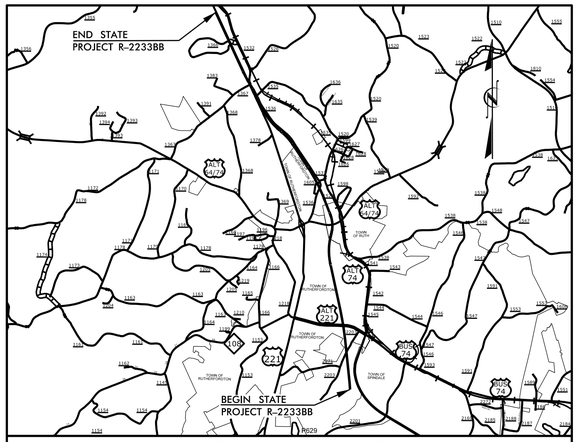
09/08/99

TIP PROJECT: R-2233BB

CONTRACT: C204397



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RUTHERFORD COUNTY

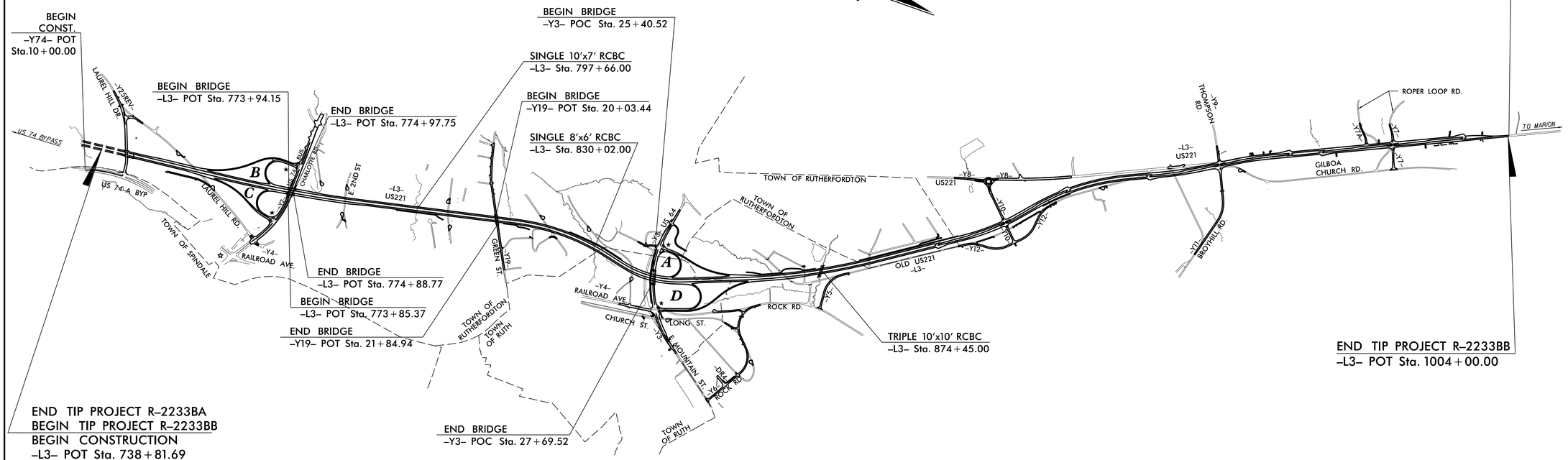
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BB		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.5		R/W
34400.2.7		UTIL.
34400.3.4		CONST.

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RETAINING WALL AND STRUCTURES

NAD 83



END TIP PROJECT R–2233BA
BEGIN TIP PROJECT R–2233BB
BEGIN CONSTRUCTION
–L3– POT Sta. 738+81.69

THIS IS A CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STRUCTURES

NCDOT CONTACT: HOANG DIEU, P.E.

DESIGN DATA

ADT 2020 = 13300
ADT 2040 = 14500
K = 9 %
D = 60 %
T = 9 % *
V = 70 MPH
* TTST 5% DUAL 4%
FUNC CLASS = ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R–2233BB = 4.996 MILES
LENGTH STRUCTURE TIP PROJECT R–2233BB= 0.026 MILES
TOTAL LENGTH TIP PROJECT R–2233BB = 5.022 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PREPARED IN THE OFFICE OF:

MODJESKI and MASTERS
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

2018 STANDARD SPECIFICATIONS

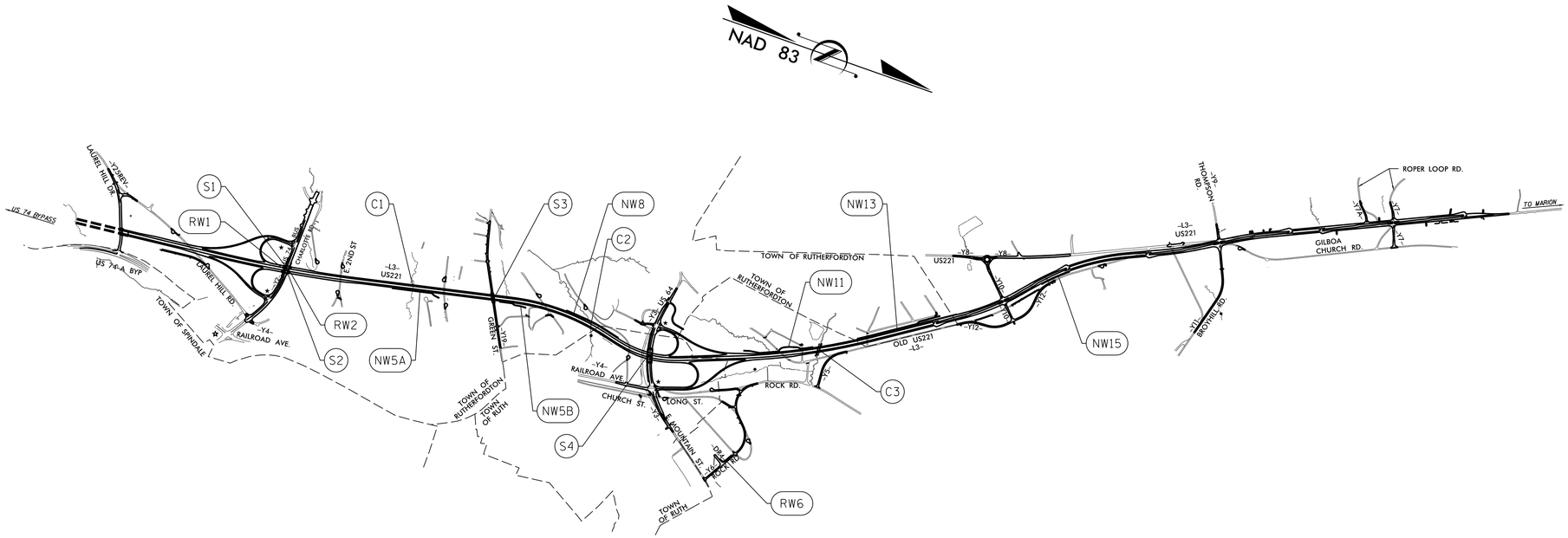
LETTING DATE:
DECEMBER 21, 2021

STRUCTURES ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
10/7/2021
DocuSigned by:
Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

FILES
MODJESKI & MASTERS

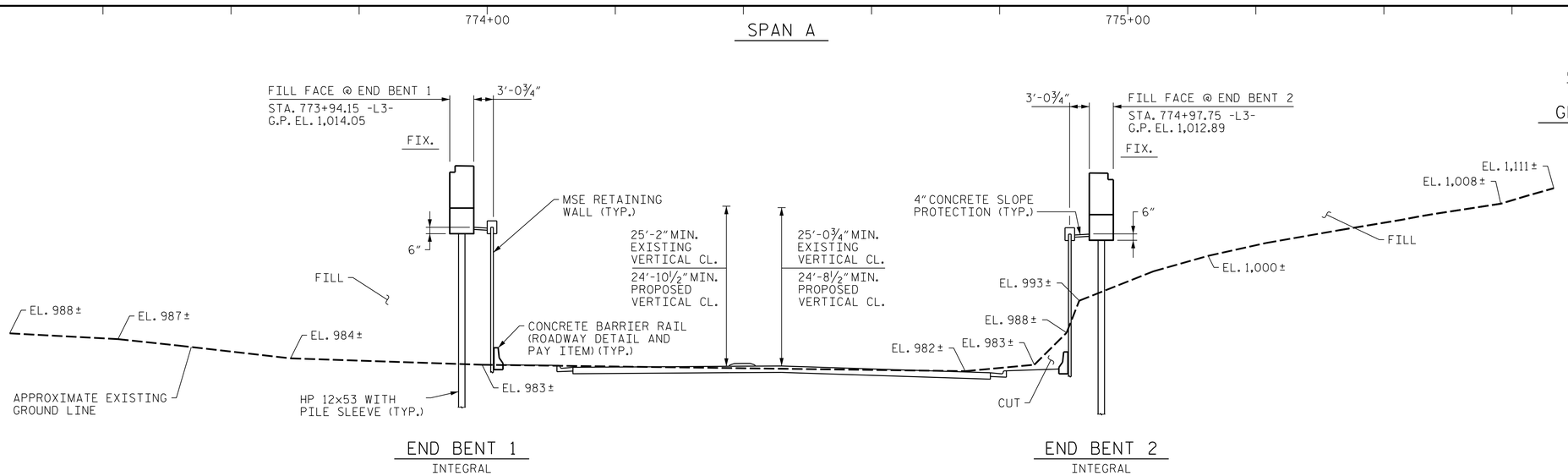


INDEX

STR. NO.	STATION	DESCRIPTION	SHEETS
S1	774+41.49 -L3- 29+93.51 -Y2-	LEFT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.	S1-1 THRU S1-28
S2	774+41.49 -L3- 29+93.51 -Y2-	RIGHT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.	S2-1 THRU S2-28
S3	20+88.94 -Y19- 812+50.25 -L3-	BRIDGE ON GREEN ST. OVER US 221 RUTHERFORDTON BYPASS BETWEEN US 221 AND US 74 ALT.	S3-1 THRU S3-34
S4	26+65.52 -Y3- 843+44.48 -L3-	BRIDGE ON US 64 OVER US 221 RUTHERFORDTON BYPASS BETWEEN US 221 AND US 74 ALT.	S4-1 THRU S4-45
C1	797+66.00 -L3-	SINGLE 10 FT. X 7 FT. CONCRETE BOX CULVERT 91° SKEW	C1-1 THRU C1-5
C2	830+02.00 -L3-	SINGLE 8 FT. X 6 FT. CONCRETE BOX CULVERT 43° SKEW	C2-1 THRU C2-5
C3	874+45.00 -L3-	TRIPLE 10 FT. X 10 FT. CONCRETE BOX CULVERT 117° SKEW	C3-1 THRU C3-5
C4	735+38.59 -L3-	SINGLE 10 FT. X 8 FT. CONCRETE BOX CULVERT 52°-20'-33" SKEW	C4-1 THRU C4-6
NW5A	793+98.23 -L3-	SOUND BARRIER WALL No. -NW5A-	SW-1 THRU SW-8
NW5B	813+78.54 -L3-	SOUND BARRIER WALL No. -NW5B-	SW-1 THRU SW-8
NW8	826+63.46 -L3-	SOUND BARRIER WALL No. -NW8-	
NW11	860+65.54 -L3-	SOUND BARRIER WALL No. -NW11-	
NW13	881+73.56 -L3-	SOUND BARRIER WALL No. -NW13-	
NW15	916+96.43 -L3-	SOUND BARRIER WALL ±No. -NW15-	
RW1	29+93.51 -Y2-	BRIDGE NOS. 660 AND 661 ON -L3- OVER -Y2- MSE RETAINING WALL NO. 1	W-1
RW2	29+93.51 -Y2-	BRIDGE NOS. 660 AND 661 ON -L3- OVER -Y2- MSE RETAINING WALL NO. 2	W-2
RW6	26+60.00 -Y6- TO 13+14.09 -DR4-	MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NO. 6	W-6

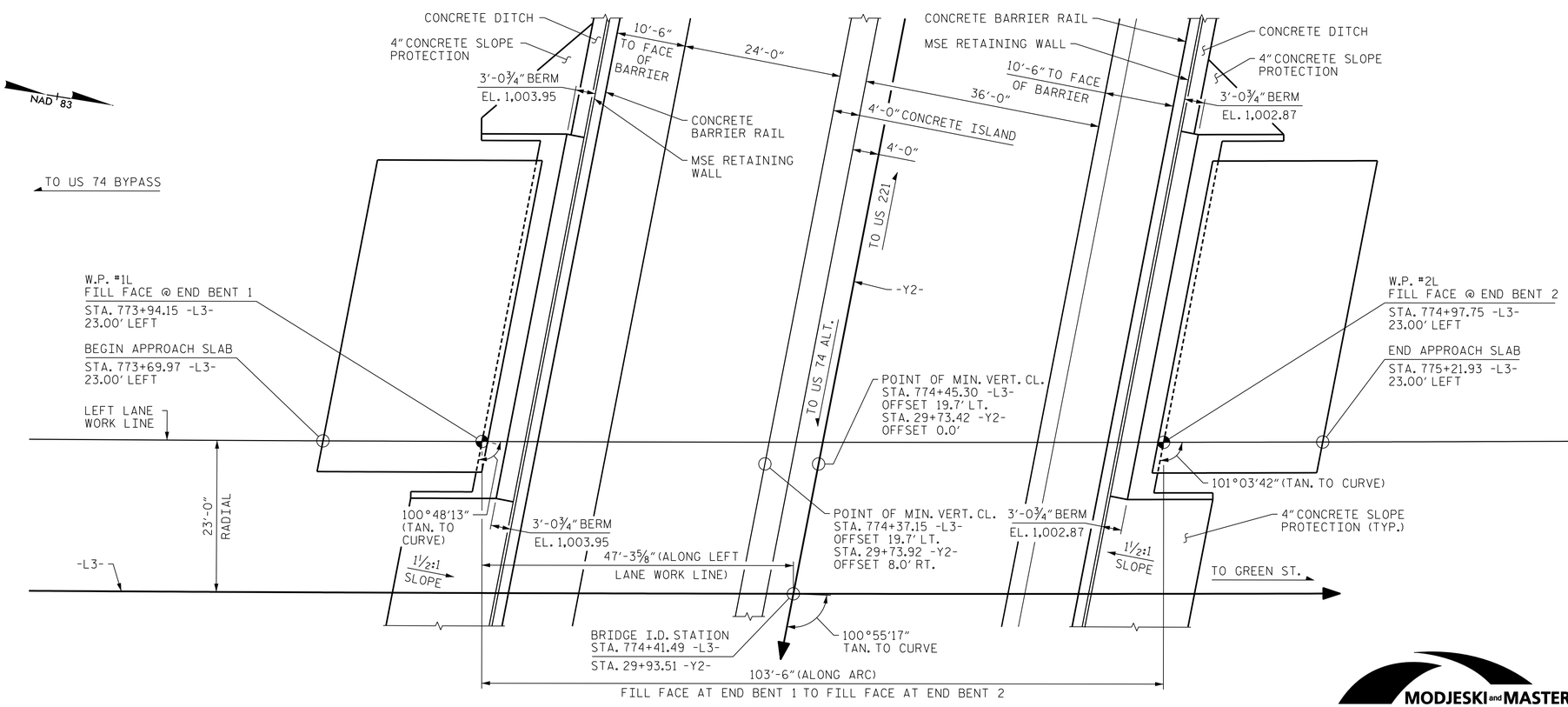
SECTION ALONG LEFT LANE WORK LINE

SECTIONS AT END BENTS ARE AT RIGHT ANGLES



PI = 777+00.00
EL = 1,006.22'
VC = 950'
(-)2.3100% (+)2.7876%

GRADE DATA -L3-



PLAN

PILES NOT SHOWN FOR CLARITY

HORIZONTAL CURVE DATA

-L3-

PI STA. 774+55.22
Δ = 6°21'09.5" (LT)
D = 0°14'56.8"
L = 2,550.11'
T = 1,276.36'
R = 23,000.00'
SE = NC

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-
29+93.51 -Y2-
SHEET 1 OF 4 BRIDGE NO. 660

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR LEFT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.

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

STR. #1

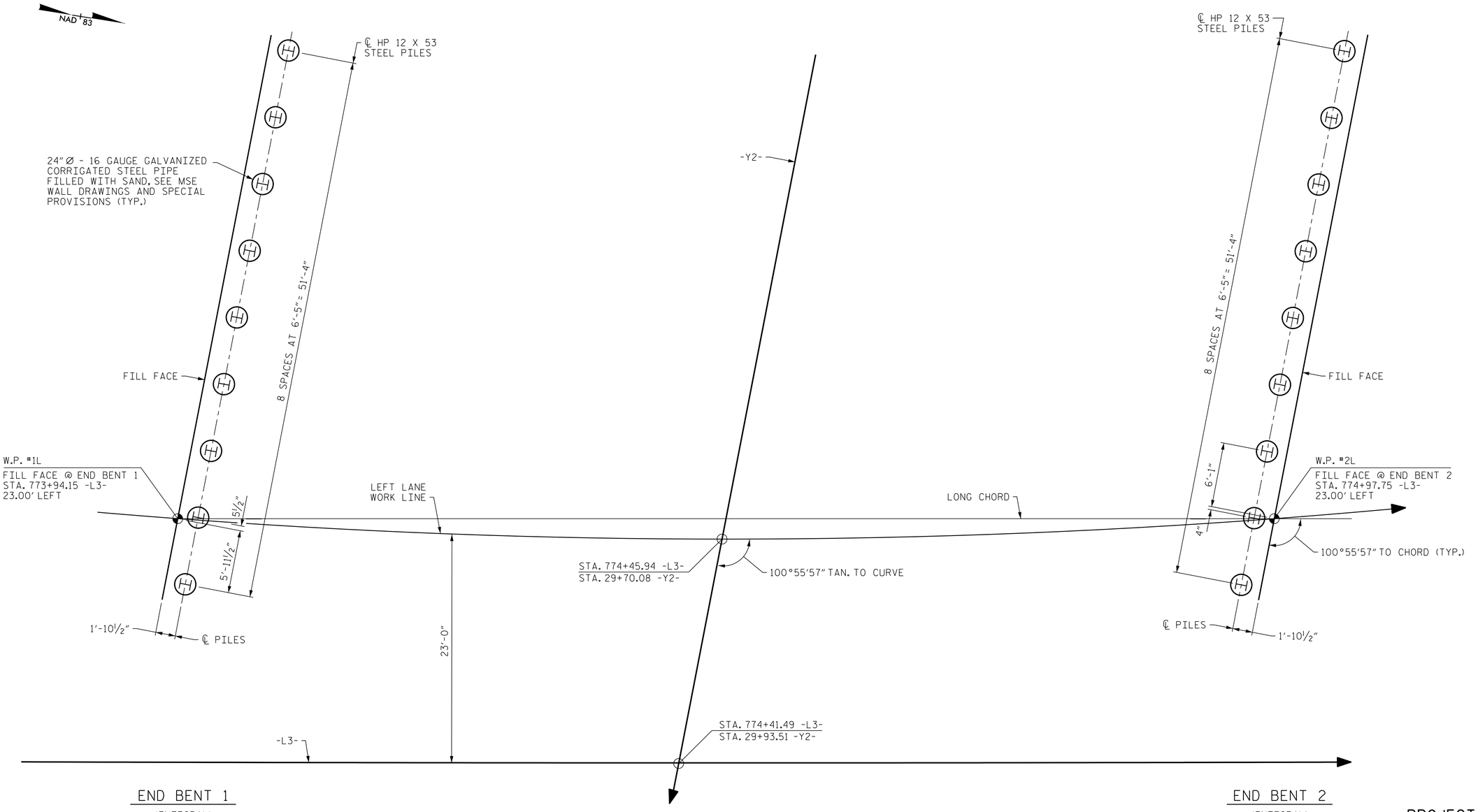
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
401_001_R2233BB_SMU_GD_B00660.dgn



END BENT 1
(INTEGRAL)

END BENT 2
(INTEGRAL)

FOUNDATION LAYOUT

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 132 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 132 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

PREDRILL PILE LOCATIONS AT END BENT NO. 2 TO 10 FEET BELOW TOP OF MSE WALL LEVELING PAD WITH EQUIPMENT THAT WILL RESULT IN A MAXIMUM PREDRILLING DIAMETER OF 12". FOR PREDRILLING FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

INSTALL PILES AT END BENT NOS. 1 AND 2 PRIOR TO MSE WALL CONSTRUCTION.

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

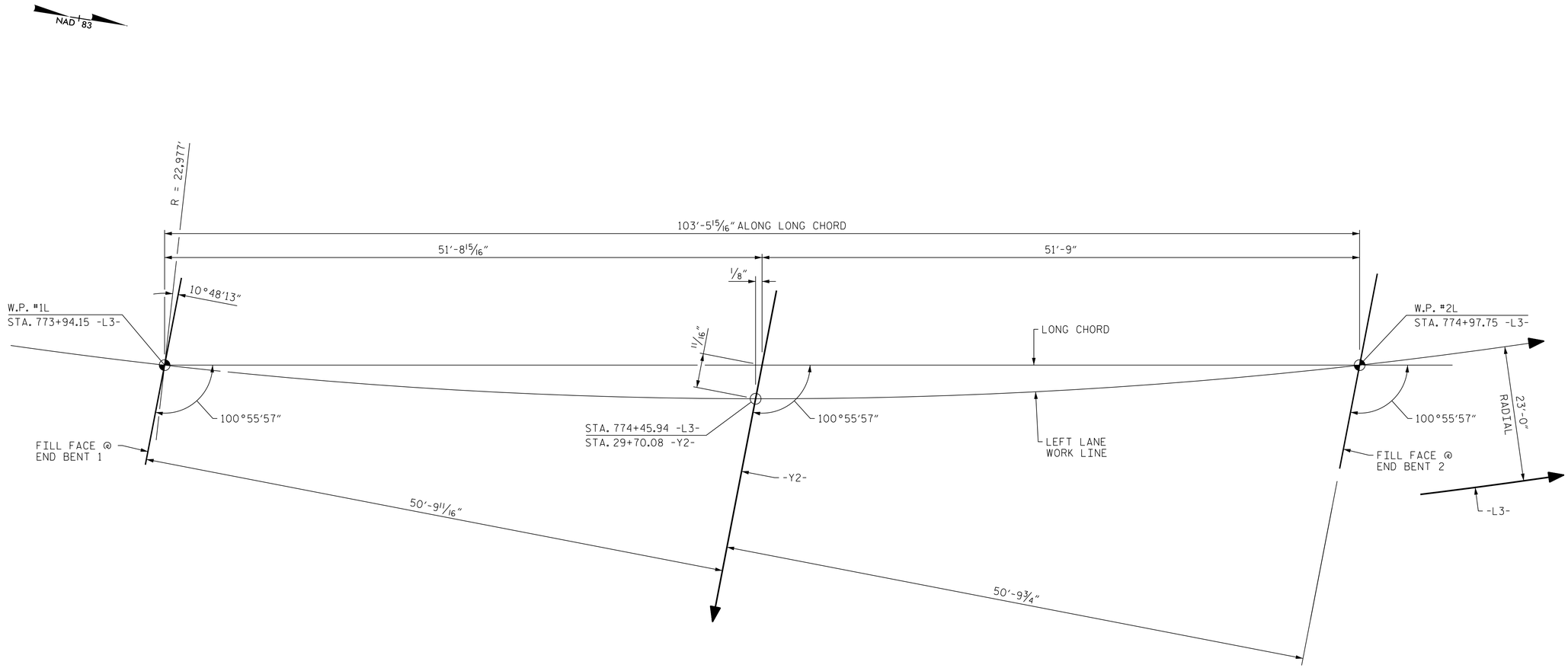
GENERAL DRAWING

FOR LEFT LANE BRIDGE ON US 221
RUTHERFORDTON BYPASS OVER
US 74 BUS. BETWEEN US 74
BYPASS AND GREEN ST.

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

STR. #1

4/22/2020
401.003.R2233BB.SMU.FL_800660.DGN



LONG CHORD LAYOUT

(END BENTS ARE PARALLEL)

HORIZONTAL CURVE DATA

-L3-

PI STA. 774+55.22
Δ = 6°21'09.5" (LT)
D = 0°14'56.8"
L = 2,550.11'
T = 1,276.36'
R = 23,000.00'
SE = NC

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR LEFT LANE BRIDGE ON US 221
RUTHERFORDTON BYPASS OVER
US 74 BUS. BETWEEN US 74
BYPASS AND GREEN ST.

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

STR. #1

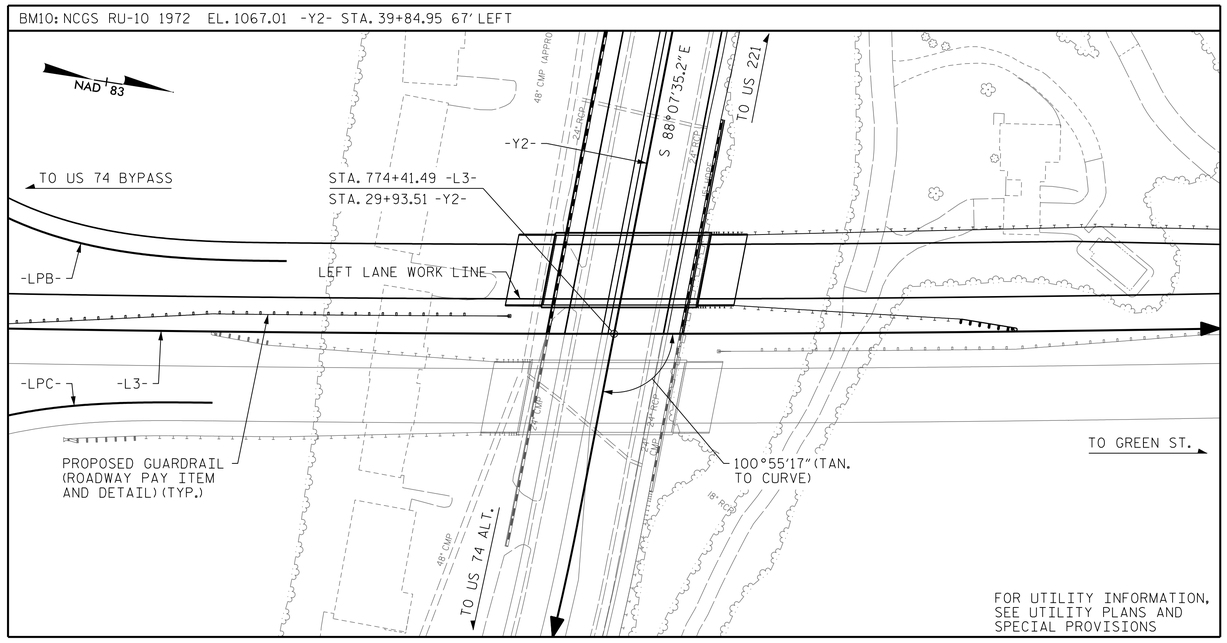
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DESIGNED BY:	C. CORMAN	DATE :	APR 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
401.005.R2233BB.SMU.LC.800660.DGN



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

USE TYPE III REINFORCED APPROACH FILL DETAILS. OMIT THE MSE WALL REINFORCEMENT ON THE END BENT CAPS.

TOTAL BILL OF MATERIAL

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 774+41.49 -L3-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SET UP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	PREDRILLING FOR PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	5,014	6,441		LUMP SUM		6	606.63						203.6		LUMP SUM
END BENT 1			47.7		6,046			9	9	540				62	
END BENT 2			45.1		5,976			9	9	405	9	82		58	
TOTAL	5,014	6,441	92.8	LUMP SUM	12,022	6	606.63	18	18	945	9	82	203.6	120	LUMP SUM

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR LEFT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.

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

STR. #1

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	B. LOFLIN	DATE :	SEP 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
401_007_R2233BB_SMU_TBM_800660.dgn

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.19	--	1.75	0.741	1.58	A	E	49.8	0.888	1.19	A	I	9.4	0.80	0.741	1.21	A	E	49.8	
		HL-93 (OPERATING)	N/A		1.58	--	1.35	0.741	2.05	A	E	49.8	0.888	1.58	A	I	9.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.63	58.68	1.75	0.741	2.20	A	E	49.8	0.888	1.63	A	I	9.4	0.80	0.741	1.68	A	E	49.8	
		HS-20 (OPERATING)	36.000		2.15	77.40	1.35	0.741	2.86	A	E	49.8	0.888	2.15	A	I	9.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.99	53.87	1.40	0.741	6.54	A	E	49.8	0.888	5.26	A	I	9.4	0.80	0.741	3.99	A	E	49.8	
		SNGARBS2	20.000		2.89	57.80	1.40	0.741	4.73	A	E	49.8	0.888	3.65	A	I	9.4	0.80	0.741	2.89	A	E	49.8	
		SNAGRIS2	22.000		2.70	59.40	1.40	0.741	4.43	A	E	49.8	0.888	3.36	A	I	9.4	0.80	0.741	2.70	A	E	49.8	
		SNCOTTS3	27.250		1.98	53.96	1.40	0.741	3.25	A	E	49.8	0.888	2.56	A	I	9.4	0.80	0.741	1.98	A	E	49.8	
		SNAGGRS4	34.925		1.62	56.58	1.40	0.741	2.66	A	E	49.8	0.888	2.06	A	I	9.4	0.80	0.741	1.62	A	E	49.8	
		SNS5A	35.550		1.59	56.52	1.40	0.741	2.61	A	E	49.8	0.888	2.07	A	I	9.4	0.80	0.741	1.59	A	E	49.8	
		SNS6A	39.950		1.45	57.93	1.40	0.741	2.37	A	E	49.8	0.888	1.87	A	I	9.4	0.80	0.741	1.45	A	E	49.8	
		SNS7B	42.000		1.38	57.96	1.40	0.741	2.26	A	E	49.8	0.888	1.81	A	I	9.4	0.80	0.741	1.38	A	E	49.8	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.76	58.08	1.40	0.741	2.88	A	E	49.8	0.888	2.25	A	I	9.4	0.80	0.741	1.76	A	E	49.8	
		TNT4A	33.075		1.76	58.21	1.40	0.741	2.89	A	E	49.8	0.888	2.21	A	I	9.4	0.80	0.741	1.76	A	E	49.8	
		TNT6A	41.600		1.43	59.49	1.40	0.741	2.34	A	E	49.8	0.888	1.90	A	I	9.4	0.80	0.741	1.43	A	E	49.8	
		TNT7A	42.000		1.43	60.06	1.40	0.741	2.34	A	E	49.8	0.888	1.87	A	I	9.4	0.80	0.741	1.43	A	E	49.8	
		TNT7B	42.000		1.46	61.32	1.40	0.741	2.40	A	E	49.8	0.888	1.78	A	I	9.4	0.80	0.741	1.46	A	E	49.8	
		TNAGRIT4	43.000		1.40	60.20	1.40	0.741	2.30	A	E	49.8	0.888	1.72	A	I	9.4	0.80	0.741	1.40	A	E	49.8	
		TNAGT5A	45.000		1.33	59.85	1.40	0.741	2.18	A	E	49.8	0.888	1.69	A	I	9.4	0.80	0.741	1.33	A	E	49.8	
		TNAGT5B	45.000	⟨3⟩	1.32	59.40	1.40	0.741	2.16	A	E	49.8	0.888	1.64	A	I	9.4	0.80	0.741	1.32	A	E	49.8	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

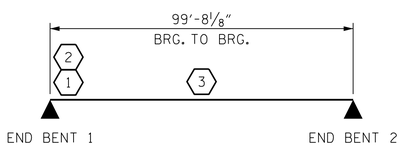
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

DESIGNED BY: C.CORMAN DATE : AUG 2019
DRAWN BY: K. WHITE DATE : AUG 2019
CHECKED BY: J.BORUTA DATE : AUG 2019
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

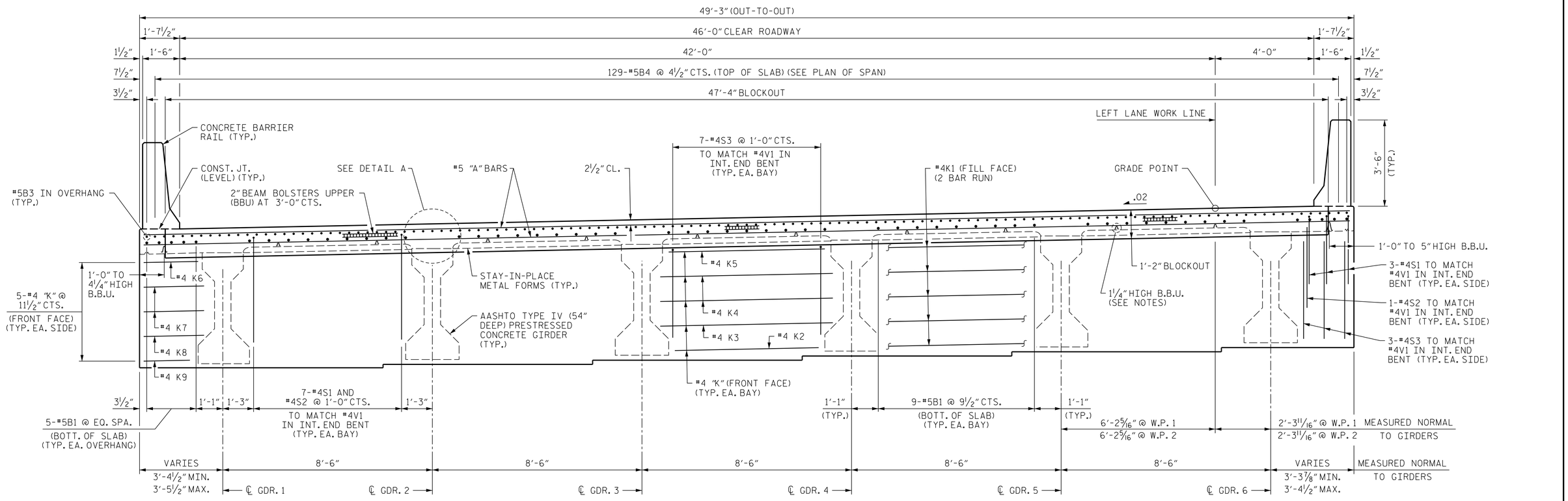
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-5
1			3			TOTAL SHEETS
2			4			28

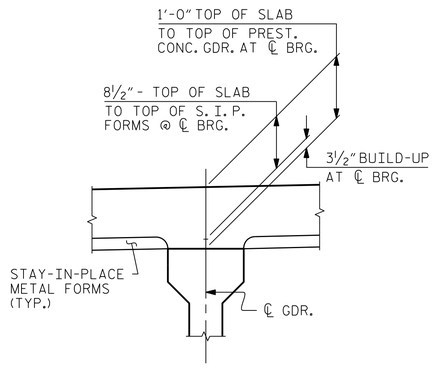
STR. #1 STD. NO. LRFR1

4/22/2020
401.009_R2233BB_SMU_LRFR_800660.dgn



TYPICAL SECTION AT INTEGRAL END BENT

DIMENSIONS ARE RADIAL UNLESS NOTED OTHERWISE



DETAIL "A"

NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 ½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-6
1			3			TOTAL SHEETS
2			4			28

STR. #1

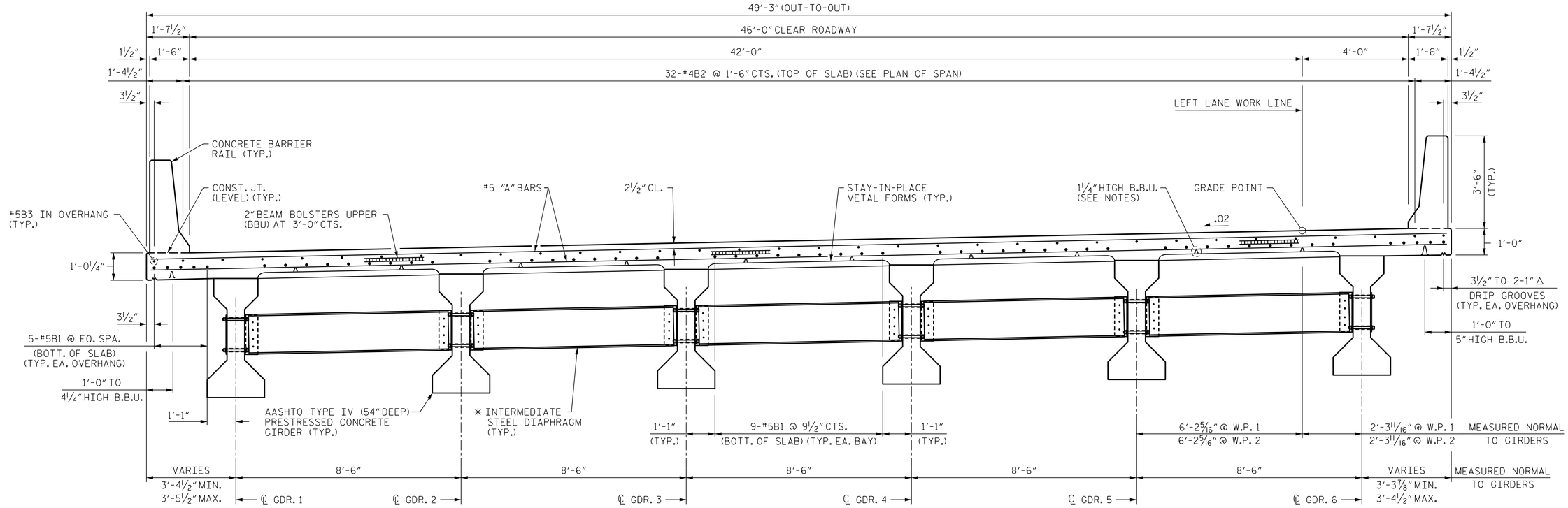
DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
401.011.R2233BB.SMU.TSI.800660.dgn



TYPICAL SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

(SHOWING INTERMEDIATE DIAPHRAGMS)

* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

DIMENSIONS ARE RADIAL UNLESS NOTED OTHERWISE

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-7
1			3			TOTAL SHEETS
2			4			28

STR. #1

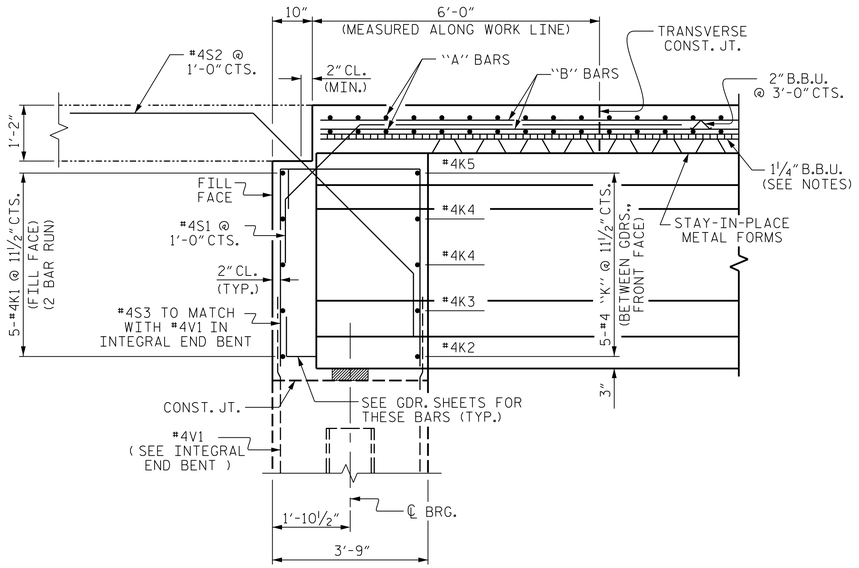
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
401.013.R2233BB.SMU.TS2.800660.DGN



SECTION THRU INTEGRAL END BENT

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			28

STR. #1

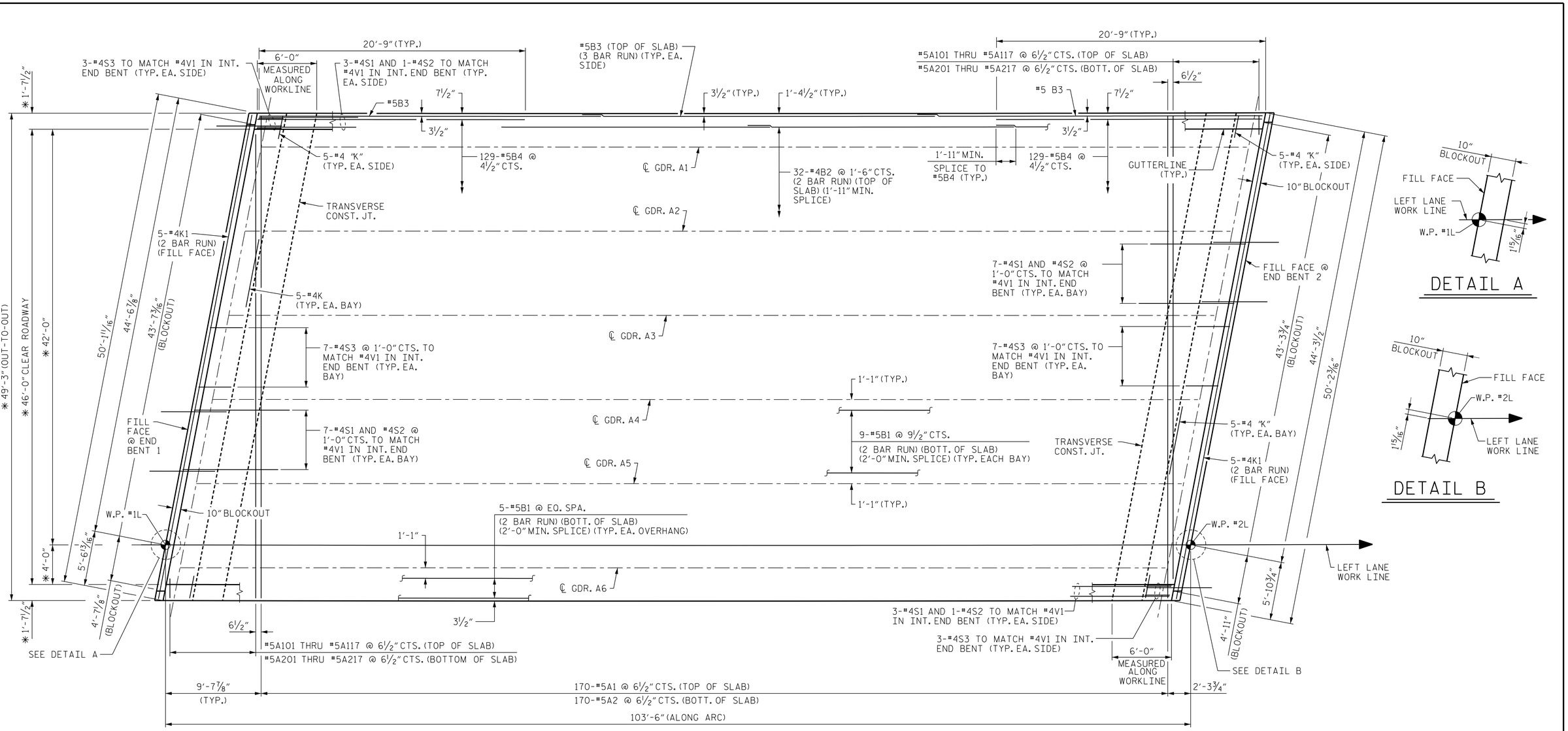
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

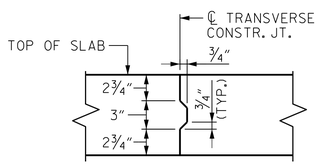
4/22/2020
401.015.R2233BB.SMU.T53.800660.DGN



DETAIL A

DETAIL B

✳ RADIAL DIMENSIONS



TRANSVERSE CONSTRUCTION JOINT

REINFORCING STEEL IN SLAB NOT SHOWN.

LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

PLAN OF SPAN A

"A" BARS TO BE PLACED PERPENDICULAR TO AND ALONG LONG CHORD

NOTES:

FOR LAP LENGTHS NOT SHOWN, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-9
1			3			TOTAL SHEETS
2			4			28

STR. #1

DESIGNED BY:	C. CORMAN	DATE : JUNE 2019
DRAWN BY:	K. WHITE	DATE : JUNE 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

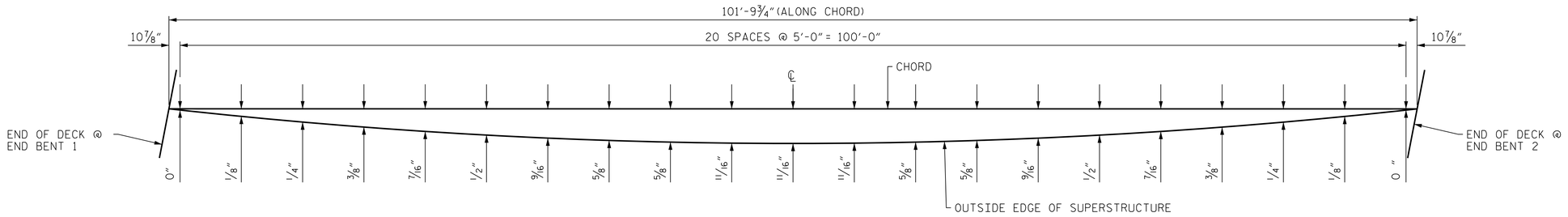
4/22/2020
401_017_R2233BB_SMU_S1_800660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

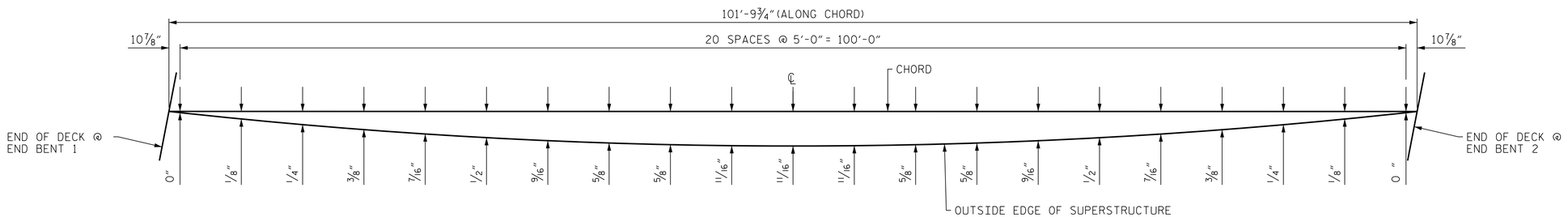
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020

DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...



ARC OFFSETS - SPAN A (LEFT SIDE)



ARC OFFSETS - SPAN A (RIGHT SIDE)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			28

STR. #1

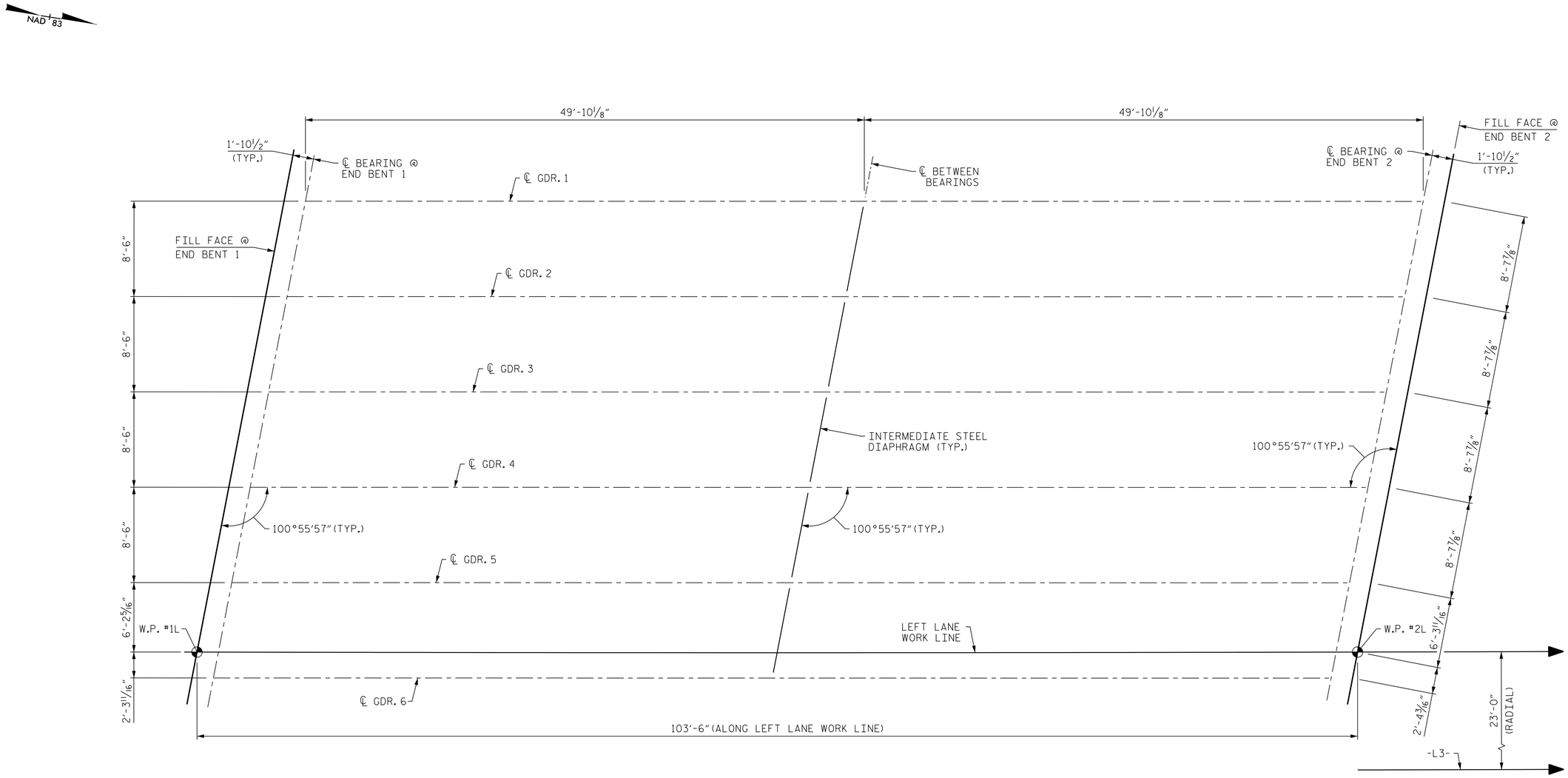
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	K. WHITE	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
401.019.R2233BB.SMU.ARC_800660.DGN



INTEGRAL END BENT
E1

INTEGRAL END BENT
E1

FRAMING PLAN - SPAN A

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

NOTES:

CONTRACTOR IS RESPONSIBLE FOR FURNISHING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

END BENTS ARE PARALLEL.

ALL GIRDERS ARE PARALLEL TO LONG CHORD.

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
401.021.R2233BB.SMU_FP_800660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

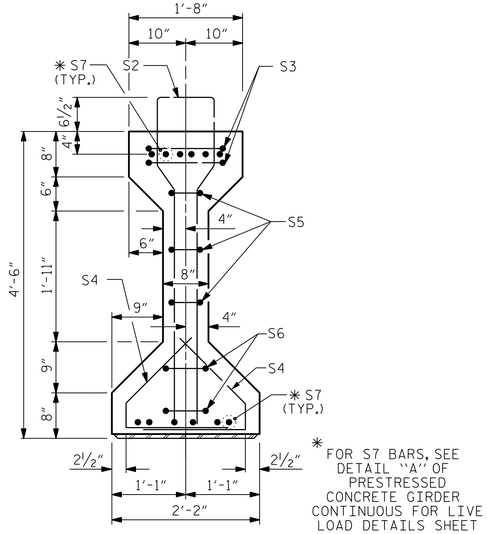
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
FRAMING PLAN
SPAN A

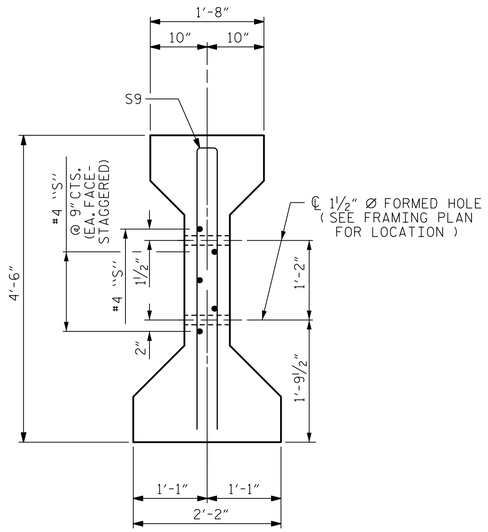
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			28

STR. #1



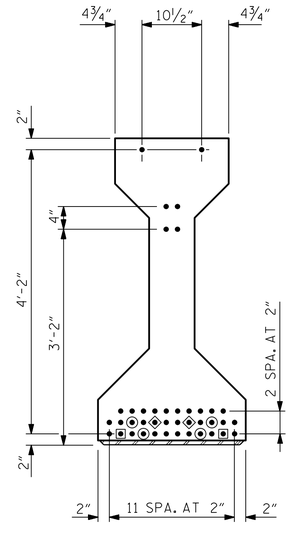
* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION A-A

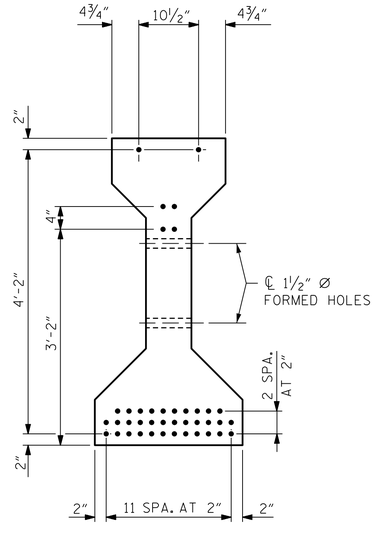


SECTION C-C

(S1 BARS NOT SHOWN)



AT END OF GIRDER

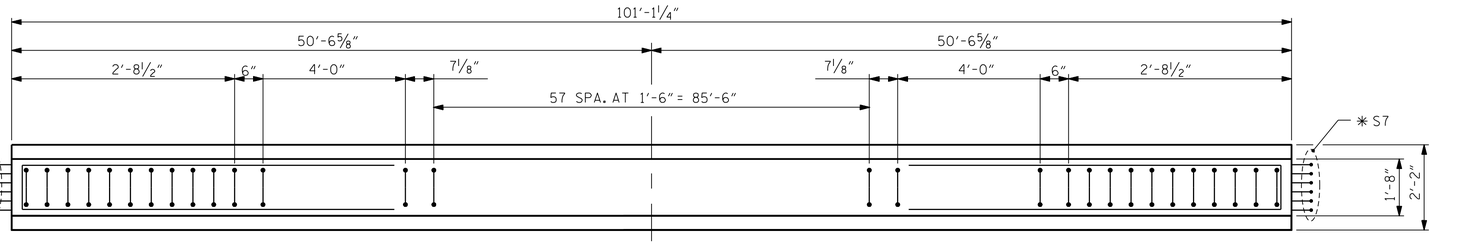


AT ℄ OF GIRDER

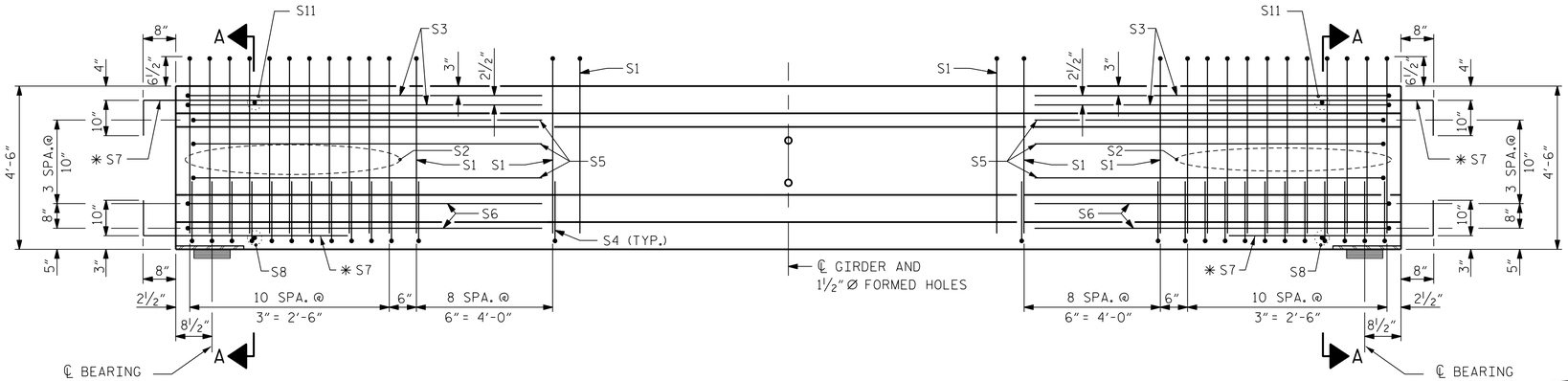
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- ▣ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.
- ◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER.
- ◈ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER.



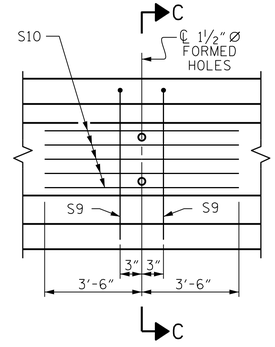
PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.

0.6" Ø L. R. GRADE 270 STRANDS

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

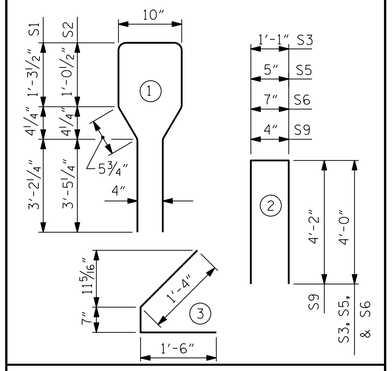
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-9"	546
S2	22	#6	1	10'-9"	355
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	4	#4	2	8'-7"	23
S7	24	#5	STR	3'-8"	92
S8	2	#3	STR	1'-10"	1
S9	2	#5	2	8'-8"	18
S10	5	#4	STR	7'-0"	23
S11	2	#3	STR	1'-4"	1

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	7500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
54" PCG GIRDER	1300	20.5	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	101'-1¼"	606.63'

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
2			4			28

STR. #1 STD. NO. PCG6

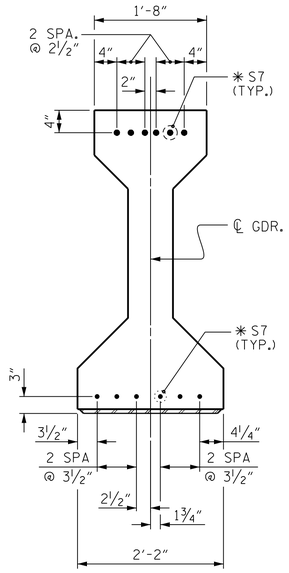
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC
DESIGNED BY: C. CORMAN	DATE : JULY 2019	
DRAWN BY: K. WHITE	DATE : JULY 2019	
CHECKED BY: J. BORUTA	DATE : JULY 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

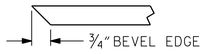
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/22/2020
401.023.R2233BB.SMU.G1.800660.dgn



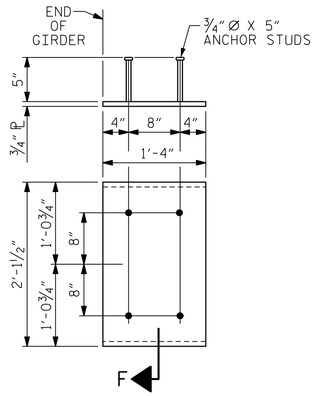
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)



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

(2 REQ'D PER GIRDER)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 PSI.

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

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

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A										
	GIRDERS 1 THRU 6										
TENTH POINTS	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.120	0.165	0.193	0.203	0.193	0.165	0.120	0.064	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.050	0.098	0.136	0.160	0.169	0.160	0.136	0.098	0.050	0
FINAL CAMBER ↑	0	3/16"	1/4"	5/16"	3/8"	7/16"	3/8"	5/16"	1/4"	3/16"	0

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

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS
2			4			28

STR. #1 STD. NO. PCG9

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

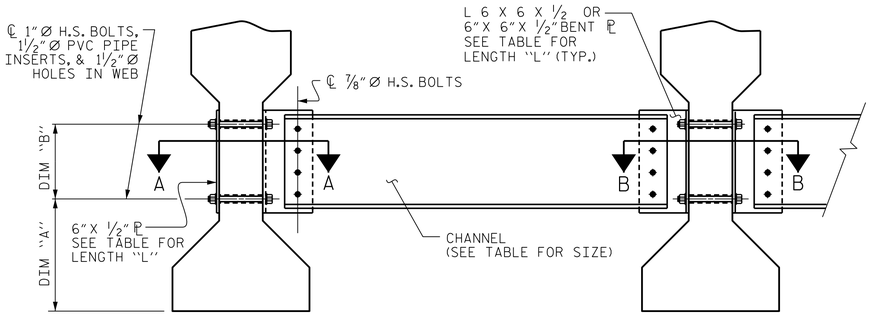
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

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

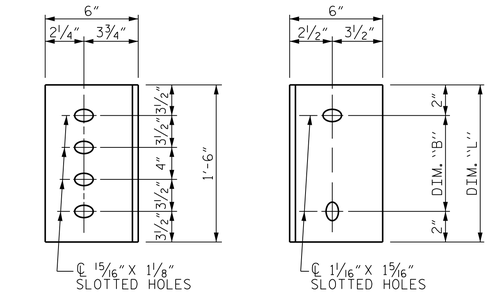
REV.	1/15	MAA/TMG
REV.	2/15	MAA/TMG
REV.	12/17	MAA/THC

4/22/2020
401.025.R2233BB.SMU.02.800660.DGN



PART SECTION AT INTERMEDIATE DIAPHRAGM

(EXTERIOR BAY SHOWN)



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

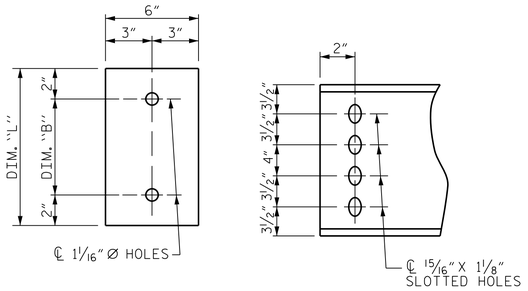


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM F3125 GRADE A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

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

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

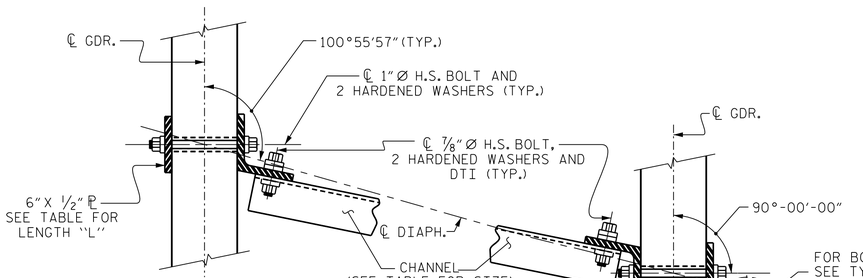
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

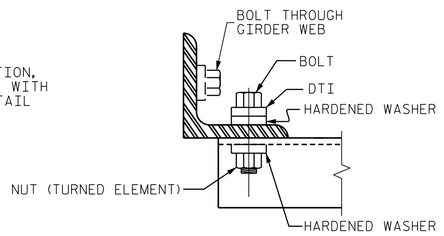
TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"



SECTION A-A

SECTION B-B



BOLT WITH DTI ASSEMBLY DETAIL

CONNECTION DETAILS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-14
1			3			TOTAL SHEETS
2			4			28

STR. #1 STD. NO. PCG10

MODJESKI and MASTERS
Experience great bridges.

