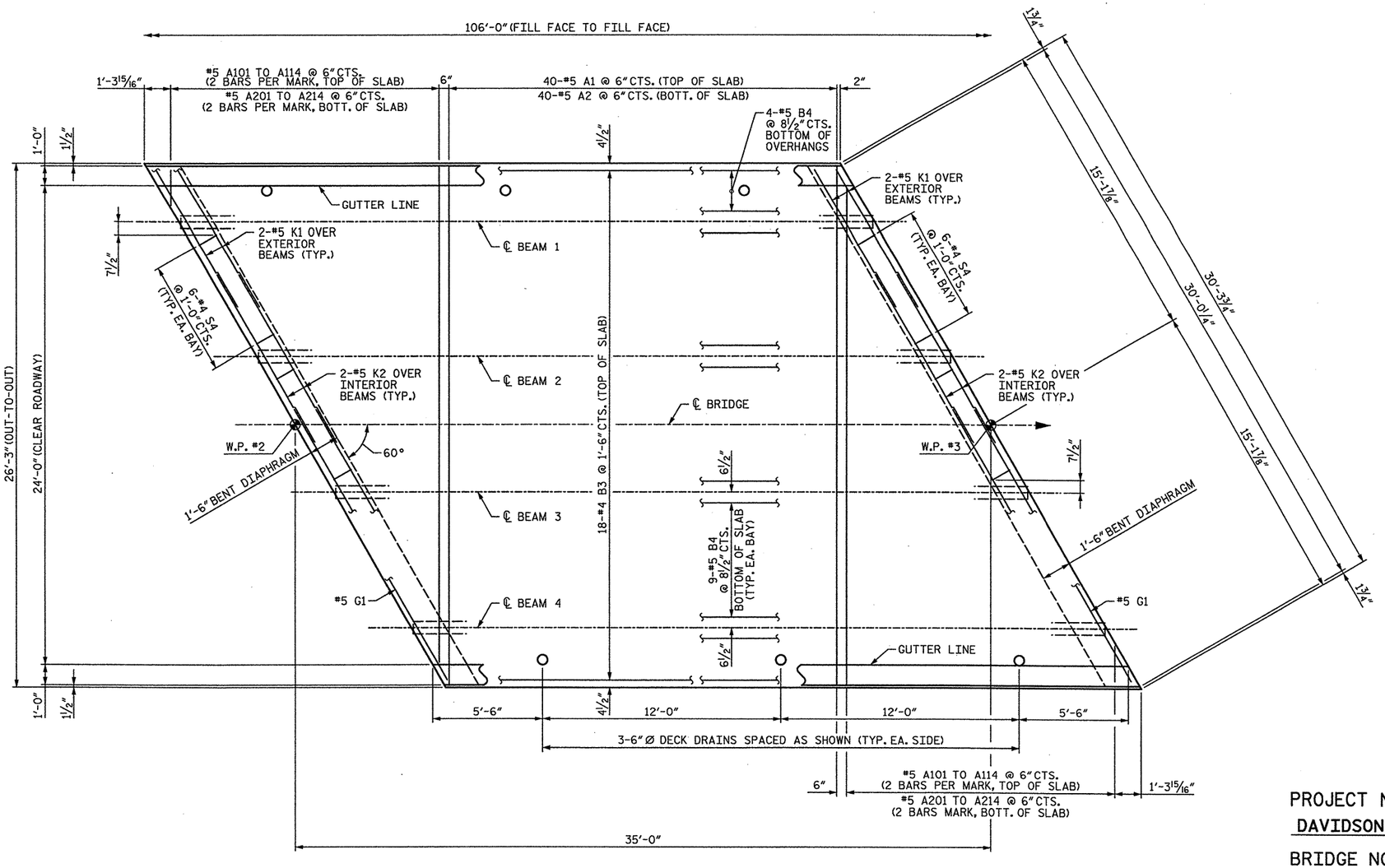
5/17/2012



PLAN OF SPAN B

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 12765 ENGINEER PAUL E. KELLY, JR.
5/17/12

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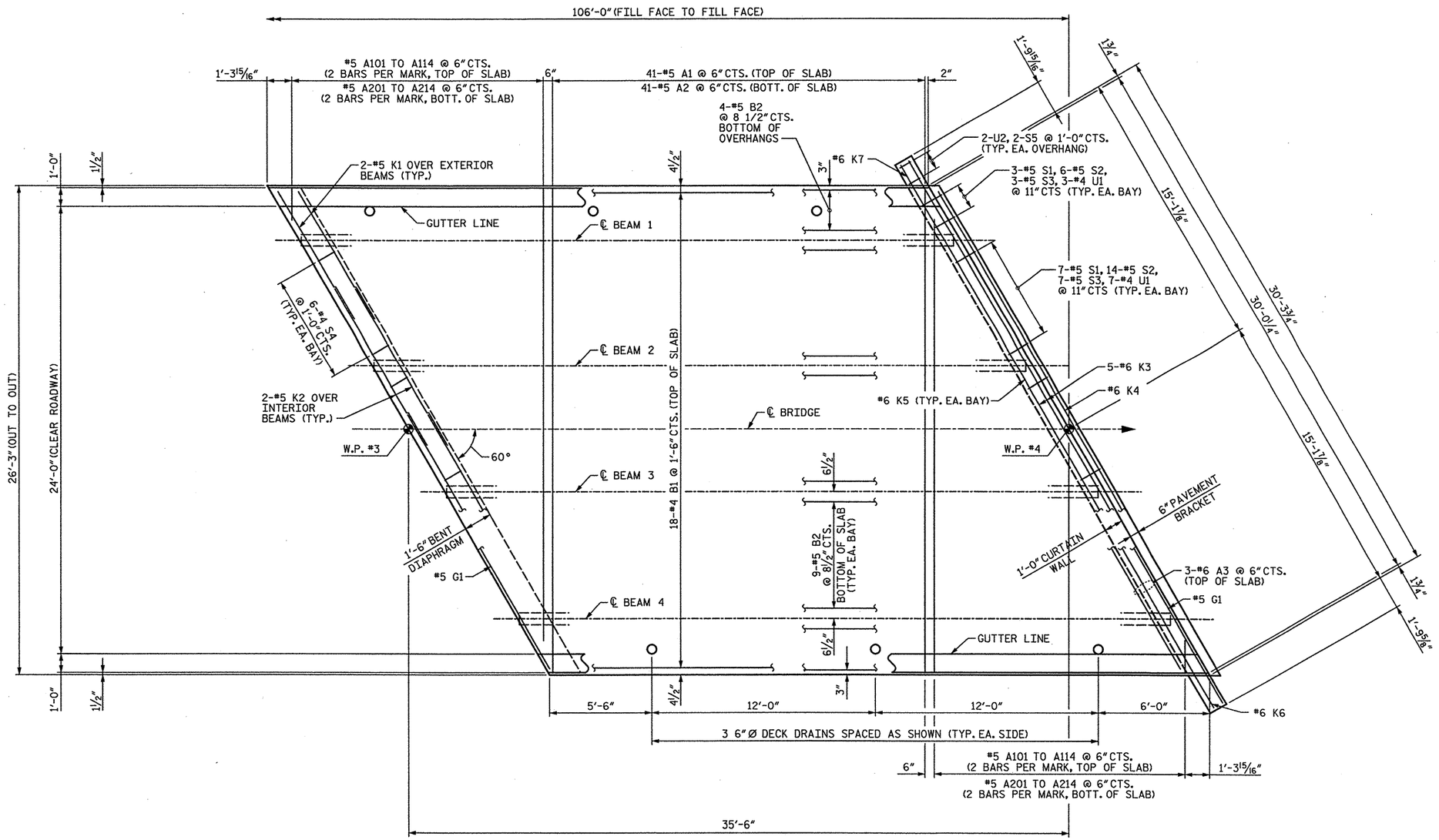
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-05
CHECKED BY : MR DATE : 04-05



PLAN OF SPAN C

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

SPAN C

NORTH CAROLINA PROFESSIONAL SEAL 19761 ENGINEER C. E. KELLY, JR.
5/17/12

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			89

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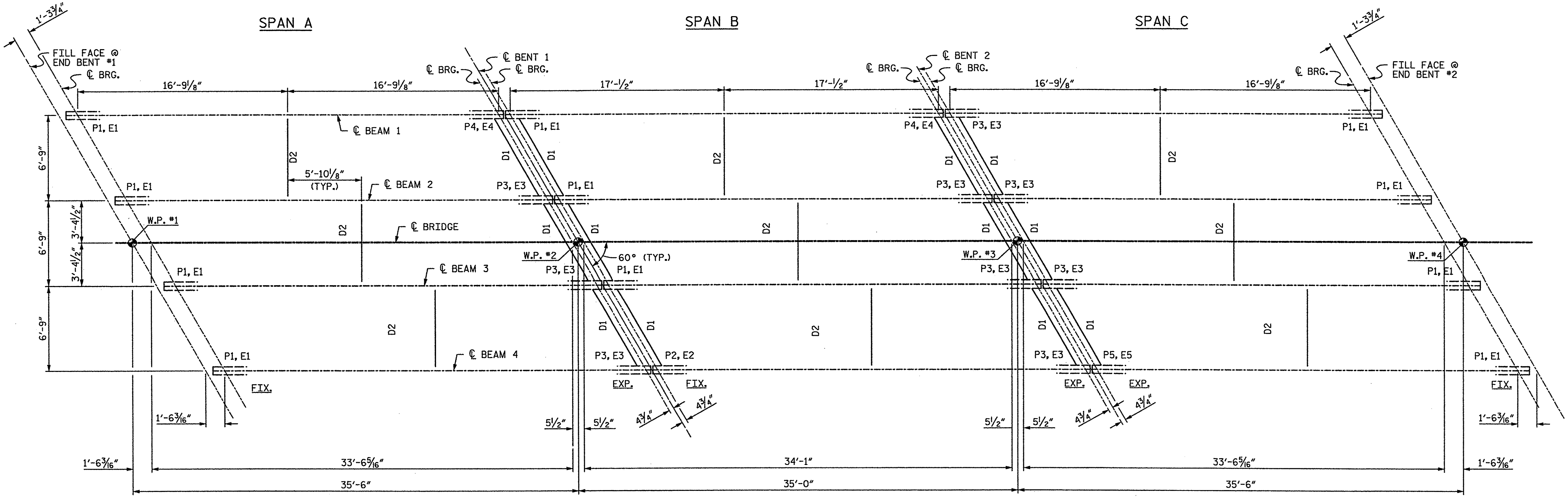
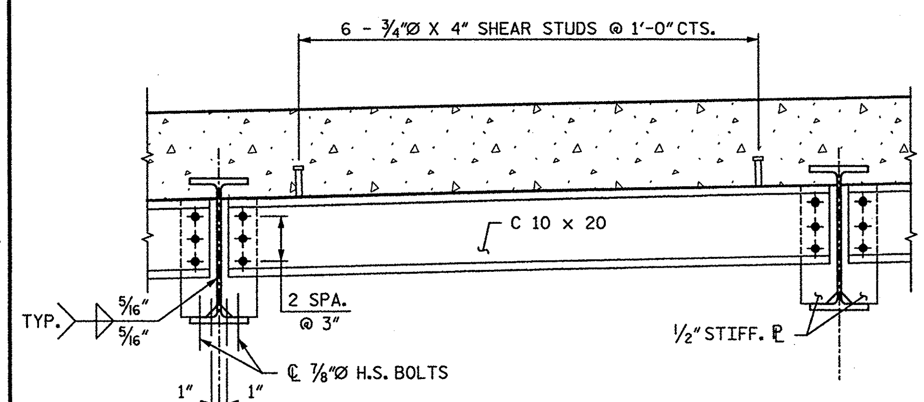
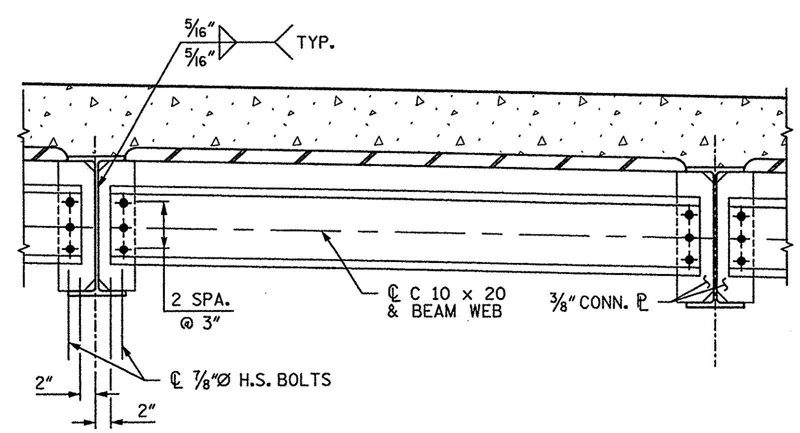


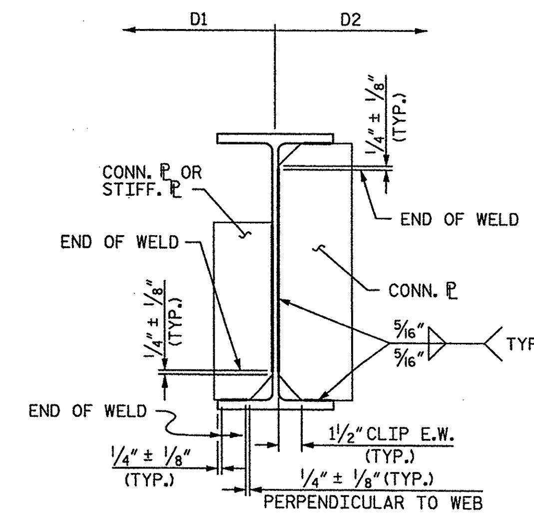
FRAMING PLAN



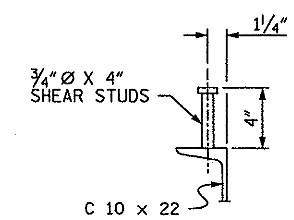
TYPICAL BENT DIAPHRAGM - D1 ⚠



TYPICAL INTERMEDIATE DIAPHRAGM - D2



TYPICAL CONNECTOR PLATE CONNECTIONS ⚠



SHEAR STUD DETAIL
(ON CHANNEL)

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 18765 — 6/15/12

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
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⚠ REV. CONNECTOR ℙ

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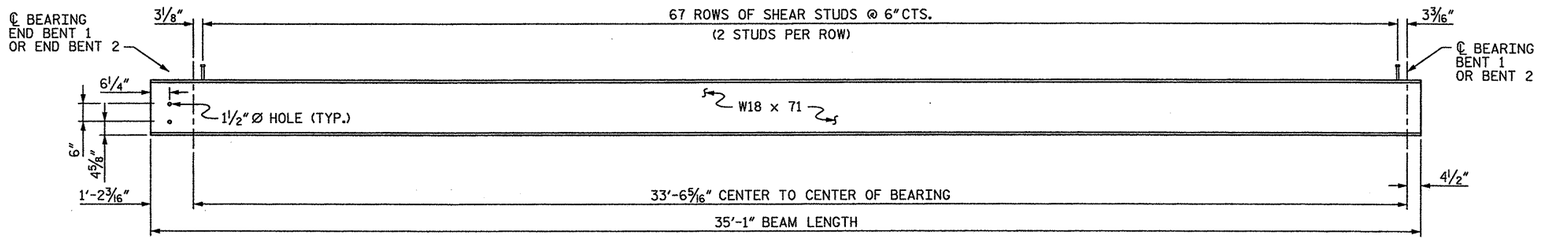
6/15/2012



BEAM ELEVATION - SPANS A & C

(SPAN A SHOWN, SPAN C MIRROR IMAGE)

⚠ NOTES:

NO SHOP CAMBER REQUIRED, TURN NATURAL MILL CAMBER UP.

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.

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.

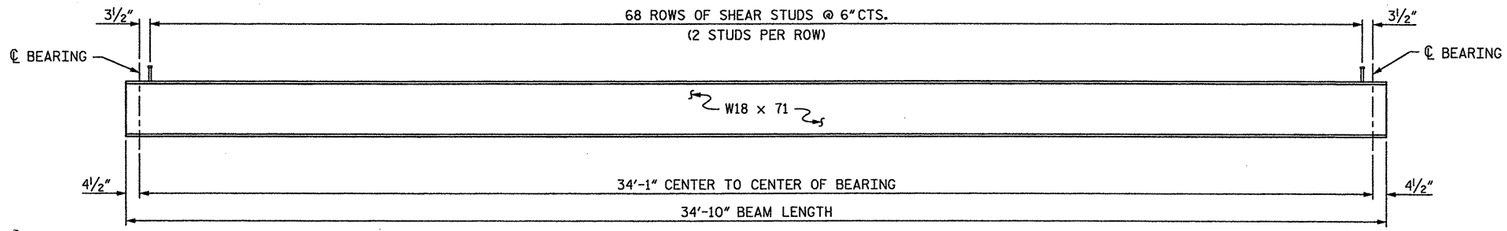
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

END OF BEAMS AND GIRDERS SHALL BE PLUMB.

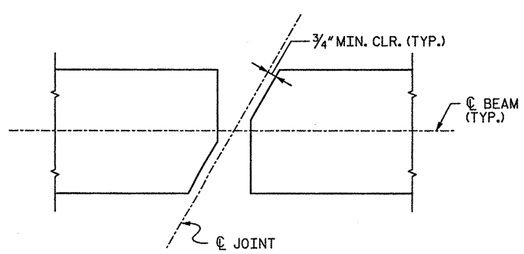
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

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

STRUCTURAL STEEL QUANTITIES	
APPROXIMATE TOTAL	36,326 LBS

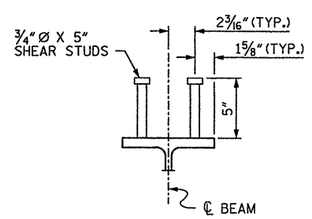


BEAM ELEVATION - SPAN B



TOP FLANGE CLIP DETAILS

(TOP FLANGE AT EXPANSION JOINT)



SHEAR STUD DETAIL

(ON BEAMS)

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER R. E. WELTY, JR.
6/15/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1	STV	6-12	3			TOTAL SHEETS
2			4			89

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⚠ REV. ADDED NOTES

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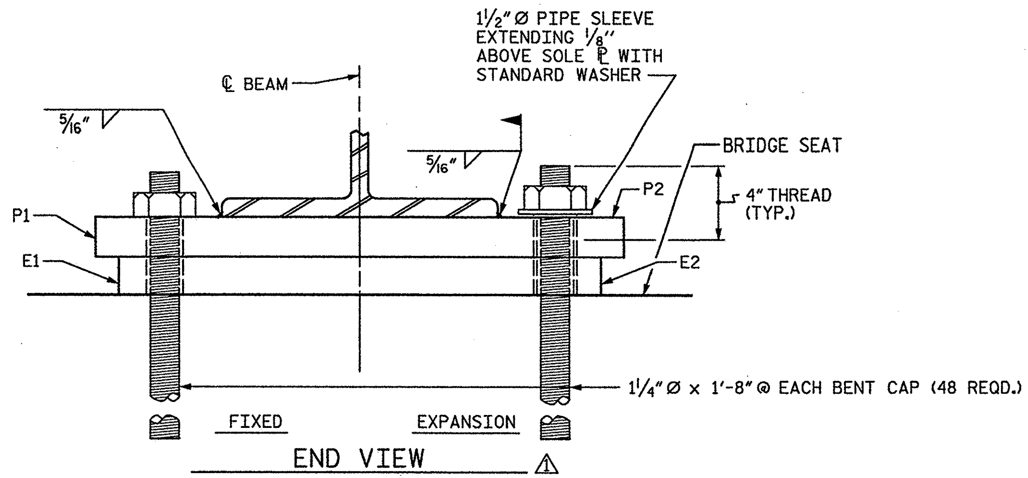
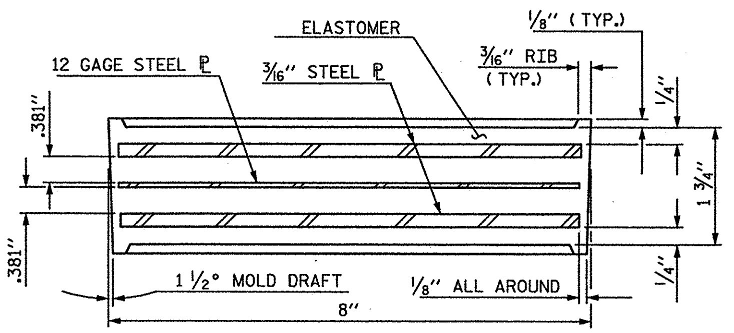
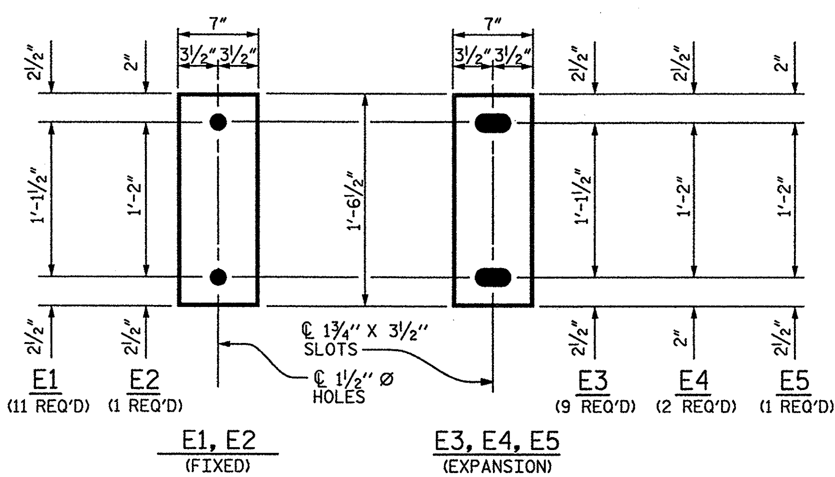
6/15/2012



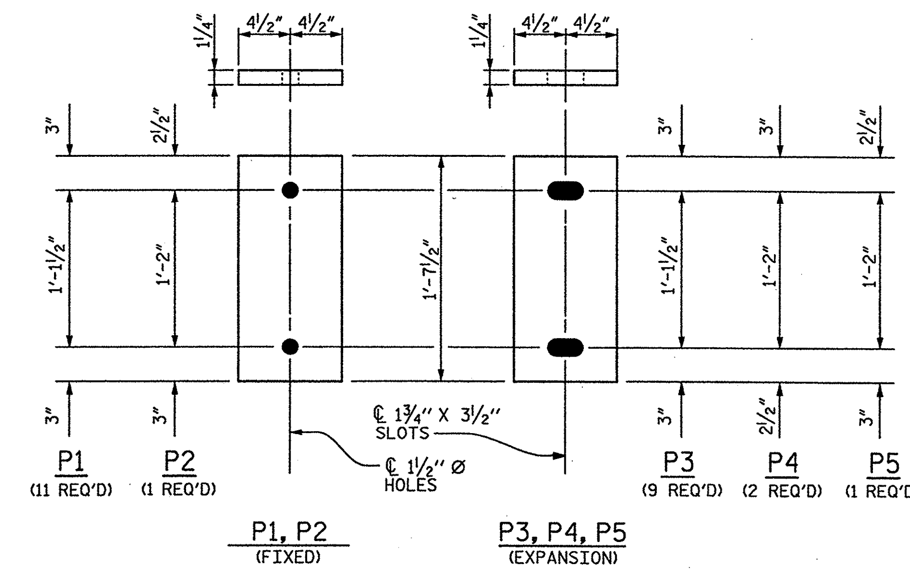
END VIEW ⚠



TYPICAL SECTION OF ELASTOMERIC BEARINGS



PLAN VIEW OF ELASTOMERIC BEARING



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 1½" 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 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.

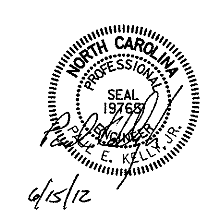
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 04-12
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⚠ REV. ANCHOR BOLT

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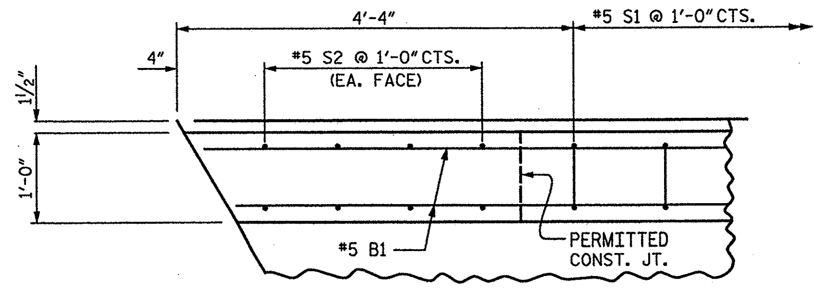
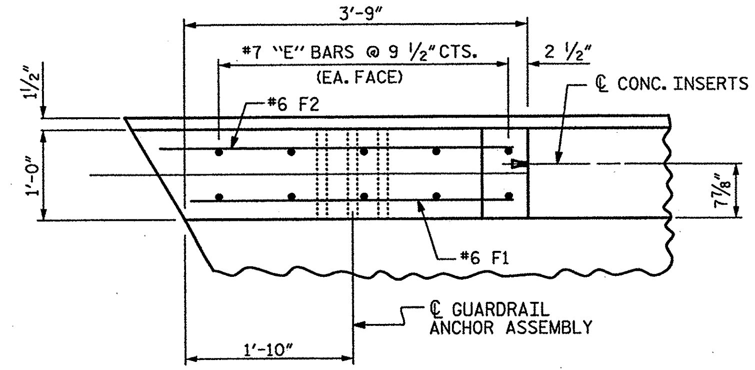
6/15/2012

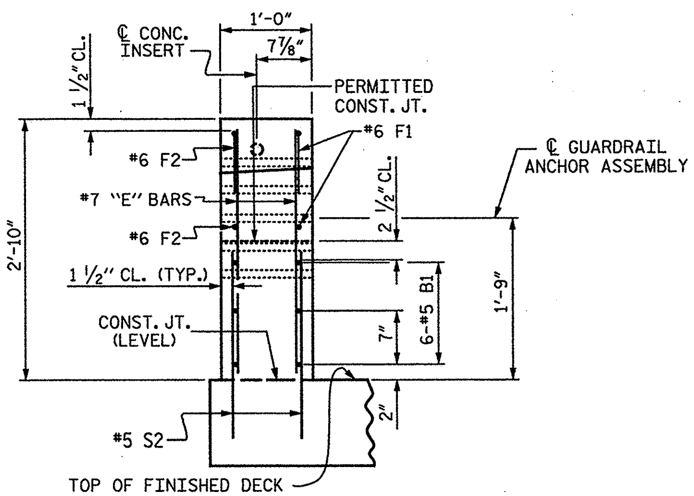


PLAN OF PARAPET

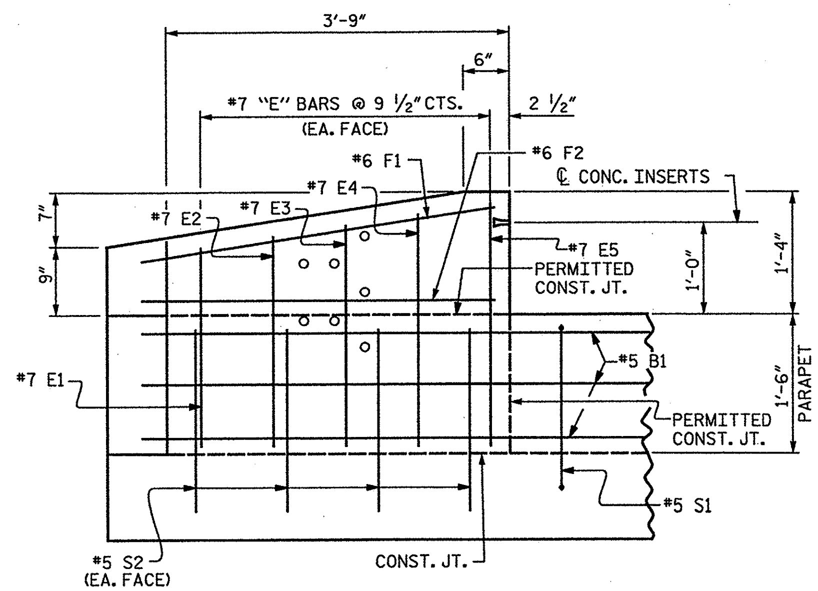


PLAN OF END POST

ONE BAR METAL RAIL					
BILL OF MATERIAL FOR TWO END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*E1	4	#7	STR	2'-0"	16
*E2	4	#7	STR	2'-2"	18
*E3	4	#7	STR	2'-4"	19
*E4	4	#7	STR	2'-6"	20
*E5	4	#7	STR	2'-7"	21
*F1	4	#6	STR	7'-1"	43
*F2	4	#6	STR	7'-8"	46
*S2	16	#5	STR	2'-0"	33
*EPOXY COATED REINFORCING STEEL				LBS.	216
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	0.8



END VIEW



ELEVATION

PARAPET AND END POST FOR ONE BAR RAIL

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PARAPET END POST DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19785 E. KELLY
6/18/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-56
1	STV	6-12	3				TOTAL SHEETS
2			4				89

DRAWN BY : JWK DATE : 04-12
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⚠ REV. PER NCDOT COMMENTS

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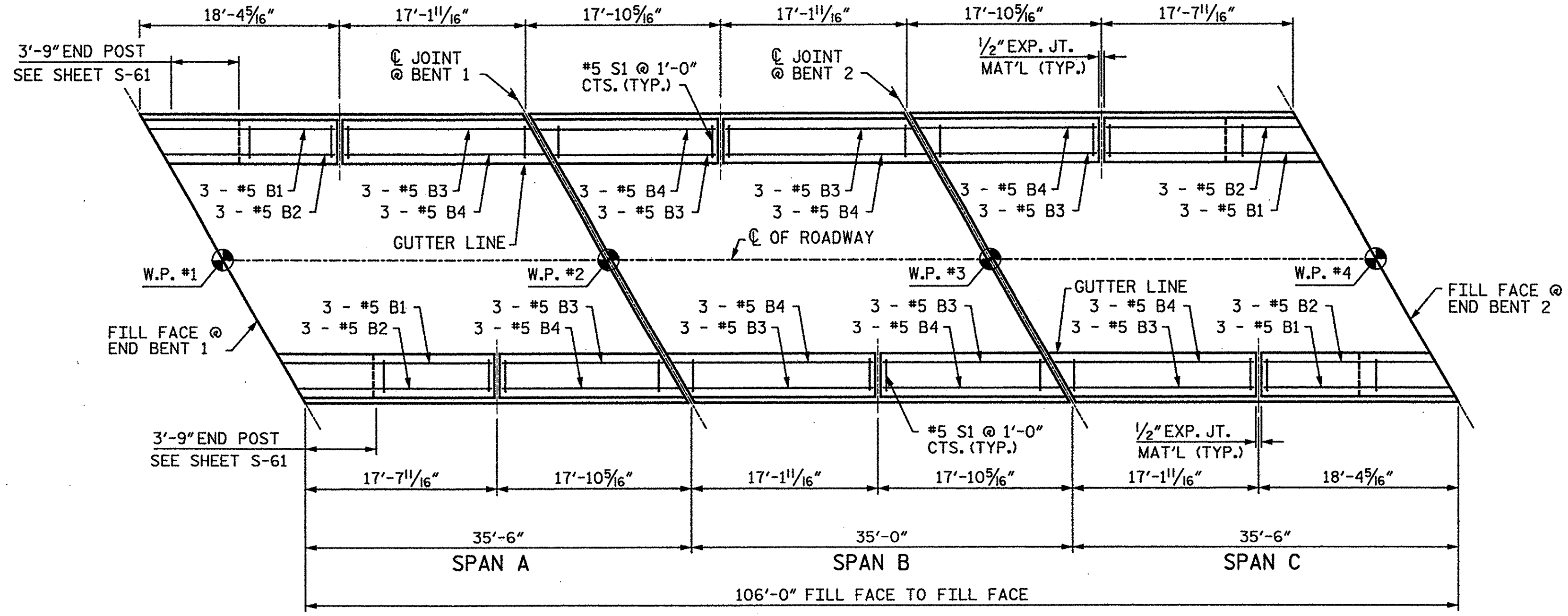
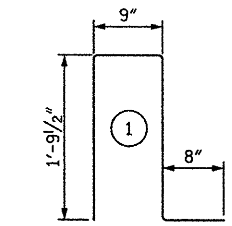


PLAN OF CONCRETE PARAPET

BAR TYPES



BILL OF MATERIAL

FOR CONCRETE PARAPET ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	12	#5	STR	17'-11"	225
* B2	12	#5	STR	17'-7"	220
* B3	24	#5	STR	17'-0"	426
* B4	24	#5	STR	17'-4"	434
* S1	200	#5	①	3'-5"	713

* EPOXY COATED REINFORCING STEEL	LBS.	2,018
CLASS AA LIGHTWEIGHT CONCRETE	C.Y.	10.9
CONCRETE PARAPET	L.F.	196

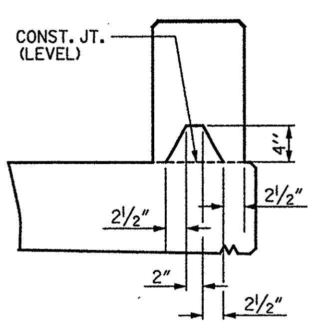
NOTES:

THE CONCRETE PARAPET IN SPAN "A" SHALL NOT BE CAST UNTIL THE SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

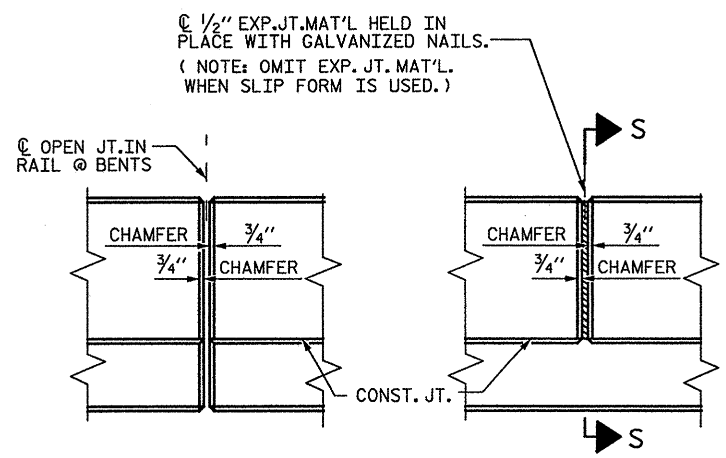
VERTICAL GROOVED CONTRACTION JOINTS, 1/2 IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT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

FOR END POST DETAILS, SEE SHEET S-61.

