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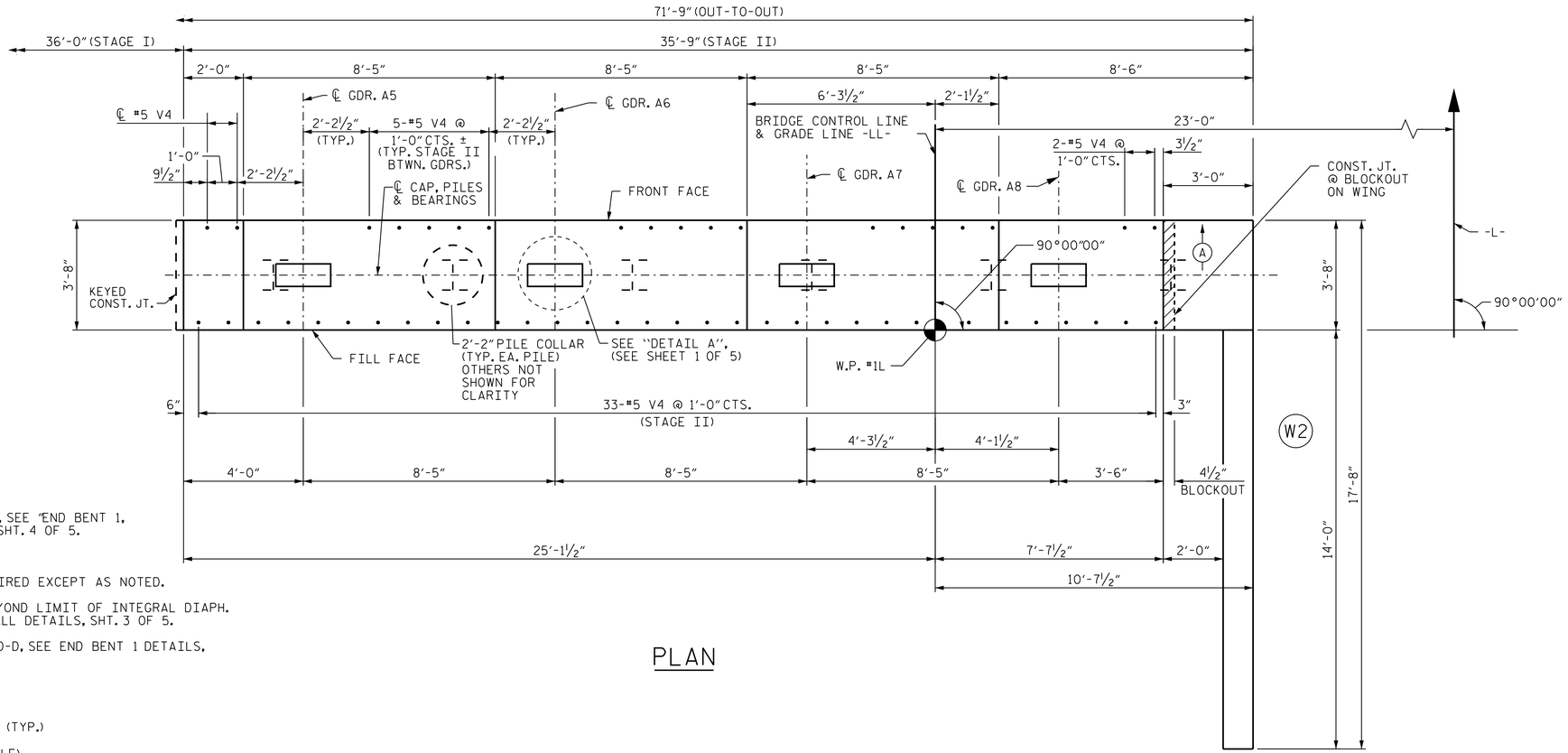


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHT. 4 OF 5.

(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

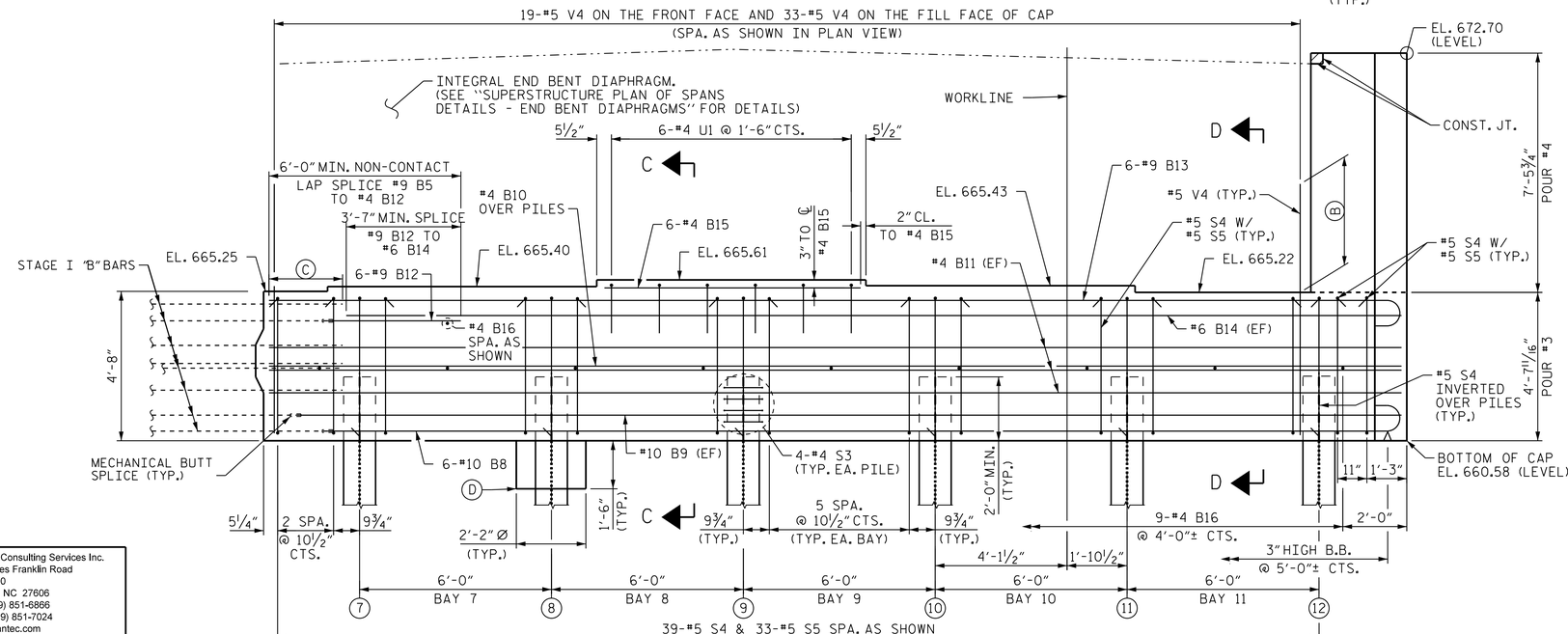
(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 1 WING WALL DETAILS, SHT. 3 OF 5.

FOR SECTIONS C-C AND D-D, SEE END BENT 1 DETAILS, SHEET 5 OF 5.

(B) #5 V4 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT

(C) 2'-5" MIN. SPLICE LENGTH (TYP.)

(D) PILE COLLAR (TYP. EA. PILE) OTHERS NOT SHOWN FOR CLARITY



ELEVATION

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CHECKED BY : S.S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-36
1			3			TOTAL SHEETS
2			4			56

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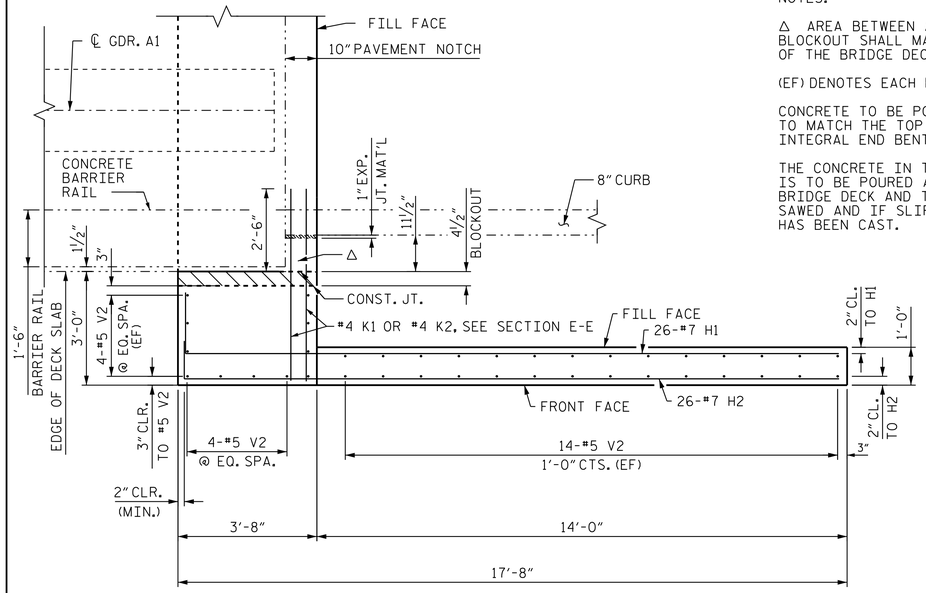
NOTES:

△ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.

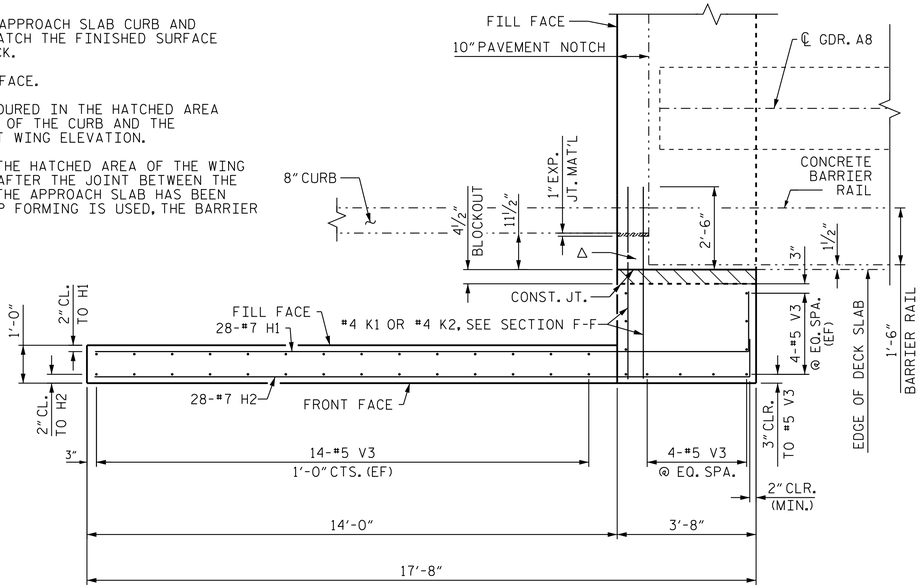
(EF) DENOTES EACH FACE.

CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.