333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

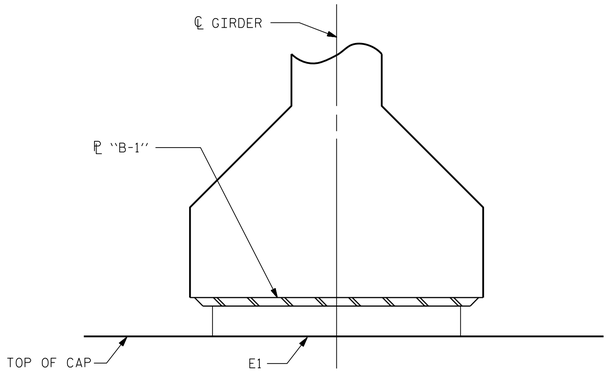
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

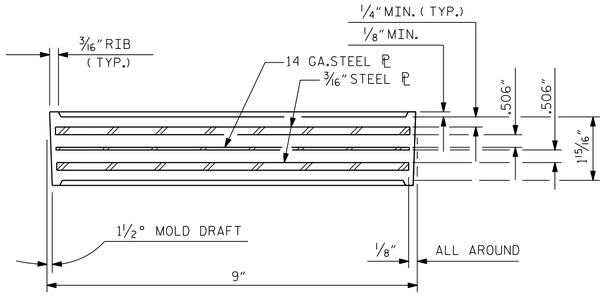
DRAWN BY : TLA 6/05
CHECKED BY : VC 6/05

REV. 5/1/06RRR KMM/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

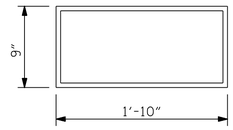
4/22/2020
401.027.R2233BB.SWU.SS.800660.DGN



SECTION F-F
@ INTEGRAL END BENT



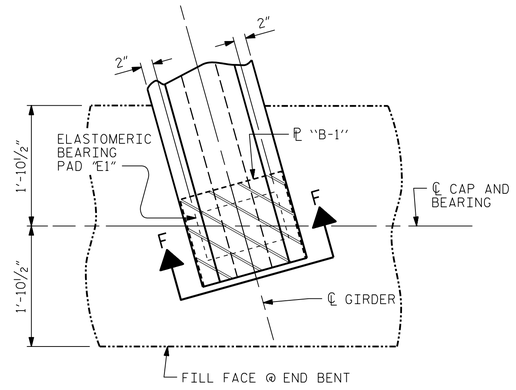
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN @ END BENT

NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

DRAWN BY :	WJH 8/89
CHECKED BY :	CRK 8/89

REV. 6/13	AAC/MAA
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

4/22/2020

DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

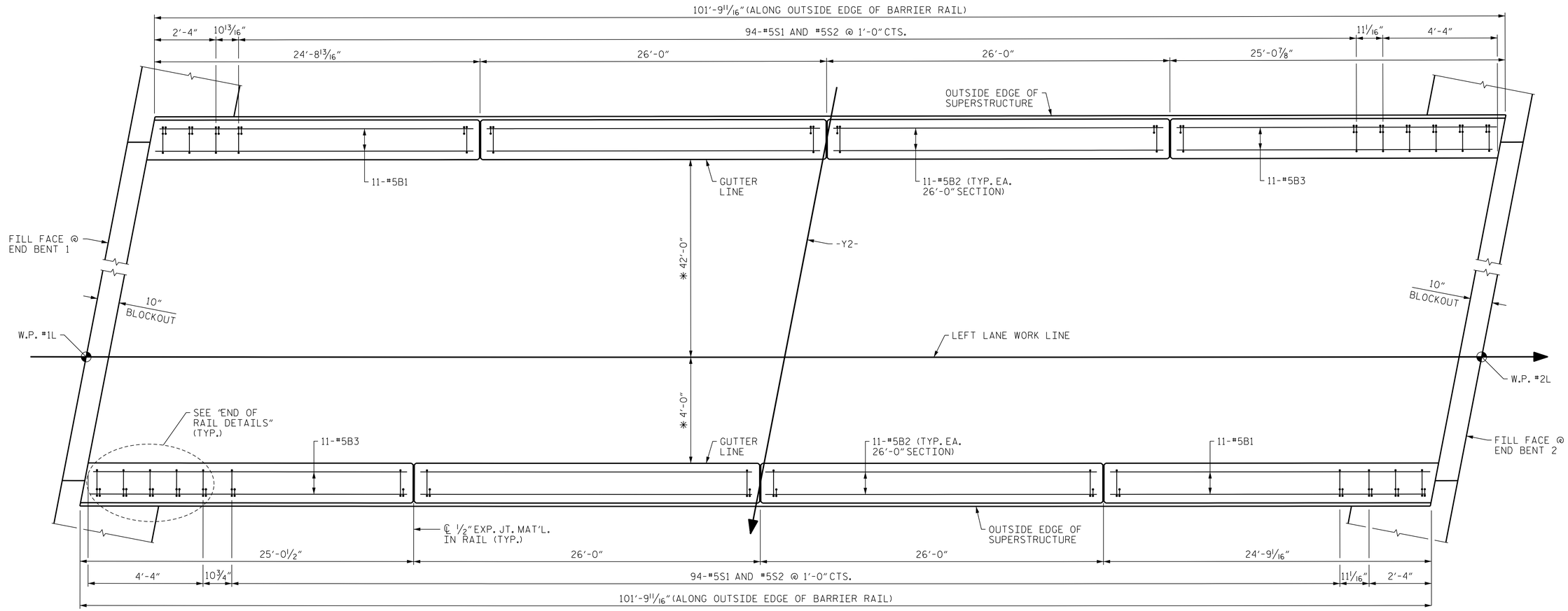
ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-15
1			3			TOTAL SHEETS
2			4			28

STR. #1 STD. NO. EB3 (SHT 3)

4/22/2020
401_029_R2233BB_SMU_BG_800660.DGN



PLAN OF CONCRETE BARRIER RAIL

* RADIAL DIMENSIONS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUERSTRUCTURE

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-16
1			3			TOTAL SHEETS
2			4			28

STR. #1

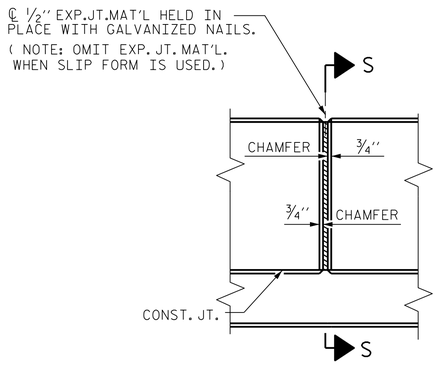
DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
401.031.R2233BB.SWL.CBR.B00660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ELEVATION AT EXPANSION JOINTS

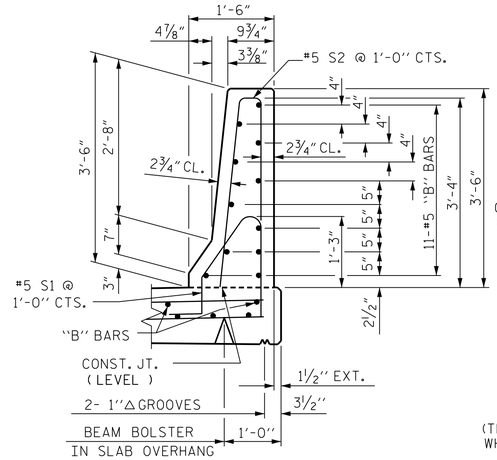
BARRIER RAIL DETAILS

NOTES

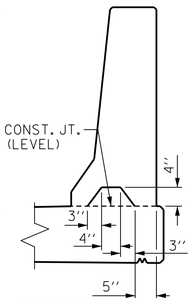
THE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



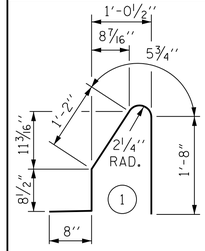
SECTION THRU RAIL

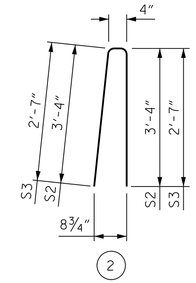


SECTION S-S

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

BAR TYPES





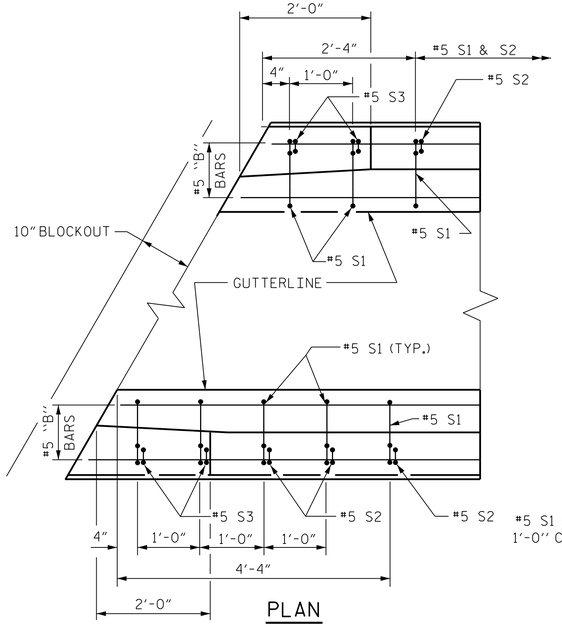
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

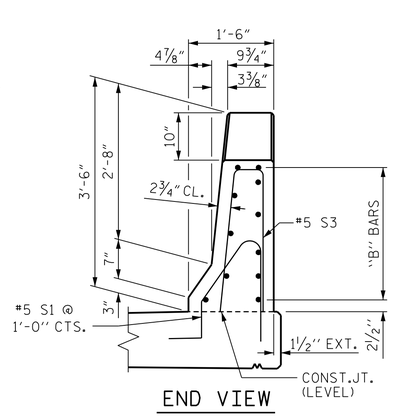
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	22	5	STR	24'-5"	560
✳ B2	44	5	STR	25'-8"	1178
✳ B3	22	5	STR	24'-8"	566
✳ S1	204	5	1	4'-8"	993
✳ S2	196	5	2	7'-0"	1431
✳ S3	8	5	2	5'-6"	46

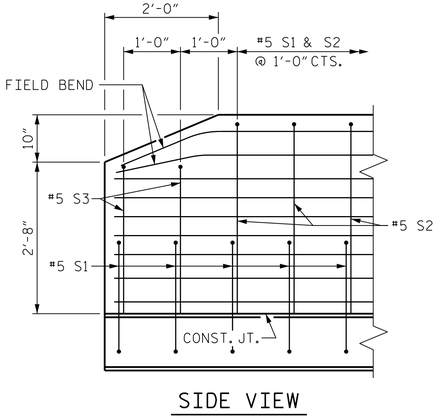
✳ EPOXY COATED REINFORCING STEEL	4,774 LBS.
CLASS AA CONCRETE	27.7 CU. YDS.
CONCRETE BARRIER RAIL	203.6 LIN. FT.



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			28

STR. #1 CBR1

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

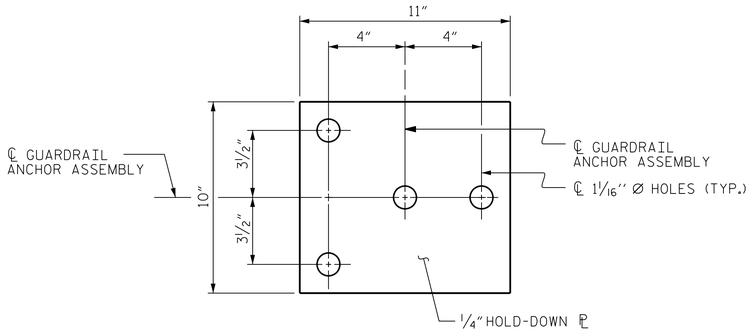
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

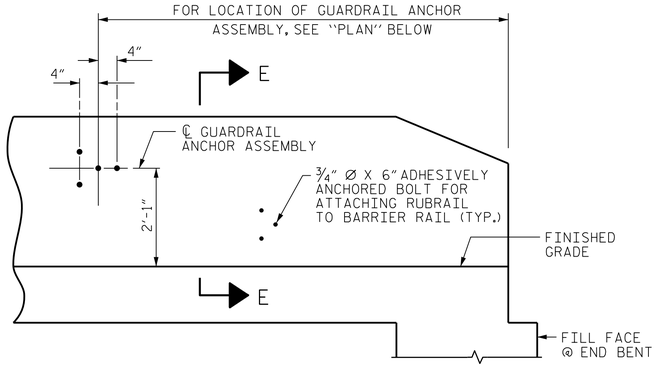
DRAWN BY :	ARB	5/87
CHECKED BY :	SJD	9/87

REV. 7/12	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

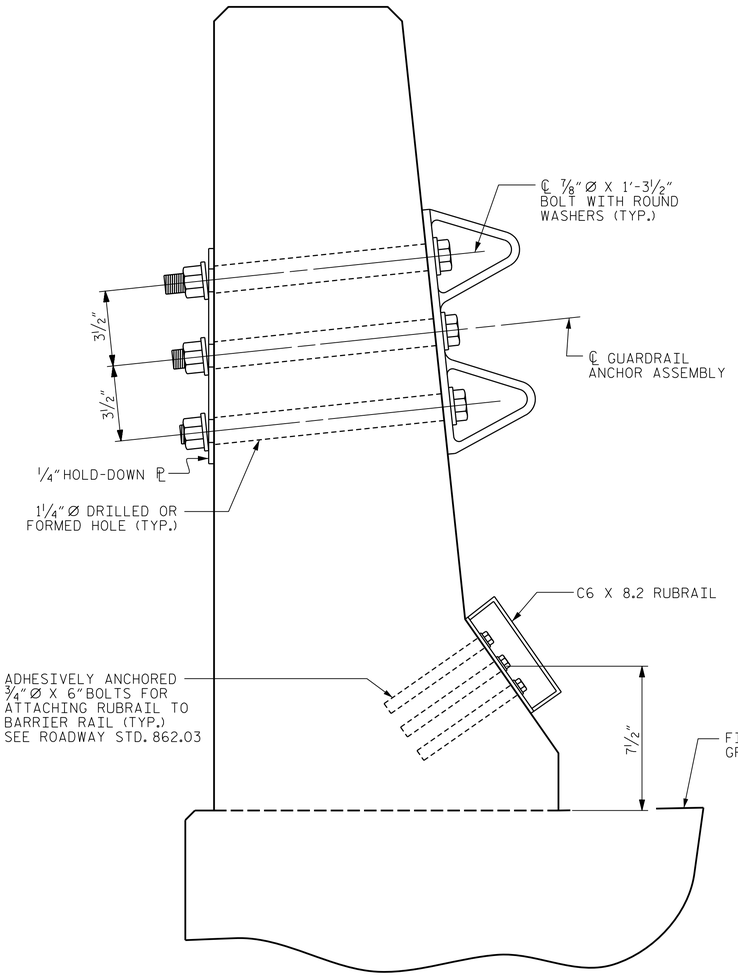
4/22/2020
401_033_R2233BB_SMU_BRD_800660.DGN



PLAN

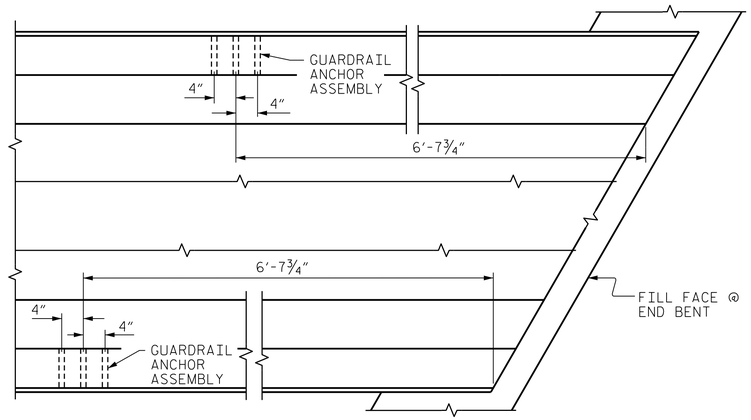


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

@ END BENT #2

NOTES

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

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

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

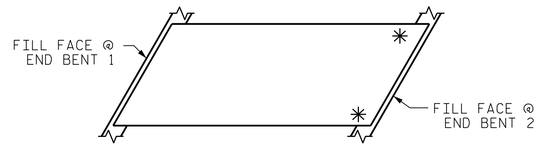
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

DRAWN BY : TLA 5/06
CHECKED BY : GM 5/06

REV. 7/12	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

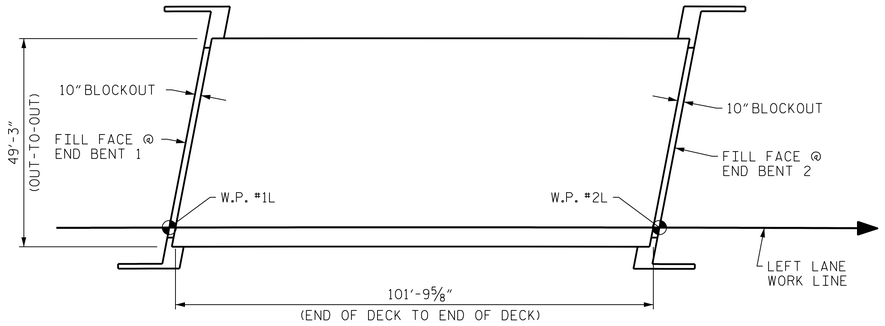
STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			28

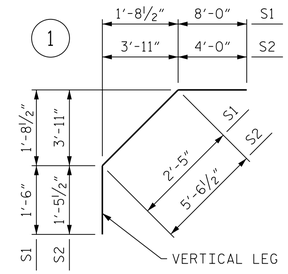
STR. #1 STD. NO. GRA2

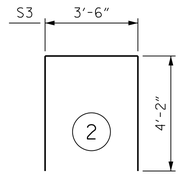
4/22/2020
401.035_R2233BB_SMU_GR_800660.DGN



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5,014)

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	170	5	STR	48'-10"	8659
✳ A101	2	5	STR	47'-1"	98
✳ A102	2	5	STR	44'-3"	92
✳ A103	2	5	STR	41'-6"	87
✳ A104	2	5	STR	38'-8"	81
✳ A105	2	5	STR	35'-10"	75
✳ A106	2	5	STR	33'-1"	69
✳ A107	2	5	STR	30'-3"	63
✳ A108	2	5	STR	27'-5"	57
✳ A109	2	5	STR	24'-8"	51
✳ A110	2	5	STR	21'-10"	46
✳ A111	2	5	STR	19'-1"	40
✳ A112	2	5	STR	16'-3"	34
✳ A113	2	5	STR	13'-5"	28
✳ A114	2	5	STR	10'-8"	22
✳ A115	2	5	STR	7'-10"	16
✳ A116	2	5	STR	5'-0"	10
✳ A117	2	5	STR	2'-3"	5
A2	170	5	STR	48'-10"	8659
A201	2	5	STR	47'-1"	98
A202	2	5	STR	44'-3"	92
A203	2	5	STR	41'-6"	87
A204	2	5	STR	38'-8"	81
A205	2	5	STR	35'-10"	75
A206	2	5	STR	33'-1"	69
A207	2	5	STR	30'-3"	63
A208	2	5	STR	27'-5"	57
A209	2	5	STR	24'-8"	51
A210	2	5	STR	21'-10"	46
A211	2	5	STR	19'-1"	40
A212	2	5	STR	16'-3"	34
A213	2	5	STR	13'-5"	28
A214	2	5	STR	10'-8"	22
A215	2	5	STR	7'-10"	16
A216	2	5	STR	5'-0"	10
A217	2	5	STR	2'-3"	5

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	110	5	STR	51'-9"	5937
✳ B2	64	4	STR	33'-1"	1414
✳ B3	6	5	STR	35'-6"	222
✳ B4	258	5	STR	20'-7"	5539
K1	20	4	STR	25'-8"	343
K2	10	4	STR	6'-1"	41
K3	10	4	STR	7'-2"	48
K4	20	4	STR	7'-7"	101
K5	10	4	STR	6'-7"	44
K6	4	4	STR	2'-2"	6
K7	8	4	STR	2'-9"	15
K8	4	4	STR	2'-5"	6
K9	4	4	STR	1'-11"	5
✳ S1	82	4	1	11'-11"	653
✳ S2	74	4	1	11'-0"	544
S3	82	4	2	11'-10"	648

REINFORCING STEEL = 16,727 LBS.

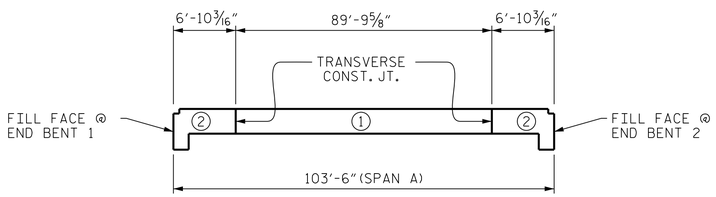
EPOXY COATED REINFORCING STEEL = 17,905 LBS.

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,078 SQ. FT.
BRIDGE DECK	4,363 SQ. FT.
TOTAL	6,441 SQ. FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	140.2	16,727	17,905
POUR #2	78.8		
TOTALS ✳✳	219.0	16,727	17,905



POUR SEQUENCE

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS
2			4			28

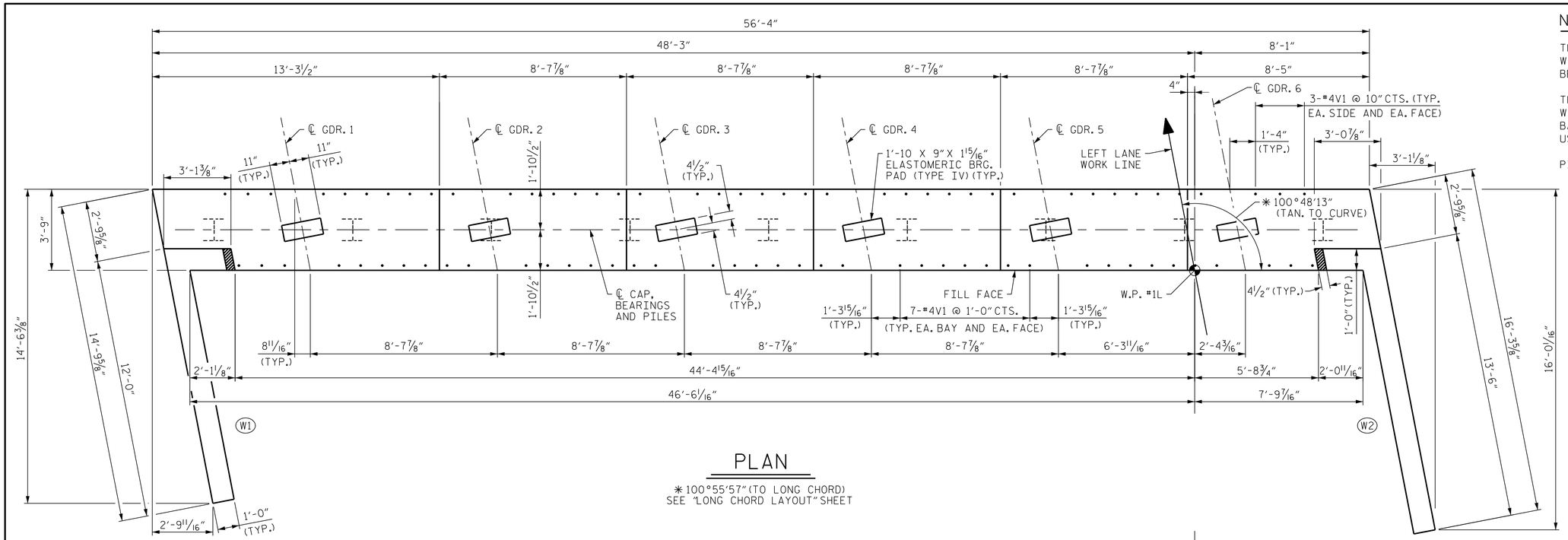
STR. #1 STD. NO. BOM2

DESIGNED BY:	A. DUTTA	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

DRAWN BY : JMB 5/87
CHECKED BY : SJD 9/87

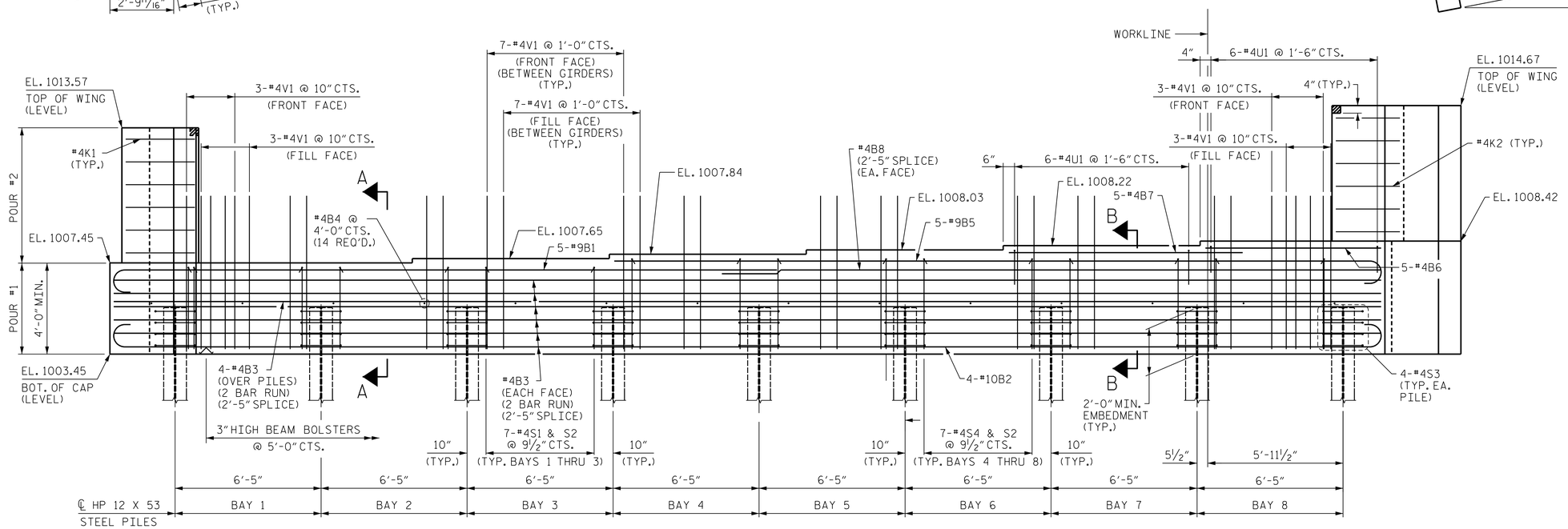
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC
REV. 06/19	BNB/THC

4/22/2020
401.037.R2233BB.SMU.BM.800660.dgn



PLAN

✳ 100°55'57" (TO LONG CHORD)
SEE "LONG CHORD LAYOUT" SHEET



ELEVATION

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

NOTES:

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT TO THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

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

PILE SLEEVES NOT SHOWN FOR CLARITY.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			28

STR. #1

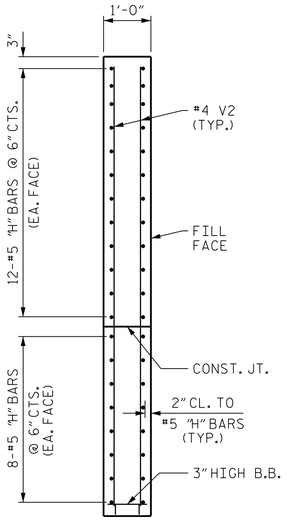
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

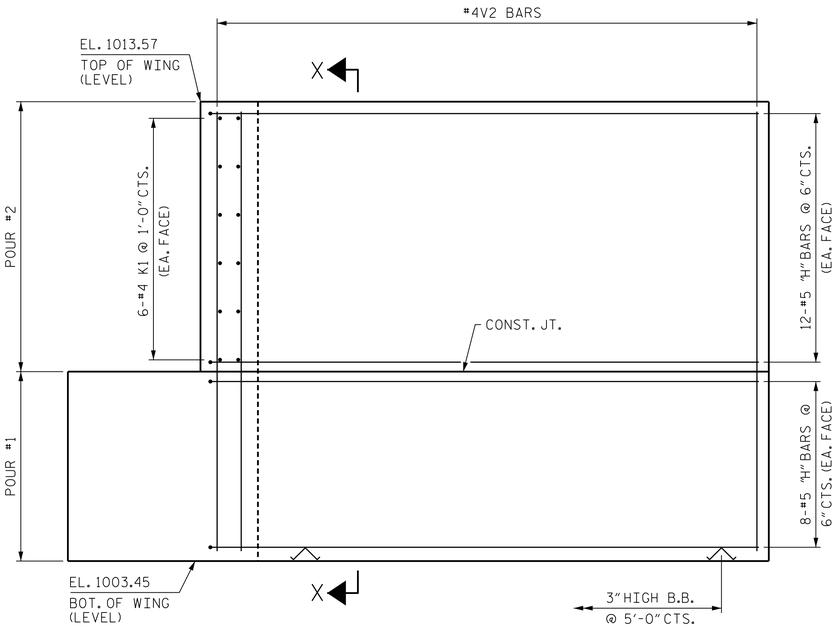
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

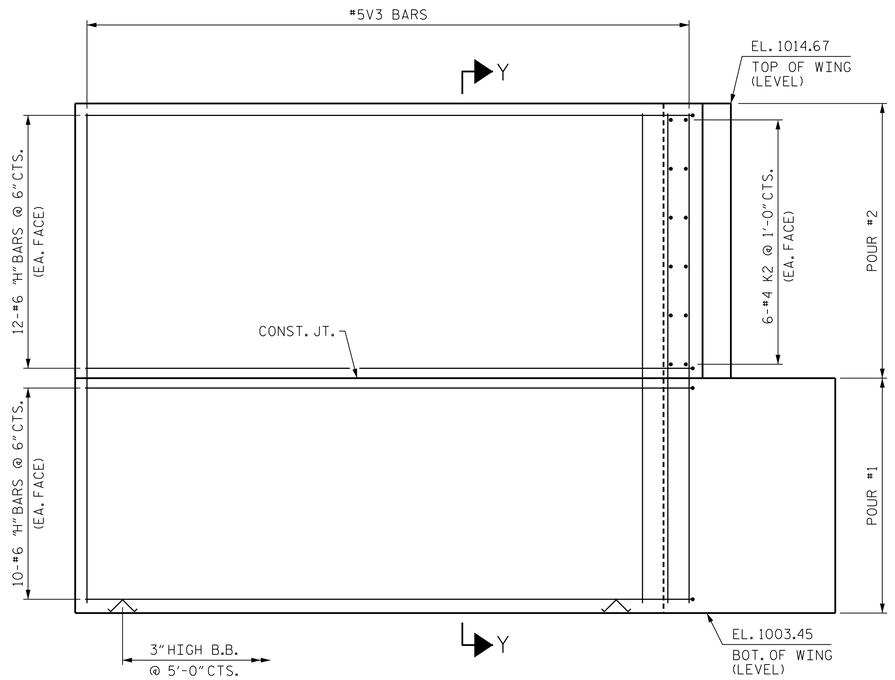
4/22/2020
401.039_R2233BB_SMU_E11_800660.DGN



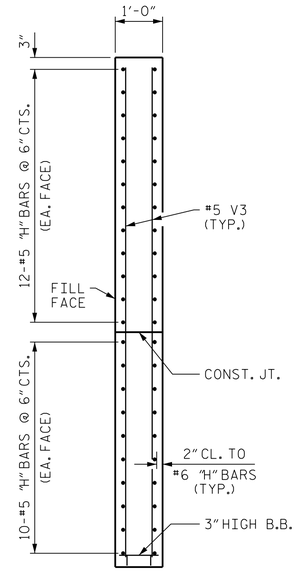
SECTION X-X



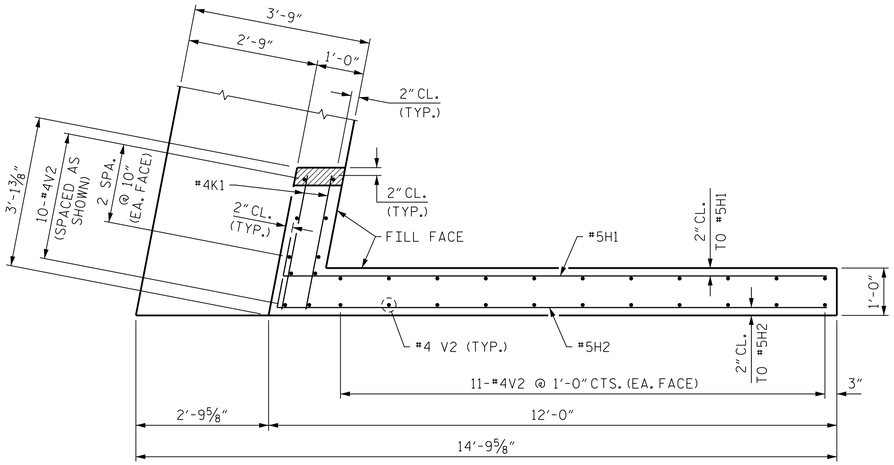
ELEVATION OF WING (W1)



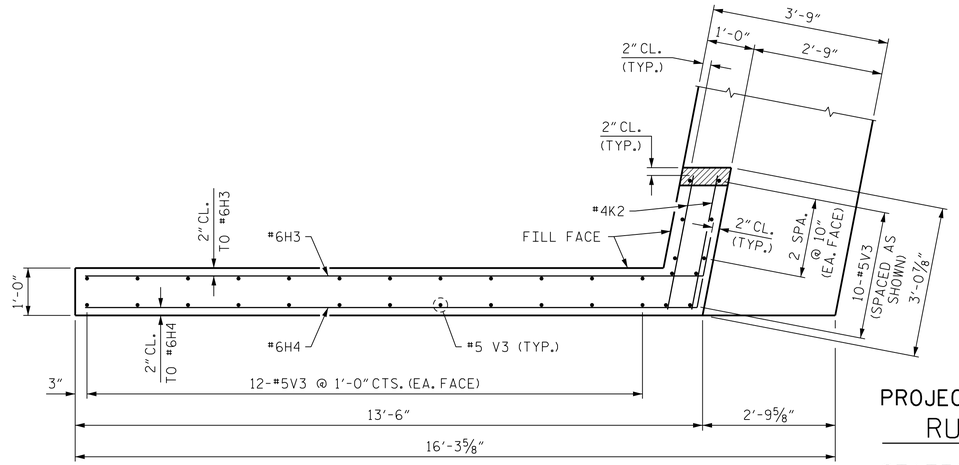
ELEVATION OF WING (W2)



SECTION Y-Y



PLAN OF WING (W1)



PLAN OF WING (W2)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STR. #1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-21
1			3			TOTAL SHEETS
2			4			28

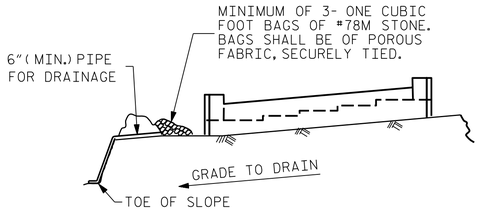
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
401.041.R2233BB.SMU.E12.800660.DGN

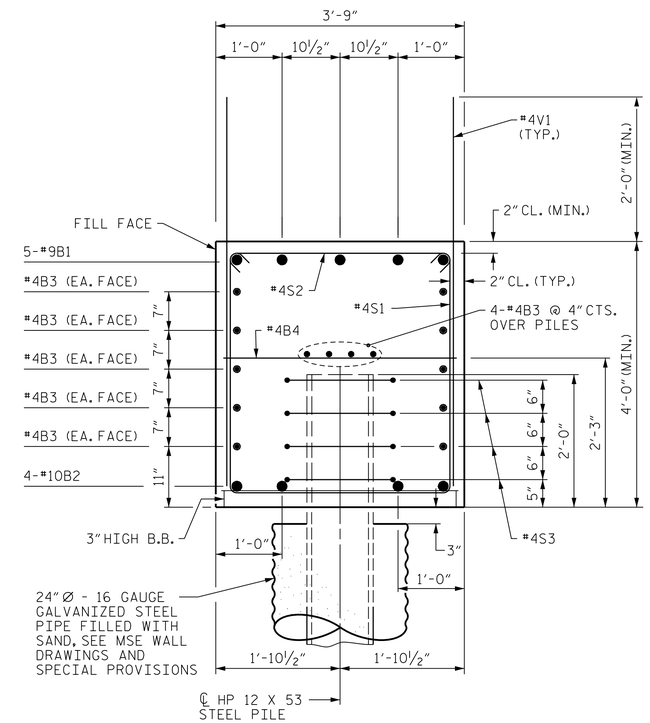


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

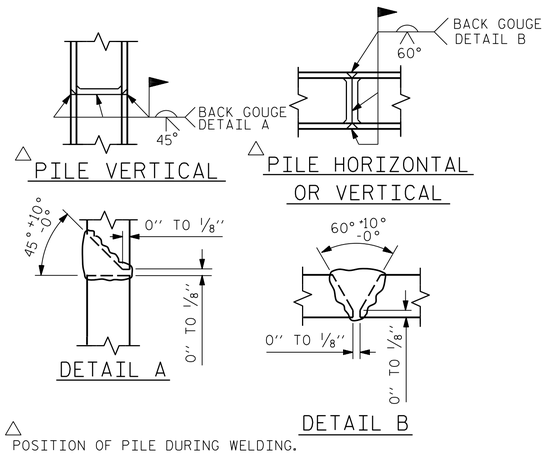
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

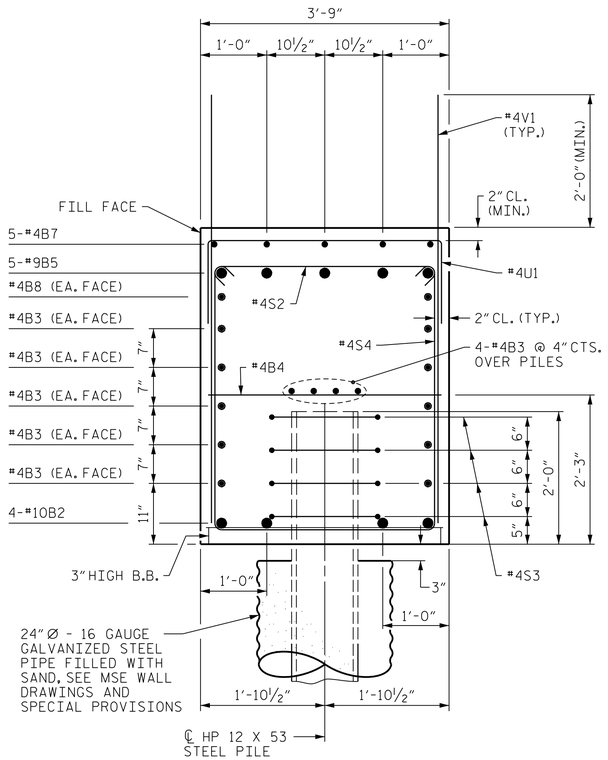
TEMPORARY DRAINAGE AT END BENT



SECTION A-A

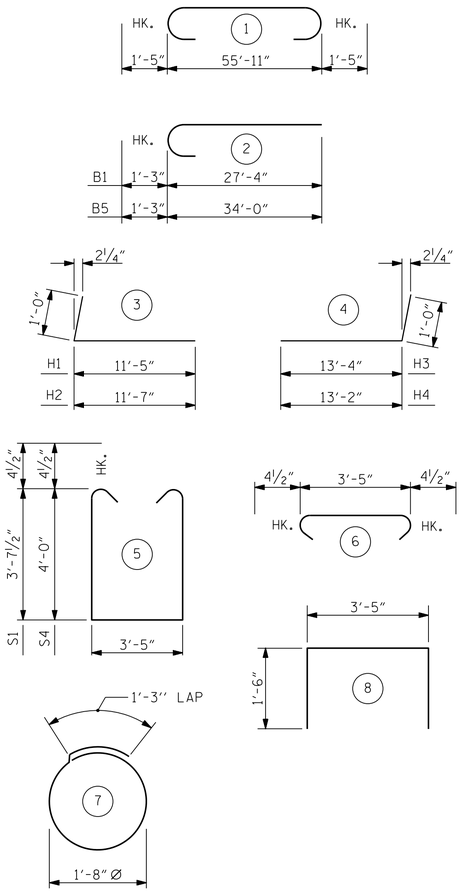


PILE SPLICE DETAILS



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	2	28'-7"	486
B2	4	#10	1	58'-9"	1011
B3	28	#4	STR	29'-3"	547
B4	14	#4	STR	3'-5"	32
B5	5	#9	2	35'-3"	599
B6	5	#4	STR	8'-1"	27
B7	5	#4	STR	8'-4"	28
B8	2	#4	STR	31'-1"	42
H1	20	#5	3	12'-5"	259
H2	20	#5	3	12'-7"	262
H3	22	#6	4	14'-4"	474
H4	22	#6	4	14'-2"	468
K1	12	#4	STR	2'-9"	22
K2	12	#4	STR	2'-8"	21
S1	21	#4	5	11'-5"	160
S2	56	#4	6	4'-2"	156
S3	36	#4	7	6'-6"	156
S4	35	#4	5	12'-2"	284
U1	12	#4	8	6'-5"	51
V1	82	#4	STR	6'-10"	374
V2	32	#4	STR	9'-8"	206
V3	34	#5	STR	10'-9"	381

REINFORCING STEEL	LBS.	6046
CLASS A CONCRETE		
POUR #1 CAP & LOWER WINGS	C.Y.	38.9
POUR #2 UPPER PART OF WINGS	C.Y.	8.8
TOTAL CLASS A CONCRETE	C.Y.	47.7
HP 12x53 STEEL PILES NO. 9	LIN. FT.	540
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-22
1			3			TOTAL SHEETS
2			4			28

STR. #1

DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
401_043_R2233BB_SMU_E13_800660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

11/22/2020

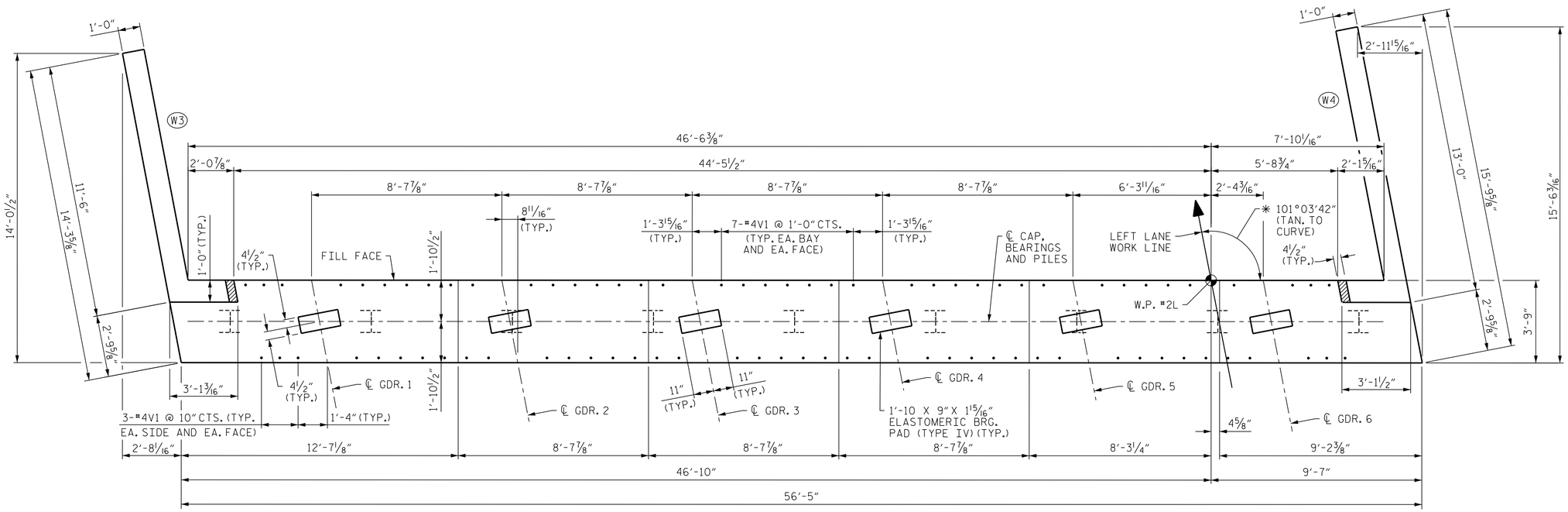
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

NOTES:

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

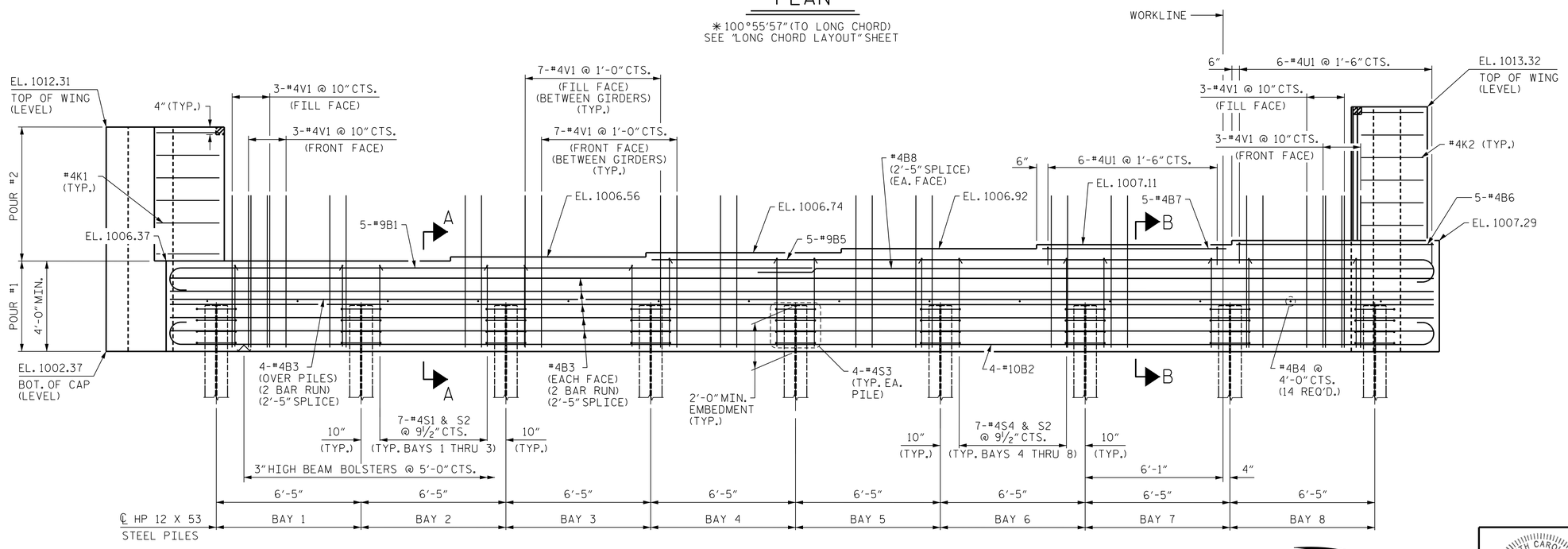
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

PILE SLEEVES NOT SHOWN FOR CLARITY.



PLAN

* 100°55'57" (TO LONG CHORD)
SEE "LONG CHORD LAYOUT" SHEET



ELEVATION

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

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
401.045.R2233BB.SMU.E21.B00660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

SHEET 1 OF 3

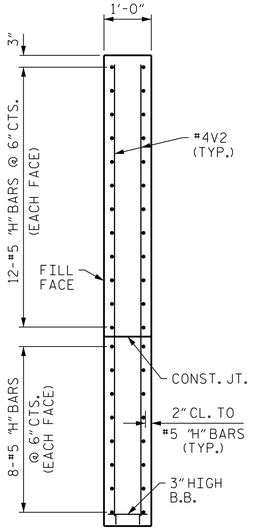
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

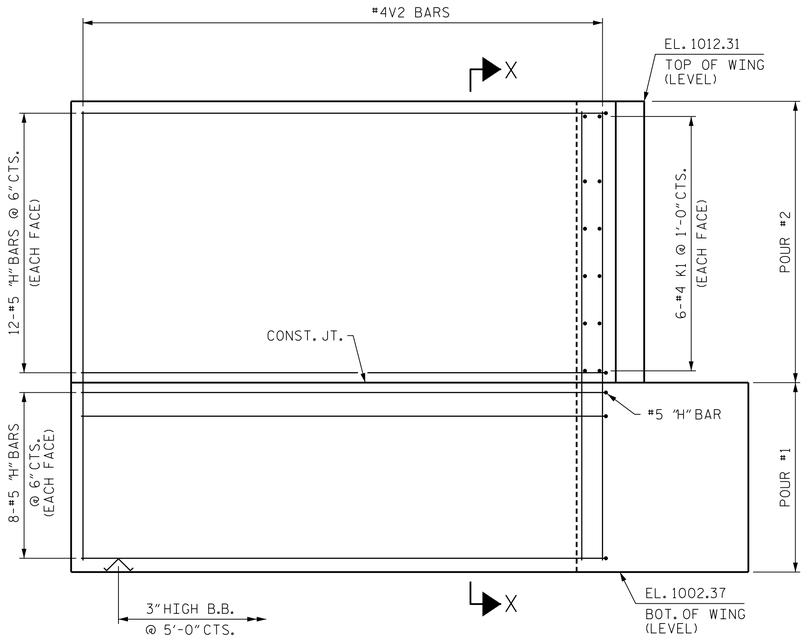
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			28

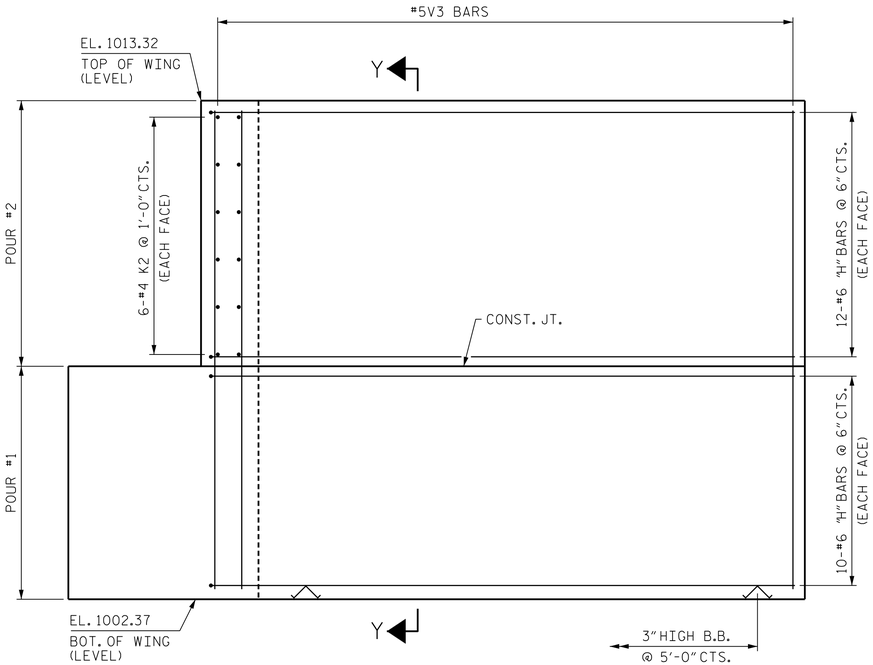
STR. #1



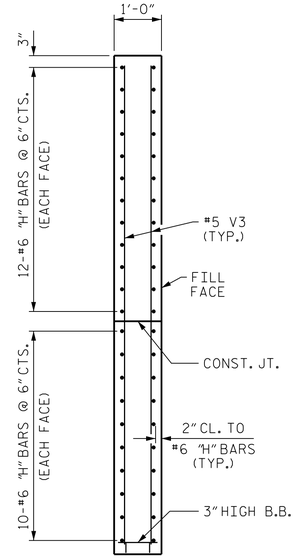
SECTION X-X



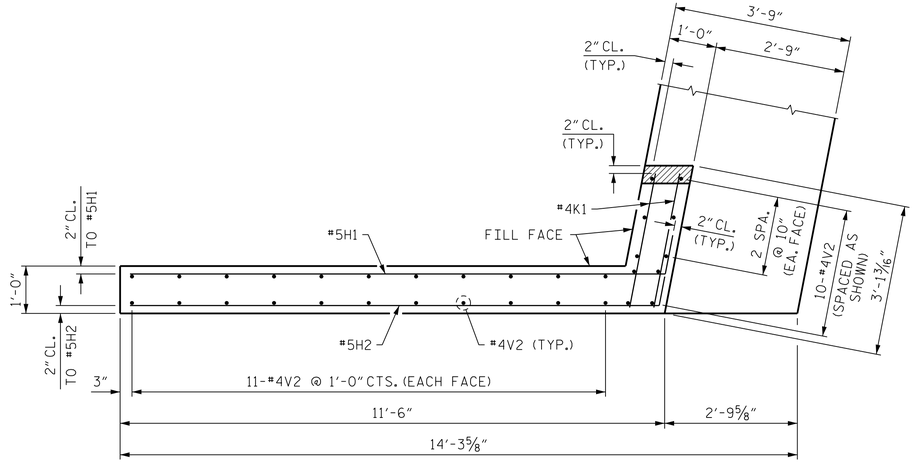
ELEVATION OF WING W3



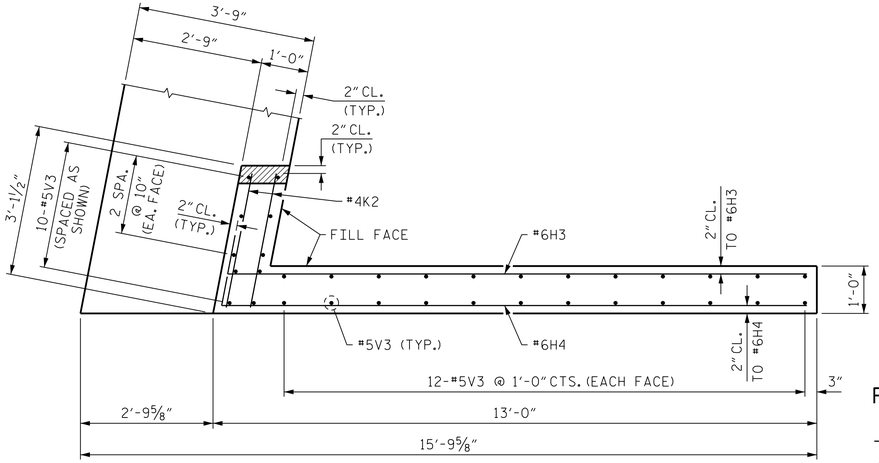
ELEVATION OF WING W4



SECTION Y-Y



PLAN OF WING W3



PLAN OF WING W4

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

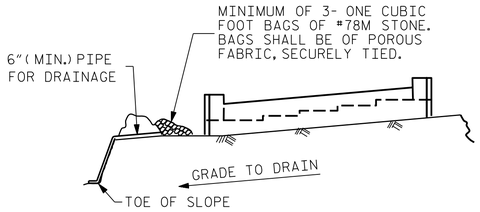
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-24
1			3			TOTAL SHEETS
2			4			28

STR. #1

4/22/2020
401.047.R2233BB.SMU.E22.800660.DGN

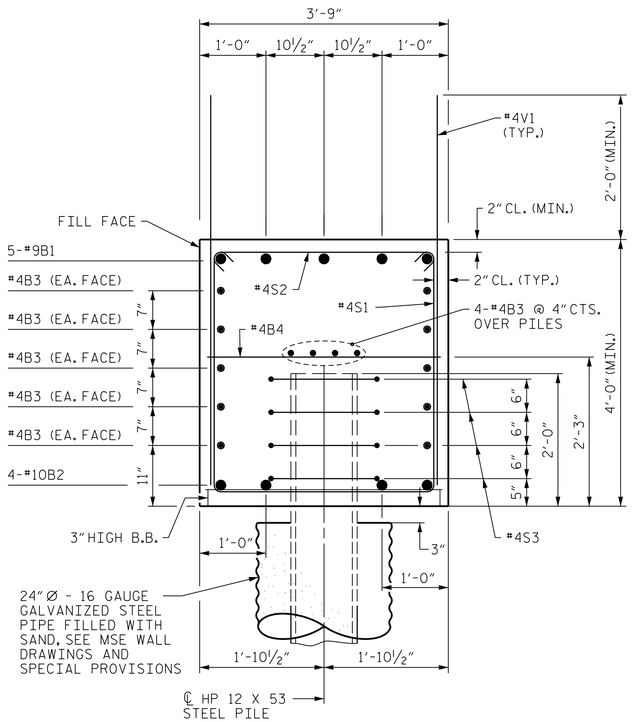


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

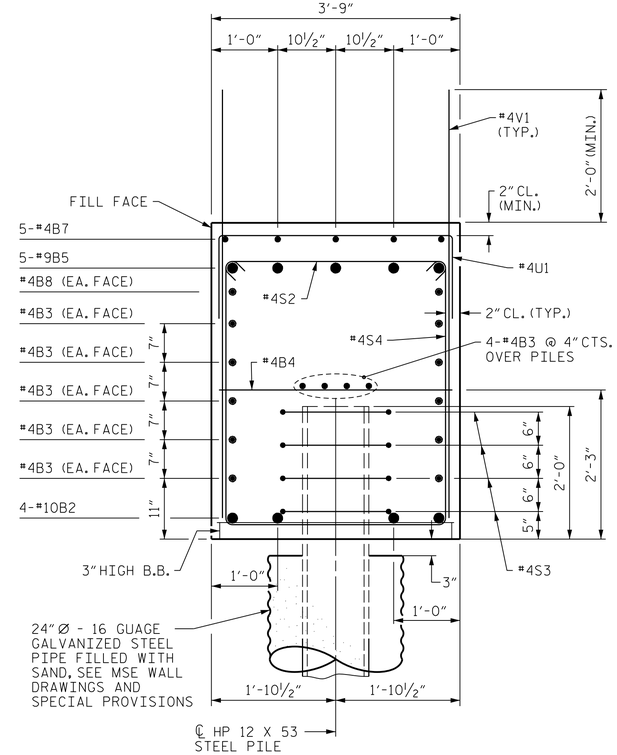
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

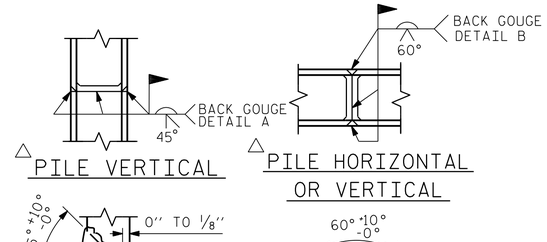
TEMPORARY DRAINAGE AT END BENT



SECTION A-A



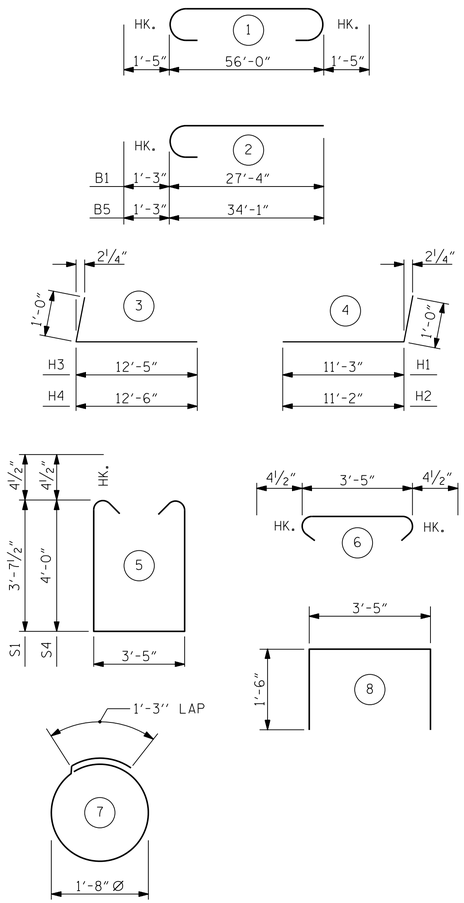
SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	2	28'-7"	486
B2	4	#10	1	58'-10"	1013
B3	28	#4	STR	29'-3"	547
B4	14	#4	STR	3'-5"	32
B5	5	#9	2	35'-4"	601
B6	5	#4	STR	8'-0"	27
B7	5	#4	STR	8'-4"	28
B8	2	#4	STR	31'-2"	42
H1	20	#5	4	12'-3"	256
H2	20	#5	4	12'-2"	254
H3	22	#6	3	13'-5"	435
H4	22	#6	3	13'-6"	438
K1	12	#4	STR	2'-8"	21
K2	12	#4	STR	2'-8"	21
S1	21	#4	5	11'-5"	160
S2	56	#4	6	4'-2"	156
S3	36	#4	7	6'-6"	156
S4	35	#4	5	12'-2"	284
U1	12	#4	8	6'-5"	51
V1	82	#4	STR	6'-10"	374
V2	32	#4	STR	9'-6"	203
V3	34	#5	STR	10'-7"	375

REINFORCING STEEL	LBS.	5976
CLASS A CONCRETE		
POUR #1 CAP, LOWER WINGS & CONC. COLLARS	C.Y.	38.7
POUR #2 UPPER PART OF WINGS	C.Y.	6.4
TOTAL CLASS A CONCRETE	C.Y.	45.1
HP 12x53 STEEL PILES		
NO. 9	LIN. FT.	405
STEEL PILE POINTS	EACH	9
PREDRILLING FOR PILES	LIN. FT.	82
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

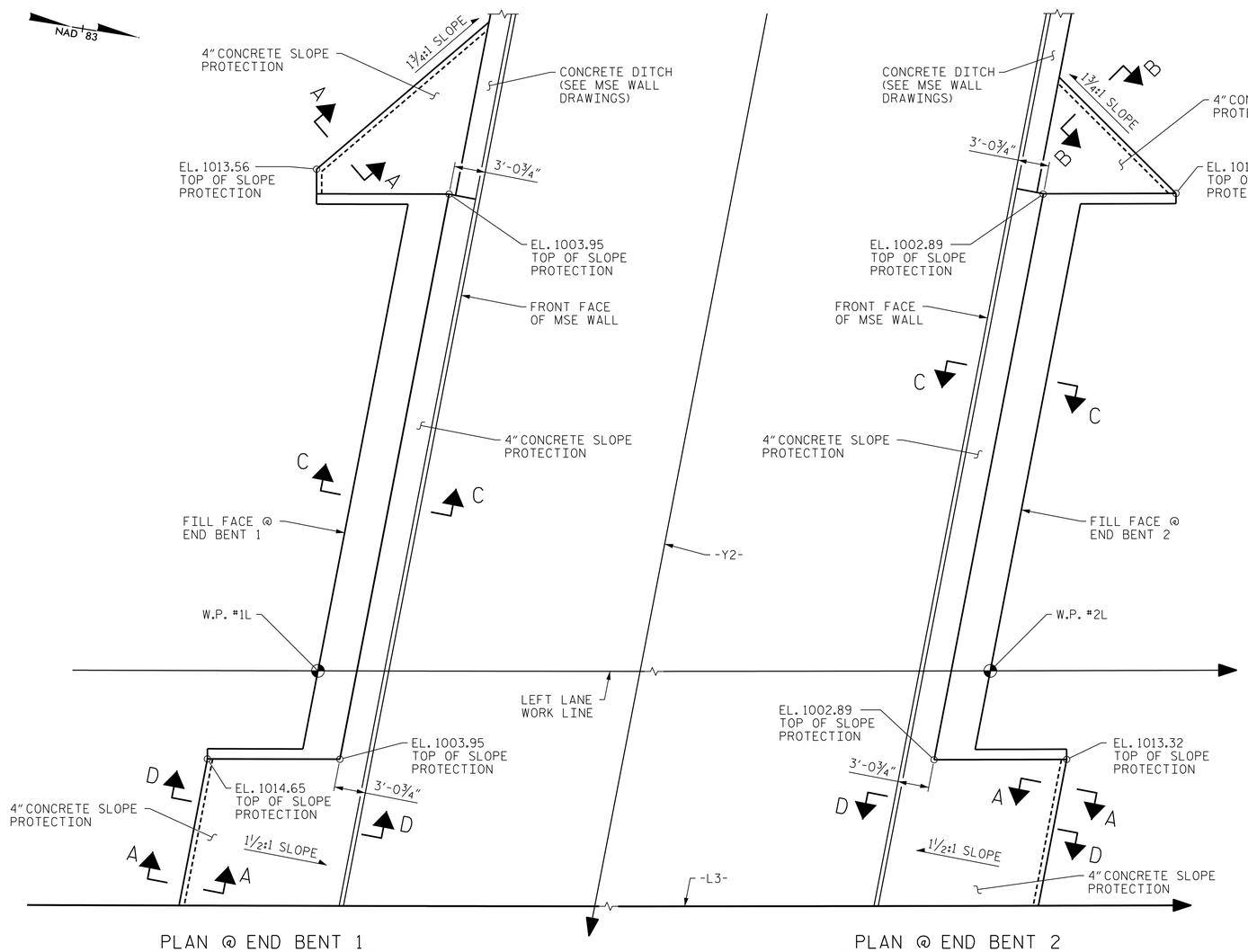
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

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

SHEET NO. S1-25
TOTAL SHEETS 28

STR. #1

4/22/2020
401_049_R2233BB_SMU_E23_800660.DGN



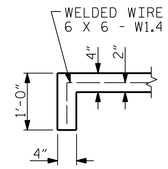
SLOPE PROTECTION LAYOUT

NOTES:

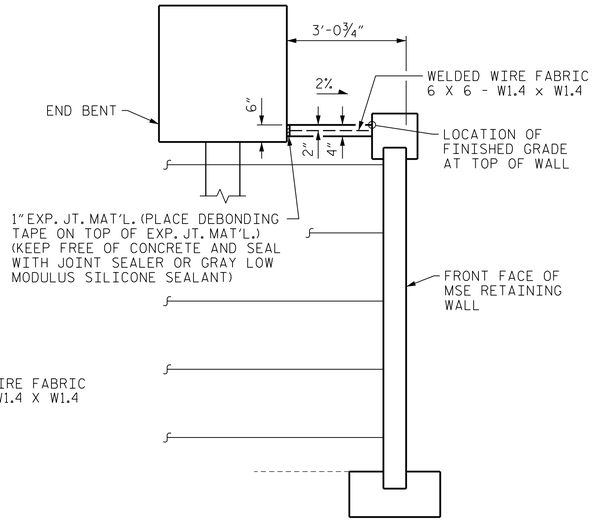
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN DETAILS.