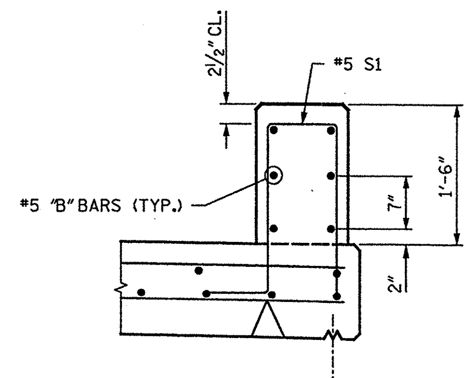


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

CONCRETE PARAPET DETAILS

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 82
REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1			3			
2			4			

SHEET NO. S-57
TOTAL SHEETS 89

DRAWN BY : AR DATE : 04-12
CHECKED BY : MR DATE : 04-12

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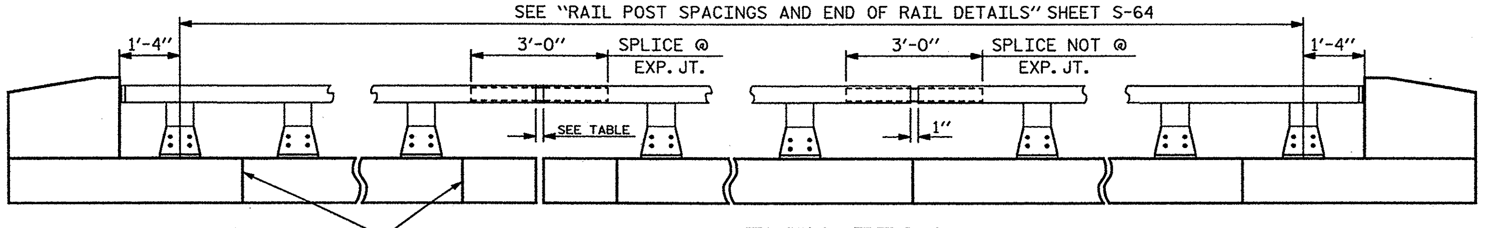
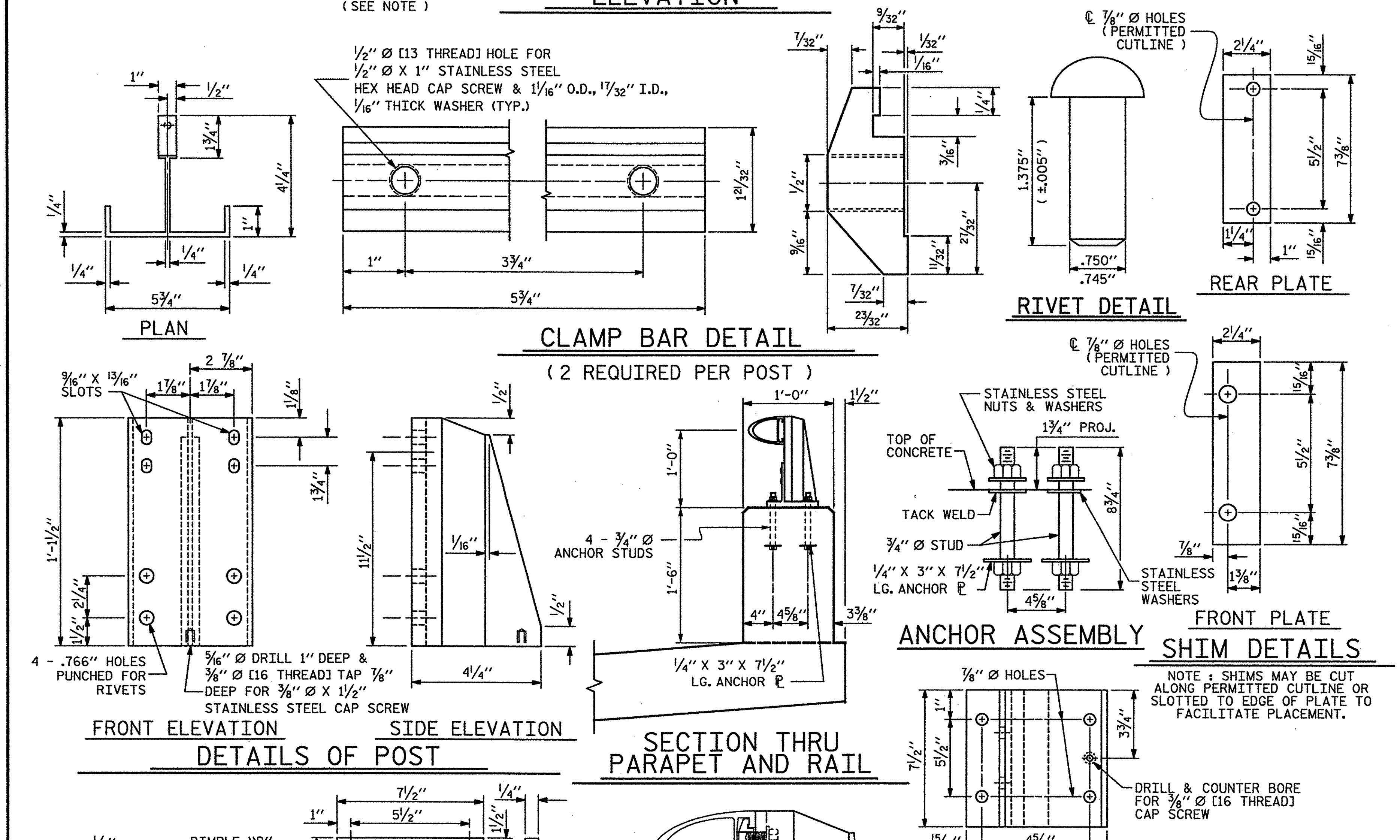
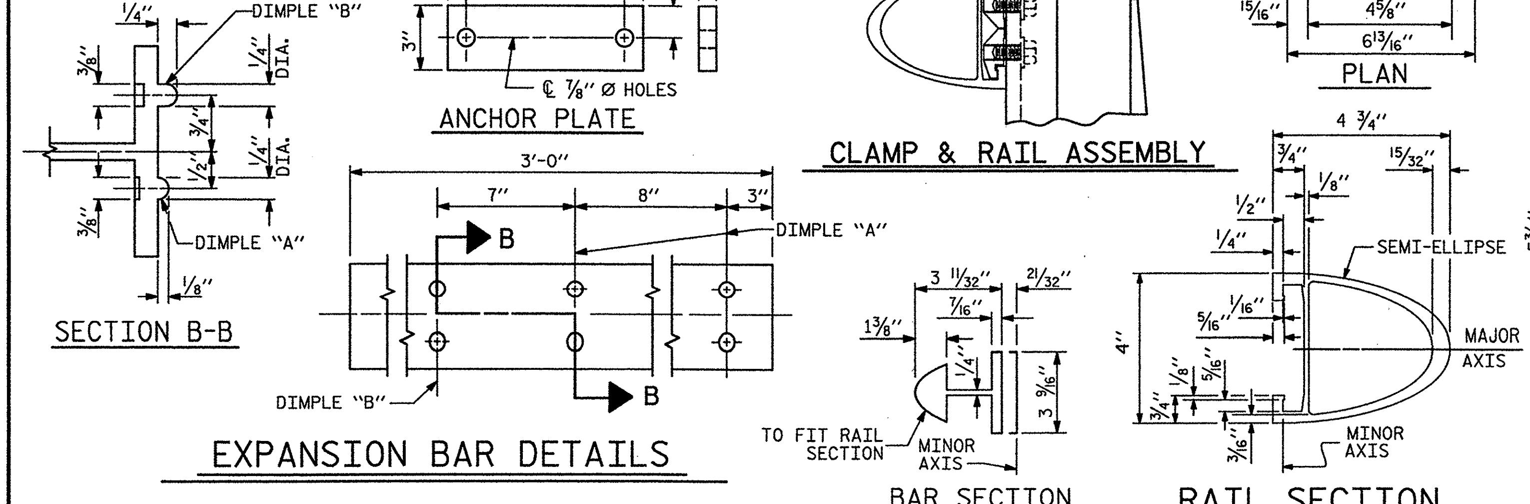
5/17/2012

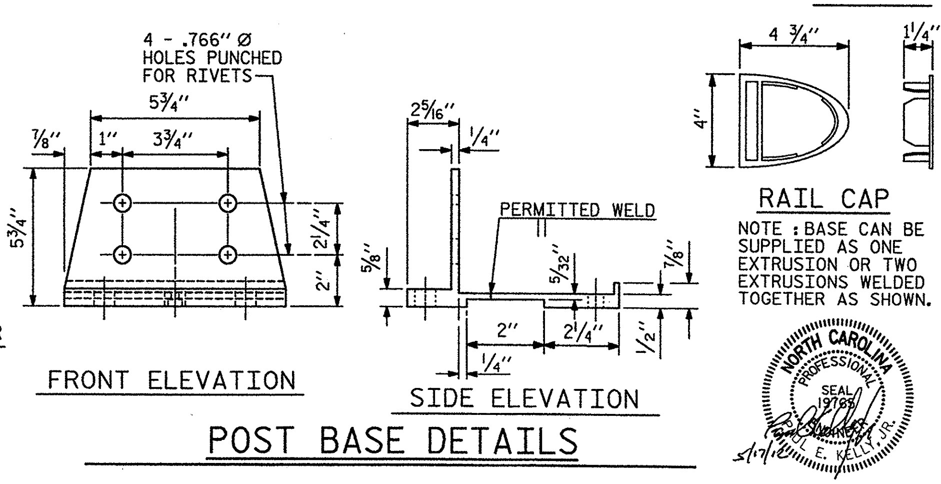


℄ EXP. JT. @	RAIL OPENING
BENT No. 1	1"
BENT No. 2	1"

TABLE







NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

MATERIAL FOR ANCHOR STUDS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. STUDS TO BE EMBEDDED 7" IN CONCRETE. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK, CLASS 2B THREAD, AND MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ANCHOR ℙ SHALL BE AASHTO M270 GRADE 36.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL.

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾"Ø BOLT IS 10 KIPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS, NUTS AND WASHERS SHALL MEET THE SAME REQUIREMENTS AS THE ANCHOR STUDS, NUTS AND WASHERS FOR USE WITH THE ANCHOR ASSEMBLY.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 197.0 LIN. FT.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

1 BAR METAL RAIL

DRAWN BY: JWK DATE: 04-12
CHECKED BY: MR DATE: 04-12

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1				3				TOTAL SHEETS
2				4				89

STD. NO. BMR1

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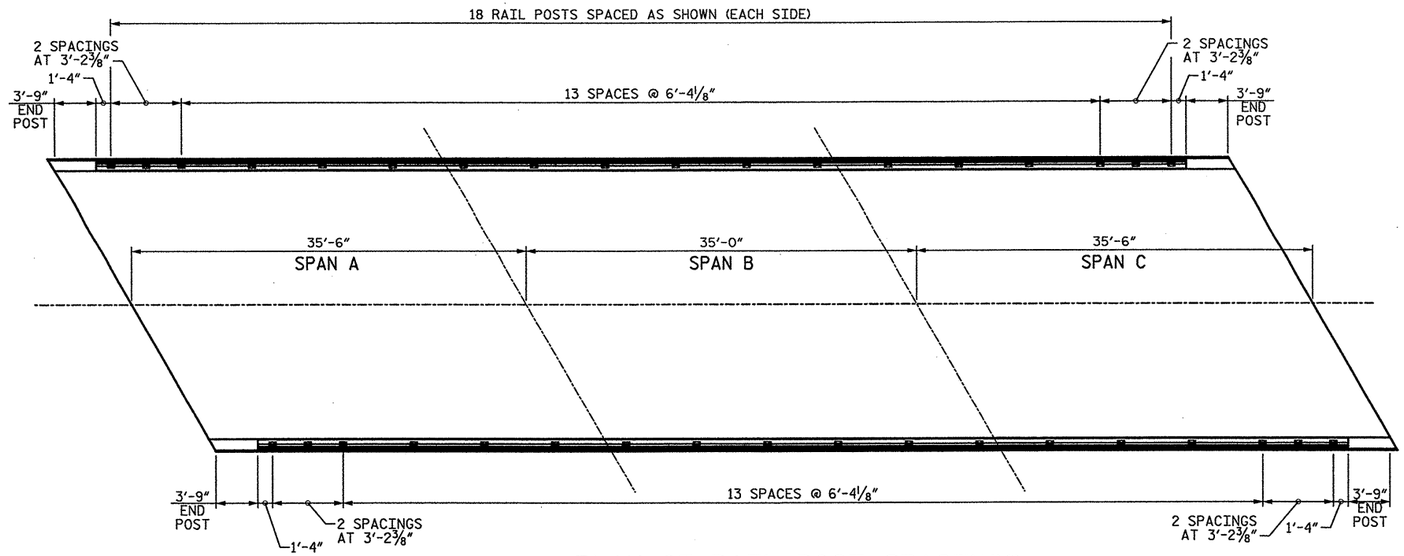
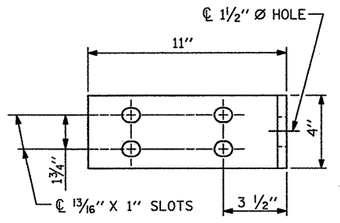
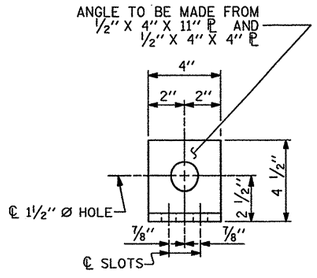


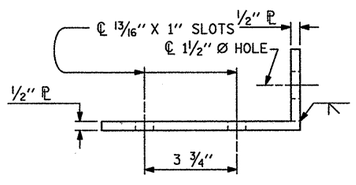
PLAN OF RAIL POST SPACINGS



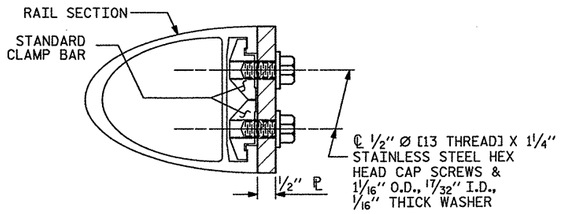
ELEVATION



END VIEW (FIX AND EXP.)

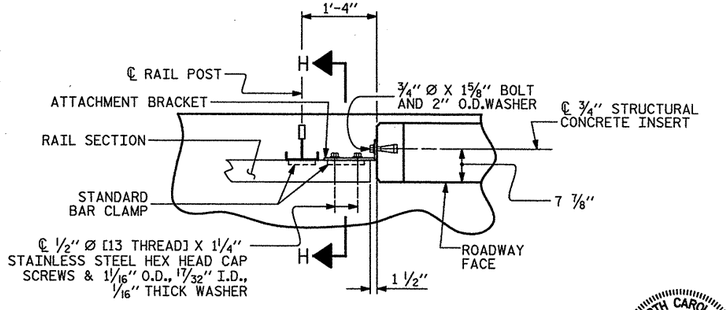


TOP VIEW



SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

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

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

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

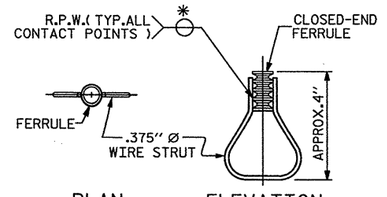
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER JAMES E. KELLY, JR.
5/1/12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			89

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Charlotte, NC 28208
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DRAWN BY : JWK DATE : 04-12
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STD. NO. BMR2

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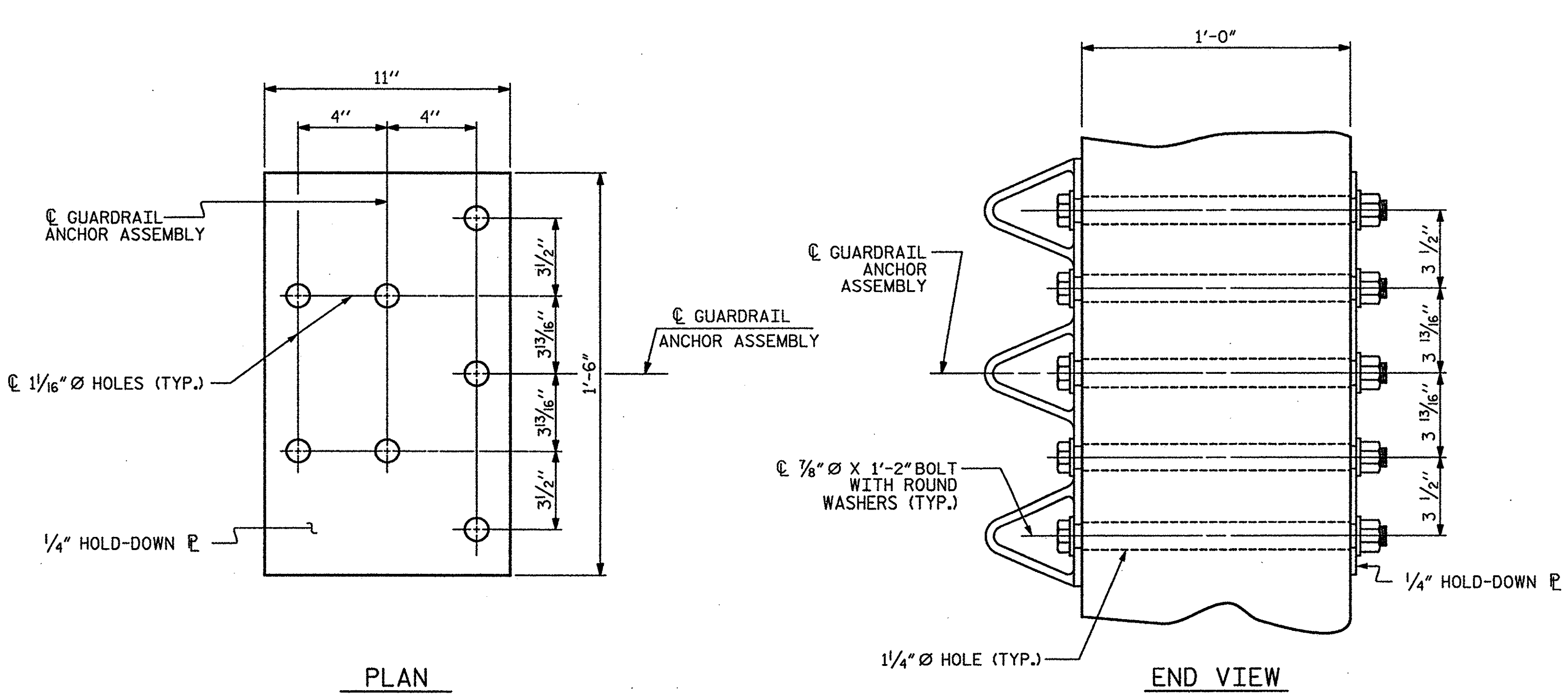
5/17/2012 dveyga



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

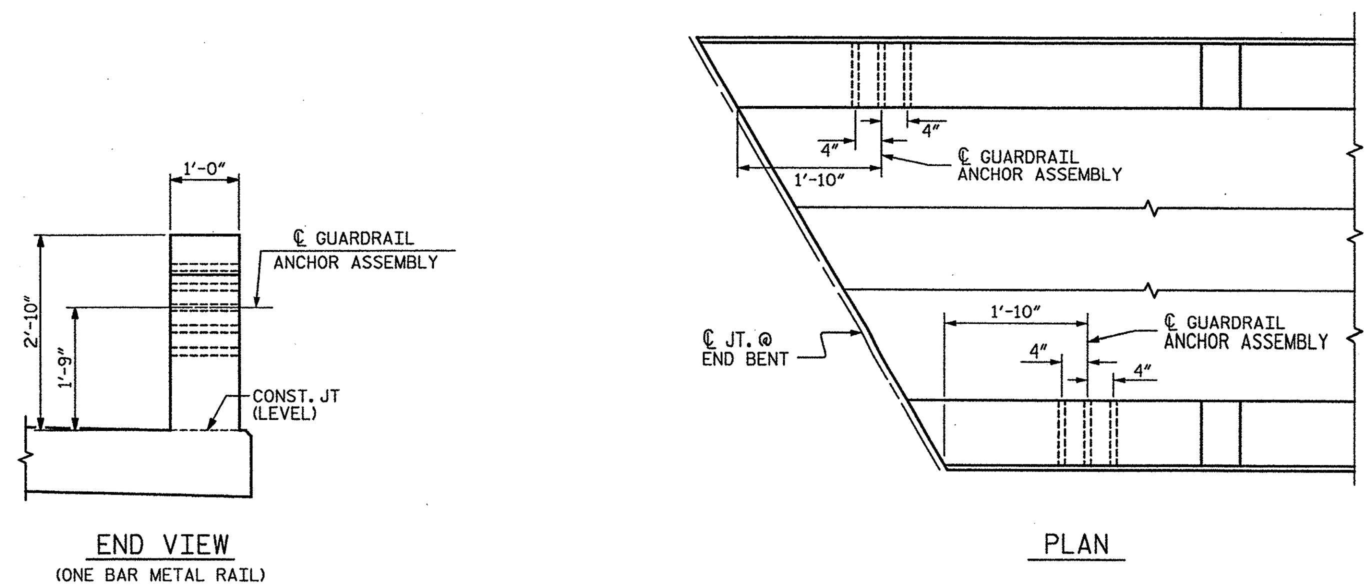
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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1			3					TOTAL SHEETS
2			4					89

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

STD. NO. GRA3

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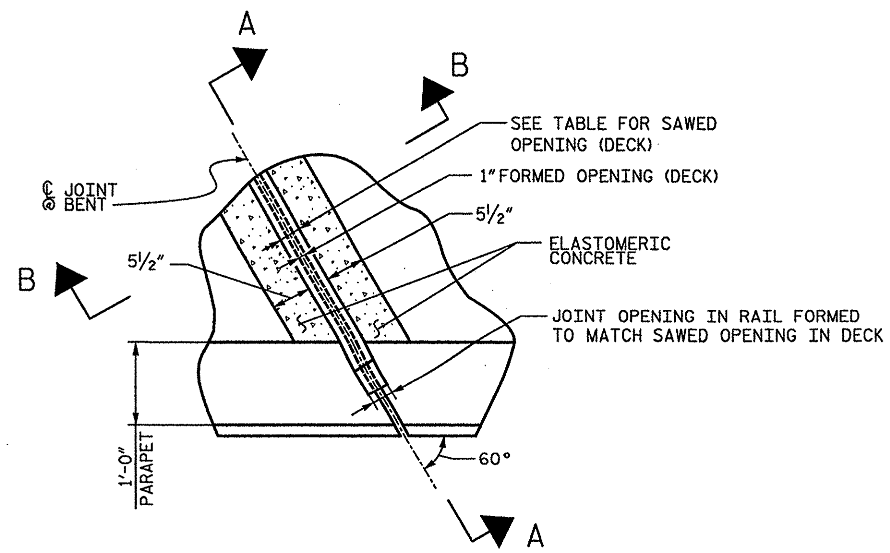
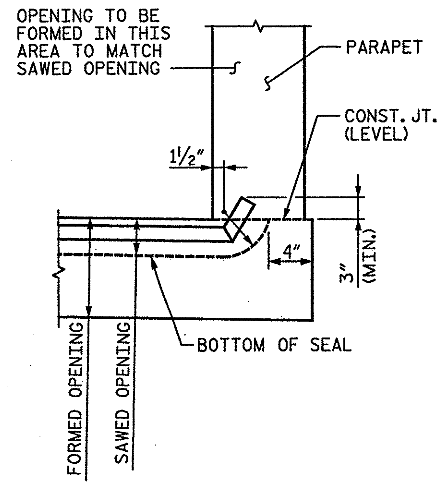
5/17/2012

NOTES:

1. SEE SPECIAL PROVISIONS FOR FOAM JOINT SEALS.
2. SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

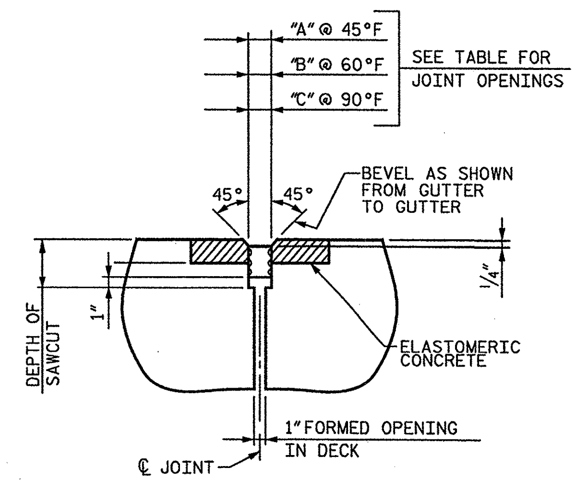


PLAN



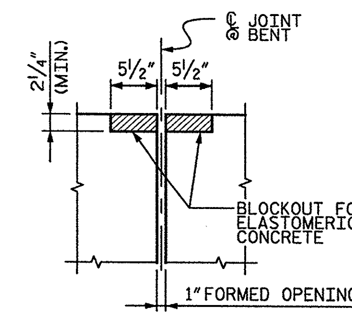
SECTION A-A

FOAM JOINT SEAL TO BE CUT, HEAT WELDED, AND TURNED UP AT A 60° ANGLE FROM THE BASE OF THE PARAPET.



SECTION B-B

FOAM JOINT SEAL



SECTION B-B

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENTIONS)

MOVEMENT AND SETTING AT FOAM JOINT

BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY.)	PERPENDICULAR JOINT OPENING AT 45°F ("A")	PERPENDICULAR JOINT OPENING AT 60°F ("B")	PERPENDICULAR JOINT OPENING AT 90°F ("C")
B1	60°	2½"	⅜"	1 15/16"	1⅞"	1 13/16"
B2	60°	2½"	11/16"	1 15/16"	1⅞"	1 11/16"

BILL OF MATERIAL

BENT NO.	ELASTOMERIC CONCRETE * (CU.FT.)
EB1	4.8
B1	4.8
B2	4.8
EB2	4.8

BASED ON MINIMUM BLOCKOUT SHOWN.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

JOINT SEAL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KELLY, JR. 5/17/12

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1000 West Morehead St., Ste. 200
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NC License No. F-0991

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2			4			89

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dlveyoo

5/17/2012

BILL OF MATERIAL

SPAN A OR C						SPAN B					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	41	#5	STR	25'-11"	1108	* A1	40	#5	STR	25'-11"	1081
A2	41	#5	STR	25'-11"	1108	A2	40	#5	STR	25'-11"	1081
* A3	3	#6	STR	29'-11"	135						
* A101	4	#5	STR	1'-9"	8	* A101	4	#5	STR	1'-9"	8
* A102	4	#5	STR	3'-5"	15	* A102	4	#5	STR	3'-5"	15
* A103	4	#5	STR	5'-2"	22	* A103	4	#5	STR	5'-2"	22
* A104	4	#5	STR	6'-11"	29	* A104	4	#5	STR	6'-11"	29
* A105	4	#5	STR	8'-8"	36	* A105	4	#5	STR	8'-8"	36
* A106	4	#5	STR	10'-5"	44	* A106	4	#5	STR	10'-5"	44
* A107	4	#5	STR	12'-2"	51	* A107	4	#5	STR	12'-2"	51
* A108	4	#5	STR	13'-10"	58	* A108	4	#5	STR	13'-10"	58
* A109	4	#5	STR	15'-7"	65	* A109	4	#5	STR	15'-7"	65
* A110	4	#5	STR	17'-4"	72	* A110	4	#5	STR	17'-4"	72
* A111	4	#5	STR	19'-1"	80	* A111	4	#5	STR	19'-1"	80
* A112	4	#5	STR	20'-9"	87	* A112	4	#5	STR	20'-9"	87
* A113	4	#5	STR	22'-6"	94	* A113	4	#5	STR	22'-6"	94
* A114	4	#5	STR	24'-3"	101	* A114	4	#5	STR	24'-3"	101
A201	4	#5	STR	1'-9"	8	A201	4	#5	STR	1'-9"	8
A202	4	#5	STR	3'-5"	15	A202	4	#5	STR	3'-5"	15
A203	4	#5	STR	5'-2"	22	A203	4	#5	STR	5'-2"	22
A204	4	#5	STR	6'-11"	29	A204	4	#5	STR	6'-11"	29
A205	4	#5	STR	8'-8"	36	A205	4	#5	STR	8'-8"	36
A206	4	#5	STR	10'-5"	44	A206	4	#5	STR	10'-5"	44
A207	4	#5	STR	12'-2"	51	A207	4	#5	STR	12'-2"	51
A208	4	#5	STR	13'-10"	58	A208	4	#5	STR	13'-10"	58
A209	4	#5	STR	15'-7"	65	A209	4	#5	STR	15'-7"	65
A210	4	#5	STR	17'-4"	72	A210	4	#5	STR	17'-4"	72
A211	4	#5	STR	19'-1"	80	A211	4	#5	STR	19'-1"	80
A212	4	#5	STR	20'-9"	87	A212	4	#5	STR	20'-9"	87
A213	4	#5	STR	22'-6"	94	A213	4	#5	STR	22'-6"	94
A214	4	#5	STR	24'-3"	101	A214	4	#5	STR	24'-3"	101
* B1	18	#4	STR	35'-2"	443	* B3	18	#4	STR	34'-7"	416
B2	35	#5	STR	35'-2"	1285	B4	35	#5	STR	34'-7"	1263
* G1	2	#5	STR	29'-11"	62	* G1	2	#5	STR	29'-11"	62
* K1	4	#5	1	8'-10"	36	* K1	8	#5	1	8'-10"	72
* K2	4	#5	2	11'-2"	47	* K2	8	#5	2	11'-2"	94
K3	5	#6	STR	33'-2"	249						
K4	1	#6	STR	29'-11"	50	* S4	42	#4	6	3'-5"	96
K5	3	#6	STR	7'-6"	34						
K6	1	#6	STR	5'-8"	9	REINFORCING STEEL					3106 LBS.
K7	1	#6	STR	3'-9"	7	* EPOXY COATED REINF. STEEL					2583 LBS.
						CLASS AA LIGHTWEIGHT CONCRETE					24.3 CU. YDS.
* S1	27	#5	3	1'-7"	45						
S2	54	#5	4	2'-8"	150						
* S3	27	#5	5	1'-9"	49						
* S4	18	#4	6	3'-3"	39						
S5	4	#4	9	1'-3"	3						
U1	27	#4	7	2'-4"	42						
U2	4	#4	8	5'-5"	15						
REINFORCING STEEL					3714 LBS.						
* EPOXY COATED REINF. STEEL					2762 LBS.						
CLASS AA LIGHTWEIGHT CONCRETE					26.7 CU. YDS.						

SUPERSTRUCTURE BILL OF MATERIAL

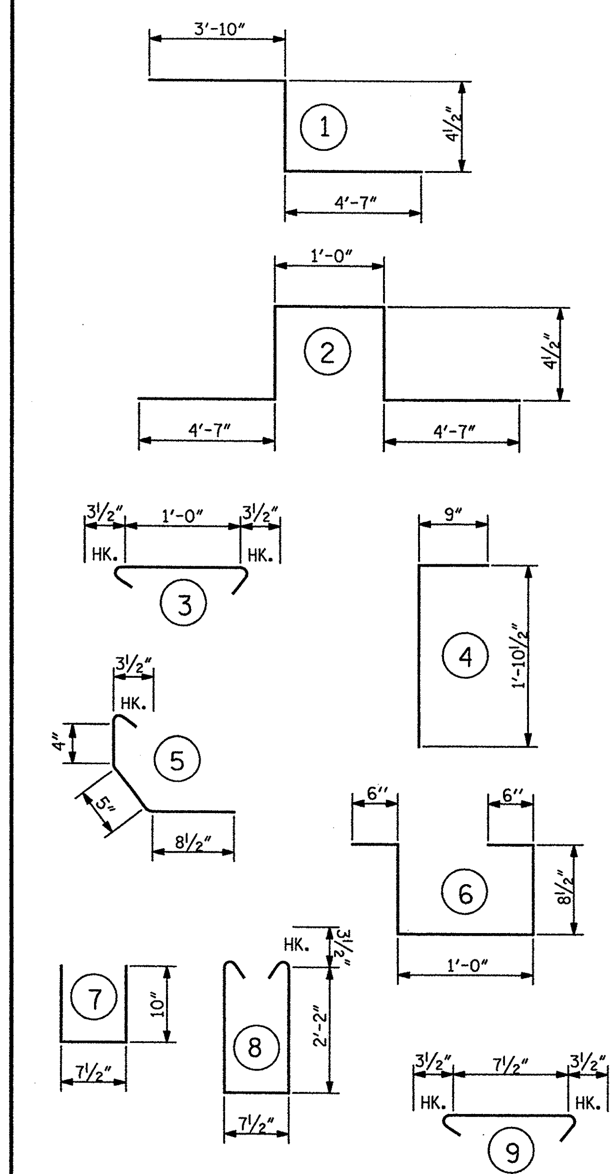
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN A		3714	2762
POUR 1	26.7		
SPAN B		3106	2583
POUR 1	24.3		
SPAN C		3714	2762
POUR 1	26.7		
TOTALS**	108.9	10534	8107

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

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

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

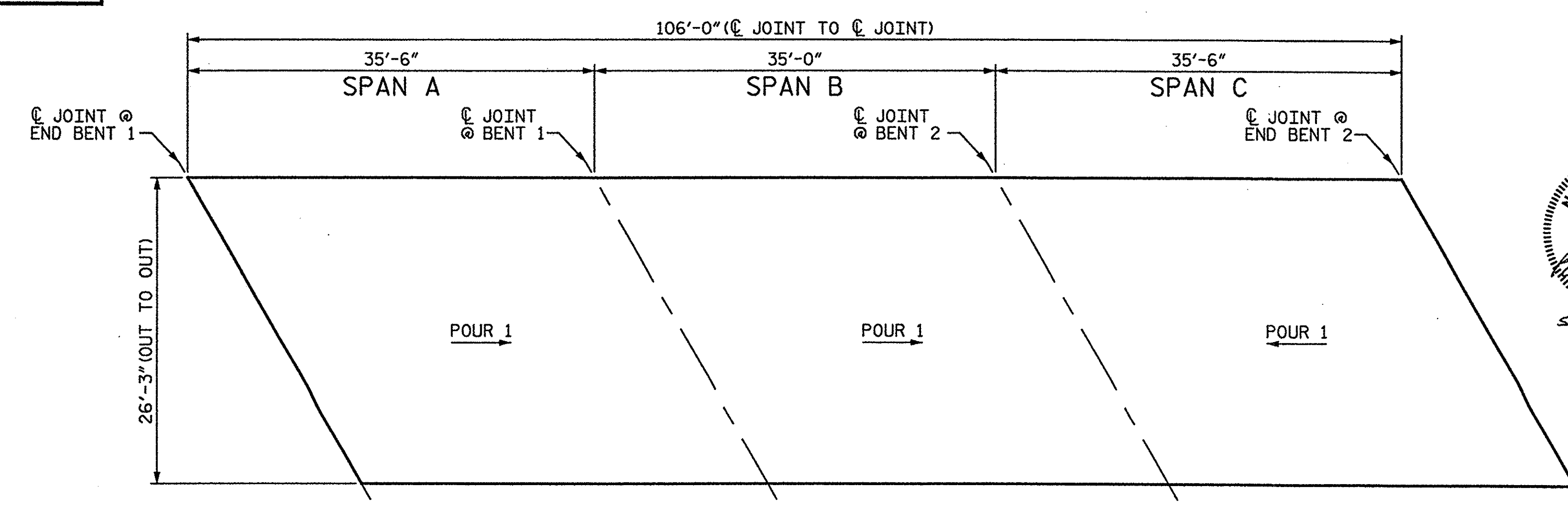
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

GROOVING BRIDGE FLOORS

APPROACH SLABS	616 SQ.FT.
BRIDGE DECK	2,216 SQ.FT.
TOTAL	2,832 SQ.FT.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 2,783)

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER E. KEY 5/17/12

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

BILL OF MATERIALS

STV/ Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
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2			4			89