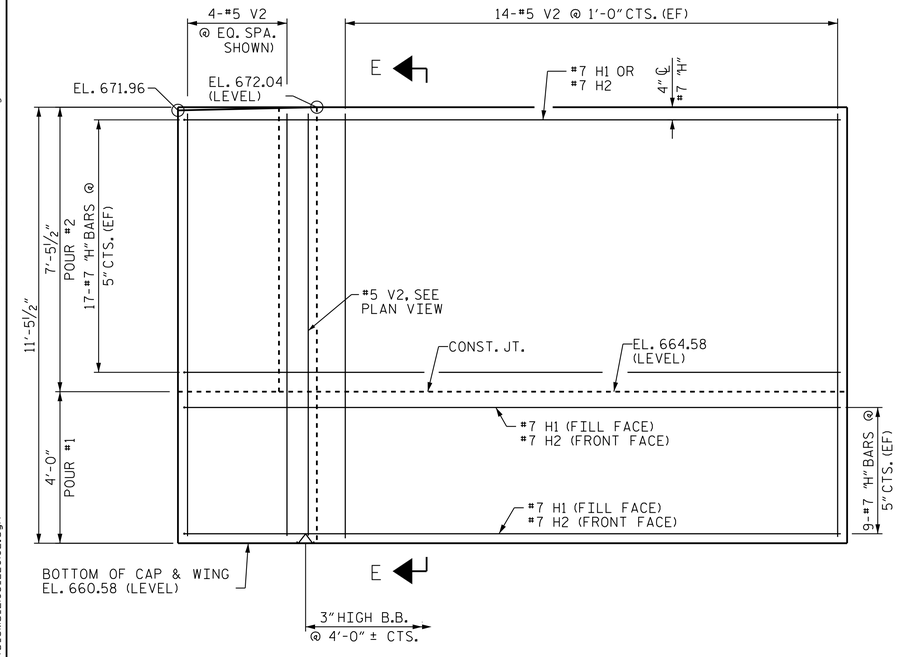
THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.



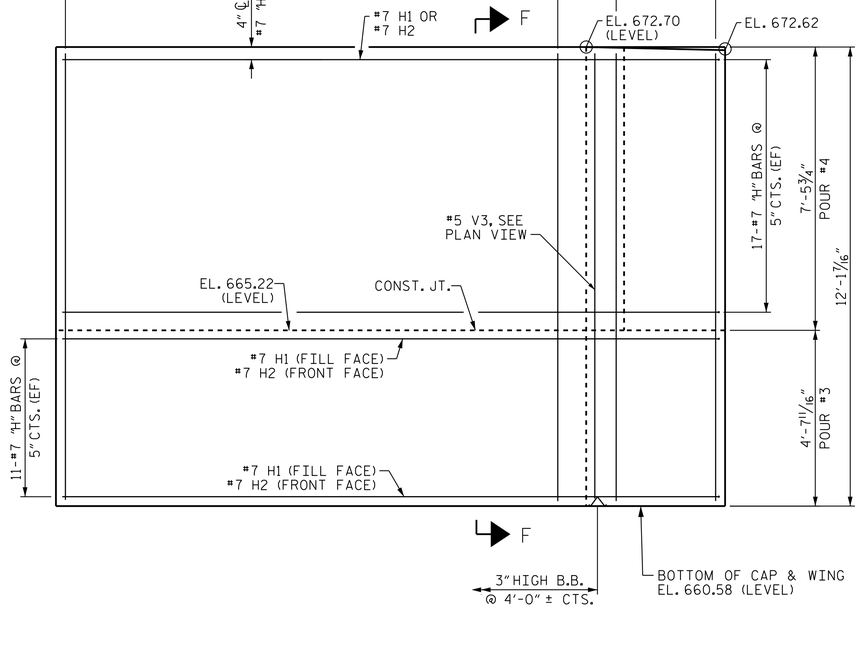
PLAN OF LEFT WING (W1)



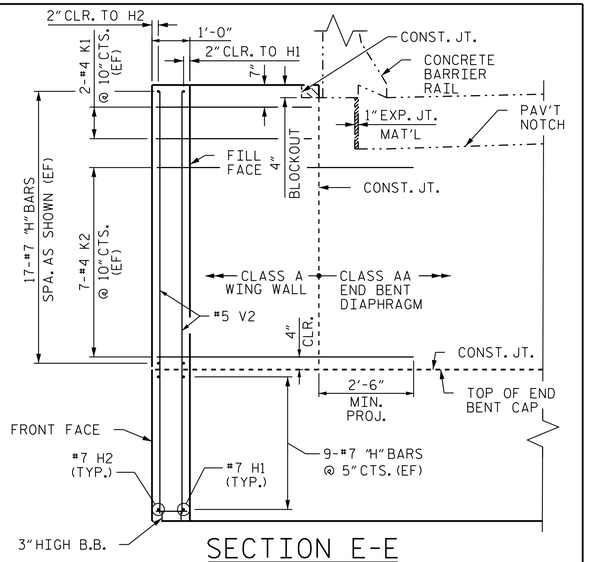
PLAN OF RIGHT WING (W2)



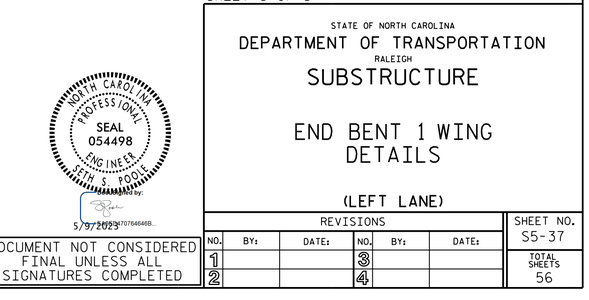
ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)



SECTION E-E



SECTION F-F

PROJECT NO. R-2707D

CLEVELAND COUNTY

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SUBSTRUCTURE

END BENT 1 WING DETAILS

(LEFT LANE)

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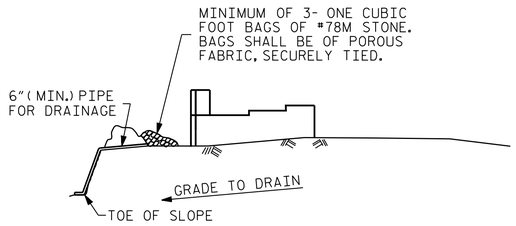
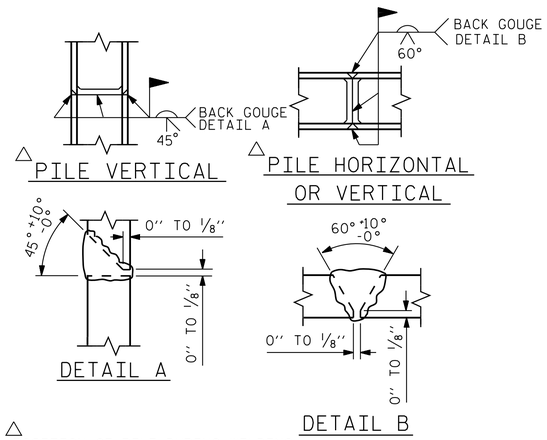


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

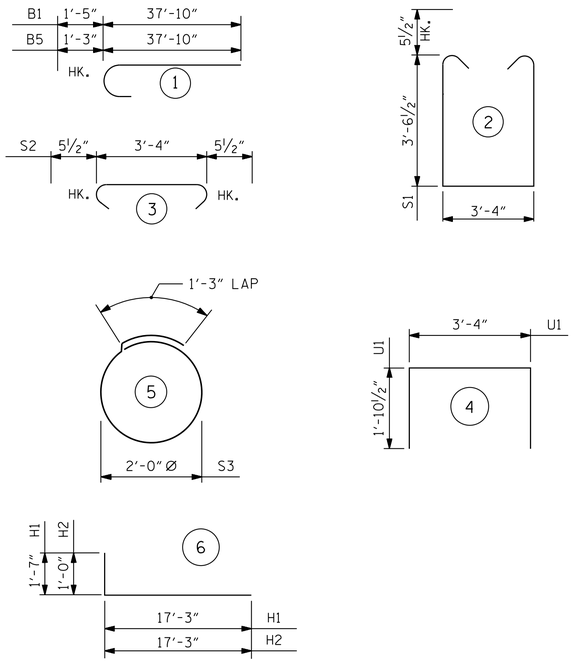
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

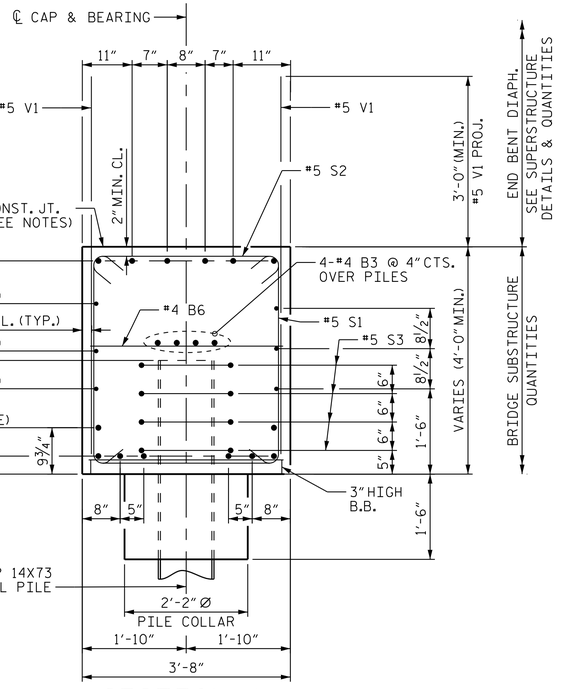
BILL OF MATERIAL

END BENT 1 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	39'-3"	1014
B2	2	#10	STR	36'-10"	317
B3	4	#4	STR	38'-5"	103
B4	6	#4	STR	38'-5"	154
B5	6	#9	1	39'-1"	798
B6	9	#4	STR	3'-4"	21
B7	6	#4	STR	15'-4"	62
H1	26	#7	6	18'-10"	1001
H2	26	#7	6	18'-3"	970
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S1	41	#5	2	11'-4"	485
S2	35	#5	3	4'-3"	156
S3	24	#4	5	7'-7"	122
U1	9	#4	4	7'-1"	43
V1	55	#5	STR	7'-5"	426
V2	39	#5	STR	11'-0"	448

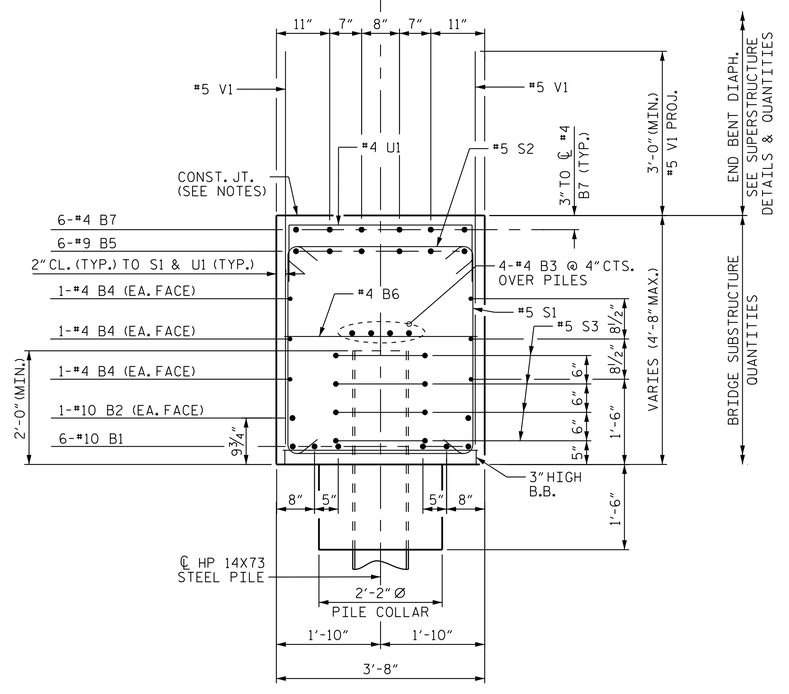
REINFORCING STEEL LBS. 6,177

CLASS A CONCRETE BREAKDOWN:	
POUR#1: CAP, COLLARS, & WINGS	C.Y. 24.2
POUR#2: UPPER WINGS	C.Y. 7.0
CLASS A CONCRETE TOTAL	C.Y. 31.2



SECTION A-A

SEE "END BENT 1", SHEET 1 OF 5.