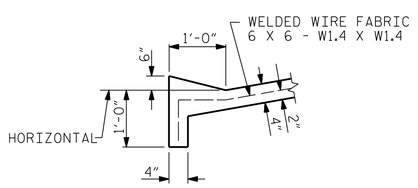
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



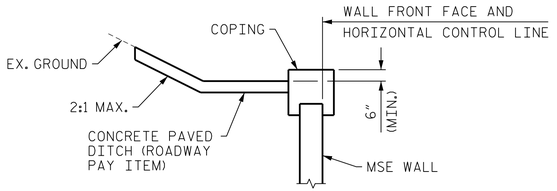
SECTION A-A



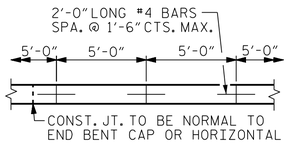


SECTION B-B

SECTION C-C

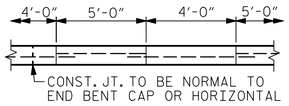


SECTION D-D



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

BRIDGE @ STA. 774+41.49 -L3- (LEFT LANE)	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	62	119
END BENT 2	58	117

* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			28

STR. #1

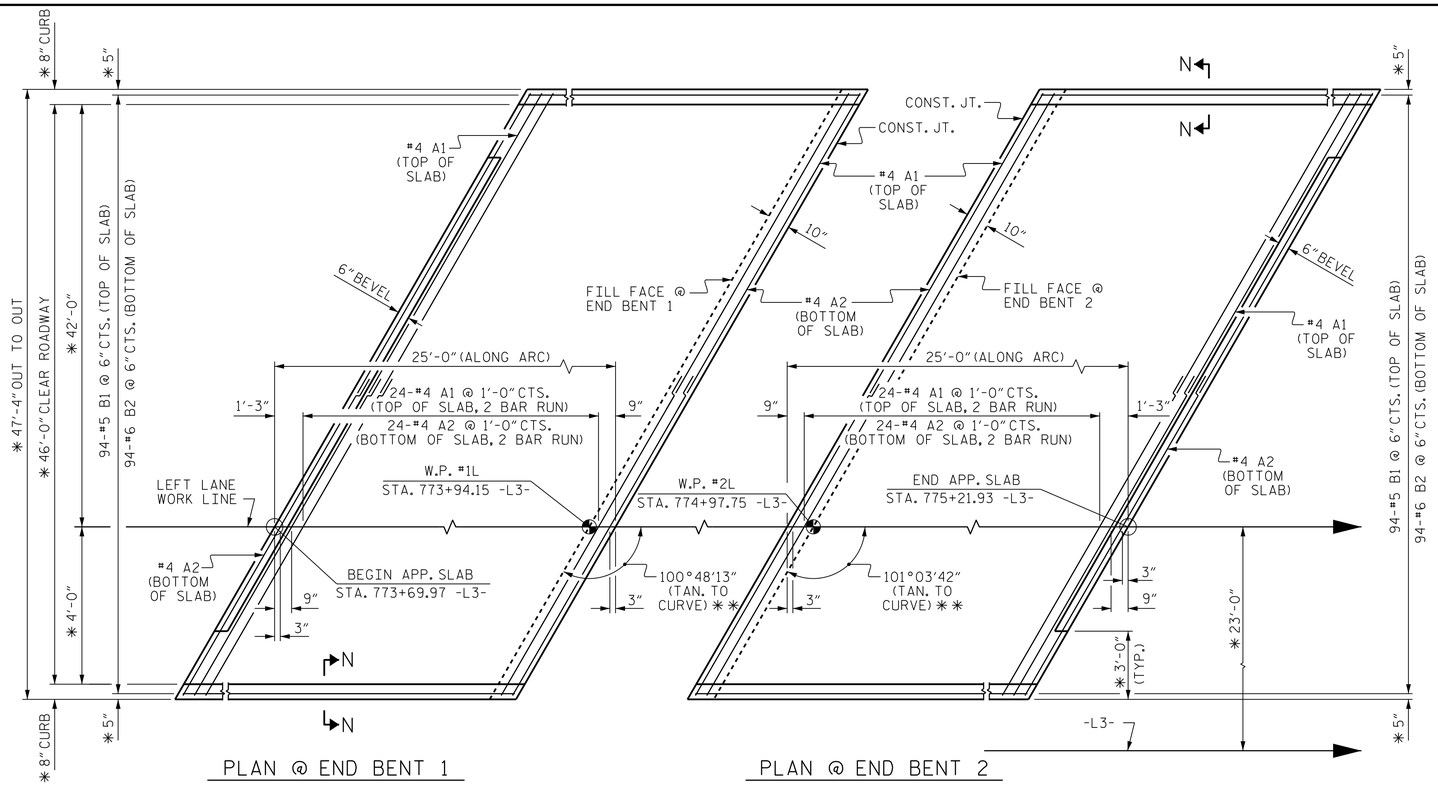
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

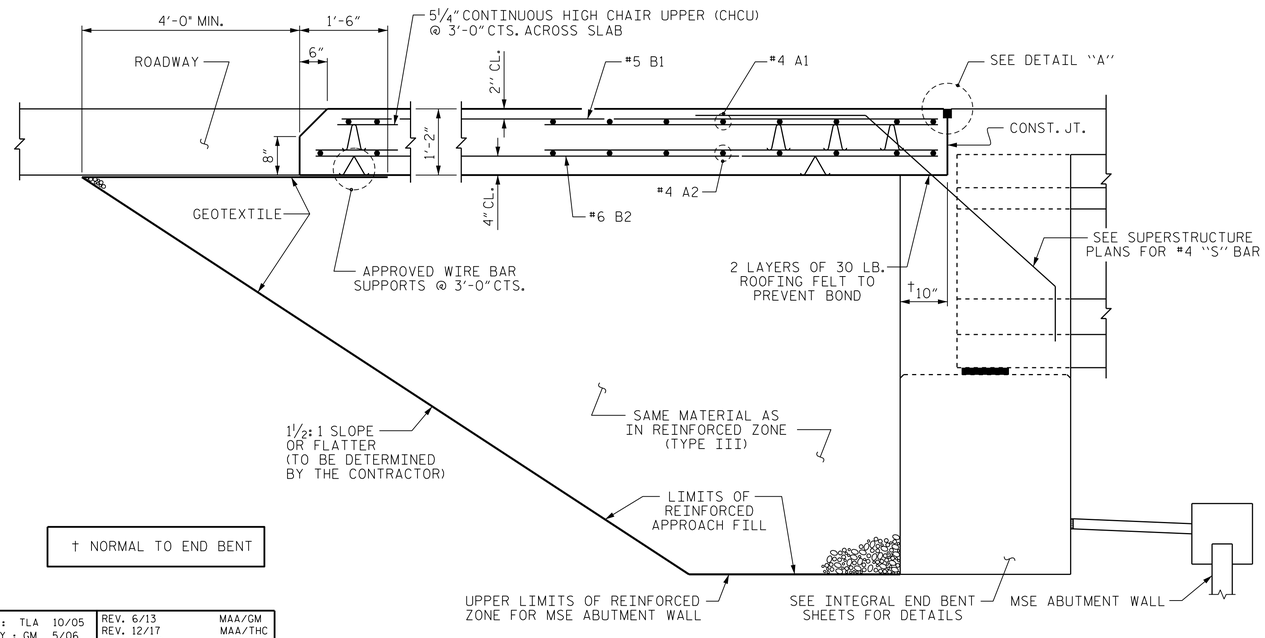
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	A. DUTTA	DATE :	AUG 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
401.051.R2233BB.SMU_SP1.B00660.DGN



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
∗ RADIAL DIMENSION
∗∗ 100°55'57" (TO LONG CHORD) SEE "LONG CHORD LAYOUT" SHEET FOR ADDITIONAL INFORMATION



† NORMAL TO END BENT

SECTION THRU SLAB
(TYPE III - REINFORCED APPROACH FILL)

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKWALL MATERIAL, SEE ROADWAY PLANS.

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

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

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

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.

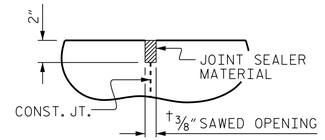
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

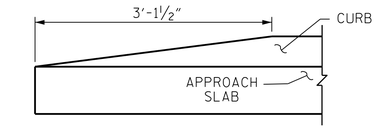
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
∗ A1	52	#4	STR	24'-11"	866
A2	52	#4	STR	24'-9"	860
∗ B1	94	#5	STR	24'-2"	2369
B2	94	#6	STR	24'-6"	3459
REINFORCING STEEL				LBS.	4319
∗ EPOXY COATED REINFORCING STEEL				LBS.	3235
CLASS AA CONCRETE				C.Y.	51.1

SPLICE LENGTHS

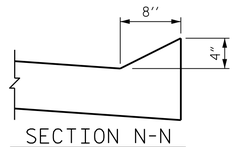
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

DRAWN BY : TLA 10/05	REV. 6/13	MAA/GM
CHECKED BY : GM 5/06	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC
DESIGNED BY: CCC/K. WHITE	DATE : AUG 2019	
DRAWN BY: K. WHITE	DATE : AUG 2019	
CHECKED BY: J. BORUTA	DATE : AUG 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

4/22/2020
401.053.R2233BB.SMU.AS1.800660.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

SHEET 1 OF 2

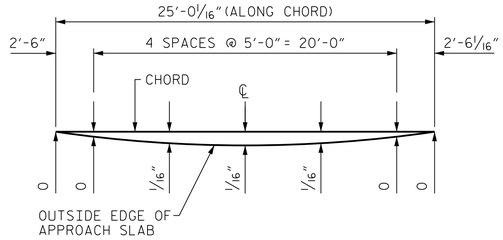
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

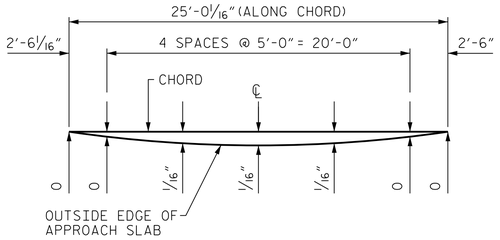
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			28

STR. #1 STD. NO. BAS5 1b



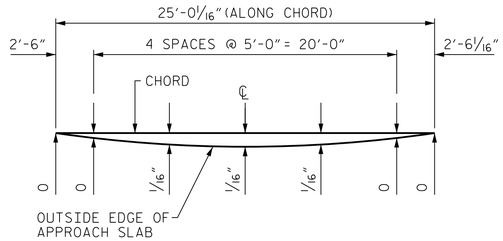
ARC OFFSETS - LEFT SIDE

@ END BENT #1



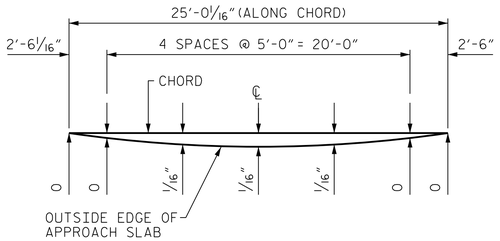
ARC OFFSETS - LEFT SIDE

@ END BENT #2



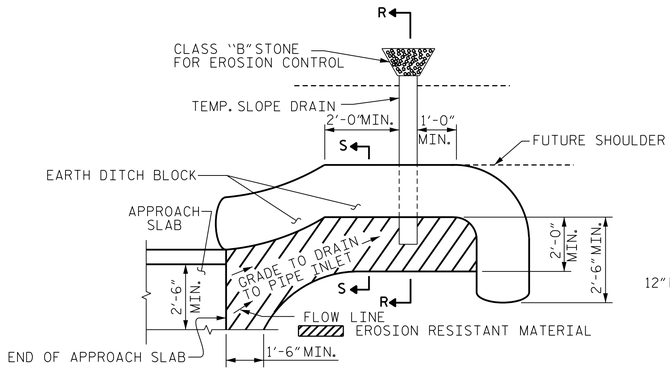
ARC OFFSETS - RIGHT SIDE

@ END BENT #1



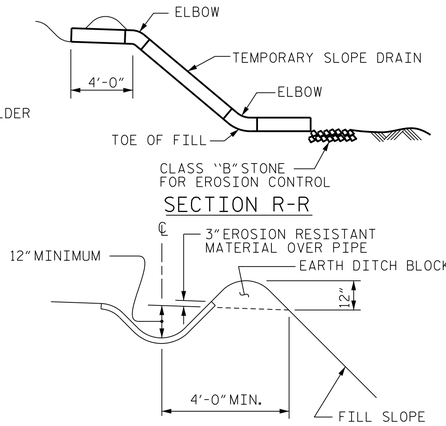
ARC OFFSETS - RIGHT SIDE

@ END BENT #2



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.

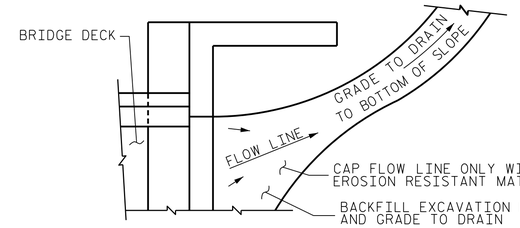
PLAN VIEW



SECTION 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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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

STR. #1 STD. NO. BAS5 1b

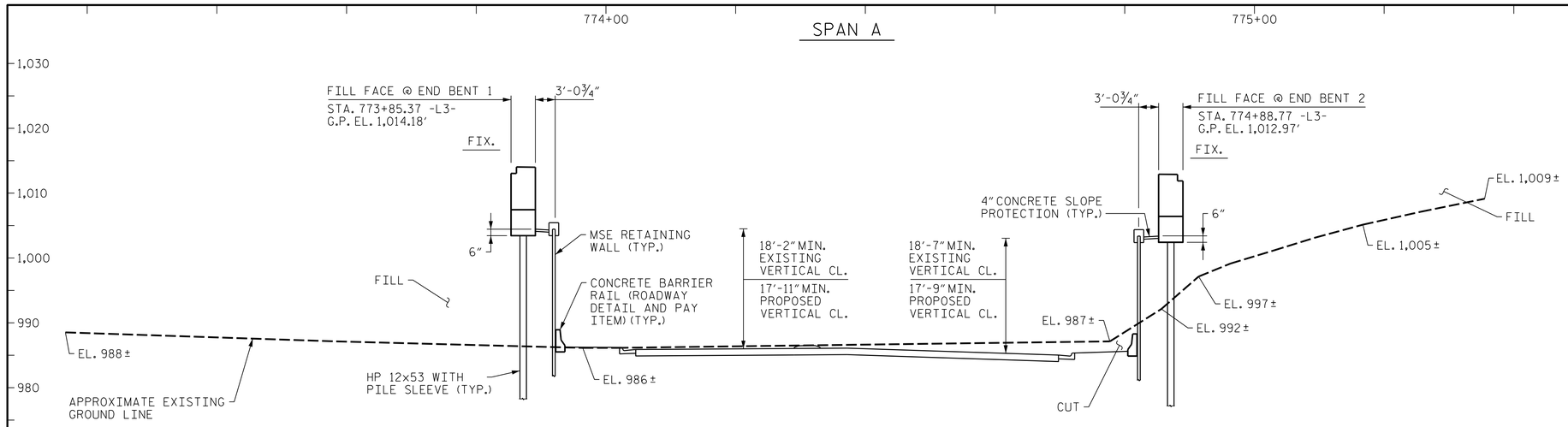
DESIGNED BY:	CCC/K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
401.055.R2233BB.SMU.AS2.800660.DGN

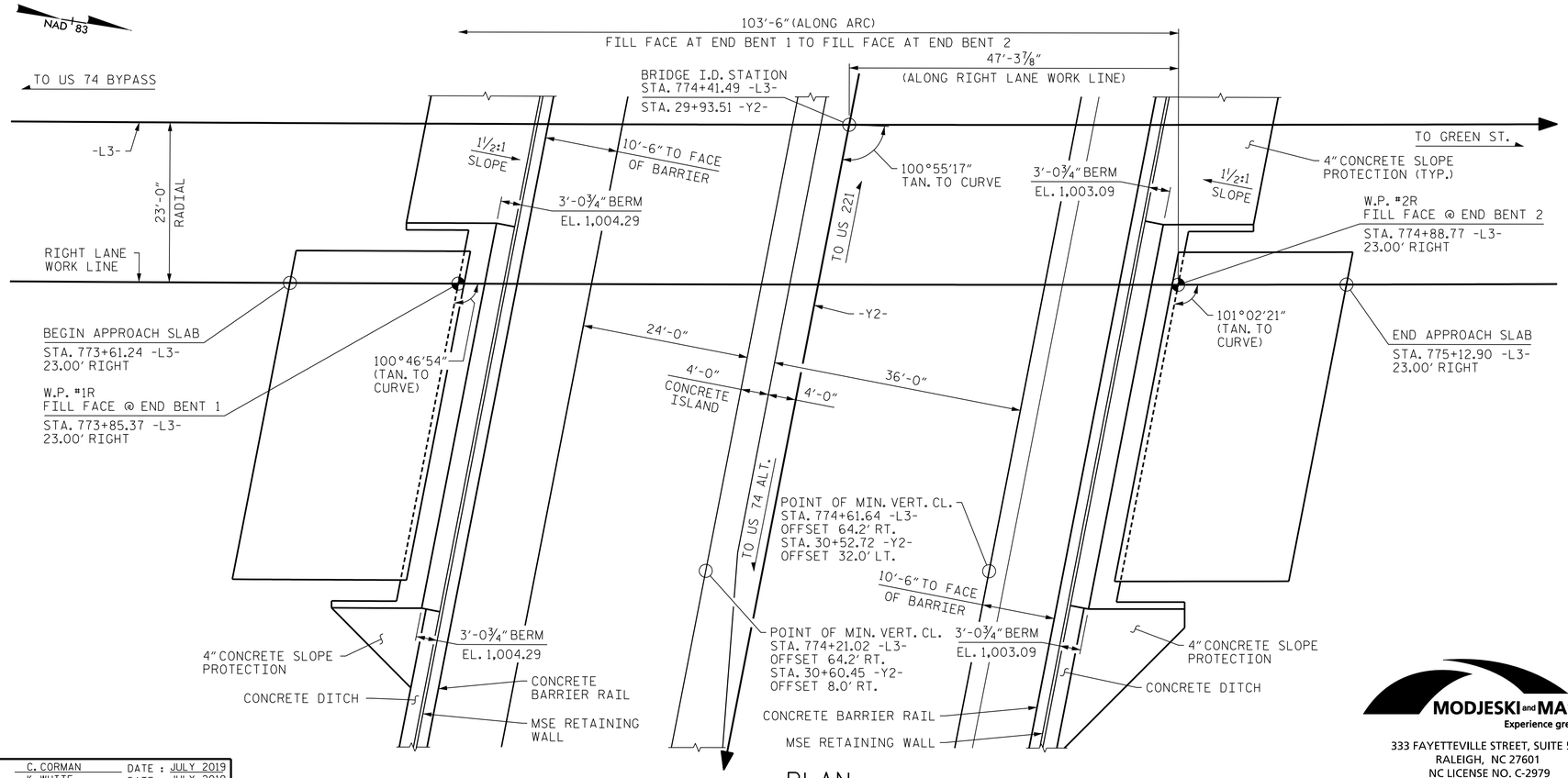


PI = 777+00.00
EL = 1,006.22'
VC = 950'
(-)2.3100% (+)2.7876%

GRADE DATA -L3-

SECTION ALONG RIGHT LANE WORK LINE

SECTIONS AT END BENTS ARE AT RIGHT ANGLES



PLAN

PILES NOT SHOWN FOR CLARITY

HORIZONTAL CURVE DATA

-L3-

PI STA. 774+55.22
Δ = 6°21'09.5" (LT)
D = 0°14'56.8"
L = 2,550.11'
T = 1,276.36'
R = 23,000.00'
SE = NC

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-
29+93.51 -Y2-
SHEET 1 OF 4 BRIDGE NO. 661

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR RIGHT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.

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

STR. #2

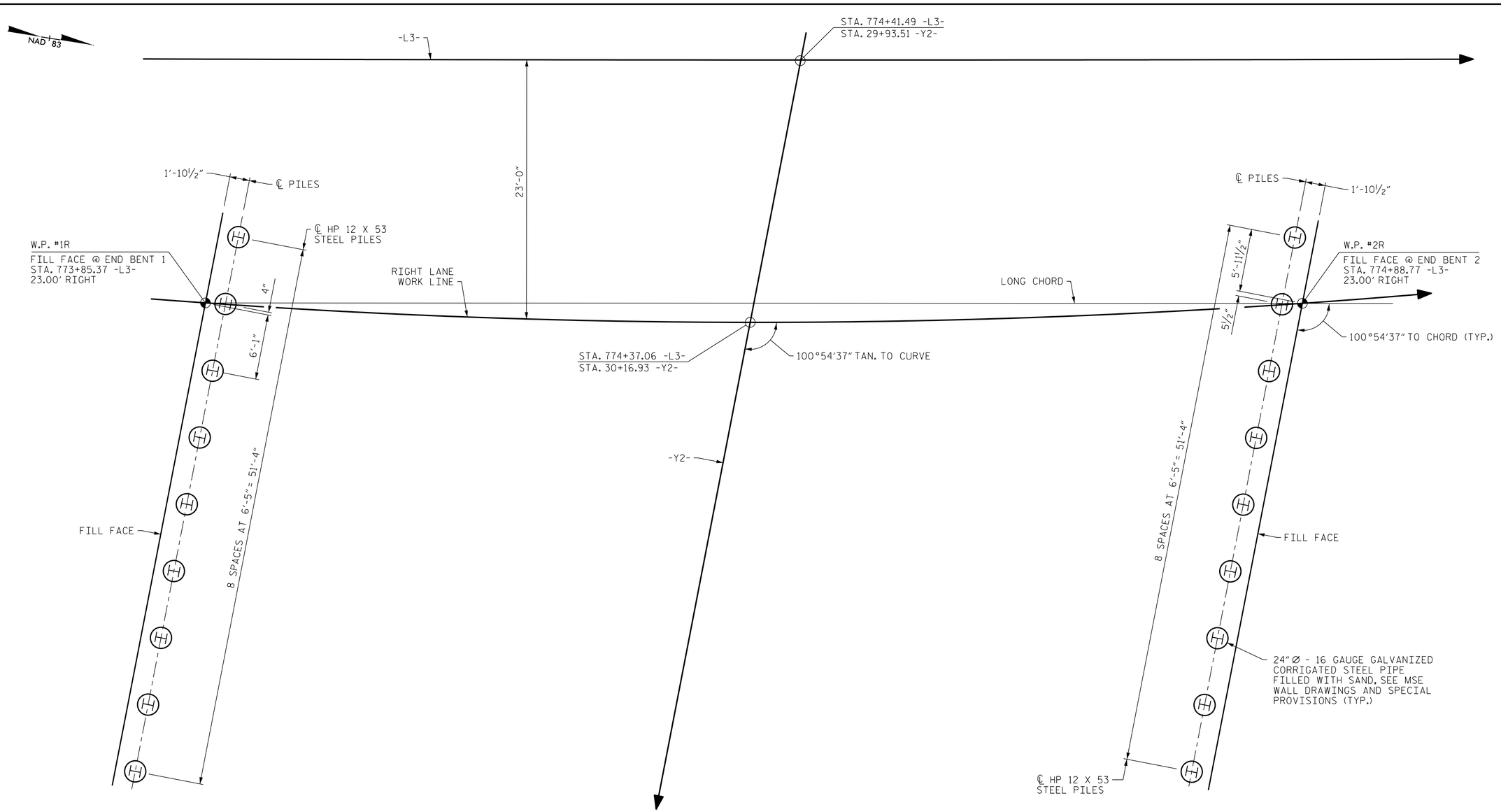
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
402.001.R2233BB.SWU.G01.800661.dgn



END BENT 1
(INTEGRAL)

END BENT 2
(INTEGRAL)

FOUNDATION LAYOUT

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 132 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 132 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

PREDRILL PILE LOCATIONS AT END BENT NO. 2 TO 10 FEET BELOW TOP OF MSE WALL LEVELING PAD WITH EQUIPMENT THAT WILL RESULT IN A MAXIMUM PREDRILLING DIAMETER OF 12". FOR PREDRILLING FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

INSTALL PILES AT END BENT NOS. 1 AND 2 PRIOR TO MSE WALL CONSTRUCTION.

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
402.003.R2233BB.SMU.FL_B0066I.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

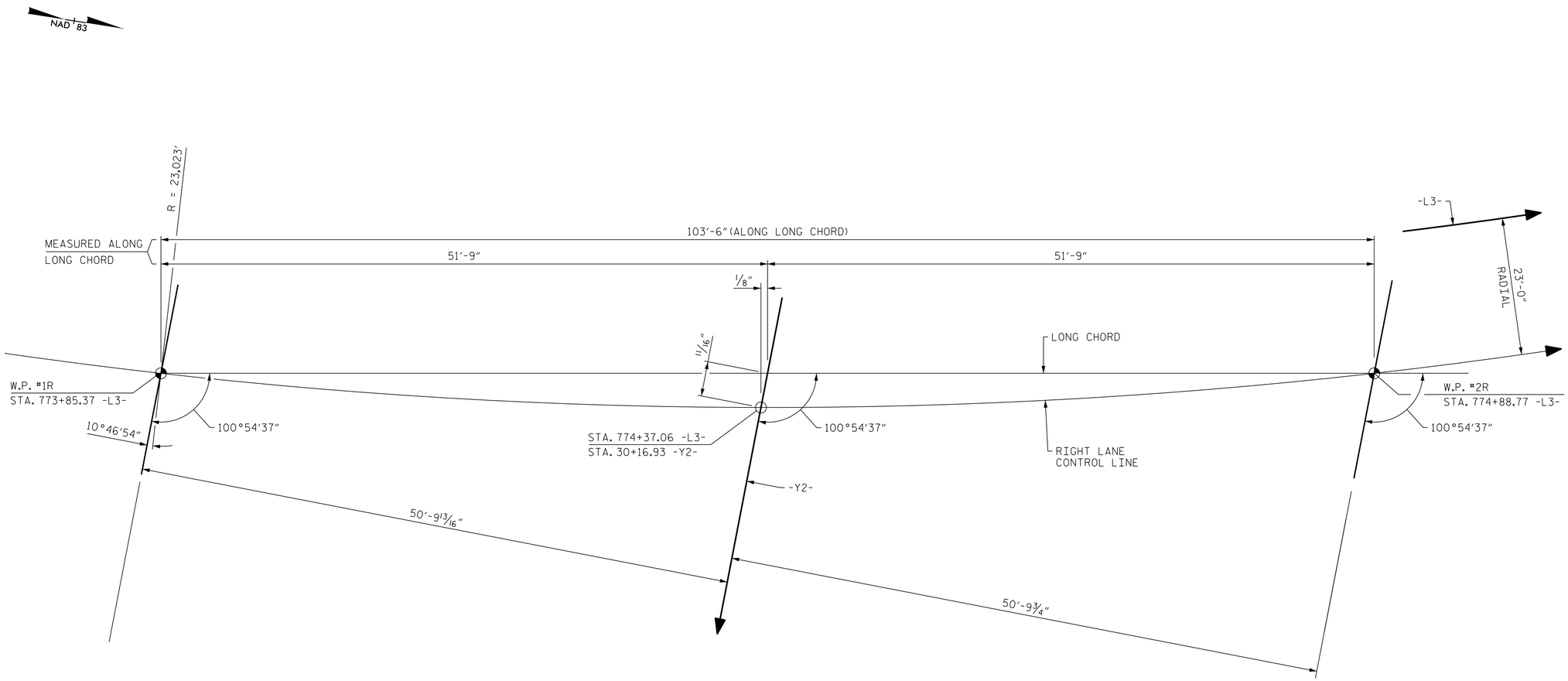
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR RIGHT LANE BRIDGE ON US 221
RUTHERFORDTON BYPASS OVER
US74 BUS. BETWEEN US 74
BYPASS AND GREEN ST.

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

STR. #2



LONG CHORD LAYOUT

(END BENTS ARE PARALLEL)

HORIZONTAL CURVE DATA

-L3-

PI STA. 774+55.22
Δ = 6°21'09.5"(LT)
D = 0°14'56.8"
L = 2,550.11'
T = 1,276.36'
R = 23,000.00'
SE = NC

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 4

STR. #2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR RIGHT LANE BRIDGE ON US 221
RUTHERFORDTON BYPASS OVER
US 74 BUS. BETWEEN US 74
BYPASS AND GREEN ST.

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

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

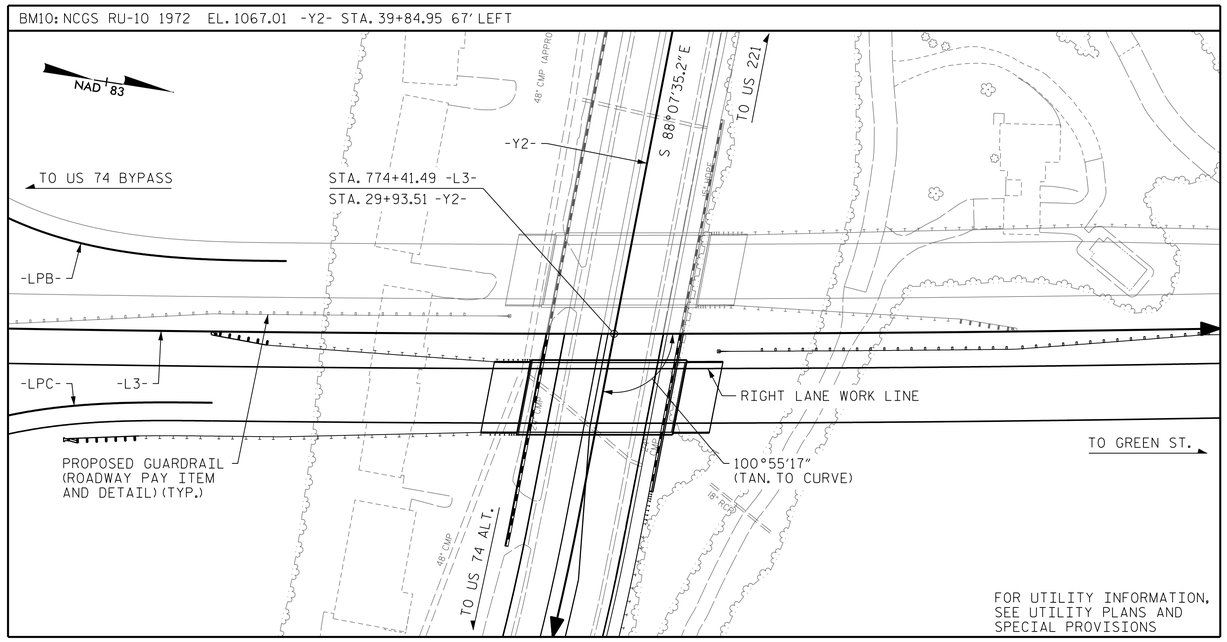
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

4/22/2020

DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DESIGNED BY:	C.CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J.BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
402_005_R2233BB_SMU_LC_800661.DGN



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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

USE TYPE III REINFORCED APPROACH FILL DETAILS. OMIT THE MSE WALL RAINFORCEMENT ON THE END BENT CAPS.

TOTAL BILL OF MATERIAL

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 774+41.49 -L3-	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SET UP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	PREDRILLING FOR PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	5,014	6,441		LUMP SUM		6	606.63						203.6		LUMP SUM
END BENT 1			45.5		6,178			9	9	450				68	
END BENT 2			45.4		6,051			9	9	315	9	88		68	
TOTAL	5,014	6,441	90.9	LUMP SUM	12,229	6	606.63	18	18	765	9	88	203.6	136	LUMP SUM

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR RIGHT LANE BRIDGE ON US 221 RUTHERFORDTON BYPASS OVER US 74 BUS. BETWEEN US 74 BYPASS AND GREEN ST.

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

STR. #2

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
402_007_R2233BB_SMU_TBM_800661.dgn

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III 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	1.19	--	1.75	0.741	1.58	A	E	49.8	0.888	1.19	A	I	9.4	0.80	0.741	1.21	A	E	49.8	
		HL-93 (OPERATING)	N/A		1.58	--	1.35	0.741	2.05	A	E	49.8	0.888	1.58	A	I	9.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.63	58.68	1.75	0.741	2.20	A	E	49.8	0.888	1.63	A	I	9.4	0.80	0.741	1.68	A	E	49.8	
		HS-20 (OPERATING)	36.000		2.15	77.40	1.35	0.741	2.86	A	E	49.8	0.888	2.15	A	I	9.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.99	53.87	1.40	0.741	6.54	A	E	49.8	0.888	5.26	A	I	9.4	0.80	0.741	3.99	A	E	49.8	
		SNGARBS2	20.000		2.89	57.80	1.40	0.741	4.73	A	E	49.8	0.888	3.65	A	I	9.4	0.80	0.741	2.89	A	E	49.8	
		SNAGRIS2	22.000		2.70	59.40	1.40	0.741	4.43	A	E	49.8	0.888	3.36	A	I	9.4	0.80	0.741	2.70	A	E	49.8	
		SNCOTTS3	27.250		1.98	53.96	1.40	0.741	3.25	A	E	49.8	0.888	2.56	A	I	9.4	0.80	0.741	1.98	A	E	49.8	
		SNAGGRS4	34.925		1.62	56.58	1.40	0.741	2.66	A	E	49.8	0.888	2.06	A	I	9.4	0.80	0.741	1.62	A	E	49.8	
		SNS5A	35.550		1.59	56.52	1.40	0.741	2.61	A	E	49.8	0.888	2.07	A	I	9.4	0.80	0.741	1.59	A	E	49.8	
		SNS6A	39.950		1.45	57.93	1.40	0.741	2.37	A	E	49.8	0.888	1.87	A	I	9.4	0.80	0.741	1.45	A	E	49.8	
		SNS7B	42.000		1.38	57.96	1.40	0.741	2.26	A	E	49.8	0.888	1.81	A	I	9.4	0.80	0.741	1.38	A	E	49.8	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.76	58.08	1.40	0.741	2.88	A	E	49.8	0.888	2.25	A	I	9.4	0.80	0.741	1.76	A	E	49.8	
		TNT4A	33.075		1.76	58.21	1.40	0.741	2.89	A	E	49.8	0.888	2.21	A	I	9.4	0.80	0.741	1.76	A	E	49.8	
		TNT6A	41.600		1.43	59.49	1.40	0.741	2.34	A	E	49.8	0.888	1.90	A	I	9.4	0.80	0.741	1.43	A	E	49.8	
		TNT7A	42.000		1.43	60.06	1.40	0.741	2.34	A	E	49.8	0.888	1.87	A	I	9.4	0.80	0.741	1.43	A	E	49.8	
		TNT7B	42.000		1.46	61.32	1.40	0.741	2.40	A	E	49.8	0.888	1.78	A	I	9.4	0.80	0.741	1.46	A	E	49.8	
		TNAGRIT4	43.000		1.40	60.20	1.40	0.741	2.30	A	E	49.8	0.888	1.72	A	I	9.4	0.80	0.741	1.40	A	E	49.8	
		TNAGT5A	45.000		1.33	59.85	1.40	0.741	2.18	A	E	49.8	0.888	1.69	A	I	9.4	0.80	0.741	1.33	A	E	49.8	
		TNAGT5B	45.000	3	1.32	59.40	1.40	0.741	2.16	A	E	49.8	0.888	1.64	A	I	9.4	0.80	0.741	1.32	A	E	49.8	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

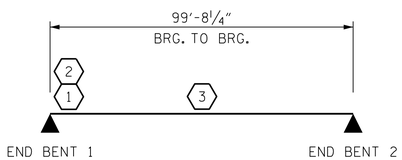
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

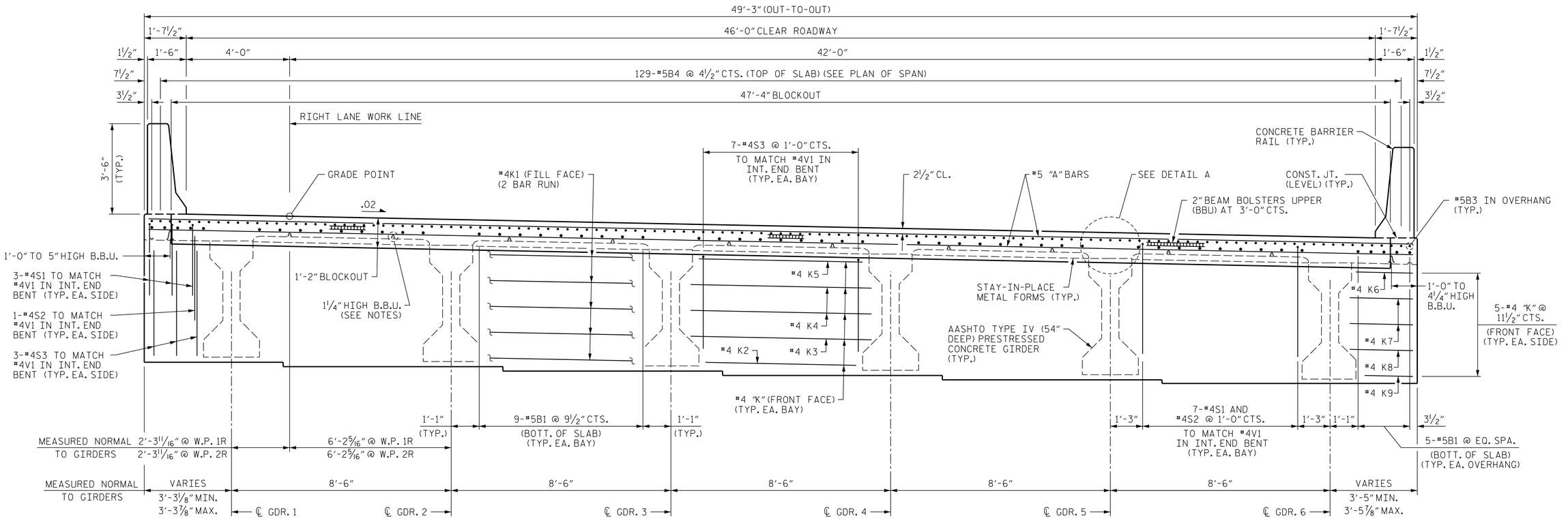
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-5
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. LRFR1

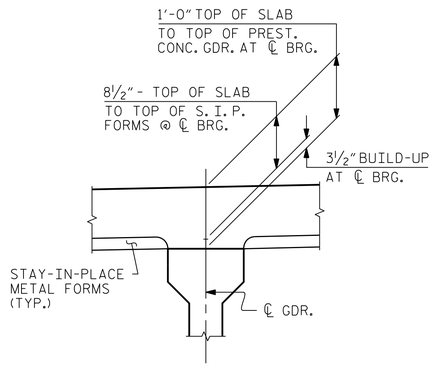
DESIGNED BY:	C.CORMAN	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : AUG 2019
CHECKED BY:	J.BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
402.009.R2233BB.SMU.LRFR_800661.dgn



TYPICAL SECTION AT INTEGRAL END BENT

DIMENSIONS ARE RADIAL UNLESS NOTED OTHERWISE



DETAIL A

NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 ½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

DESIGNED BY:	C. CORMAN	DATE :	AUG 2019
DRAWN BY:	K. WHITE	DATE :	AUG 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
402_011_R2233BB_SMU_TSI_80666i.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

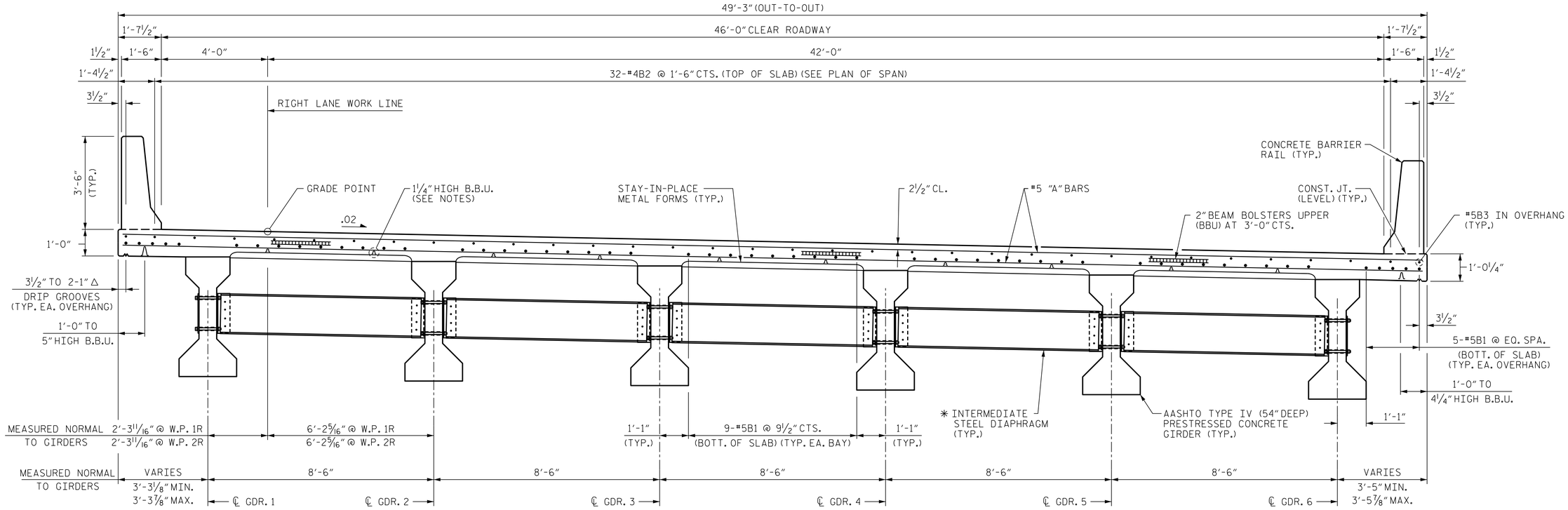
PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-6
1			3			TOTAL SHEETS
2			4			28

STR. #2



TYPICAL SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

(SHOWING INTERMEDIATE DIAPHRAGMS)

* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

DIMENSIONS ARE RADIAL UNLESS NOTED OTHERWISE

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-7
1			3			TOTAL SHEETS
2			4			28

STR. #2

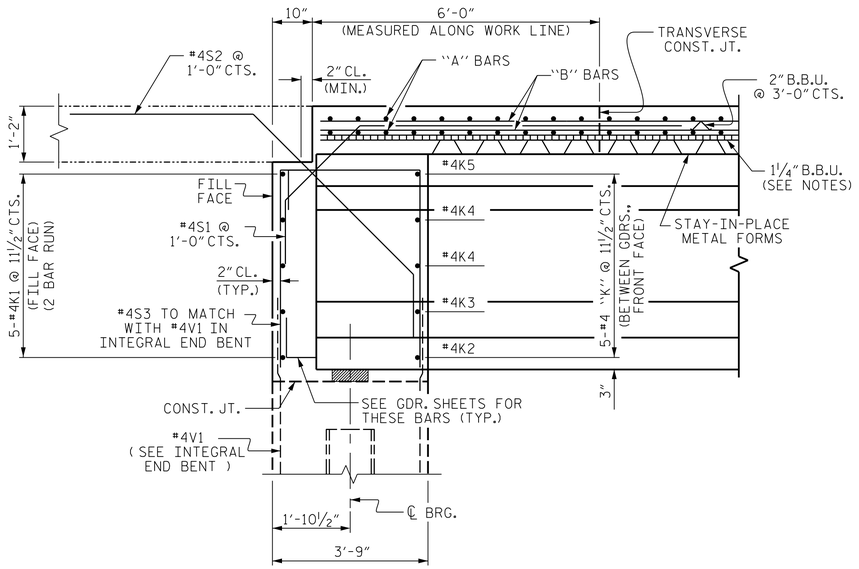
DESIGNED BY:	C. CORMAN	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : AUG 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
402.013.R2233BB.SMU.TS2_800661.DGN



SECTION THRU INTEGRAL END BENT

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8
1			3			TOTAL SHEETS
2			4			28

STR. #2

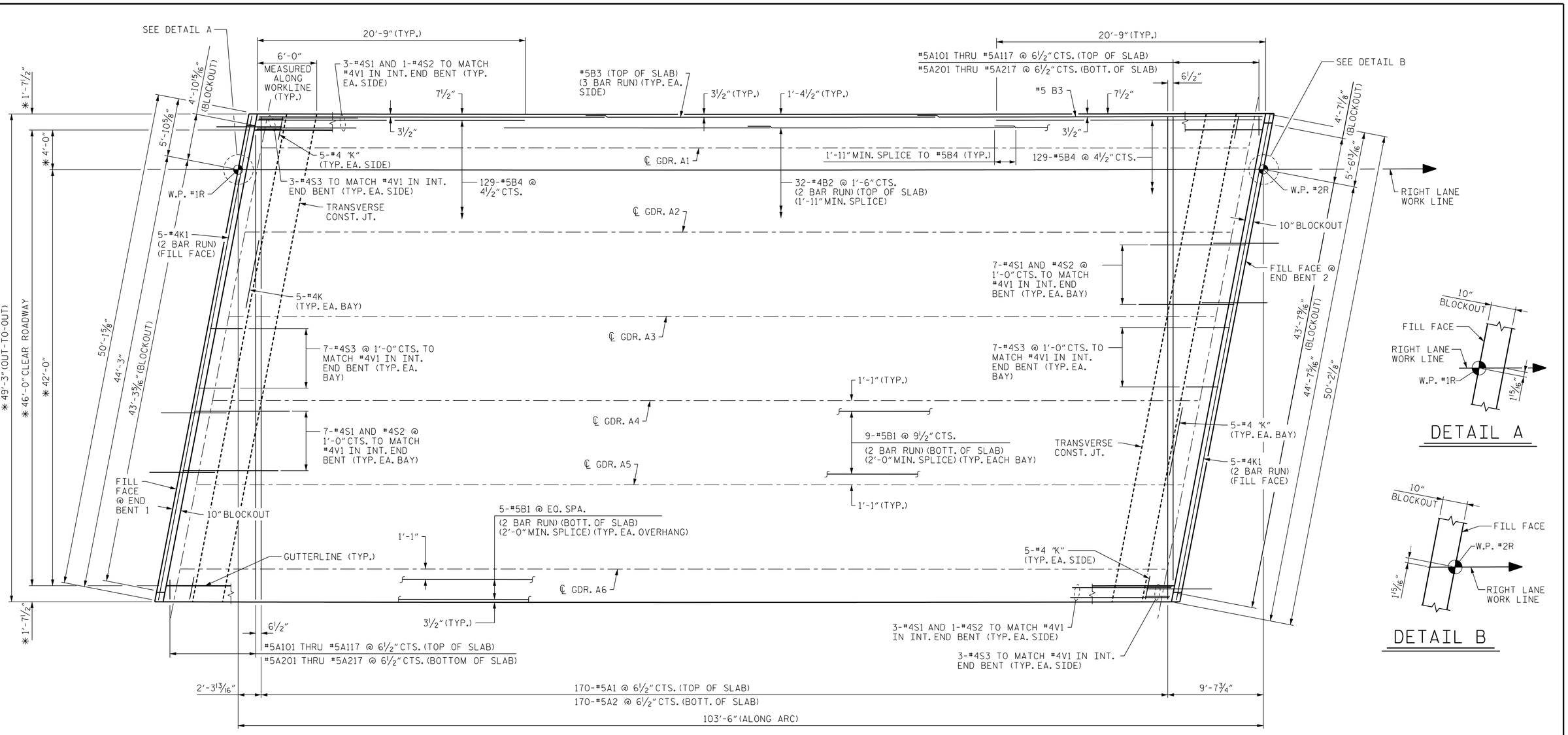
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : AUG 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/22/2020
402.015.R2233BB.SMU.TS3.800661.DGN



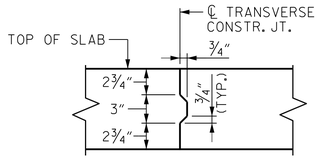
PLAN OF SPAN A

"A" BARS TO BE PLACED PERPENDICULAR TO AND ALONG LONG CHORD

DETAIL A

DETAIL B

✱ RADIAL DIMENSIONS



TRANSVERSE CONSTRUCTION JOINT

REINFORCING STEEL IN SLAB NOT SHOWN.

LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

NOTES:

FOR LAP LENGTHS NOT SHOWN, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

DESIGNED BY:	C. CORMAN	DATE :	JUNE 2019
DRAWN BY:	K. WHITE	DATE :	JUNE 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

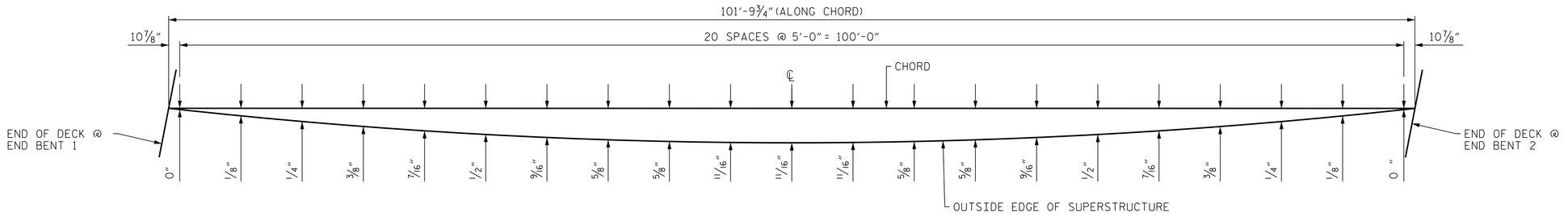
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A

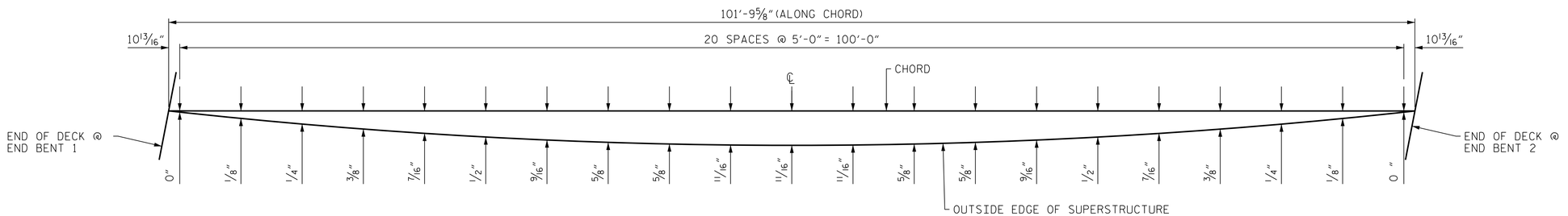
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-9
1			3			TOTAL SHEETS
2			4			28

STR. #2

4/22/2020
402.017.R2233BB.SMU.S1.800661.DGN



ARC OFFSETS - SPAN A (LEFT SIDE)



ARC OFFSETS - SPAN A (RIGHT SIDE)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

DESIGNED BY:	C.CORMAN	DATE :	APR 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

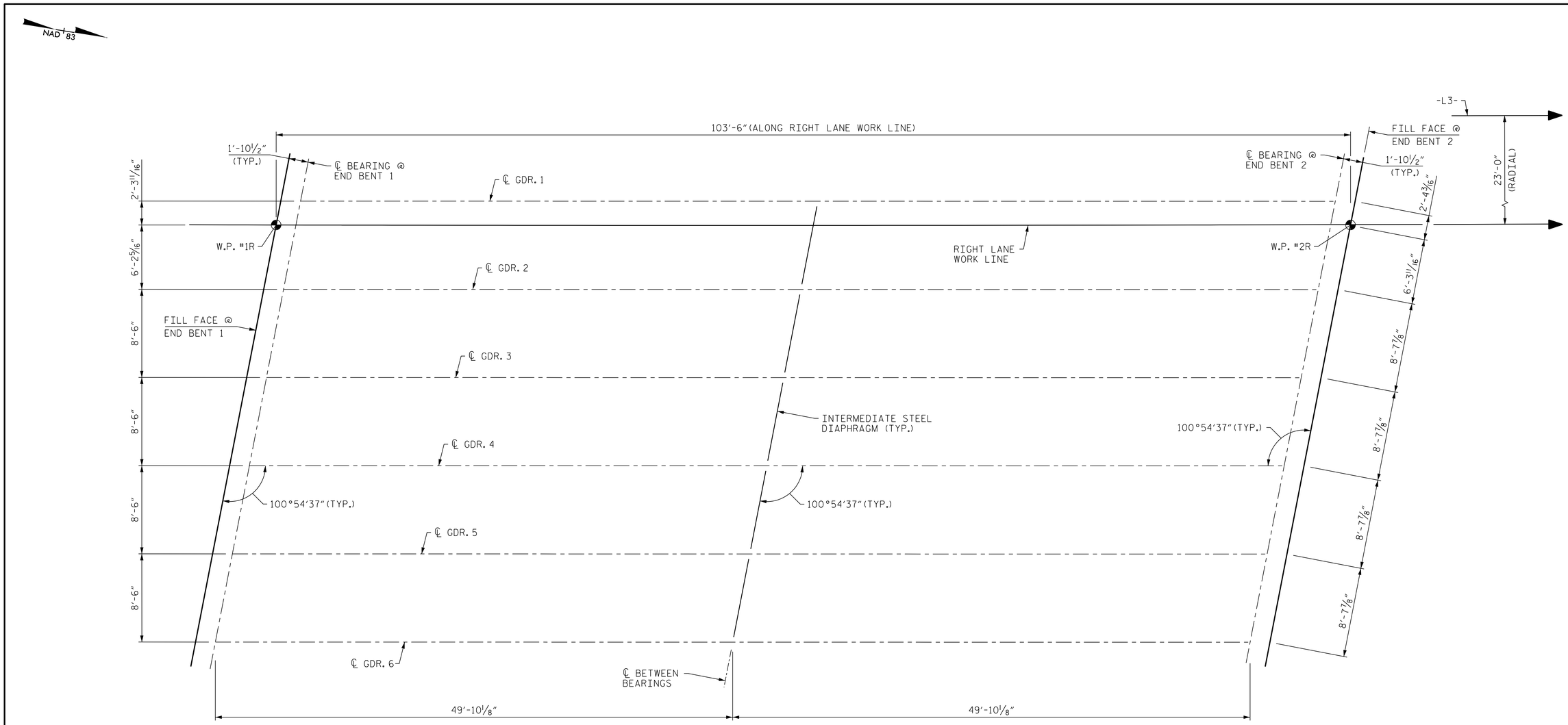
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS
2			4			28

STR. #2

4/22/2020
402_019_R2233BB_SMU_ARC_800661.DGN



INTEGRAL END BENT
E1

INTEGRAL END BENT
E1

FRAMING PLAN - SPAN A

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

NOTES:

CONTRACTOR IS RESPONSIBLE FOR FURNISHING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

END BENTS ARE PARALLEL.

ALL GIRDERS ARE PARALLEL TO LONG CHORD.