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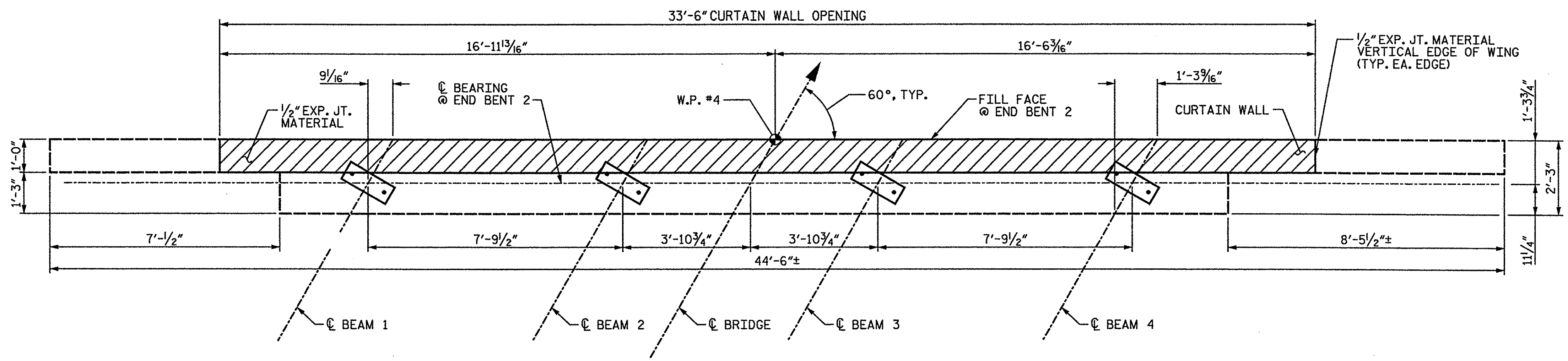
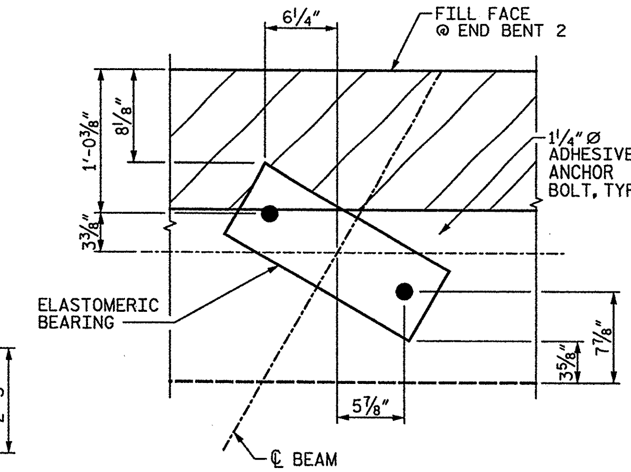
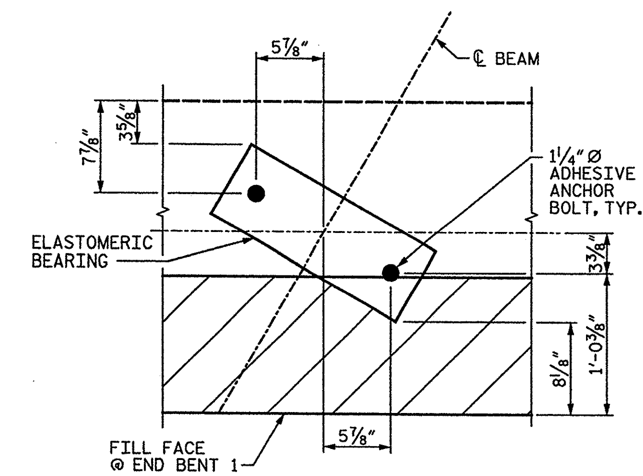
5/17/2012



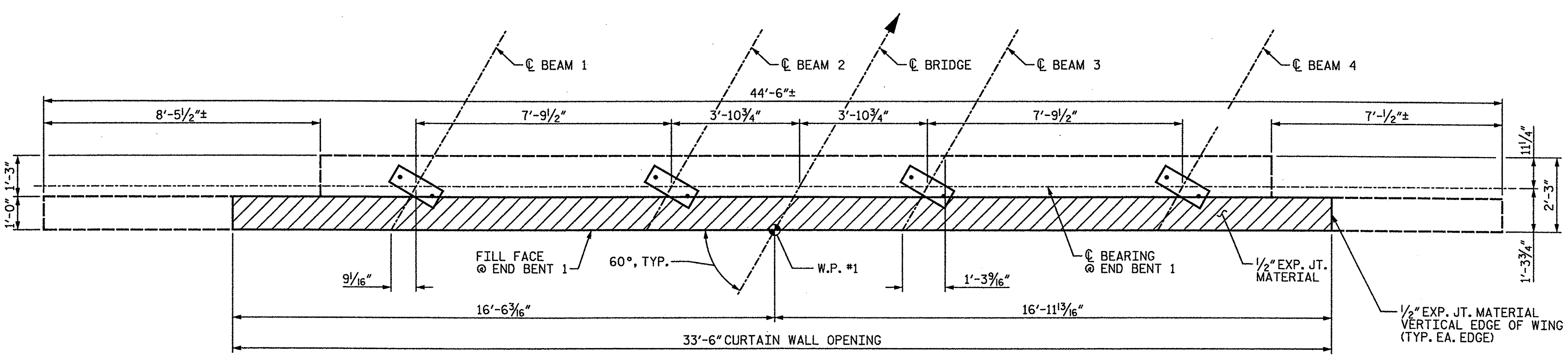
PLAN OF END BENT 2



⚠ ANCHOR BOLT PLACEMENT DETAIL - END BENT 2



⚠ ANCHOR BOLT PLACEMENT DETAIL - END BENT 1



PLAN OF END BENT 1

NOTE ⚠

SEE BEARING LOCATION PLAN SHEET 2 OF 2 FOR NOTES.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN
END BENTS 1&2

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2			4			89

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⚠ REV. NOTES, ANCHOR BOLTS

NORTH CAROLINA PROFESSIONAL SEAL 19765 PAUL E. KELLY, JR.
6/15/12

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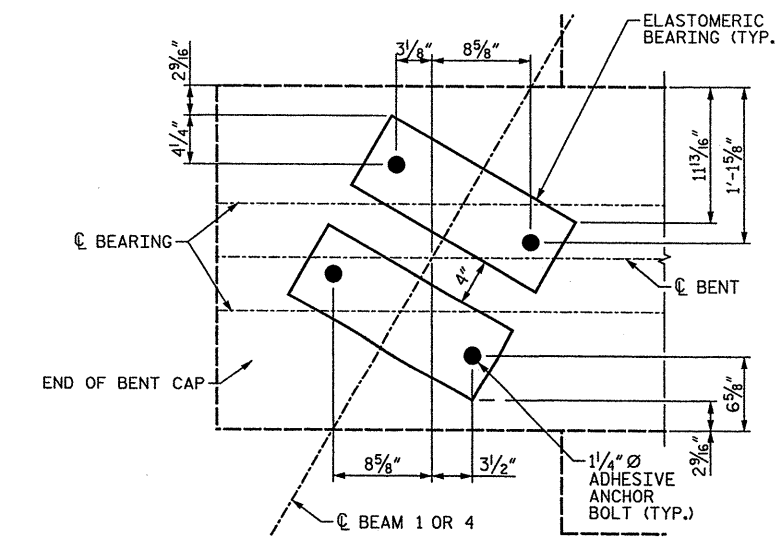
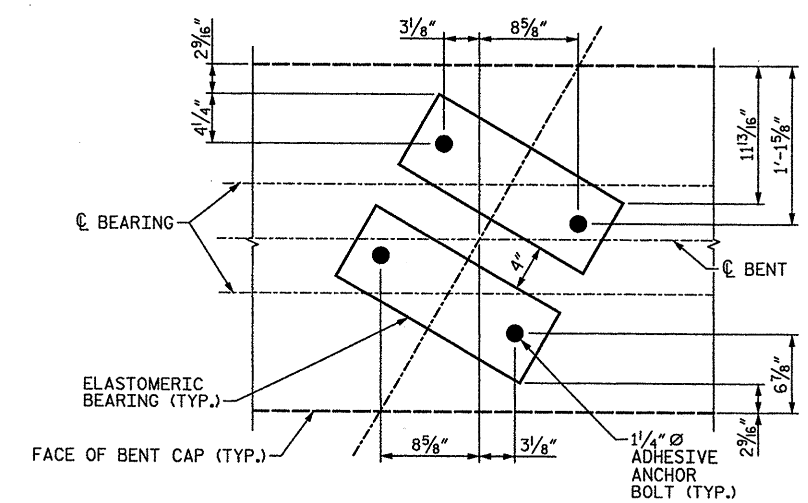
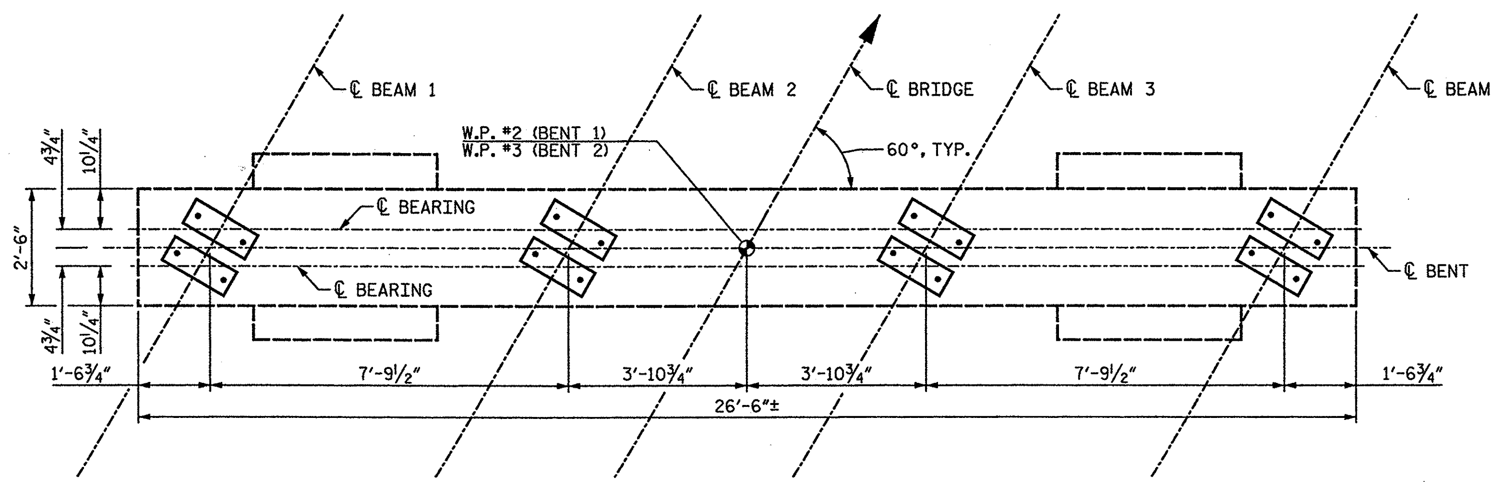


ANCHOR BOLT PLACEMENT DETAIL BEAMS 1 & 4 OF BENTS 1 & 2



ANCHOR BOLT PLACEMENT DETAIL BEAMS 2 & 3 OF BENTS 1 & 2



PLAN OF BENTS 1 & 2

⚠ NOTES

EXTREME CARE MUST BE TAKEN WHILE PLACING THE ANCHOR BOLTS IN THE END BENT CAP TO AVOID DAMAGE TO THE EXISTING TIMBER PILES.

EXISTING ANCHOR BOLTS WILL BE CUT AND GROUND FLUSH WITH TOP OF CAP.

ADHESIVE ANCHOR BOLTS FOR BENT AND END BENT CAPS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH A SAFE WORKING LOAD OF 20 KIPS TENSION AND 12 KIPS SHEAR.

REMOVAL OF EXISTING ANCHOR BOLTS, INSTALLATION OF PROPOSED ADHESIVELY ANCHORED BOLTS, AND ALL WORK, MATERIAL AND EQUIPMENT NECESSARY TO COMPLETE THE ACCEPTED WORK, SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

APPLY AN EPOXY PROTECTIVE COATING TO TOP SURFACES OF BENT AND END BENT CAPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. PRIOR TO APPLICATION THE CAPS SHALL BE THOROUGHLY CLEANED BY POWER WASHING. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 18785 ENGINEER 6/15/12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING LOCATION PLAN BENTS 1 & 2

STV / Ralph Whitehead Associates, Inc.
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NC License No. F-0991

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⚠ ADDED NOTES, REV. ANCHOR BOLTS

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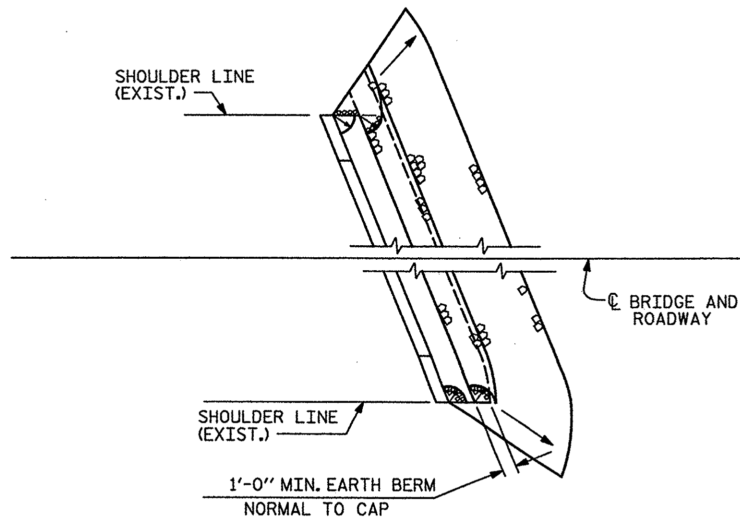
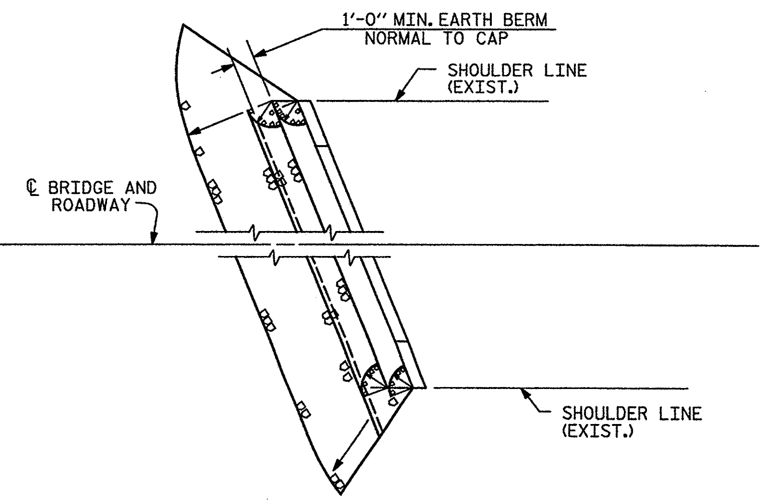
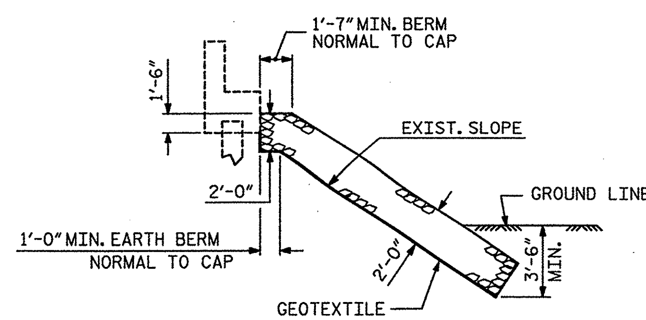


END BENT 1



END BENT 2

ESTIMATED QUANTITIES		
BRIDGE 082	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	22	32
END BENT 2	32	47



℄ SECTION

BERM RIP RAPPED

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KELLY, JR.
5/17/12

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Charlotte, NC 28208
NC License No. F-0991

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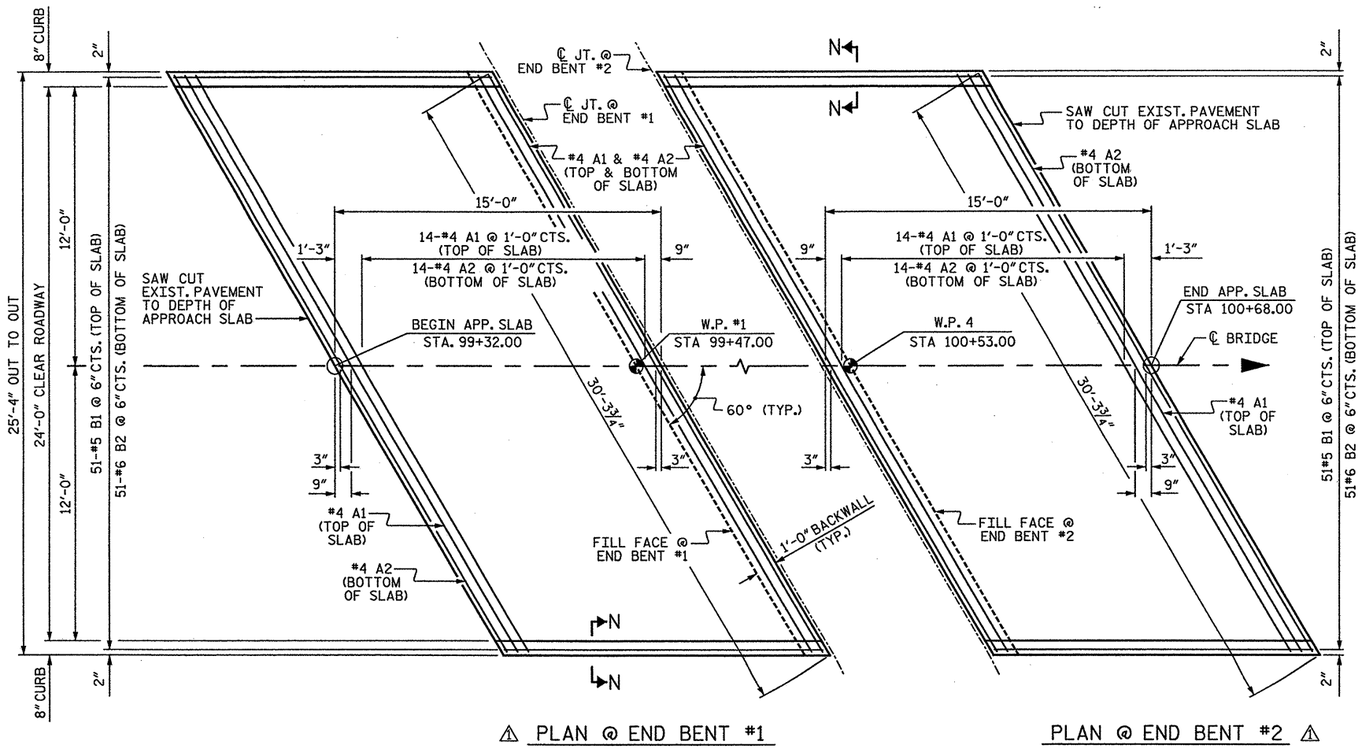
5/17/2012



⚠ PLAN @ END BENT #1 — PLAN @ END BENT #2 ⚠

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

⚠ NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND *78M STONE BACKFILL, AND OUTLET PADS SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE BRIDGE APPROACH SLAB. NO EXTRA MEASUREMENT OR PAYMENT WILL BE MADE.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

*78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

*78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF END BENT FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

FOR OUTLET PAD SEE ROADWAY STANDARD DRAWING 815.03.

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

SAW CUT THE EXISTING PAVEMENT ALONG THE EDGE OF THE PROPOSED APPROACH SLAB AS SHOWN IN THE PLAN DETAILS. DEMOLISH AND EXCAVATE PAVEMENT AND SUBGRADE SOIL TO THE FULL DEPTH OF THE APPROACH SLAB.

DAMAGED PAVEMENT ALONG THE EDGE OF APPROACH SLAB SHALL BE REPAIRED TO PROVIDE A SMOOTH RIDING SURFACE TO THE SATISFACTION OF THE ENGINEER.

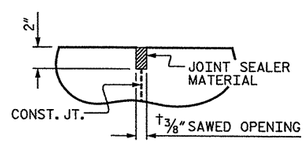
BILL OF MATERIAL

APPROACH SLAB AT EB #1

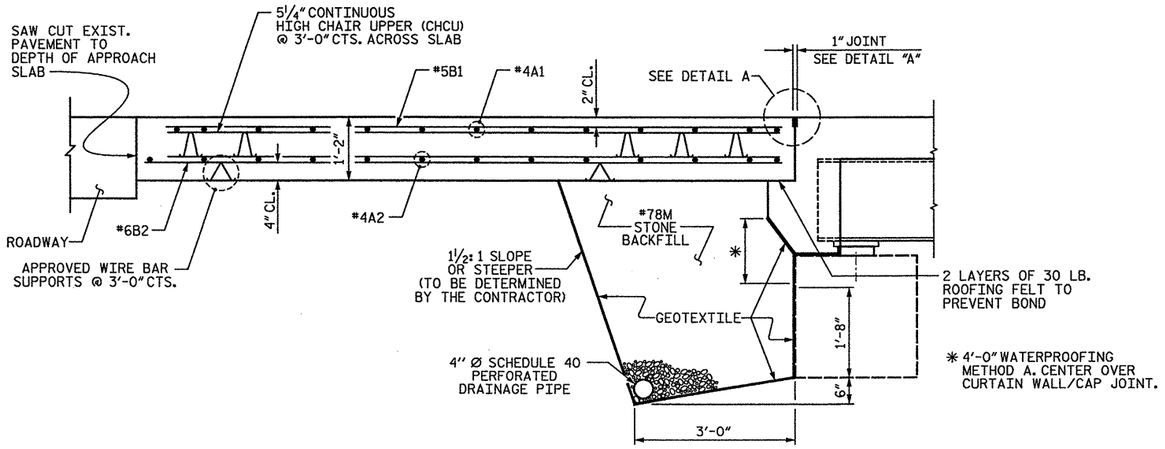
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	16	#4	STR	28'-10"	309
A2	16	#4	STR	28'-10"	309
*B1	51	#5	STR	14'-8"	781
B2	51	#6	STR	14'-8"	1124
REINFORCING STEEL				LBS.	1090
*EPOXY COATED REINFORCING STEEL				LBS.	1432
CLASS AA CONCRETE				C.Y.	16.6

APPROACH SLAB AT EB #2

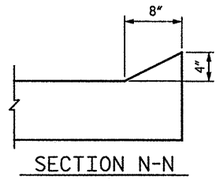
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A	16	#4	STR	28'-10"	309
A2	16	#4	STR	28'-10"	309
*B	51	#5	STR	14'-8"	781
B2	51	#6	STR	14'-8"	1124
REINFORCING STEEL				LBS.	1090
*EPOXY COATED REINFORCING STEEL				LBS.	1432
CLASS AA LIGHTWEIGHT CONCRETE				C.Y.	16.6



DETAIL "A"



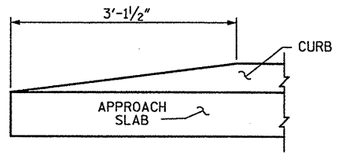
SECTION THRU SLAB ⚠



SECTION N-N

SPLICE LENGTHS

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



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER BRIAN E. KELLY
6/15/12

PROJECT NO. 41665.6A

DAVIDSON COUNTY

BRIDGE NO.: 082

REHAB. OF BRIDGE NO. 082 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB PLAN & SECTION

DRAWN BY : JWK DATE : 04-12
CHECKED BY : MR DATE : 04-12

⚠ REV. PER NCDOT COMMENTS

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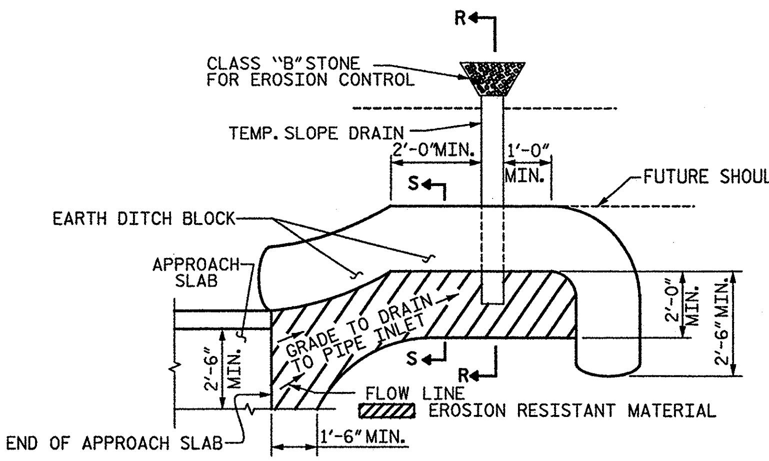
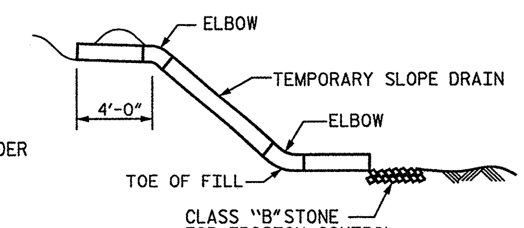
6/15/2012

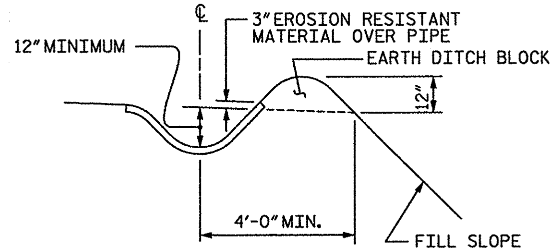


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



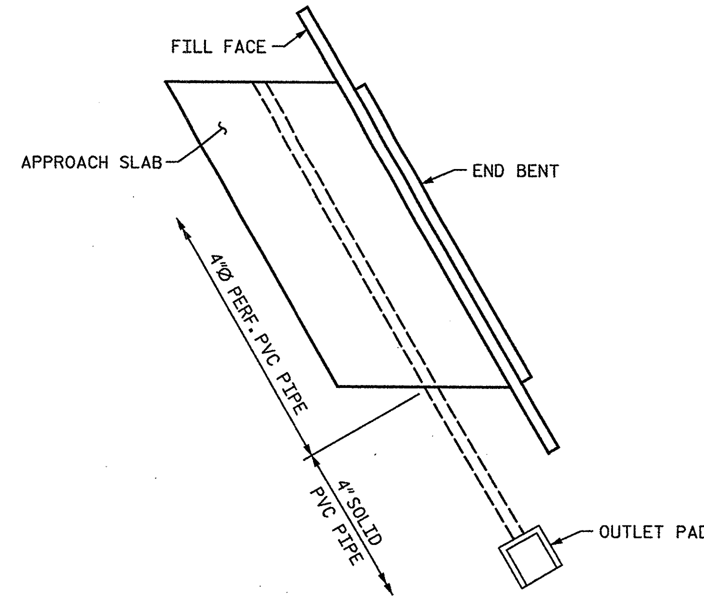
SECTION R-R



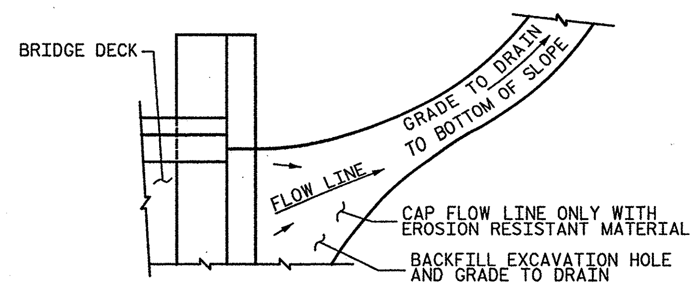
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

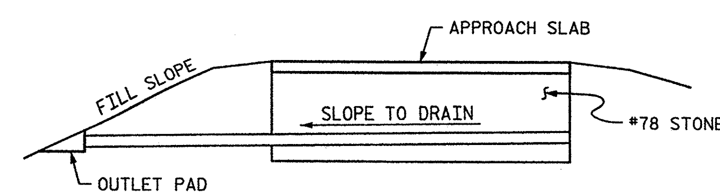


PIPE DRAIN AND OUTLET PLAN



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



PIPE DRAIN AND OUTLET ELEVATION

PROJECT NO. 41665.6A
DAVIDSON COUNTY
BRIDGE NO.: 082
REHAB. OF BRIDGE NO. 082 SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KELLY, JR. 5/17/12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

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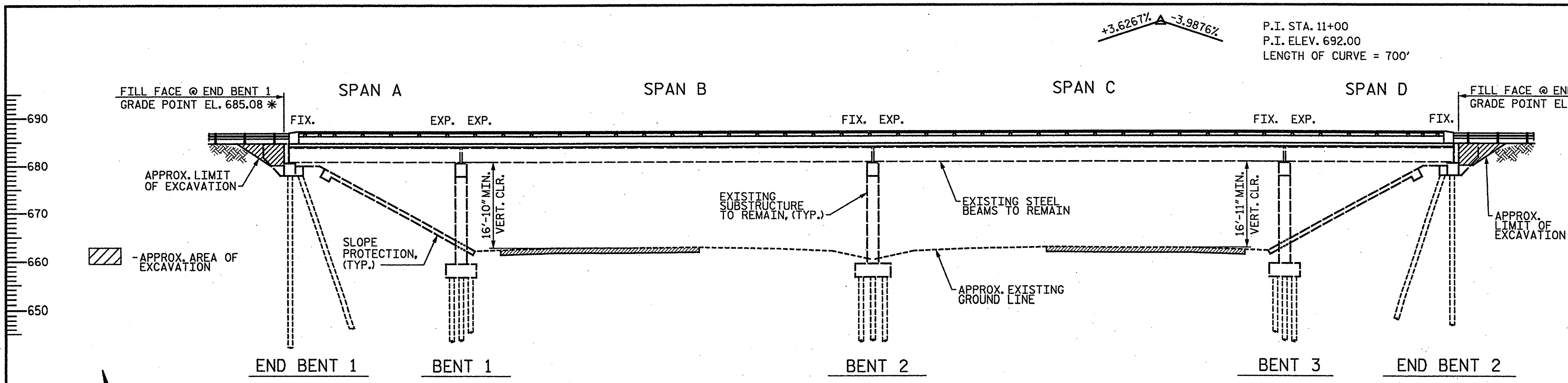
5/17/2012



SECTION ALONG ℄ OF BRIDGE

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

* -EXISTING ELEVATION BASED ON AS-BUILT DRAWINGS

NOTES: ⚠

SEE SHEET NO. SN FOR GENERAL NOTES.

EXISTING BRIDGE INFORMATION BASED ON BEST AVAILABLE DATA.

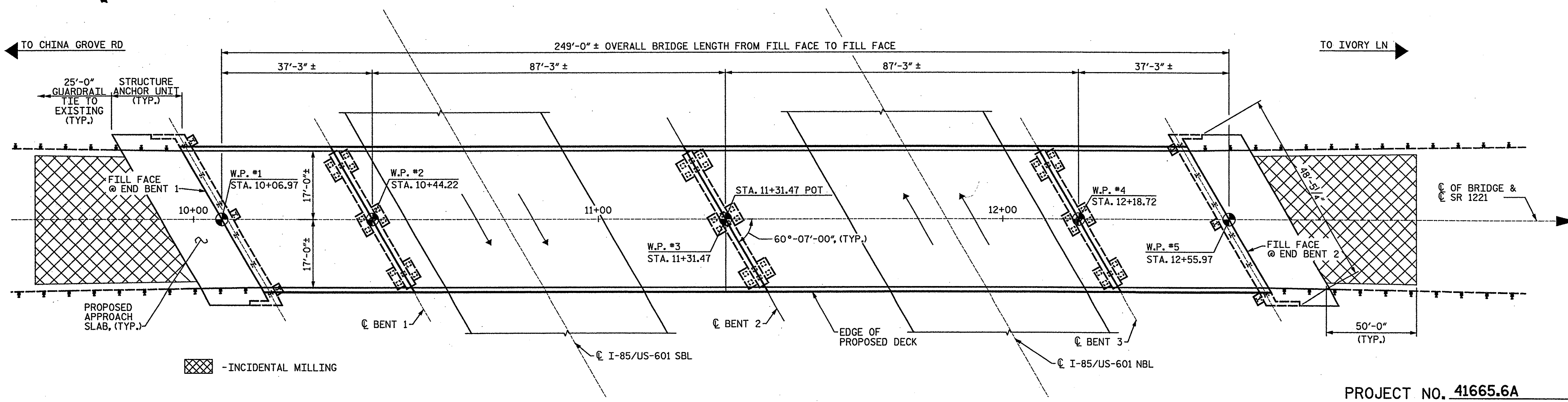
STATION INFORMATION IS SHOWN BASED ON AS-BUILT DRAWINGS.

DIMENSIONS SHOWN IN THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE AND ARE APPROXIMATE.

REMOVE EXISTING STRUCTURES IN ACCORDANCE WITH SECTION 402 OF THE STANDARD SPECIFICATIONS EXCEPT AS NOTED HEREIN.

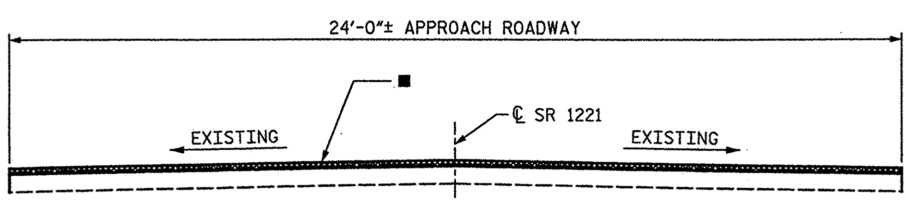
ALL EXISTING BEAMS, STEEL DIAPHRAGMS, AND SUBSTRUCTURE INCLUDING WINGWALLS WILL REMAIN IN PLACE.

THE CONTRACTOR SHALL EXERCISE CARE TO ENSURE THAT EXISTING STRUCTURAL ELEMENTS THAT ARE TO REMAIN IN PLACE ARE UNDAMAGED BY DEMOLITION ACTIVITIES. ALL DAMAGE TO EXISTING STRUCTURAL ELEMENTS THAT ARE TO REMAIN SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER AT NO COST TO THE DEPARTMENT.



-INCIDENTAL MILLING

PLAN



TYPICAL ROADWAY SECTION ⚠

■ VARIABLE DEPTH MILLING 0"- 1½". REPLACE WITH 1½" MIN. ASPHALT C1 TO TRANSITION TO EXISTING RIDING SURFACE

C1	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF 9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 1½" DEPTH.