SECTION B-B

SEE "END BENT 1", SHEET 1 OF 5.

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS (STAGE I)

(LEFT LANE)

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1			3			TOTAL SHEETS
2			4			56

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5/9/2023

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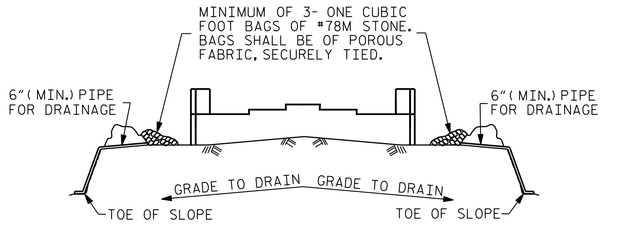

BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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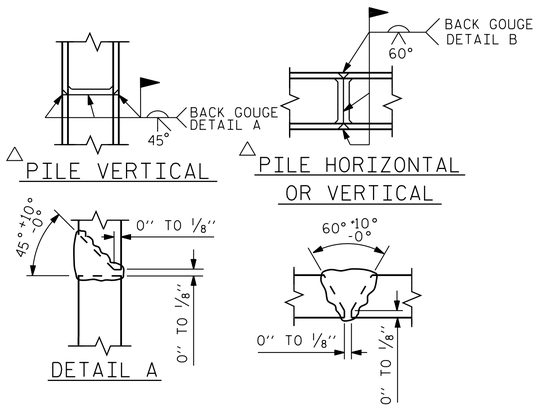
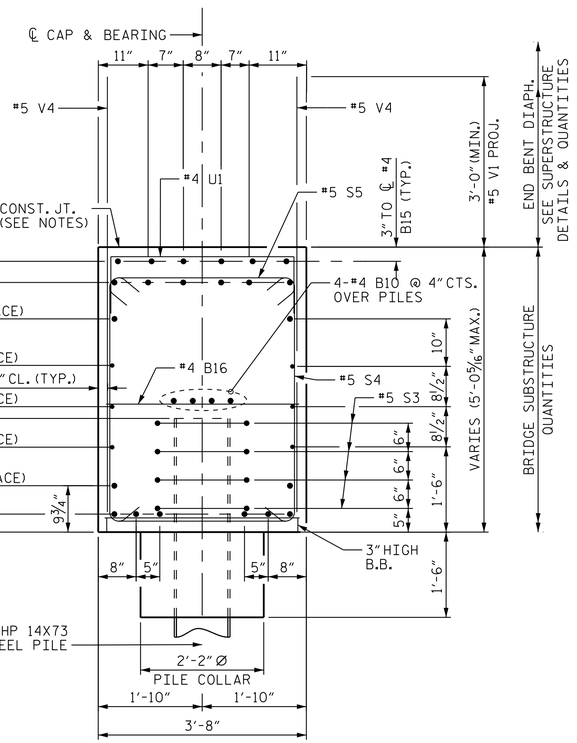
TEMPORARY DRAINAGE AT END BENT



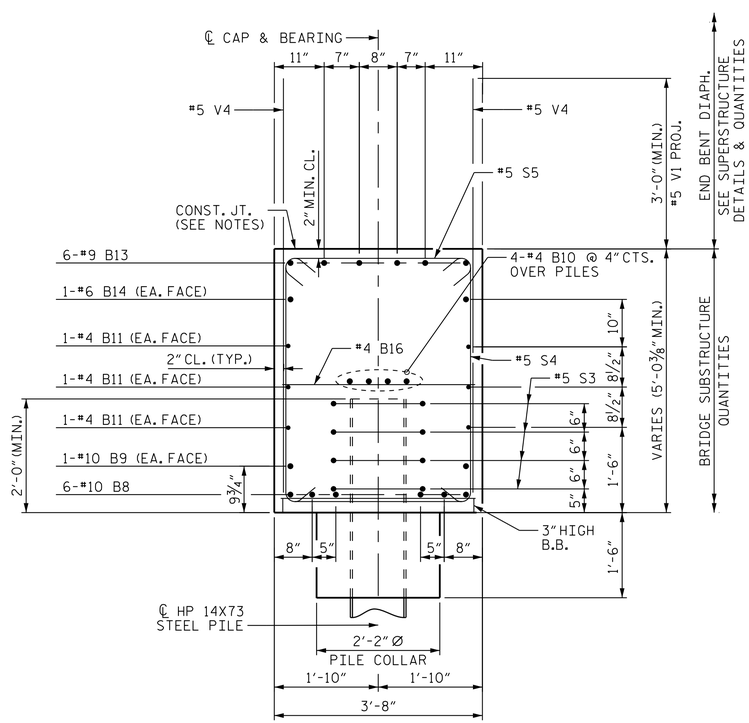
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION C-C

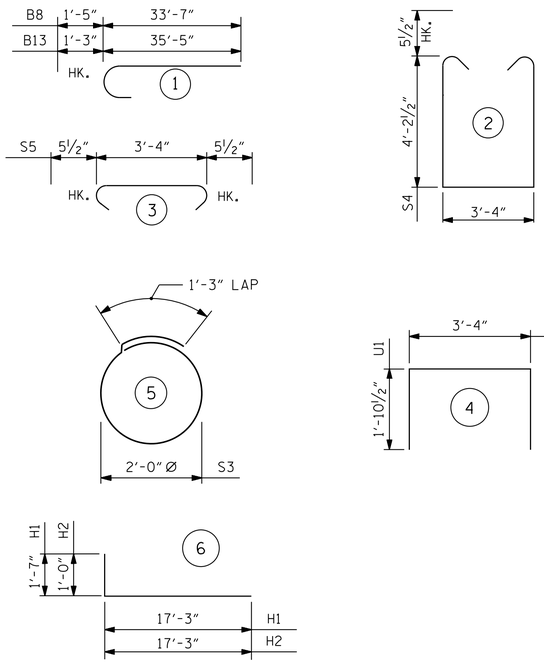
SEE "END BENT 1", SHEET 2 OF 5.



SECTION D-D

SEE "END BENT 1", SHEET 2 OF 5.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B8	6	#10	1	35'-0"	904
B9	2	#10	STR	34'-7"	298
B10	4	#4	STR	35'-5"	95
B11	6	#4	STR	35'-5"	142
B12	6	#9	STR	4'-2"	85
B13	6	#9	1	36'-8"	748
B14	2	#6	STR	33'-0"	100
B15	6	#4	STR	8'-1"	33
B16	10	#4	STR	3'-4"	23
H1	28	#7	6	18'-10	1078
H2	28	#7	6	18'-3"	1045
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S3	24	#4	5	7'-7"	122
S4	41	#5	2	12'-8"	542
S5	35	#5	3	4'-3"	156
U1	6	#4	4	7'-1"	29
V3	39	#5	STR	11'-8"	475
V4	52	#5	STR	7'-9"	421

REINFORCING STEEL	LBS. 6,353
CLASS A CONCRETE BREAKDOWN:	
POUR#3: CAP, COLLARS, & WINGS	C.Y. 27.3
POUR#4: UPPER WINGS	C.Y. 7.0
CLASS A CONCRETE TOTAL	C.Y. 34.3

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS (STAGE II)

(LEFT LANE)

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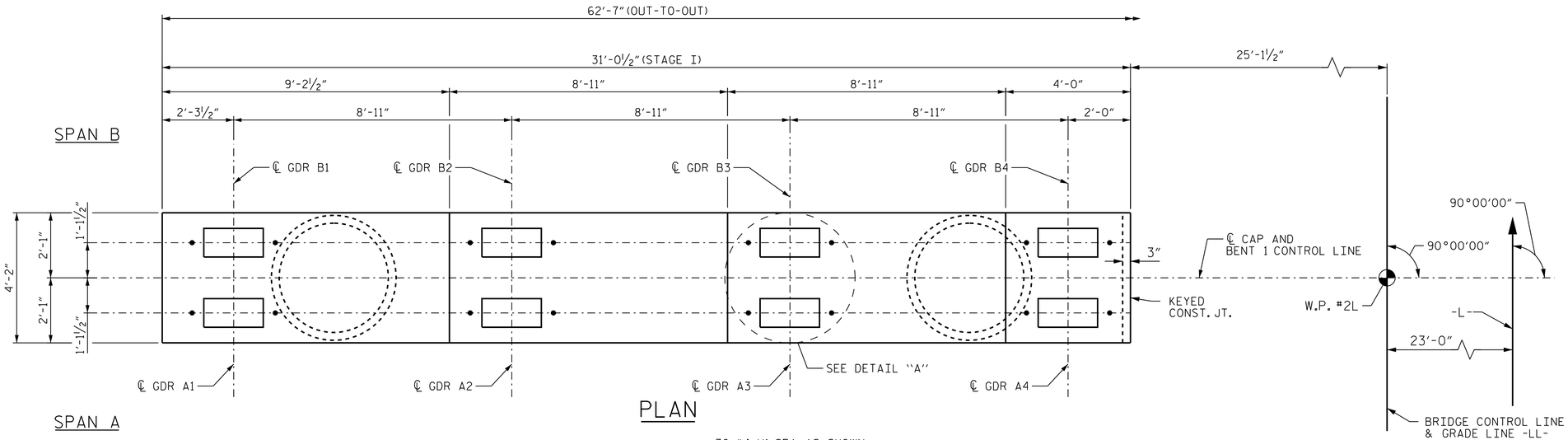


NOTES:

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

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR VIEW A-A, AND SECTION B-B, SEE "BENT 1 DETAILS" SHEET 4 OF 4.