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

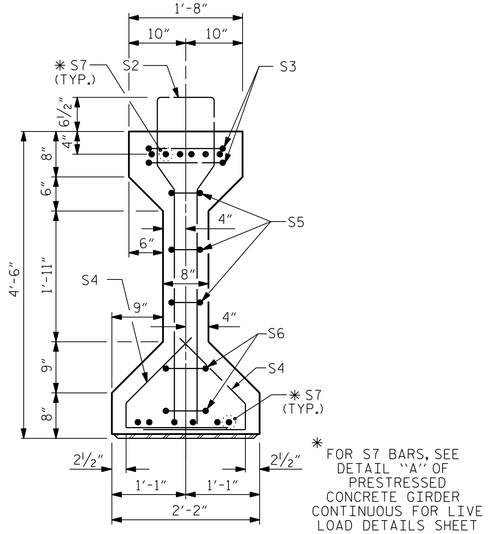
SUPERSTRUCTURE

FRAMING PLAN
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			28

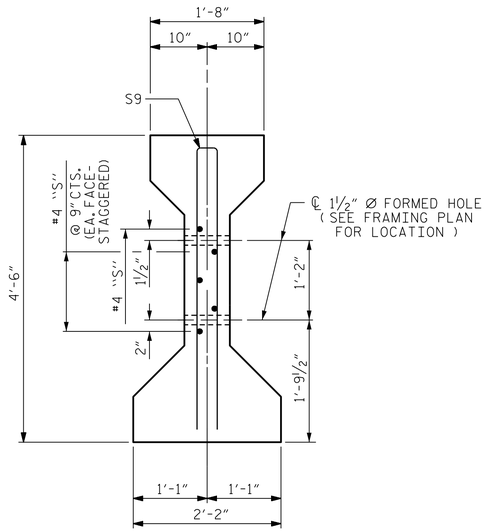
STR. #2

4/22/2020
402.021.R2233BB.SMU_FP_B0066I.DGN



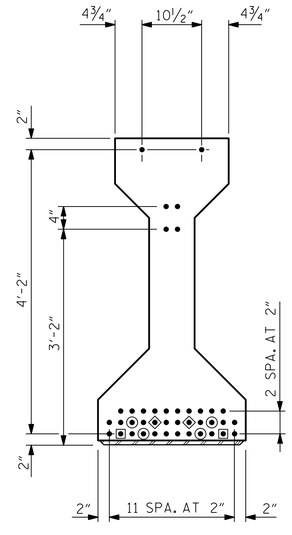
✱ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION A-A

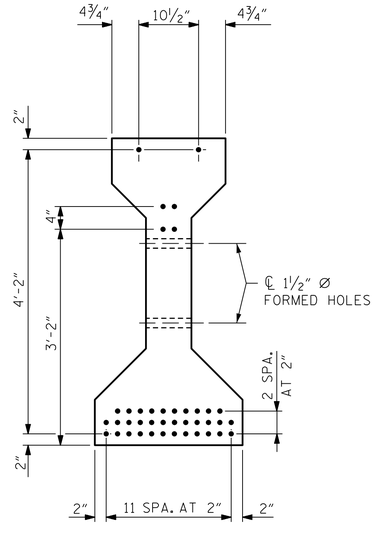


SECTION C-C

(S1 BARS NOT SHOWN)



AT END OF GIRDER

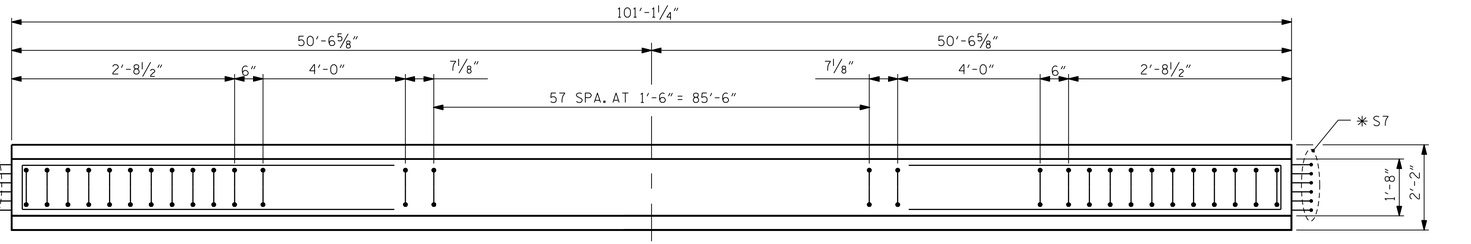


AT ℄ OF GIRDER

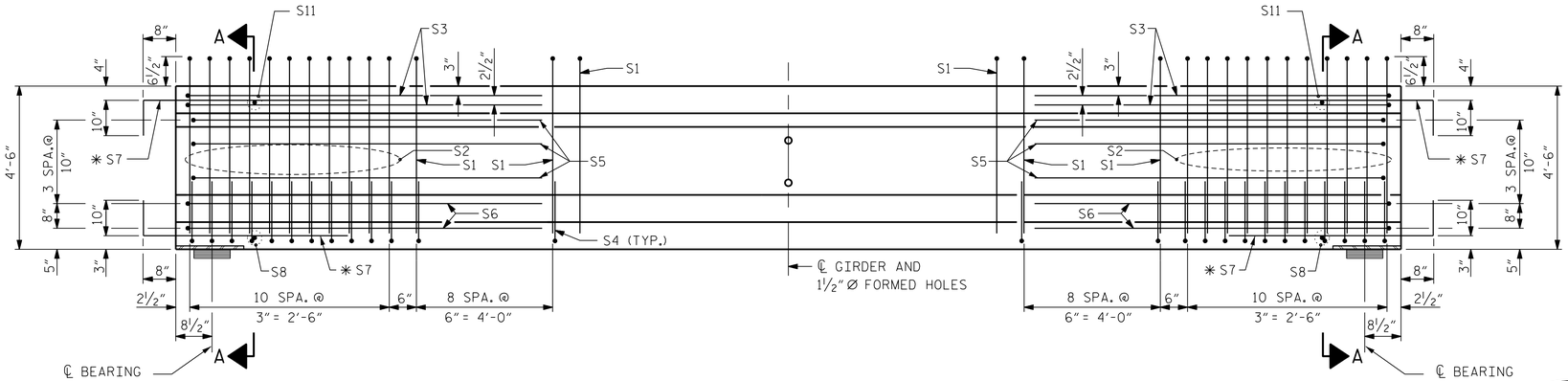
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- ▣ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.
- ◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER.
- ◈ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER.



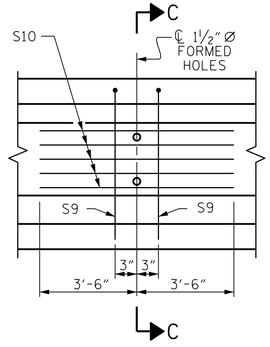
PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.

0.6" Ø L. R. GRADE 270 STRANDS

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

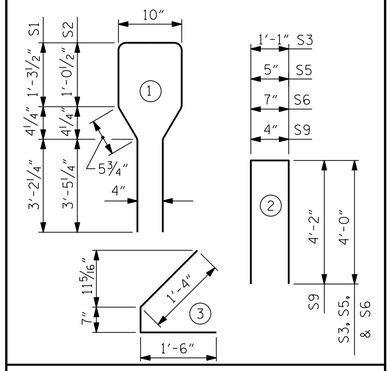
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-9"	546
S2	22	#6	1	10'-9"	355
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
S6	4	#4	2	8'-7"	23
S7	24	#5	STR	3'-8"	92
S8	2	#3	STR	1'-10"	1
S9	2	#5	2	8'-8"	18
S10	5	#4	STR	7'-0"	23
S11	2	#3	STR	1'-4"	1

✱ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	7500 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
54"PCG GIRDER	1300	20.5	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	101'-1¼"	606.63'

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. PCG6

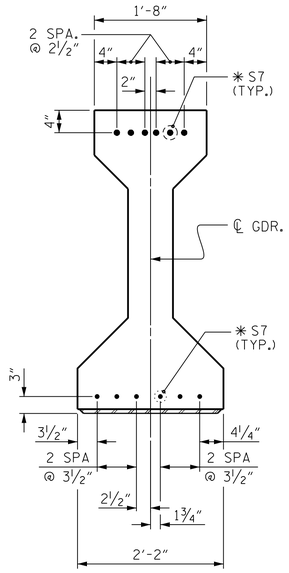
		REV. 10/1/11	MAA/GM
DRAWN BY :	ELR 8/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 8/91	REV. 12/17	MAA/THC
DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

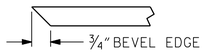
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/22/2020
402.023.R2233BB.SMU.01.80066l.dgn



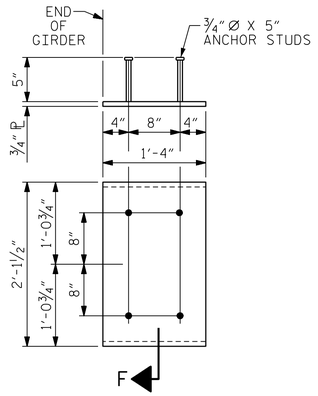
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)



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

(2 REQ'D PER GIRDER)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 PSI.

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

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

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A										
	GIRDERS 1 THRU 6										
TENTH POINTS	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.120	0.165	0.193	0.203	0.193	0.165	0.120	0.064	0
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.050	0.098	0.136	0.160	0.169	0.160	0.136	0.098	0.050	0
FINAL CAMBER ↑	0	3/16"	1/4"	5/16"	3/8"	7/16"	3/8"	5/16"	1/4"	3/16"	0

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

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-13
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. PCG9

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

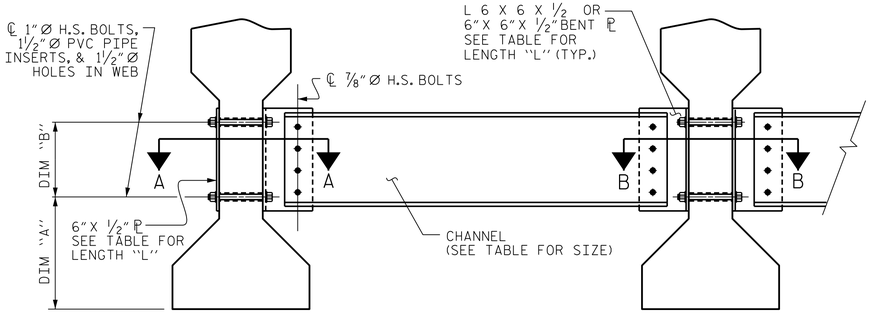
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

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

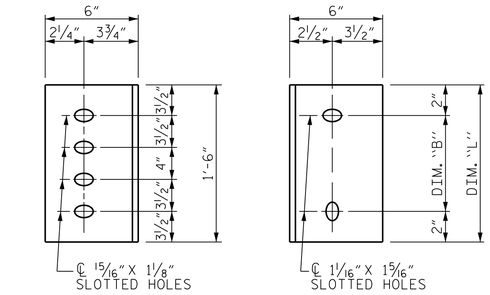
REV.	1/15	MAA/TMG
REV.	2/15	MAA/TMG
REV.	12/17	MAA/THC

4/22/2020
402.025.R2233BB_SMU.G2.B00661.DGN



PART SECTION AT INTERMEDIATE DIAPHRAGM

(EXTERIOR BAY SHOWN)



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

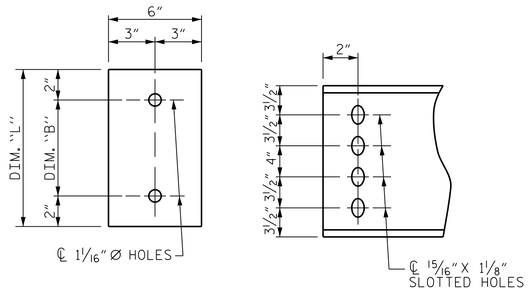


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM F3125 GRADE A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

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

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

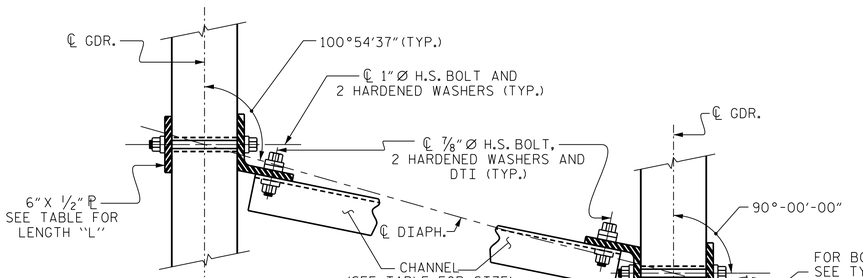
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

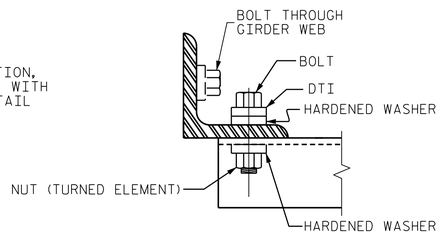
TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"



SECTION A-A

SECTION B-B



BOLT WITH DTI ASSEMBLY DETAIL

CONNECTION DETAILS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-14
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. PCG10

MODJESKI and MASTERS
Experience great bridges.

333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

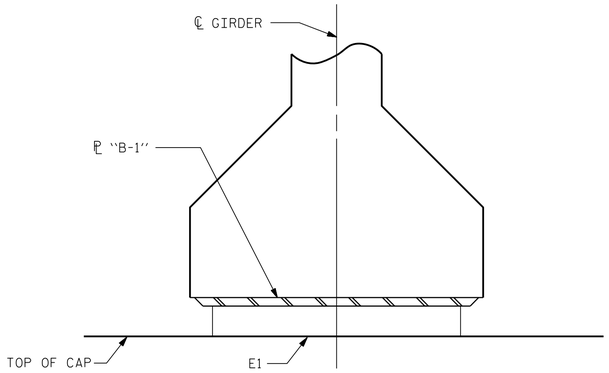
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

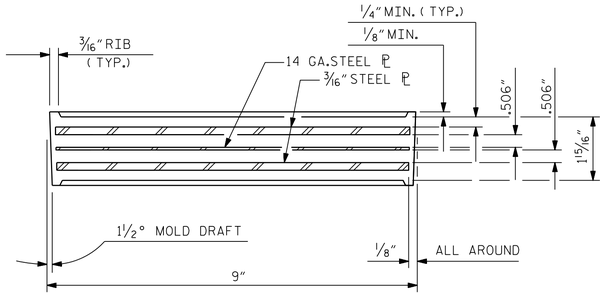
DRAWN BY : TLA 6/05
CHECKED BY : VC 6/05

REV. 5/1/06RRR KMM/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

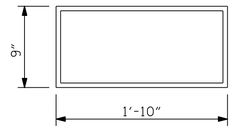
4/22/2020
402.027.R2233BB.SWL.SS.800661.DGN



SECTION F-F
@ INTEGRAL END BENT



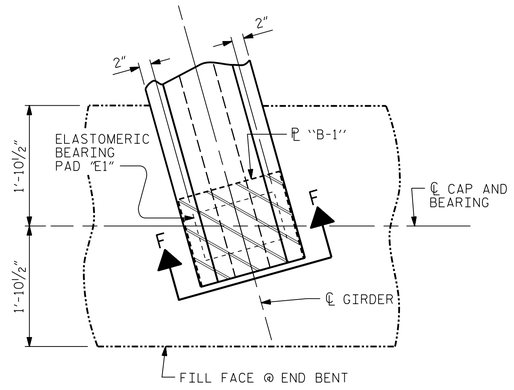
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN @ END BENT

NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

DRAWN BY :	WJH	8/89
CHECKED BY :	CRK	8/89

REV. 6/13	AAC/MAA
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

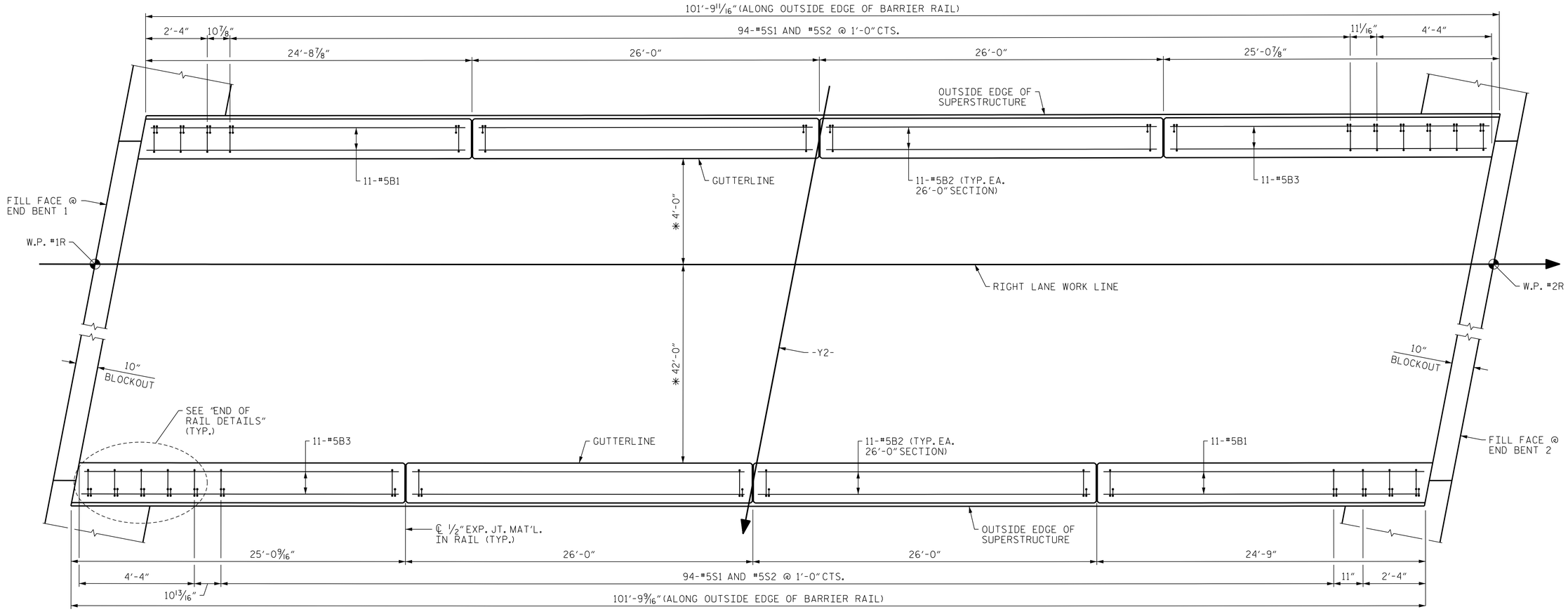
ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-15
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. EB3 (SHT 3)

4/22/2020
402_029_R2233BB_SMU_BG_800661.DGN



PLAN OF CONCRETE BARRIER RAIL

* RADIAL DIMENSIONS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-16
1			3			TOTAL SHEETS
2			4			28

STR. #2

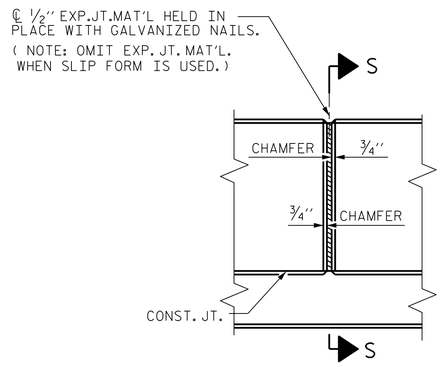
DESIGNED BY:	C. CORMAN	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : AUG 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
402.031.R2233BB.SMU.CBR.80066i.DGN



ELEVATION AT EXPANSION JOINTS

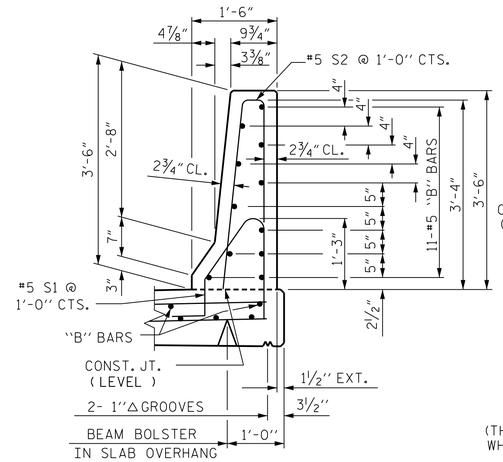
BARRIER RAIL DETAILS

NOTES

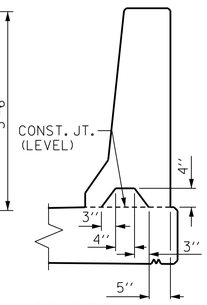
THE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



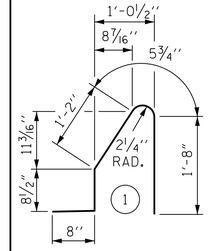
SECTION THRU RAIL

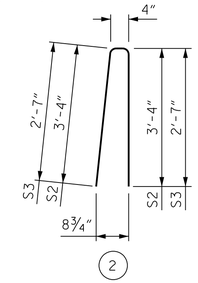


SECTION S-S

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

BAR TYPES





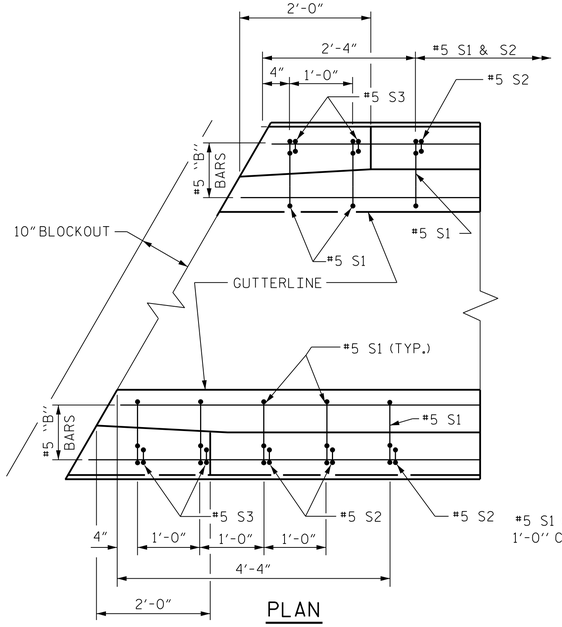
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

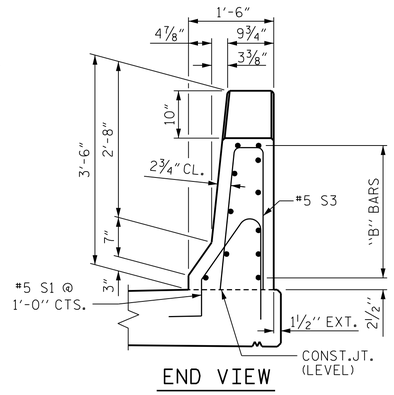
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	22	5	STR	24'-5"	560
✳ B2	44	5	STR	25'-8"	1178
✳ B3	22	5	STR	24'-8"	566
✳ S1	204	5	1	4'-8"	993
✳ S2	196	5	2	7'-0"	1431
✳ S3	8	5	2	5'-6"	46

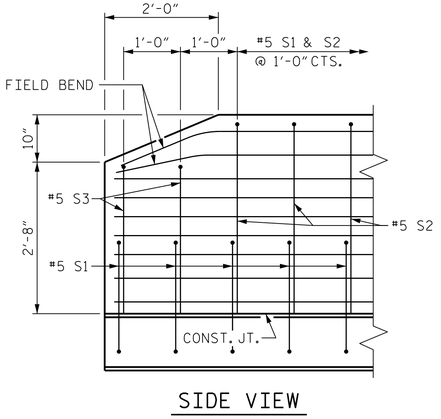
✳ EPOXY COATED REINFORCING STEEL	4,774 LBS.
CLASS AA CONCRETE	27.7 CU. YDS.
CONCRETE BARRIER RAIL	203.6 LIN. FT.



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

REVISIONS		
REV. 7/12		MAA/GM
REV. 6/13		MAA/GM
REV. 12/17		MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

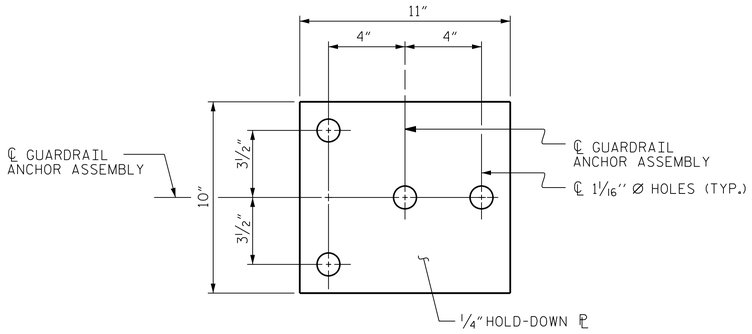
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

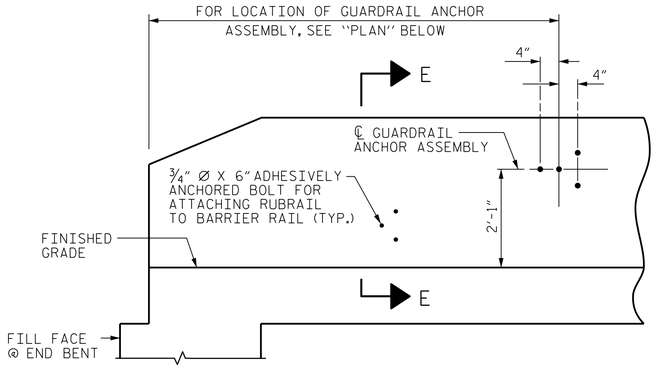
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			28

STR. #2 CBR1

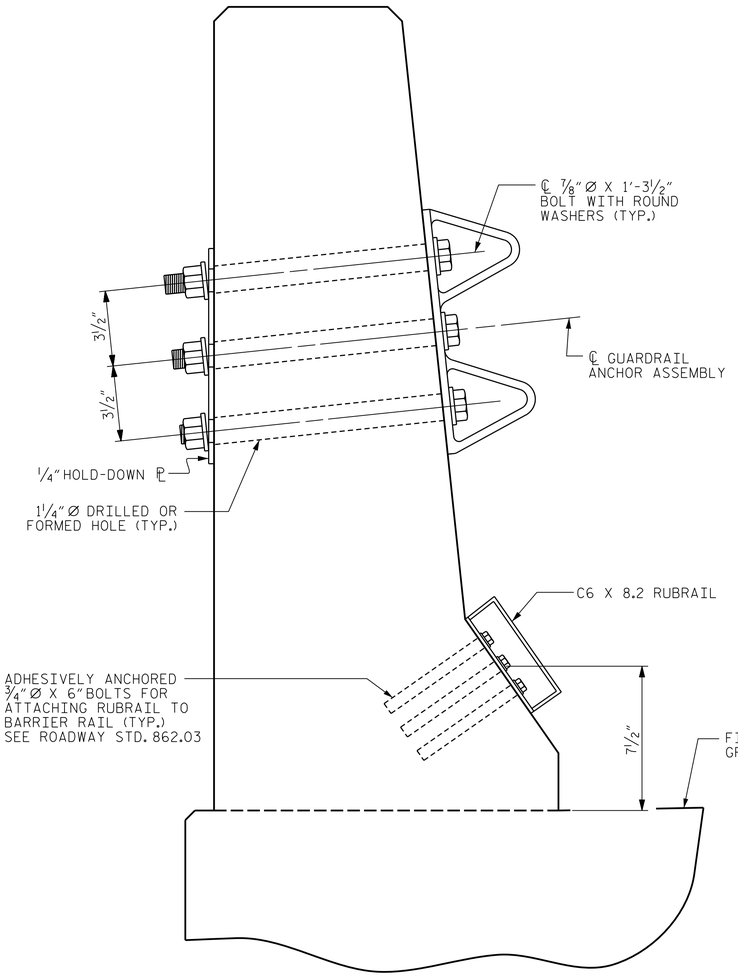
4/22/2020
402.033.R2233BB_SMU_BRD_B00661.DGN



PLAN

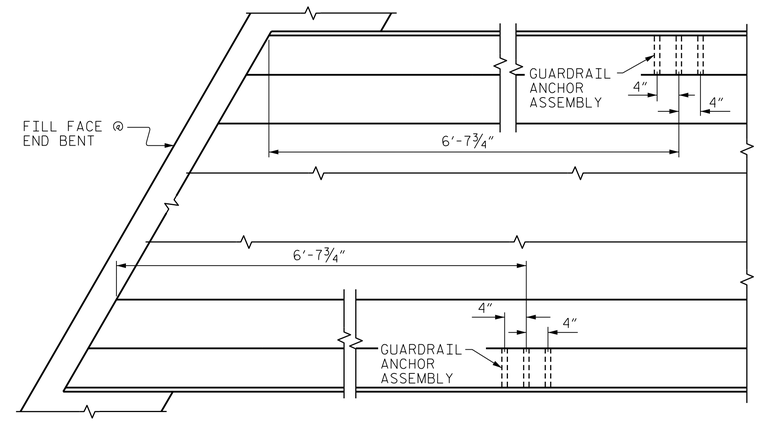


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

@ END BENT #1

NOTES

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

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

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

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

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

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

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

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

SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019		
DRAWN BY:	K. WHITE	DATE :	APR 2019		
CHECKED BY:	J. BORUTA	DATE :	AUG 2019		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019		

DRAWN BY :	TLA	5/06	
CHECKED BY :	GM	5/06	
REV. 7/12			MAA/GM
REV. 6/13			MAA/GM
REV. 12/17			MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

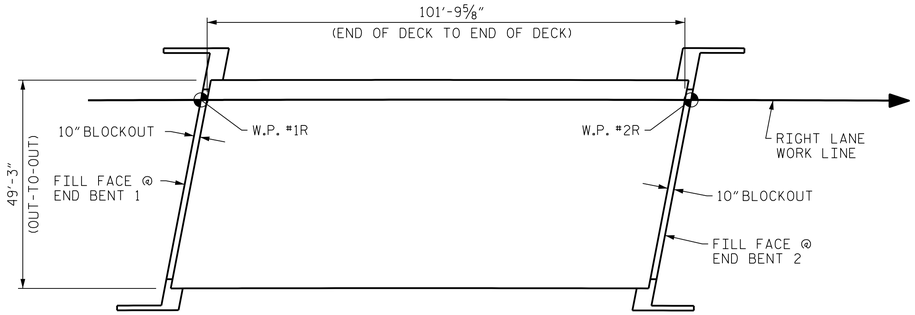
STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

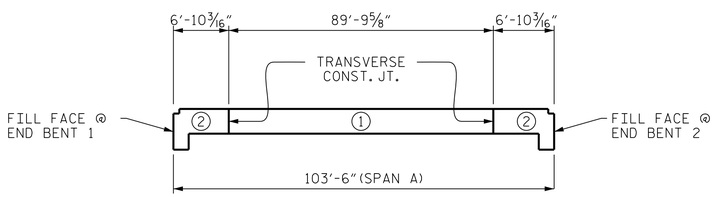
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-18
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. GRA2

4/22/2020
402.055.R2233BB.SMU.GR.800661.DGN

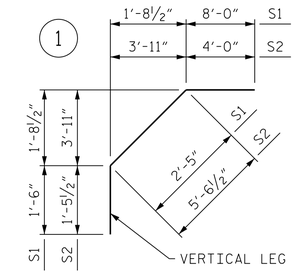


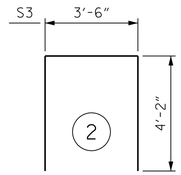
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5,014)



POUR SEQUENCE

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	170	5	STR	48'-10"	8659
✳ A101	2	5	STR	47'-1"	98
✳ A102	2	5	STR	44'-3"	92
✳ A103	2	5	STR	41'-6"	87
✳ A104	2	5	STR	38'-8"	81
✳ A105	2	5	STR	35'-10"	75
✳ A106	2	5	STR	33'-1"	69
✳ A107	2	5	STR	30'-3"	63
✳ A108	2	5	STR	27'-5"	57
✳ A109	2	5	STR	24'-8"	51
✳ A110	2	5	STR	21'-10"	46
✳ A111	2	5	STR	19'-1"	40
✳ A112	2	5	STR	16'-3"	34
✳ A113	2	5	STR	13'-5"	28
✳ A114	2	5	STR	10'-8"	22
✳ A115	2	5	STR	7'-10"	16
✳ A116	2	5	STR	5'-0"	10
✳ A117	2	5	STR	2'-3"	5
A2	170	5	STR	48'-10"	8659
A201	2	5	STR	47'-1"	98
A202	2	5	STR	44'-3"	92
A203	2	5	STR	41'-6"	87
A204	2	5	STR	38'-8"	81
A205	2	5	STR	35'-10"	75
A206	2	5	STR	33'-1"	69
A207	2	5	STR	30'-3"	63
A208	2	5	STR	27'-5"	57
A209	2	5	STR	24'-8"	51
A210	2	5	STR	21'-10"	46
A211	2	5	STR	19'-1"	40
A212	2	5	STR	16'-3"	34
A213	2	5	STR	13'-5"	28
A214	2	5	STR	10'-8"	22
A215	2	5	STR	7'-10"	16
A216	2	5	STR	5'-0"	10
A217	2	5	STR	2'-3"	5

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	110	5	STR	51'-9"	5937
✳ B2	64	4	STR	33'-1"	1414
✳ B3	6	5	STR	35'-6"	222
✳ B4	258	5	STR	20'-7"	5539
K1	20	4	STR	25'-8"	343
K2	10	4	STR	6'-1"	41
K3	10	4	STR	7'-2"	48
K4	20	4	STR	7'-7"	101
K5	10	4	STR	6'-7"	44
K6	4	4	STR	2'-2"	6
K7	8	4	STR	2'-9"	15
K8	4	4	STR	2'-5"	6
K9	4	4	STR	1'-11"	5
✳ S1	82	4	1	11'-11"	653
✳ S2	74	4	1	11'-0"	544
S3	82	4	2	11'-10"	648

REINFORCING STEEL = 16,727 LBS.

✳EPOXY COATED
REINFORCING STEEL = 17,905 LBS.

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,078 SQ. FT.
BRIDGE DECK	4,363 SQ. FT.
TOTAL	6,441 SQ. FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	140.2		
POUR #2	78.8	16,727	17,905
TOTALS ✳✳	219.0	16,727	17,905

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			28

STR. #2

DESIGNED BY: A. DUTTA DATE : AUG 2019
DRAWN BY: K. WHITE DATE : JULY 2019
CHECKED BY: J. BORUTA DATE : SEPT 2019
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

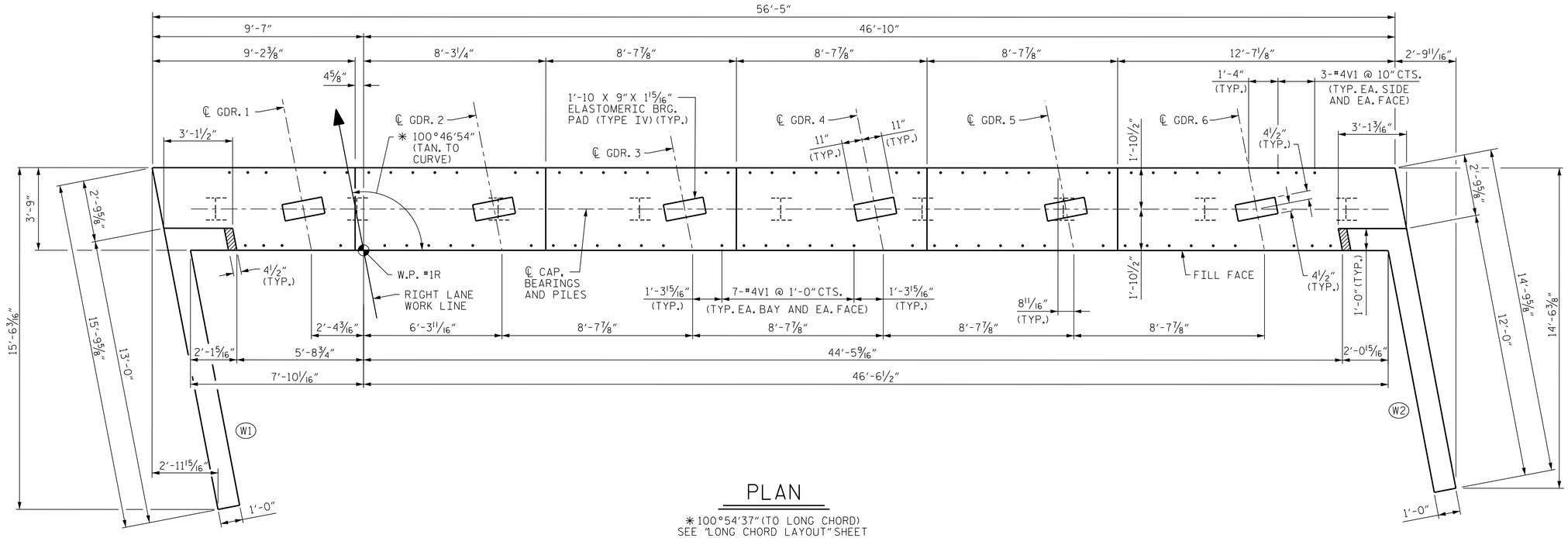
4/22/2020
402.057.R2233BB.SMU.BM.800661.dgn

NOTES:

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

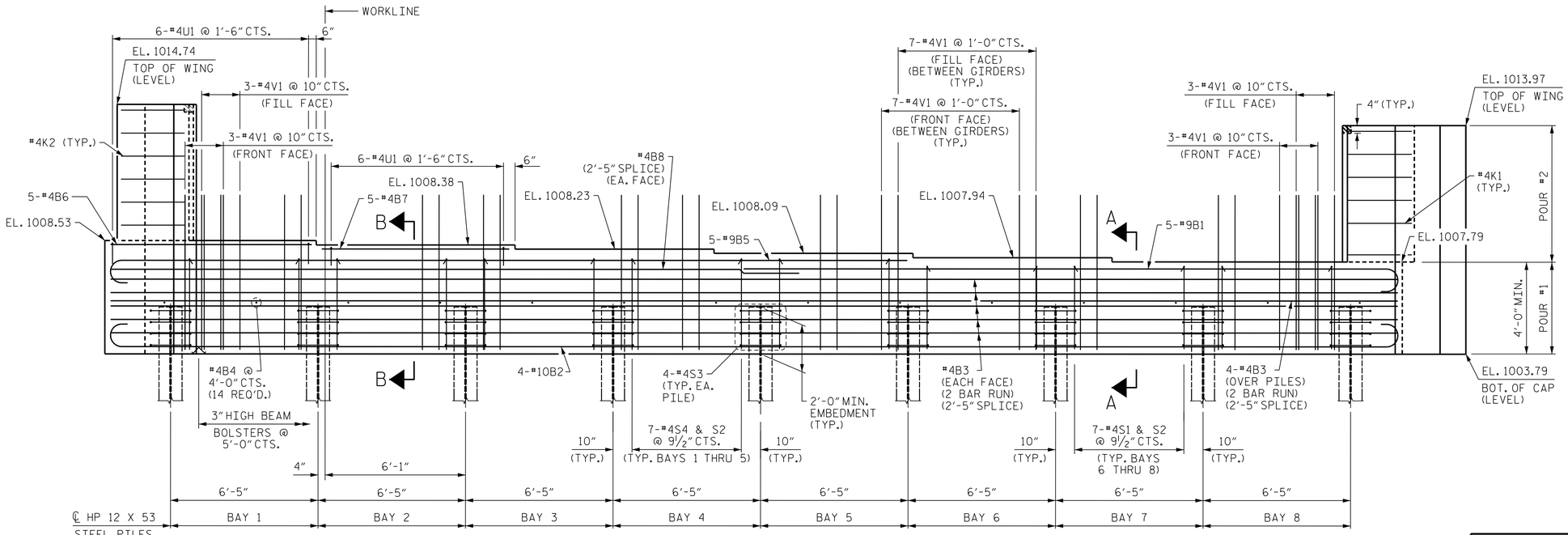
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

PILE SLEEVES NOT SHOWN FOR CLARITY.



PLAN

* 100°54'37" (TO LONG CHORD)
SEE "LONG CHORD LAYOUT" SHEET



ELEVATION

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

STR. #2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-20
1			3			TOTAL SHEETS
2			4			28

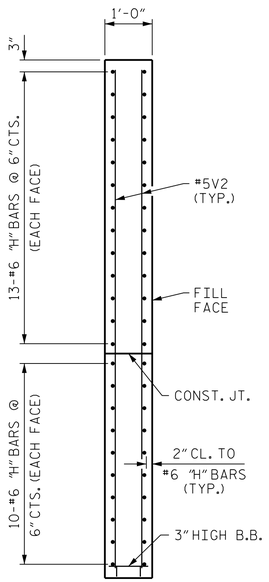
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	M. NIFONG	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

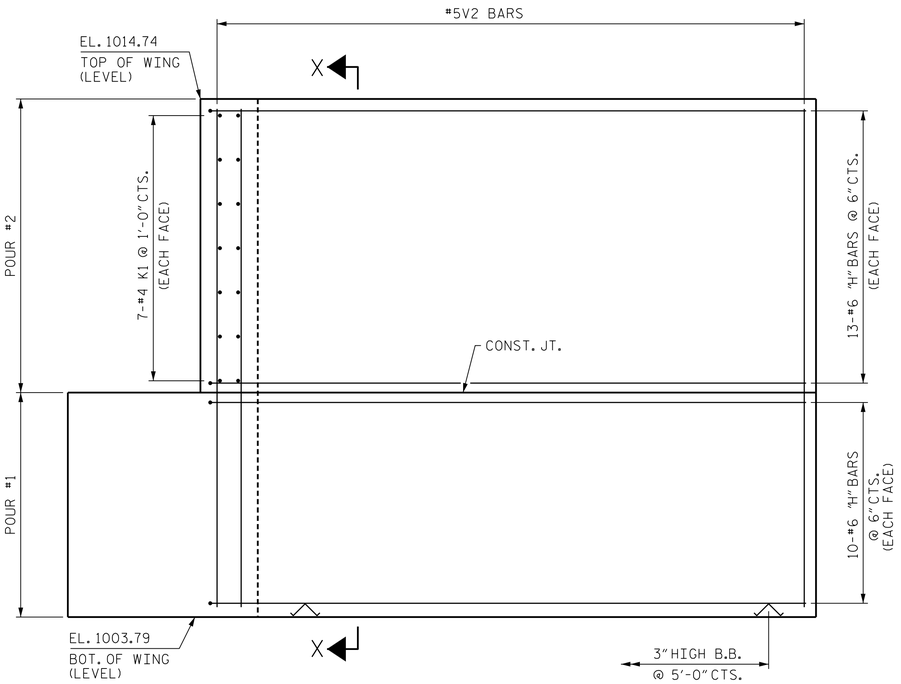
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

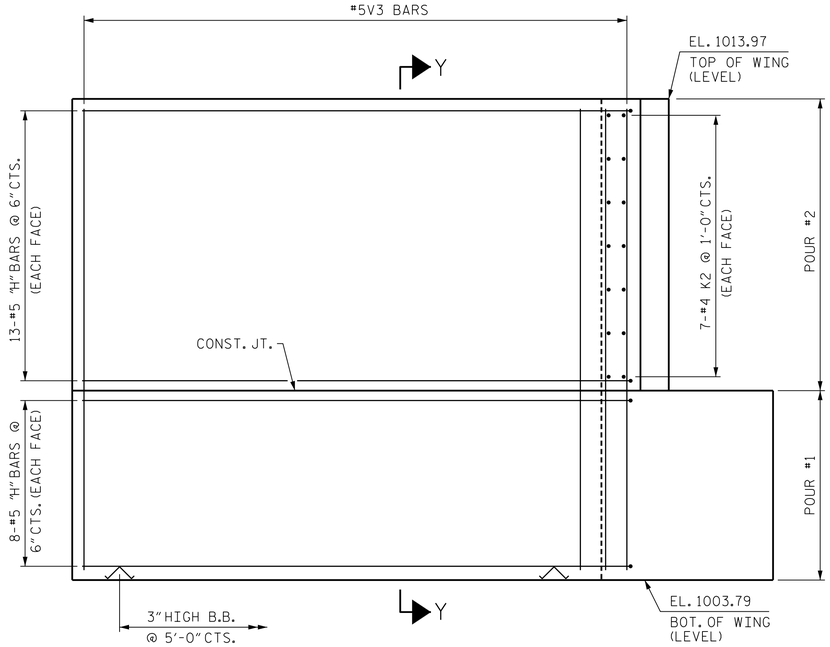
4/22/2020
402.039_R2233BB_SMU_E11_800661.DGN



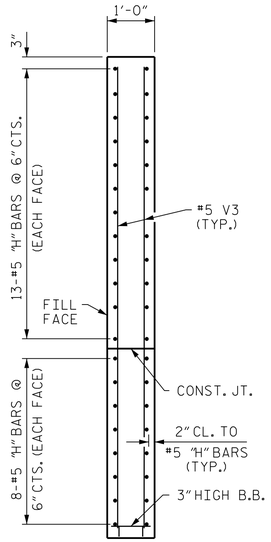
SECTION X-X



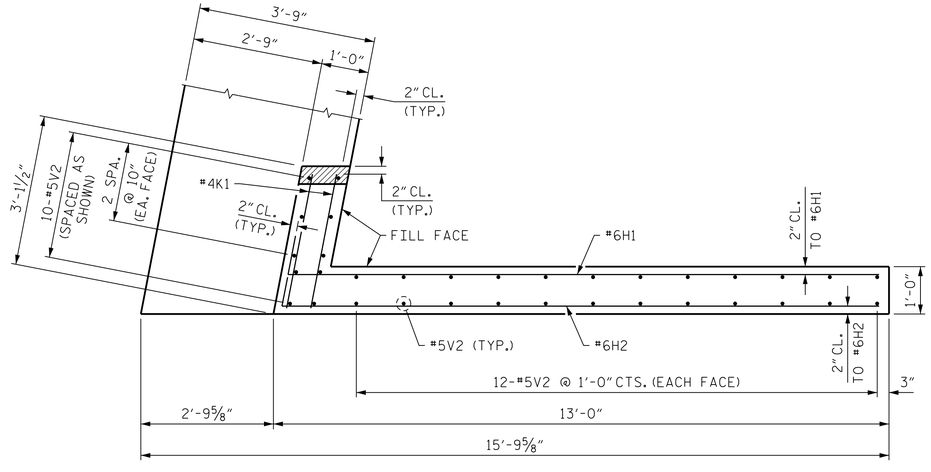
ELEVATION OF WING (W1)



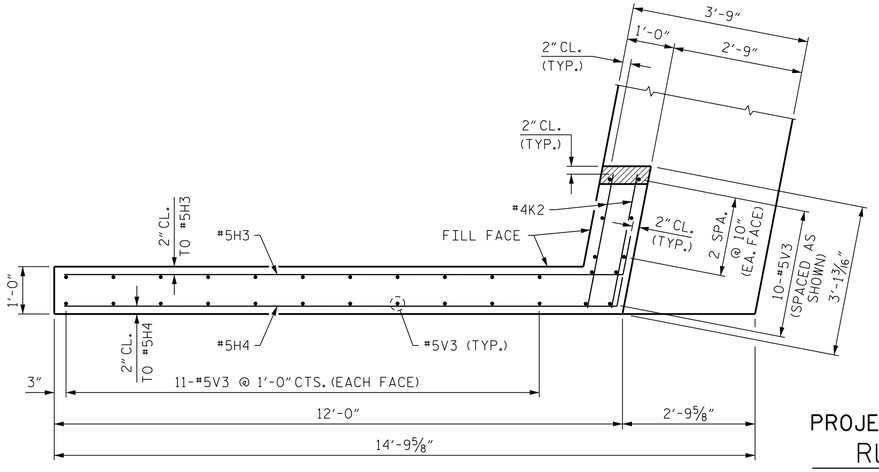
ELEVATION OF WING (W2)



SECTION Y-Y



PLAN OF WING (W1)



PLAN OF WING (W2)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-21
1			3			TOTAL SHEETS
2			4			28

STR. #2

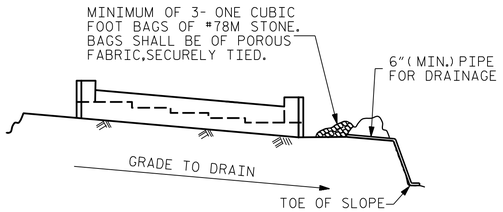
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	M. NIFONG	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
402_041_R2233BB_SMU_E12_800661.DGN

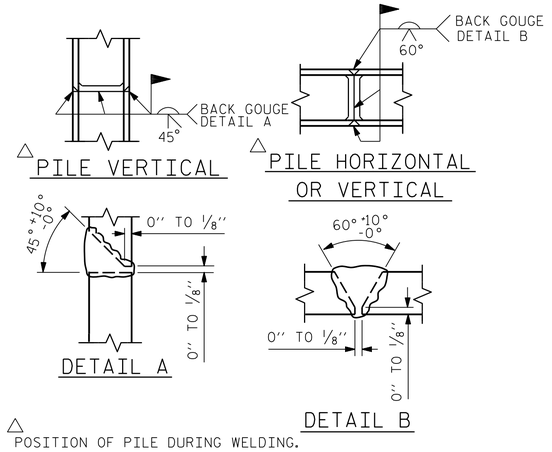


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

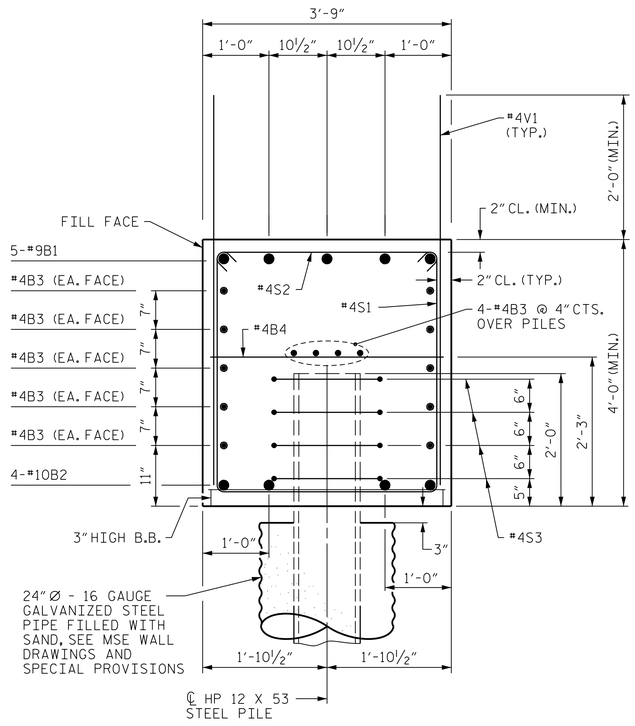
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

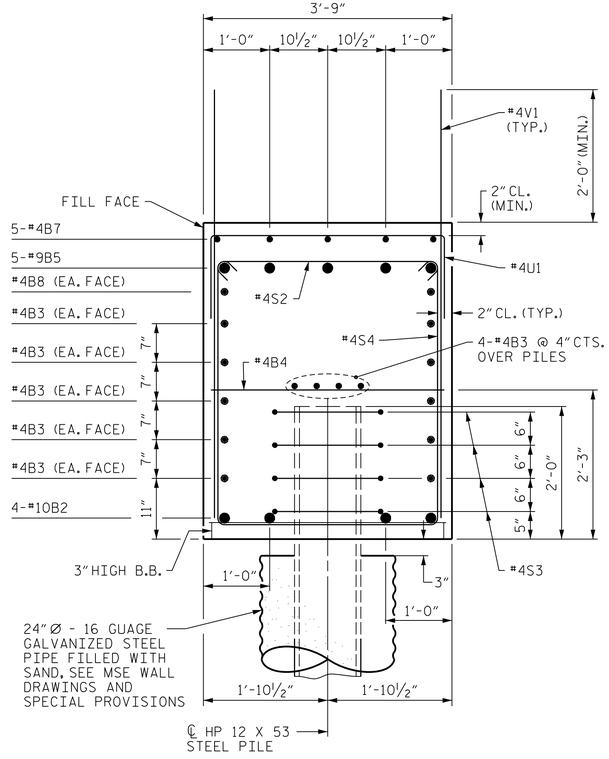


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

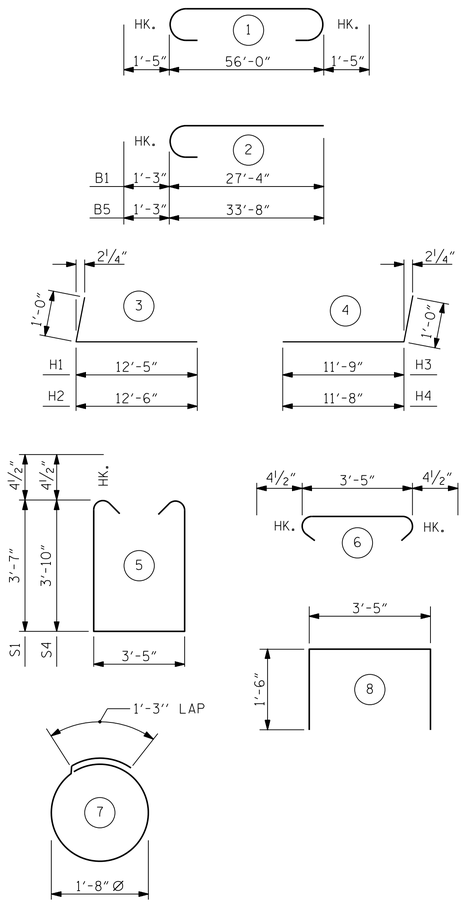


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	2	28'-7"	486
B2	4	#10	1	58'-10"	1013
B3	28	#4	STR	29'-3"	547
B4	14	#4	STR	3'-5"	32
B5	5	#9	2	34'-11"	594
B6	5	#4	STR	8'-6"	28
B7	5	#4	STR	8'-4"	28
B8	2	#4	STR	31'-2"	42
H1	23	#6	3	13'-5"	464
H2	23	#6	3	13'-6"	466
H3	21	#5	4	12'-9"	279
H4	21	#5	4	12'-8"	277
K1	12	#4	STR	2'-9"	22
K2	12	#4	STR	2'-8"	21
S1	21	#4	5	11'-4"	160
S2	56	#4	6	4'-2"	156
S3	36	#4	7	6'-6"	156
S4	35	#4	5	11'-10"	277
U1	12	#4	8	6'-5"	51
V1	82	#4	STR	7'-0"	383
V2	34	#5	STR	10'-6"	372
V3	32	#5	STR	9'-9"	325

REINFORCING STEEL		LBS.	6178
CLASS A CONCRETE			
POUR #1	CAP LOWER WINGS & CONC. COLLARS	C.Y.	38.7
POUR #2	UPPER PART OF WINGS	C.Y.	6.8
TOTAL CLASS A CONCRETE		C.Y.	45.5
HP 12x53 STEEL PILES NO. 9		LIN. FT.	450
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES		NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	M. NIFONG	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

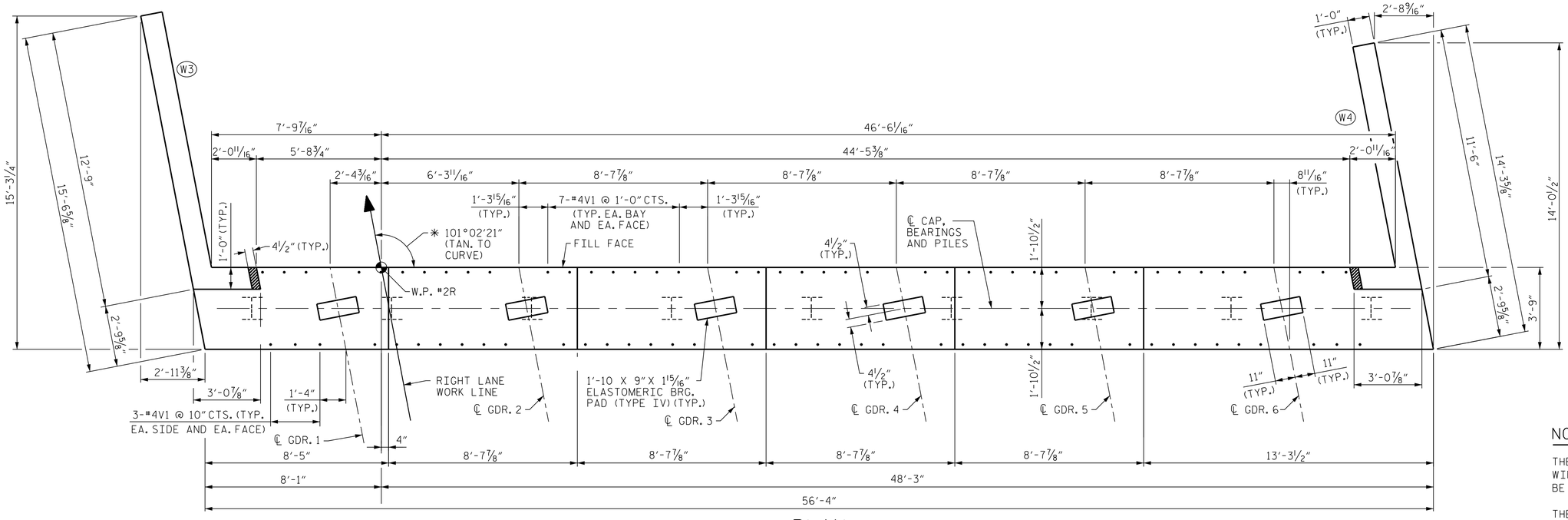
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

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

SHEET NO. S2-22
TOTAL SHEETS 28

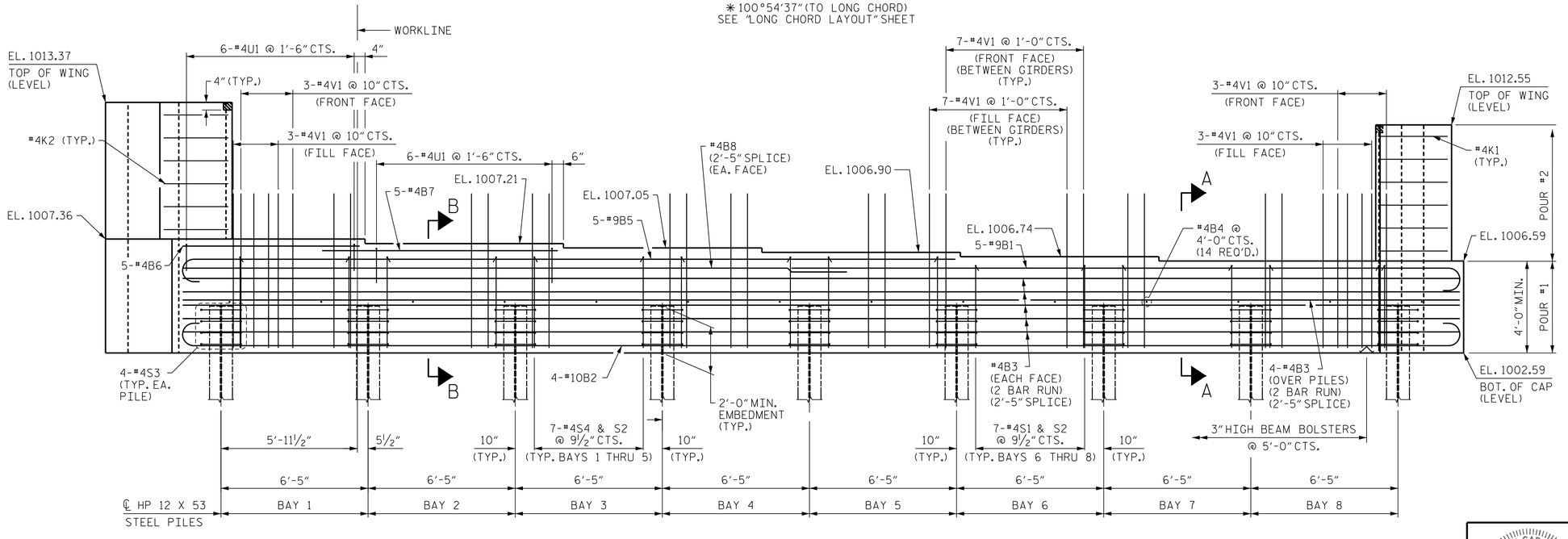
STR. #2

4/22/2020
402_043.R2233BB_SMU_E13_80066I.DGN



PLAN

✳ 100°54'37" (TO LONG CHORD)
SEE "LONG CHORD LAYOUT" SHEET



ELEVATION

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

NOTES:

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT TO THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

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

PILE SLEEVES NOT SHOWN FOR CLARITY.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DESIGNED BY:	C. CORMAN — DATE : JULY 2019
DRAWN BY:	K. WHITE — DATE : JULY 2019
CHECKED BY:	M. NIFONG — DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

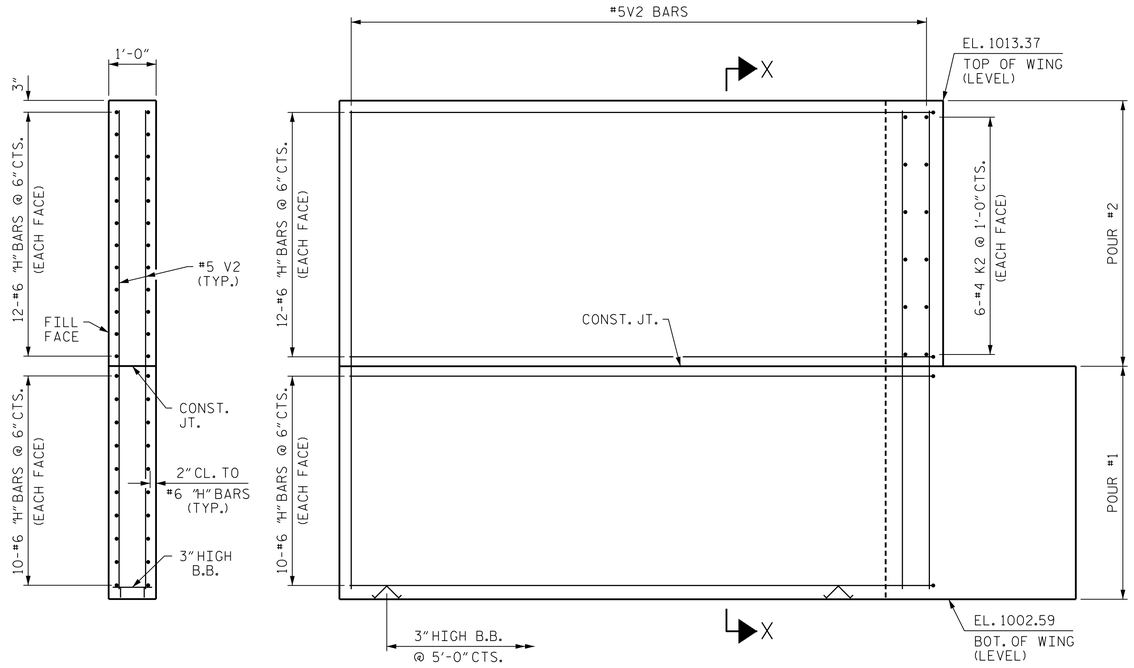
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-23
1			3			TOTAL SHEETS
2			4			28