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 1221
OVER I-85/US-601

NORTH CAROLINA PROFESSIONAL SEAL 19768 ENGINEER ... E. KELLY ... 2/25/13

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

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2			4		

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SHEET NO. S-68
TOTAL SHEETS 89

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

⚠ REV. PER NCDOT COMMENTS

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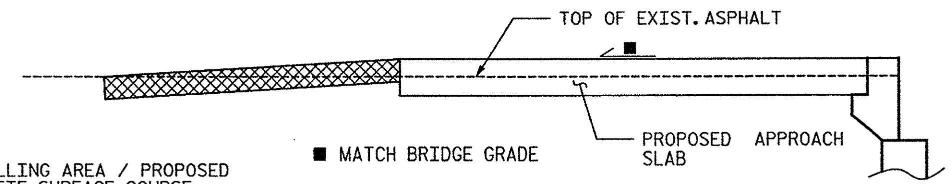
guidool

2/25/2013

TOTAL BILL OF MATERIAL ⚠

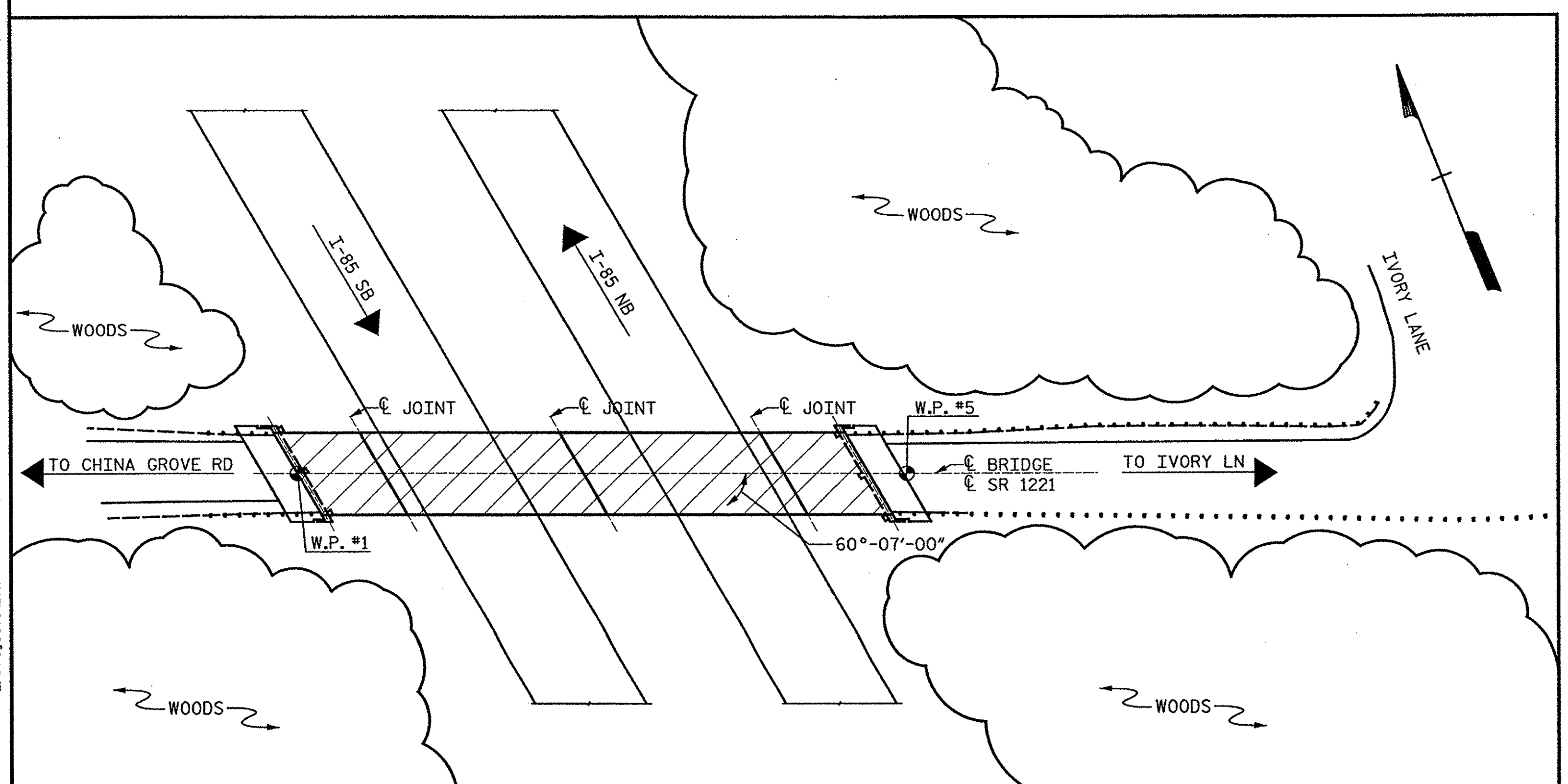
	INCIDENTAL MILLING	ASPHALT CONCRETE SURFACE COURSE TYPE SF 9.5A	STEEL BM GUARDRAIL	GUARDRAIL ANCHOR UNITS TYPE III	PARTIAL REMOVAL OF EXISTING STRUCTURE AT BRIDGE 65	UNCLASSIFIED STRUCTURE EXCAVATION AT BRIDGE 65	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONCRETE)	GROOVING BRIDGE FLOORS	BRIDGE APPROACH SLABS AT BRIDGE 65	CLEANING AND REPAINTING OF BRIDGE 65	POLLUTION CONTROL	METHOD 'A' WATERPROOFING	ONE BAR METAL RAIL	1'-0" x 1'-6" CONCRETE PARAPET(SAND LIGHTWEIGHT CONCRETE)	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	EPOXY RESIN INJECTION	CONCRETE REPAIRS (CLASS 'A')	STRUCTURAL STEEL MODIFICATION	UNDER STRUCTURE WORK PLATFORM
	SQ. YDS.	TONS	LIN. FT.	EA.	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	LUMP SUM	LUMP SUM	LUMP SUM	SQ. YD.	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM	LIN. FT.	CU. FT.	LUMP SUM	LUMP SUM
TOTAL	86	39	100	4	LUMP SUM	LUMP SUM	9027	8587	LUMP SUM	LUMP SUM	LUMP SUM	37	483	483	LUMP SUM	LUMP SUM	145	6	LUMP SUM	LUMP SUM



■ MATCH BRIDGE GRADE

INCIDENTAL MILLING AREA / PROPOSED ASPHALT CONCRETE SURFACE COURSE

BRIDGE TRANSITION



LOCATION SKETCH

NOTES:

DESIGN LIVE LOAD FOR REHABILITATED SUPERSTRUCTURE = HS-20.

THE REHABILITATED SUPERSTRUCTURE HAS BEEN DESIGNED BY THE STRENGTH DESIGN METHOD IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES 17TH ED., 2002.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

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

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT BRIDGE 65.

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.

ALL BAR SUPPORTS USED IN THE (BARRIER RAIL, PARAPET, SIDEWALK, DECK) AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

INSTALLATION OF SHEAR CONNECTORS FOR SPANS A & D SHALL BE PAID FOR AS STRUCTURAL STEEL MODIFICATION, SEE SPECIAL PROVISIONS.

FOR CLEANING AND REPAINTING OF BRIDGE 65 SEE SPECIAL PROVISIONS FOR PAINTING EXISTING STRUCTRES.

THE BRIDGE DECK, CURTAIN WALLS, TRAFFIC BARRIERS AND END POSTS OF EXISTING STRUCTURE (THE EXISTING STRUCTURE CONSISTS OF SIMPLE SPANS OF LENGTH 37'-3", 87'-3, 87'-3' AND 37'-3" APPROXIMATELY WITH A CLEAR ROADWAY WIDTH OF 34'-0" SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE ENGINEER FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE DECK (SHOWN AS HATCHED), CURTAIN WALLS SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE TRAFFIC. THE CONTRACTOR SHALL SUBMIT PLANS FOR DEMOLITION OF BRIDGE DECK, PARAPET, CURTAIN WALLS, AND TRAFFIC BARRIERS IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVISING A SYSTEM FOR REPLACEMENT OF THE EXISTING BEARING WITH THE PROPOSED ELASTOMERIC BEARING PADS SOLE PLATES, AND ANCHOR BOLTS. RAISING ALL OR PART OF THE SUPERSTRUCTURE IS ANTICIPATED. PLANS AND CALCULATIONS, SEALED BY A PROFESSIONAL ENGINEER IN THE STATE OF NORTH CAROLINA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

NORTH CAROLINA PROFESSIONAL SEAL 19768 ENGINEER PAUL E. KELLY 2/27/13

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH AND TOTAL BILL OF MATERIALS

BRIDGE ON SR 1221 OVER I-85/US-601

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-69
1	STV	6-12	3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

⚠ REV. PER NCDOT COMMENTS

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pkelly

2/27/2013

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: LIVE-LOAD FACTORS (γ_{LL})	STRENGTH I MOMENT: DISTRIBUTION FACTORS (DF)	STRENGTH I MOMENT: RATING FACTOR	STRENGTH I MOMENT: SPAN	STRENGTH I MOMENT: GIRDER LOCATION	STRENGTH I MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	STRENGTH I SHEAR: DISTRIBUTION FACTORS (DF)	STRENGTH I SHEAR: RATING FACTOR	STRENGTH I SHEAR: SPAN	STRENGTH I SHEAR: GIRDER LOCATION	STRENGTH I SHEAR: DISTANCE FROM LEFT END OF SPAN (ft)	SERVICE II LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	SERVICE II MOMENT: DISTRIBUTION FACTORS (DF)	SERVICE II MOMENT: RATING FACTOR	SERVICE II MOMENT: SPAN	SERVICE II MOMENT: GIRDER LOCATION	SERVICE II MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	COMMENT NUMBER
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.13	--	1.75	0.584	1.26	B	I	43.12	0.779	3.12	B	I	0	1.30	0.584	1.13	B	I	43.12	
DESIGN LOAD RATING		HL-93 (OPERATING)	N/A		1.47	--	1.35	0.584	2.20	B	I	43.12	0.779	5.46	B	I	0	1.00	0.584	1.47	B	I	43.12	
DESIGN LOAD RATING		HS-20 (INVENTORY)	36.00	(2)	1.51	54.360	1.75	0.584	1.69	B	I	43.12	0.779	3.79	B	I	0	1.30	0.584	1.51	B	I	43.12	
DESIGN LOAD RATING		HS-20 (OPERATING)	36.00		1.97	70.920	1.35	0.584	2.19	B	I	43.12	0.779	4.92	B	I	0	1.00	0.584	1.97	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.81	51.435	1.40	0.584	5.23	B	I	43.12	0.779	10.29	B	I	86.25	1.30	0.584	3.81	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNGARBS2	20.000		2.58	51.600	1.40	0.584	3.59	B	I	43.12	0.779	7.65	B	I	0	1.30	0.584	2.58	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGRIS2	22.000		2.39	52.580	1.40	0.584	3.34	B	I	43.12	0.779	7.24	B	I	0	1.30	0.584	2.39	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNCOTTS3	27.250		1.78	48.505	1.40	0.584	2.48	B	I	43.12	0.779	5.11	B	I	86.25	1.30	0.584	1.78	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNAGGRS4	34.925		1.46	50.991	1.40	0.584	2.03	B	I	43.12	0.779	4.59	B	I	0	1.30	0.584	1.46	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS5A	35.550		1.44	51.192	1.40	0.584	2.01	B	I	43.12	0.779	4.78	B	I	0	1.30	0.584	1.44	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS6A	39.950		1.31	52.335	1.40	0.584	1.83	B	I	43.12	0.779	4.44	B	I	0	1.30	0.584	1.31	B	I	43.12	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNS7B	42.000		1.25	52.500	1.40	0.584	1.74	B	I	43.12	0.779	4.32	B	I	86.25	1.30	0.584	1.25	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.71	56.430	1.40	0.584	2.35	B	I	43.12	0.779	5.18	B	I	0	1.30	0.584	1.71	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT4A	33.075		1.60	52.920	1.40	0.584	2.22	B	I	43.12	0.779	4.96	B	I	0	1.30	0.584	1.60	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT6A	41.600		1.30	54.080	1.40	0.584	1.81	B	I	43.12	0.779	4.60	B	I	86.25	1.30	0.584	1.30	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7A	42.000		1.30	54.600	1.40	0.584	1.81	B	I	43.12	0.779	4.30	B	I	0	1.30	0.584	1.30	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7B	42.000		1.32	55.440	1.40	0.584	1.84	B	I	43.12	0.779	4.26	B	I	0	1.30	0.584	1.32	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT4	43.000		1.27	54.610	1.40	0.584	1.77	B	I	43.12	0.779	4.06	B	I	0	1.30	0.584	1.27	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5A	45.000		1.21	54.450	1.40	0.584	1.69	B	I	43.12	0.779	4.30	B	I	86.25	1.30	0.584	1.21	B	I	43.12	
LEGAL LOAD RATING	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5B	45.000	(3)	1.19	53.550	1.40	0.584	1.66	B	I	43.12	0.779	3.84	B	I	0	1.30	0.584	1.19	B	I	43.12	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		1.00																			

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. 1" OF FUTURE WEARING SURFACE ASSUMED FOR RATING.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) ✱✱

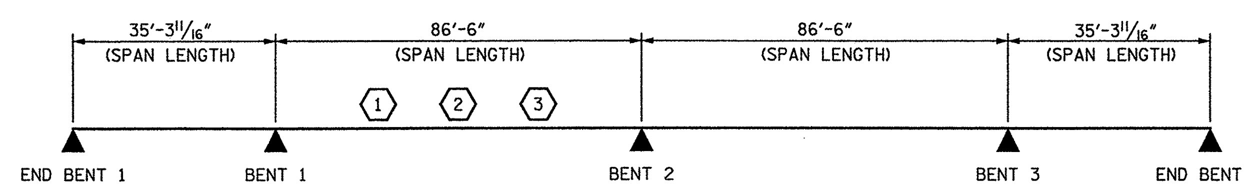
(2) DESIGN LOAD RATING (HS-20) ✱✱

(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. 41665.6A
ROWAN COUNTY
BRIDGE NO.: 065

NORTH CAROLINA PROFESSIONAL SEAL 19765 PAUL E. KELLY, JR. 11/28/12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR STEEL GIRDERS (NON-INTERSTATE TRAFFIC)

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-70
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AR DATE : 11-12
CHECKED BY : AC DATE : 11-12

STD. NO. LRFR3

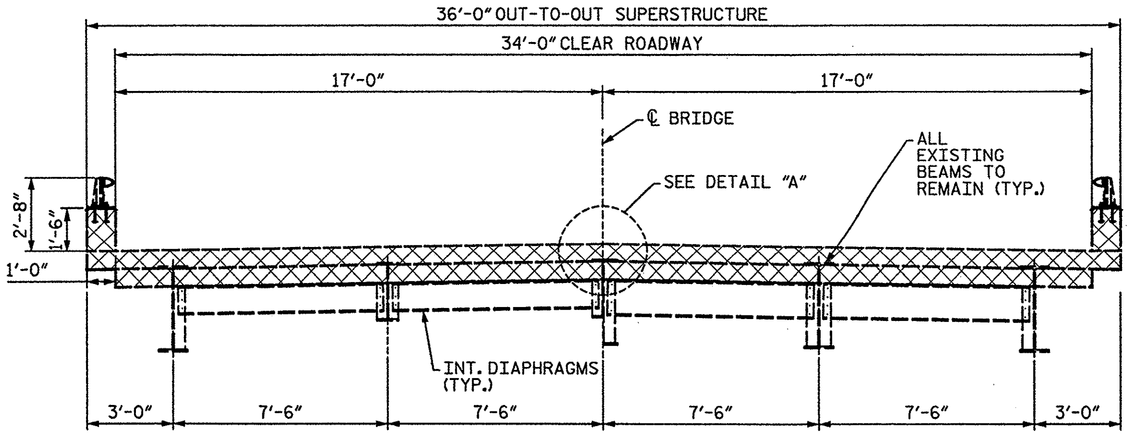
NOTES:

SEE SHEET NO. SN FOR GENERAL NOTES.

EXISTING BRIDGE INFORMATION BASED ON BEST AVAILABLE DATA.

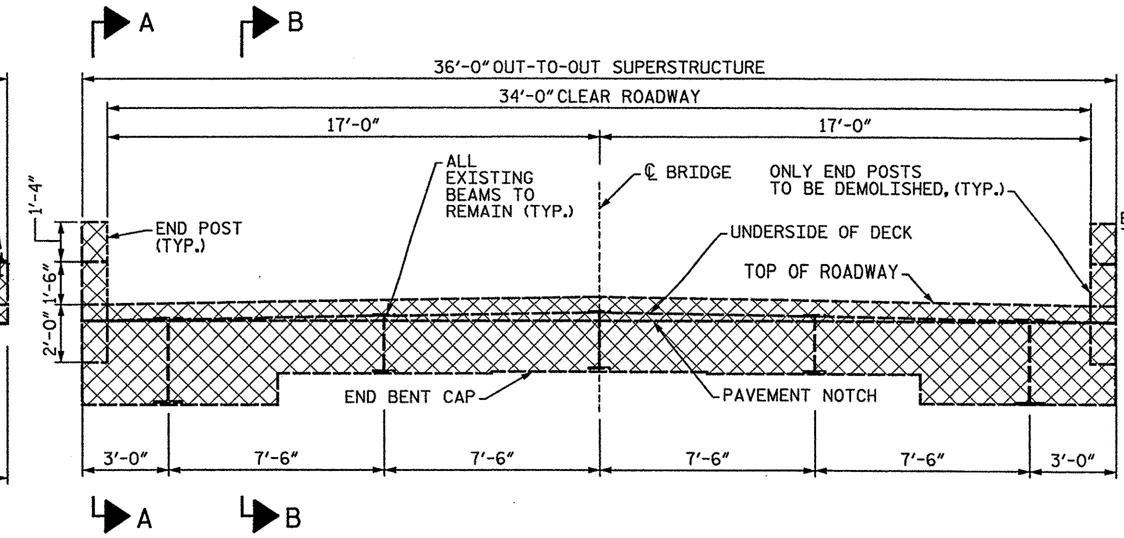
ALL EXISTING BEAMS, DIAPHRAGMS, AND SUBSTRUCTURE INCLUDING WINGWALLS TO REMAIN.

EXISTING CONCRETE TO BE REMOVED

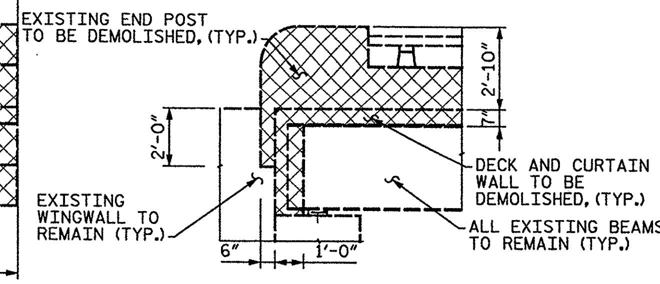


TYPICAL SECTION - EXISTING

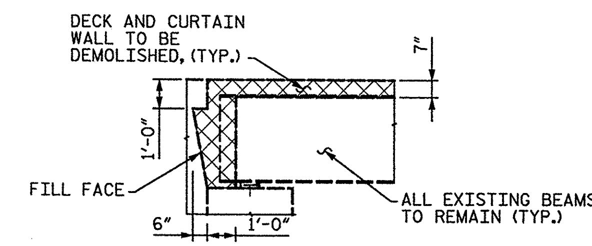
(DIAPHRAGMS AT BENTS SHOWN)



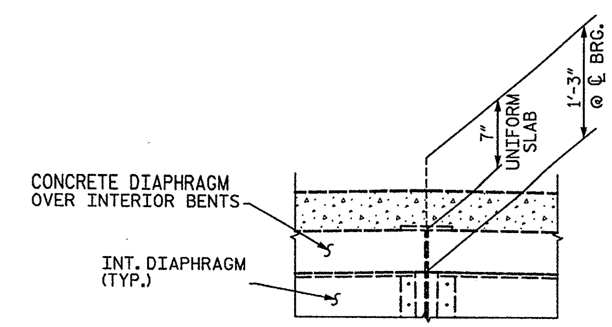
END ELEVATION - EXISTING



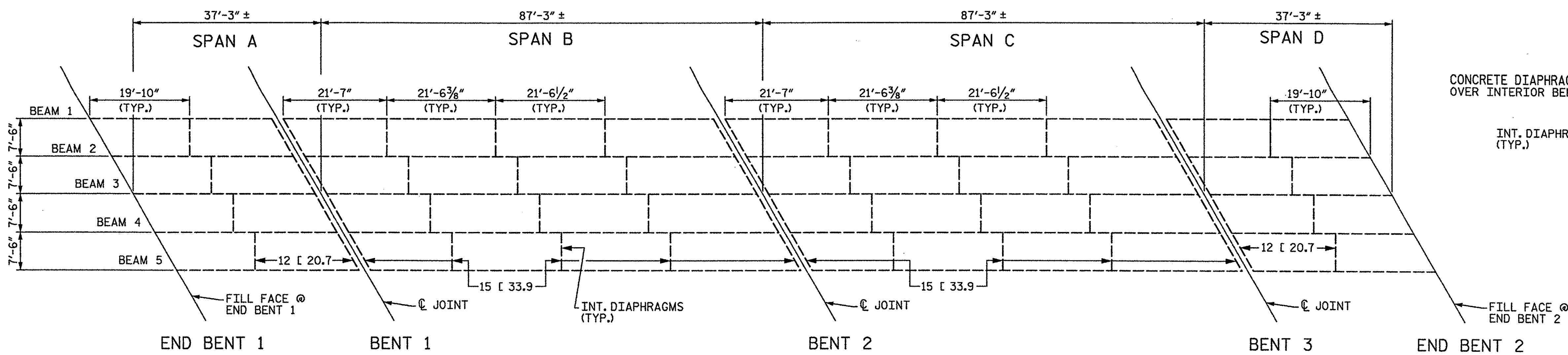
SECTION A-A



SECTION B-B



DETAIL "A"



NOTE: ALL EXISTING BEAMS TO REMAIN.

CARE SHALL BE EXERCISED WHILE DEMOLISHING THE EXISTING SLAB, SO THAT THE EXISTING SHEAR STUDS ON THE BEAMS IN SPAN 'B' AND SPAN 'C' ARE NOT DAMAGED. ANY SHEAR STUDS THAT ARE DAMAGED SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

FRAMING PLAN - EXISTING

FOR INFORMATION ONLY

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
EXISTING BRIDGE DETAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19789 PAUL E. KELLY, JR. 5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-71
1			3					TOTAL SHEETS
2			4					89

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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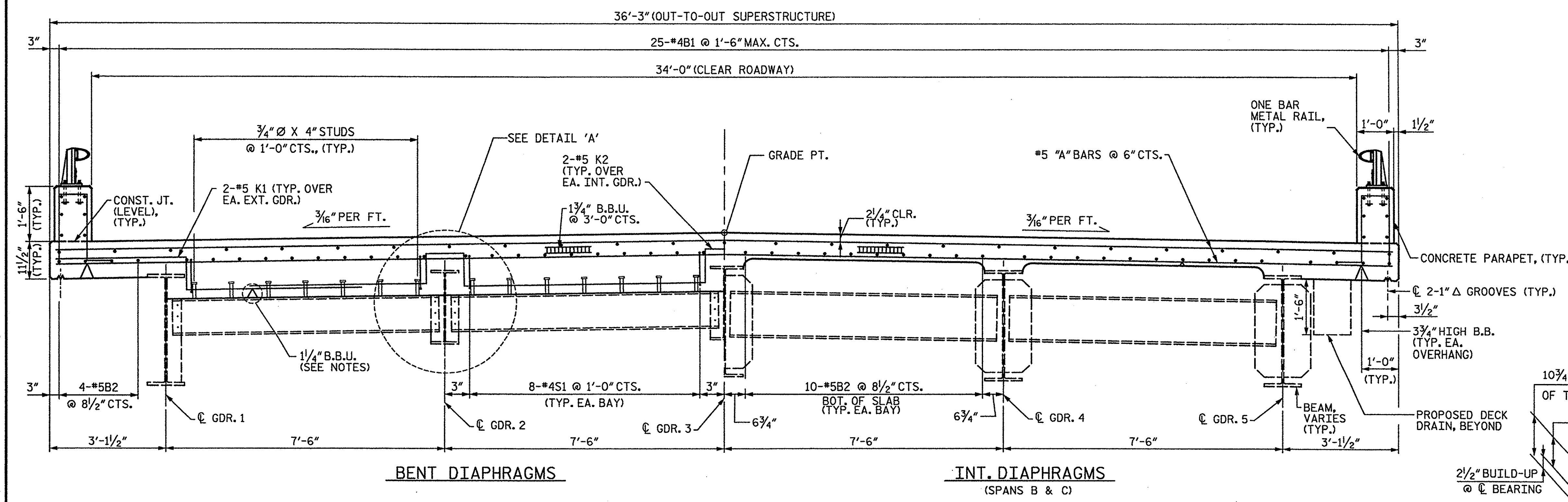
alveyac

5/17/2012



TYPICAL SECTION - PROPOSED

(DIAPHRAGMS AT BENTS SHOWN)

NOTES:

SEE SHEET NO. SN FOR GENERAL NOTES.

EXISTING BRIDGE INFORMATION BASED ON BEST AVAILABLE DATA.

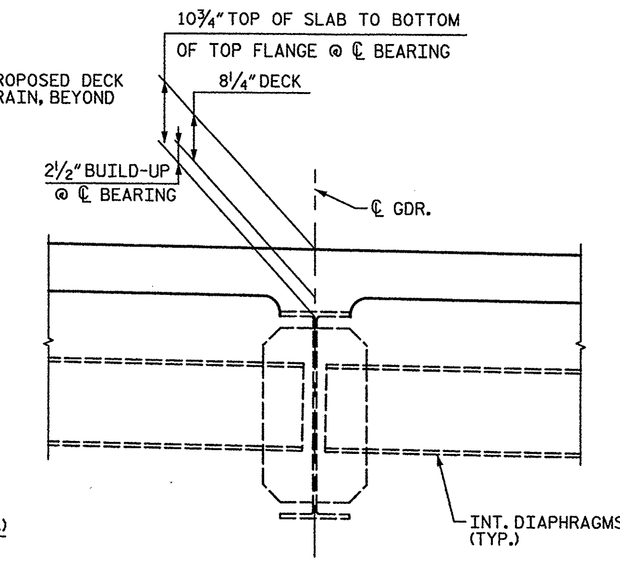
REMOVEABLE FORMS MUST BE USED FOR DECK CONSTRUCTION. STAY-IN-PLACE FORMS WILL NOT BE PERMITTED.

WHEN USING REMOVEABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 1 1/4" ABOVE THE TOP OF THE REMOVEABLE FORM.

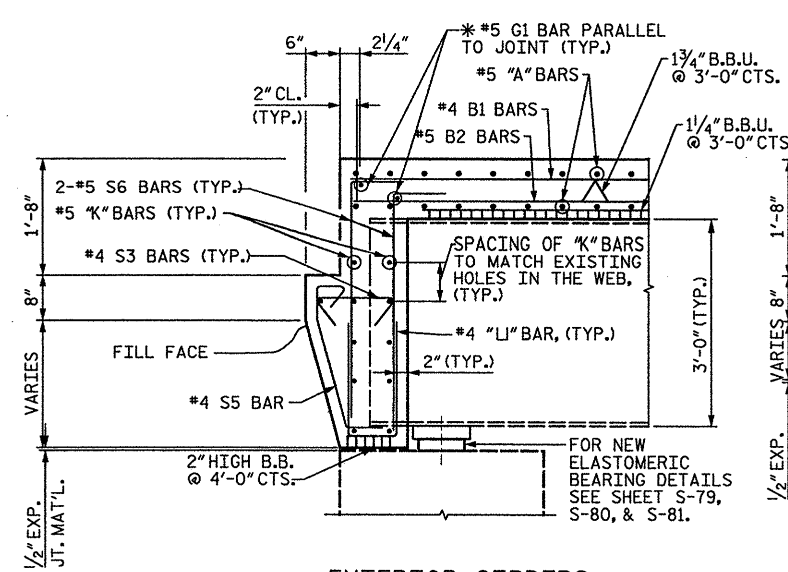
NEW SHEAR STUDS SHALL BE ATTACHED TO BEAMS IN SPANS 'A' AND 'D'.

SEE SHEET S-77 FOR PROPOSED SHEAR STUD DETAIL FOR SPANS A & D.

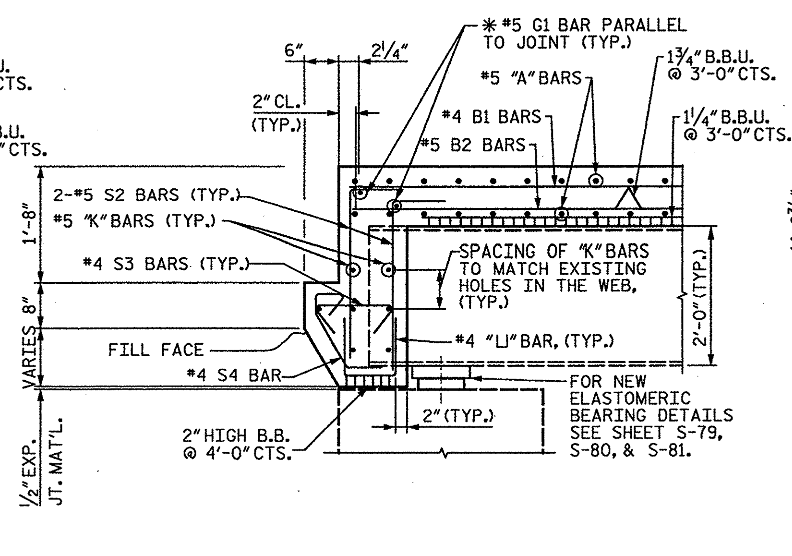
SEE NOTE ON SHEET S-75 FOR SHEAR STUDS IN SPANS B & C.



DETAIL 'A'



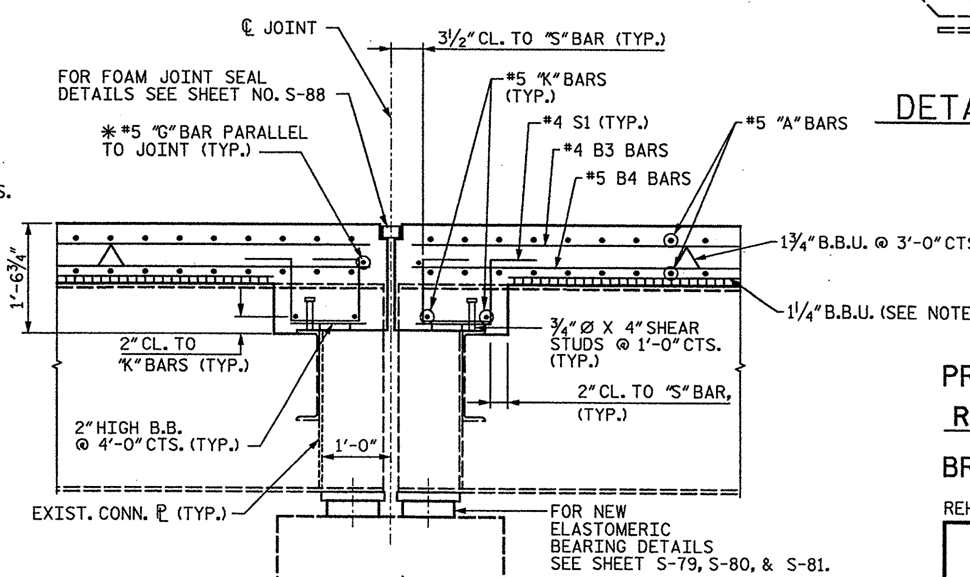
EXTERIOR GIRDERS



INTERIOR GIRDERS

PROPOSED SECTION @ END BENT

✱ #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



PROPOSED SECTION @ BENTS

✱ #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19765 E. KELLY, JR. 5/17/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 — SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION AND DETAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-72
1			3			TOTAL SHEETS
2			4			89

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
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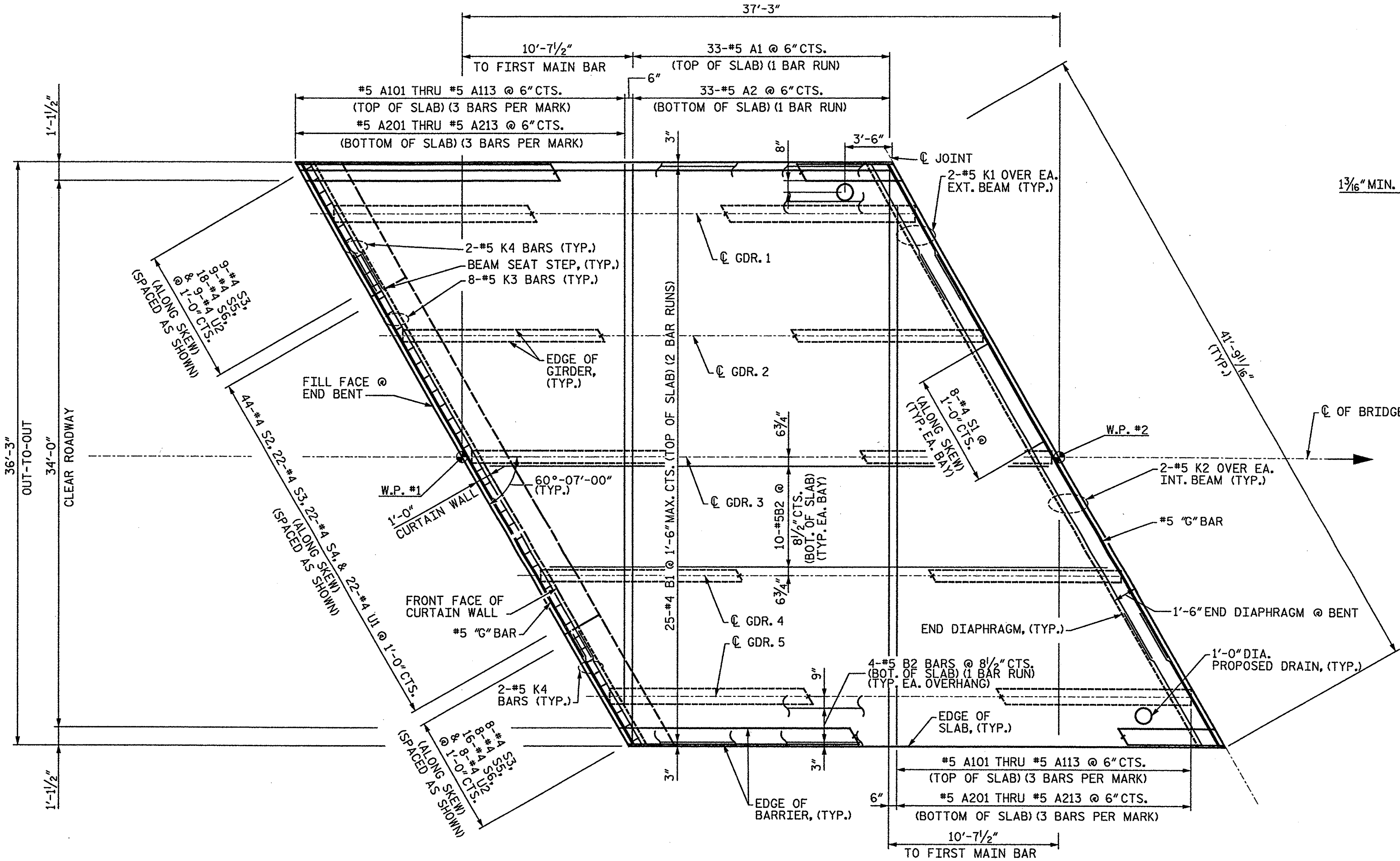
alveyco

5/17/2012

NOTES:

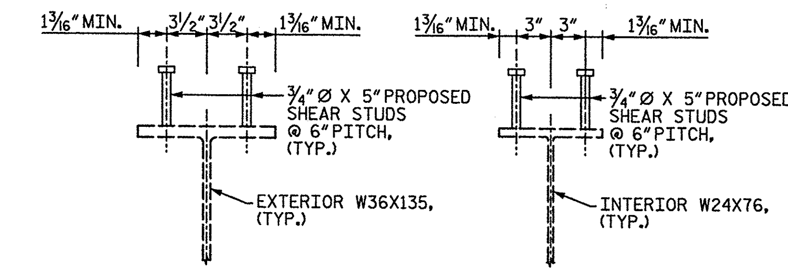
SEE SHEET NO. SN FOR GENERAL NOTES.