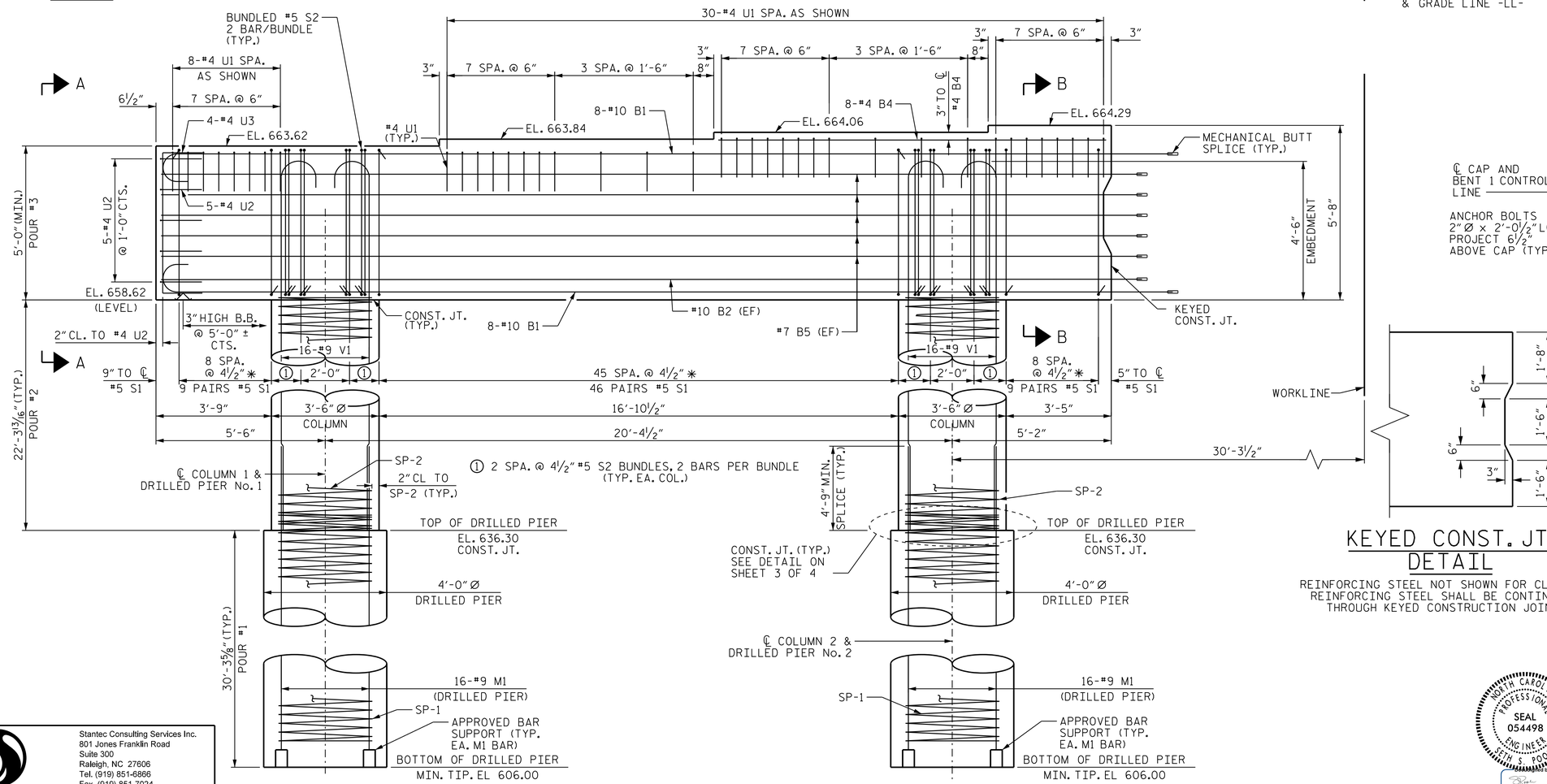
(EF) DENOTES EACH FACE.

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

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

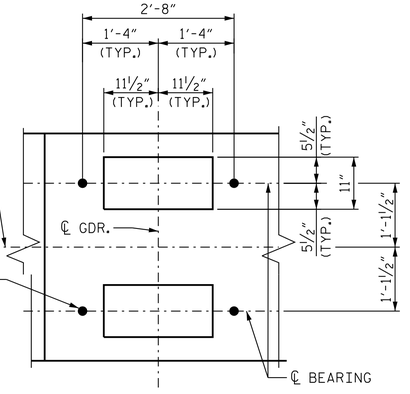
DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR PIERS LOCATED IN WATER.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.



ELEVATION

✳ INVERT ALTERNATE STIRRUPS PAIRS



DETAIL "A"

DIMENSIONS AND DETAILS SHOWN ARE TYPICAL FOR EA. BEARING @ EA. GIRDER.

KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 (STAGE I)

(LEFT LANE)

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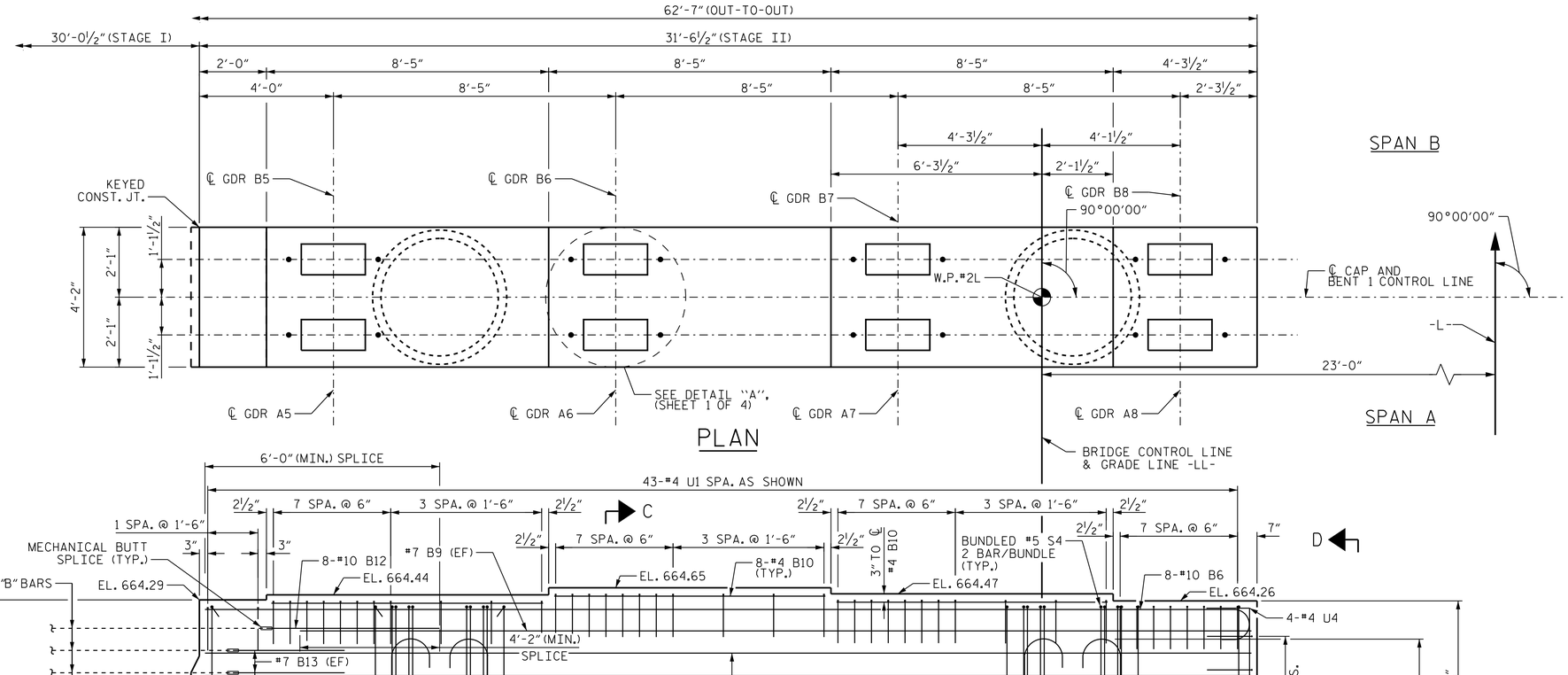
NOTES:

FOR SECTION C-C AND VIEW D-D, SEE "BENT 1 DETAILS" SHEET 4 OF 4.



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* INVERT ALTERNATE STIRRUPS PAIRS

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SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 (STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-41
1			3			TOTAL SHEETS
2			4			56

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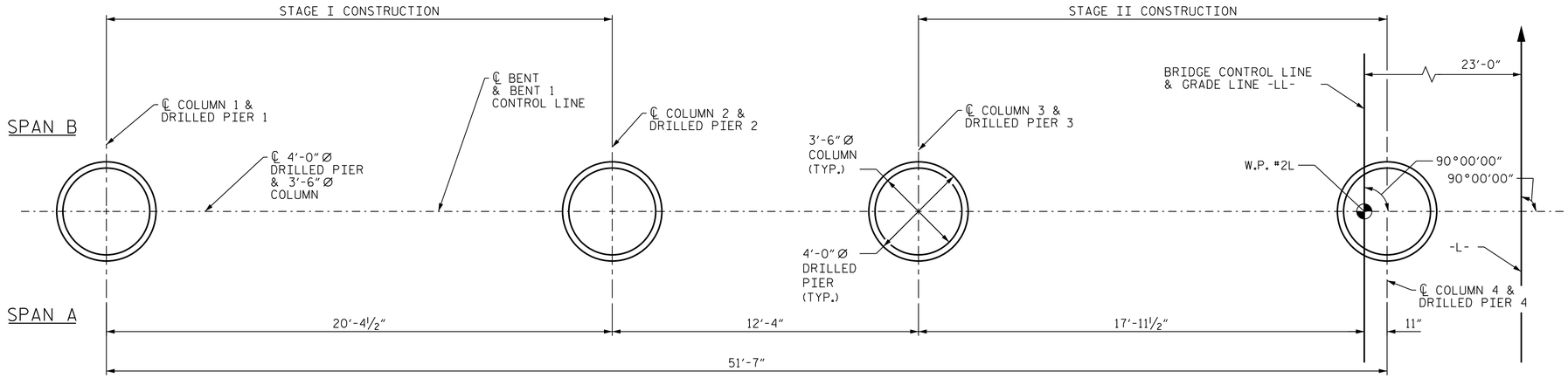
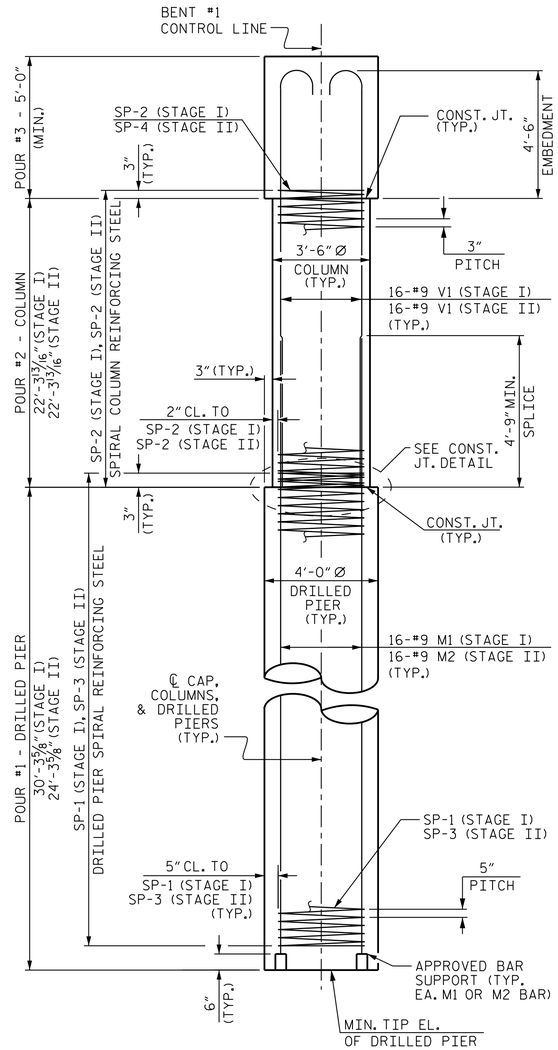
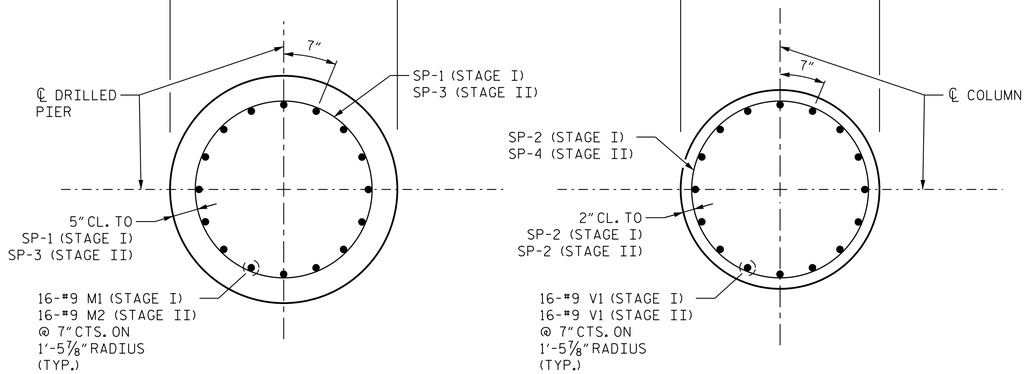