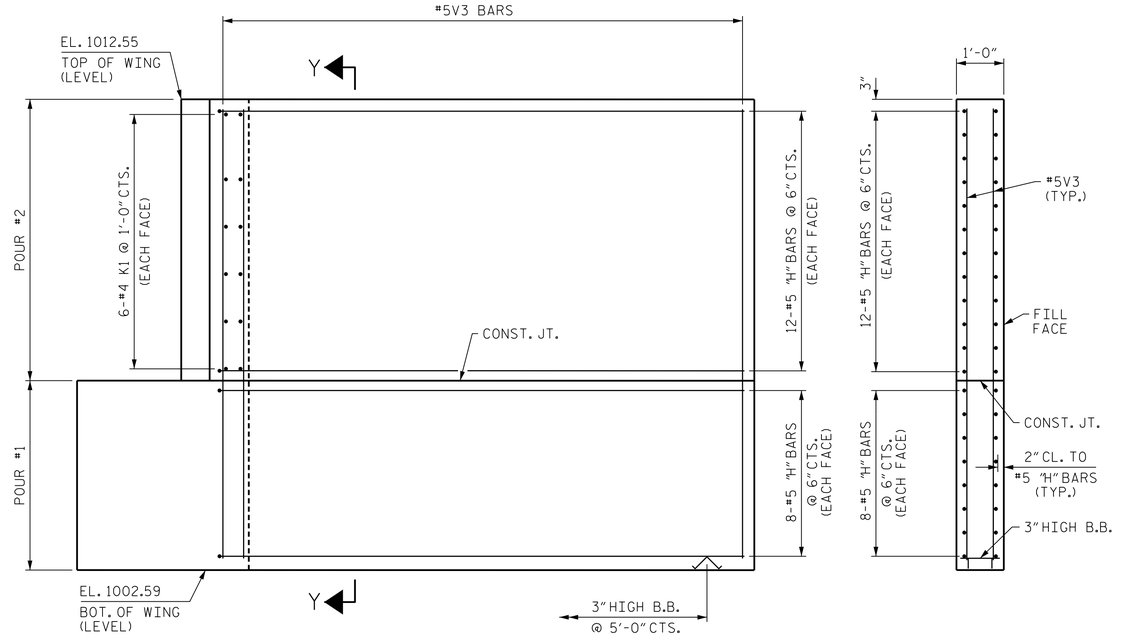
STR. #2

4/22/2020
402.045.R2233BB.SMU.E21.80066i.DGN



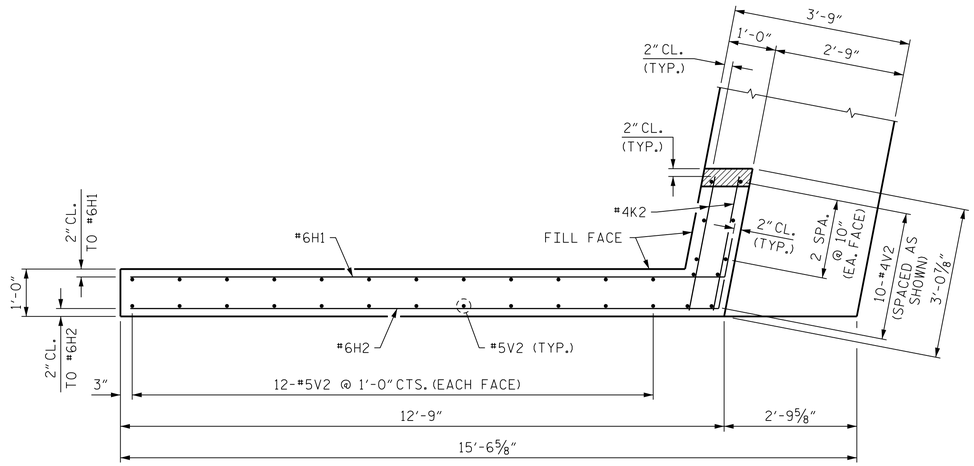
SECTION X-X

ELEVATION OF WING (W3)

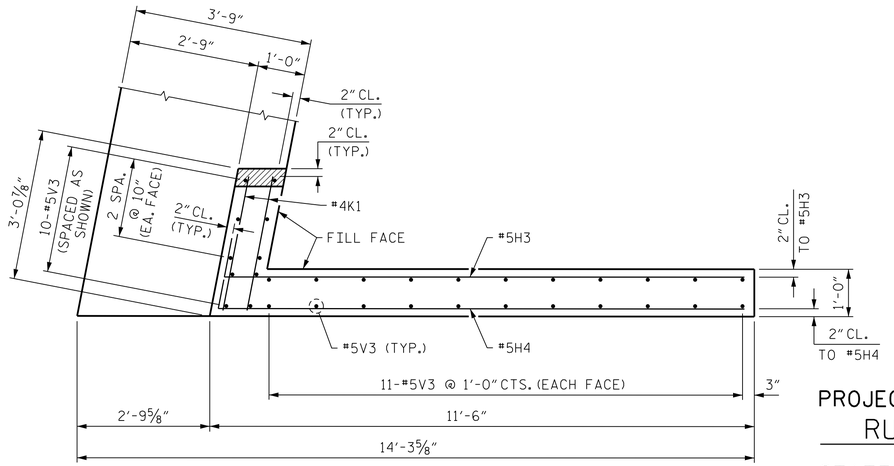


ELEVATION OF WING (W4)

SECTION Y-Y



PLAN OF WING (W3)



PLAN OF WING (W4)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 3

STR. #2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-24
1			3			TOTAL SHEETS
2			4			28

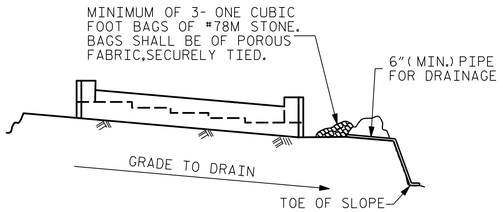
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	M. NIFONG	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
402.047.R2233BB.SMU.E22.B0061.DGN

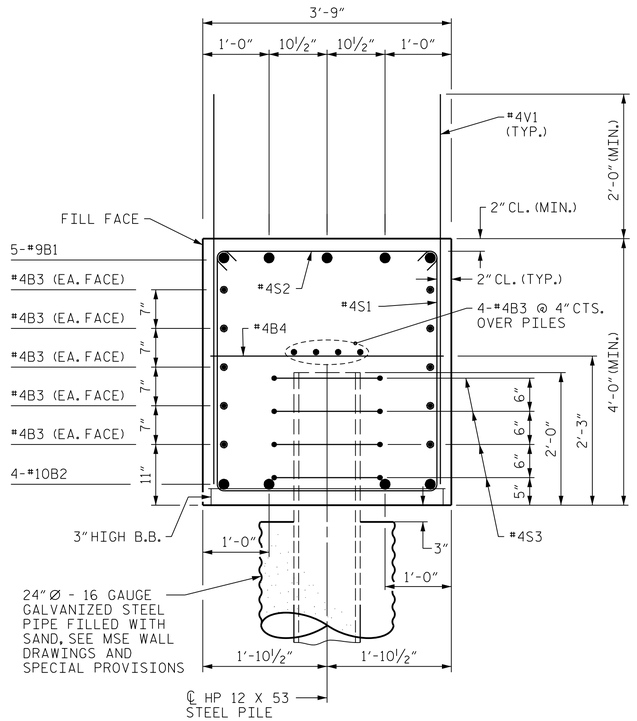


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

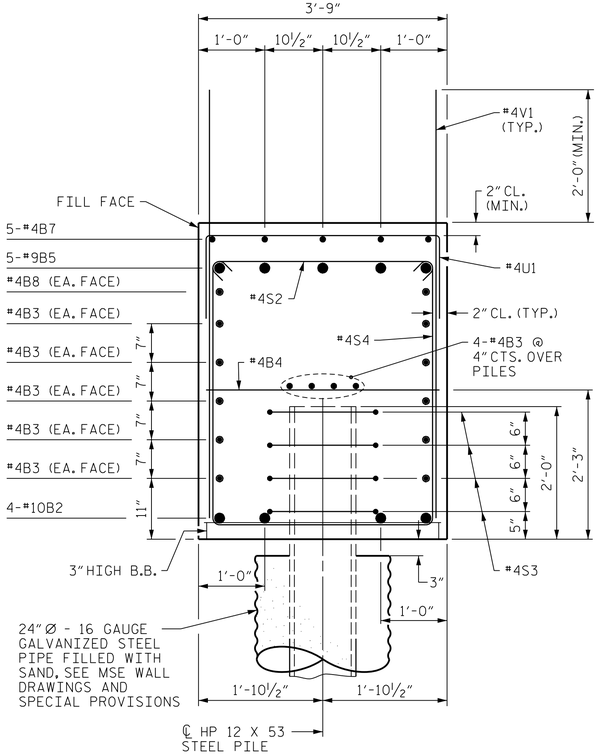
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

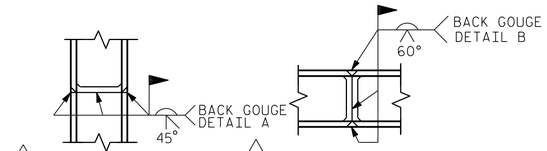
TEMPORARY DRAINAGE AT END BENT



SECTION A-A

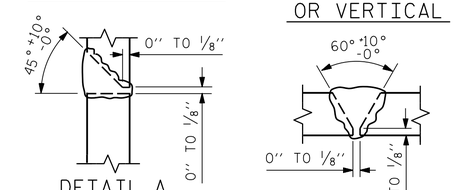


SECTION B-B



△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



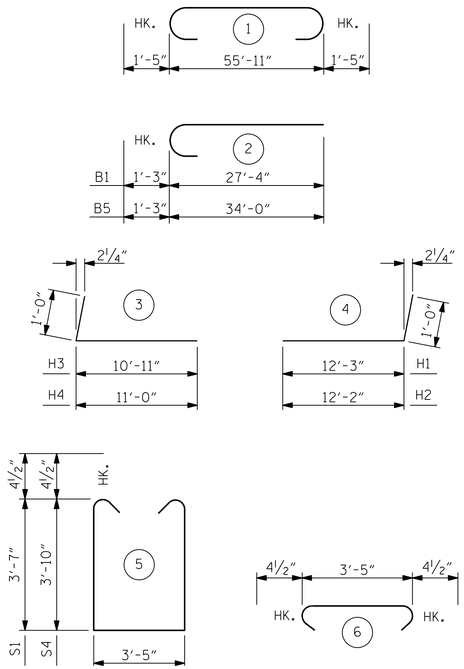
DETAIL A

DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	2	28'-7"	486
B2	4	#10	1	58'-9"	1011
B3	28	#4	STR	29'-3"	547
B4	14	#4	STR	3'-5"	32
B5	5	#9	2	35'-3"	599
B6	5	#4	STR	8'-1"	27
B7	5	#4	STR	8'-4"	28
B8	2	#4	STR	31'-1"	42
H1	22	#6	4	13'-3"	438
H2	22	#6	4	13'-2"	435
H3	20	#5	3	11'-11"	248
H4	20	#5	3	12'-0"	250
K1	12	#4	STR	2'-9"	22
K2	12	#4	STR	2'-8"	21
S1	21	#4	5	11'-4"	160
S2	56	#4	6	4'-2"	156
S3	36	#4	7	6'-6"	156
S4	35	#4	5	11'-10"	277
U1	12	#4	8	6'-5"	51
V1	82	#4	STR	7'-0"	383
V2	34	#5	STR	10'-4"	366
V3	32	#5	STR	9'-6"	317

REINFORCING STEEL		LBS.	6051
CLASS A CONCRETE			
POUR #1	CAP & LOWER WINGS	C.Y.	39.1
POUR #2	UPPER PART OF WINGS	C.Y.	6.3
TOTAL CLASS A CONCRETE		C.Y.	45.4
HP 12x53 STEEL PILES			
NO. 9		LIN. FT.	315
STEEL PILE POINTS		EACH	9
PREDRILLING FOR PILES		LIN. FT.	88
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES		NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019		
DRAWN BY:	K. WHITE	DATE :	JULY 2019		
CHECKED BY:	M. NIFONG	DATE :	AUG 2019		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019		

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

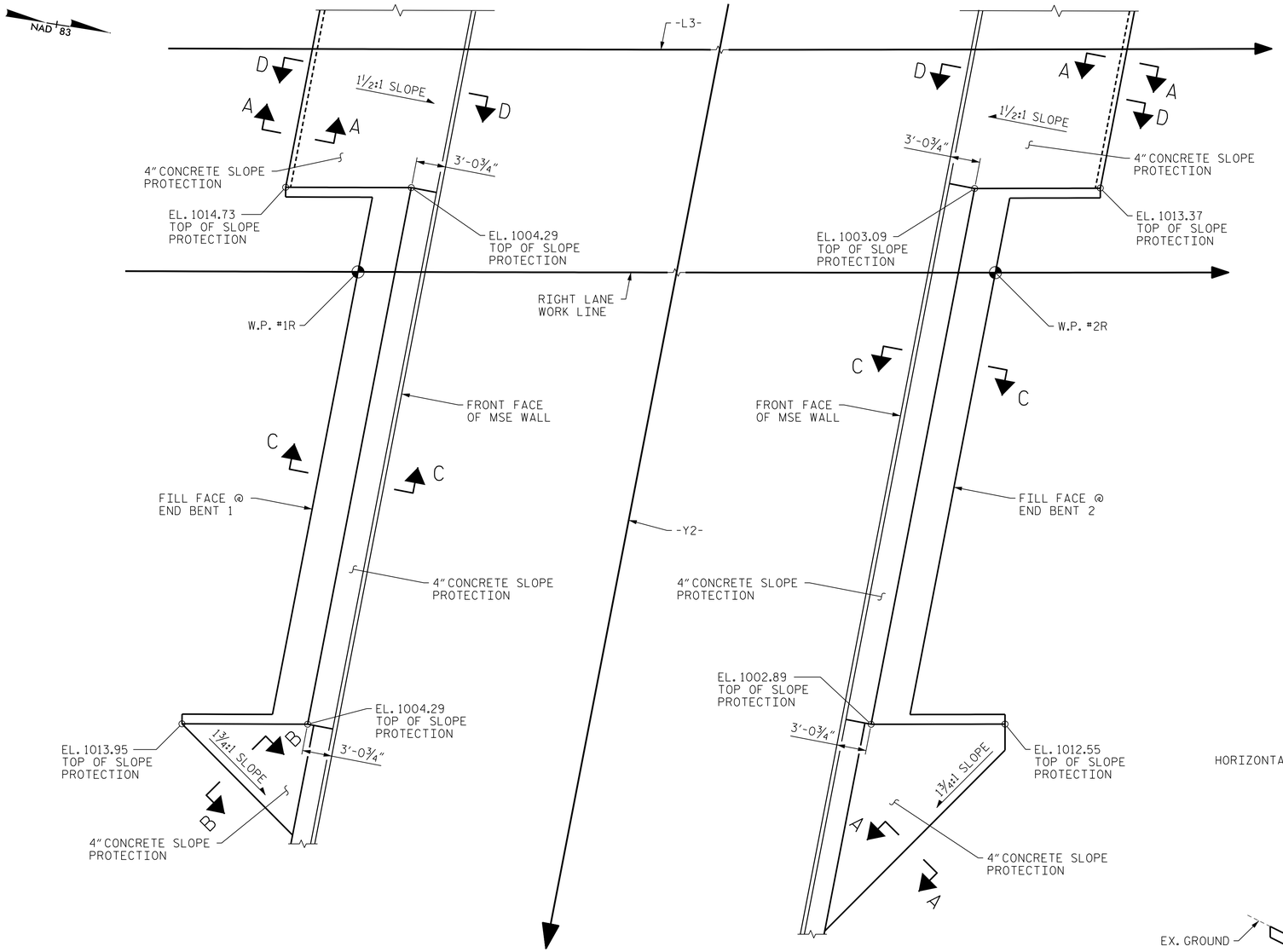
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-25
1			3			TOTAL SHEETS
2			4			28

STR. #2

4/22/2020
402.049.R2233BB.SMU.E23.B00661.DGN



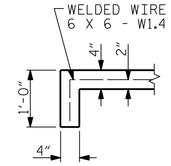
PLAN @ END BENT 1

PLAN @ END BENT 2

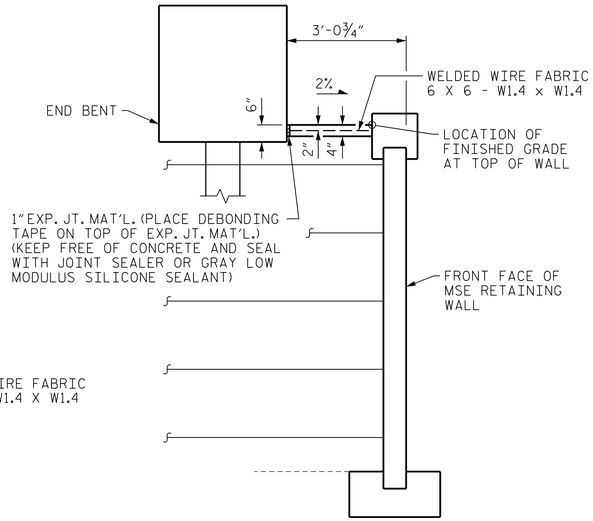
NOTES:

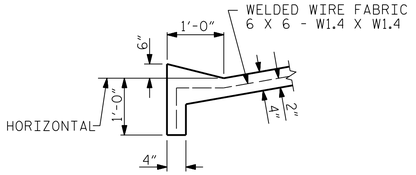
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJUSTMENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



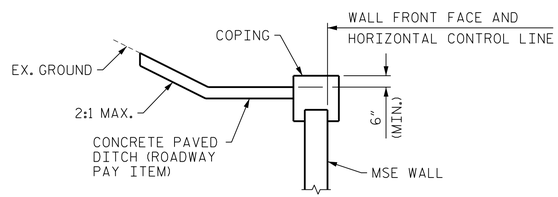
SECTION A-A





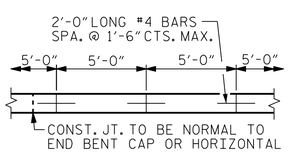
SECTION B-B

SECTION C-C



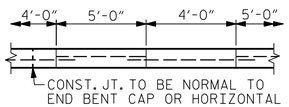
SECTION D-D

SLOPE PROTECTION LAYOUT



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

BRIDGE @ STA. 774+41.49 -L3- (RIGHT LANE)	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	68.0	123
END BENT 2	68.0	123

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION

DESIGNED BY:	A. DUTTA	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	M. NIFONG	DATE : SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

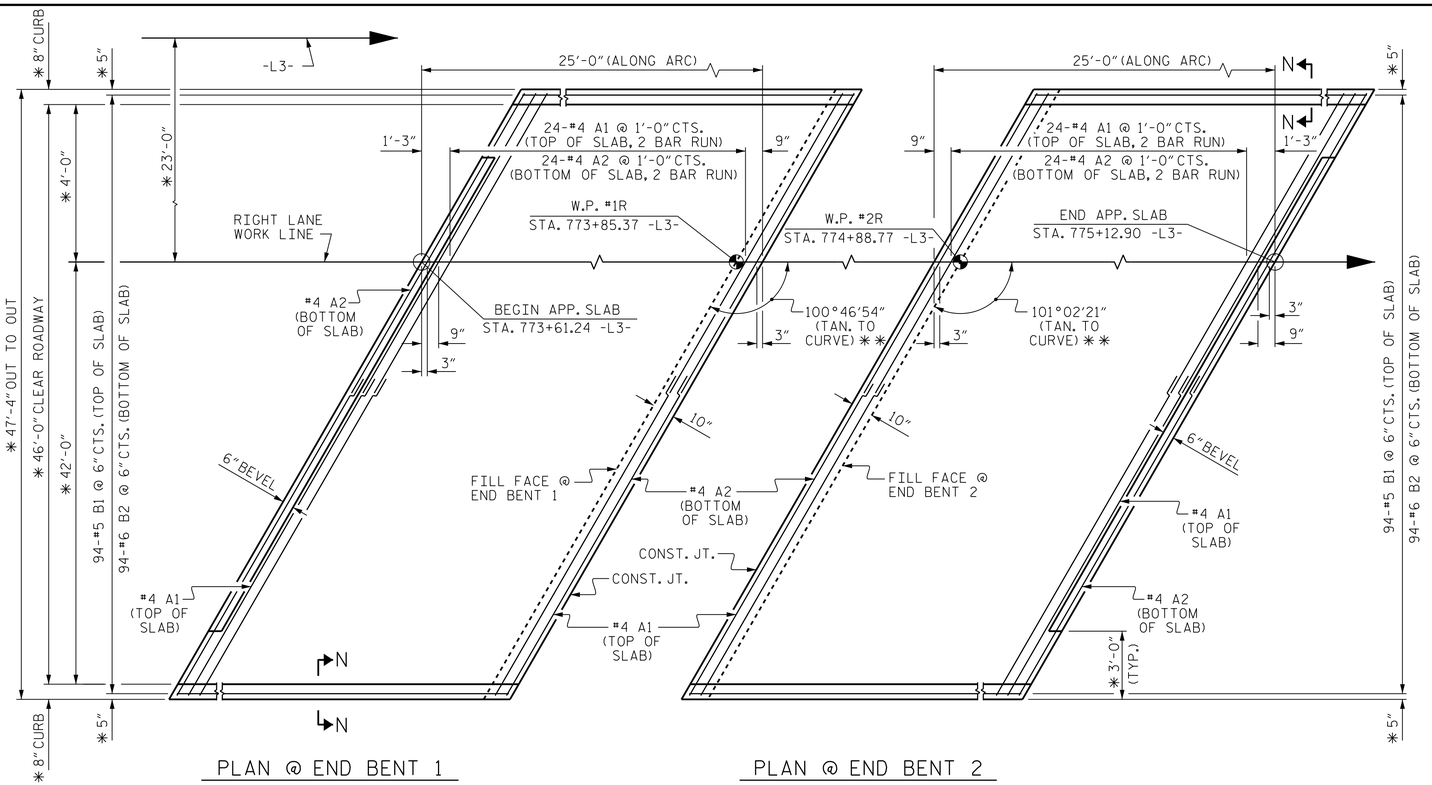
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-26
1			3			TOTAL SHEETS
2			4			28

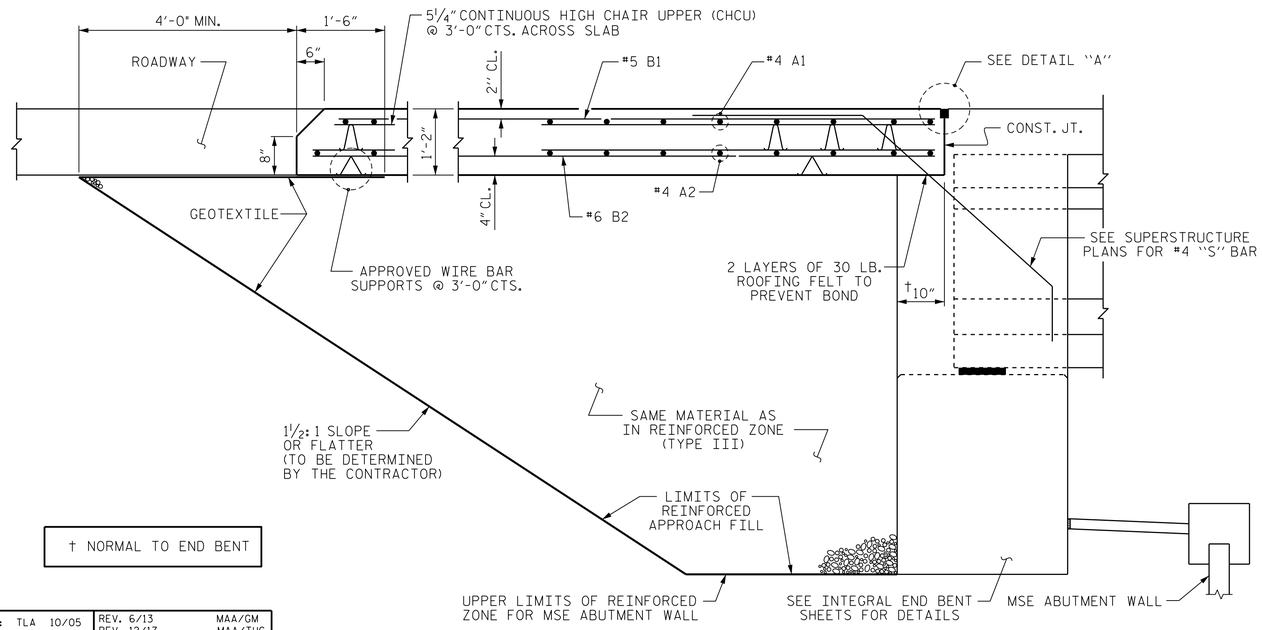
STR. #2

4/22/2020
402.051.R2233BB_SMU_SP1_B00661.DGN



PLAN @ END BENT 1 PLAN @ END BENT 2

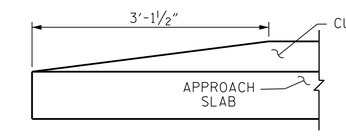
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* RADIAL DIMENSION
** 100°54'37" (TO LONG CHORD) SEE "LONG CHORD LAYOUT" SHEET FOR ADDITIONAL INFORMATION



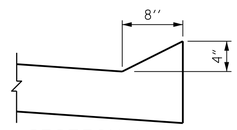
† NORMAL TO END BENT

SECTION THRU SLAB

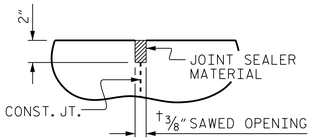
(TYPE III - REINFORCED APPROACH FILL)



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N



DETAIL "A"

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKWALL MATERIAL, SEE ROADWAY PLANS.

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

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

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

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.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	24'-11"	866
A2	52	#4	STR	24'-9"	860
* B1	94	#5	STR	24'-2"	2369
B2	94	#6	STR	24'-6"	3459
REINFORCING STEEL				LBS.	4319
* EPOXY COATED REINFORCING STEEL				LBS.	3235
CLASS AA CONCRETE				C.Y.	51.1

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 1 OF 2

DRAWN BY : TLA 10/05	REV. 6/13	MAA/GM
CHECKED BY : GM 5/06	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC
DESIGNED BY: CCC/K. WHITE	DATE : AUG 2019	
DRAWN BY: K. WHITE	DATE : AUG 2019	
CHECKED BY: J. BORUTA	DATE : AUG 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

4/22/2020
402.053.R2233BB.SMU.ASI.B00661.DGN

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 4/22/2020

DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

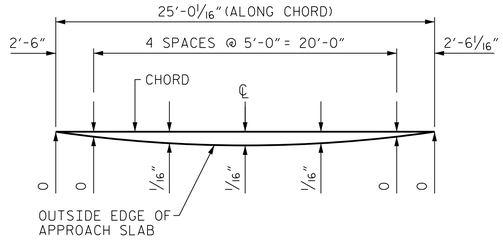
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

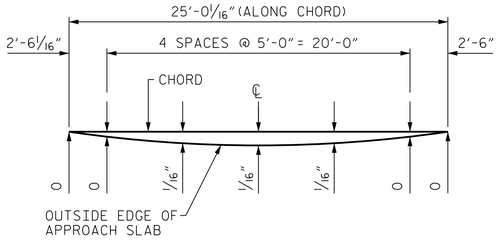
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-27
1			3			TOTAL SHEETS
2			4			28

STR. #2 STD. NO. BAS5 1b



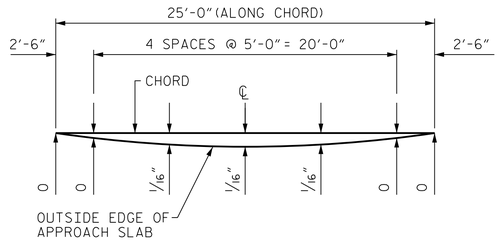
ARC OFFSETS - LEFT SIDE

@ END BENT #1



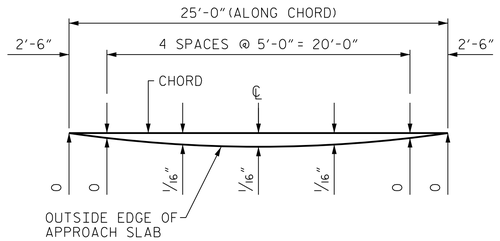
ARC OFFSETS - LEFT SIDE

@ END BENT #2



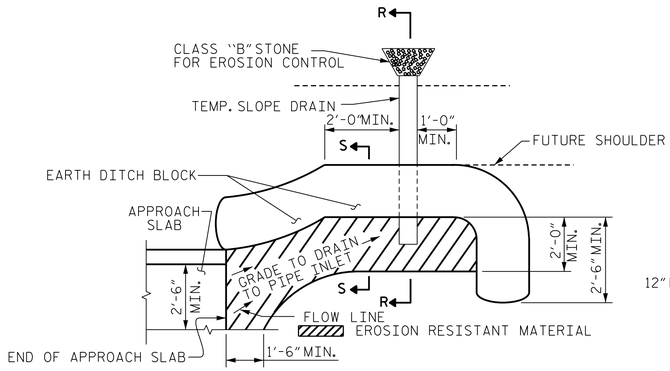
ARC OFFSETS - RIGHT SIDE

@ END BENT #1



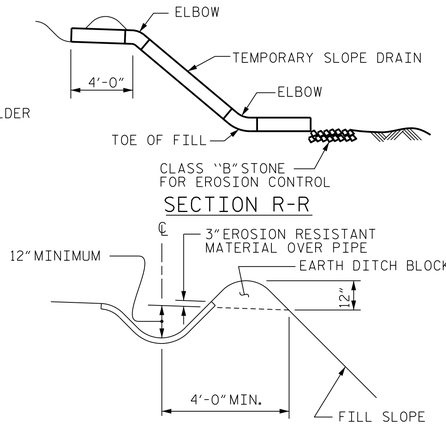
ARC OFFSETS - RIGHT SIDE

@ END BENT #2



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.

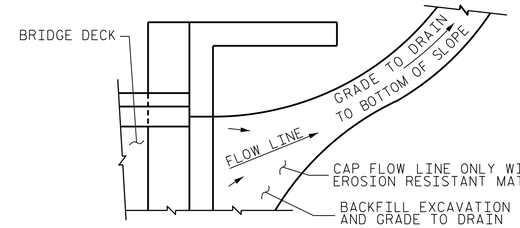
PLAN VIEW



SECTION 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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 774+41.49 -L3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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

STR. #2 STD. NO. BAS5 1b

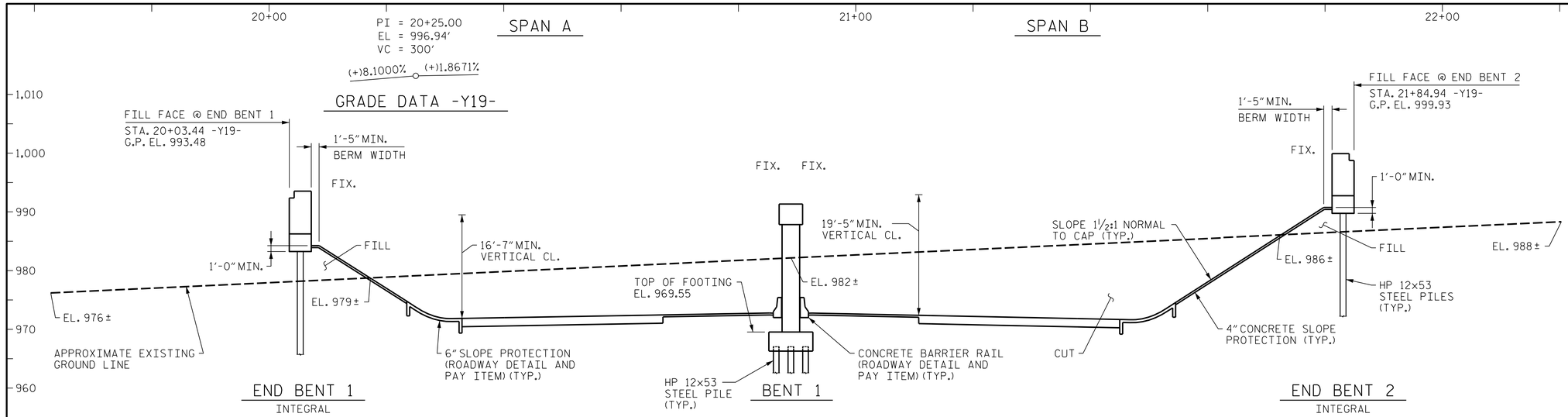
DESIGNED BY:	CCC/K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

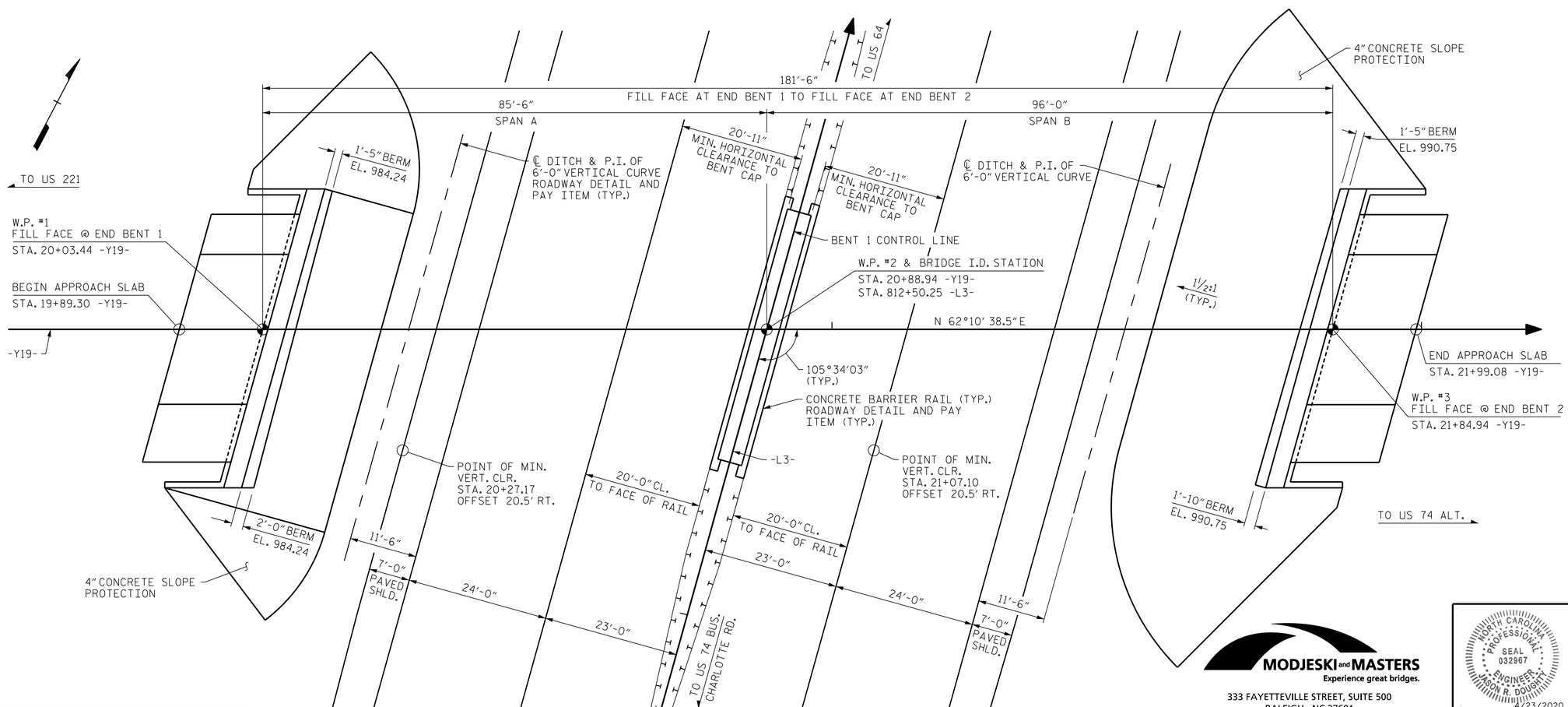
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
402.055_R2233BB_SMU_AS2_800661.DGN



SECTION ALONG SURVEY LINE -Y19-

SECTIONS AT END BENTS AND BENT ARE AT RIGHT ANGLES



PLAN

PILES, FOOTINGS AND COLUMNS NOT SHOWN FOR CLARITY

DESIGNED BY:	B. LOFLIN	DATE :	AUG 2019
DRAWN BY:	K. WHITE	DATE :	AUG 2019
CHECKED BY:	J. DOUGHTY	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403.001.R2233BB_SMU_GD1_800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-
812+50.25 -L3-
SHEET 1 OF 3 BRIDGE NO. 662

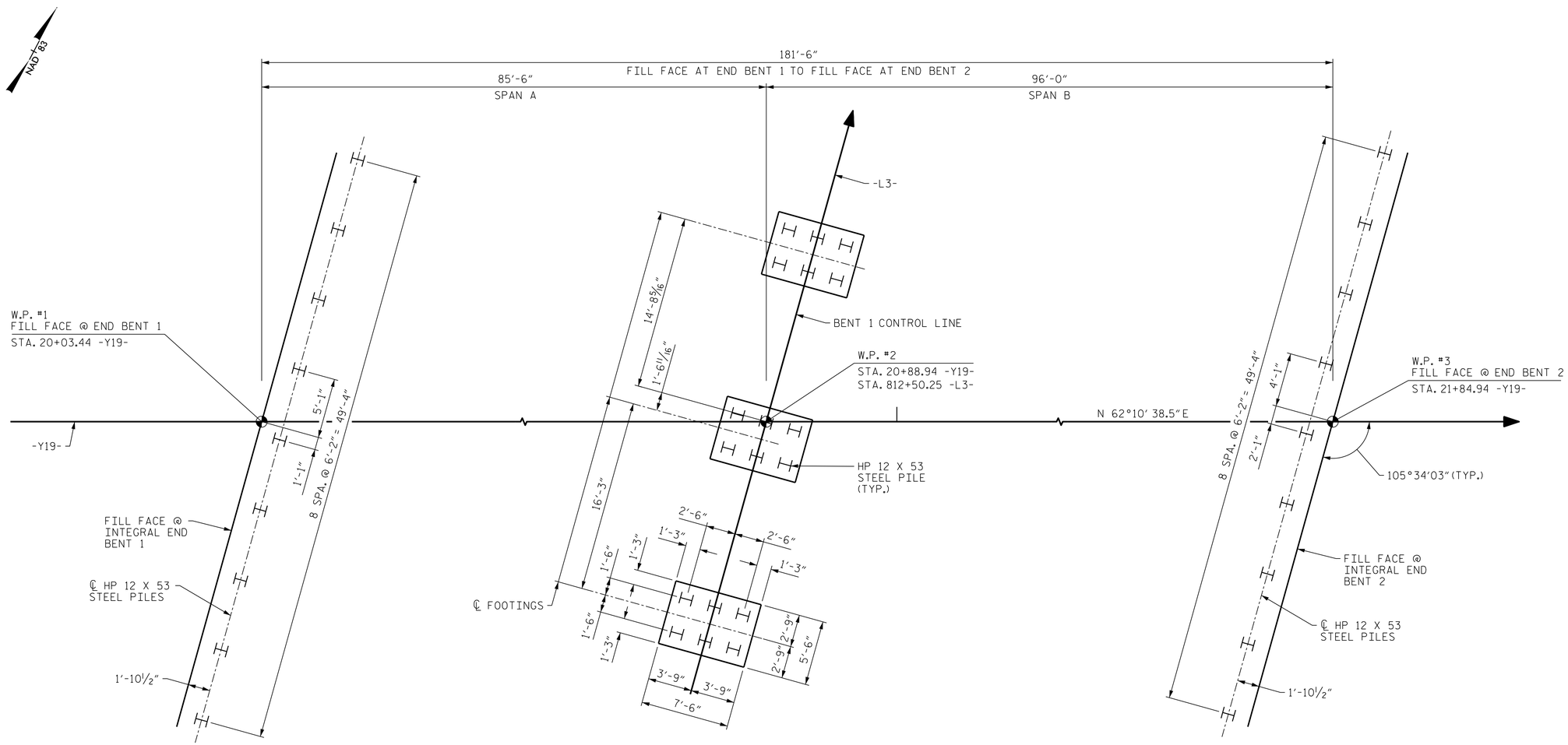
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON GREEN ST. OVER US 221 RUTHERFORDTON BYPASS BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-1
1			3			TOTAL SHEETS
2			4			34

STR. #3



INTEGRAL END BENT 1

BENT 1

DIMENSIONS AND PILE LAYOUT
ARE TYPICAL FOR EACH FOOTING.

INTEGRAL END BENT 2

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE TO THE PILE ℄ AT THE BOTTOM OF CAP OR FOOTING)

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 108 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 180 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 116 TONS PER PILE.

DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 193 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 116 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 193 TONS PER PILE.

DESIGNED BY:	J. BORUTA	DATE : JUNE 2019
DRAWN BY:	K. WHITE	DATE : JUNE 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

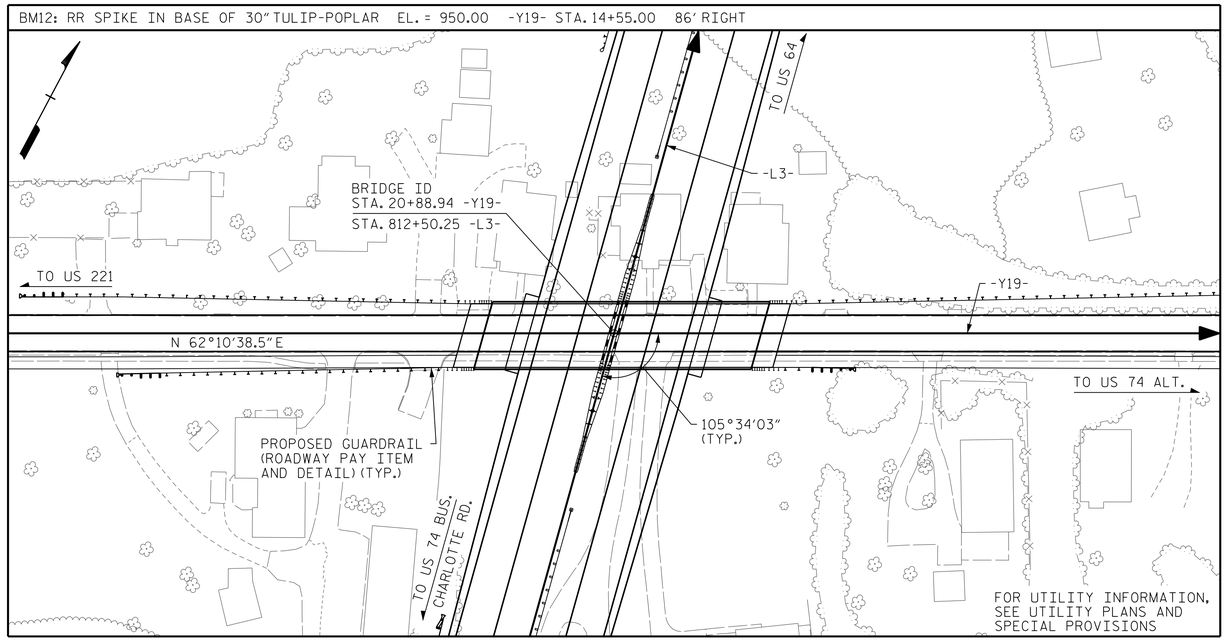
GENERAL DRAWING

FOR BRIDGE ON GREEN ST. OVER US 221 RUTHERFORDTON BYPASS BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-2
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/22/2020
403.003.R2233BB_SMU.G02.800662.dgn



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

WORK SHALL NOT BE STARTED ON BENT 1 UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT NO. 1 AT STA. 20+88.94 -Y19-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 20+88.94 -Y19-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SET UP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		THREE BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	LUMP SUM	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EACH	NO.	LIN. FT.	LIN. FT.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE		8,015	5,194		LUMP SUM			10	891.41				343.92		LUMP SUM
END BENT 1				42.8		5,110				9	9	630		212	
BENT 1	LUMP SUM			58.2		9,190	1,224			18	18	990			
END BENT 2				42.3		5,318				9	9	675		377	
TOTAL	LUMP SUM	8,015	5,194	143.3	LUMP SUM	19,618	1,224	10	891.41	36	36	2,295	343.92	589	LUMP SUM

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON GREEN ST. OVER US 221 RUTHERFORDTON BYPASS BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-3
1			3			TOTAL SHEETS
2			4			34

STR. #3

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	B. LOFLIN	DATE :	SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403_005_R2233BB_SMU_GD3_800662.dgn

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III 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	1.33	--	1.75	0.750	1.75	B	I	46.5	0.974	1.35	B	I	74.8	0.80	0.750	1.33	B	I	46.5	
		HL-93 (OPERATING)	N/A		1.79	--	1.35	0.750	2.27	B	I	46.5	0.974	1.79	B	I	74.8	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.78	64.08	1.75	0.750	2.42	B	I	46.5	0.974	1.78	B	I	74.8	0.80	0.750	1.83	B	I	46.5	
		HS-20 (OPERATING)	36.000		2.35	84.60	1.35	0.750	3.13	B	I	46.5	0.974	2.35	B	I	74.8	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.34	58.59	1.40	0.750	7.15	B	I	46.5	0.974	5.69	B	I	74.8	0.80	0.750	4.34	B	I	46.5	
		SNGARBS2	20.000		3.14	62.80	1.40	0.750	5.18	B	I	46.5	0.974	3.97	B	I	74.8	0.80	0.750	3.14	B	I	46.5	
		SNAGRIS2	22.000		2.93	64.46	1.40	0.750	4.83	B	I	46.5	0.974	3.66	B	I	74.8	0.80	0.750	2.93	B	I	46.5	
		SNCOTTS3	27.250		2.14	58.32	1.40	0.750	3.53	B	I	46.5	0.974	2.76	B	I	74.8	0.80	0.750	2.14	B	I	46.5	
		SNAGGRS4	34.925		1.76	61.47	1.40	0.750	2.90	B	I	46.5	0.974	2.24	B	I	74.8	0.80	0.750	1.76	B	I	46.5	
		SNS5A	35.550		1.73	61.50	1.40	0.750	2.84	B	I	46.5	0.974	2.26	B	I	74.8	0.80	0.750	1.73	B	I	46.5	
		SNS6A	39.950		1.57	62.72	1.40	0.750	2.59	B	I	46.5	0.974	2.04	B	I	74.8	0.80	0.750	1.57	B	I	46.5	
		SNS7B	42.000		1.49	62.58	1.40	0.750	2.46	B	I	46.5	0.974	2.00	B	I	74.8	0.80	0.750	1.49	B	I	46.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.91	63.03	1.40	0.750	3.15	B	I	46.5	0.974	2.47	B	I	74.8	0.80	0.750	1.91	B	I	46.5	
		TNT4A	33.075		1.92	63.50	1.40	0.750	3.16	B	I	46.5	0.974	2.41	B	I	74.8	0.80	0.750	1.92	B	I	46.5	
		TNT6A	41.600		1.55	64.48	1.40	0.750	2.56	B	I	46.5	0.974	2.12	B	I	74.8	0.80	0.750	1.55	B	I	46.5	
		TNT7A	42.000		1.56	65.52	1.40	0.750	2.56	B	I	46.5	0.974	2.07	B	I	74.8	0.80	0.750	1.56	B	I	46.5	
		TNT7B	42.000		1.59	66.78	1.40	0.750	2.62	B	I	46.5	0.974	1.95	B	I	74.8	0.80	0.750	1.59	B	I	46.5	
		TNAGRIT4	43.000		1.53	65.79	1.40	0.750	2.52	B	I	46.5	0.974	1.89	B	I	74.8	0.80	0.750	1.53	B	I	46.5	
		TNAGT5A	45.000		1.45	65.25	1.40	0.750	2.38	B	I	46.5	0.974	1.86	B	I	74.8	0.80	0.750	1.45	B	I	46.5	
		TNAGT5B	45.000	3	1.43	64.35	1.40	0.750	2.36	B	I	46.5	0.974	1.79	B	I	74.8	0.80	0.750	1.43	B	I	46.5	

LOAD FACTORS:

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

NOTES:

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

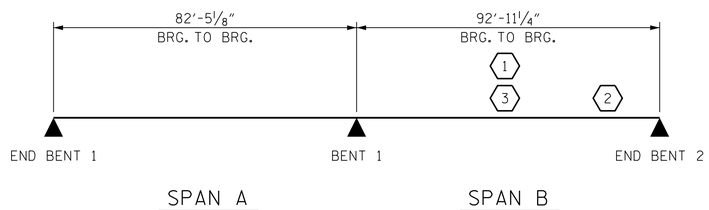
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

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



LRFR SUMMARY

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-4
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. LRFR1

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

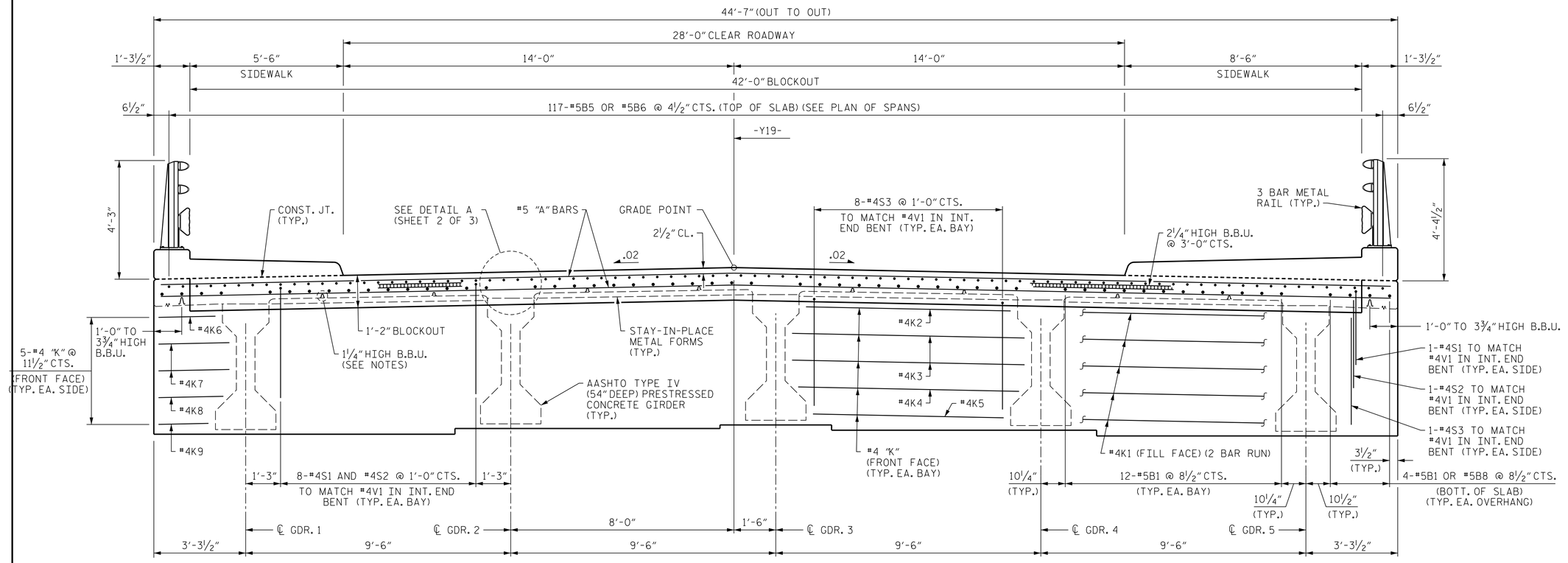
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	B. LOFLIN	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

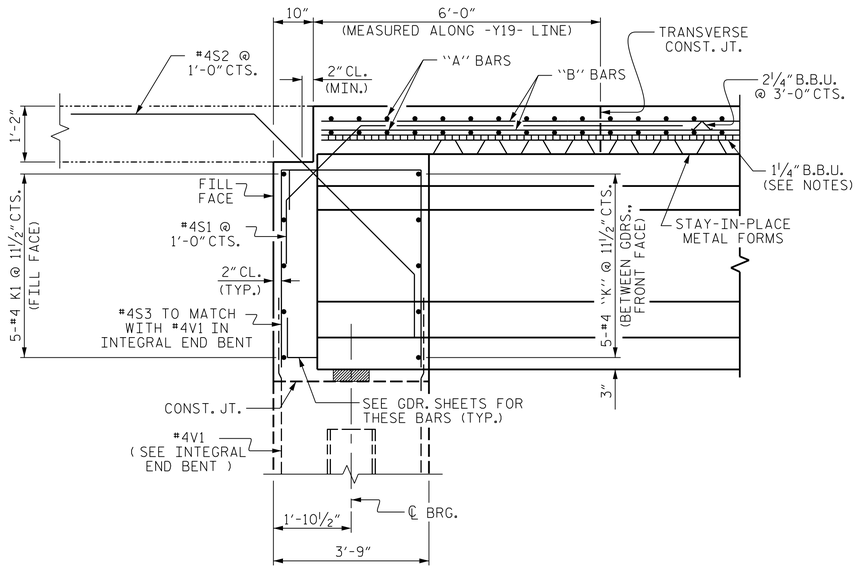
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR	MAA/GM
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC

4/22/2020
403.007.R2233BB.SWU.G04.800662.dgn



TYPICAL SECTION AT INTEGRAL END BENT



SECTION THRU INTEGRAL END BENT

NOTES:

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

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

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

DESIGNED BY:	C. CORMAN	DATE :	APR 2019		
DRAWN BY:	K. WHITE	DATE :	APR 2019		
CHECKED BY:	J. BORUTA	DATE :	AUG 2019		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019		

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

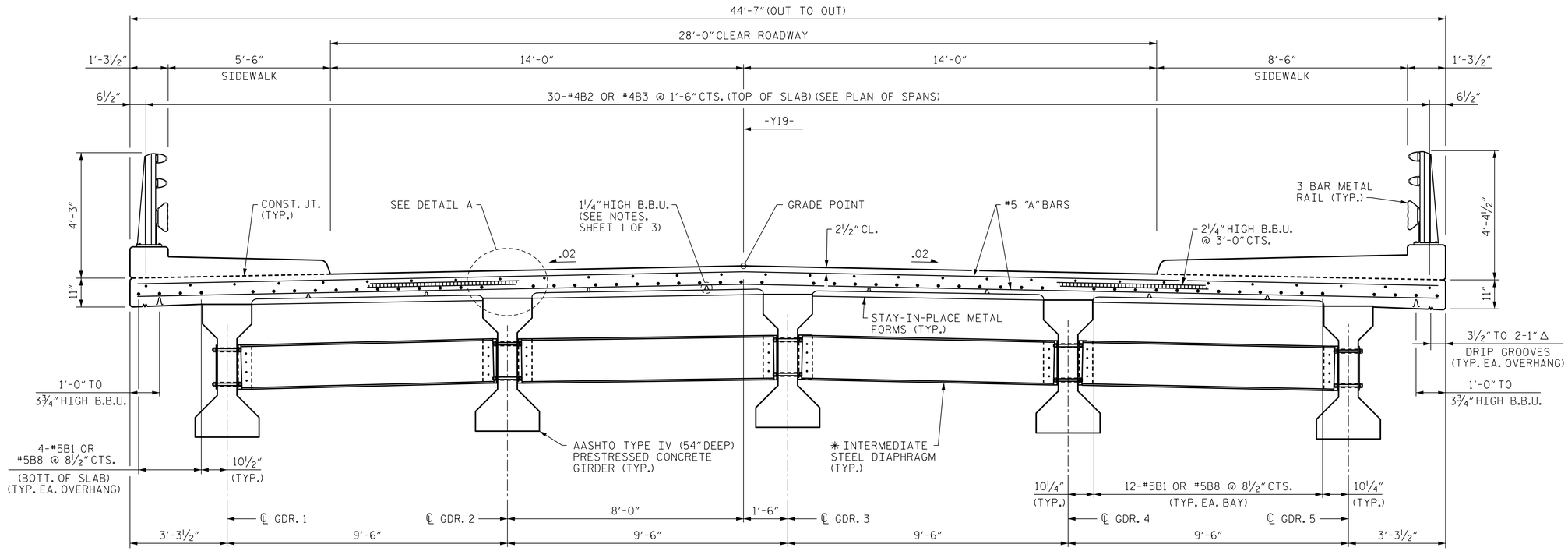
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-5
1			3			TOTAL SHEETS
2			4			34

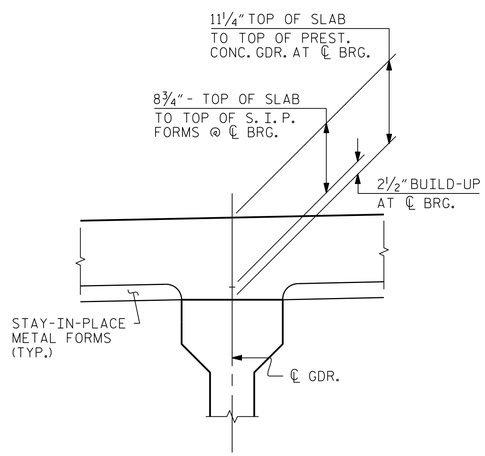
STR. #3

4/22/2020
403_009_R2233BB_SMU_TYP1_800662.dgn



TYPICAL SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL A

DESIGNED BY:	C. CORMAN	DATE :	APR 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403.011.R2233BB.SMU_TYP2_800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

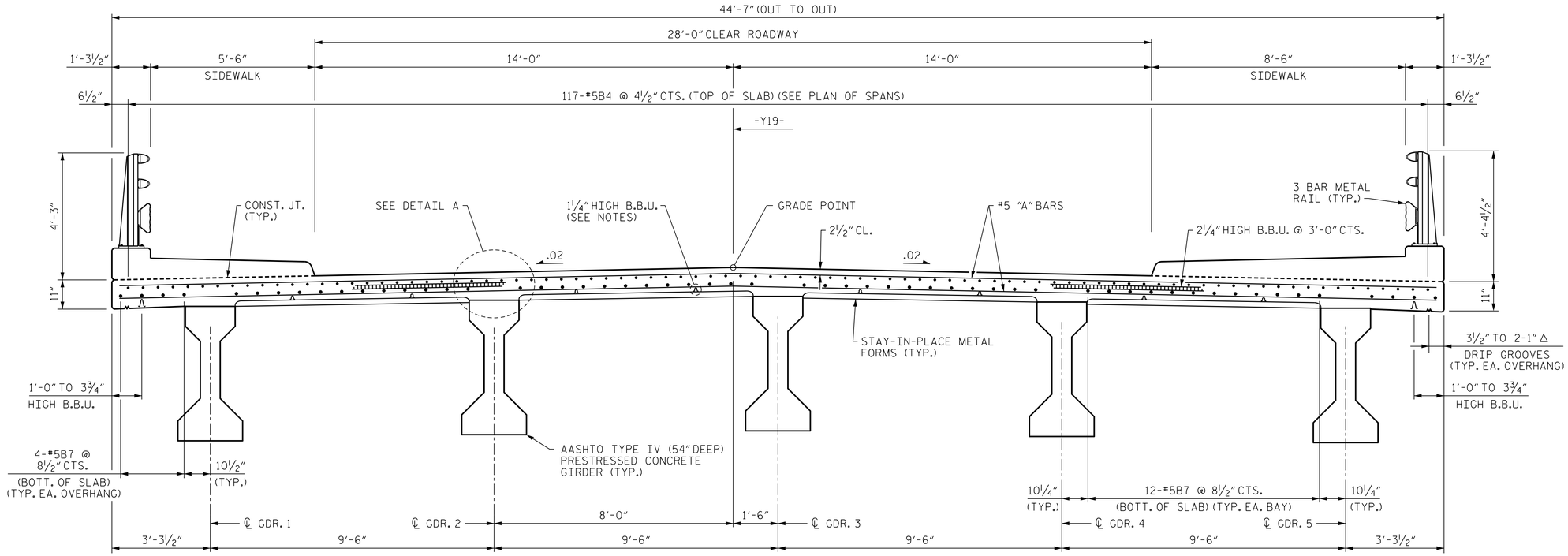
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-
SHEET 2 OF 3

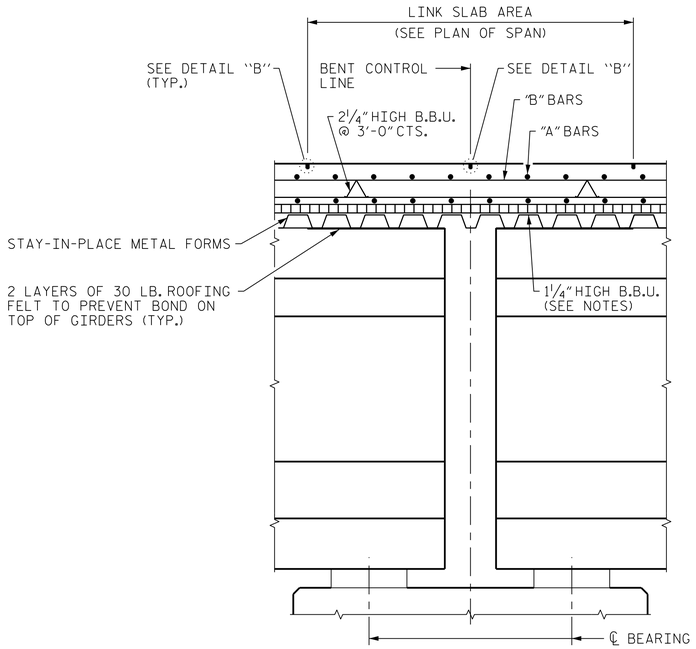
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-6
1			3			TOTAL SHEETS
2			4			34

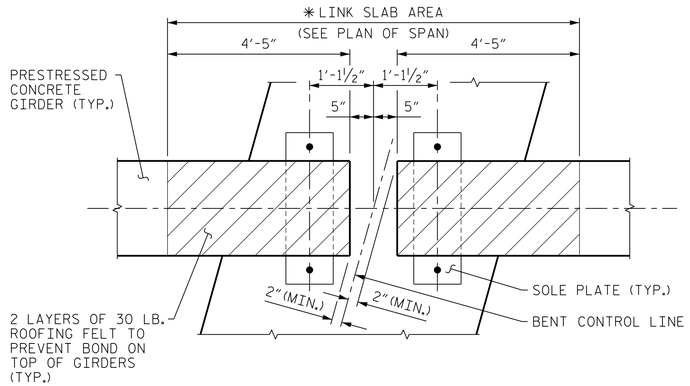
STR. #3



TYPICAL SECTION AT LINK SLAB

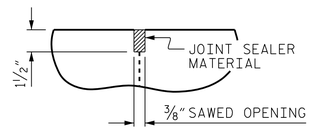


SECTION THROUGH BENT



PLAN AT BENT 1

* NO WELDING OF FORMS TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA.