REMOVEABLE FORMS MUST BE USED FOR DECK CONSTRUCTION. STAY-IN-PLACE FORMS WILL NOT BE PERMITTED.



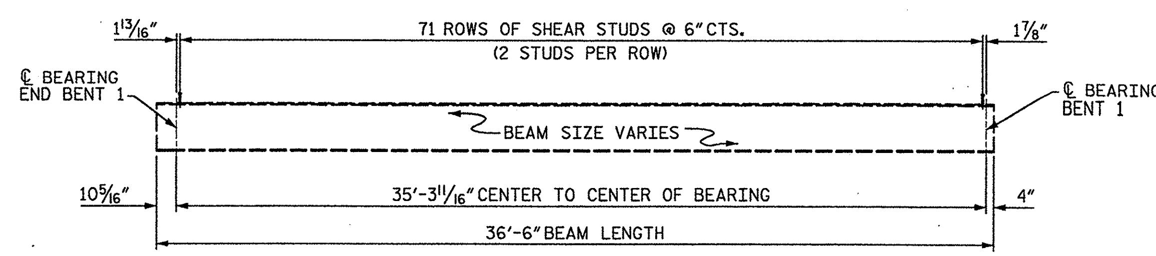
PLAN OF SPANS - SPAN A & D

(SPAN A SHOWN, SPAN D IS MIRRORED)



SPANS A & D

SHEAR STUD DETAILS



BEAM ELEVATION

(SPAN A SHOWN, SPAN D IS MIRRORED)

NORTH CAROLINA PROFESSIONAL SEAL ... E. KELLY, JR. 5/17/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-73
1			3					TOTAL SHEETS
2			4					89

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Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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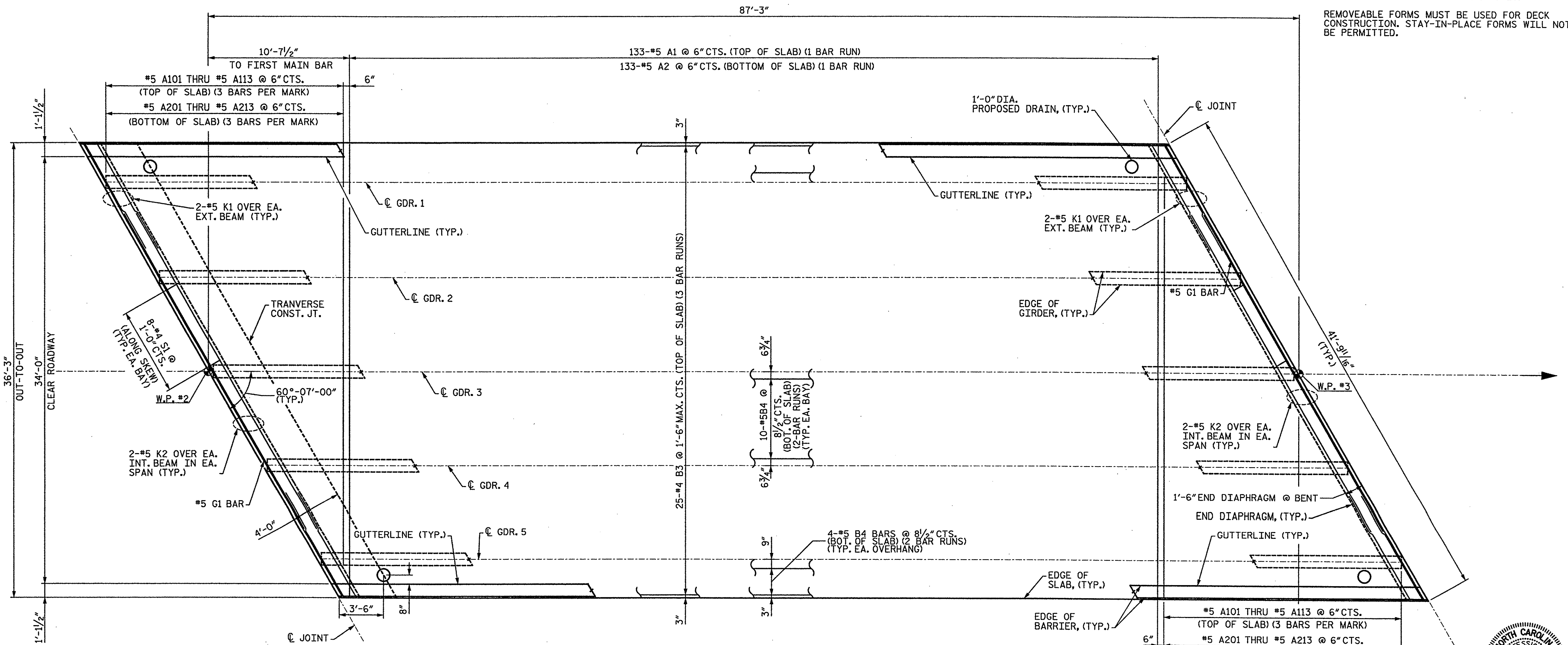
alveyac

5/17/2012

NOTES:

SEE SHEET NO. SN FOR GENERAL NOTES.

REMOVEABLE FORMS MUST BE USED FOR DECK CONSTRUCTION. STAY-IN-PLACE FORMS WILL NOT BE PERMITTED.



PLAN OF SPANS - SPAN B & C

(SPAN B SHOWN, SPAN C IS SIMILAR)

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 19765 — 5/17/12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-74
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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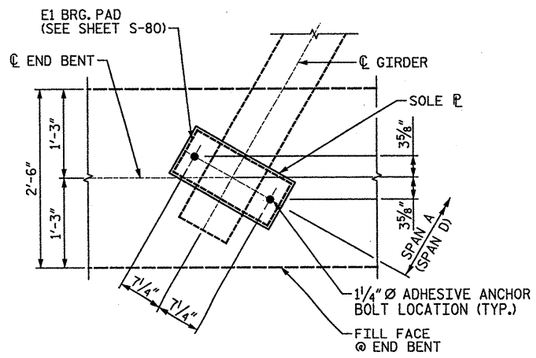
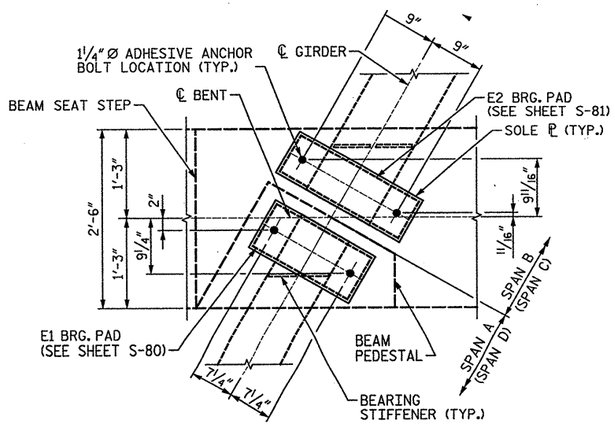
5/17/2012 dveyoc



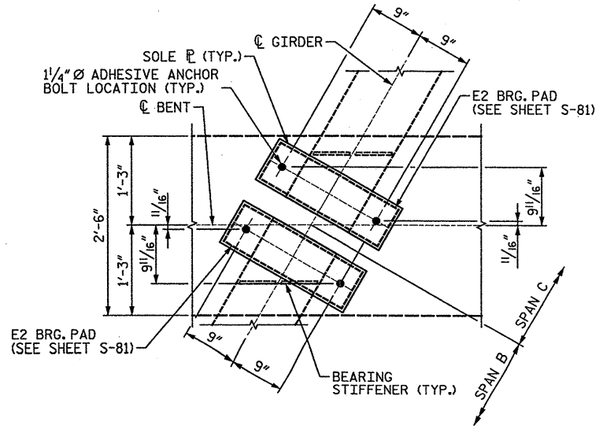
ANCHOR BOLT PLACEMENT DETAIL - END BENT 1 & 2

(END BENT 2 SHOWN IN PARENTHESIS)



ANCHOR BOLT PLACEMENT DETAIL - BENT 1 & 3

(BENT 3 SHOWN IN PARENTHESIS)



ANCHOR BOLT PLACEMENT DETAIL - BENT 2

⚠ NOTES

EXISTING ANCHOR BOLTS WILL BE CUT AND GROUND FLUSH WITH TOP OF CAP.

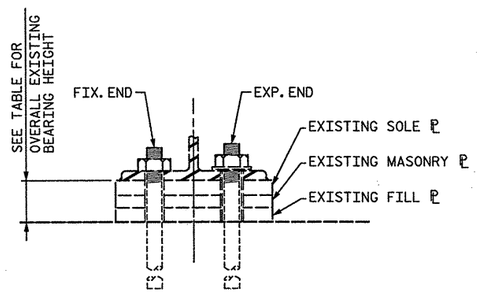
ADHESIVE ANCHOR BOLTS FOR BENT AND END BENT CAPS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS WITH A SAFE WORKING LOAD OF 20 KIPS TENSION AND 12 KIPS SHEAR.

REMOVAL OF EXISTING ANCHOR BOLTS, INSTALLATION OF PROPOSED ADHESIVELY ANCHORED BOLTS, AND ALL WORK, MATERIAL AND EQUIPMENT NECESSARY TO COMPLETE THE ACCEPTED WORK, SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

APPLY AN EPOXY PROTECTIVE COATING TO TOP SURFACES OF BENT AND END BENT CAPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. PRIOR TO APPLICATION THE CAPS SHALL BE THOROUGHLY CLEANED BY POWER WASHING. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE ELASTOMERIC BEARING INSTALLATION, NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

FOR ELASTOMERIC BEARING DETAILS, SEE SHEETS S-80 & S-81.

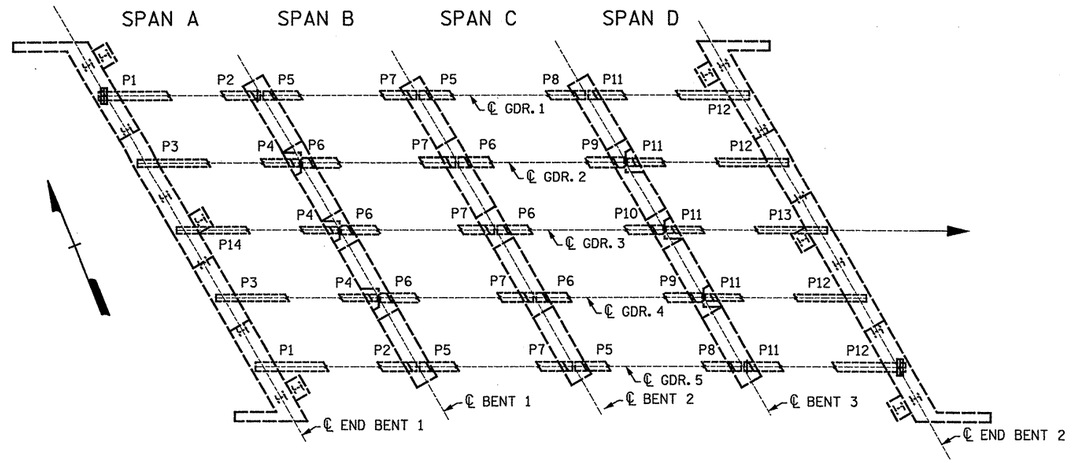
FOR SOLE PLATE DETAILS, SEE SHEETS S-80 & S-81.



END VIEW - EXISTING BEARINGS

EXISTING BEAM SEAT ELEVATIONS*							
GIRDER	END BENT 1	BENT 1		BENT 2	BENT 3		END BENT 2
	SPAN A	SPAN A	SPAN B	SPAN B & C	SPAN C	SPAN D	SPAN D
G1	681.06	681.29	681.29	681.33	680.55	680.55	680.00
G2	682.17	682.41	681.45	681.45	680.63	681.57	681.00
G3	682.24	682.54	681.59	681.54	680.63	681.63	681.00
G4	682.24	682.44	681.49	681.40	680.50	681.44	680.84
G5	681.20	681.37	681.37	681.24	680.30	680.30	679.68

* ELEVATIONS SHOWN ARE BASED ON AS-BUILT PLANS & ARE FOR INFORMATION ONLY. THE CONTRACTOR MUST VERIFY ALL ELEVATIONS BEFORE COMMENCING WORK.



SOLE PLATE LOCATION PLAN

(SEE SHEET S-80 FOR SOLE PLATE DIMENSIONS)

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER RALPH E. KISER
6/15/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BEARING REPLACEMENT PLAN

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-75
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : AFM DATE : 05-12
CHECKED BY : AC DATE : 05-12

⚠ ADDED NOTES, REV. ANCHOR BOLTS

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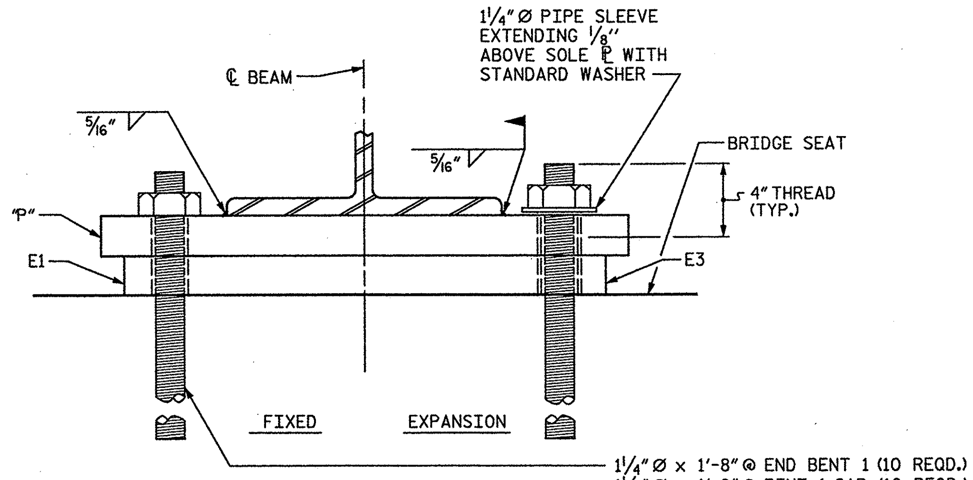
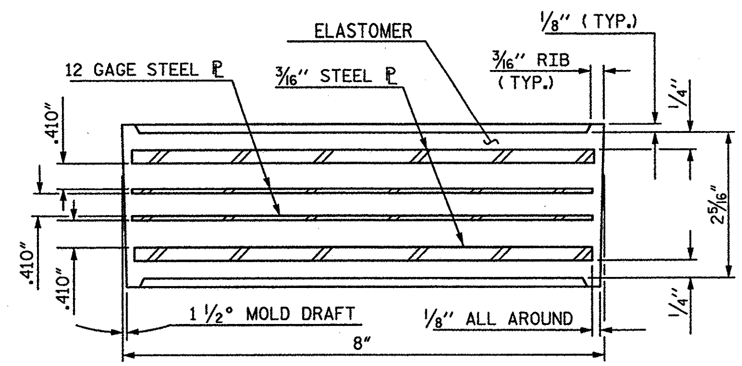
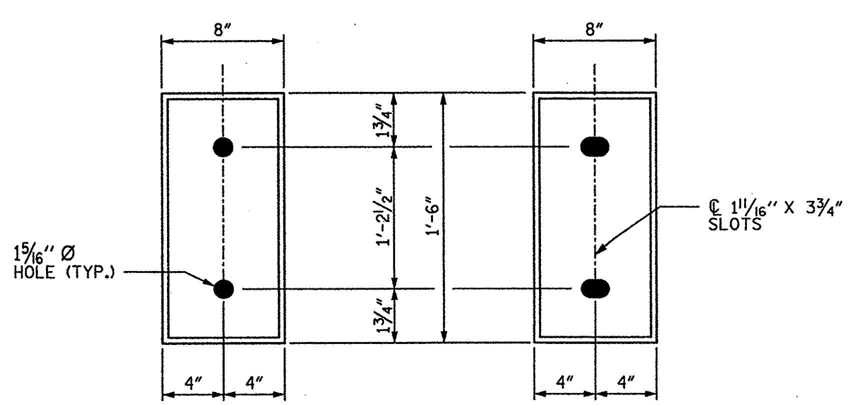
6/15/2012



END VIEW ⚠

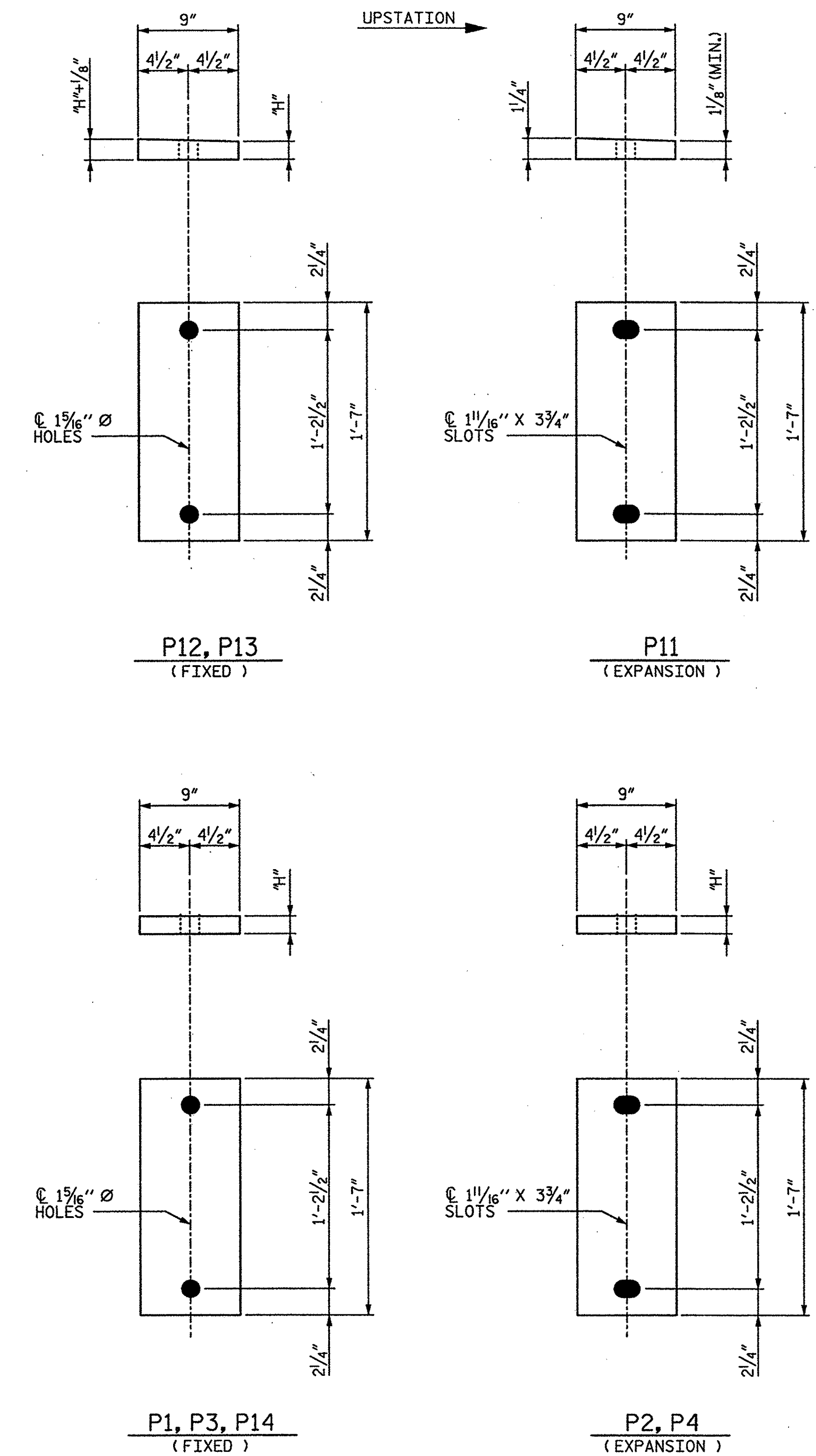


TYPICAL SECTION OF ELASTOMERIC BEARING E1



E1 (20 REQ'D)   E3 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING



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 1¼" 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 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.

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

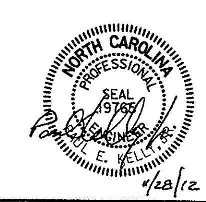
SOLE PLATE			
TYPE	"H"	"W"	REQ'D
P1	1 1/16"	9"	2
P2	1 5/16"	9"	2
P3	1 3/16"	9"	2
P4	1¼"	9"	3
P5	1 3/16"	8"	4
P6	1⅛"	8"	6
P7	1 3/16"	8"	5
P8	1⅛"	8"	2
P9	1 1/16"	8"	2
P10	1 11/16"	8"	1
P11	1⅛"	8"	5
P12	1⅛"	9"	4
P13	1 9/16"	9"	1
P14	2 3/16"	9"	1

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065   SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-76
1	STV	6-12	3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : ACA   DATE : 06-12
CHECKED BY : PEK   DATE : 06-12

⚠ REV. ANCHOR BOLT, ELAST. BEARING, AND SOLE ℙ

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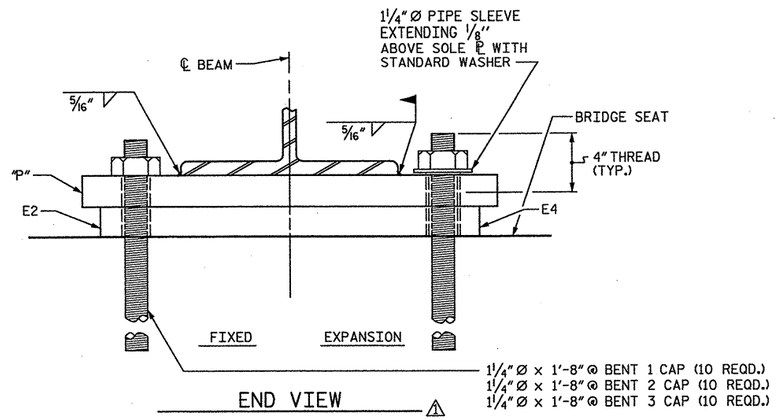
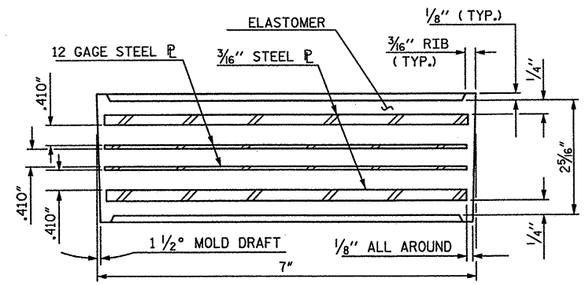
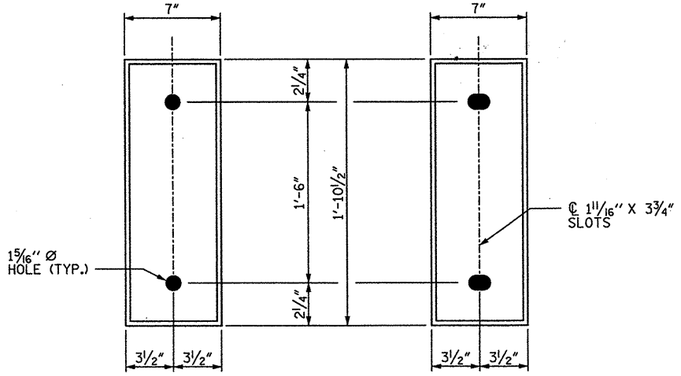
11/28/2012



END VIEW ⚠1

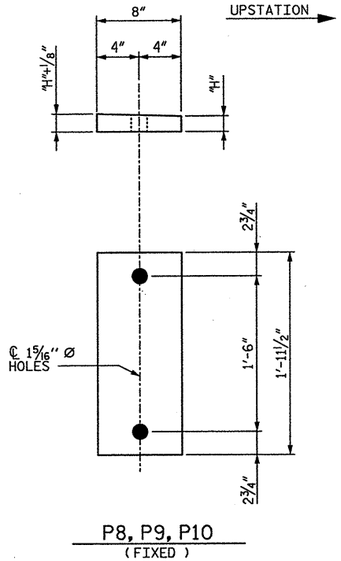


TYPICAL SECTION OF ELASTOMERIC BEARING E2



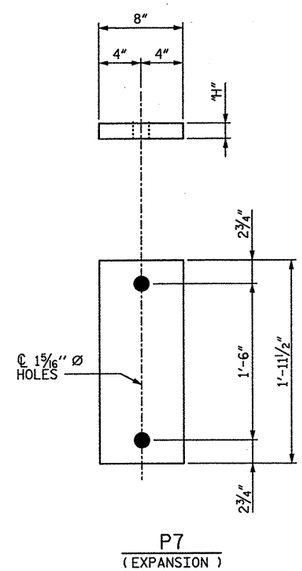
E2 (20 REQ'D) E4 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING



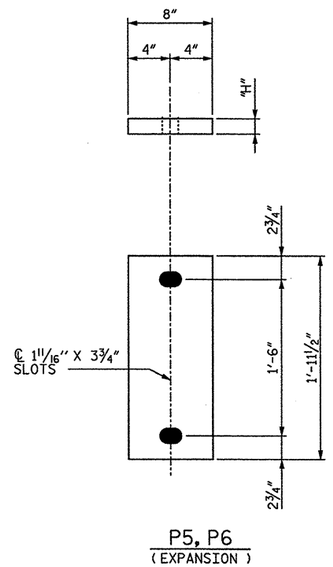
P8, P9, P10

(FIXED)



P7

(EXPANSION)



P5, P6

(EXPANSION)

SOLE PLATE DETAILS ("P")

NOTES

SEE SHEET S-80 FOR NOTES.

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-77
1	STV	6-12	3			TOTAL SHEETS
2			4			89

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER PAUL E. KELLY

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : ACA DATE : 06-12
CHECKED BY : PEK DATE : 06-12

⚠1 REV. ANCHOR BOLT, ELAST. BEARING, AND SOLE ℙ

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11/28/2012

DEAD LOAD DEFLECTION TABLE FOR BEAMS

	SPANS A & D																					
	GIRDER 1 & 5											GIRDERS 2, 3 & 4										
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	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.002	0.003	0.004	0.005	0.005	0.005	0.004	0.003	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.005	0.007	0.008	0.008	0.008	0.007	0.005	0.003	0.000	0.000	0.011	0.020	0.027	0.032	0.034	0.032	0.027	0.020	0.011	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.003	0.007	0.009	0.011	0.011	0.011	0.009	0.007	0.003	0.000	0.000	0.013	0.024	0.032	0.038	0.040	0.038	0.032	0.024	0.013	0.000
	SPANS B & C																					
	GIRDER 1											GIRDER 3										
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	0.021	0.038	0.051	0.059	0.063	0.060	0.052	0.038	0.021	0.000	0.000	0.022	0.041	0.055	0.064	0.067	0.064	0.055	0.040	0.022	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.061	0.109	0.145	0.168	0.179	0.171	0.147	0.109	0.061	0.000	0.000	0.077	0.140	0.188	0.219	0.230	0.219	0.188	0.138	0.075	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0.000	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.011	0.008	0.004	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.087	0.155	0.206	0.239	0.254	0.243	0.208	0.155	0.087	0.000	0.000	0.104	0.188	0.254	0.295	0.310	0.295	0.253	0.185	0.101	0.000
	GIRDERS 2 & 4											GIRDER 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	0.022	0.041	0.055	0.064	0.067	0.064	0.055	0.040	0.022	0.000	0.000	0.022	0.039	0.051	0.059	0.062	0.060	0.051	0.037	0.021	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.075	0.137	0.185	0.214	0.225	0.215	0.184	0.135	0.073	0.000	0.000	0.062	0.111	0.146	0.168	0.177	0.170	0.146	0.107	0.059	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.004	0.008	0.011	0.012	0.013	0.012	0.010	0.008	0.004	0.000	0.000	0.004	0.008	0.010	0.012	0.012	0.012	0.010	0.007	0.004	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.102	0.185	0.250	0.290	0.305	0.290	0.249	0.182	0.099	0.000	0.000	0.088	0.158	0.208	0.239	0.251	0.242	0.208	0.151	0.084	0.000

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM).

VERTICAL CURVE ORDINATE TABLE FOR BEAMS

	SPAN A											SPAN B										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
GIRDER 1	0.000	0.034	0.066	0.097	0.126	0.153	0.180	0.204	0.227	0.249	0.269	0.000	0.041	0.074	0.099	0.115	0.123	0.123	0.115	0.098	0.073	0.040
GIRDER 2	0.000	0.032	0.062	0.091	0.119	0.145	0.169	0.192	0.213	0.233	0.252	0.000	0.037	0.066	0.087	0.099	0.103	0.099	0.086	0.065	0.036	-0.001
GIRDER 3	0.000	0.030	0.059	0.086	0.112	0.136	0.159	0.180	0.199	0.218	0.234	0.000	0.033	0.058	0.074	0.083	0.082	0.074	0.057	0.033	-0.001	-0.042
GIRDER 4	0.000	0.028	0.055	0.081	0.105	0.127	0.148	0.168	0.186	0.202	0.217	0.000	0.029	0.050	0.062	0.066	0.062	0.050	0.029	0.000	-0.037	-0.083
GIRDER 5	0.000	0.027	0.052	0.076	0.098	0.119	0.138	0.155	0.172	0.186	0.199	0.000	0.025	0.041	0.050	0.050	0.042	0.025	0.000	-0.033	-0.074	-0.124
	SPAN C											SPAN D										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
GIRDER 1	0.000	-0.042	-0.091	-0.150	-0.216	-0.291	-0.374	-0.465	-0.564	-0.672	-0.788	0.000	-0.052	-0.106	-0.161	-0.217	-0.276	-0.335	-0.396	-0.459	-0.523	-0.589
GIRDER 2	0.000	-0.046	-0.100	-0.162	-0.232	-0.311	-0.398	-0.494	-0.597	-0.709	-0.829	0.000	-0.054	-0.109	-0.166	-0.224	-0.284	-0.346	-0.409	-0.473	-0.539	-0.606
GIRDER 3	0.000	-0.050	-0.108	-0.174	-0.249	-0.332	-0.423	-0.522	-0.630	-0.746	-0.870	0.000	-0.056	-0.113	-0.171	-0.231	-0.293	-0.356	-0.421	-0.487	-0.555	-0.624
GIRDER 4	0.000	-0.054	-0.116	-0.186	-0.265	-0.352	-0.447	-0.551	-0.663	-0.783	-0.911	0.000	-0.057	-0.116	-0.177	-0.238	-0.302	-0.367	-0.433	-0.501	-0.570	-0.641
GIRDER 5	0.000	-0.058	-0.124	-0.199	-0.281	-0.372	-0.472	-0.579	-0.695	-0.819	-0.952	0.000	-0.059	-0.120	-0.182	-0.245	-0.310	-0.377	-0.445	-0.515	-0.586	-0.659

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM).

NOTE:
CONTRACTOR IS RESPONSIBLE FOR VERIFYING CAMBER OF EXISTING STEEL GIRDERS.

AS-BUILT CAMBER	
SPANS A & D - ALL GIRDERS	*
SPANS B & C - ALL GIRDERS	4 13/16"

* NO AS-BUILT SHOP CAMBER
CAMBER VALUE REPORTED AT MID-SPAN OF GIRDER

NORTH CAROLINA PROFESSIONAL SEAL 19769 ENGINEER PAUL E. WELLS, JR.
5/1/12

PROJECT NO. 41665.6A
ROWAN COUNTY
BRIDGE NO.: 065
REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-78
1			3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : AFM DATE : 05-12
CHECKED BY : AC DATE : 05-12

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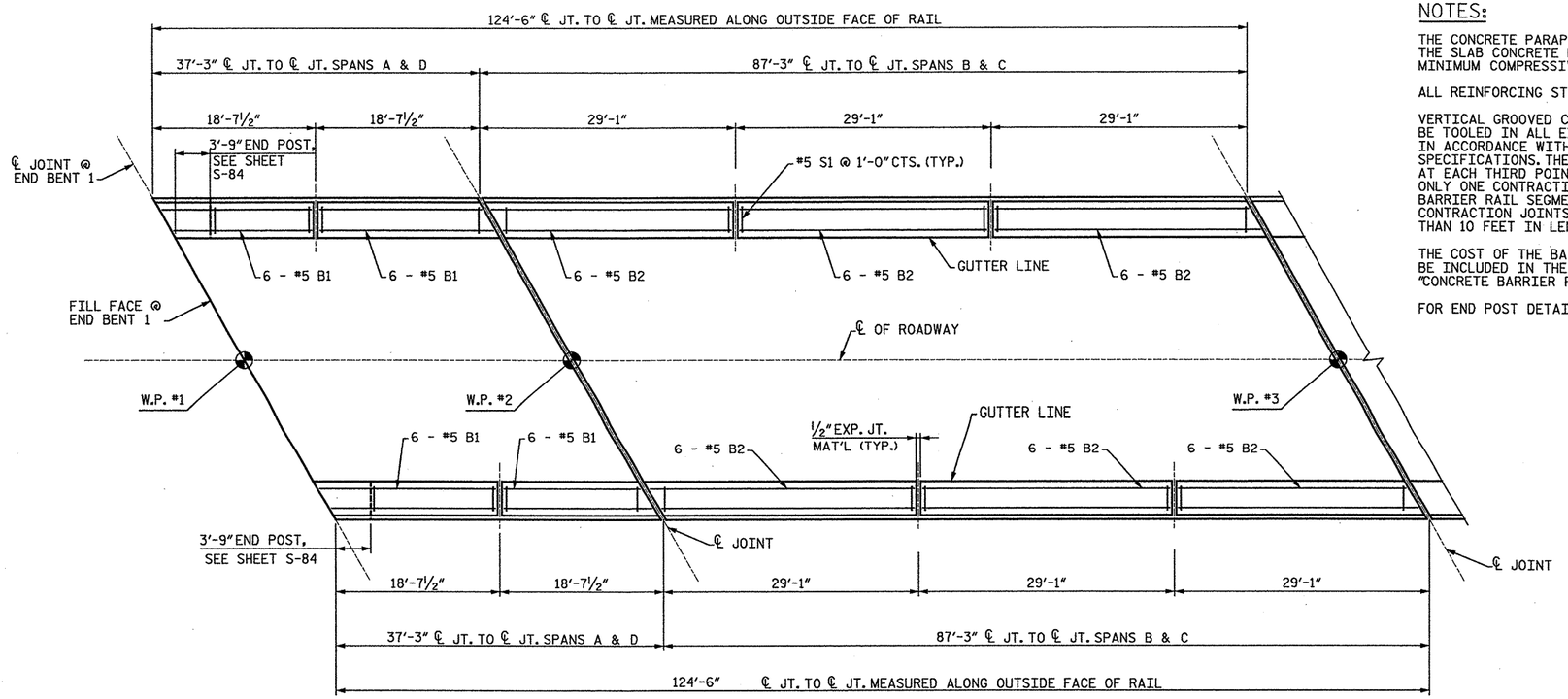
5/17/2012



HALF PLAN OF CONCRETE PARAPET - SPANS A & B

(SPANS C & D MIRRORED)

NOTES:

THE CONCRETE PARAPET IN SPAN "A" SHALL NOT BE CAST UNTIL THE SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

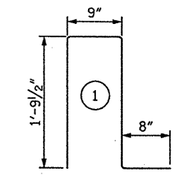
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY.