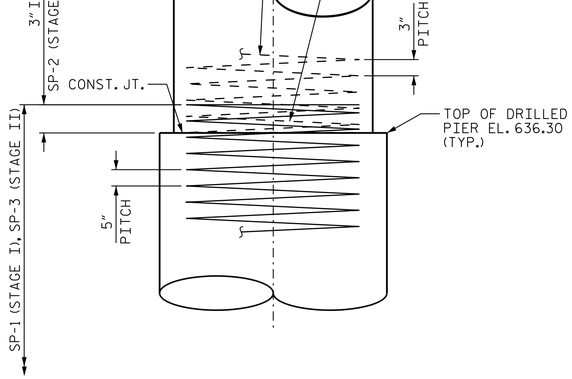
PLAN OF DRILLED PIERS

END ELEVATION



SECTION THRU DRILLED PIER TYPICAL ALL DRILLED PIERS

SECTION THRU COLUMN TYPICAL ALL COLUMNS



CONSTRUCTION JOINT DETAIL

LONGITUDINAL STEEL NOT SHOWN FOR CLARITY.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-42
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

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CHECKED BY :	S.S. POOLE	DATE :	01/25/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

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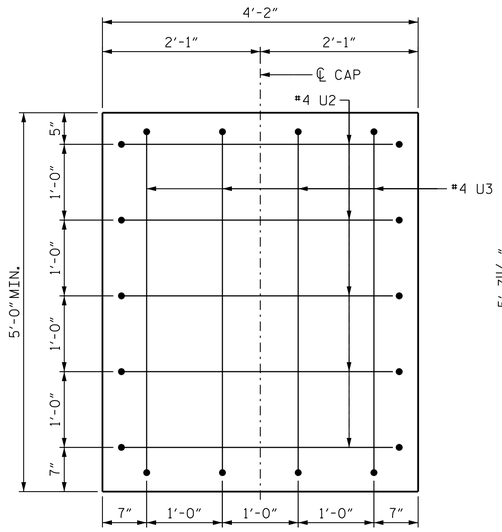
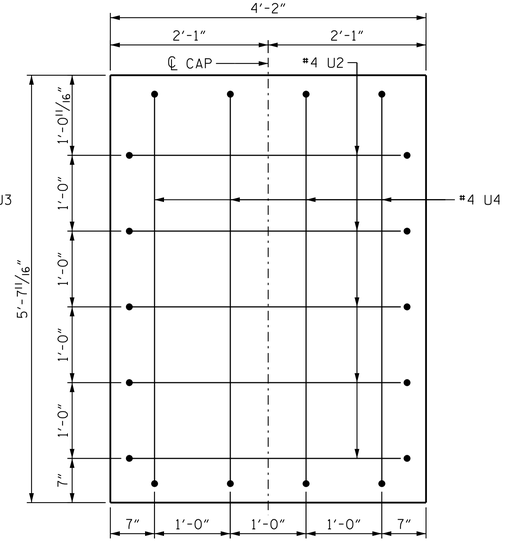
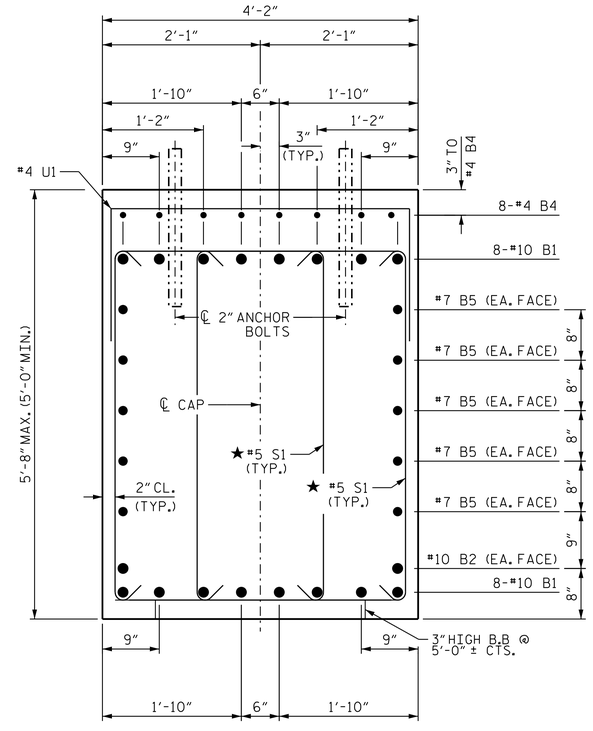


VIEW A-A

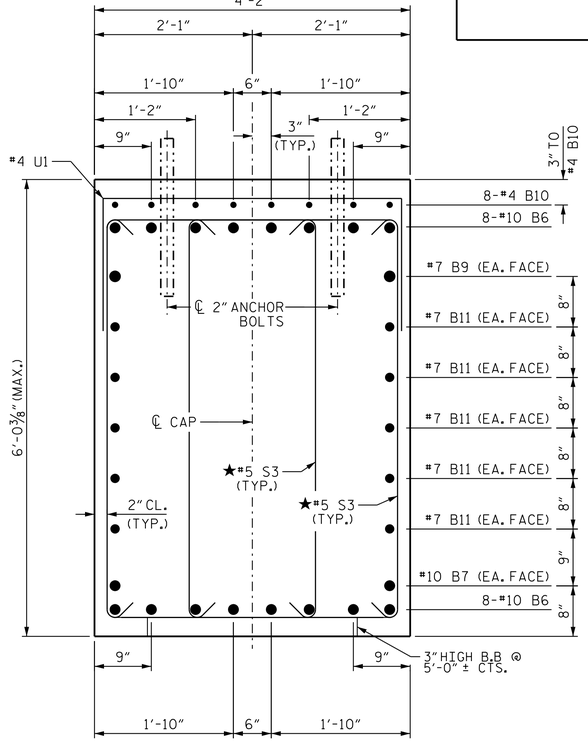


VIEW D-D



SECTION B-B

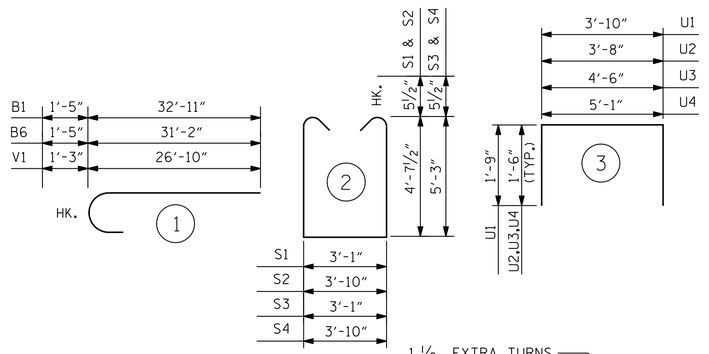
★ INVERT ALTERNATE STIRRUPS



SECTION C-C

★ INVERT ALTERNATE STIRRUPS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	1	34'-4"	2364
B2	2	#10	STR	31'-11"	275
B4	8	#4	STR	12'-7"	67
B5	10	#7	STR	31'-11"	652
M1	32	#9	STR	37'-7"	4089
S1	128	#5	2	13'-3"	1769
S2	16	#5	2	14'-0"	234
U1	38	#4	3	7'-4"	186
U2	5	#4	3	6'-8"	22
U3	4	#4	3	7'-6"	20
V1	32	#9	1	28'-1"	3056
REINFORCING STEEL				LBS.	12,734
SP-1	2	★★★	3	717'-2"	1,496
SP-2	2	★★	4	916'-0"	1,224
SPIRAL COLUMN REINFORCING STEEL				LBS.	2,720
DRILLED PIER CONC. BREAKDOWN:					
POUR #1 DRILLED PIERS				C.Y.	28.2
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				C.Y.	15.9
POUR #3 CAP				C.Y.	25.1
TOTAL CLASS A CONC.				C.Y.	41.0

BENT 1 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	16	#10	1	32'-7"	2243
B7	2	#10	STR	31'-2"	268
B9	2	#7	STR	29'-4"	120
B10	24	#4	STR	8'-1"	130
B11	10	#7	STR	31'-2"	637
B12	8	#10	STR	4'-2"	143
B13	10	#7	STR	3'-4"	68
B14	10	#10	STR	3'-9"	161
M2	32	#9	STR	31'-7"	3436
S3	128	#5	2	14'-6"	1936
S4	16	#5	2	15'-3"	255
U1	43	#4	3	7'-4"	211
U2	5	#4	3	6'-8"	22
U4	4	#4	3	8'-1"	22
V1	32	#9	1	28'-1"	3056
REINFORCING STEEL				LBS.	12,708
SP-3	2	★★★	3	576'-2"	1,202
SP-2	2	★★	4	916'-0"	1,224
SPIRAL COLUMN REINFORCING STEEL				LBS.	2,426
DRILLED PIER CONC. BREAKDOWN:					
POUR #1 DRILLED PIERS				C.Y.	22.6
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				C.Y.	15.9
POUR #3 CAP				C.Y.	28.4
TOTAL CLASS A CONC.				C.Y.	44.3

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

(LEFT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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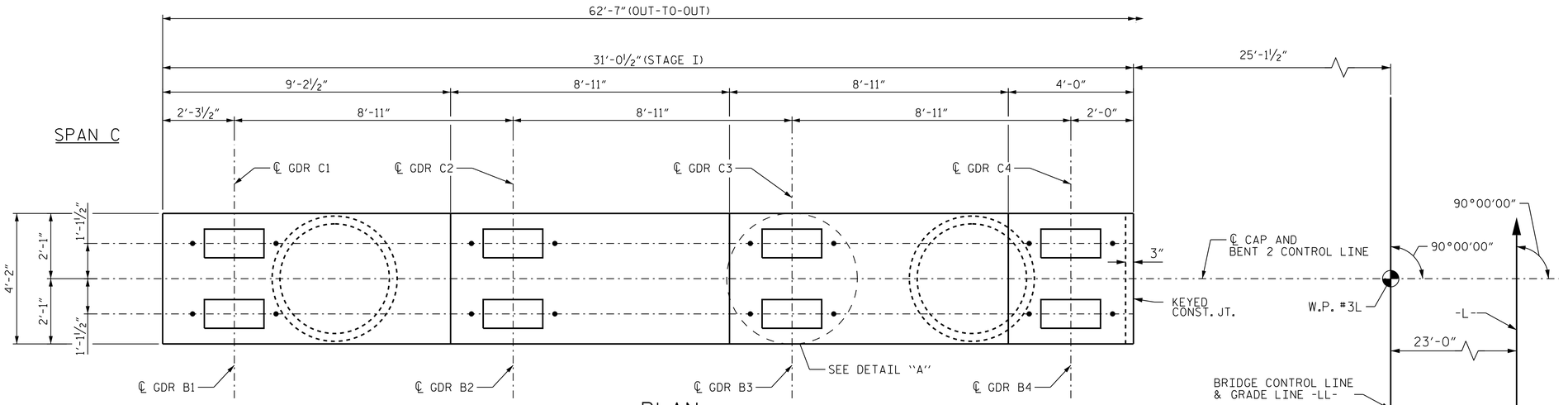


NOTES:

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

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR VIEW A-A, AND SECTION B-B, SEE "BENT 2 DETAILS" SHEET 4 OF 4.