DETAIL "B"

A 1½" DEEP CONTRACTION JOINT SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-7
1			3			TOTAL SHEETS
2			4			34

STR. #3

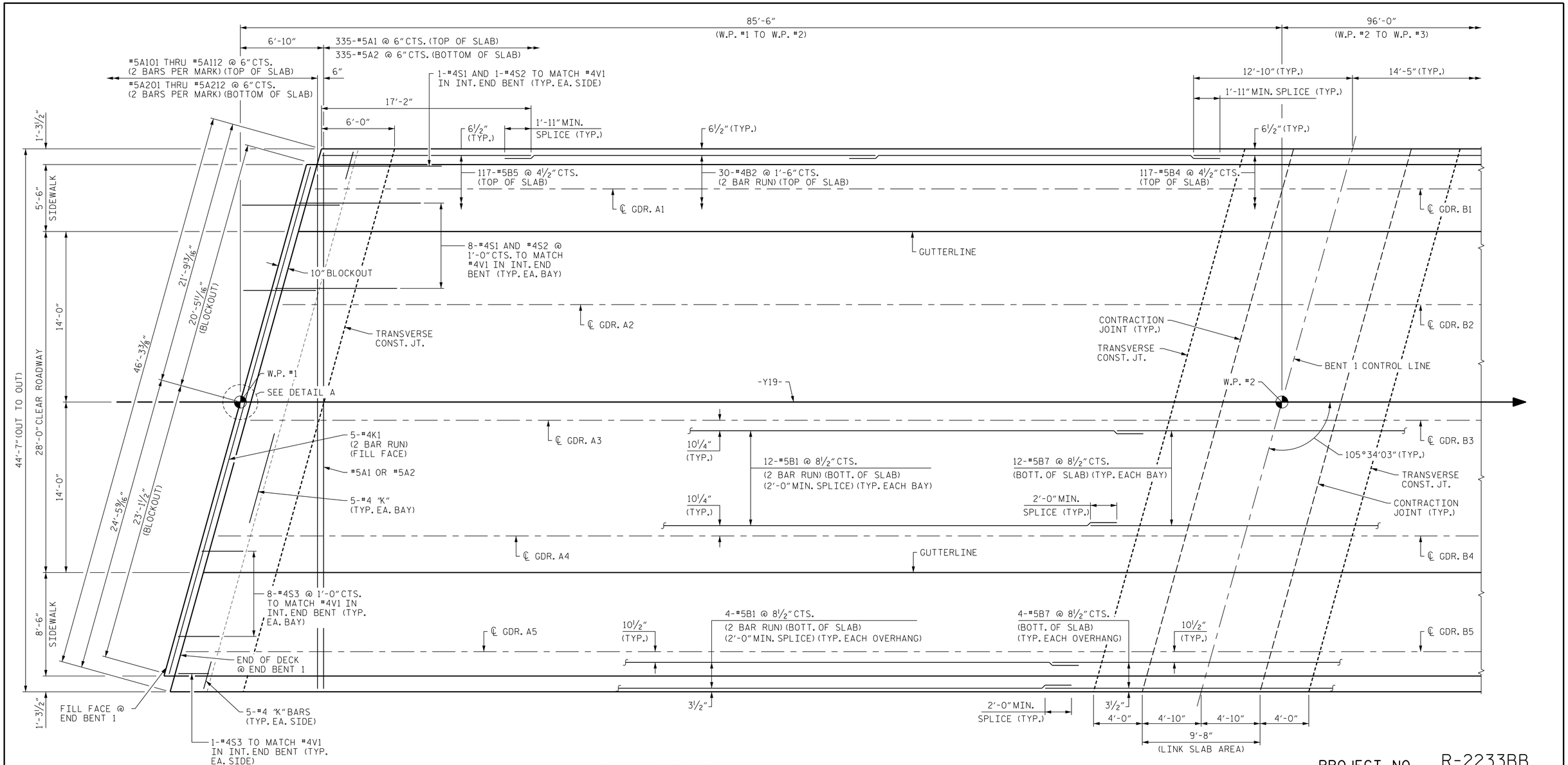
DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : MAR 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

4/23/2020
403_013_R2233BB_SMU_TYP3_800662.dgn

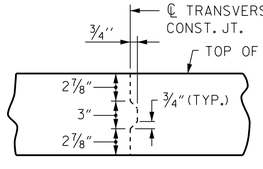
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

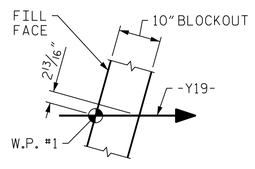


PLAN OF SPAN A



TRANSVERSE CONSTRUCTION JOINT

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



DETAIL A

NOTES:

FOR LAP LENGTHS NOT SHOWN, SEE "SUPERSTRUCTURE BILL OF MATERIALS" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

DESIGNED BY:	C. CORMAN	DATE :	APR 2019
DRAWN BY:	K. WHITE	DATE :	APR 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

SHEET 1 OF 2

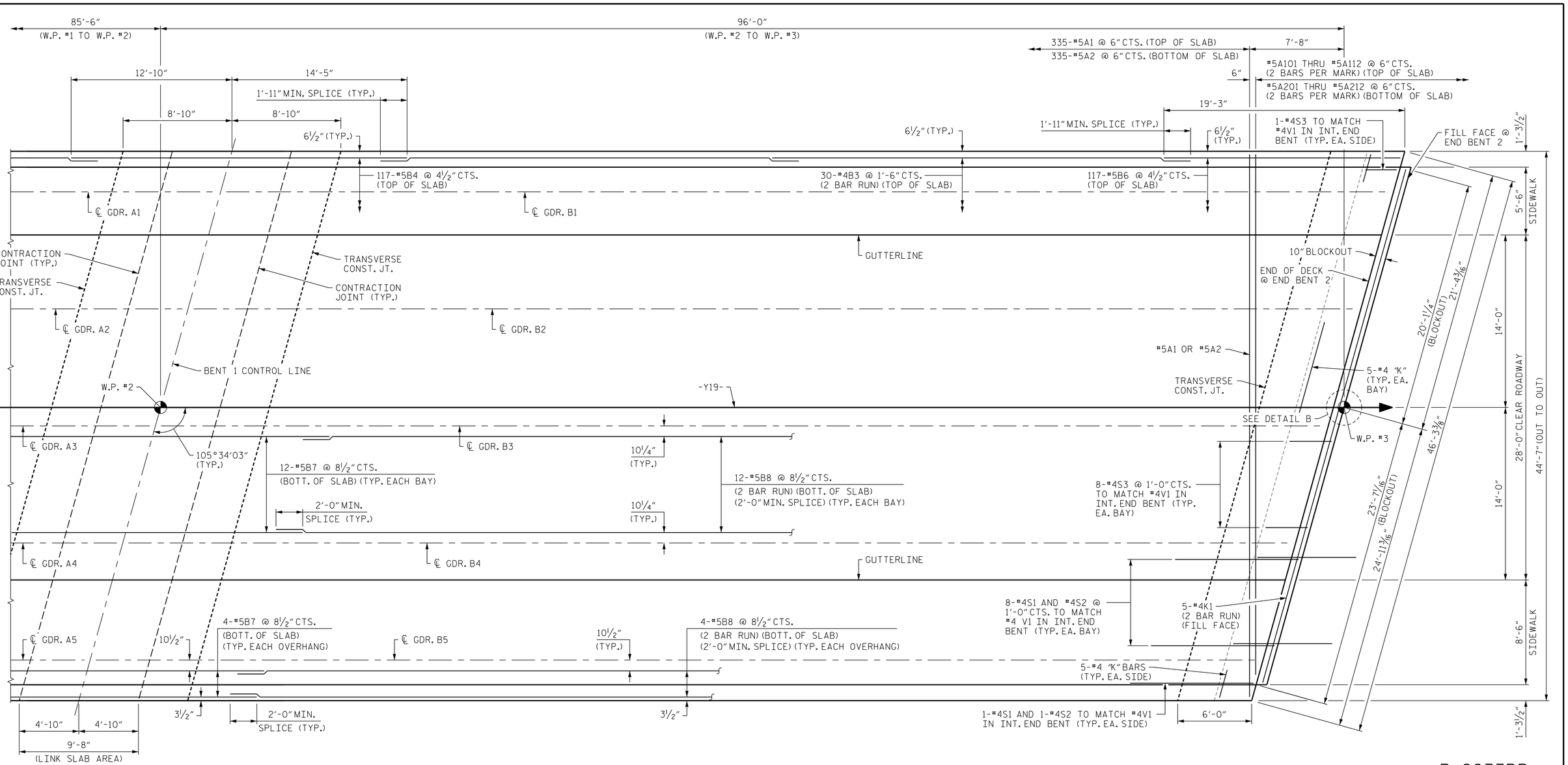
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN A

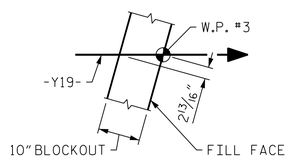
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-8
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/23/2020
403.015.R2233BB.SMU_PSA_800662.dgn



PLAN OF SPAN B



DETAIL B

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN B

DESIGNED BY:	C. CORMAN	DATE : APR 2019
DRAWN BY:	K. WHITE	DATE : APR 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

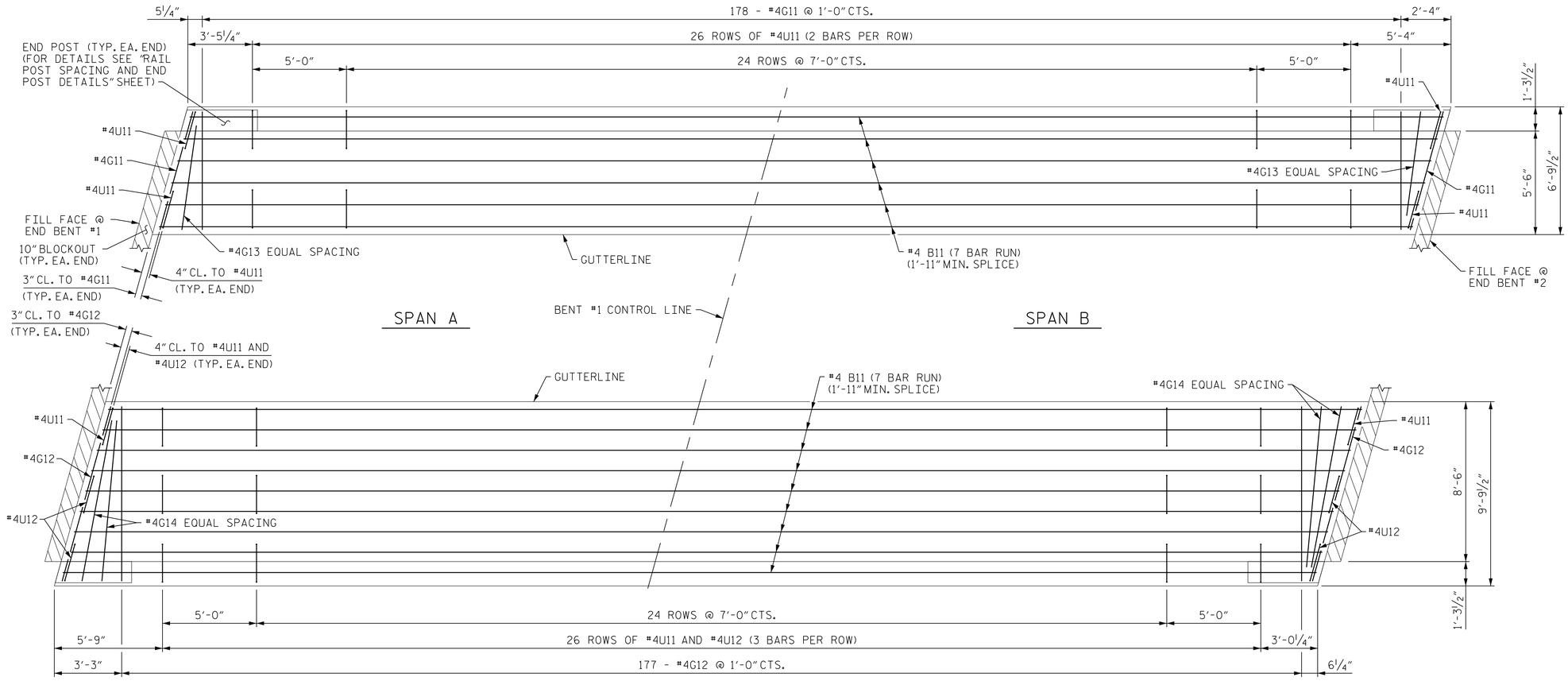
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

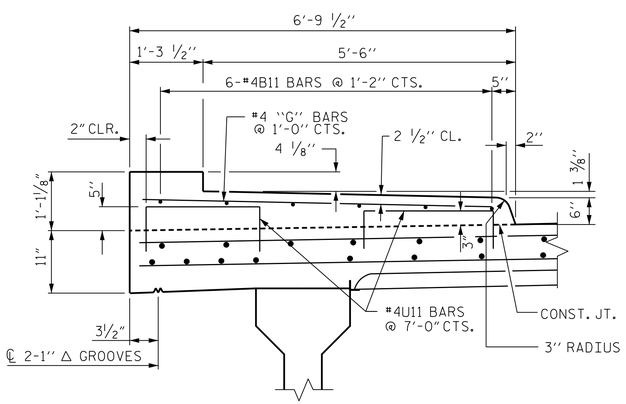
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-9
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/23/2020
403.017.R2233BB.SMU.PSB.800662.dgn

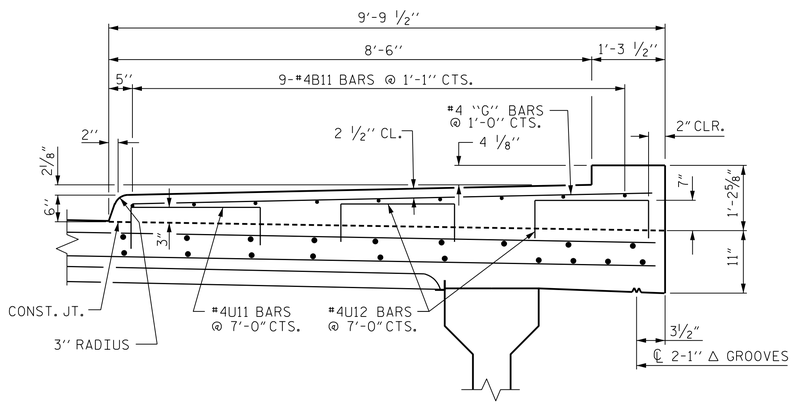


PLAN OF SIDEWALKS



SECTION THRU LEFT SIDEWALK

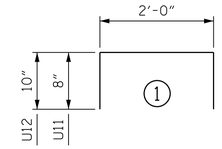
(METAL RAIL NOT SHOWN)



SECTION THRU RIGHT SIDEWALK

(METAL RAIL NOT SHOWN)

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B11	105	4	STR	27'-4"	1917
G11	180	4	STR	6'-2"	742
G12	179	4	STR	9'-2"	1096
G13	2	4	STR	5'-5"	7
G14	4	4	STR	8'-5"	23
U11	84	4	1	3'-4"	187
U12	56	4	1	3'-8"	137

EPOXY COATED REINFORCING STEEL = 4109 LBS.

CLASS AA CONCRETE = 79.2 C.Y.

NOTES:

GROOVED CONTRACTION JOINTS ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. FOR GROOVED CONTRACTION JOINT LAYOUT, SEE "RAIL POST SPACING AND END POST DETAILS" SHEET.

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

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

"U" BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREED OFF.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

DESIGNED BY:	K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	J. BORUTA	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

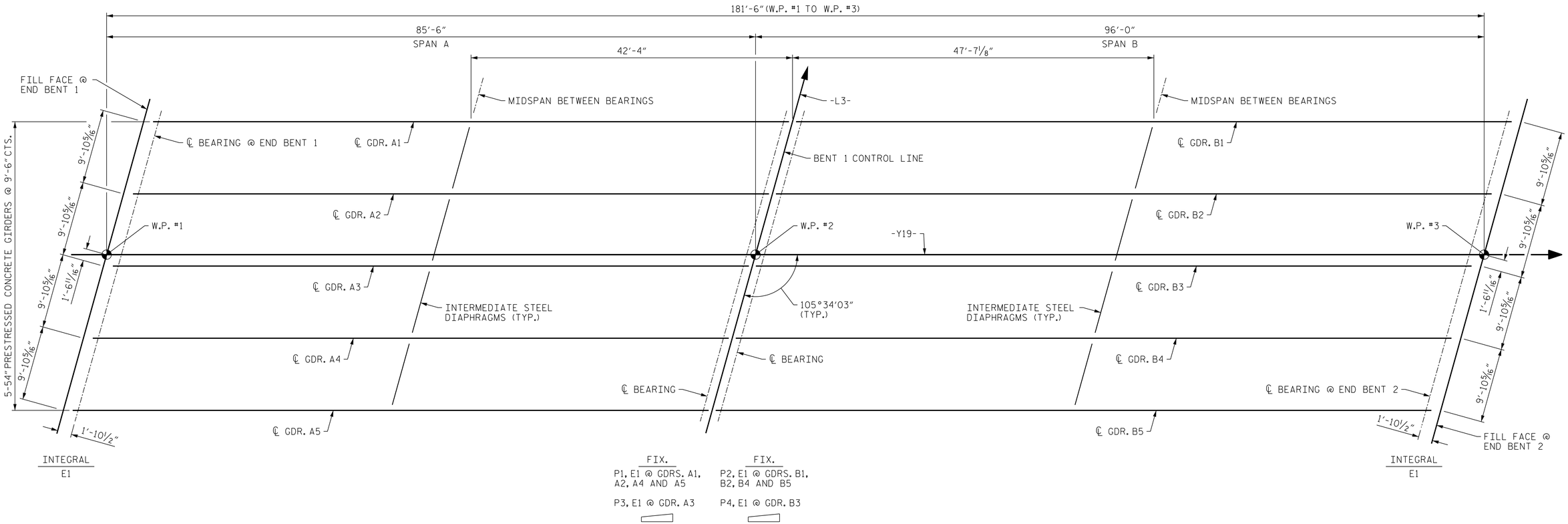
SUPERSTRUCTURE

SIDEWALK DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-10
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/22/2020
403_019_R2233BB_SMU_SW_800662.dgn



FRAMING PLAN

NOTES:

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

END BENTS AND BENT ARE PARALLEL.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-11
1			3			TOTAL SHEETS
2			4			34

STR. #3

DESIGNED BY:	J. BORUTA	DATE : JUNE 2019
DRAWN BY:	K. WHITE	DATE : MAR 2019
CHECKED BY:	B. LOFLIN	DATE : JUNE 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

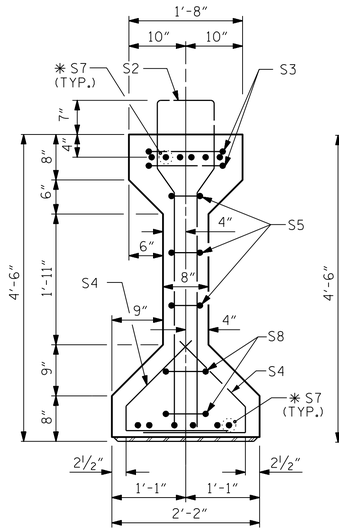
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020

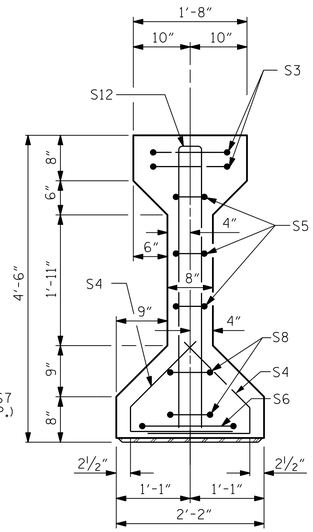
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

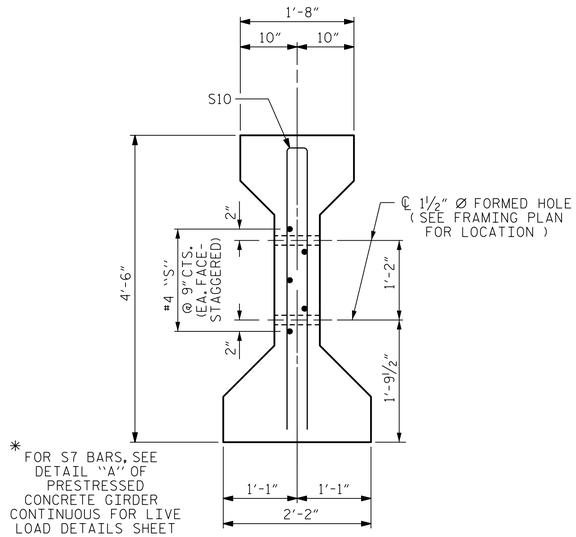
4/22/2020
403.021.R2233BB.SMU.FP.800662.dgn



SECTION A-A

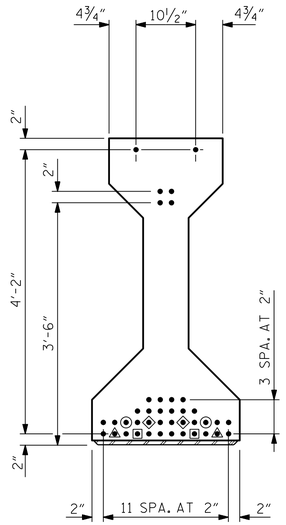


SECTION B-B

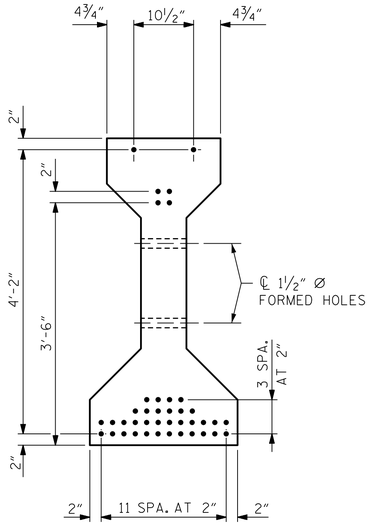


✱ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C
(S1 BARS NOT SHOWN)

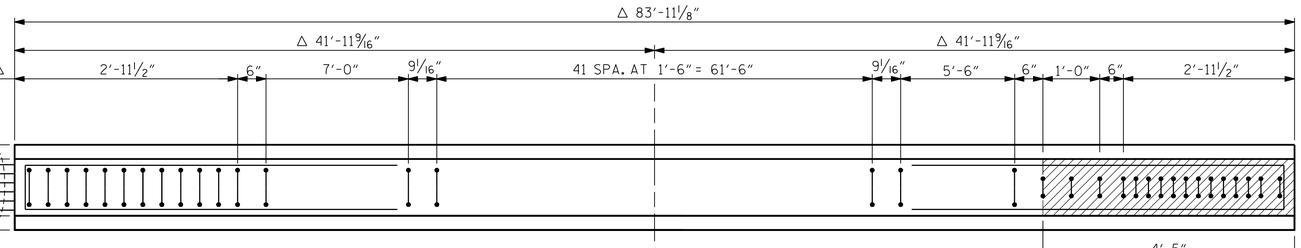


AT END OF GIRDER

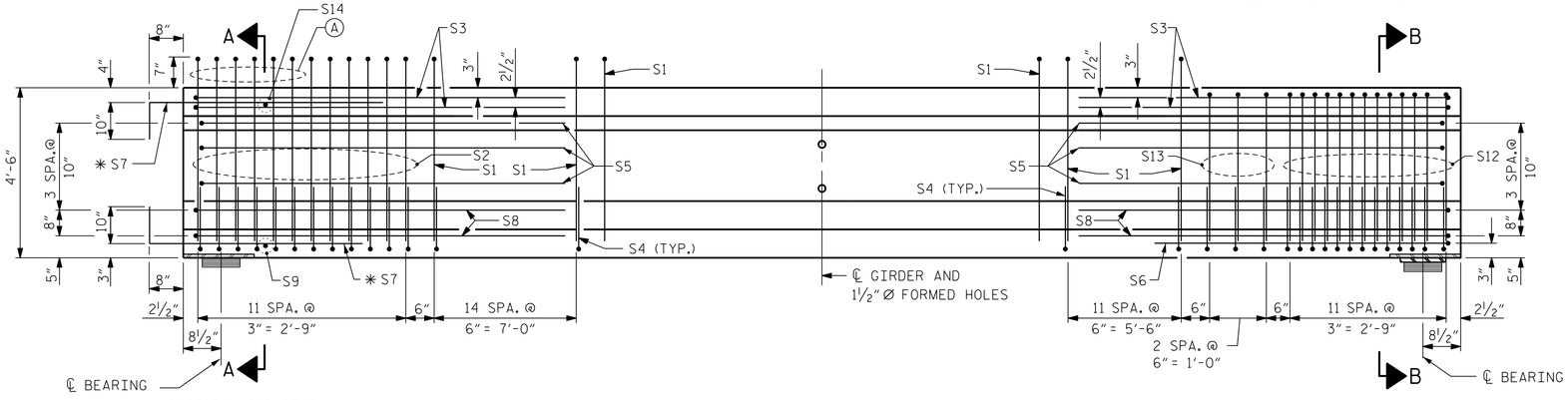


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



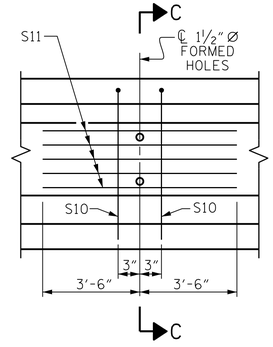
PLAN OF GIRDER



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- △ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER.
- ▣ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.
- ◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER.
- ◈ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER.



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.

0.6" Ø L. R. GRADE 270 STRANDS

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

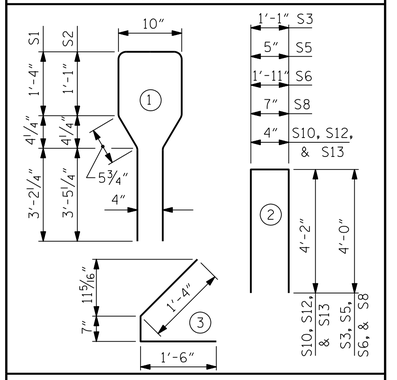
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	69	#4	1	10'-10"	499
S2	12	#6	1	10'-10"	195
S3	4	#4	2	9'-1"	24
S4	108	#4	3	3'-5"	246
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱ S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	12	#6	2	8'-8"	156
S13	3	#4	2	8'-8"	17
S14	1	#3	STR	1'-4"	1

✱ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	7500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
54"PCG GIRDER	1,290	17.0	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	83'-11⅛"	419.64'

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-12
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. PCG6

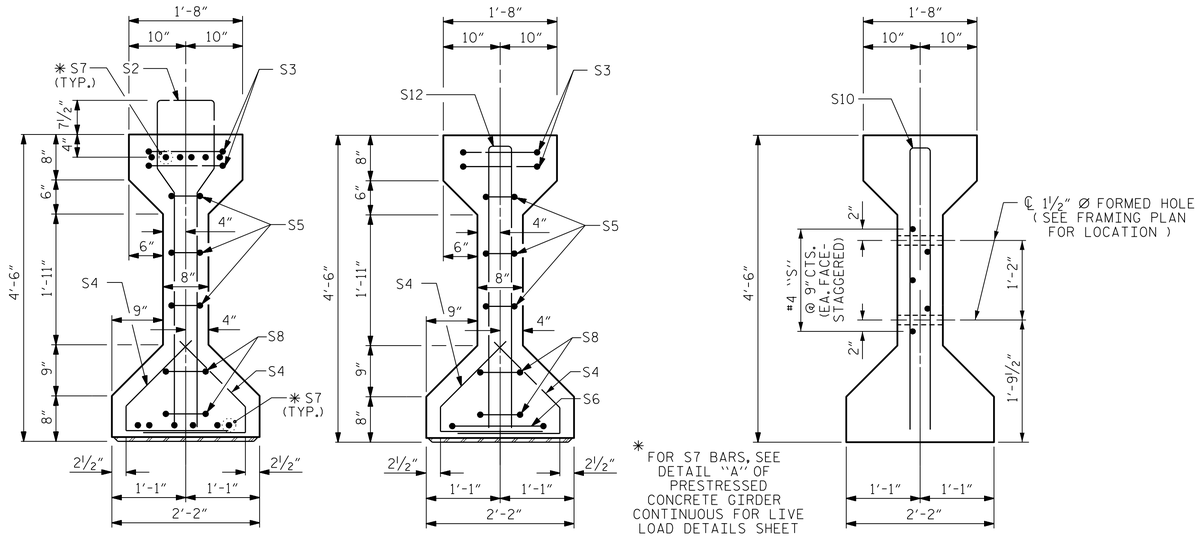
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC
DESIGNED BY: J. BORUTA	DATE : APR 2019	
DRAWN BY: K. WHITE	DATE : MAR 2019	
CHECKED BY: B. LOFLIN	DATE : JUNE 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

△ MEASURED AND SPACED ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH AND END BEVEL (ELEVATION VIEW) DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET.

Ⓐ END BEVEL IS REQUIRED. ROTATE END S2 BAR SUCH THAT IT IS PLACED PARALLEL TO END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT S2 BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

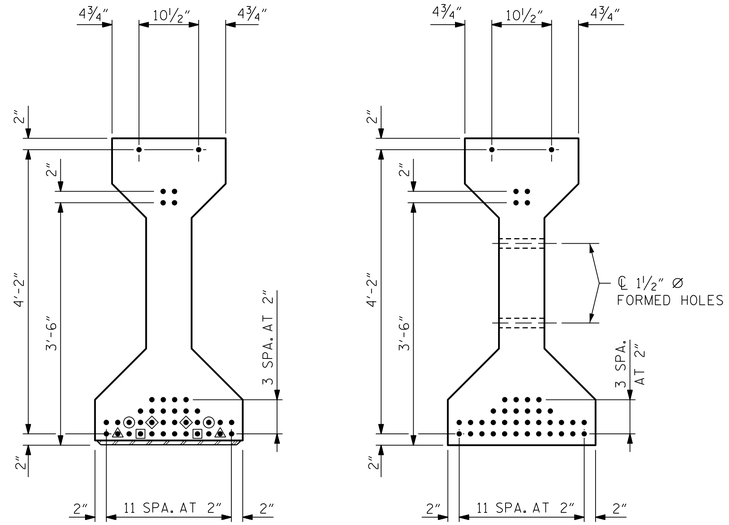


SECTION A-A

SECTION B-B

SECTION C-C

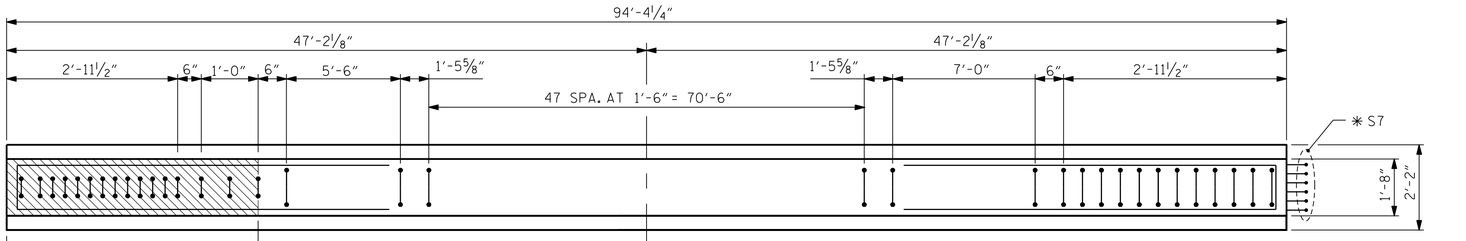
(S1 BARS NOT SHOWN)



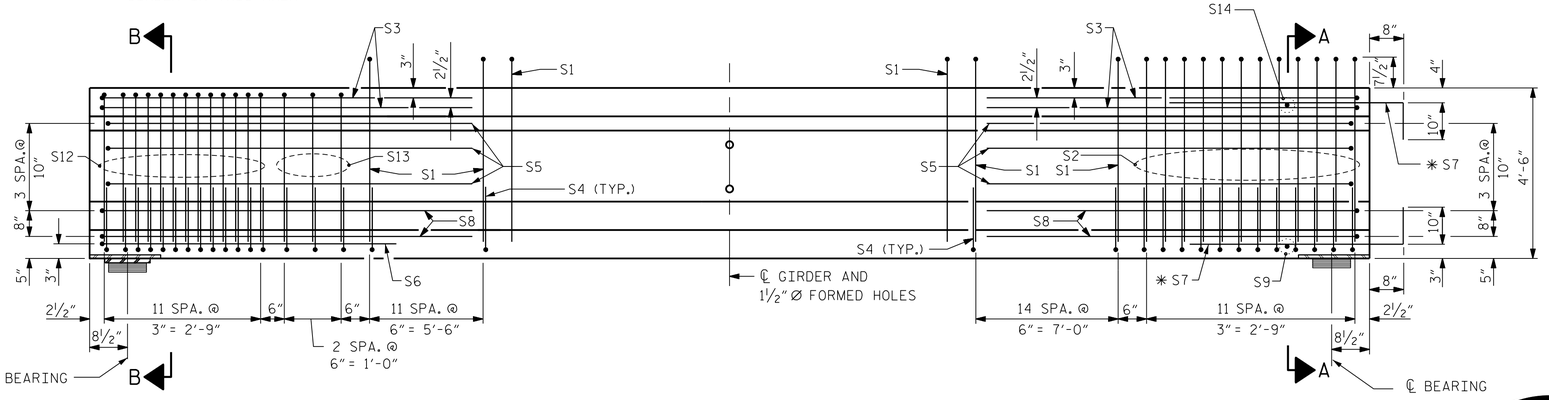
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



FIX (LINK SLAB)

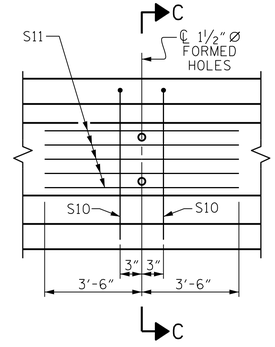
INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- ▲ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER.
- ▣ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.
- ◉ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER.
- ◈ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.

0.6" Ø L. R. GRADE 270 STRANDS

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

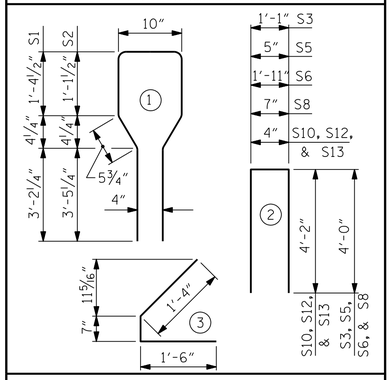
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	75	#4	1	10'-11"	547
S2	12	#6	1	10'-11"	197
S3	4	#4	2	9'-1"	24
S4	108	#4	3	3'-5"	246
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	12	#6	2	8'-8"	156
S13	3	#4	2	8'-8"	17
S14	1	#3	STR	1'-4"	1

✱NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	7500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
54" PCG GIRDER	1,340	19.1	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	94'-4¼"	471.77'

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-13
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. PCG6

DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC
DESIGNED BY: J. BORUTA	DATE : APR 2019	
DRAWN BY: K. WHITE	DATE : MAR 2019	
CHECKED BY: B. LOFLIN	DATE : JUNE 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/22/2020
403_025_R2233BB_SMU_PCGB_800662.dgn

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A											SPAN B										
	GIRDERS 1 & 5											GIRDERS 1 & 5										
TENTH POINTS	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.052	0.098	0.134	0.157	0.165	0.157	0.134	0.098	0.052	0	0	0.057	0.108	0.148	0.174	0.182	0.174	0.148	0.108	0.057	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.025	0.049	0.068	0.080	0.084	0.080	0.068	0.049	0.025	0	0	0.041	0.080	0.111	0.130	0.137	0.130	0.111	0.080	0.041	0
FINAL CAMBER ↑	0	5/16"	5/8"	13/16"	15/16"	1"	15/16"	13/16"	5/8"	5/16"	0	0	3/16"	5/16"	7/16"	1/2"	9/16"	1/2"	7/16"	5/16"	3/16"	0
	GIRDERS 2 - 4											GIRDERS 2 - 4										
TENTH POINTS	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0	0.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.052	0.098	0.134	0.157	0.165	0.157	0.134	0.098	0.052	0	0	0.057	0.108	0.148	0.174	0.182	0.174	0.148	0.108	0.057	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.027	0.054	0.075	0.088	0.093	0.088	0.075	0.054	0.027	0	0	0.045	0.089	0.123	0.144	0.151	0.144	0.123	0.089	0.045	0
FINAL CAMBER ↑	0	5/16"	9/16"	11/16"	13/16"	7/8"	13/16"	11/16"	9/16"	5/16"	0	0	1/8"	1/4"	5/16"	3/8"	3/8"	3/8"	5/16"	1/4"	1/8"	0

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

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

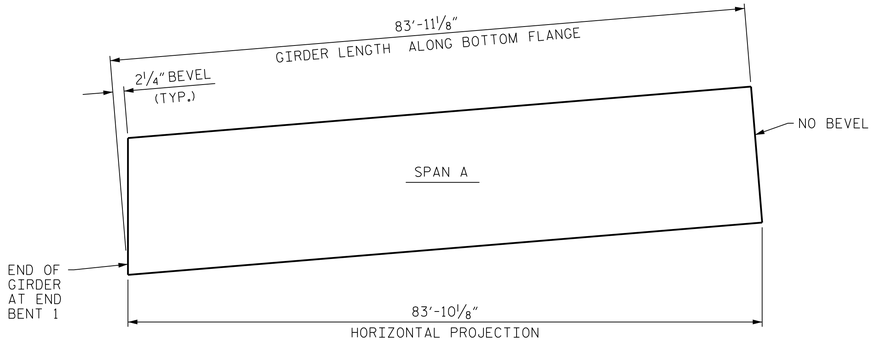
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,400 PSI.

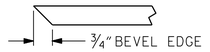
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4" AND AREA SHOWN ON GIRDER SHEETS, SHALL BE RAKED TO A DEPTH OF 1/4".

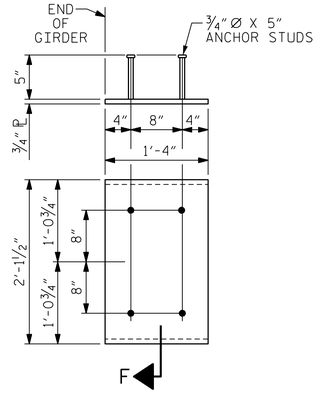
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



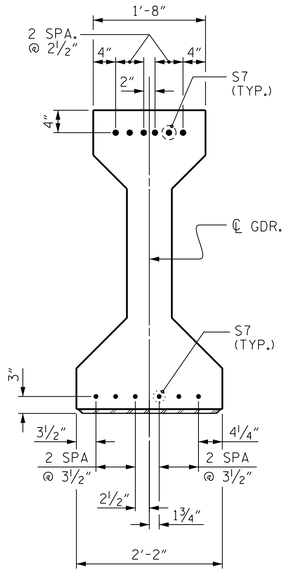
GIRDER LENGTH AND END BEVEL (ELEVATION VIEW)



SECTION "F"
(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE IV GIRDER
(2 REQ'D PER GIRDER)



DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-14
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. PCG9

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

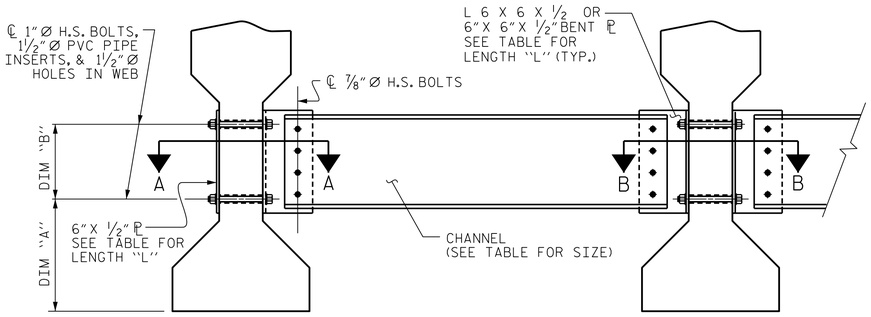
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	APR 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	B. LOFLIN	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

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

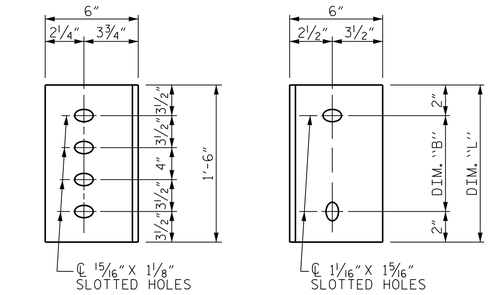
REV.	1/15	MAA/TMG
REV.	2/15	MAA/TMG
REV.	12/17	MAA/THC

4/22/2020
403_027_R2233BB_SMU_CGD_800662.dgn



PART SECTION AT INTERMEDIATE DIAPHRAGM

(EXTERIOR BAY SHOWN)



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

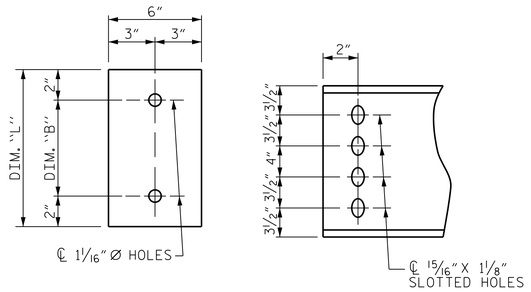


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM F3125 GRADE A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

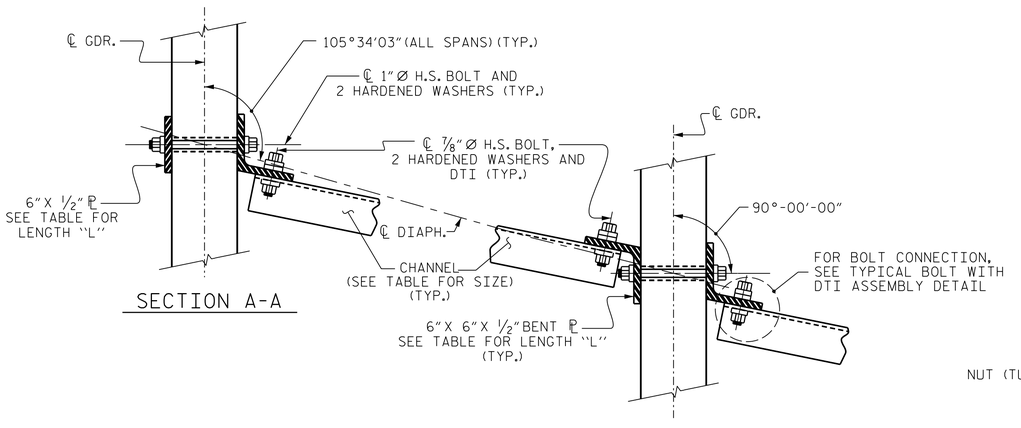
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

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

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

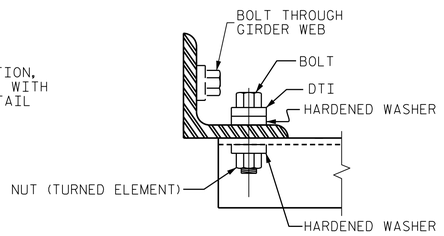
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-15
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. PCG10

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

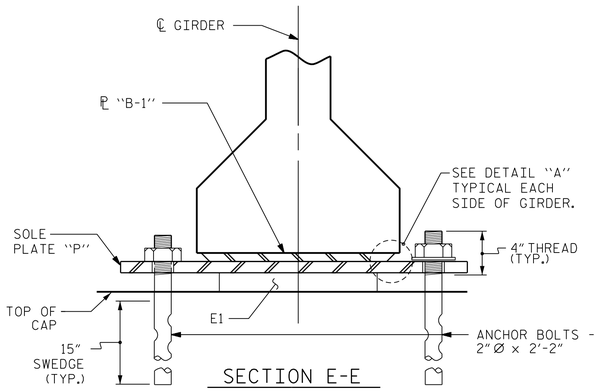
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	JUNE 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	B. LOFLIN	DATE :	JUNE 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

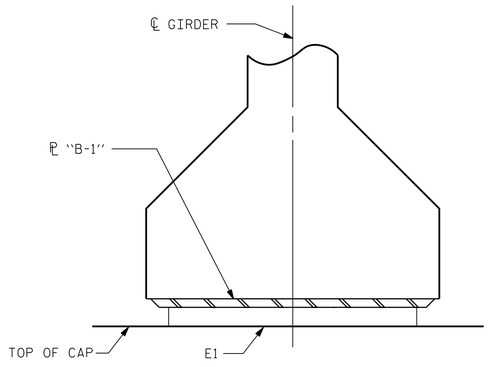
DRAWN BY : TLA 6/05
CHECKED BY : VC 6/05

REV. 5/1/06RRR KMM/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

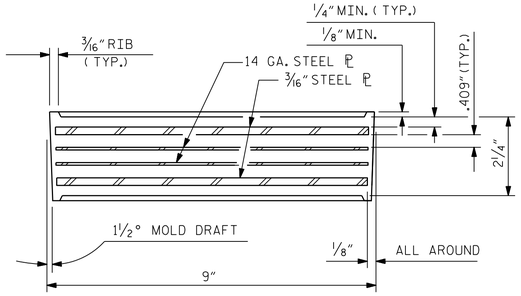
4/22/2020
403.029.R2233BB.SMU.GSD.800662.dgn



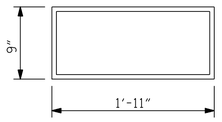
SECTION E-E
AT INTERIOR BENT



SECTION F-F
AT INTEGRAL END BENT



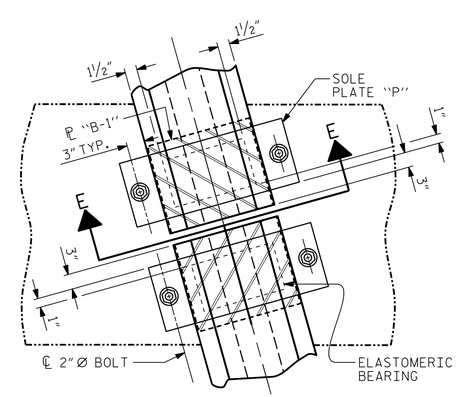
TYPICAL SECTION OF ELASTOMERIC BEARINGS



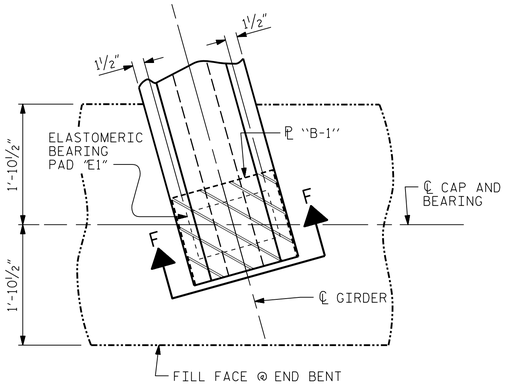
E1 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

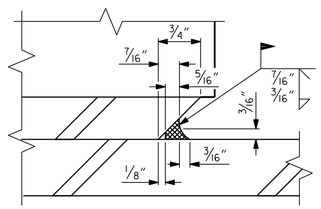
TYPE V



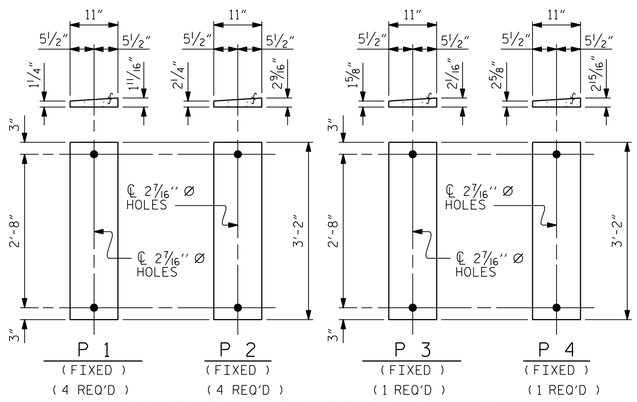
TYPICAL PLAN @ BENT



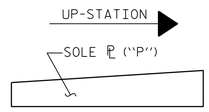
TYPICAL PLAN @ END BENT



DETAIL "A"



SOLE PLATE DETAILS ("P")



SOLE ℄ PLACEMENT DETAIL

NOTES

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L.(NO IMPACT)	
TYPE V	365 k

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

DESIGNED BY:	J. BORUTA	DATE :	JUNE 2019		
DRAWN BY:	K. WHITE	DATE :	MAR 2019		
CHECKED BY:	B. LOFLIN	DATE :	JUNE 2019		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019		

DRAWN BY : EEM 2/97
CHECKED BY : VAP 2/97

REV. 6/13 AAC/MAA
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

4/22/2020
403.031.R2233BB.SMU.EB3.800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

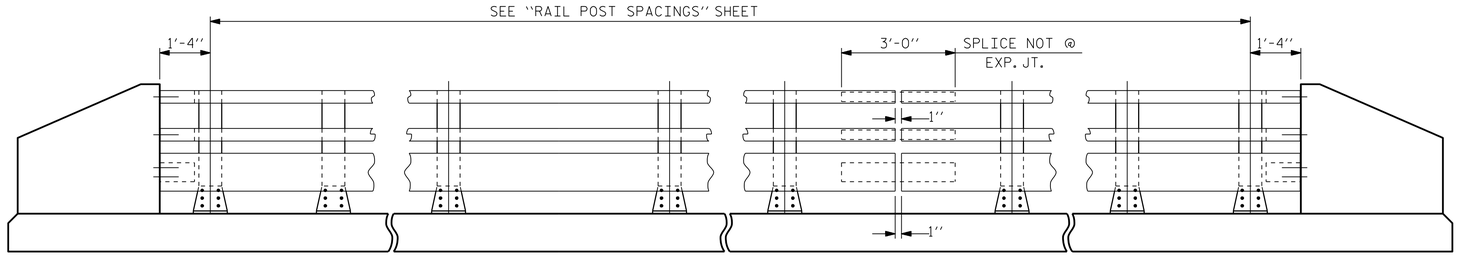
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
7/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

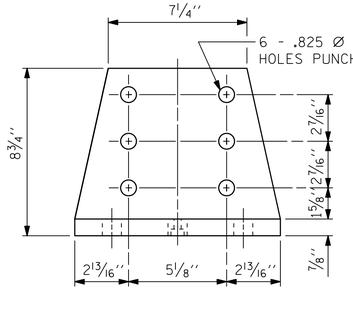
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-16
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. EB4 (SHT 1)

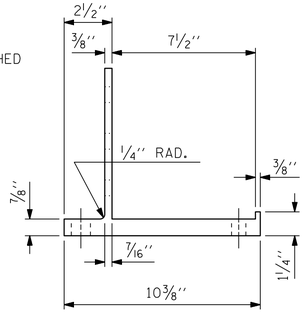


NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

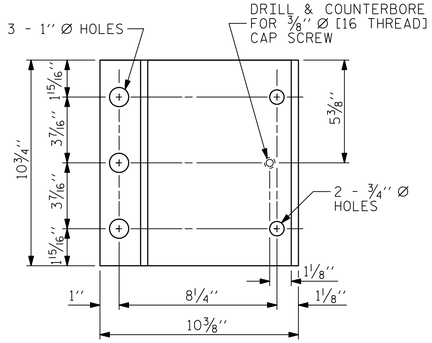
ELEVATION



FRONT ELEVATION

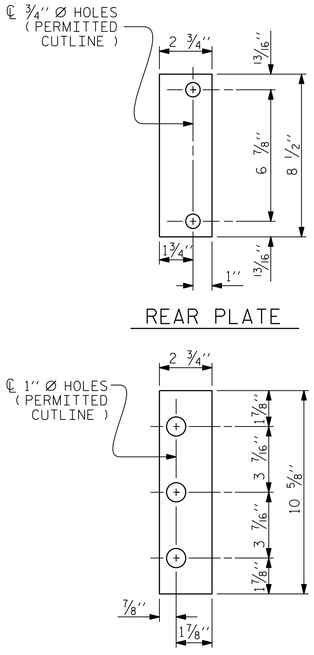


SIDE ELEVATION



PLAN

POST BASE DETAILS

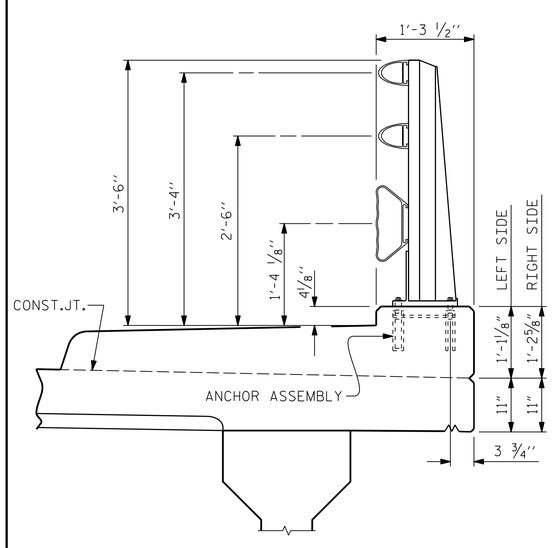


REAR PLATE

FRONT PLATE

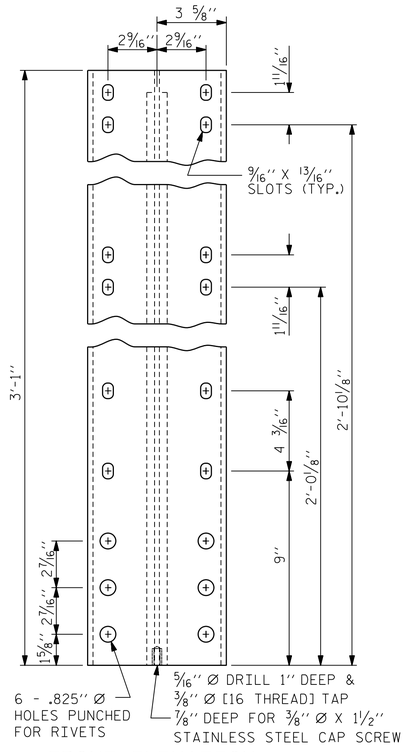
SHIM DETAILS

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

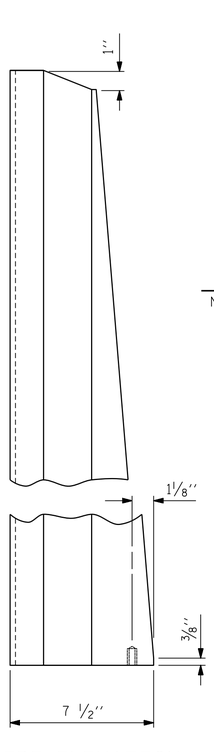


SECTION THRU RAIL

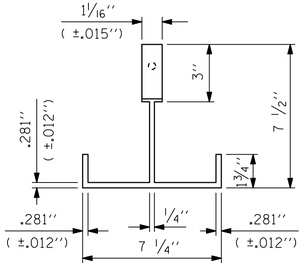
FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



FRONT ELEVATION

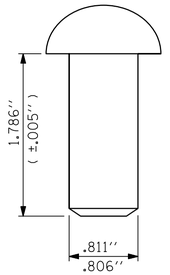


SIDE ELEVATION



PLAN

DETAILS OF POST



RIVET DETAIL

NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 343.92 LIN.FT.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

3 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-17
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. BMR5

DESIGNED BY:	C. CORMAN/K. WHITE	DATE : MAY 2019
DRAWN BY:	K. WHITE	DATE : MAY 2019
CHECKED BY:	J. DOUGHTY	DATE : JUNE 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

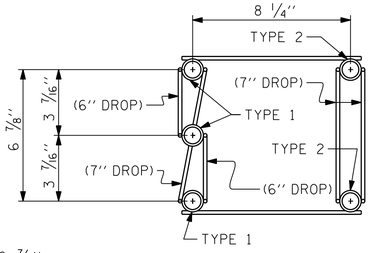
4/22/2020
403.033.R2233BB.SMU.3BR1.800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020

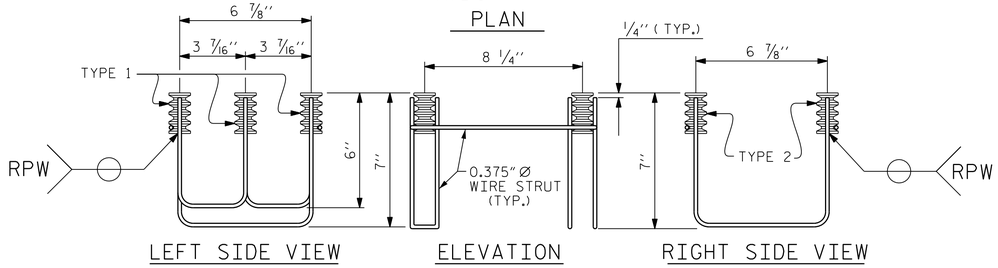
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...



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

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

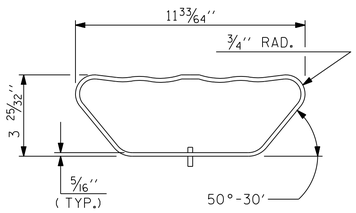
PLAN



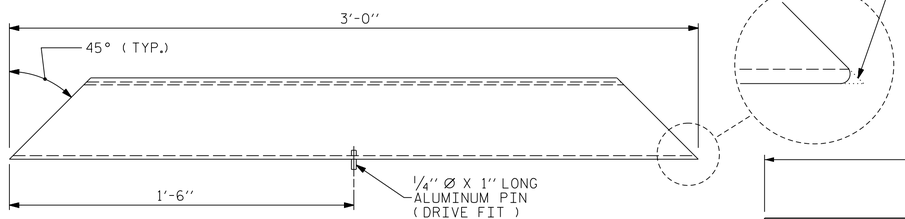
LEFT SIDE VIEW ELEVATION RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

(60 ASSEMBLIES REQUIRED)



END VIEW



PLAN VIEW

BOTTOM RAIL EXPANSION BAR

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES AND 1 3/4'' FOR 5/8'' FERRULES.

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

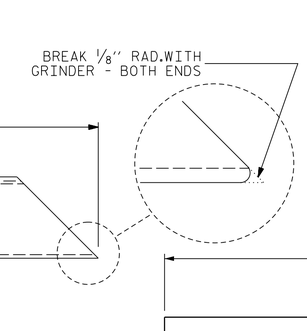
C. 2 - 5/8'' Ø X 2 1/4'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8'' Ø X 2 1/4'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM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

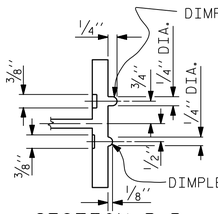
D. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

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

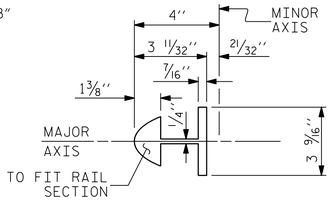
F. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

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

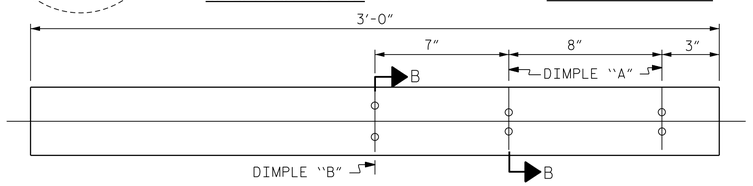




SECTION B-B

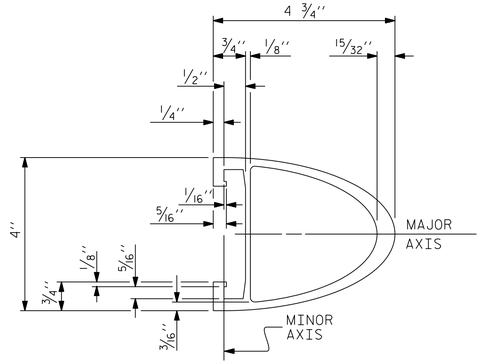


BAR SECTION

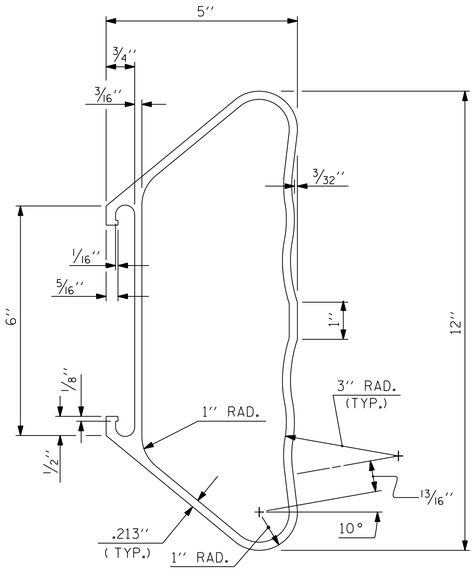


BACK ELEVATION

TOP & MIDDLE RAIL EXPANSION BAR

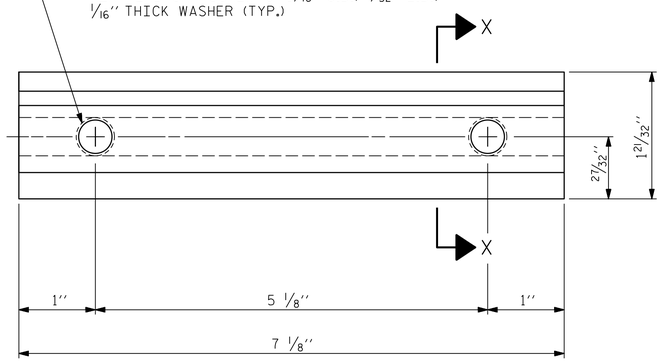


TOP & MIDDLE RAIL SECTION

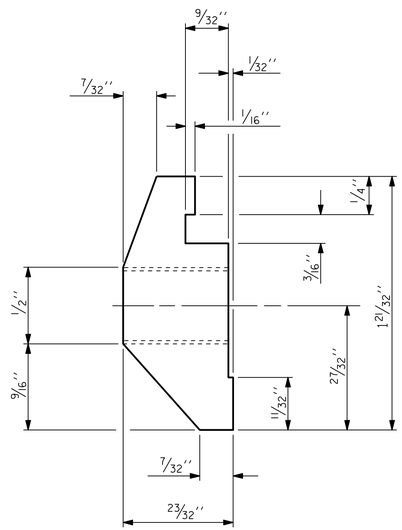


BOTTOM RAIL SECTION

1/2'' Ø [13 THREAD] HOLE FOR 1/2'' Ø X 1'' STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16'' O.D., 17/32'' I.D., 1/16'' THICK WASHER (TYP.)