VERTICAL GROOVED CONTRACTION JOINTS, ½ IN DEPTH SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

FOR END POST DETAILS, SEE SHEET S-84.

BAR TYPES

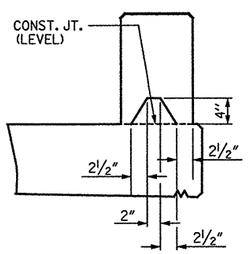


BILL OF MATERIAL

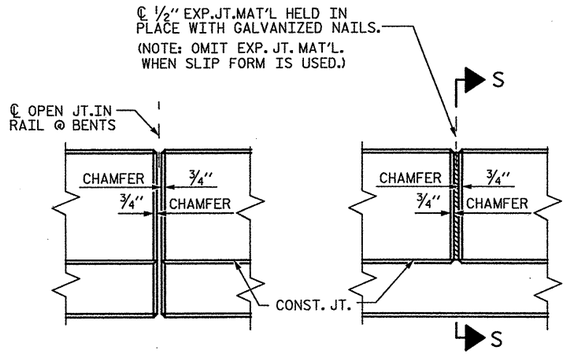
FOR CONCRETE PARAPET ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	48	#5	STR	18'-1"	906
✱ B2	72	#5	STR	28'-7"	2148
✱ S1	469	#5	①	5'-0"	2448

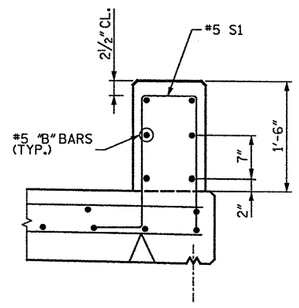
✱ EPOXY COATED REINFORCING STEEL	LBS.	5502
CLASS AA LIGHTWEIGHT CONCRETE	C. Y.	27
LIGHTWEIGHT CONCRETE PARAPET	L.F.	483



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



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

CONCRETE PARAPET DETAILS

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-79
1			3			TOTAL SHEETS
2			4			89

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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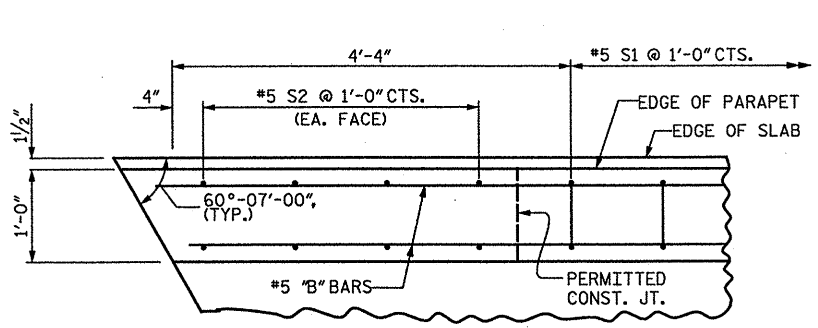
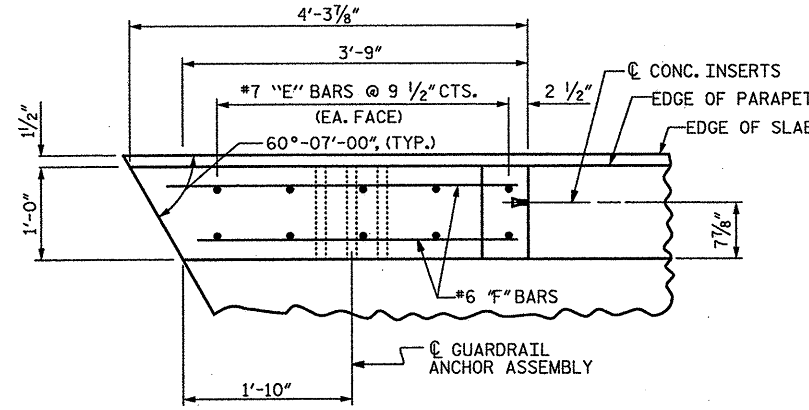
5/17/2012 diveyoo



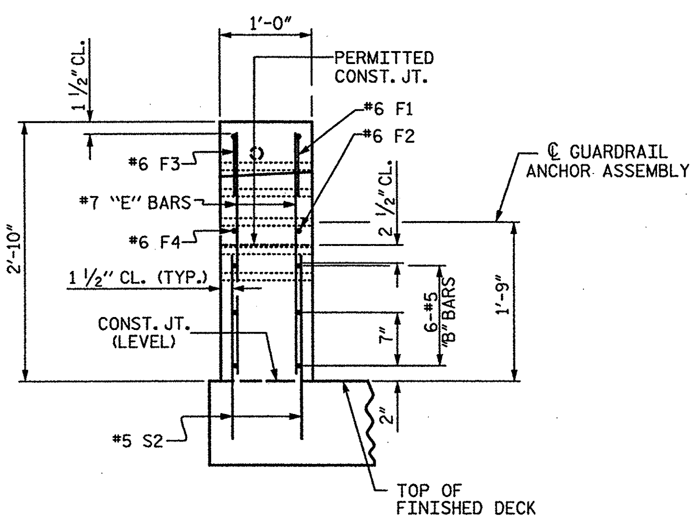
PLAN OF PARAPET



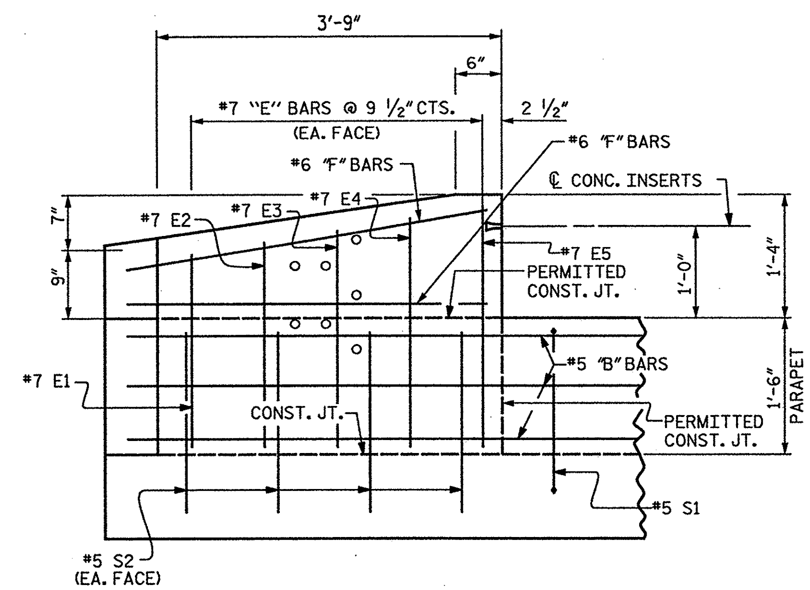
PLAN OF END POST

ONE BAR METAL RAIL					
BILL OF MATERIAL FOR PARAPET AND TWO END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
∗E1	4	#7	STR	2'-0"	16
∗E2	4	#7	STR	2'-2"	18
∗E3	4	#7	STR	2'-4"	19
∗E4	4	#7	STR	2'-6"	20
∗E5	4	#7	STR	2'-7"	21
∗F1	4	#6	STR	3'-3"	20
∗F2	4	#6	STR	3'-3"	20
∗F3	4	#6	STR	3'-9"	23
∗F4	4	#6	STR	3'-9"	23
∗S2	16	#5	STR	2'-0"	33
∗EPOXY COATED REINFORCING STEEL					213 LBS.
CLASS AA LIGHTWEIGHT CONCRETE					0.8 C.Y.

∗∗SEE SHEET S-83 FOR CONCRETE PARAPET PLAN & QUANTITIES.



END VIEW



ELEVATION

PARAPET AND END POST FOR ONE BAR RAIL

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
END POST DETAILS

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1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-80
1	STV	6-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12
△ REV. PER NCDOT COMMENTS

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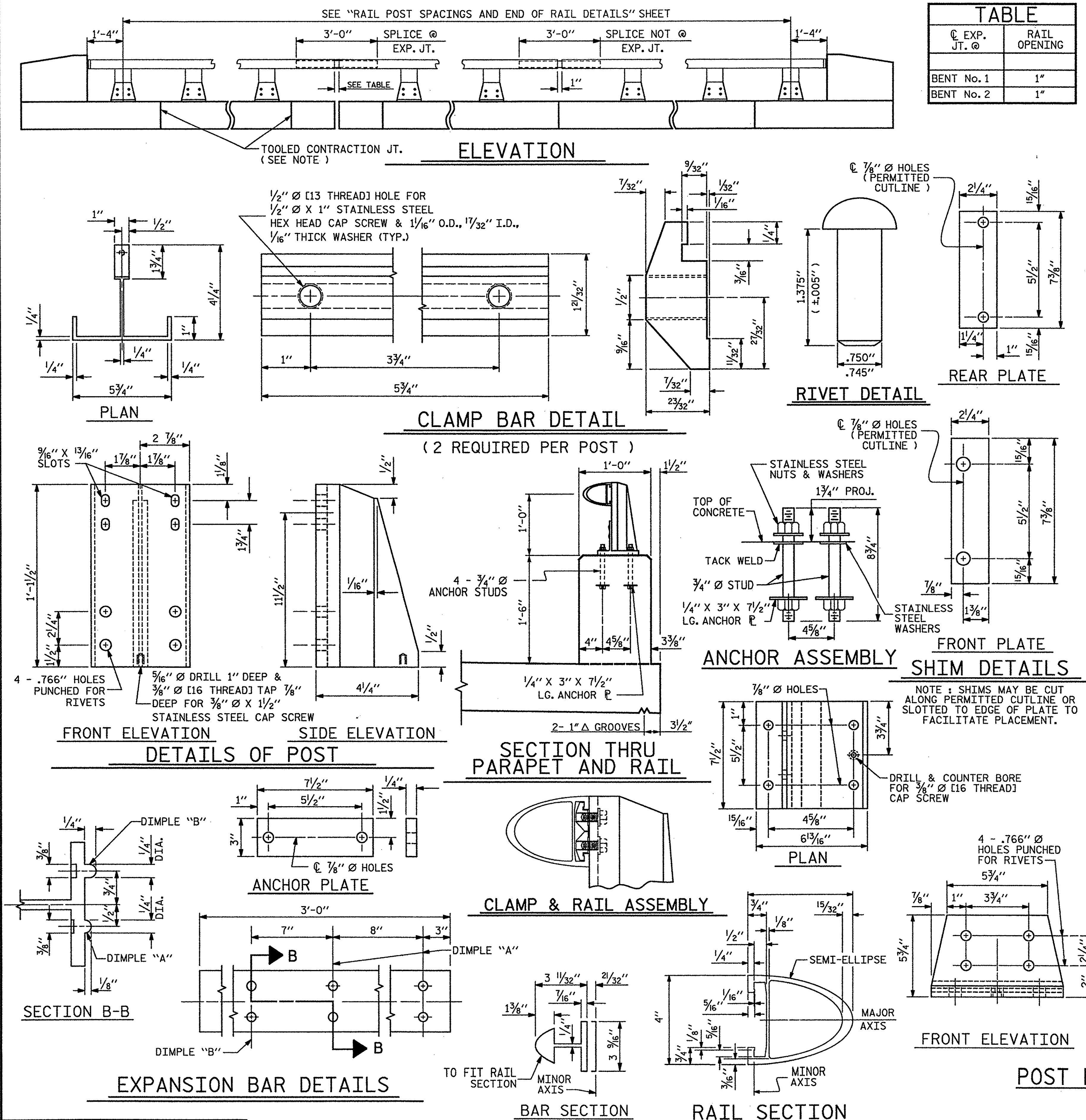
dveyoo

6/18/2012

NORTH CAROLINA PROFESSIONAL SEAL 19766 P. E. KELLY, JR.
6/18/12



TABLE

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

NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

MATERIAL FOR ANCHOR STUDS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. STUDS TO BE EMBEDDED 7" IN CONCRETE. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK, CLASS 2B THREAD, AND MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ANCHOR ℄ SHALL BE AASHTO M270 GRADE 36.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL.

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS, NUTS AND WASHERS SHALL MEET THE SAME REQUIREMENTS AS THE ANCHOR STUDS, NUTS AND WASHERS FOR USE WITH THE ANCHOR ASSEMBLY.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

NORTH CAROLINA PROFESSIONAL SEAL 19765 E. KE... 5/17/12

PAY LENGTH = 483 LIN. FT.

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
1 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-81
1			3			TOTAL SHEETS
2			4			89

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Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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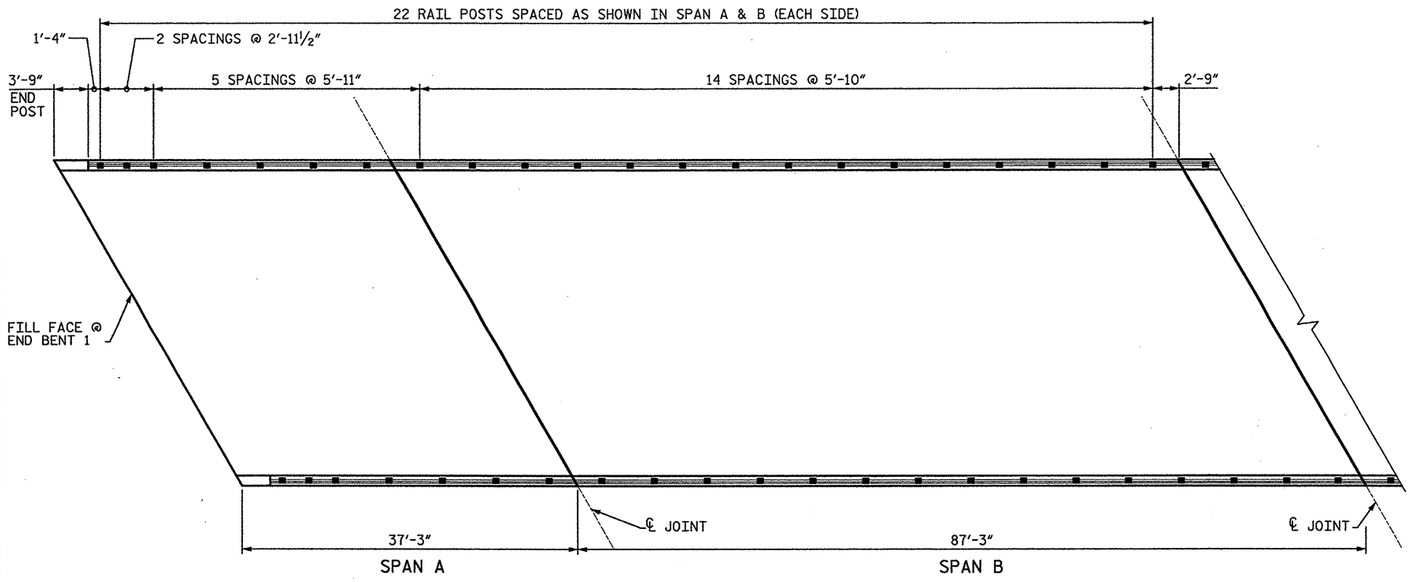
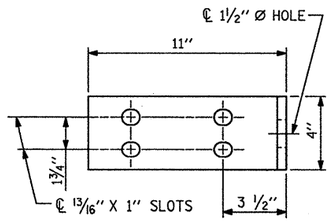
5/17/2012

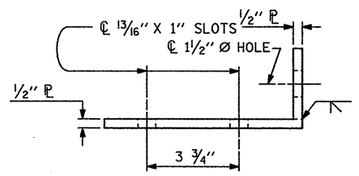


PLAN OF RAIL POST SPACINGS

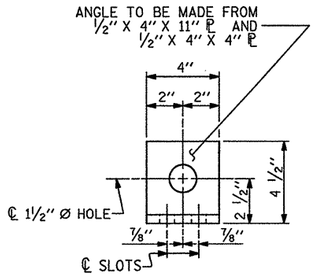
(SPANS C & D MIRRORED)



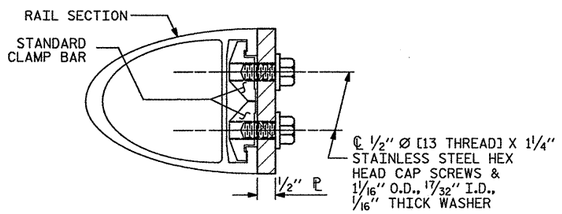
ELEVATION



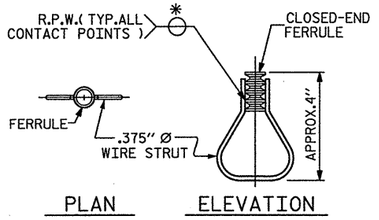
TOP VIEW



END VIEW (FIX AND EXP.)



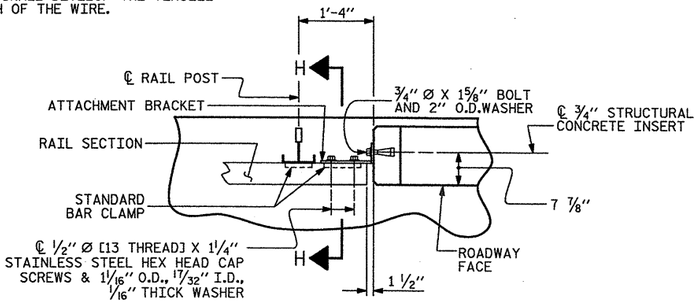
SECTION H-H (FIX)



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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



PLAN - RAIL AND END POST

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

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

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

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

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

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NORTH CAROLINA PROFESSIONAL SEAL 19764 ENGINEER ANDREW C. KELLY, JR. 5/17/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-82
1			3			TOTAL SHEETS
2			4			89

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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Charlotte, NC 28208
NC License No. F-0991

STD. NO. BMR2

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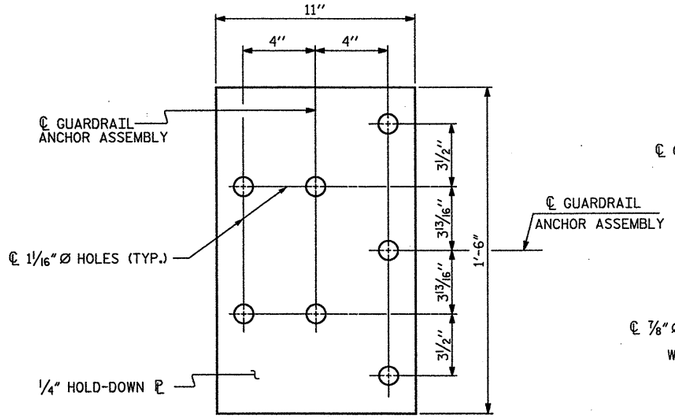
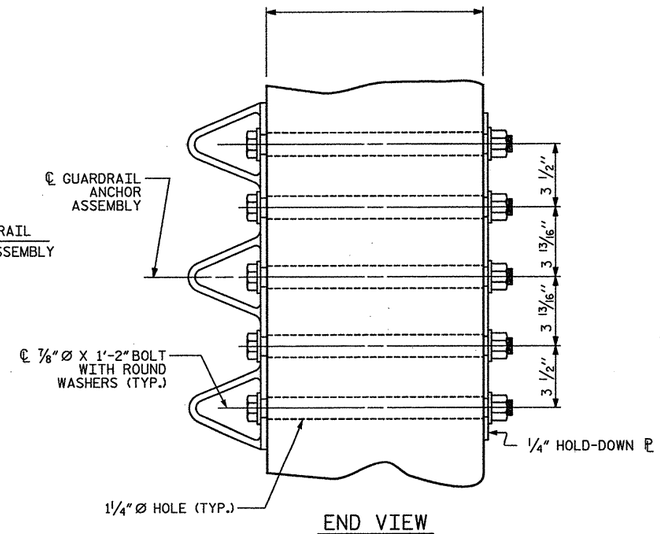
5/17/2012 dveyoa



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

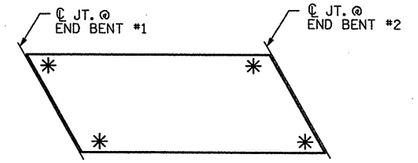
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

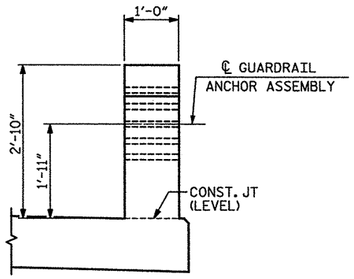
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

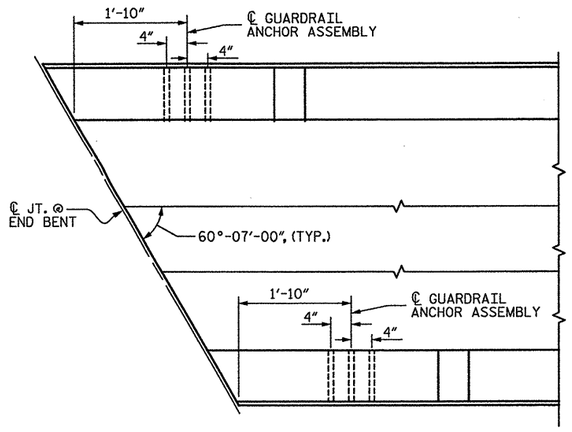


SKETCH SHOWING POINTS OF ATTACHMENT

✱ LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(ONE BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

NORTH CAROLINA PROFESSIONAL SEAL 18765 ENGINEER RALPH E. KELLY, JR.
11/28/12

PROJECT NO. 41665.6A
ROWAN COUNTY
BRIDGE NO.: 065
REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS

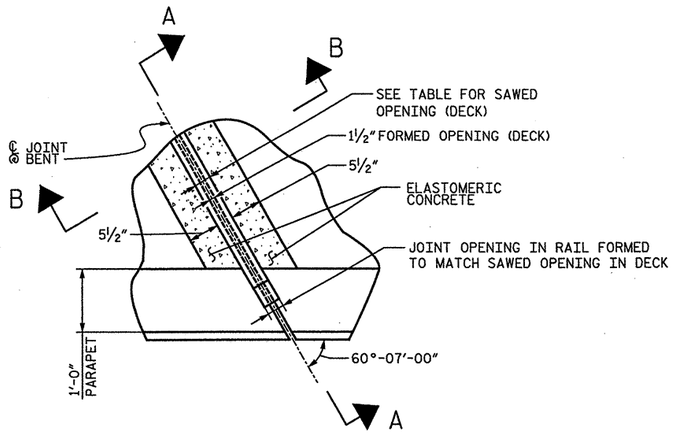
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-83
1			3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License No. F-0991

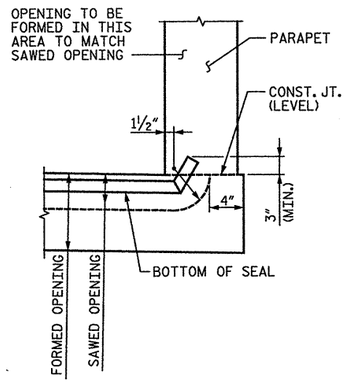
DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

STD. NO. CRAR

I:\Projects\2515384\2515384.0001\50_Deliverables & Submittals\TIBP.3.H.2\Structures\Rusta\Bridge 65 Rowan\BR - joint seal approach, guardrail anchorage.dgn
dlveyao
11/28/2012

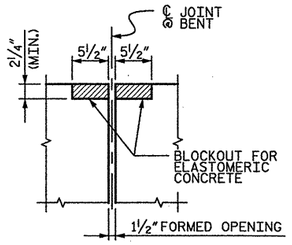


PLAN



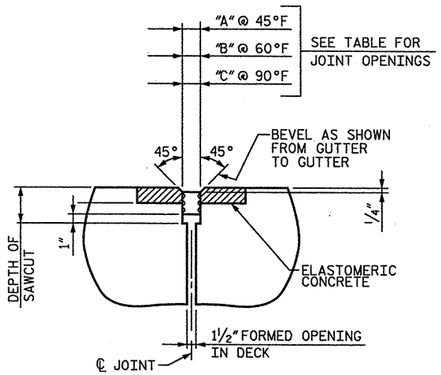
SECTION A-A

FOAM JOINT SEAL TO BE CUT, HEAT WELDED, AND TURNED UP AT A 60° ANGLE FROM THE BASE OF THE PARAPET.



SECTION B-B

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENTIONS)



SECTION B-B

FOAM JOINT SEAL

MOVEMENT AND SETTING AT FOAM JOINT

BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY.)	PERPENDICULAR JOINT OPENING AT 45°F ("A")	PERPENDICULAR JOINT OPENING AT 60°F ("B")	PERPENDICULAR JOINT OPENING AT 90°F ("C")
B1 & B3	60°-07'-00"	2½"	1"	2 1/16"	1⅞"	1 15/16"
B2	60°-07'-00"	2½"	¾"	2"	1⅞"	1⅝"

BILL OF MATERIAL

BENT NO.	ELASTOMERIC CONCRETE * (CU.FT.)
B1 & B3	6.2
B2	6.2

*BASED ON MINIMUM BLOCKOUT SHOWN, BASED ON MINIMUM BLOCKOUT WIDTH SHOWN AND AVERAGE CONCRETE WEARING THICKNESS.

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER JAMES E. KEY, JR. 11/28/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-84
1			3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

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″			

GROOVING BRIDGE FLOORS

APPROACH SLABS	930	SQ.FT.
BRIDGE DECK	7657	SQ.FT.
TOTAL	8587	SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA LIGHTWEIGHT CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN A		5117	3885
POUR 1	41.6		
SPAN B		11004	8257
POUR 2	90.1		
SPAN C		11004	8257
POUR 3	90.1		
SPAN C		5117	3885
POUR 4	41.6		
TOTALS**	263.4	32242	24284

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

BILL OF MATERIAL

SPAN A OR D

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	33	#5	STR	35′-11″	1237
A2	33	#5	STR	35′-11″	1237
✳A101	6	#5	STR	2′-2″	14
✳A102	6	#5	STR	4′-9″	30
✳A103	6	#5	STR	7′-4″	46
✳A104	6	#5	STR	9′-11″	62
✳A105	6	#5	STR	12′-6″	78
✳A106	6	#5	STR	15′-1″	95
✳A107	6	#5	STR	17′-8″	111
✳A108	6	#5	STR	20′-3″	127
✳A109	6	#5	STR	22′-10″	143
✳A110	6	#5	STR	25′-5″	159
✳A111	6	#5	STR	28′-0″	175
✳A112	6	#5	STR	30′-7″	192
✳A113	6	#5	STR	33′-2″	208
A201	6	#5	STR	2′-2″	14
A202	6	#5	STR	4′-9″	30
A203	6	#5	STR	7′-4″	46
A204	6	#5	STR	9′-11″	62
A205	6	#5	STR	12′-6″	78
A206	6	#5	STR	15′-1″	95
A207	6	#5	STR	17′-8″	111
A208	6	#5	STR	20′-3″	127
A209	6	#5	STR	22′-10″	143
A210	6	#5	STR	25′-5″	159
A211	6	#5	STR	28′-0″	175
A212	6	#5	STR	30′-7″	192
A213	6	#5	STR	33′-2″	208
✳B1	50	#4	STR	19′-4″	646
B2	48	#5	STR	36′-7″	1833
✳G1	3	#5	STR	41′-3″	129
✳K1	4	#5	①	9′-7″	40
✳K2	6	#5	②	11′-6″	72
K3	8	#5	STR	41′-3″	345
K4	4	#5	STR	8′-6″	36
✳S1	32	#4	③	2′-10″	61
S2	44	#5	④	3′-2″	145
✳S3	39	#4	⑤	1′-7″	42
✳S4	22	#4	⑥	2′-4″	34
✳S5	17	#4	⑦	3′-2½″	36
✳S6	34	#5	④	4′-2″	148
U1	22	#4	⑧	2′-4½″	35
U2	17	#4	⑧	4′-½″	46

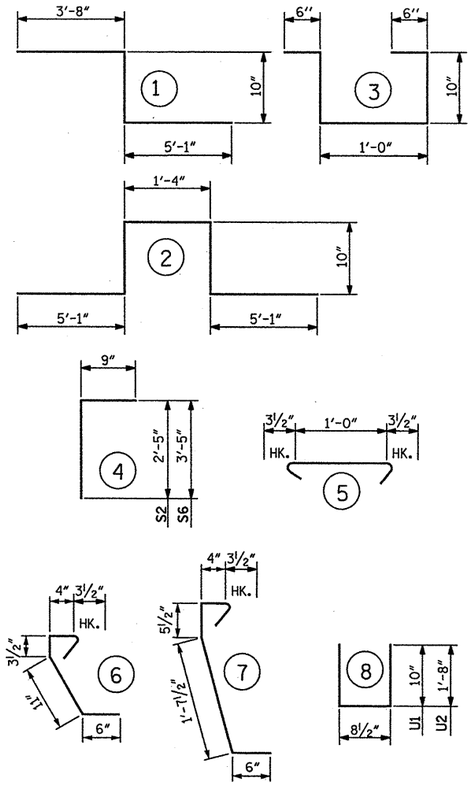
REINFORCING STEEL	5117 LBS.
✳EPOXY COATED REINF. STEEL	3885 LBS.
CLASS AA LIGHTWEIGHT CONCRETE	41.6 CU. YDS.

SPAN B OR C

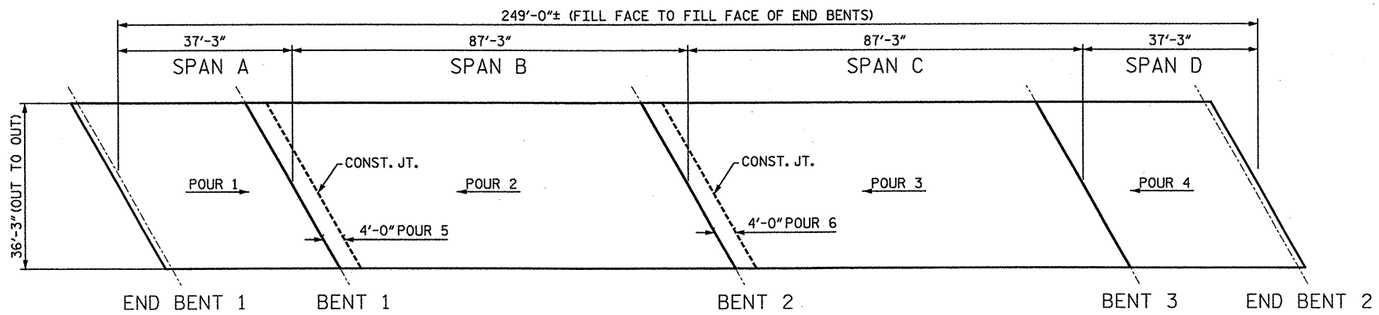
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	133	#5	STR	35′-11″	4987
A2	133	#5	STR	35′-11″	4987
✳A101	6	#5	STR	2′-2″	14
✳A102	6	#5	STR	4′-9″	30
✳A103	6	#5	STR	7′-4″	46
✳A104	6	#5	STR	9′-11″	62
✳A105	6	#5	STR	12′-6″	78
✳A106	6	#5	STR	15′-1″	95
✳A107	6	#5	STR	17′-8″	111
✳A108	6	#5	STR	20′-3″	127
✳A109	6	#5	STR	22′-10″	143
✳A110	6	#5	STR	25′-5″	159
✳A111	6	#5	STR	28′-0″	175
✳A112	6	#5	STR	30′-7″	192
✳A113	6	#5	STR	33′-2″	208
A201	6	#5	STR	2′-2″	14
A202	6	#5	STR	4′-9″	30
A203	6	#5	STR	7′-4″	46
A204	6	#5	STR	9′-11″	62
A205	6	#5	STR	12′-6″	78
A206	6	#5	STR	15′-1″	95
A207	6	#5	STR	17′-8″	111
A208	6	#5	STR	20′-3″	127
A209	6	#5	STR	22′-10″	143
A210	6	#5	STR	25′-5″	159
A211	6	#5	STR	28′-0″	175
A212	6	#5	STR	30′-7″	192
A213	6	#5	STR	33′-2″	208
✳B3	75	#4	STR	30′-4″	1520
B4	96	#5	STR	44′-6″	4456
✳G1	2	#5	STR	41′-3″	86
✳K1	8	#5	①	9′-7″	80
✳K2	12	#5	②	11′-6″	144
S1	64	#4	③	2′-10″	121

REINFORCING STEEL	11004 LBS.
✳EPOXY COATED REINF. STEEL	8257 LBS.
CLASS AA LIGHTWEIGHT CONCRETE	85.0 CU. YDS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 9027)

DECK POURING SEQUENCE:

EACH SPAN SHALL HAVE ONE CONTINUOUS POUR IN THE DIRECTION SHOWN.

POURS 1, 2, 3, AND 4 CAN BE POURED SIMULTANEOUSLY DEPENDING ON CONTRACTOR'S PREFERENCE.

POURS 5 & 6 CAN BE POURED SIMULTANEOUSLY DEPENDING ON CONTRACTOR'S PREFERENCE.

NORTH CAROLINA PROFESSIONAL SEAL 37651 ENGINEER E. KELLY FR.

6/15/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-85
1			3			TOTAL SHEETS
2			4			89

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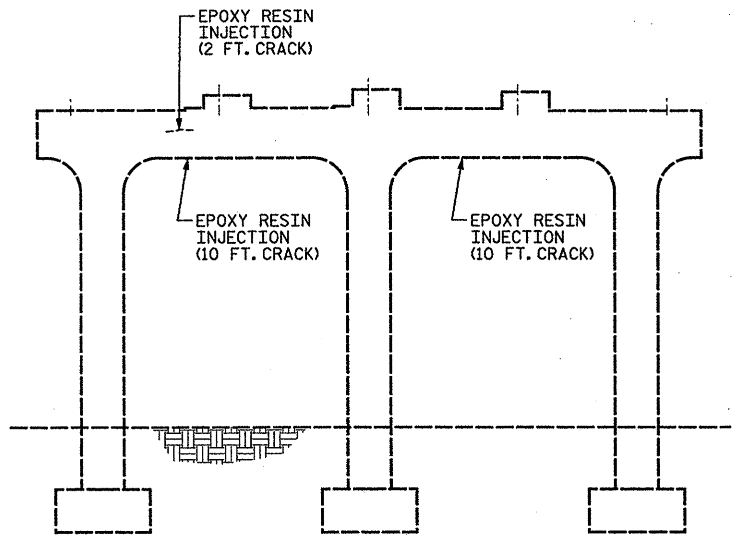
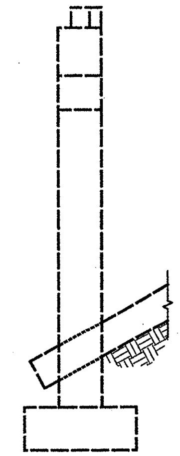
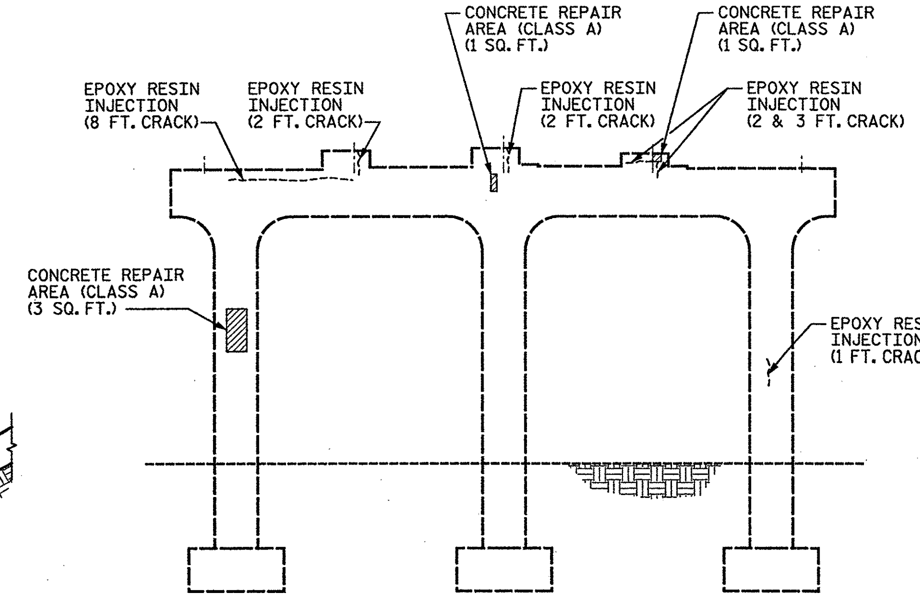
6/15/2012



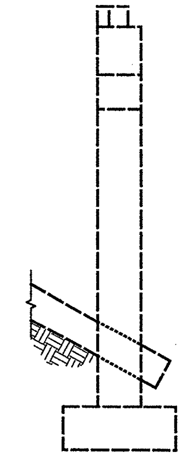
ELEVATION OF BENT 1 - LOOKING WEST



END VIEW
OF BENT 1
LOOKING NORTH



ELEVATION OF BENT 1 - LOOKING EAST



END VIEW
OF BENT 1
LOOKING SOUTH

NOTES:

FOR CONCRETE REPAIR DETAILS, SEE SHEET NO. S-93.