(EF) DENOTES EACH FACE.

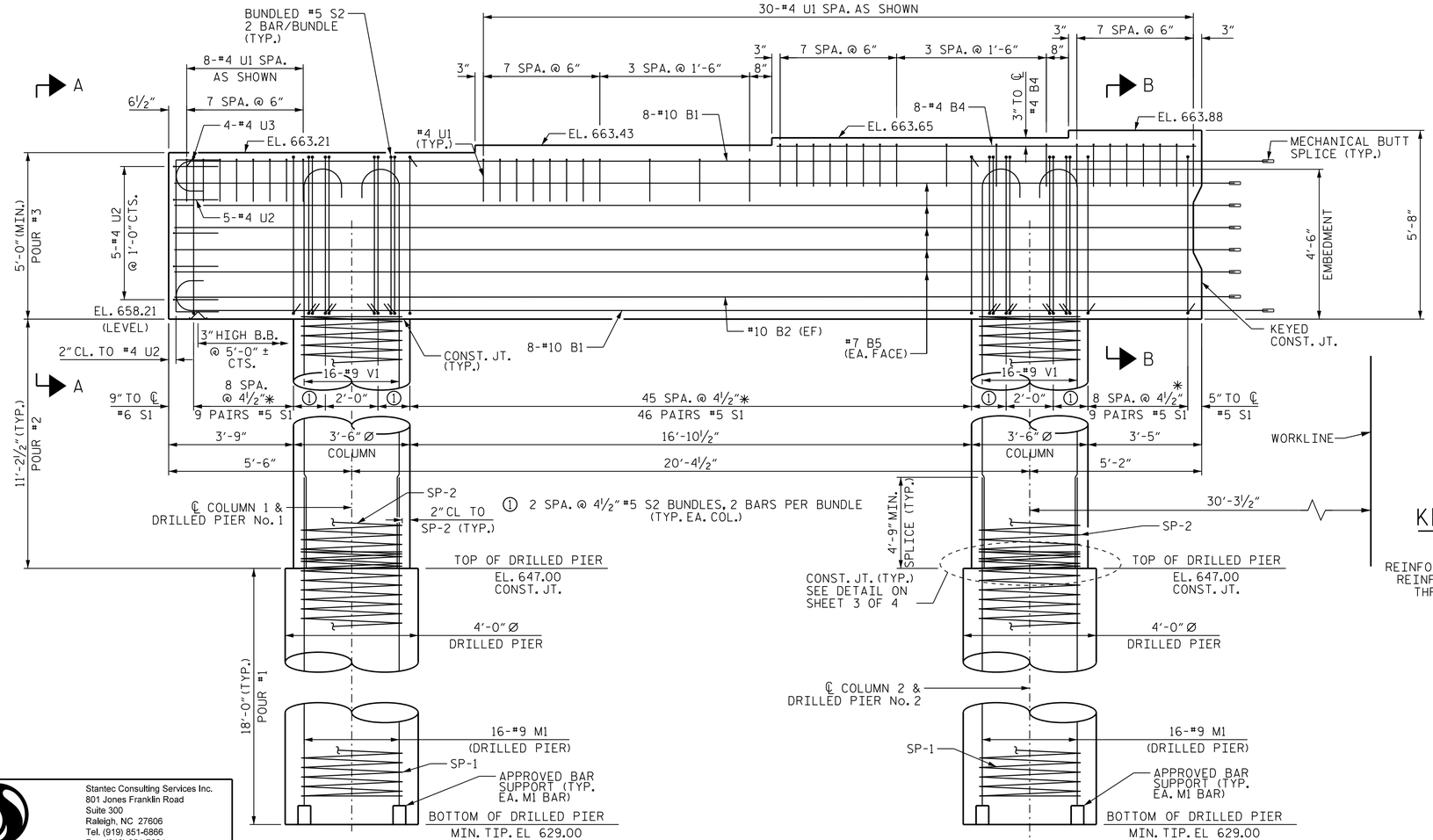
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

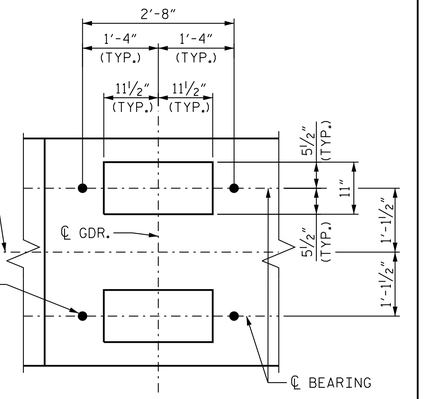
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

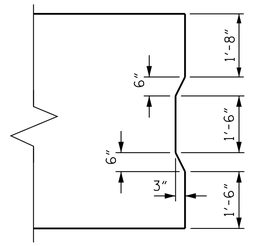
SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.



ELEVATION

* INVERT ALTERNATE STIRRUPS PAIRS





DETAIL "A"

DIMENSIONS AND DETAILS SHOWN ARE TYPICAL FOR EA. BEARING @ EA. GIRDER.

KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 (STAGE I)

(LEFT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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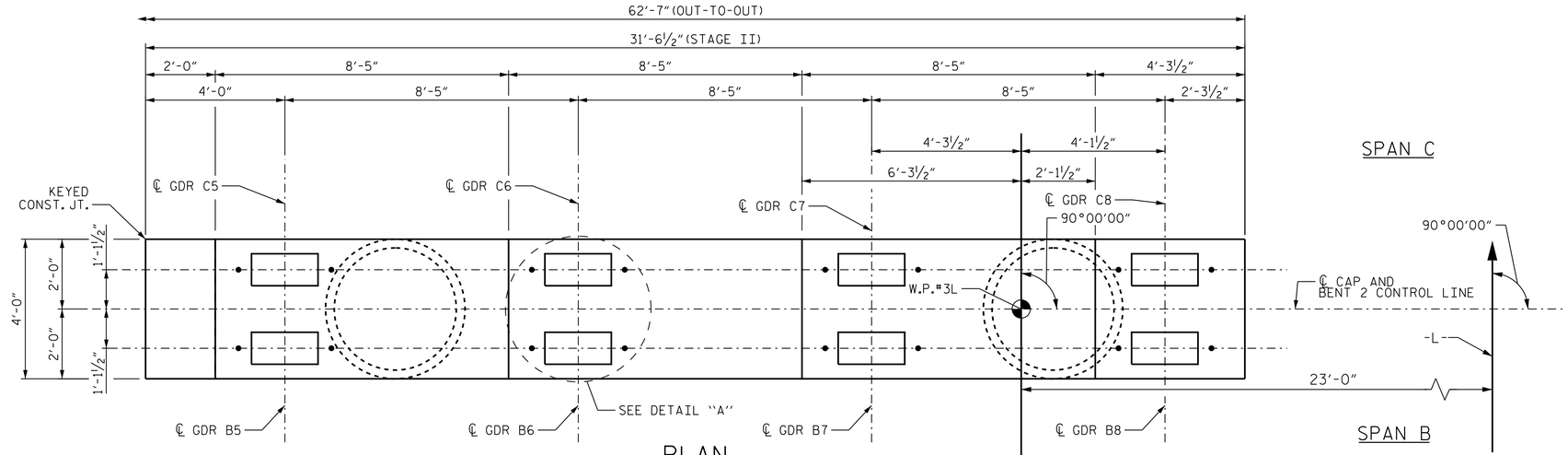
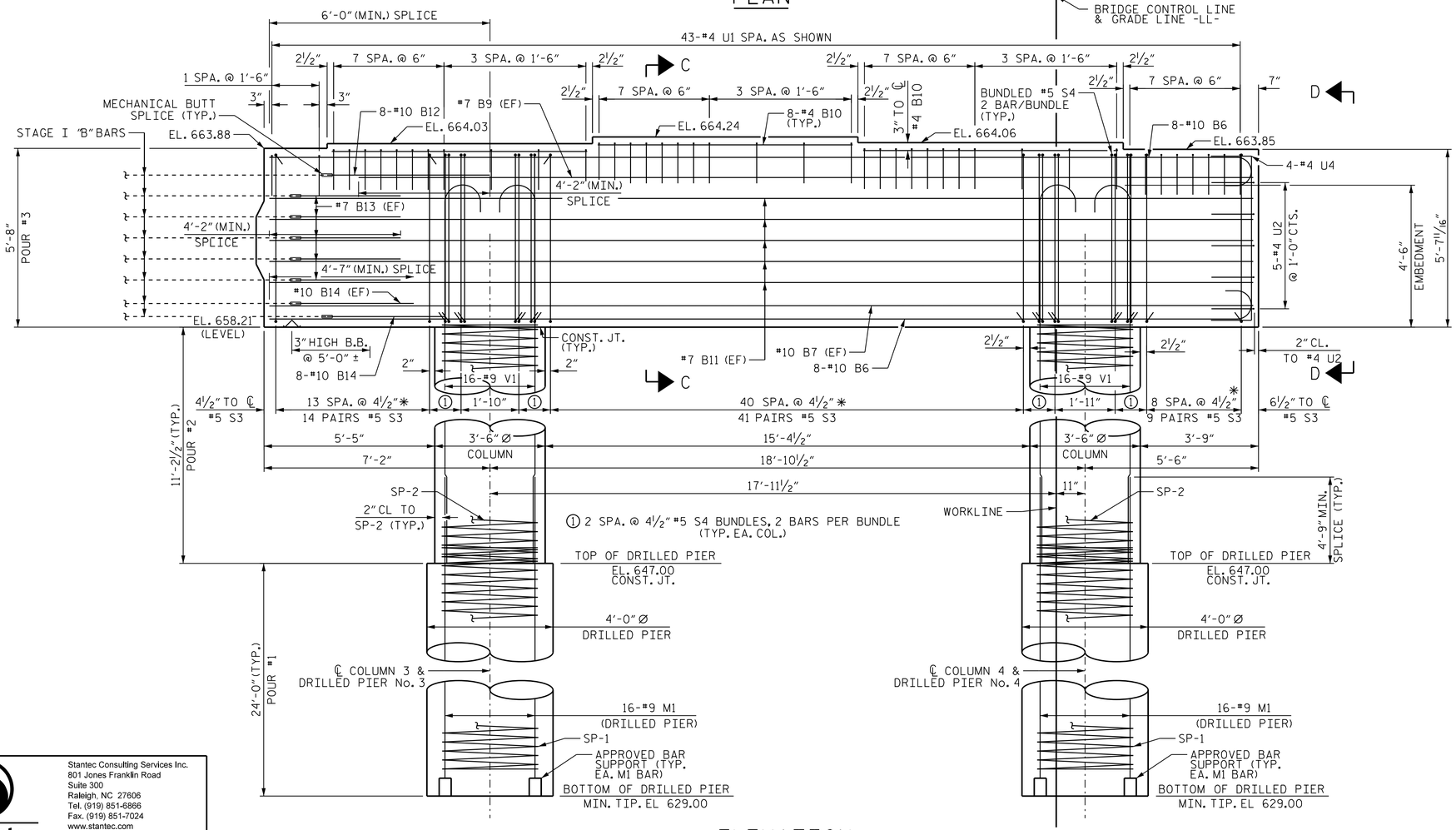
NOTES:

FOR SECTION C-C AND VIEW D-D, SEE "BENT 2 DETAILS" SHEET 4 OF 4.