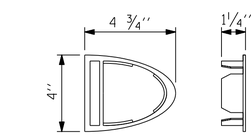
ELEVATION



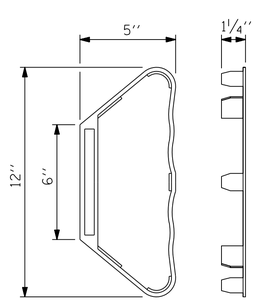
SECTION X-X

CLAMP BAR DETAIL

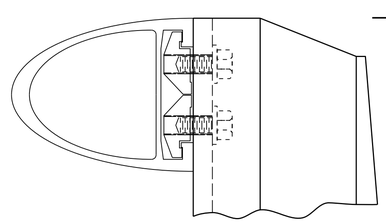
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUIT 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

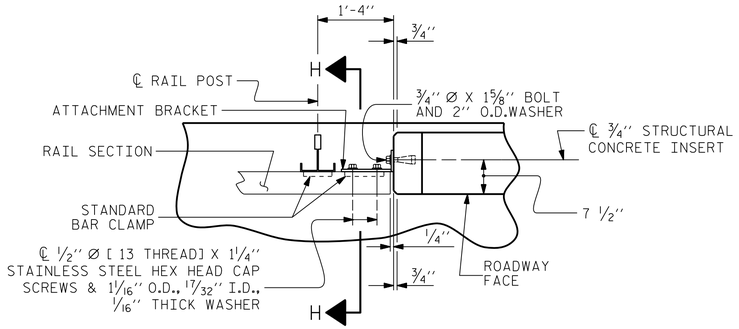
3 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-18
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. BMR6

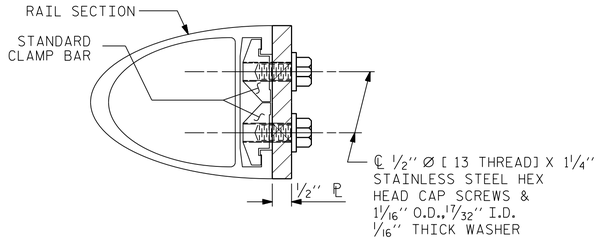
DESIGNED BY:	C. CORMAN/K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	J. DOUGHTY	DATE :	JUNE 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403.035.R2233BB.SMJ.3BR2.800662.dgn



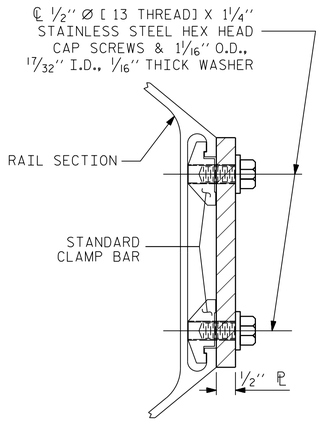
PLAN OF RAIL AND END POST

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



SECTION H-H

(FOR TOP & MIDDLE RAIL)



SECTION H-H

(FOR BOTTOM RAIL)

NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

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

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

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

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

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

NOTES

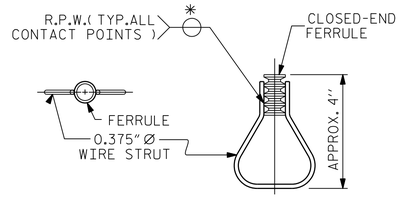
STRUCTURAL CONCRETE INSERT

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

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

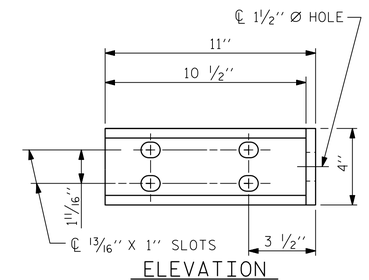
B. 1 - 3/4'' Ø X 1 5/8'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 1 5/8'' GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED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

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

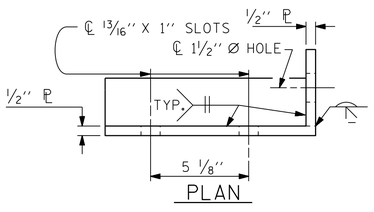


STRUCTURAL CONCRETE INSERT

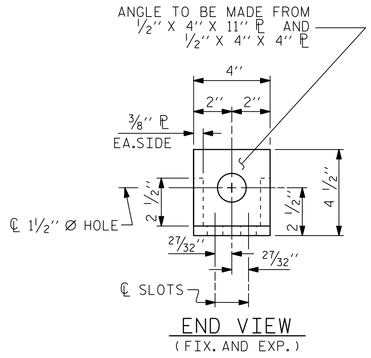
* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



ELEVATION



PLAN

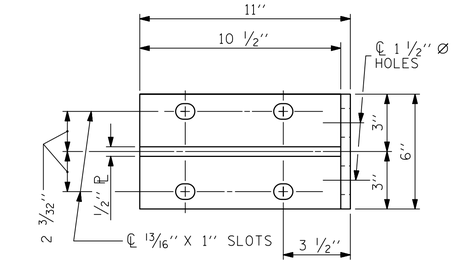


END VIEW

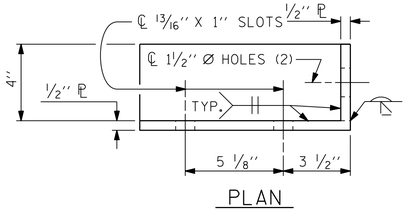
(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

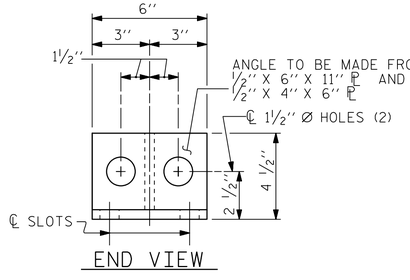
(TOP & MIDDLE RAIL ONLY)



ELEVATION



PLAN



END VIEW

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-19
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. BMR7

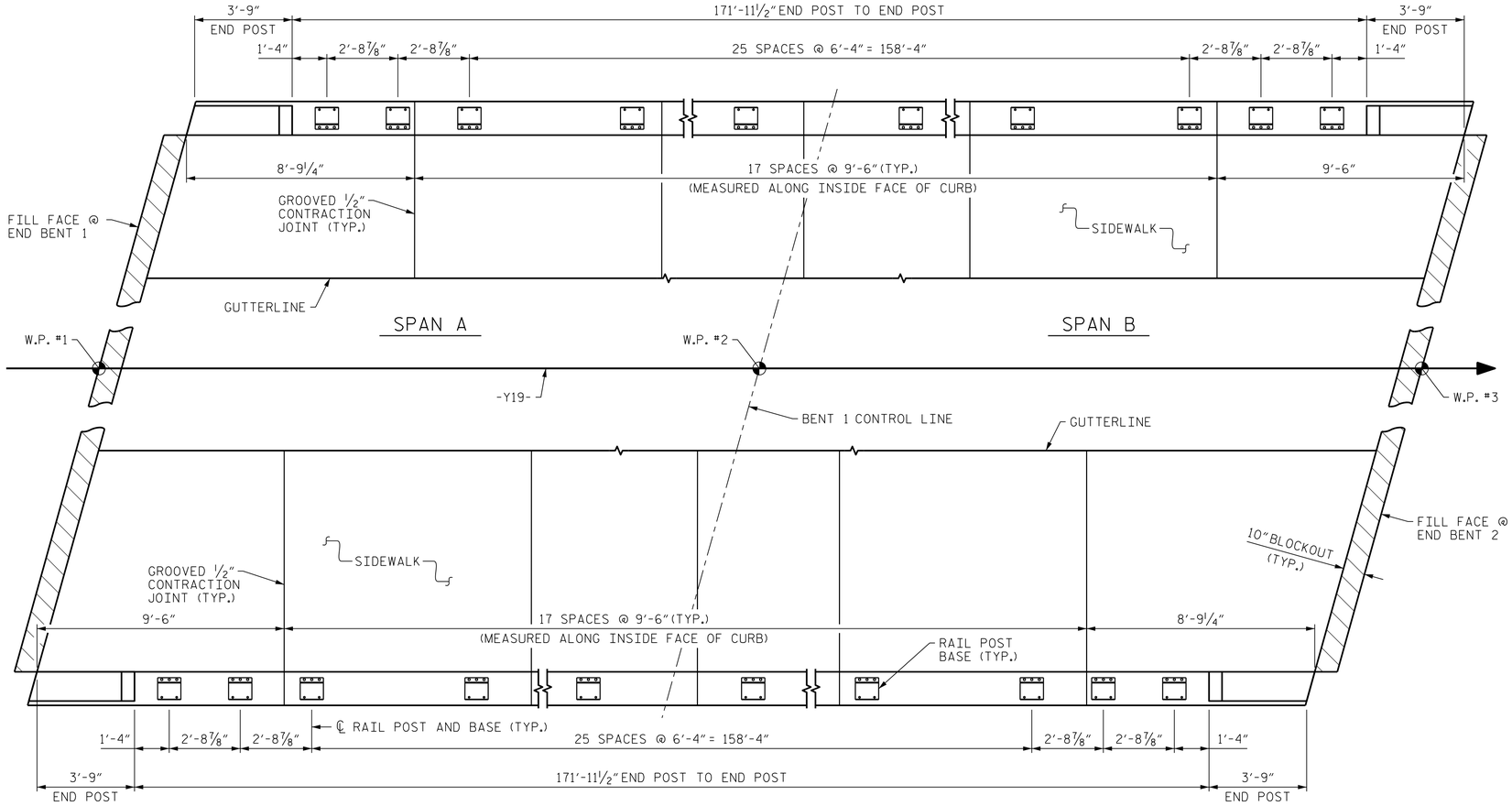
DESIGNED BY:	C. CORMAN/K. WHITE	DATE : MAY 2019
DRAWN BY:	K. WHITE	DATE : MAY 2019
CHECKED BY:	J. DOUGHTY	DATE : JUNE 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

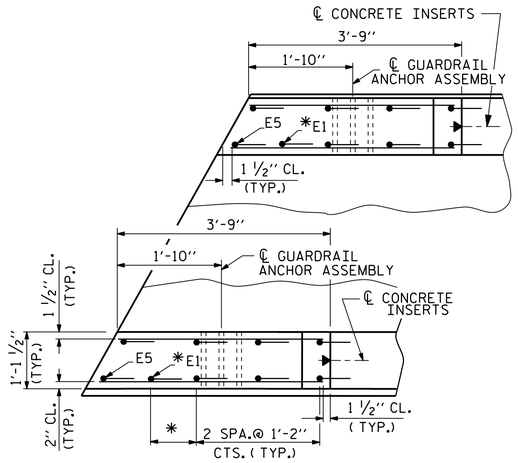
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

4/22/2020
403_037_R2233BB_SMU_3BR3_800662.dgn

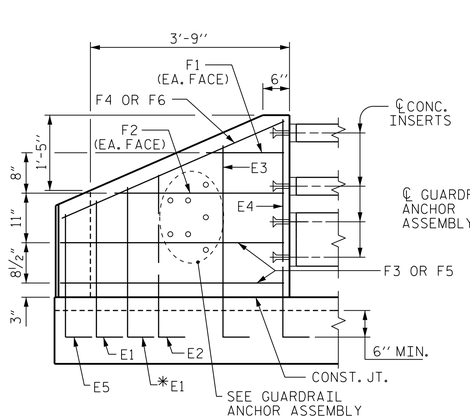


PLAN OF RAIL POST SPACING

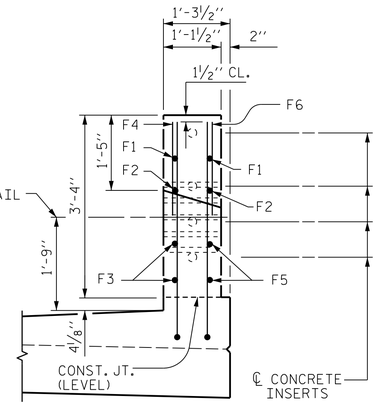
FOR SIDEWALK DETAILS AND REINFORCING STEEL, SEE SIDEWALK DETAILS SHEET.



PLAN



ELEVATION

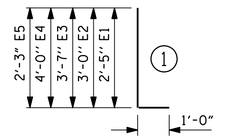


END VIEW

* CENTER E1 BETWEEN E5 AND E2 IF E5 BAR IS NEEDED TO REINFORCE LONG CORNER.

END POST DETAILS

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL FOR ONE END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS)
E1	2	#7	1	3'-5"	14
E2	2	#7	1	4'-0"	16
E3	2	#7	1	4'-7"	19
E4	2	#7	1	5'-0"	20
E5	1	#7	1	3'-3"	7
F1	2	#6	STR	1'-10"	6
F2	2	#6	STR	3'-6"	11
F3	2	#6	STR	3'-6"	11
F4	1	#6	STR	3'-9"	6
F5	2	#6	STR	3'-8"	11
F6	1	#6	STR	4'-0"	6
EPOXY COATED REINFORCING STEEL					127 LBS.
CLASS AA CONCRETE					0.43 CU. YDS.

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACING AND END POST DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-20
1			3			TOTAL SHEETS
2			4			34

STR. #3

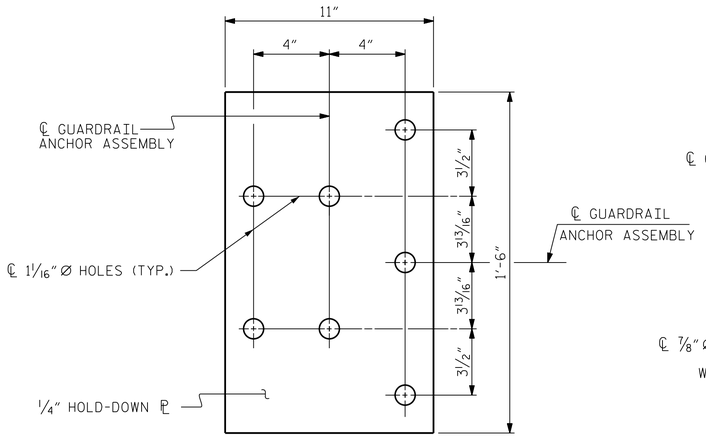
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

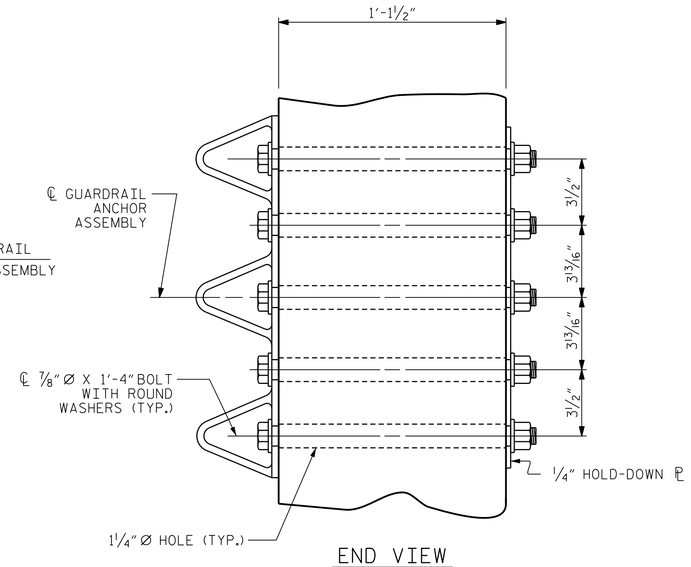
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	C. CORMAN/K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	J. DOUGHTY	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403.039_R2233BB_SWU_RPS_800662.dgn



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.

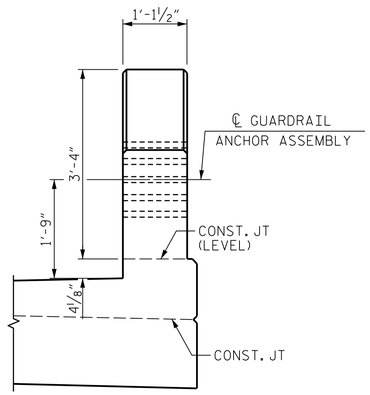
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

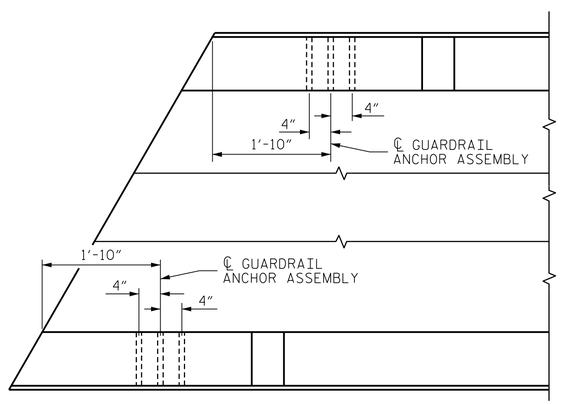
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(THREE BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

DESIGNED BY:	K. WHITE	DATE :	MAY 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	J. DOUGHTY	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

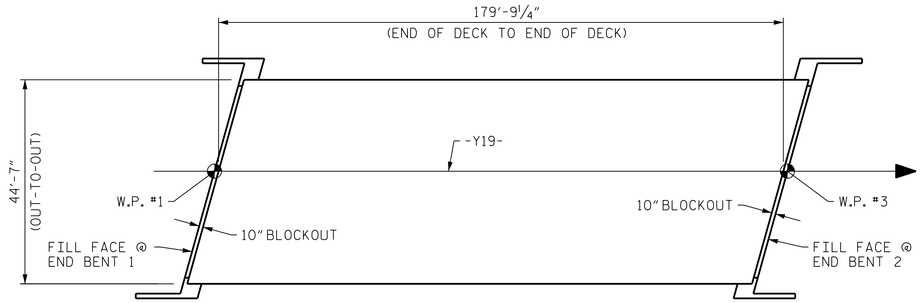
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-21
1			3			TOTAL SHEETS
2			4			34

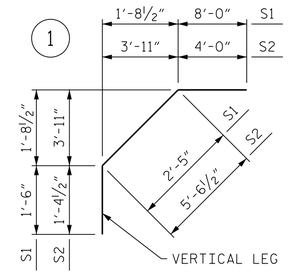
STR. #3 STD. NO. GRA3

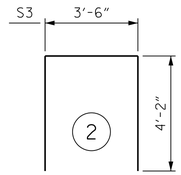
4/22/2020
403.041.R2233BB_SMU.GRA.800662.dgn



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 8,015)

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	335	5	STR	44'-2"	15432
✳ A101	4	5	STR	40'-8"	170
✳ A102	4	5	STR	37'-1"	155
✳ A103	4	5	STR	33'-6"	140
✳ A104	4	5	STR	29'-11"	125
✳ A105	4	5	STR	26'-4"	110
✳ A106	4	5	STR	22'-9"	95
✳ A107	4	5	STR	19'-2"	80
✳ A108	4	5	STR	15'-7"	65
✳ A109	4	5	STR	12'-0"	50
✳ A110	4	5	STR	8'-4"	35
✳ A111	4	5	STR	4'-9"	20
✳ A112	4	5	STR	1'-2"	5
A2	335	5	STR	44'-2"	15432
A201	4	5	STR	40'-8"	170
A202	4	5	STR	37'-1"	155
A203	4	5	STR	33'-6"	140
A204	4	5	STR	29'-11"	125
A205	4	5	STR	26'-4"	110
A206	4	5	STR	22'-9"	95
A207	4	5	STR	19'-2"	80
A208	4	5	STR	15'-7"	65
A209	4	5	STR	12'-0"	50
A210	4	5	STR	8'-4"	35
A211	4	5	STR	4'-9"	20
A212	4	5	STR	1'-2"	5
B1	112	5	STR	34'-3"	4001
✳ B2	60	4	STR	30'-3"	1212
✳ B3	60	4	STR	33'-8"	1349
✳ B4	117	5	STR	27'-3"	3325
✳ B5	117	5	STR	17'-0"	2075
✳ B6	117	5	STR	19'-1"	2329
B7	56	5	STR	40'-0"	2336
B8	112	5	STR	39'-6"	4614

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
K1	20	4	STR	23'-9"	317
K2	8	4	STR	7'-7"	41
K3	16	4	STR	8'-7"	92
K4	8	4	STR	8'-4"	45
K5	8	4	STR	7'-3"	39
K6	4	4	STR	2'-1"	6
K7	8	4	STR	2'-8"	14
K8	4	4	STR	2'-6"	7
K9	4	4	STR	1'-10"	5
✳ S1	68	4	1	11'-11"	541
✳ S2	68	4	1	10'-11"	496
S3	68	4	2	11'-10"	538

REINFORCING STEEL = 28,537 LBS.

✳EPOXY COATED REINFORCING STEEL = 27,809 LBS.

GROOVING BRIDGE FLOORS

APPROACH SLABS	708 SQ. FT.
BRIDGE DECK	4,486 SQ. FT.
TOTAL	5,194 SQ. FT.

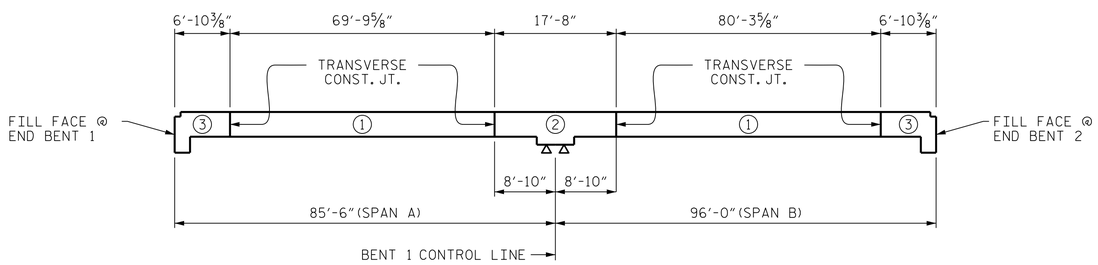
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	215.3	28,537	27,809
POUR #2	24.8		
POUR #3	72.4		
TOTALS ✳✳	312.5	28,537	27,809

✳✳QUANTITIES FOR 3-BAR METAL RAILS ARE NOT INCLUDED.

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



POUR SEQUENCE

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

DESIGNED BY:	A. DUTTA	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

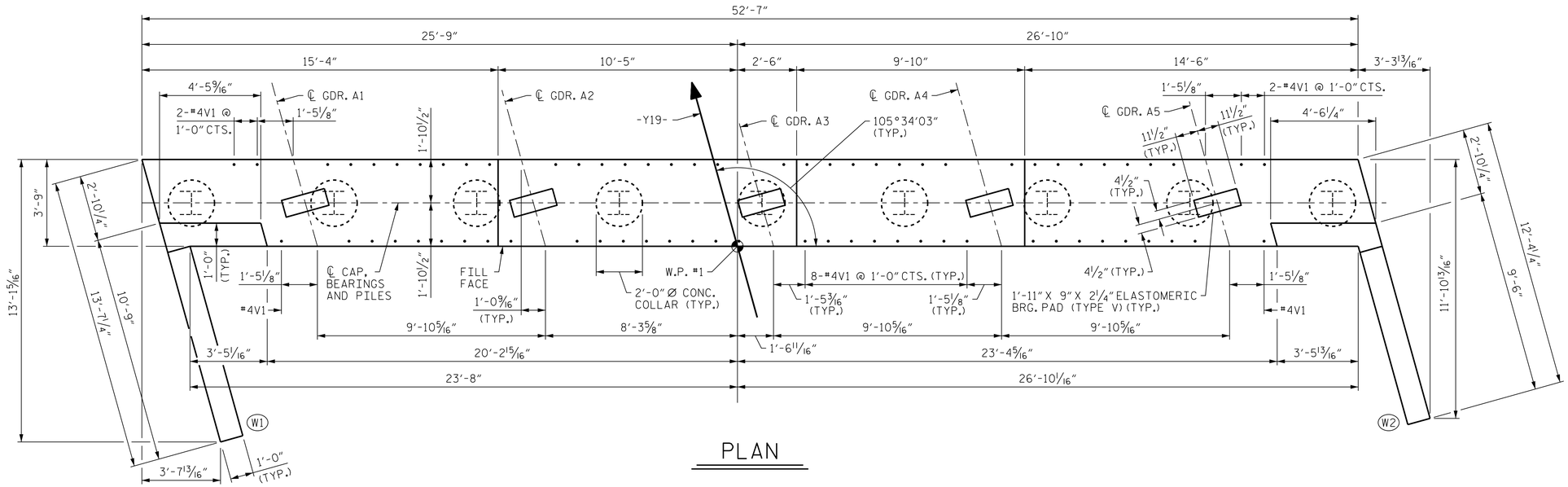
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-22
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. BOM2

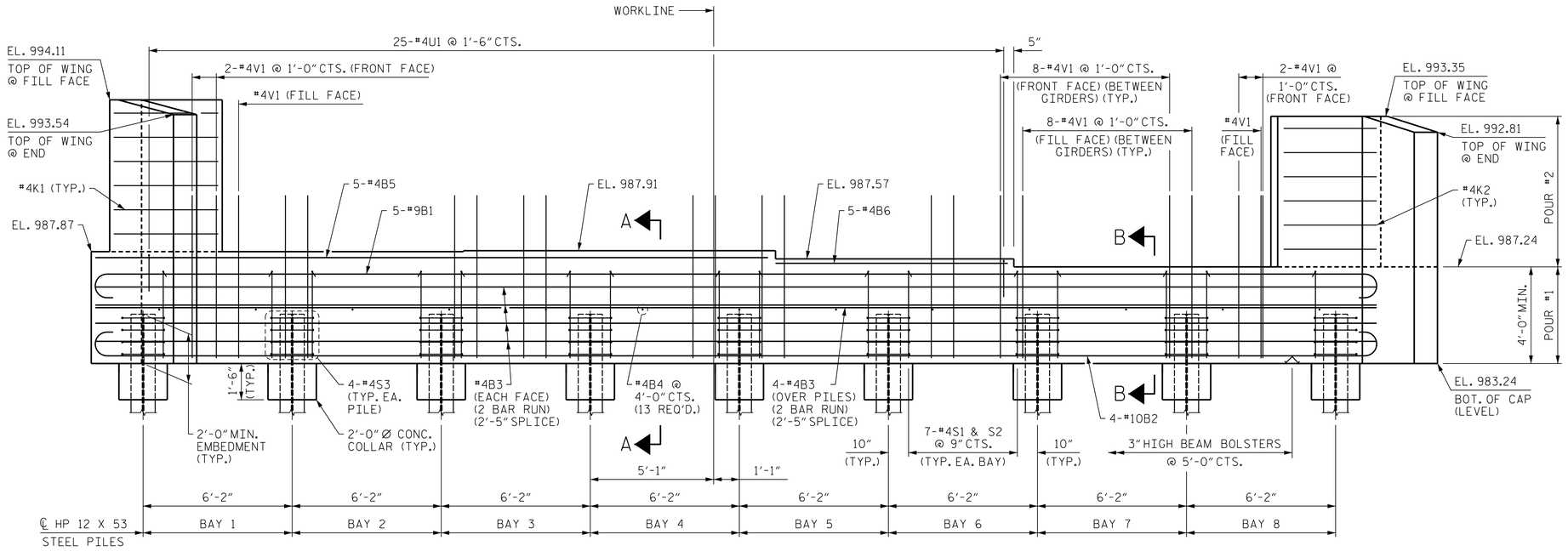
4/22/2020
403.043.R2233BB.SMU.BM.800662.dgn

NOTES:

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



PLAN



ELEVATION

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

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

SHEET 1 OF 3

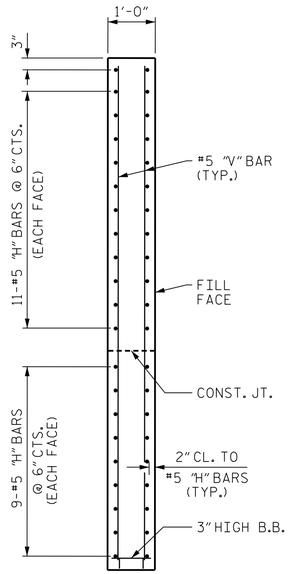
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-23
1			3			TOTAL SHEETS
2			4			34

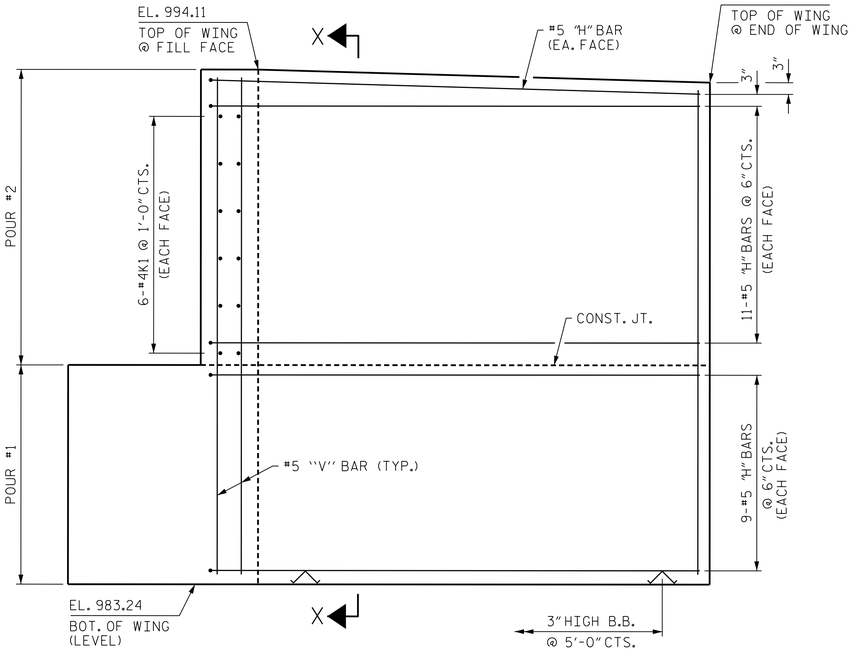
STR. #3

DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

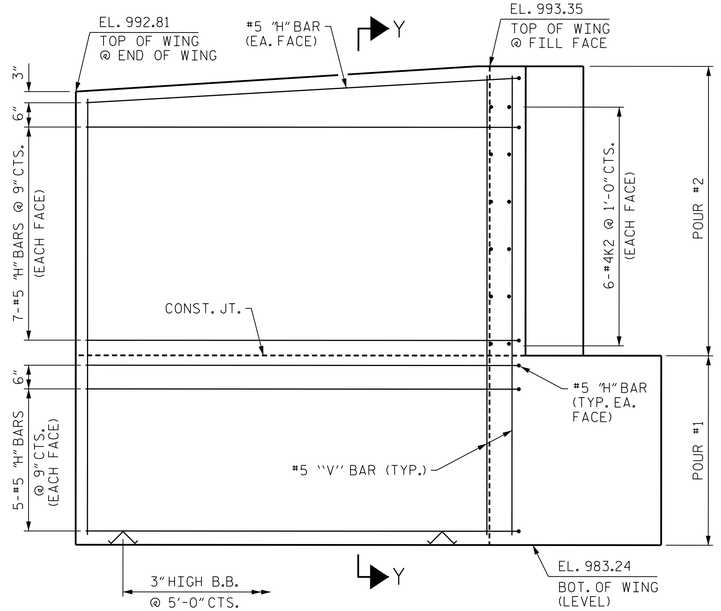
4/22/2020
403_045_R2233BB_SMU_E11_800662.DGN



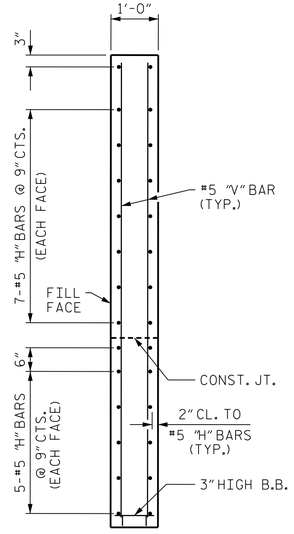
SECTION X-X



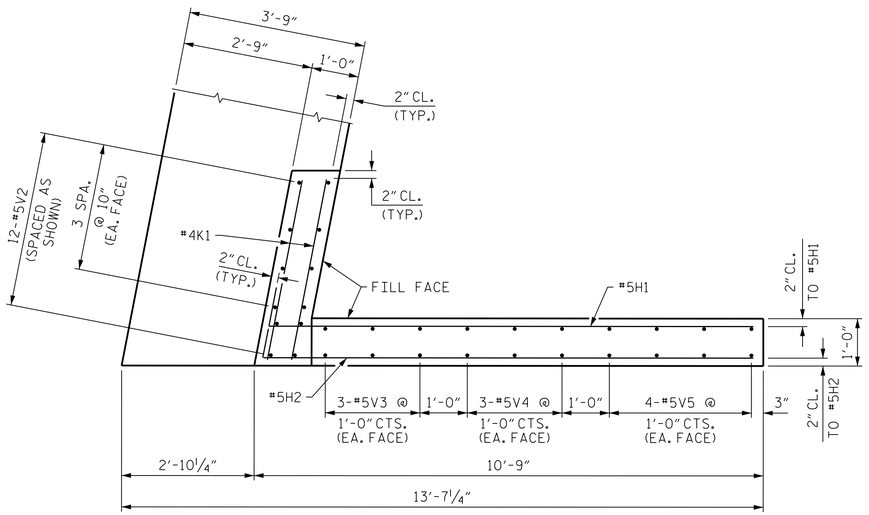
ELEVATION OF WING (W1)



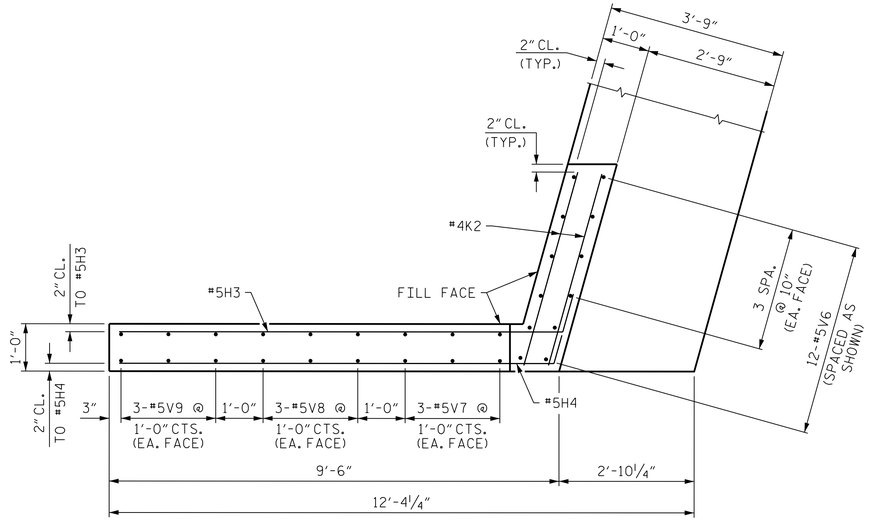
ELEVATION OF WING (W2)



SECTION Y-Y



PLAN OF WING (W1)



PLAN OF WING (W2)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-24
1			3			TOTAL SHEETS
2			4			34

STR. #3

DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

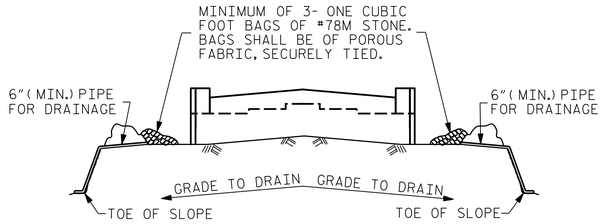
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020

DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
403_047_R2233BB_SMU_E12_800662.dgn

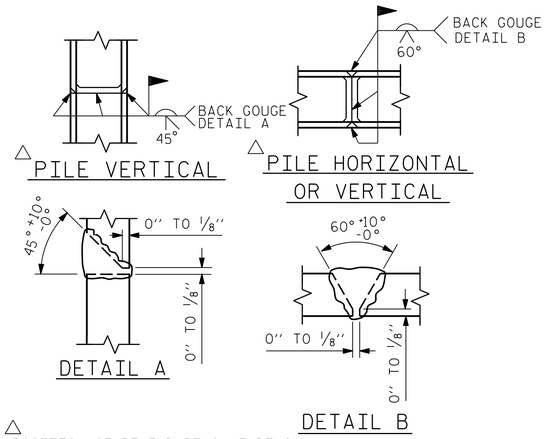


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

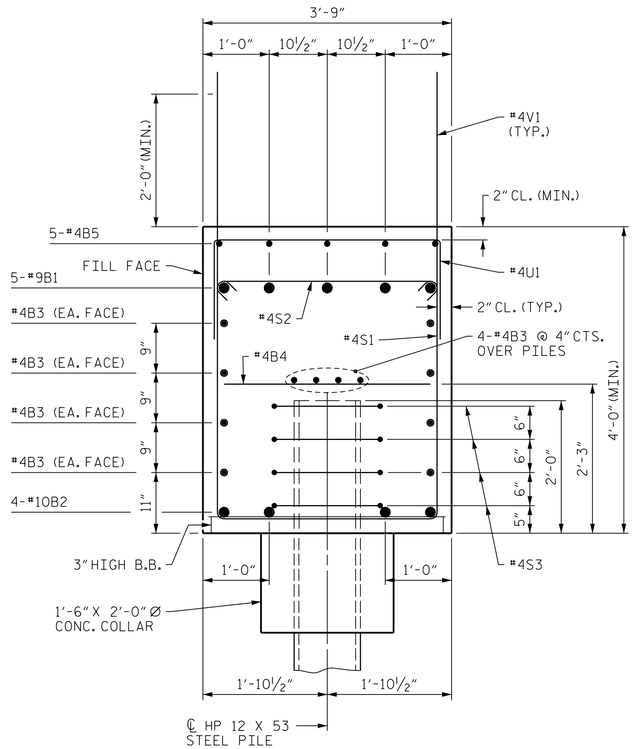
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

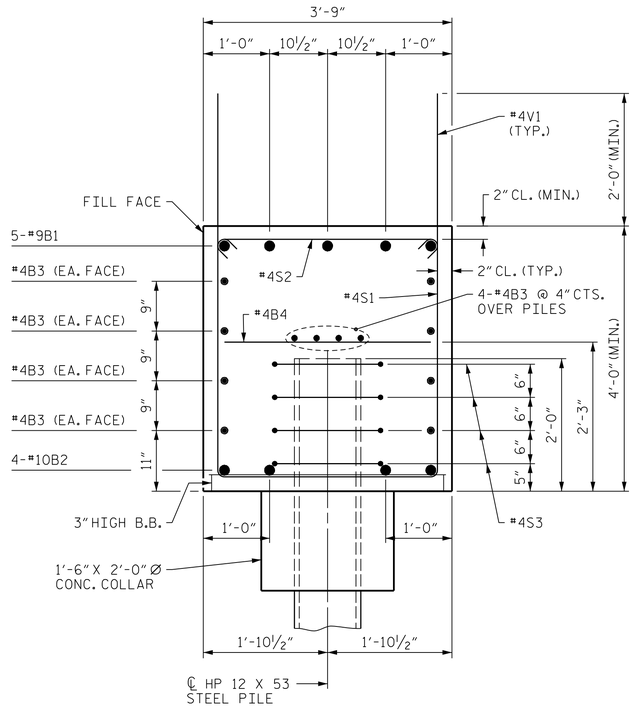


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

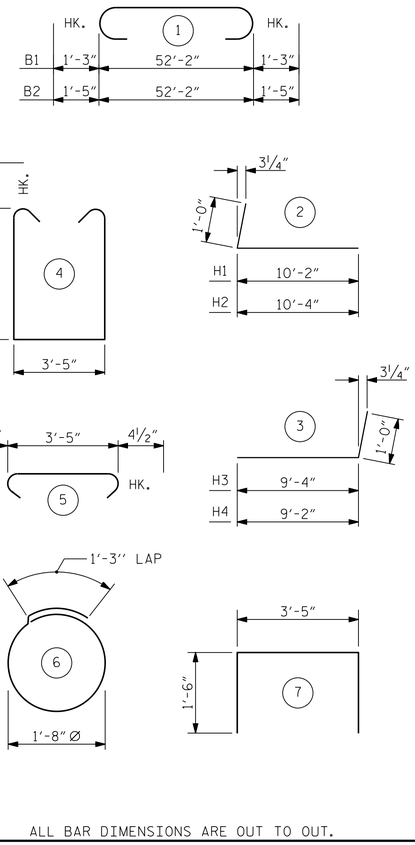


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	1	54'-8"	929
B2	4	#10	1	55'-0"	947
B3	24	#4	STR	27'-4"	438
B4	13	#4	STR	3'-5"	30
B5	5	#4	STR	26'-10"	90
B6	5	#4	STR	9'-8"	32
H1	21	#5	2	11'-2"	245
H2	21	#5	2	11'-4"	248
H3	14	#5	3	10'-4"	151
H4	14	#5	3	10'-2"	148
K1	12	#4	STR	4'-1"	33
K2	12	#4	STR	4'-2"	33
S1	56	#4	4	11'-5"	427
S2	56	#4	5	4'-2"	156
S3	36	#4	6	6'-6"	156
U1	25	#4	7	6'-5"	107
V1	70	#4	STR	6'-6"	304
V2	12	#5	STR	10'-5"	130
V3	6	#5	STR	10'-4"	65
V4	6	#5	STR	10'-2"	64
V5	8	#5	STR	9'-10"	82
V6	12	#5	STR	9'-8"	121
V7	6	#5	STR	9'-6"	59
V8	6	#5	STR	9'-4"	58
V9	6	#5	STR	9'-1"	57

REINFORCING STEEL	LBS.	5110
CLASS A CONCRETE		
POUR #1 CAP LOWER WINGS & CONC. COLLARS	C.Y.	36.7
POUR #2 UPPER PART OF WINGS	C.Y.	6.1
TOTAL CLASS A CONCRETE	C.Y.	42.8
HP 12x53 STEEL PILES NO. 9	LIN. FT.	630
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

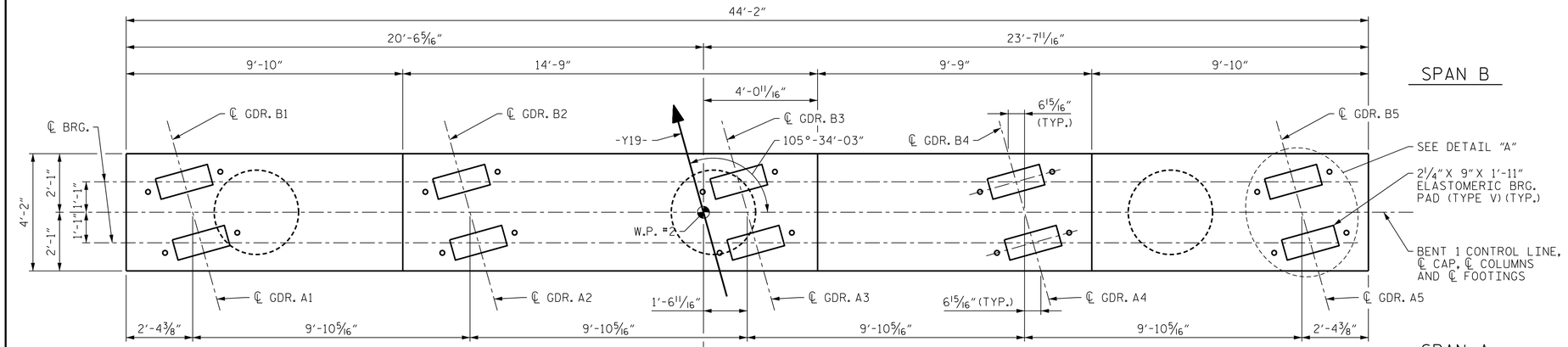
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

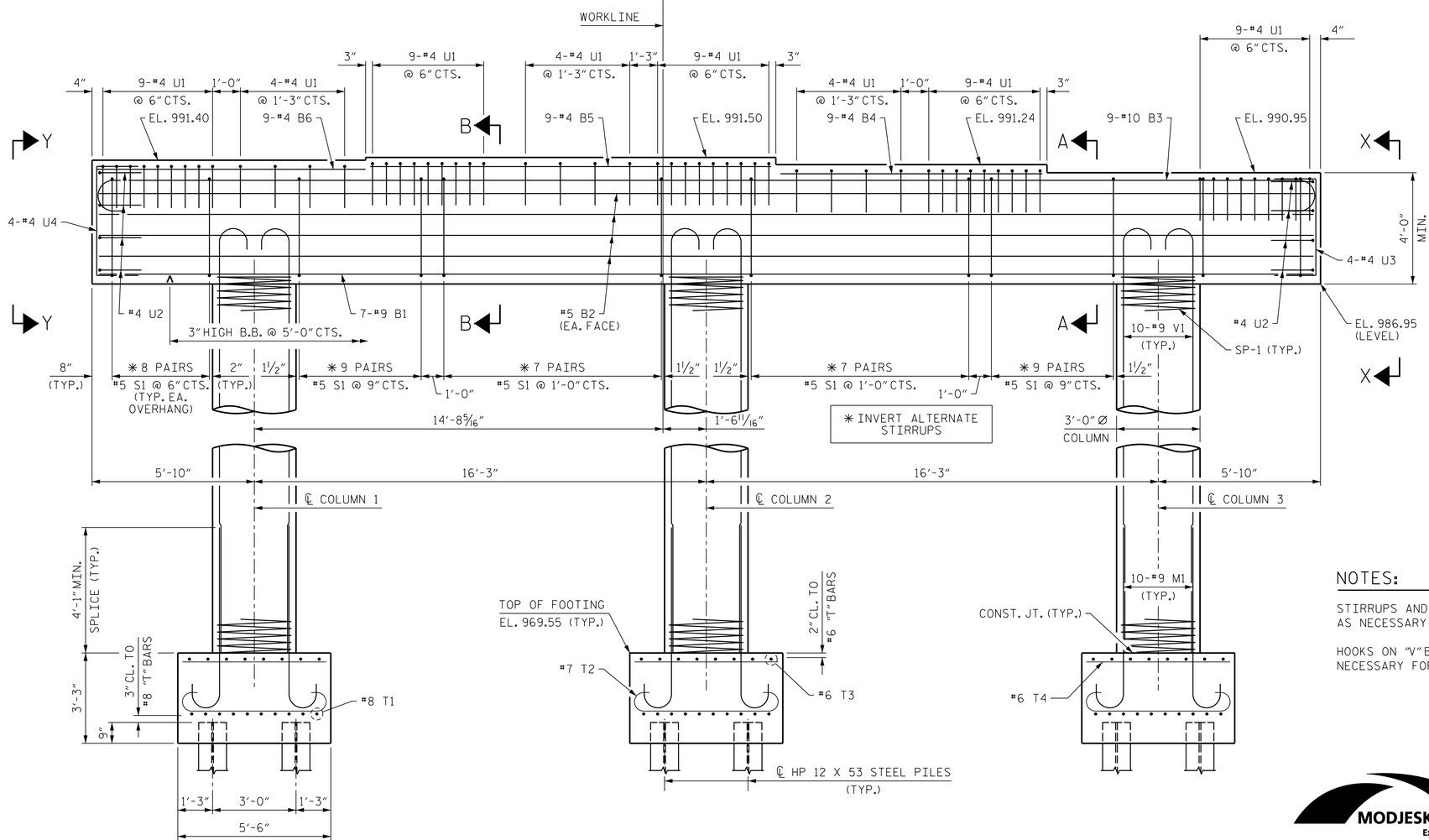
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-25
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/22/2020
403.049.R2233BB.SMU.E13.800662.dgn

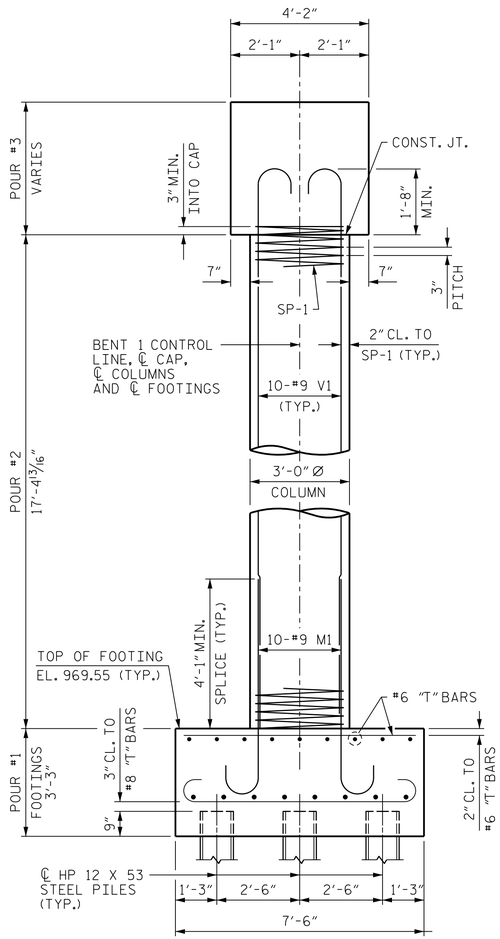


PLAN



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING



END ELEVATION

DETAILS, DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING

NOTES:

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

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-26
1			3			TOTAL SHEETS
2			4			34

STR. #3

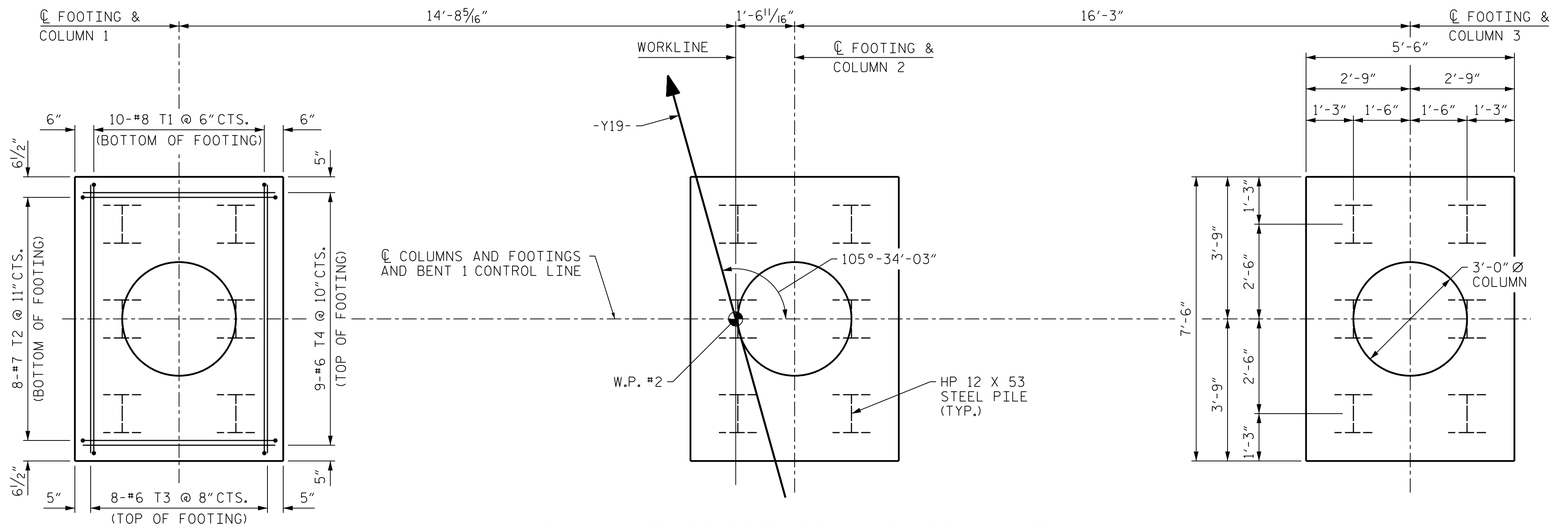
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

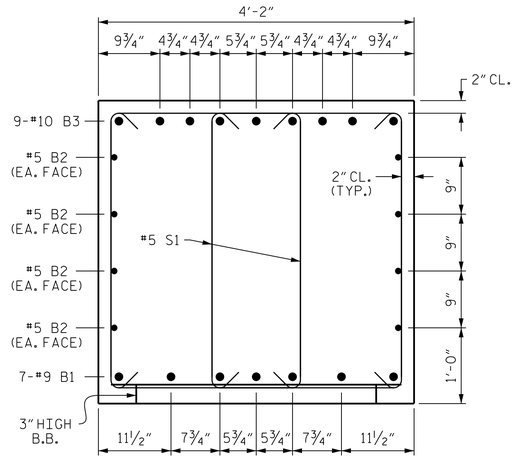
DESIGNED BY:	J. BORUTA	DATE :	JUNE 2019
DRAWN BY:	K. WHITE	DATE :	JUNE 2019
CHECKED BY:	B. LOFLIN	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
403.051.R2233BB_SMU_B1_800662.dgn

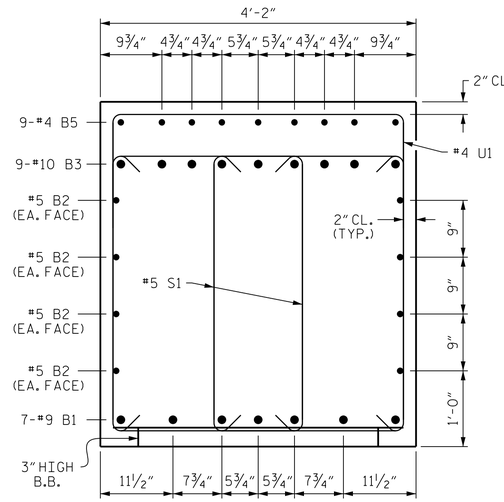


PLAN OF FOOTINGS AND COLUMNS

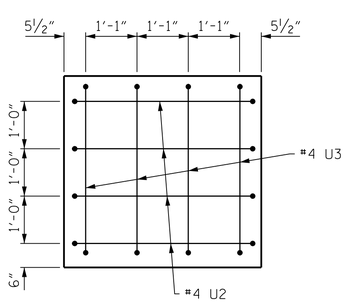
DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING



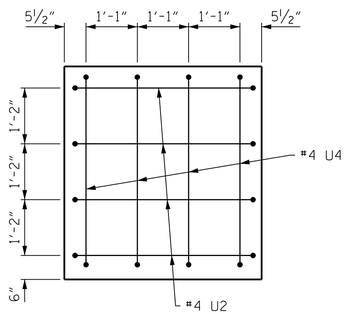
SECTION A-A



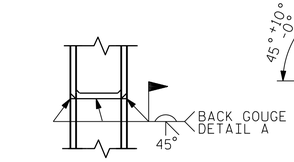
SECTION B-B



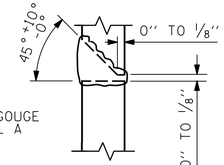
VIEW X-X



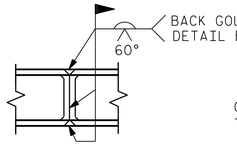
VIEW Y-Y



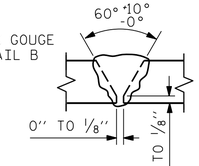
△ PILE VERTICAL



DETAIL A



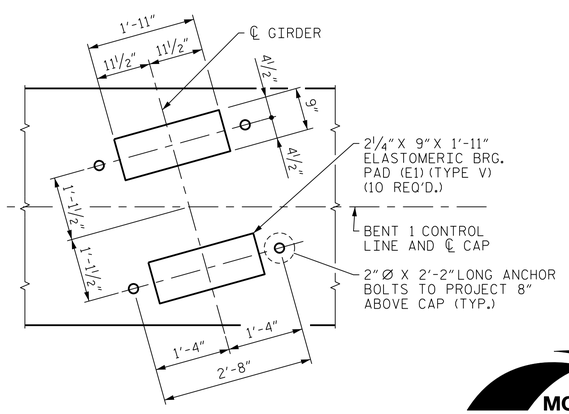
△ PILE HORIZONTAL OR VERTICAL



DETAIL B

PILE SPLICE DETAILS

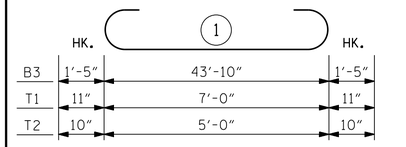
△ POSITION OF PILE DURING WELDING.