CONCRETE SHALL BE SOUNDED TO DETERMINE THE EXTENT OF ALL CONCRETE REPAIRS.

FOR CRACKS REQUIRING EPOXY RESIN INJECTION, SOUNDING MAY PROVE THAT A CONCRETE REPAIR IS NECESSARY.

SPALL, CRACK, AND DELAMINATION DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL DETERMINE ACTUAL SPALL, CRACK, AND DELAMINATION DIMENSIONS PRIOR TO MAKING REPAIRS.

THE ENGINEER SHALL BE NOTIFIED OF ANY BARS DAMAGED DURING THE CONCRETE REMOVAL PROCESS. REPAIRS TO DAMAGED BARS SHALL BE DIRECTED BY THE ENGINEER AND COMPLETED AT NO ADDITIONAL COST.

DOWEL LENGTH SHALL BE BASED ON A 9" EMBEDMENT INTO EXISTING CONCRETE AND MAY BE ADJUSTED BASED ON THE MINIMUM EMBEDMENT SPECIFIED BY THE MANUFACTURER OF THE EPOXY ADHESIVE BONDING SYSTEM.

REINFORCING STEEL SHALL BE GRADE 60.

BENT CAP REPAIRS IN BEARING AREAS SHALL BE PERFORMED WITH CLASS A CONCRETE.

SUBSTRUCTURE REPAIRS SHALL PROVIDE A MINIMUM OF 2" CLEAR COVER TO REINFORCING STEEL. REPAIRED AREAS MAY BE BUILT OUT TO ACHIEVE CLEARANCE.

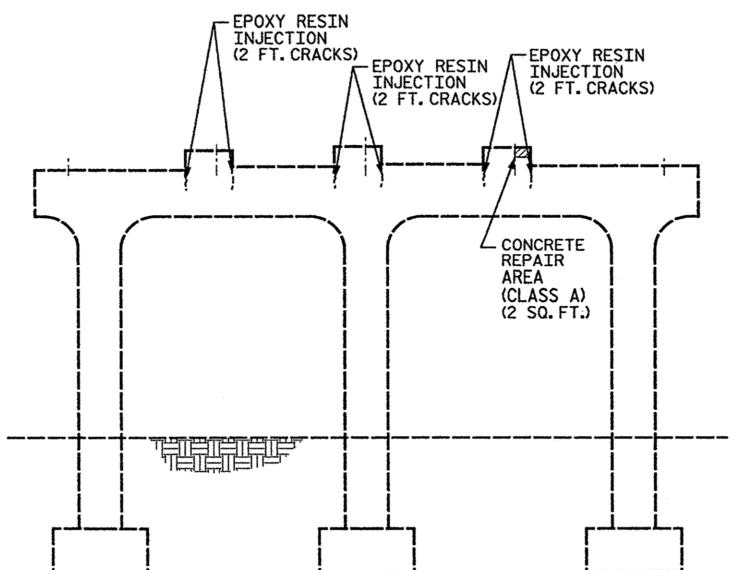
EPOXY PROTECTIVE COATING SHALL BE APPLIED TO THE TOP OF ALL BENT CAPS AND THE COST SHALL BE INCLUDED IN THE OTHER BENT REPAIRS.

FOR REPLACEMENT OF BEARINGS SEE SHEET NOS. S-79, S-80, AND S-81.

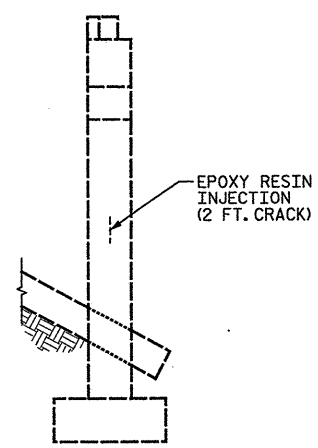
ALL BEAM SEAT REPAIRS MUST BE PERFORMED BEFORE REPLACEMENT OF EXISTING BEARINGS.

-------- APPROX. LENGTH: EPOXY RESIN INJECTION

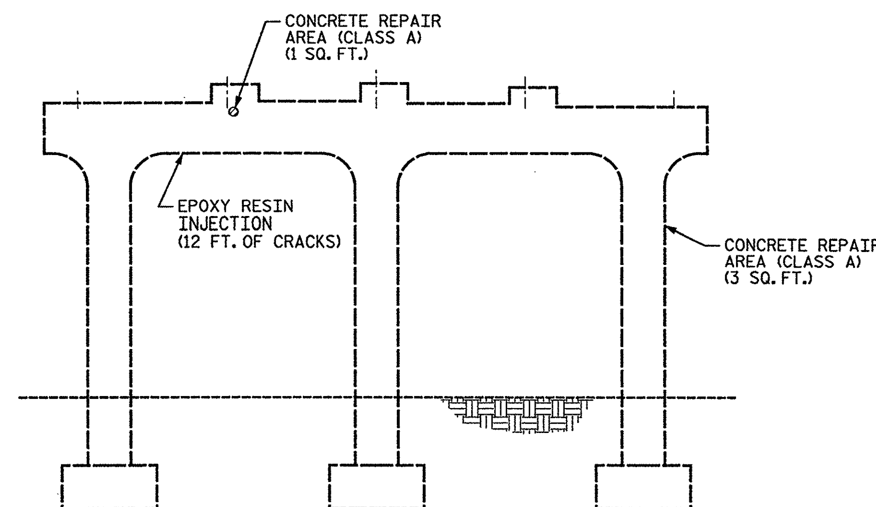
CLASS 'A' CONCRETE REPAIR



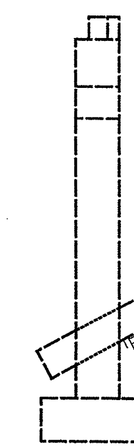
ELEVATION OF BENT 3 - LOOKING WEST



END VIEW
OF BENT 3
LOOKING NORTH

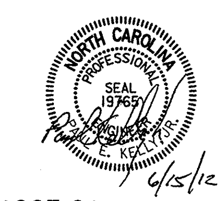


ELEVATION OF BENT 3 - LOOKING EAST



END VIEW
OF BENT 3
LOOKING SOUTH

* LOOKING DIRECTION CORRESPONDS WITH DIRECTION OF TRAVEL ALONG HIGHWAY



PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BENTS 1 & 3 SUBSTRUCTURE REPAIRS

BRIDGE ON SR 1221
OVER I-85/US-601

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-86
1	STV	6-12	3					TOTAL SHEETS
2			4					89

DRAWN BY : RJB DATE : 05-12
CHECKED BY : AC DATE : 05-12
△ REV. SHEET NO.

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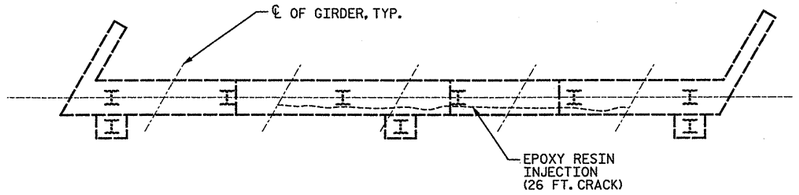
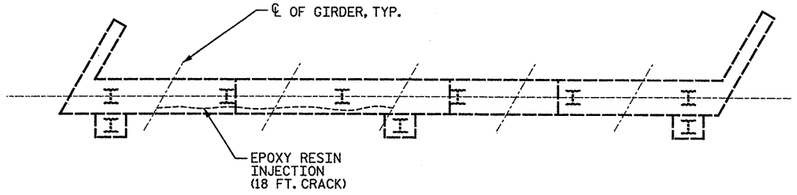
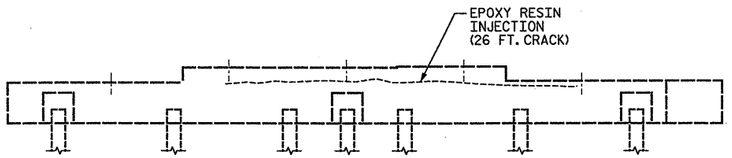
6/15/2012



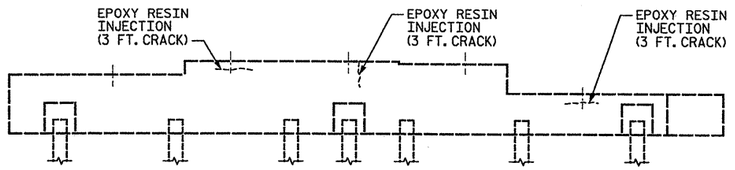
PLAN OF END BENT 1



PLAN OF END BENT 2

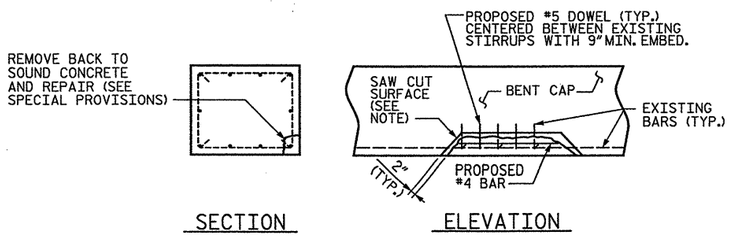


ELEVATION OF END BENT 1 - LOOKING WEST

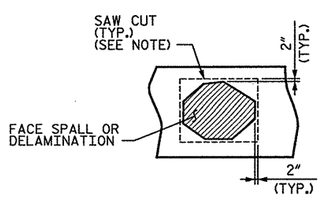


ELEVATION OF END BENT 2 - LOOKING EAST

* LOOKING DIRECTION CORRESPONDS WITH DIRECTION OF TRAVEL ALONG HIGHWAY



CORNER REPAIR



FACE REPAIR

TYPICAL SUBSTRUCTURE REPAIR DETAILS

NOTE: CONTRACTOR SHALL SAW CUT TO A MAXIMUM DEPTH OF ½", THIS DEPTH SHALL BE REDUCED TO PREVENT DAMAGE TO EXISTING REINFORCEMENT, BUT SHALL BE NO LESS THAN ½". CONTRACTOR SHALL REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL.

NOTE:

SEE NOTES ON SHEET S-92.

-------- APPROX. LENGTH: EPOXY RESIN INJECTION

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER ROBERT C. BELK, JR.
6/15/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENTS 1 & 2 SUBSTRUCTURE REPAIRS

BRIDGE ON SR 1221
OVER I-85/US-601

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-87
1	STV	6-12	3			TOTAL SHEETS
2			4			89

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : RIB DATE : 05-12
CHECKED BY : AC DATE : 05-12

⚠ REV. SHEET NO.

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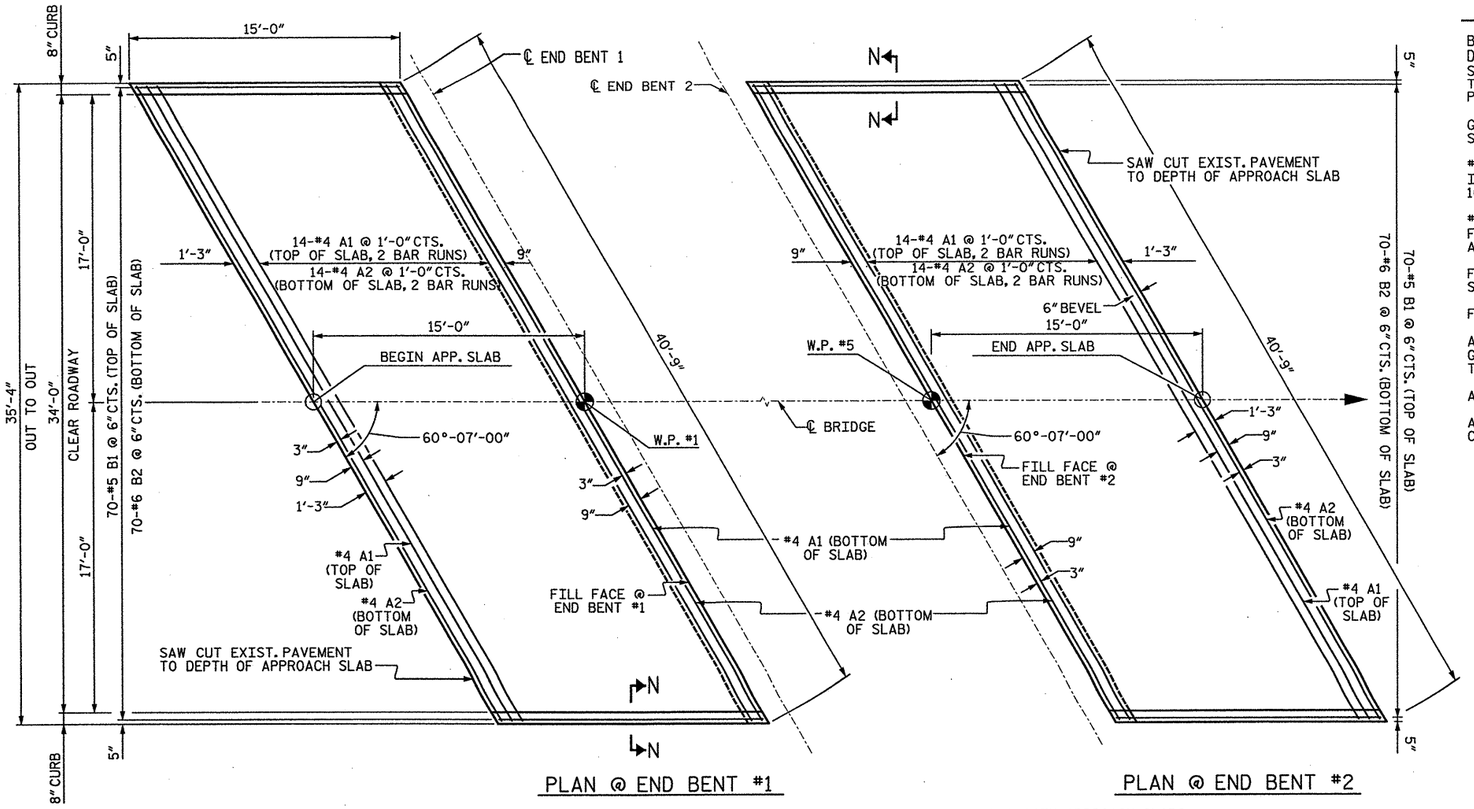
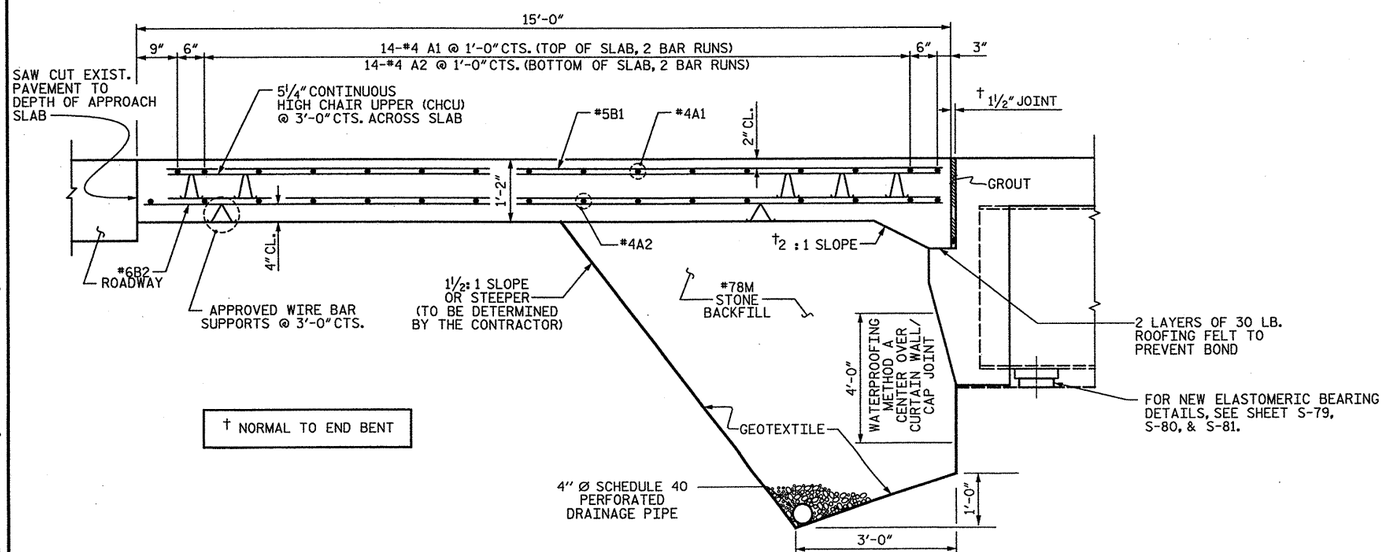
wuvm
6/15/2012

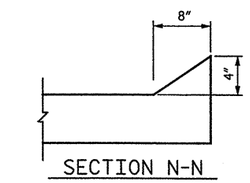


DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

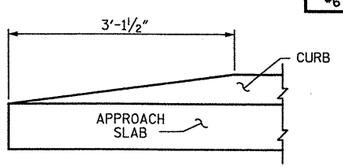


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, AND OUTLET PADS SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE BRIDGE APPROACH SLAB. NO EXTRA MEASUREMENT OR PAYMENT WILL BE MADE.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF END BENT FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

FOR OUTLET PAD SEE ROADWAY STANDARD DRAWING 815.03.

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

APPROACH SLAB GROOVING IS NOT REQUIRED.

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

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	32	#4	STR	21'-2"	453
A2	32	#4	STR	21'-0"	449
✱B1	70	#5	STR	14'-8"	1072
B2	70	#6	STR	14'-8"	1543
REINFORCING STEEL				LBS.	1992
✱EPOXY COATED REINFORCING STEEL				LBS.	1525
CLASS AA CONCRETE				C.Y.	23.6

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	32	#4	STR	21'-2"	453
A2	32	#4	STR	21'-0"	449
✱B1	70	#5	STR	14'-8"	1072
B2	70	#6	STR	14'-8"	1543
REINFORCING STEEL				LBS.	1992
✱EPOXY COATED REINFORCING STEEL				LBS.	1525
CLASS AA CONCRETE				C.Y.	23.6

SPLICE LENGTHS

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

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER MICHAEL E. KEYLON 11/28/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB PLAN & SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-88
1	STV	6-12	3			TOTAL SHEETS
2			4			89

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License No. F-0991

DRAWN BY : KMG DATE : 05-12
CHECKED BY : AC DATE : 05-12
⚠ REV. SHEET NO.

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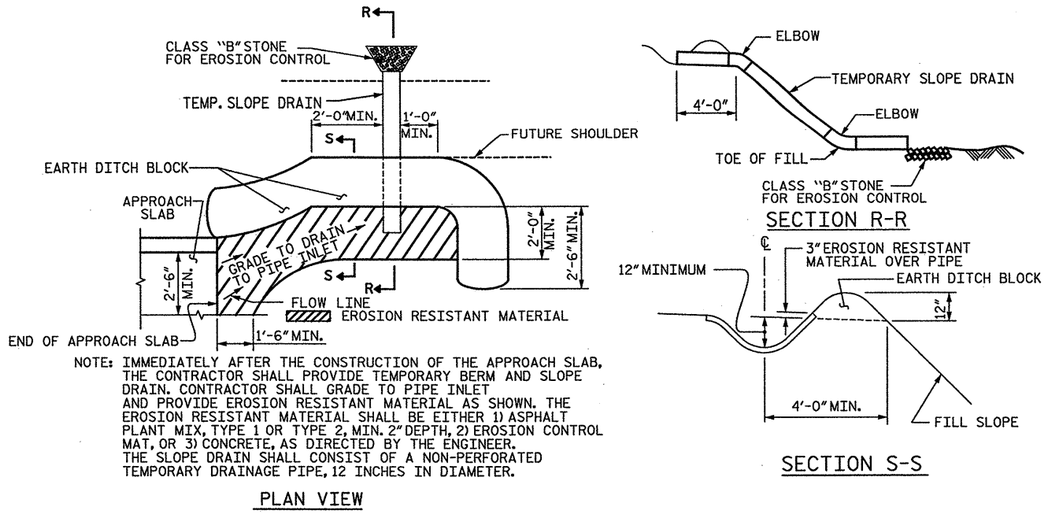
dlveyao
11/28/2012



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

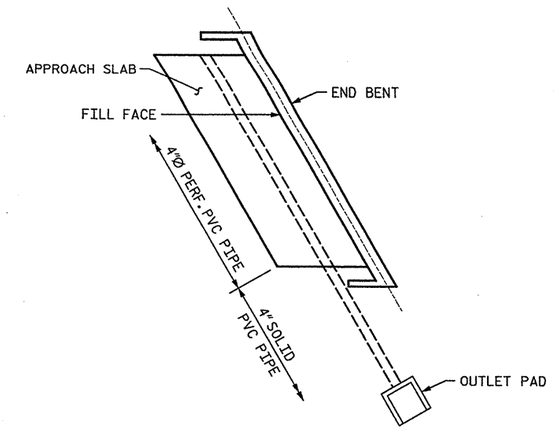
PLAN VIEW

SECTION R-R

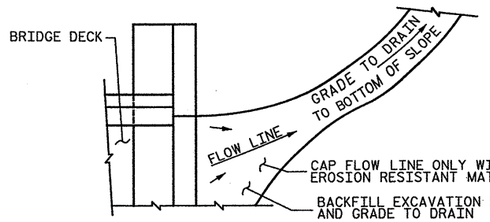
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

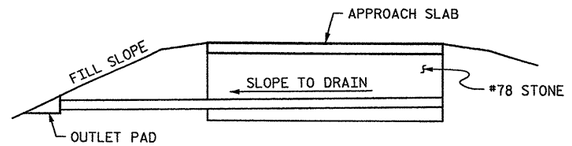


PIPE DRAIN AND OUTLET PLAN



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



PIPE DRAIN AND OUTLET ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL 19765 ENGINEER JOHN CHARLES KELLICUTT
6/15/12

PROJECT NO. 41665.6A

ROWAN COUNTY

BRIDGE NO.: 065

REHAB. OF BRIDGE NO. 065 SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-89
1	STV	6-12	3			TOTAL SHEETS
2			4			89

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⚠ REV. SHEET NO.

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wuvm
6/15/2012

STANDARD NOTES

EXISTING STRUCTURES:

DRAWINGS SHOWN ON THESE PLANS HAVE BEEN DRAWN PER AS-BUILT DRAWINGS.

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 50W	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION	
GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,600 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
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 SAND LIGHTWEIGHT CONCRETE (MAXIMUM UNIT WEIGHT OF 120 PCF) SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS FOR BRIDGES #031, #055 AND #082; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP. FOR LIGHTWEIGHT CONCRETE, SEE SPECIAL PROVISIONS FOR SAND LIGHTWEIGHT CONCRETE.

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.

PROJECT NO. 41665.6A

DAVIDSON / ROWAN COUNTY

BRIDGE NO.: _____

NORTH CAROLINA PROFESSIONAL SEAL 18765 ENGINEER ROBERT E. KELLY, JR.

4/20/12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD NOTES

STV / Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License No. F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SN
1	AC	11-12	3			TOTAL SHEETS
2			4			89

DRAWN BY : JWK DATE : 05-12
CHECKED BY : MR DATE : 05-12

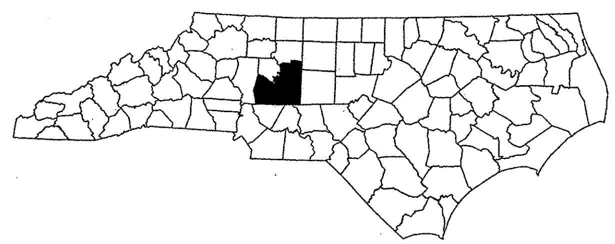
SHEET NO.
TMP-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

DAVIDSON AND ROWAN COUNTIES

DIVISION 9



LOCATION 1: DAVIDSON COUNTY BRIDGE #31 NC 8 OVER LICK CREEK
TYPE OF WORK: SUPERSTRUCTURE REPLACEMENT

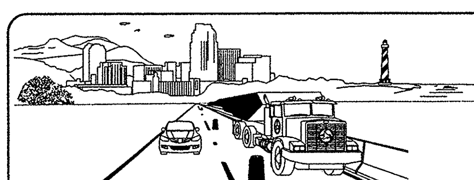
LOCATION 2: DAVIDSON COUNTY BRIDGE #55 NC 47 OVER FLAT SWAMP
TYPE OF WORK: SUPERSTRUCTURE REPLACEMENT

LOCATION 3: DAVIDSON COUNTY BRIDGE #82 NC 47 OVER LICK CREEK
TYPE OF WORK: SUPERSTRUCTURE REPLACEMENT

LOCATION 4: ROWAN COUNTY BRIDGE #65 SR 1221 OVER I-85
TYPE OF WORK: SUPERSTRUCTURE REPLACEMENT, SHOTCRETE REPAIRS

SEE SHEET 1 FOR VICINITY MAPS

INDEX OF SHEETS



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

PLAN PREPARED FOR NCDOT BRIDGE MANAGEMENT UNIT

RALEIGH, NC

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

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT ENGINEER JOHN JOHNSON, PE

DESIGN ENGINEER RICHARD ODYNSKI, PE

APPROVED: ____________

DATE: ____________

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL RICHARD A. ODYNSKI

11-9-12

PROJECT: 41665.6A

11/9/2012
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PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-1A

STV/Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License Number F-0991

ROADWAY STANDARD DRAWINGS

REV. SEPTEMBER 2011

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
1101.05	WORK ZONE VEHICLE ACCESS
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
1145.01	BARRICADES
1165.01	WORK VEHICLE LIGHTING SYSTEMS AND TMA DELINEATION
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO LANE AND MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS- INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS- (PERMANENT AND TEMPORARY)

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- REMOVAL

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD (TYPE C)
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

- EXISTING
- PROPOSED
- T E M P TEMPORARY

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

APPROVED: DATE:

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD A. ODYNSKI

11-9-12

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

ROADWAY STANDARD DRAWINGS & LEGEND

11/9/2012
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NC License Number F-0991

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-1B

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	MONDAY TO SUNDAY 6:00 A.M. TO 8:00 P.M.

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

ROAD NAME

ALL ROADS

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 8:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 8:00 P.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 8:00 P.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 8:00 P.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 8:00 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 8:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.
6. FOR LABOR DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY AND 8:00 P.M. TUESDAY.
7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 6:00 A.M. TUESDAY TO 8:00 P.M. MONDAY.
8. FOR CHRISTMAS, BETWEEN THE HOURS OF 6:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 8:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

LANE AND SHOULDER CLOSURE REQUIREMENTS

C) 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.

D) 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 IS PROTECTED BY BARRIER OR GUARDRAIL.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL 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.

F) 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.

TRAFFIC PATTERN ALTERATIONS

G) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

H) 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.

I) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

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

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

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

TRAFFIC CONTROL DEVICES

L) 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.

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

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

PAVEMENT MARKINGS AND MARKERS

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

P) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY's OPERATION.

Q) UPON COMPLETION OF ALL OTHER CONSTRUCTION OPERATIONS, INSTALL POLYUREA AND RAISED PAVEMENT MARKINGS ON THE FINAL SURFACE AS DIRECTED BY THE ENGINEER.

R) ALL TEMPORARY PAVEMENT MARKINGS SHALL BE PAINT.

MISCELLANEOUS

S) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER.

APPROVED:_____ DATE:_____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037467 ENGINEER RICHARD A. DOYNO

2-27-13

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

GENERAL NOTES

2/27/2013
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odynskra

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-1C

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PHASING

USE NCDOT STD. 1101.01 SHEETS 1 THRU 3 OF 3 TO INSTALL WORK ZONE ADVANCE WARNING SIGNS AT EACH LOCATION BEFORE BEGINNING WORK.

DO NOT PERFORM WORK ON MULTIPLE BRIDGE LOCATIONS SIMULTANEOUSLY UNLESS APPROVED BY THE ENGINEER. DO NOT WORK ON BOTH SIDES OF A ROADWAY AT THE SAME LOCATION SIMULTANEOUSLY.

LOCATION 1 (DAVIDSON 31):

STEP 1: USING SHEET TMP-2A, INSTALL DETOUR SIGNS AND DEVICES ALONG NC 8, HUNT RD, AND DENTON RD. COVER ALL SIGNS UNTIL DETOUR IS READY FOR OPERATION.

STEP 2: USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO CLOSE NC 8 AND UNCOVER DETOUR SIGNS. CONSTRUCT BRIDGE DECK PRESERVATION WORK AS REQUIRED.

STEP 3: ONCE ALL OTHER CONSTRUCTION IS COMPLETE INSTALL FINAL PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.

STEP 4: WHEN WORK IS COMPLETE, REMOVE ALL DETOUR SIGNS AND DEVICES AND RETURN TRAFFIC TO ITS NORMAL TRAFFIC PATTERN.

LOCATION 2 (DAVIDSON 55):

STEP 1: USING SHEET TMP-2B, INSTALL DETOUR SIGNS AND DEVICES ALONG NC 47, FRANK RD, REGAN RD, JERUSALEM RD, AND YOUNG RD. COVER ALL SIGNS UNTIL DETOUR IS READY FOR OPERATION.

STEP 2: USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO CLOSE NC 47 AND UNCOVER DETOUR SIGNS. CONSTRUCT BRIDGE DECK PRESERVATION WORK AS REQUIRED.

STEP 3: ONCE ALL OTHER CONSTRUCTION IS COMPLETE INSTALL FINAL PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.

STEP 4: WHEN WORK IS COMPLETE, REMOVE ALL DETOUR SIGNS AND DEVICES AND RETURN TRAFFIC TO ITS NORMAL TRAFFIC PATTERN.

LOCATION 3 (DAVIDSON 82):

STEP 1: USING SHEET TMP-2C, INSTALL DETOUR SIGNS AND DEVICES ALONG NC 47, SNYDER STATION RD, GARNER RD, AND TYSINGER RD. COVER ALL SIGNS UNTIL DETOUR IS READY FOR OPERATION.

STEP 2: USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO CLOSE NC 47 AND UNCOVER DETOUR SIGNS. CONSTRUCT BRIDGE DECK PRESERVATION WORK AS REQUIRED.

STEP 3: ONCE ALL OTHER CONSTRUCTION IS COMPLETE INSTALL FINAL PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.

STEP 4: WHEN WORK IS COMPLETE, REMOVE ALL DETOUR SIGNS AND DEVICES AND RETURN TRAFFIC TO ITS NORMAL TRAFFIC PATTERN.

LOCATION 4 (ROWAN 65):

STEP 1: USING SHEET TMP-2D, INSTALL DETOUR SIGNS AND DEVICES ALONG SR 1221, GOLDFISH RD, MOOSE RD, AND CHINA GROVE RD. COVER ALL SIGNS UNTIL DETOUR IS READY FOR OPERATION.

STEP 2: USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO CLOSE SR 1221 AND UNCOVER DETOUR SIGNS. CONSTRUCT BRIDGE PRESERVATION WORK AS REQUIRED.

STEP 3: USE NCDOT RSD. 1101.02 SHEET 4 OF 15 TO CLOSE A LANE OF I-85 TO CONSTRUCT REPAIRS DURING NIGHT OPERATIONS, AS NEEDED.

STEP 4: ONCE ALL OTHER CONSTRUCTION IS COMPLETE INSTALL FINAL PAVEMENT MARKINGS ON SR 1221 AS DIRECTED BY THE ENGINEER.

STEP 5: WHEN WORK IS COMPLETE, REMOVE ALL DETOUR SIGNS AND DEVICES AND RETURN TRAFFIC TO ITS NORMAL TRAFFIC PATTERN.