ELEVATION

* INVERT ALTERNATE STIRRUPS PAIRS

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 (STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-45
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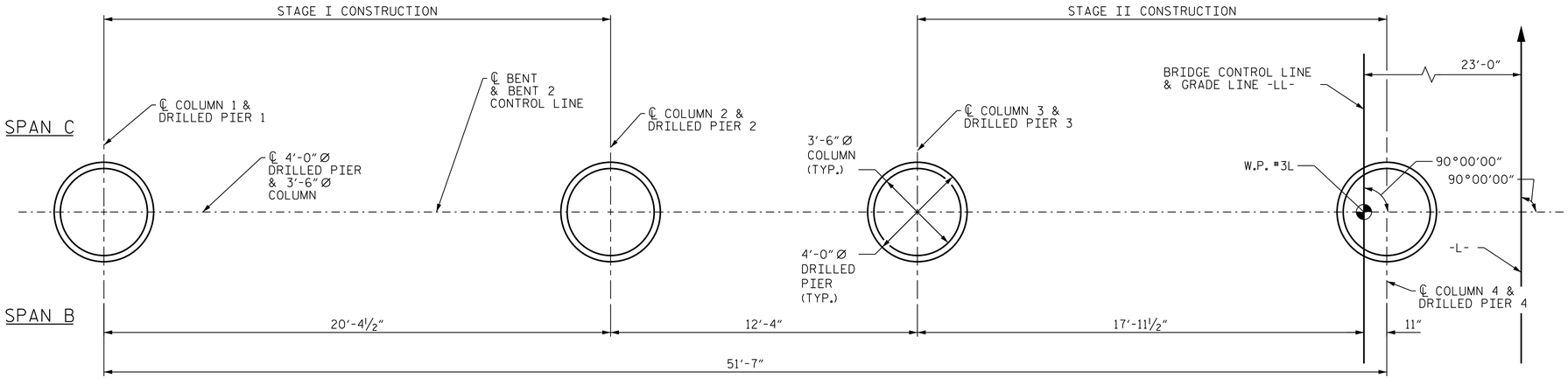
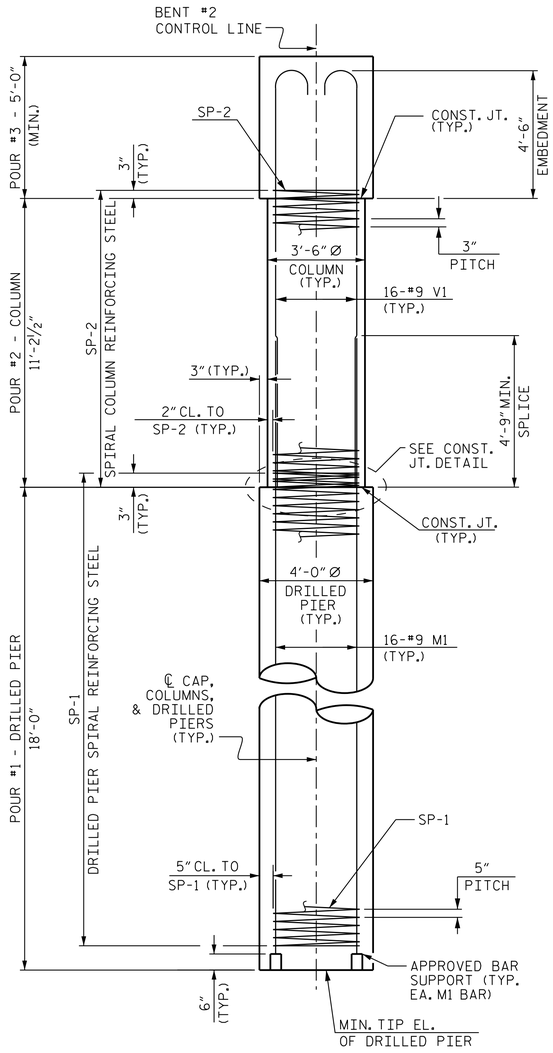


PLAN OF DRILLED PIERS



END ELEVATION

SECTION THRU DRILLED PIER TYPICAL ALL DRILLED PIERS

SECTION THRU COLUMN TYPICAL ALL COLUMNS

CONSTRUCTION JOINT DETAIL

LONGITUDINAL STEEL NOT SHOWN FOR CLARITY.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/9/2023

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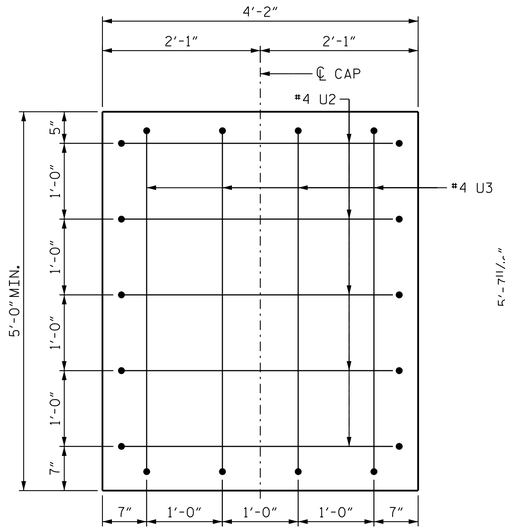
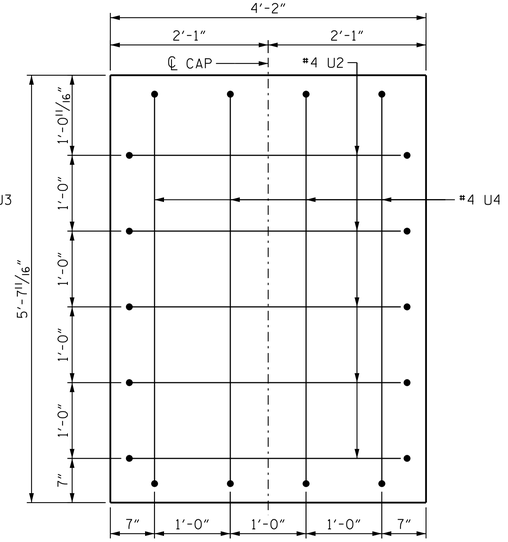
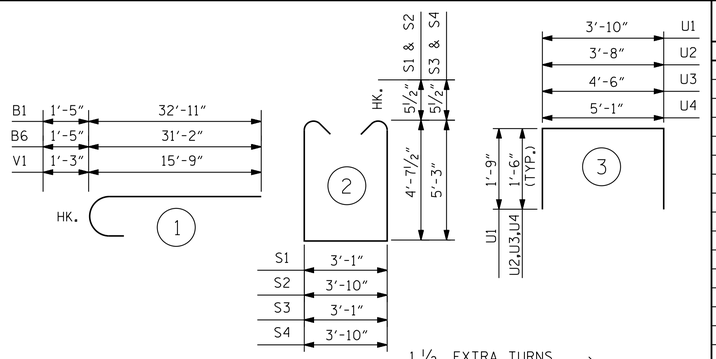


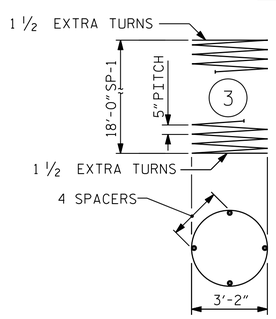
VIEW A-A



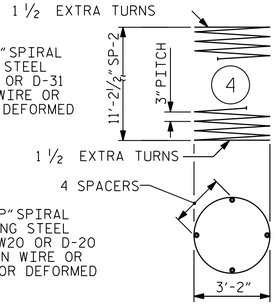
VIEW D-D

BAR TYPES





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



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

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	1	34'-4"	2364
B2	2	#10	STR	31'-11"	275
B4	8	#4	STR	12'-7"	67
B5	10	#7	STR	31'-11"	652
M1	32	#9	STR	25'-3"	2747
S1	128	#5	2	13'-3"	1769
S2	16	#5	2	14'-0"	234
U1	38	#4	3	7'-4"	186
U2	5	#4	3	6'-8"	22
U3	4	#4	3	7'-6"	20
V1	32	#9	1	17'-0"	1850
REINFORCING STEEL			LBS.		10,186
SP-1	2	***	3	428'-1"	893
SP-2	2	**	4	479'-7"	641
SPIRAL COLUMN REINFORCING STEEL			LBS.		1,534
DRILLED PIER CONC. BREAKDOWN: POUR #1 DRILLED PIERS			C.Y.		16.7
CLASS A CONCRETE BREAKDOWN POUR #2 COLUMNS			C.Y.		7.9
POUR #3 CAP			C.Y.		25.1
TOTAL CLASS A CONC.			C.Y.		33.0