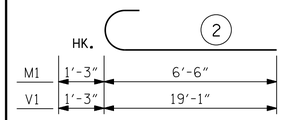


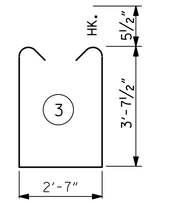
DETAIL "A"

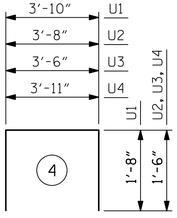
TYPICAL AT EACH BEARING

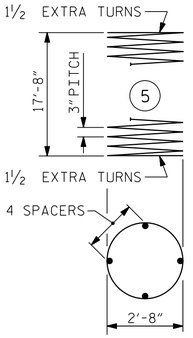
BAR TYPES











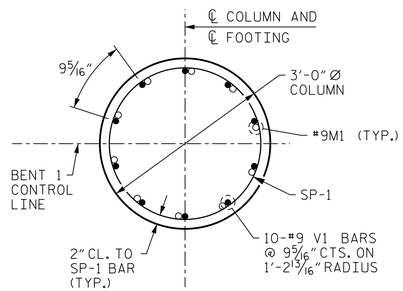
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#9	STR	43′-10″	1043
B2	8	#5	STR	43′-10″	366
B3	9	#10	1	46′-8″	1807
B4	9	#4	STR	9′-6″	57
B5	9	#4	STR	14′-3″	86
B6	9	#4	STR	9′-4″	56
M1	30	#9	2	7′-9″	791
S1	96	#5	3	10′-9″	1076
T1	30	#8	1	8′-10″	708
T2	24	#7	1	6′-8″	327
T3	24	#6	STR	7′-0″	252
T4	27	#6	STR	5′-0″	203
U1	57	#4	4	7′-2″	273
U2	8	#4	4	6′-8″	36
U3	4	#4	4	6′-6″	17
U4	4	#4	4	6′-11″	18
V1	30	#9	2	20′-4″	2074
SP-1	3	*	5	610′-7″	1224

REINFORCING STEEL	LBS.	9,190
SPIRAL COLUMN REINFORCING STEEL	LBS.	1,224
CLASS "A" CONCRETE BREAKDOWN		
POUR #1 - FOOTINGS		14.9 C.Y.
POUR #2 - COLUMNS		13.7 C.Y.
POUR #3 - CAP		29.6 C.Y.
TOTAL CLASS "A" CONCRETE		58.2 C.Y.
HP 12 X 53 STEEL PILES No. = 18		990 LIN. FT.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	NO.	18

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



PLAN OF COLUMN

REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-27
1			3			TOTAL SHEETS
2			4			34

STR. #3

DESIGNED BY:	J. BORUTA	DATE : JUNE 2019
DRAWN BY:	K. WHITE	DATE : JUNE 2019
CHECKED BY:	B. LOFLIN	DATE : JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

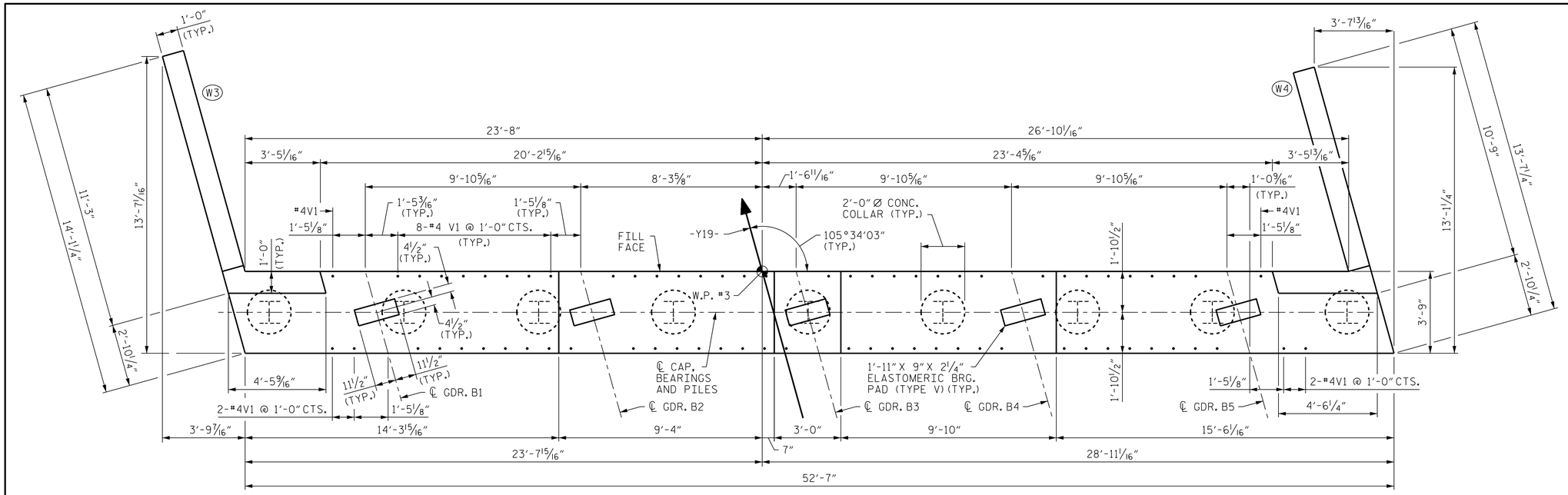
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020

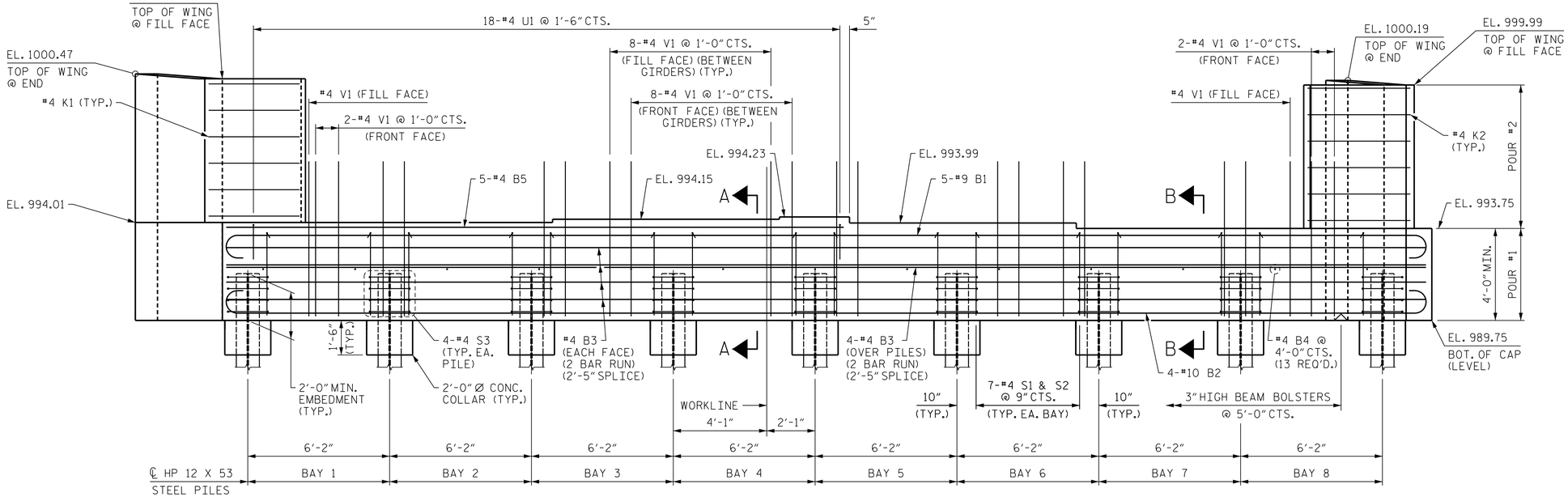
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/22/2020
403.053.R2233BB.SMU.B2.800662.dgn



PLAN



ELEVATION

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

NOTES:

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

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

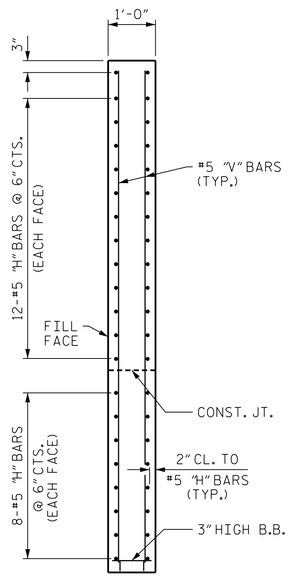
STR. #3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-28
1			3			TOTAL SHEETS
2			4			34

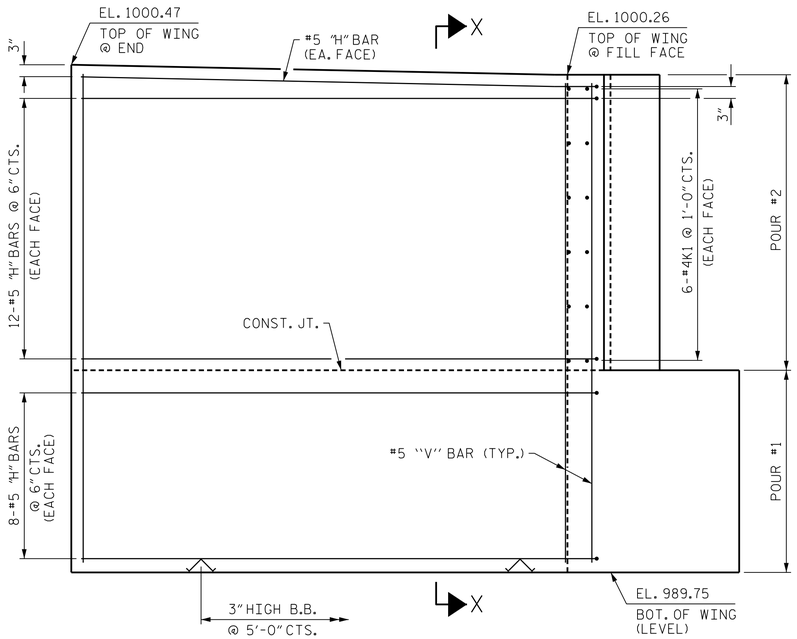
DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

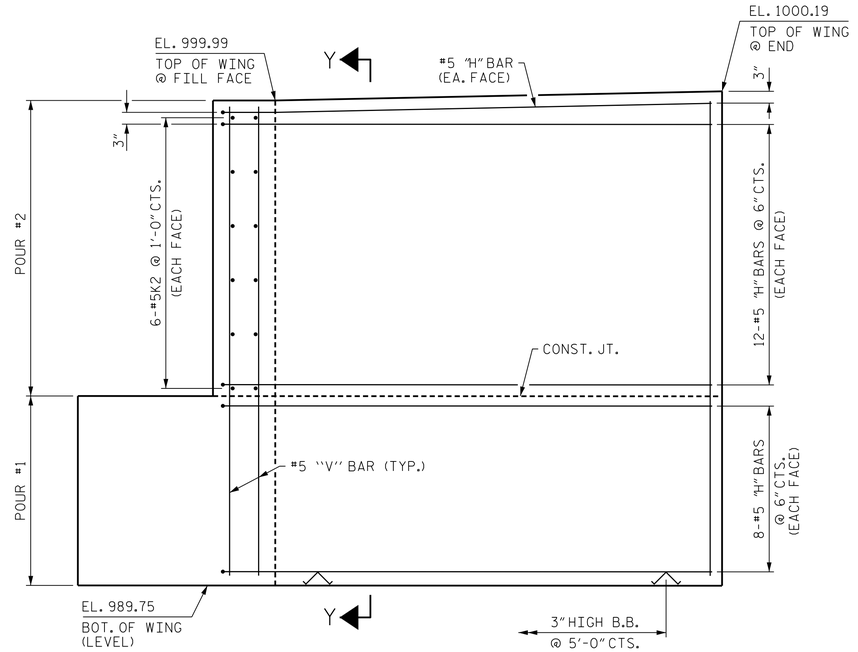
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...



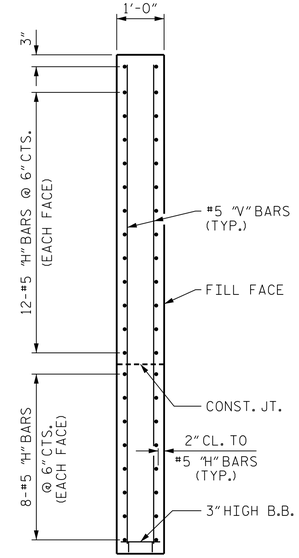
SECTION X-X



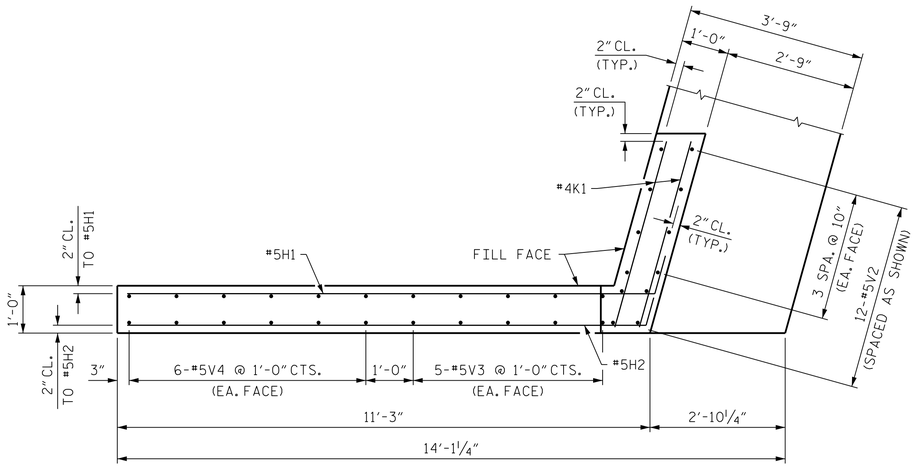
ELEVATION OF WING (W3)



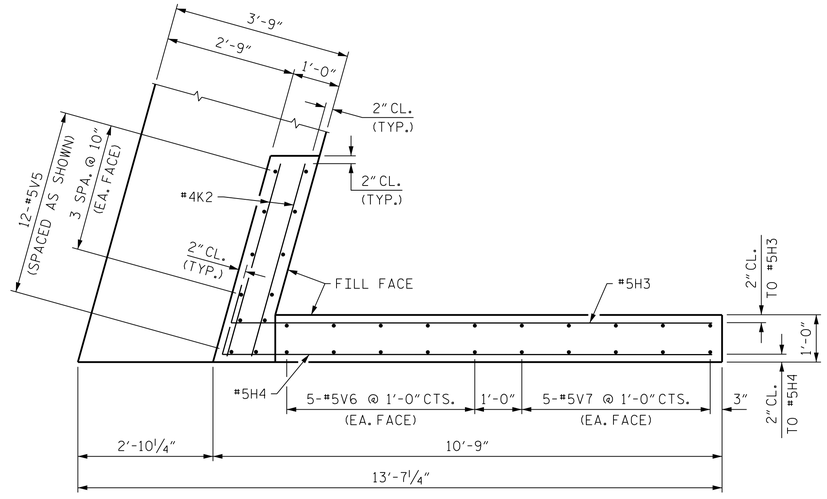
ELEVATION OF WING (W4)



SECTION Y-Y



PLAN OF WING (W3)



PLAN OF WING (W4)

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-29
1			3			TOTAL SHEETS
2			4			34

STR. #3

DESIGNED BY:	C. CORMAN	DATE : JULY 2019
DRAWN BY:	K. WHITE	DATE : JULY 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

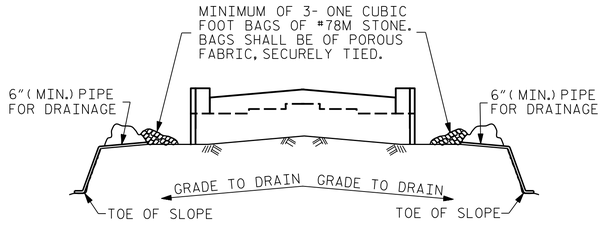
MODJESKI and MASTERS
Experience great bridges.

333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/22/2020
403.057.R2233BB.SWU.E22.800662.dgn

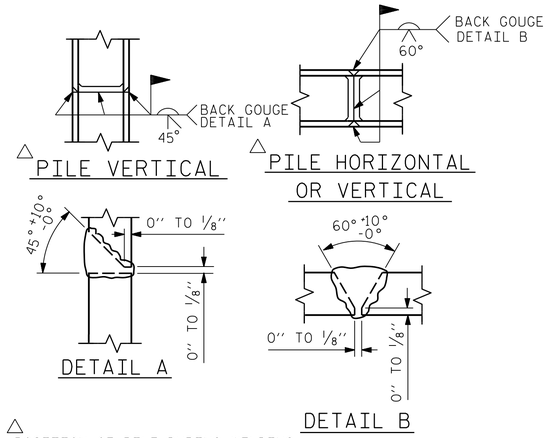


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

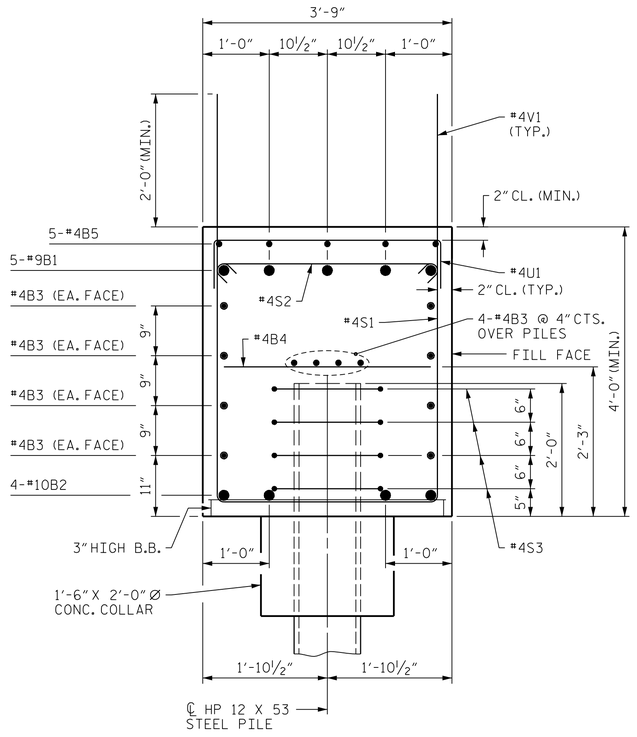
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

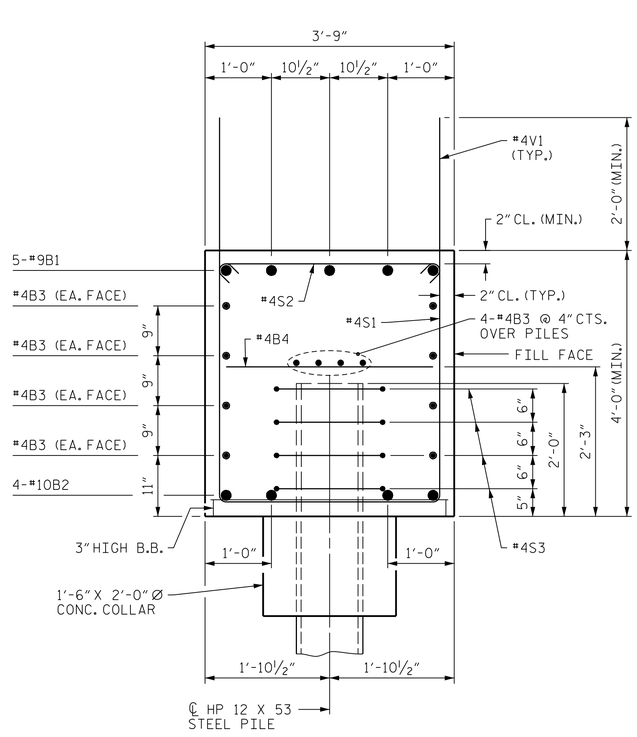


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

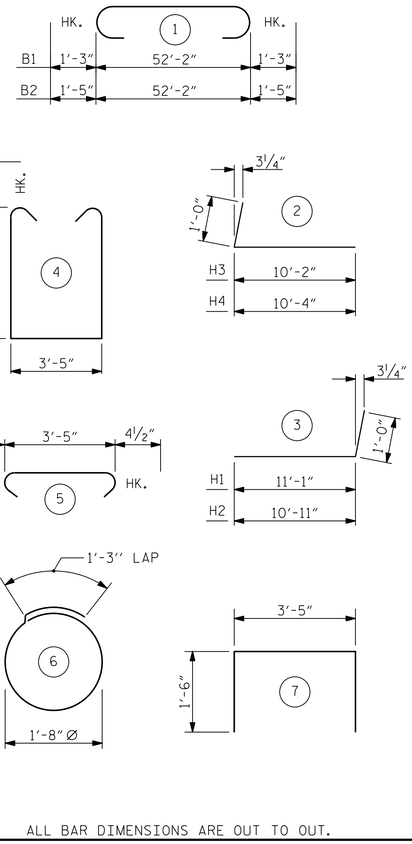


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	1	54'-8"	929
B2	4	#10	1	55'-0"	947
B3	24	#4	STR	27'-4"	438
B4	13	#4	STR	3'-5"	30
B5	5	#4	STR	26'-10"	90
H1	21	#5	3	12'-1"	265
H2	21	#5	3	11'-11"	261
H3	21	#5	2	11'-2"	245
H4	21	#5	2	11'-4"	248
K1	12	#4	STR	4'-1"	33
K2	12	#4	STR	4'-2"	33
S1	56	#4	4	11'-5"	427
S2	56	#4	5	4'-2"	156
S3	36	#4	6	6'-6"	156
U1	18	#4	7	6'-5"	77
V1	70	#4	STR	6'-3"	292
V2	12	#5	STR	10'-1"	126
V3	10	#5	STR	10'-2"	106
V4	12	#5	STR	10'-4"	129
V5	12	#5	STR	9'-10"	123
V6	10	#5	STR	9'-11"	103
V7	10	#5	STR	10'-0"	104

REINFORCING STEEL		LBS.	5318
CLASS A CONCRETE			
POUR #1	CAP LOWER WINGS & CONC. COLLARS	C.Y.	35.5
POUR #2	UPPER PART OF WINGS	C.Y.	6.8
TOTAL CLASS A CONCRETE		C.Y.	42.3
HP 12x53 STEEL PILES NO. 9		LIN. FT.	675
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES		NO.	9

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DESIGNED BY:	C. CORMAN	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	JULY 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

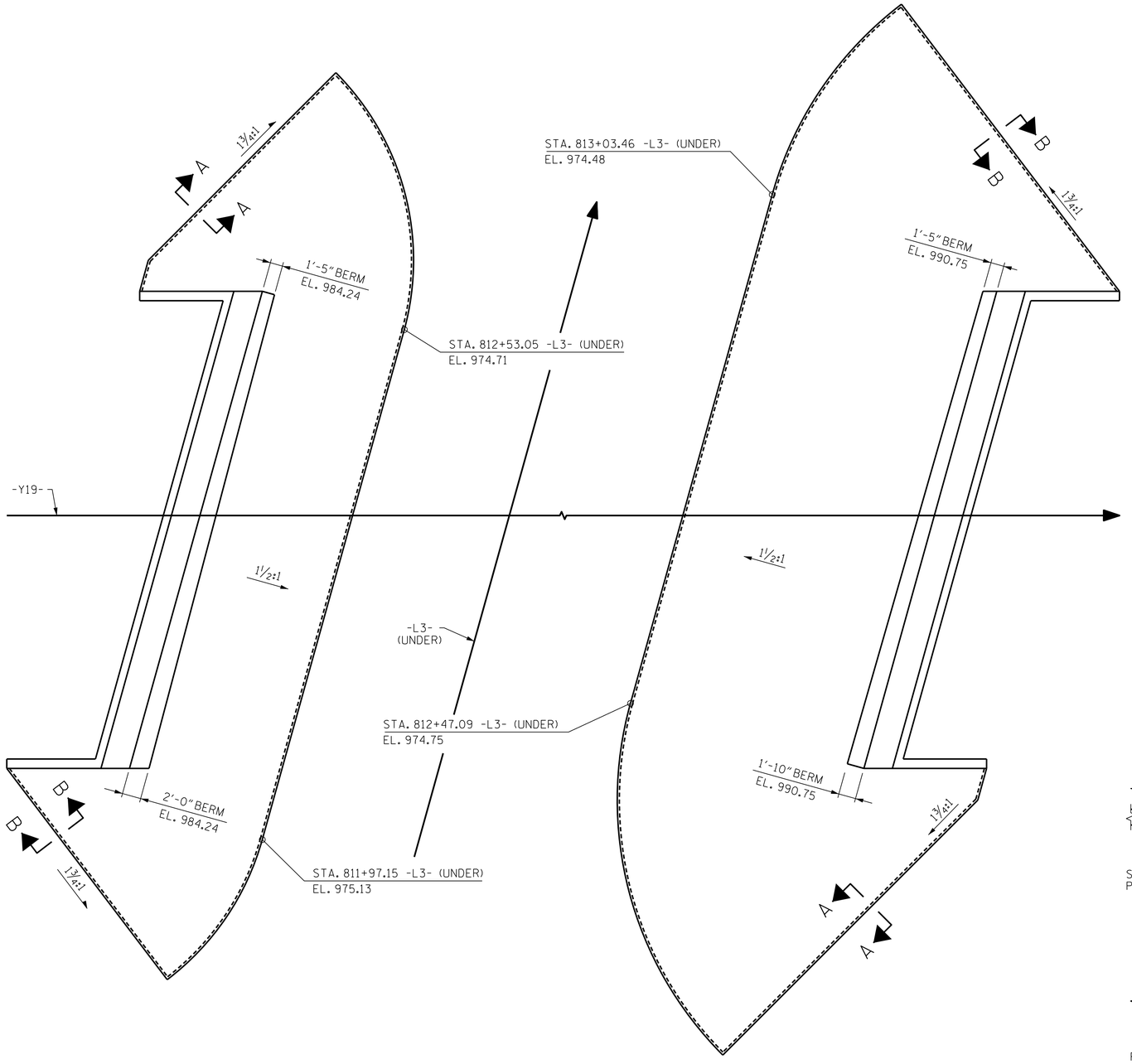
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-30
1			3			TOTAL SHEETS
2			4			34

STR. #3

4/22/2020
403.059.R2233BB.SMU.E23.800662.dgn



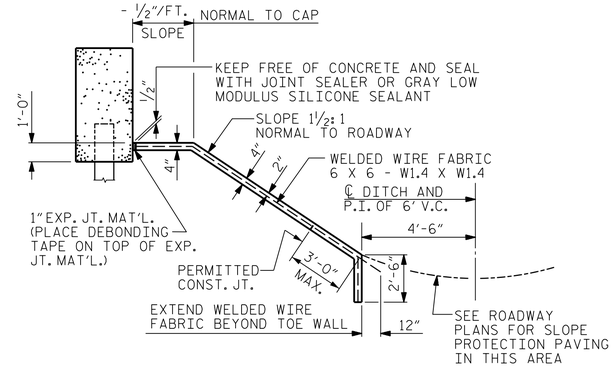
PLAN

GENERAL NOTES

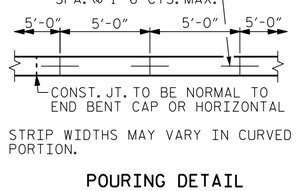
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 20+88.94 -Y19-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	212	385
END BENT 2	377	680

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

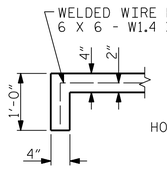


SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH

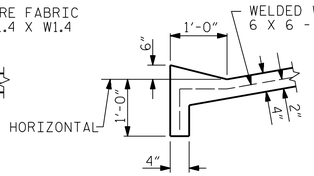


STRIP WIDTHS MAY VARY IN CURVED PORTION.

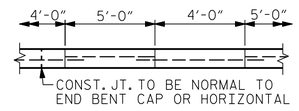
POURING DETAIL



SECTION A-A



SECTION B-B



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SLOPE PROTECTION

DRAWN BY : ELR 5/92	REV. 12/21/11 MAA/GM
CHECKED BY : GRP 6/92	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC

DESIGNED BY:	B. LOFLIN	DATE :	AUG 2019
DRAWN BY:	K. WHITE	DATE :	AUG 2019
CHECKED BY:	J. BORUTA	DATE :	AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

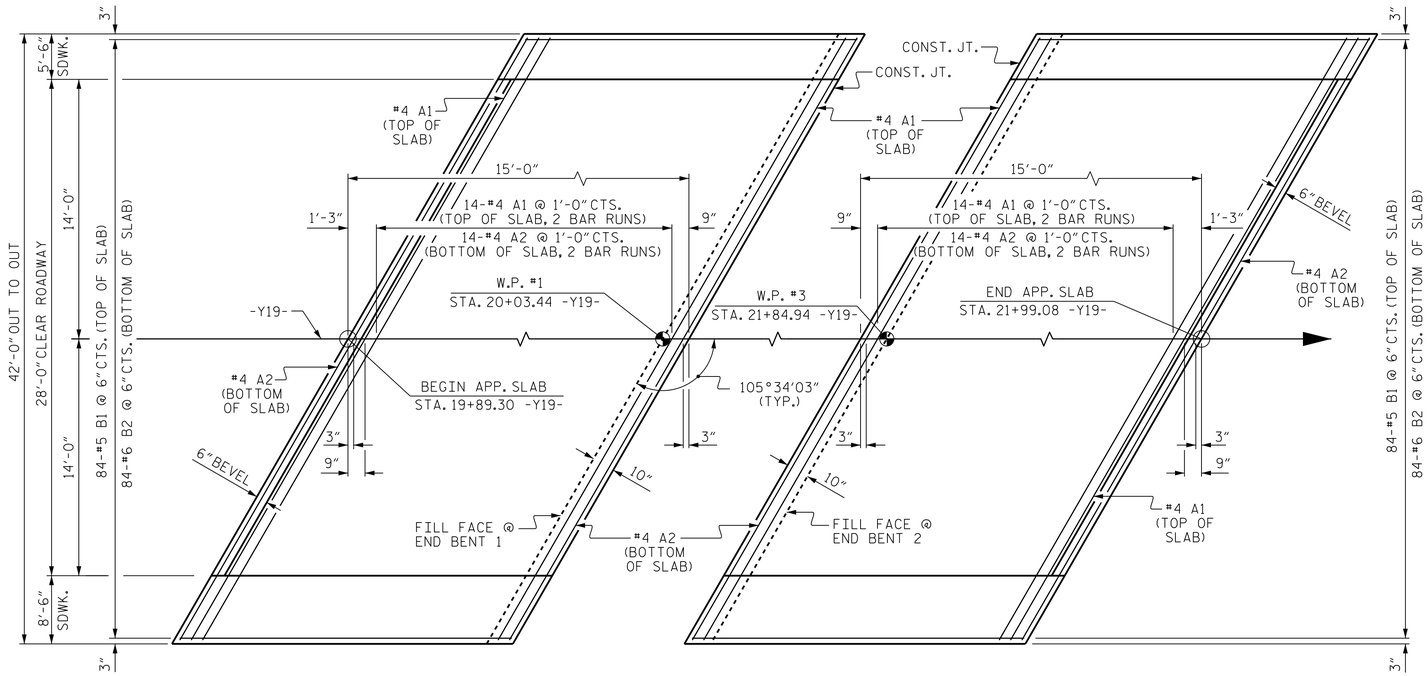
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-31
1			3			TOTAL SHEETS
2			4			34

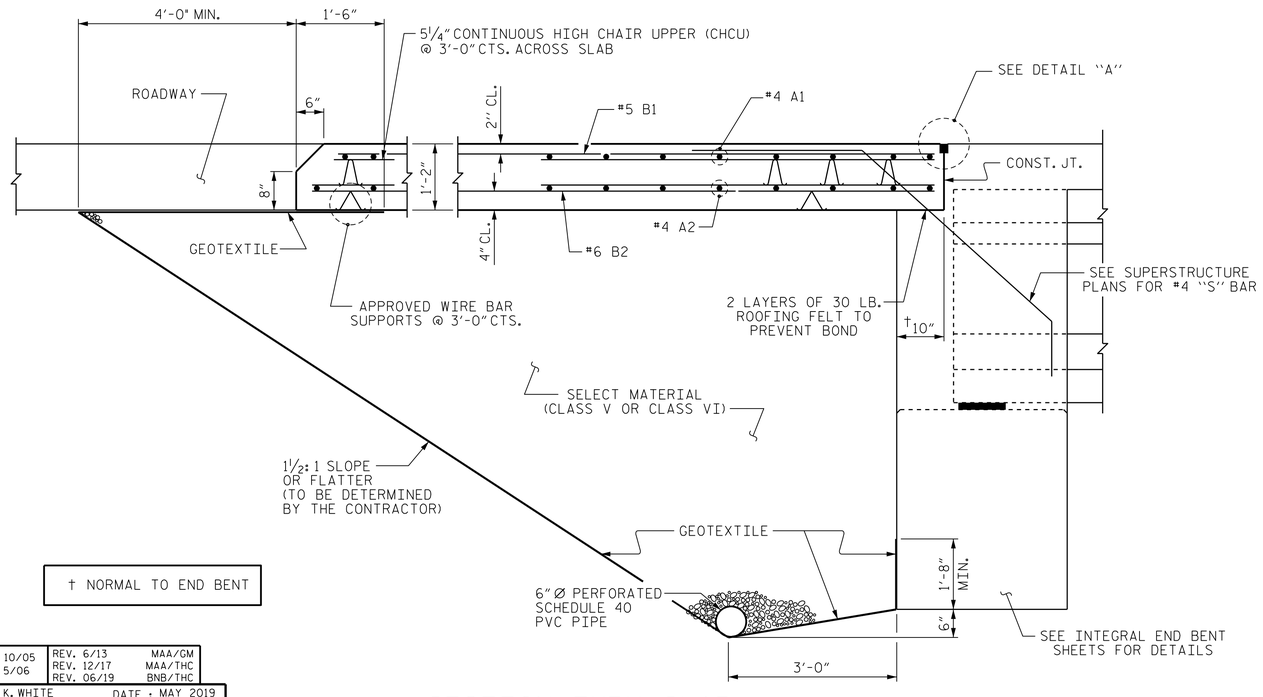
STR. #3 STD. NO. SP2

4/22/2020
403.061.R2233BB.SMU.SP_800662.dgn



PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
SEE SHEET 3 OF 3 FOR SIDEWALK DETAILS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

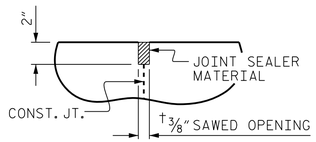
SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

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

AT THE CONTRACTOR'S OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 3 FOR DETAILS AND NOTES.



DETAIL "A"

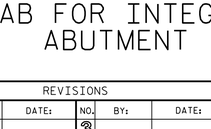
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	32	#4	STR	22'-7"	483
A2	32	#4	STR	22'-5"	479
✱ B1	84	#5	STR	14'-0"	1227
B2	84	#6	STR	14'-6"	1829
✱ B3	10	#4	STR	14'-6"	97
✱ G1	15	#4	STR	5'-2"	52
✱ G2	15	#4	STR	8'-3"	83
✱ U1	15	#4	1	3'-4"	33

REINFORCING STEEL	LBS.	2308
✱EPOXY COATED REINFORCING STEEL	LBS.	1975
CLASS AA CONCRETE	C.Y.	32.1

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

NOTE: SIDEWALK QUANTITIES INCLUDED IN BILL OF MATERIAL.

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 20+88.94 -Y19-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-32
1			3			TOTAL SHEETS
2			4			34

STR. #3 STD. NO. BAS5

DRAWN BY : TLA 10/05	REV. 6/13	MAA/GM
CHECKED BY : GM 5/06	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC

DESIGNED BY:	K. WHITE	DATE : MAY 2019
DRAWN BY:	K. WHITE	DATE : MAR 2019
CHECKED BY:	J. BORUTA	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

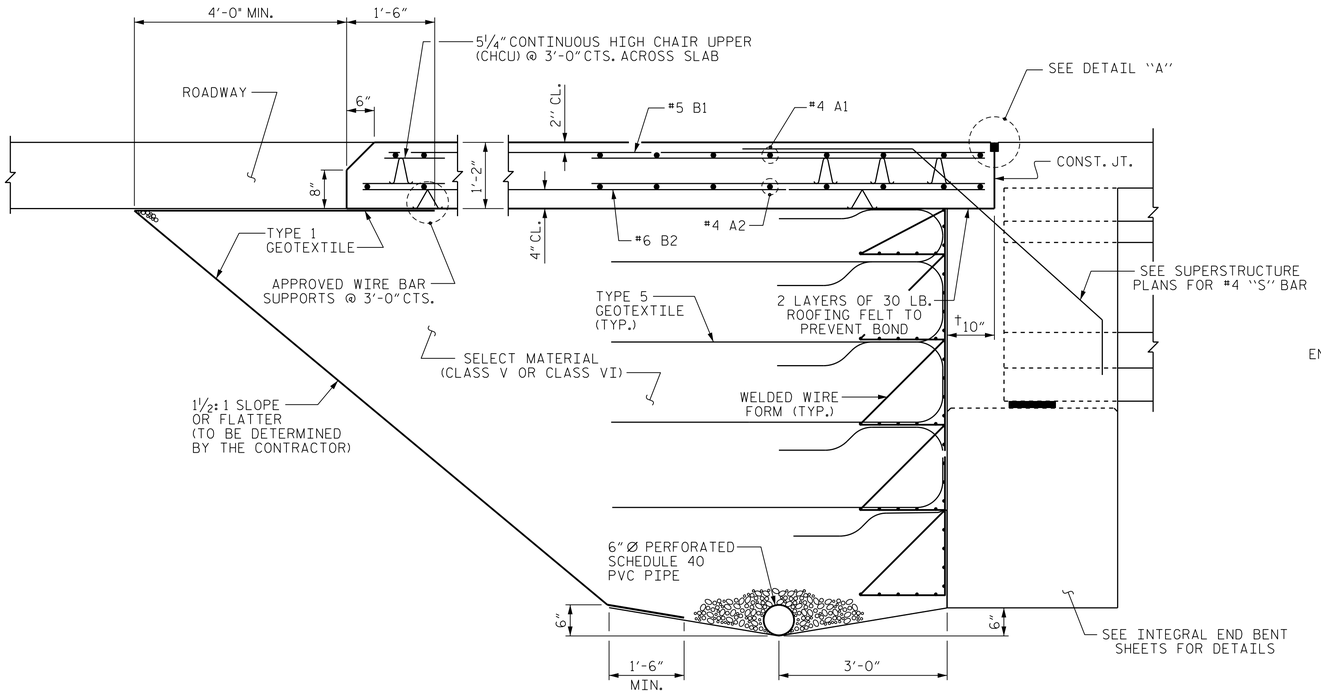
4/22/2020
403_063_R2233BB_SMU_ASL_800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

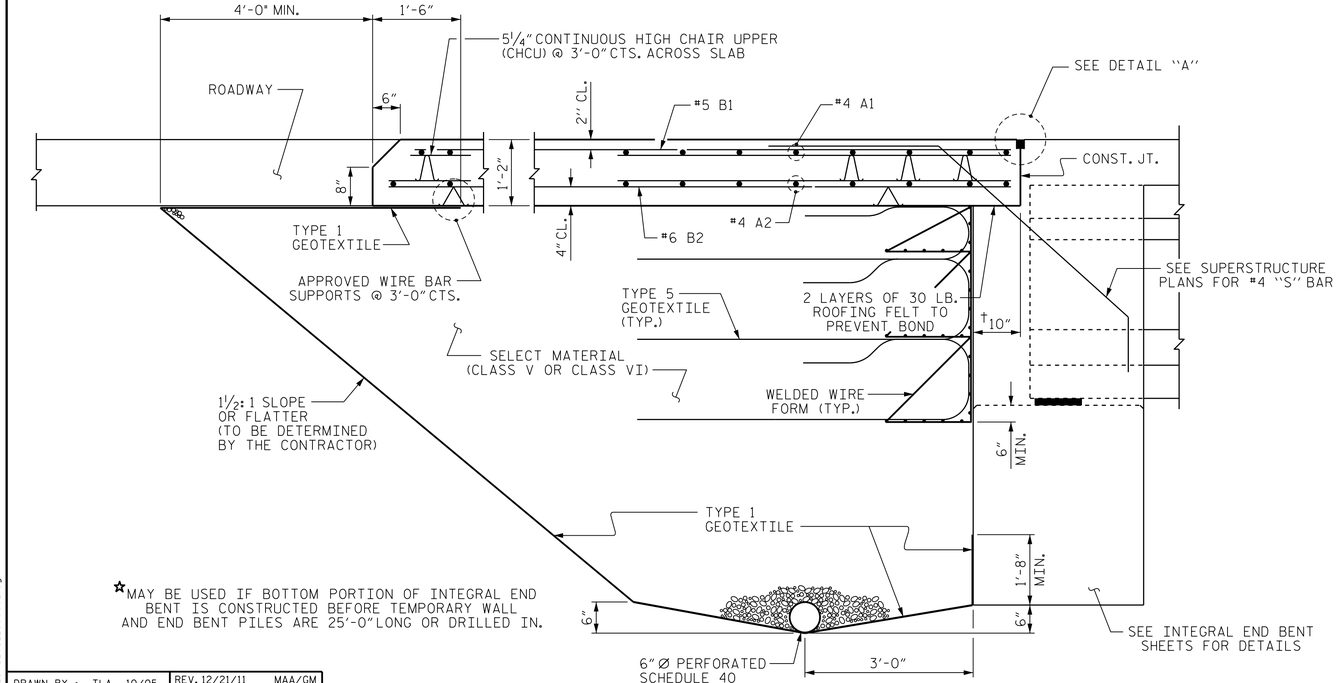
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020

DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...



SECTION THRU SLAB

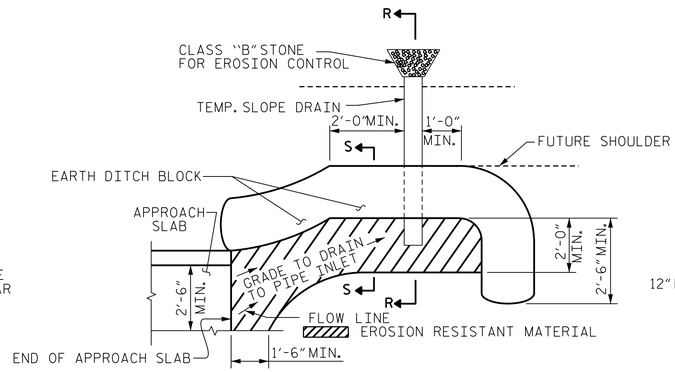
(TYPE A - ALTERNATE APPROACH FILL)



☆MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

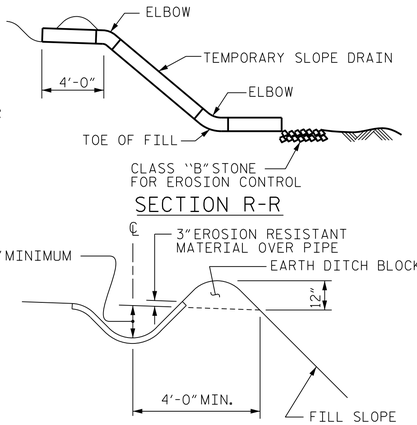
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)



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

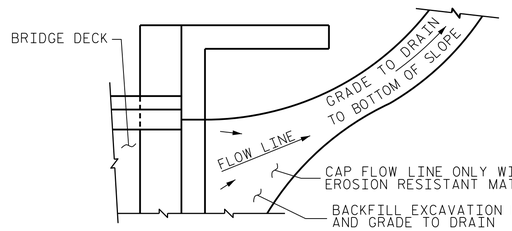


SECTION R-R

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

NOTES

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

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

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

DRAWN BY : TLA 10/05	REV. 12/21/11	MAA/GM
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY: K. WHITE	DATE : AUG 2019	
DRAWN BY: K. WHITE	DATE : AUG 2019	
CHECKED BY: J. BORUTA	DATE : AUG 2019	
DESIGN ENGINEER OF RECORD: J. DOUGHTY	DATE : NOV 2019	

4/22/2020
403_065_R2233BB_SMU_AS2_800662.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

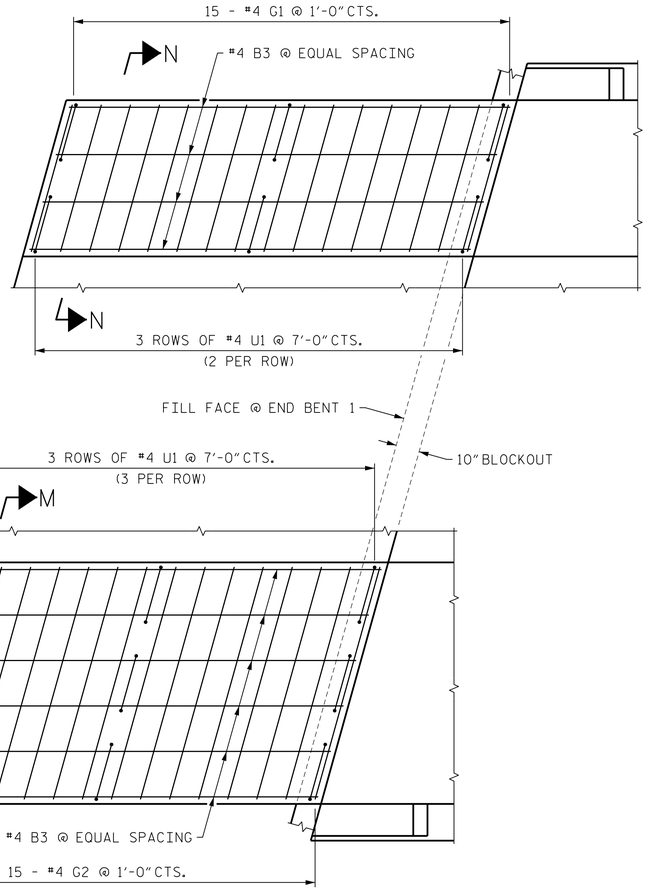
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

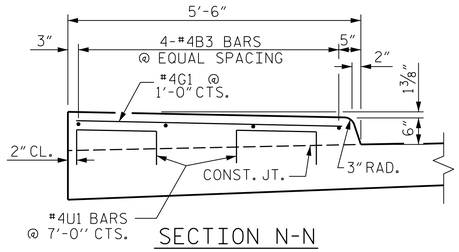
BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-33
1			3			TOTAL SHEETS
2			4			34

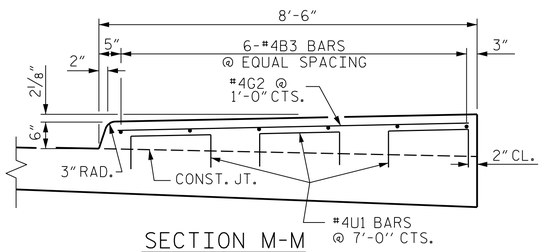
STR. #3 STD. NO. BAS5



PLAN



SECTION N-N



SECTION M-M

SIDEWALK DETAILS

BEGIN APPROACH SLAB SHOWN,
END APPROACH SLAB SIMILAR

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 20+88.94 -Y19-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

DESIGNED BY:	K. WHITE	DATE : MAY 2019				
DRAWN BY:	K. WHITE	DATE : MAR 2019				
CHECKED BY:	J. BORUTA	DATE : AUG 2019				
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019				

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

REV. 12/21/11 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

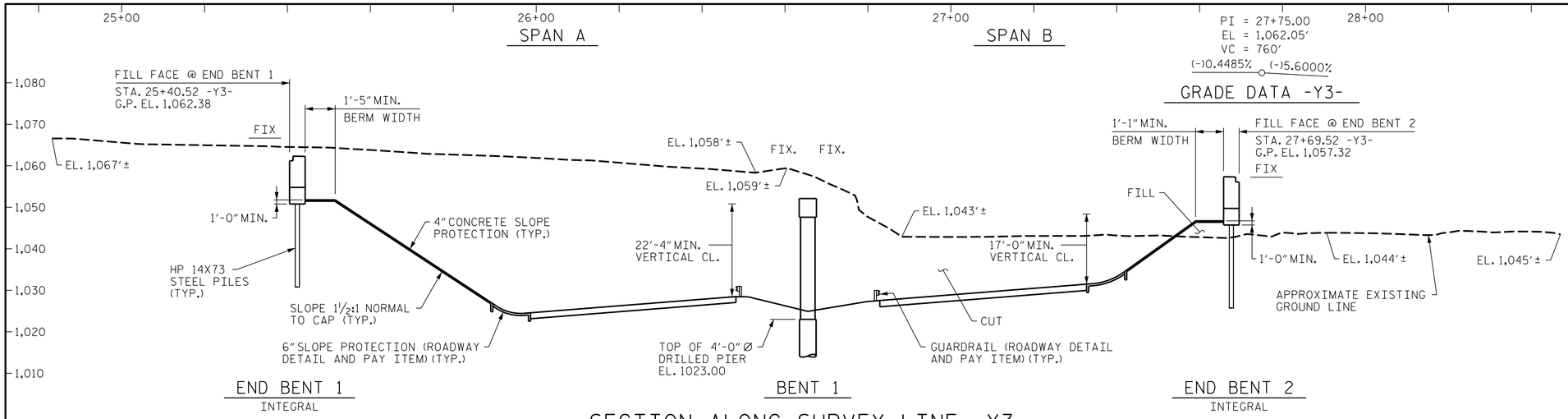
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/23/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-34
1			3			TOTAL SHEETS
2			4			34

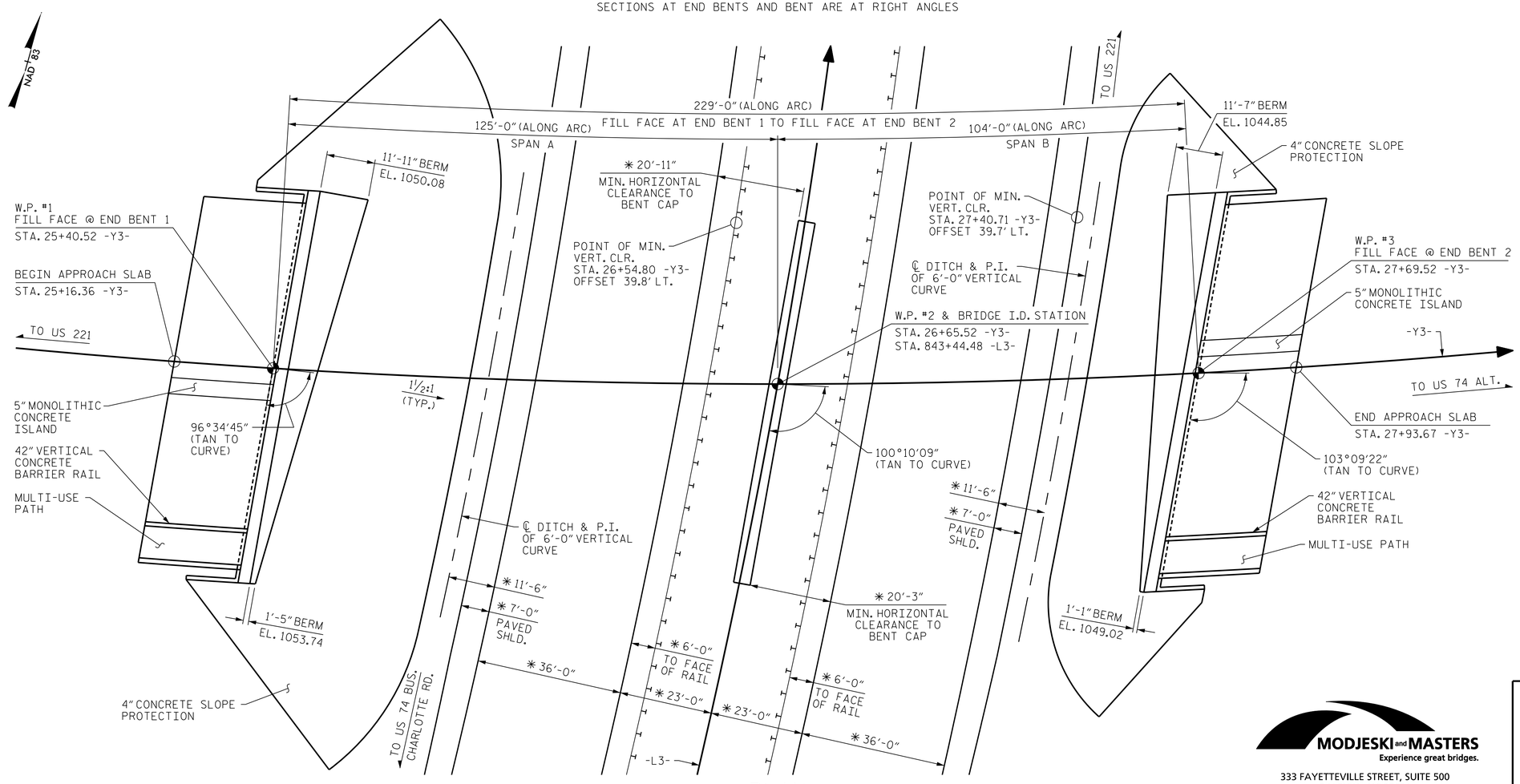
STR. #3 STD. NO. BAS5

4/22/2020
403.067.R2233BB_SMU.AS3.800662.dgn



SECTION ALONG SURVEY LINE -Y3-

SECTIONS AT END BENTS AND BENT ARE AT RIGHT ANGLES



PLAN

* DENOTES RADIAL DIMENSION
PILES, COLUMNS AND DRILLED PIERS NOT SHOWN FOR CLARITY

HORIZONTAL CURVE DATA

-Y3-		-L3-	
PI STA.	29+65.27	PI STA.	843+01.87
Δ	= 65°38'00.8" (LT)	Δ	= 24°12'57.0" (LT)
D	= 2°52'19.1"	D	= 2°59'59.2"
L	= 2,285.32'	L	= 807.25'
T	= 1,286.52'	T	= 409.74'
R	= 1,995.00'	R	= 1,910.00'
SE	= 0.04	SE	= 0.08

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 26+65.52 -Y3-
843+44.48 -L3-

SHEET 1 OF 4 BRIDGE NO. 663

STR. #4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 64
OVER US 221 RUTHERFORDTON BYPASS
BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-1
1			3			TOTAL SHEETS
2			4			45

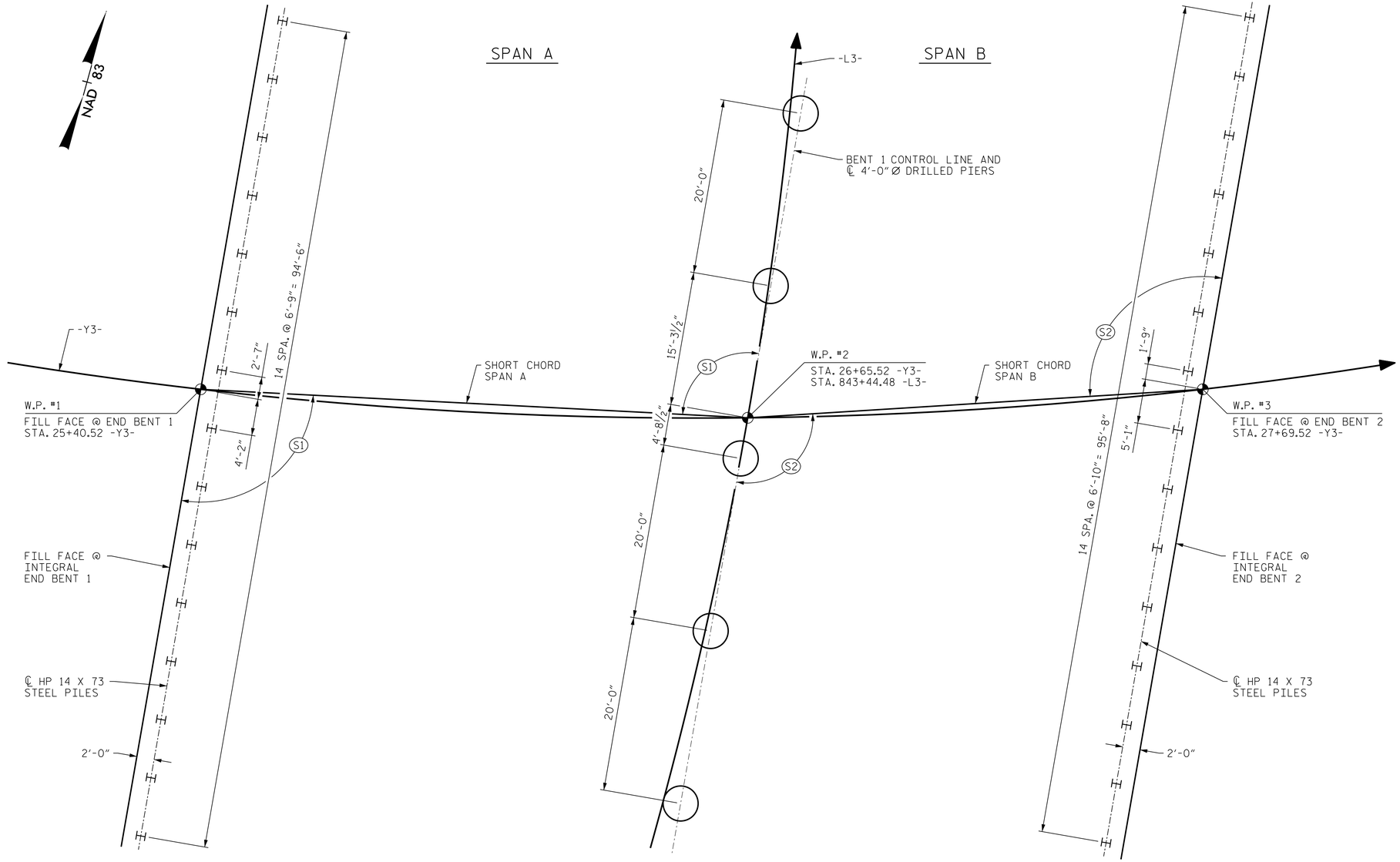
DESIGNED BY:	J. BORUTA	DATE : AUG 2019
DRAWN BY:	K. WHITE	DATE : AUG 2019
CHECKED BY:	B. LOFLIN	DATE : AUG 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : NOV 2019

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty
5F73FA2DEA974E8...

4/22/2020
404.001.R2233BB.SWU.G01.B00663.dgn



INTEGRAL END BENT 1

BENT 1

INTEGRAL END BENT 2

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE ℄ OF PILES AND DRILLED PIERS. ORIENT PILES AS SHOWN)

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 161 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 268 TONS PER PILE.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 750 TONS/PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 140 TSF.

INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 1003 FT, SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 9 FT INTO ROCK AS DEFINED BY ARTICLE 411 OF THE STANDARD SPECIFICATIONS.

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

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 146 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 243 TONS PER PILE.

ANGLES	
SHORT CHORD	
S1	98°-22'-27"
S2	101°-39'-45"

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 26+65.52 -Y3-

DESIGNED BY:	J. BORUTA	DATE :	JUNE 2019		
DRAWN BY:	K. WHITE	DATE :	JUNE 2019		
CHECKED BY:	B. LOFLIN	DATE :	AUG 2019		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019		

4/22/2020
404_003_R2233BB_SMU_FL_800663.dgn

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

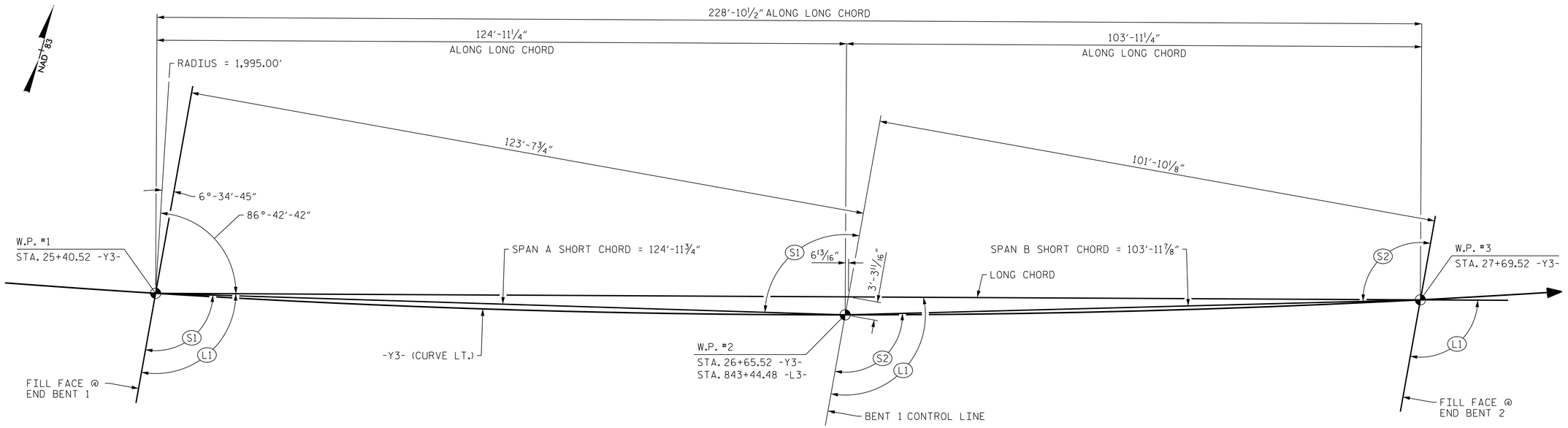
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 64
OVER US 221 RUTHERFORDTON BYPASS
BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-2
1			3			TOTAL SHEETS
2			4			45

STR. #4



LONG CHORD LAYOUT

BENT AND END BENTS ARE PARALLEL

ANGLES			
LONG CHORD		SHORT CHORD	
L1	99°-52'-03"	S1	98°-22'-27"
		S2	101°-39'-45"

HORIZONTAL CURVE DATA

-Y3-

PI STA. 29+65.27
Δ = 65°38'00.8"(LT)
D = 2°52'19.1"
L = 2,285.32'
T = 1,286.52'
R = 1,995.00'
SE = 0.04

PROJECT NO. R-2233BB

RUTHERFORD COUNTY

STATION: 26+65.52 -Y3-

SHEET 3 OF 4

STR. #4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 64
OVER US 221 RUTHERFORDTON BYPASS
BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-3
1			3			TOTAL SHEETS
2			4			45

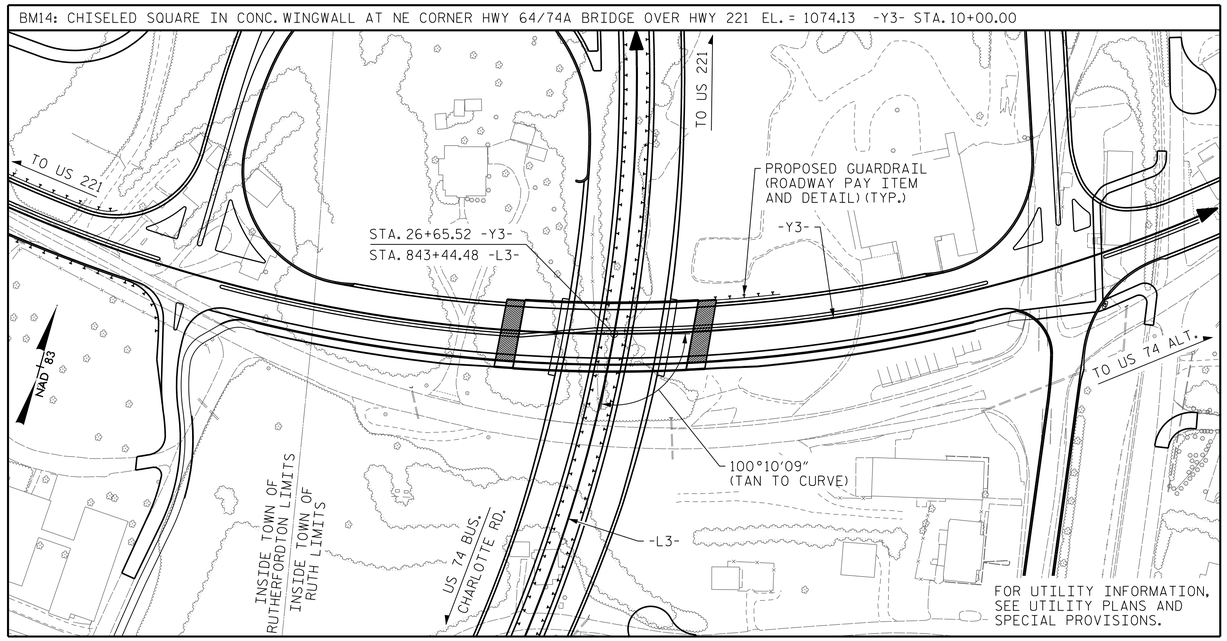
MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	MAR 2019
DRAWN BY:	K. WHITE	DATE :	MAR 2019
CHECKED BY:	B. LOFLIN	DATE :	JULY 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
404_005_R2233BB_SMU_LC_800663.dgn



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

WORK SHALL NOT BE STARTED ON END BENT 1 OR BENT 1 UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

TOTAL BILL OF MATERIAL

	4'-0" DRILLED PIER IN SOIL	4'-0" DRILLED PIER IN NOT SOIL	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 26+65.52 -Y3-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LIN. FT.	LIN. FT.	EACH	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE				20,818	22,578		LUMP SUM		
END BENT 1						78.4		9,410	
BENT 1	50.0	50.0	1			117.9		35,874	5,848
END BENT 2						78.3		9,313	
TOTAL	50.0	50.0	1	20,818	22,578	274.6	LUMP SUM	54,597	5,848

	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SET UP FOR HP 14x73 STEEL PILES	HP 14x73 STEEL PILES		TWO BAR METAL RAIL	VERTICAL CONCRETE BARRIER RAIL	1'-2" x 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	NO.	LIN. FT.	EACH	NO.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	20	2,254.90				496.77	277.14	504.55		LUMP SUM
END BENT 1			15	15	375				954	
BENT 1										
END BENT 2			15	15	565				479	
TOTAL	20	2,254.90	30	30	940	496.77	277.14	504.55	1,433	LUMP SUM

PROJECT NO. R-2233BB
RUTHERFORD COUNTY
STATION: 26+65.52 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 64
OVER US 221 RUTHERFORDTON BYPASS
BETWEEN US 221 AND US 74 ALT.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-4
1			3			TOTAL SHEETS
2			4			45

STR. #4

MODJESKI and MASTERS
Experience great bridges.
333 FAYETTEVILLE STREET, SUITE 500
RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
4/22/2020
DocuSigned by: Jason R Doughty 5F73FA2DEA974E8...

DESIGNED BY:	J. BORUTA	DATE :	JULY 2019
DRAWN BY:	K. WHITE	DATE :	MAY 2019
CHECKED BY:	B. LOFLIN	DATE :	SEPT 2019
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	NOV 2019

4/22/2020
404_007_R2233BB_SMU_TBM_800663.dgn