APPROVED:_____ DATE:_____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 037407 ENGINEER RICHARD A. ODINSKI 2-27-13

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

PHASING NOTES

2/27/2013
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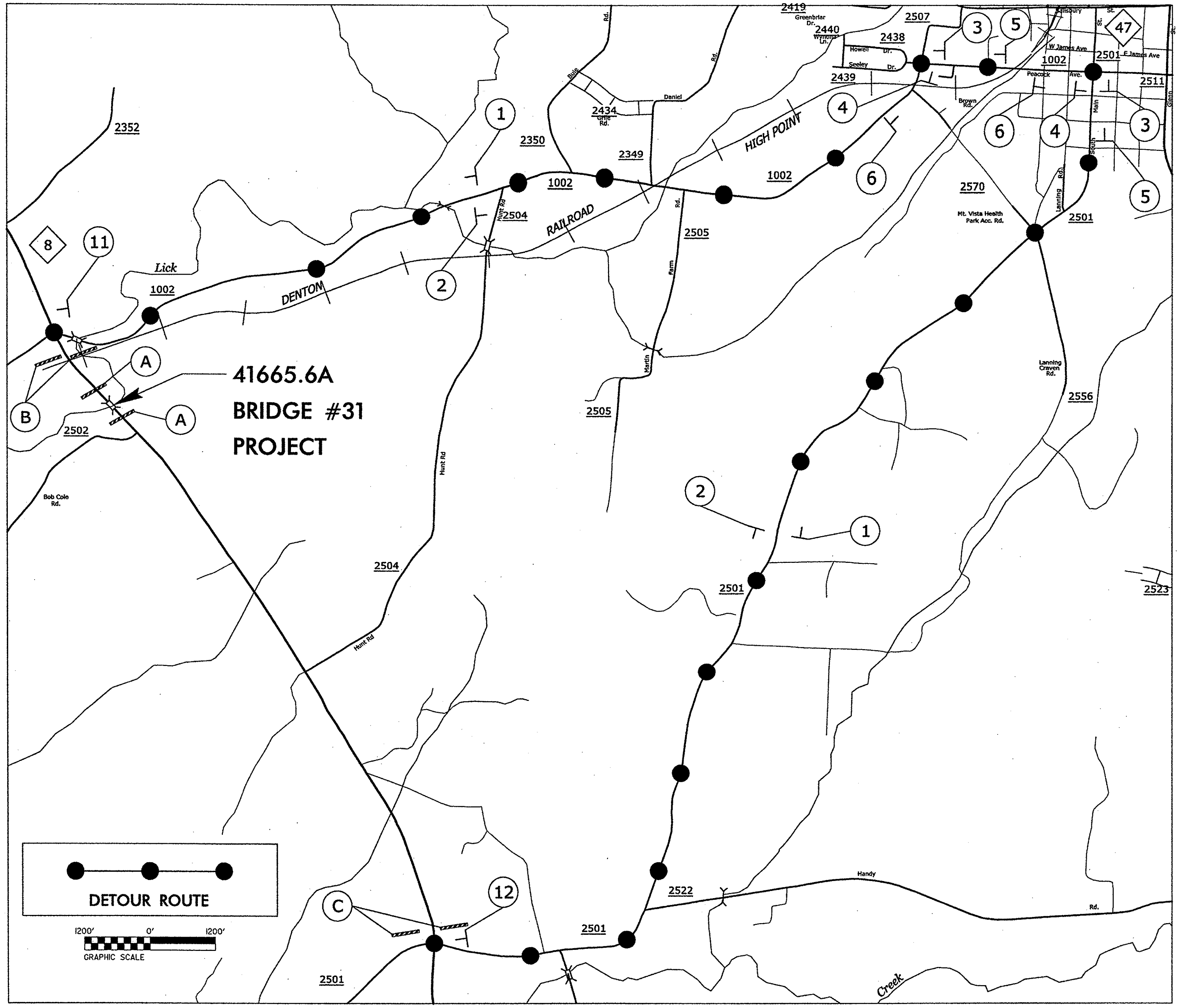
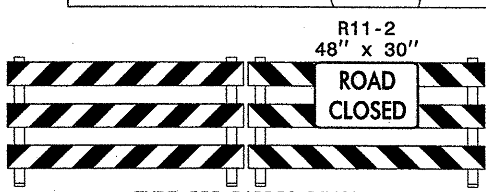
odyniskra

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-2A

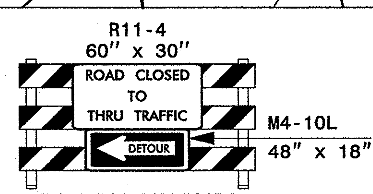
STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991





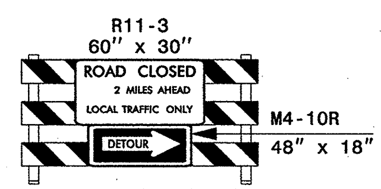
TYPE III BARRICADE(S)

(A)



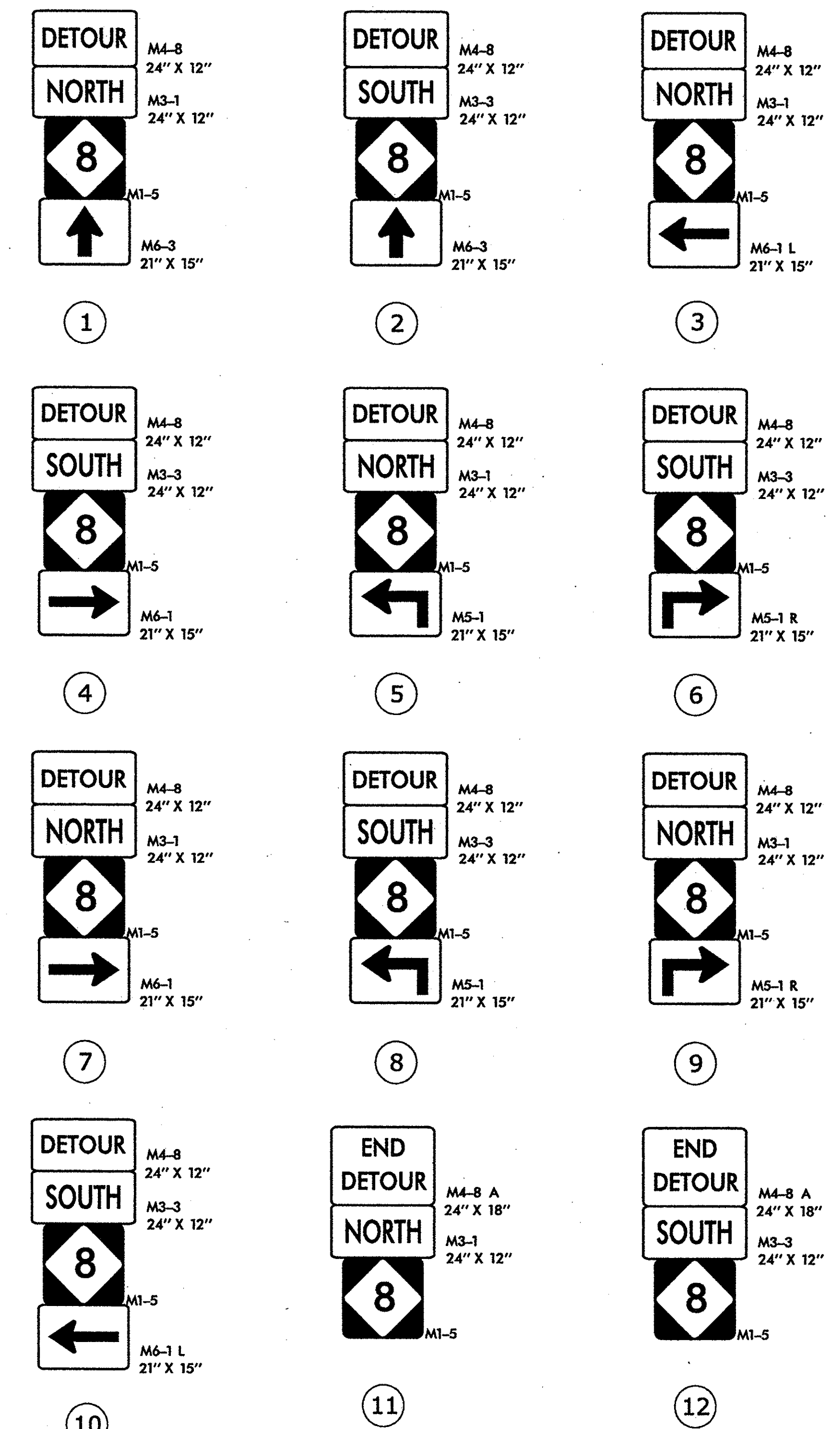
TYPE III BARRICADE

(B)



TYPE III BARRICADE

(C)



NOTES:

USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO INSTALL ROAD CLOSURE SIGNS AND DEVICES.

TRAFFIC CONTROL DEVICES (1) THRU (12) SHALL BE INSTALLED AS PER THE ENGINEER'S INSTRUCTION.

APPROVED: DATE:

SEAL

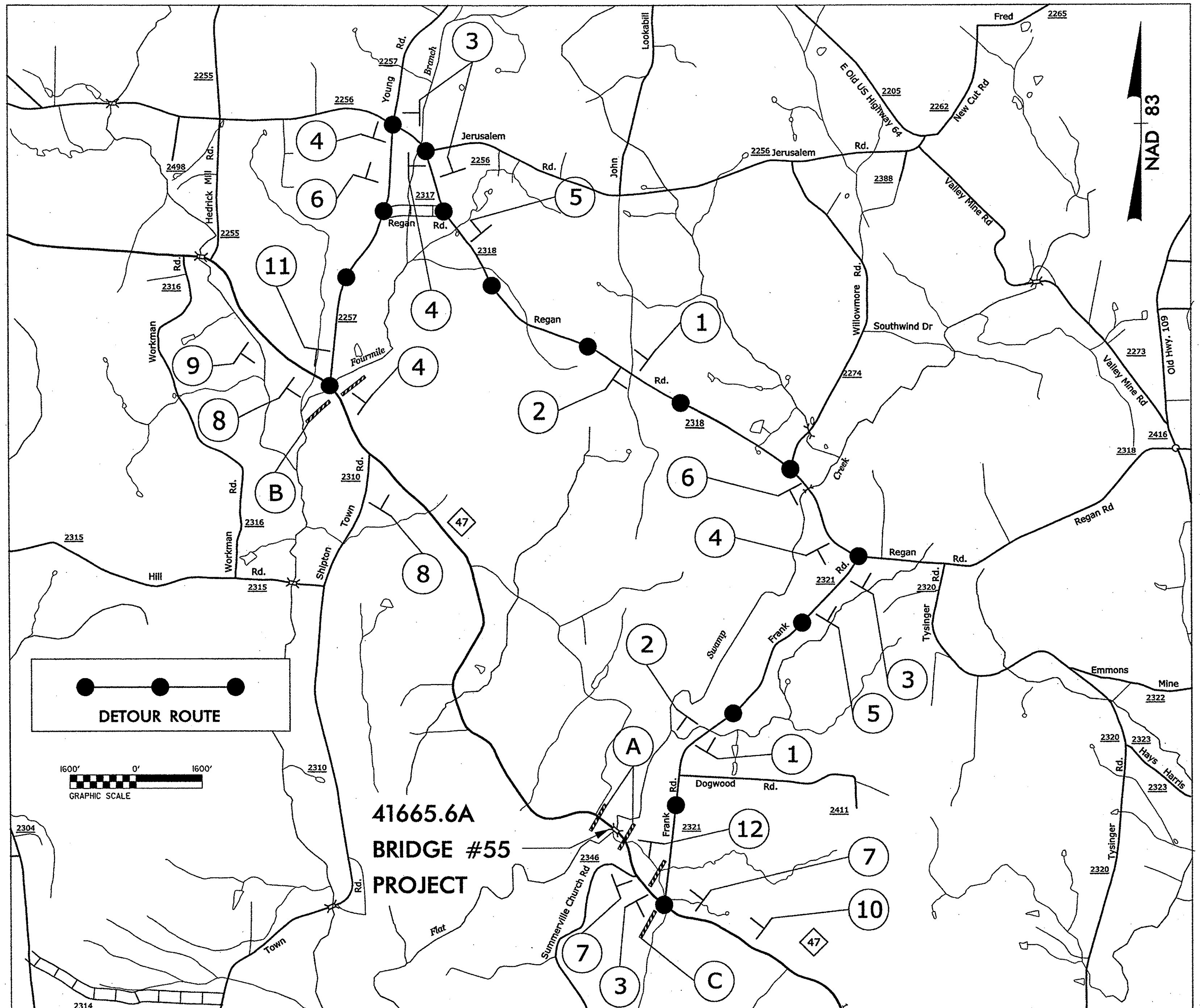
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL RICHARD A. ODYNSKI 2-7-13

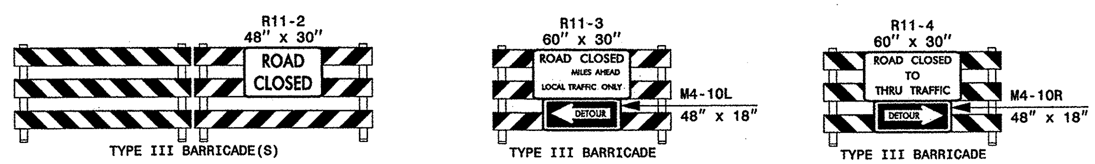
DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

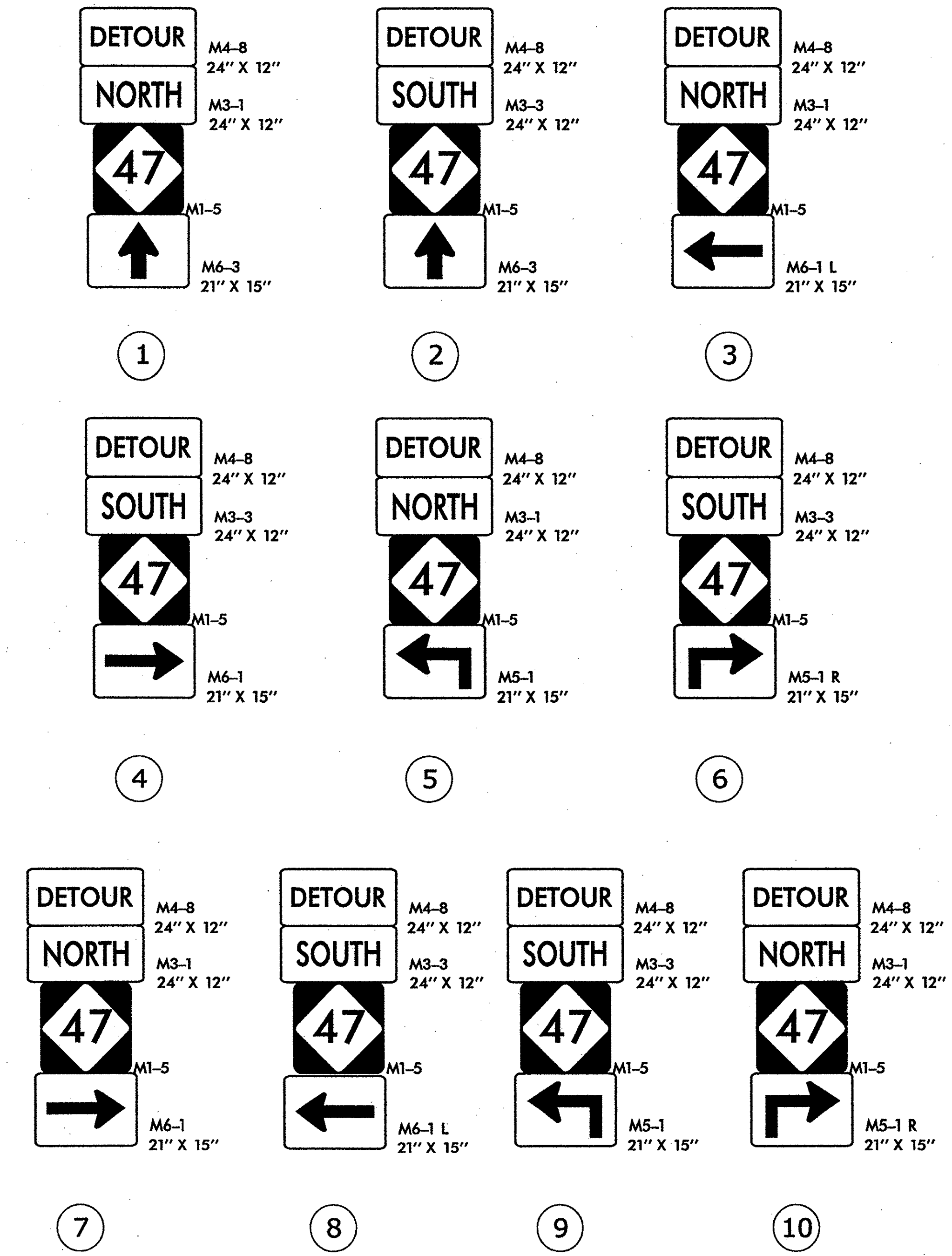
OFFSITE DETOUR A
SIGNING AND ROAD
CLOSURE SIGNING

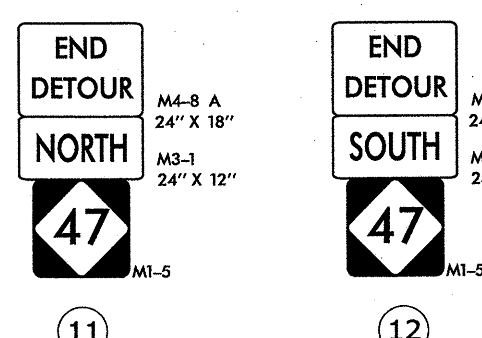
PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-2B

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991









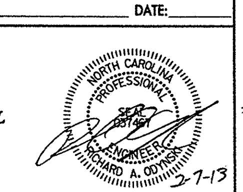
NOTES:

USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO INSTALL ROAD CLOSURE SIGNS AND DEVICES.

TRAFFIC CONTROL DEVICES (1) THRU (12) SHALL BE INSTALLED AS PER THE ENGINEER'S INSTRUCTION.

APPROVED:________________ DATE:________

SEAL

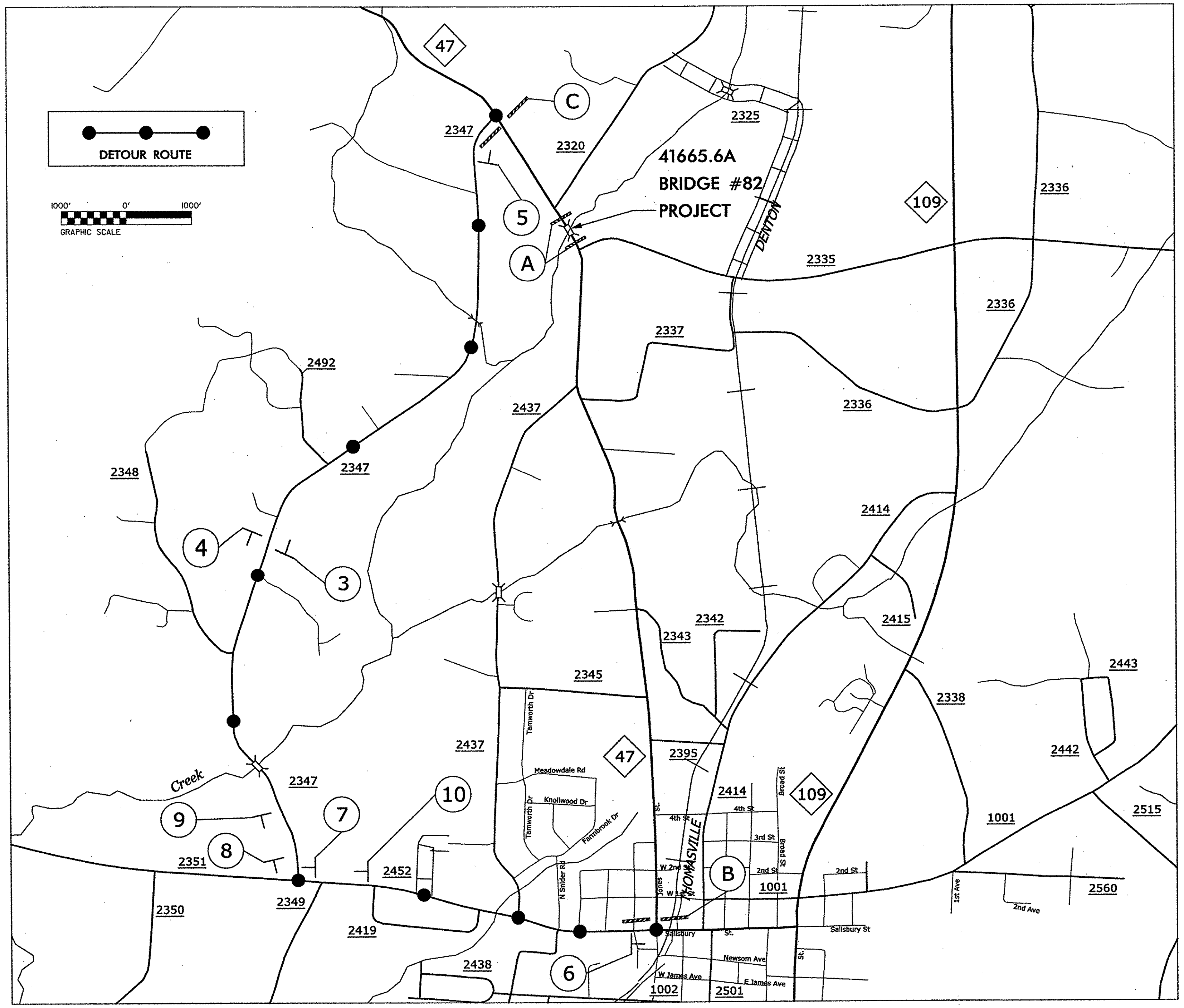


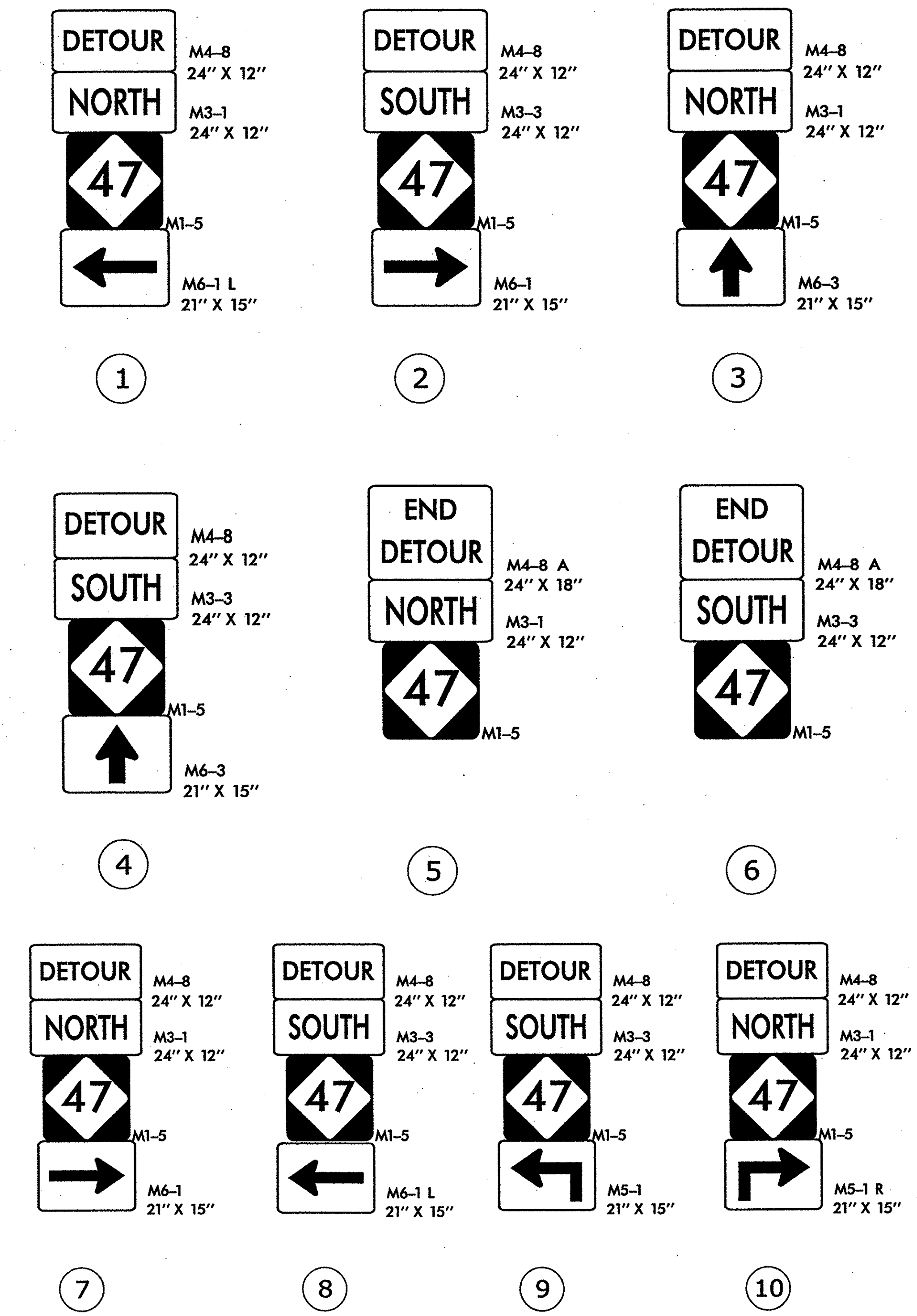
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WORK ZONE TRAFFIC CONTROL

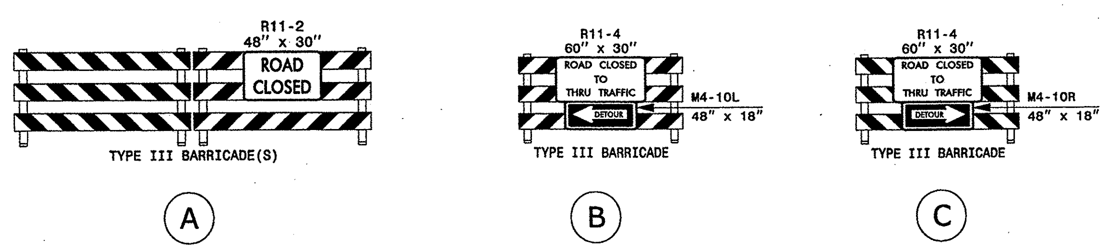
OFFSITE DETOUR B
SIGNING AND ROAD
CLOSURE SIGNING

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-2C

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991







NOTES:

USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO INSTALL ROAD CLOSURE SIGNS AND DEVICES.

TRAFFIC CONTROL DEVICES (1) THRU (10) SHALL BE INSTALLED AS PER THE ENGINEER'S INSTRUCTION.

APPROVED: DATE:

SEAL

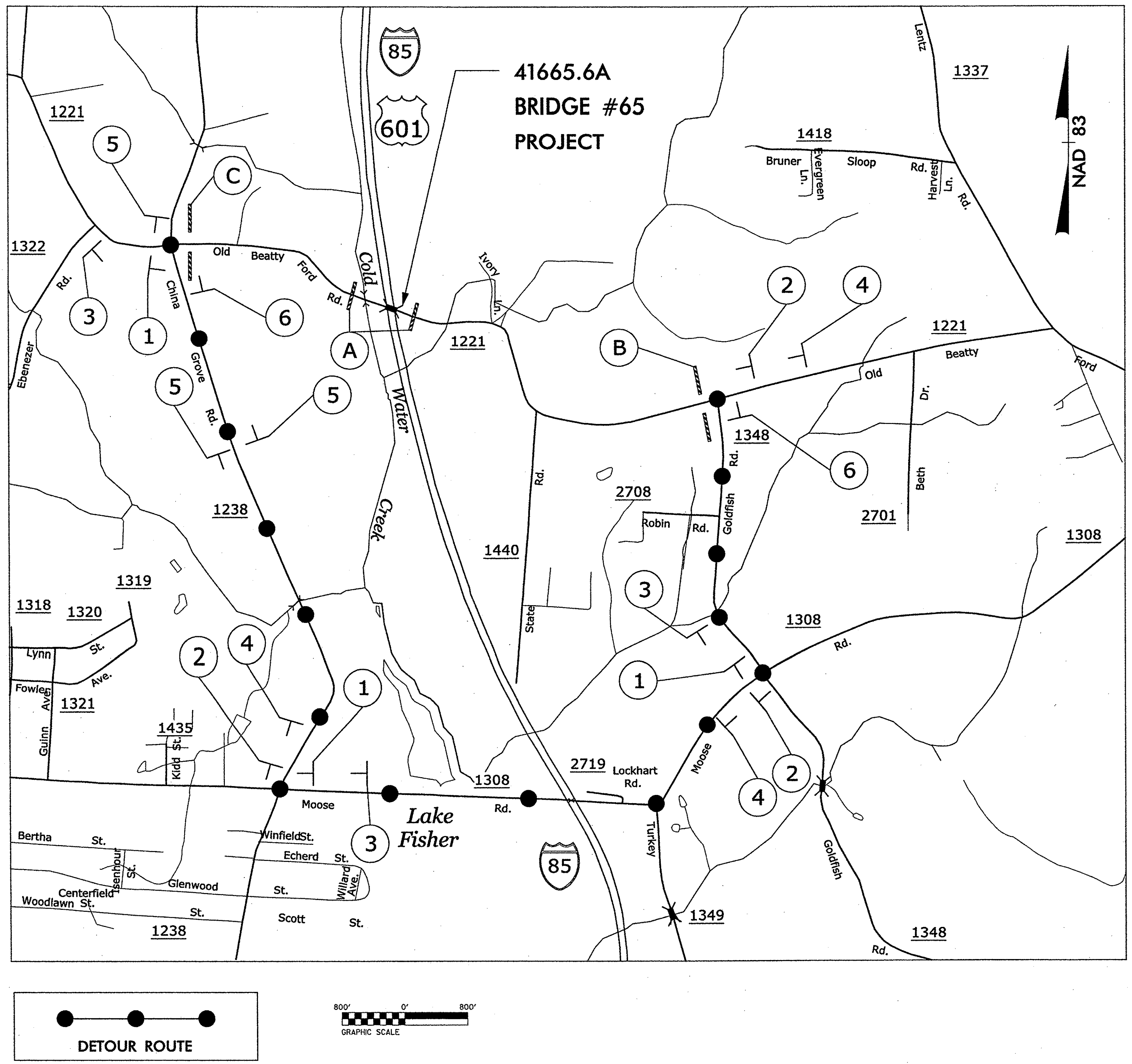
NORTH CAROLINA PROFESSIONAL SEAL 037897 ENGINEER RICHARD A. OOTHEY 2-7-13

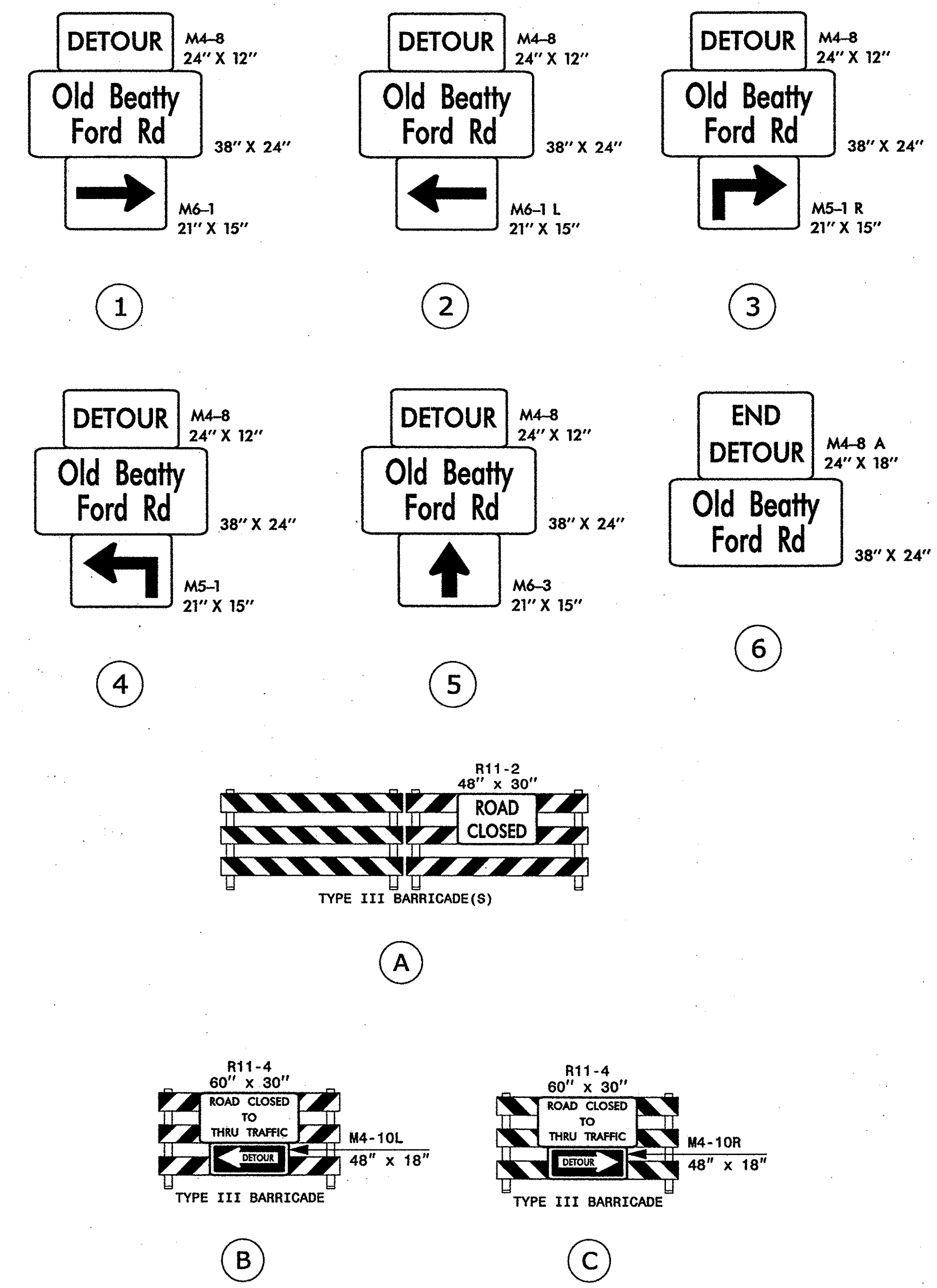
DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WORK ZONE TRAFFIC CONTROL

OFFSITE DETOUR C SIGNING AND ROAD CLOSURE SIGNING

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	TMP-2D

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991





NOTES:

USE NCDOT RSD. 1101.03 SHEET 1 OF 9 TO INSTALL ROAD CLOSURE SIGNS AND DEVICES.

TRAFFIC CONTROL DEVICES (1) THRU (6) SHALL BE INSTALLED AS PER THE ENGINEER'S INSTRUCTION.

APPROVED: ____ DATE: ____

SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
2-7-13

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

OFFSITE DETOUR D
SIGNING AND ROAD
CLOSURE SIGNING

PROJ. REFERENCE NO.	SHEET NO.
41665.6A	SD-1

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

SIGN NUMBER: SD-1
TYPE: D
QUANTITY: SEE PLANS
BACKG COLOR: FLOURESCENT ORANGE
COPY COLOR: BLACK

SIGN WIDTH: 3'-2"
HEIGHT: 2'-0"
TOTAL AREA: 6.4 Sq.Ft.
MAJ. COPY SERIES: GROUND
ROUTE MARKERS:

BORDER TYPE: FLUSH
RECESS: 0.5"
WIDTH: 0.5"
RADII: 3"
ARROW TYPES:

NO. Z BARS:
LENGTH:
MAT'L: 1.6 mm ALUMINUM

DESIGN BY: JRG
PROJECT ID: 41665.6A
CHECKED BY: RAO
DIV: 9
DATE: Feb 17, 2012

LETTER POSITIONS

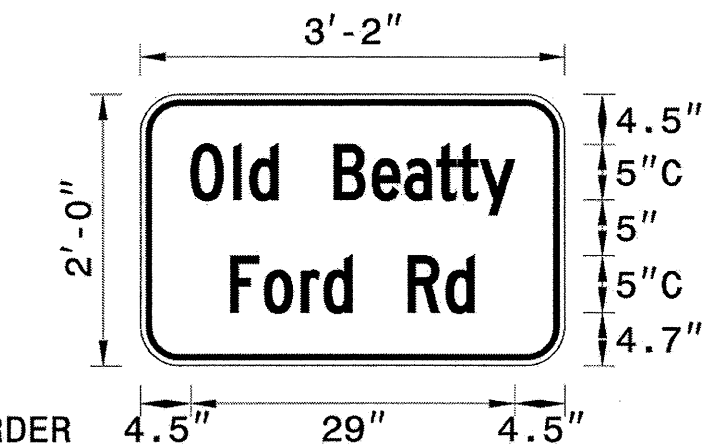
	O	l	d		B	e	a	t	t	y		
4.5	3.8	1.5	2.5	5	3.4	2.9	2.9	1.9	2	3.1	4.5	29

	F	o	r	d		R	d		
8.1	3	3.3	2	2.5	5	3.4	2.6	8.1	21.9

Letter positions are to the lower left corners

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting
2. Background shall be Type VII, VIII, or IX (prismatic) fluorescent orange retroreflective sheeting.



BORDER
R=3"
TH=0.5"
IN=0.5"

Panel Style: Street Name TC 12in.ssi
M.U.T.C.D.: 2009 Edition

NORTH CAROLINA D.O.T. SIGN DETAIL

APPROVED: DATE:

SEAL

SPECIAL SIGN DESIGN

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 ¾"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.

ENGLISH

JANUARY, 1990

REV 6-16-95 EEM /A RCW REV 5-7-03 RWW /A JTE REV 10-1-11 MAA /A GM