BENT 2 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	16	#10	1	32'-7"	2243
B7	2	#10	STR	31'-2"	268
B9	2	#7	STR	29'-4"	120
B10	24	#4	STR	8'-1"	130
B11	10	#7	STR	31'-2"	637
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B13	10	#7	STR	3'-4"	68
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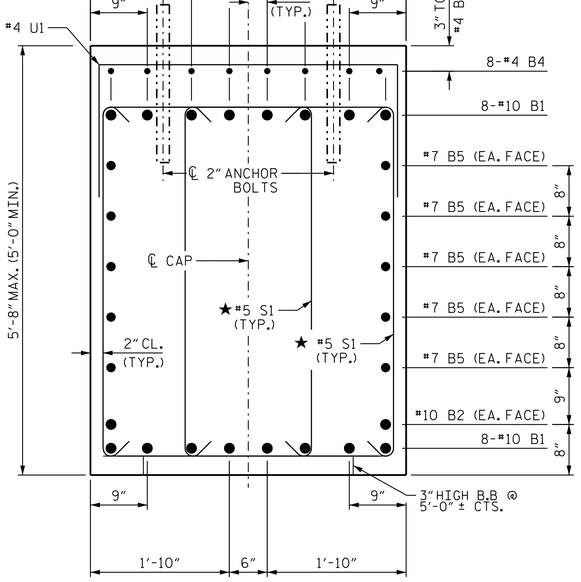
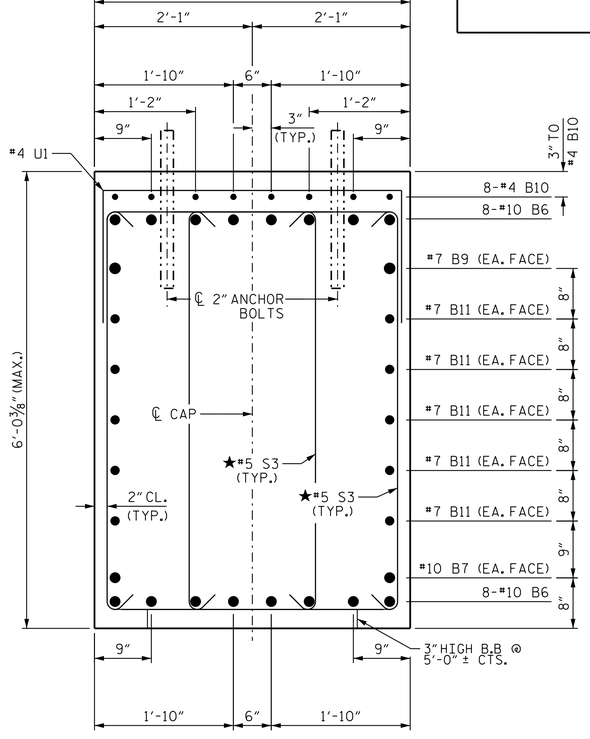
U2	5	#4	3	6'-8"	22
U4	4	#4	3	8'-1"	22
V1	32	#9	1	17'-0"	1850
REINFORCING STEEL			LBS.		10,812
SP-1	2	***	3	428'-1"	893
SP-2	2	**	4	479'-7"	641
SPIRAL COLUMN REINFORCING STEEL			LBS.		1,534
DRILLED PIER CONC. BREAKDOWN: POUR #1 DRILLED PIERS			C.Y.		16.7
CLASS A CONCRETE BREAKDOWN POUR #2 COLUMNS			C.Y.		7.9
POUR #3 CAP			C.Y.		28.5
TOTAL CLASS A CONC.			C.Y.		36.4



SECTION B-B

★ INVERT ALTERNATE STIRRUPS



SECTION C-C

★ INVERT ALTERNATE STIRRUPS

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www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 01/24/23
CHECKED BY : S.S. POOLE DATE : ~~XX/XX/XX~~
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENT 2 DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-47
1			3			TOTAL SHEETS
2			4			56

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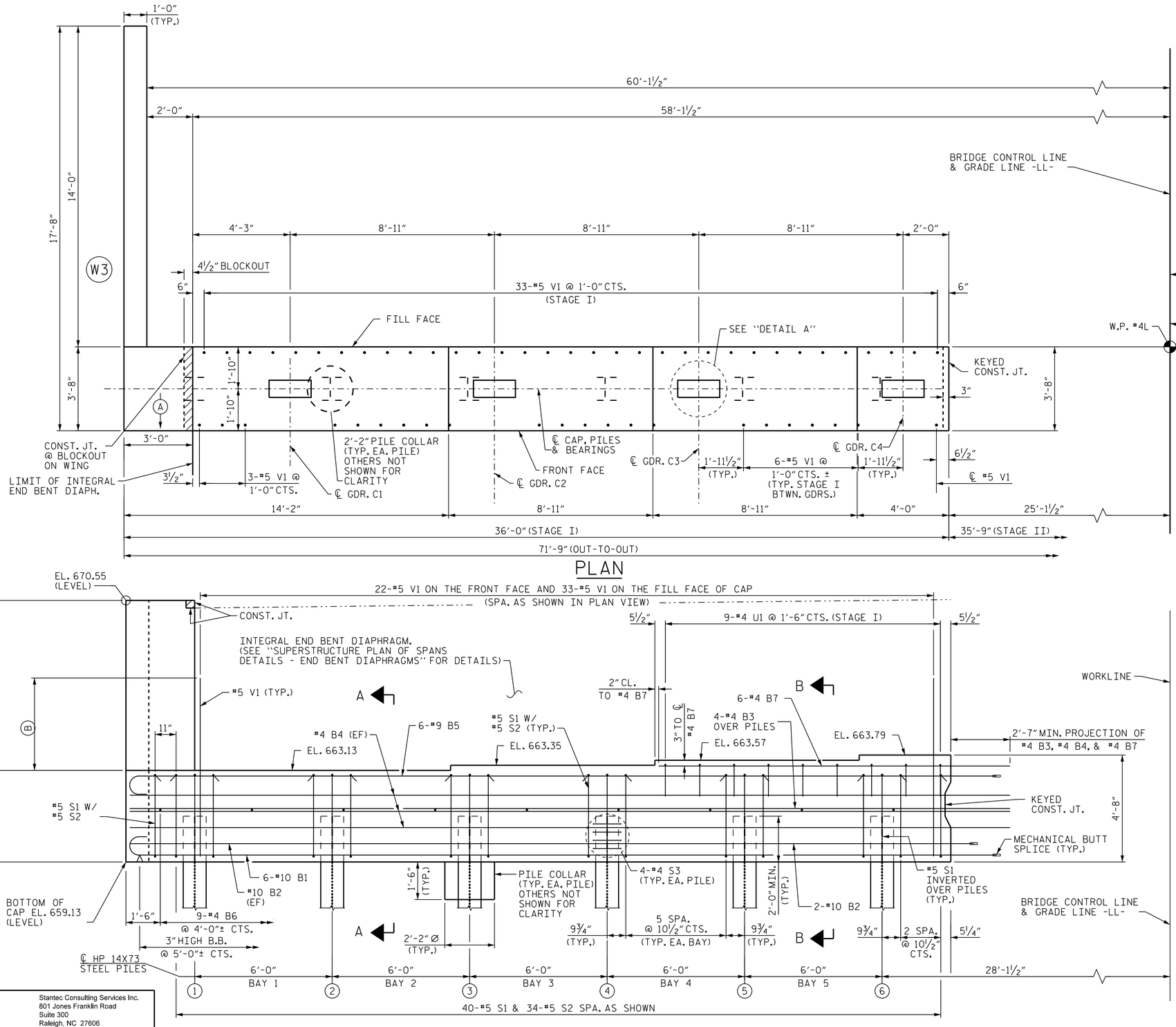


PLAN

ELEVATION

NOTES

FOR WING WALL DETAILS, SEE "END BENT 2, DETAILS - WING WALLS" SHEET 3 OF 5.

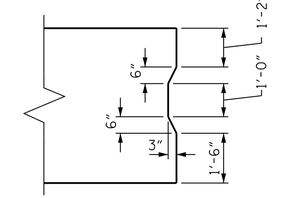
(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

FOR SECTIONS A-A AND B-B, SEE END BENT 2 DETAILS, SHEET 5 OF 5.

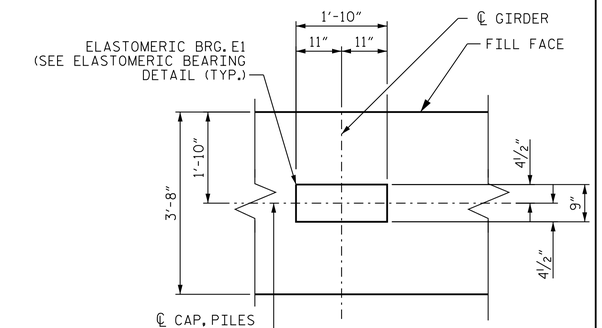
(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILS, SHEET 3 OF 5.

(B) #5 V1 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT.



KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 (STAGE I)

(LEFT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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1			3			TOTAL SHEETS
2			4			56

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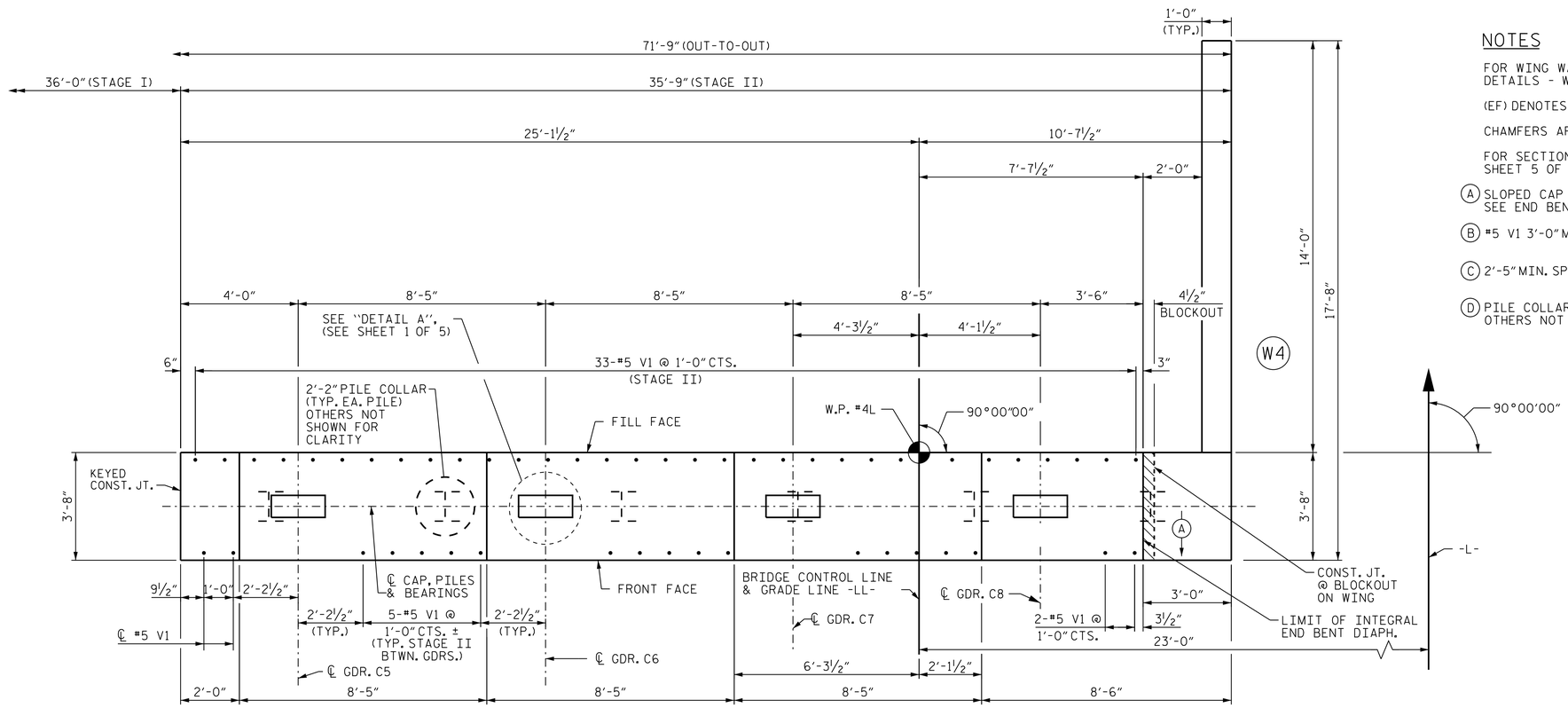


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 2, DETAILS - WING WALLS" SHEET. 4 OF 5.

(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

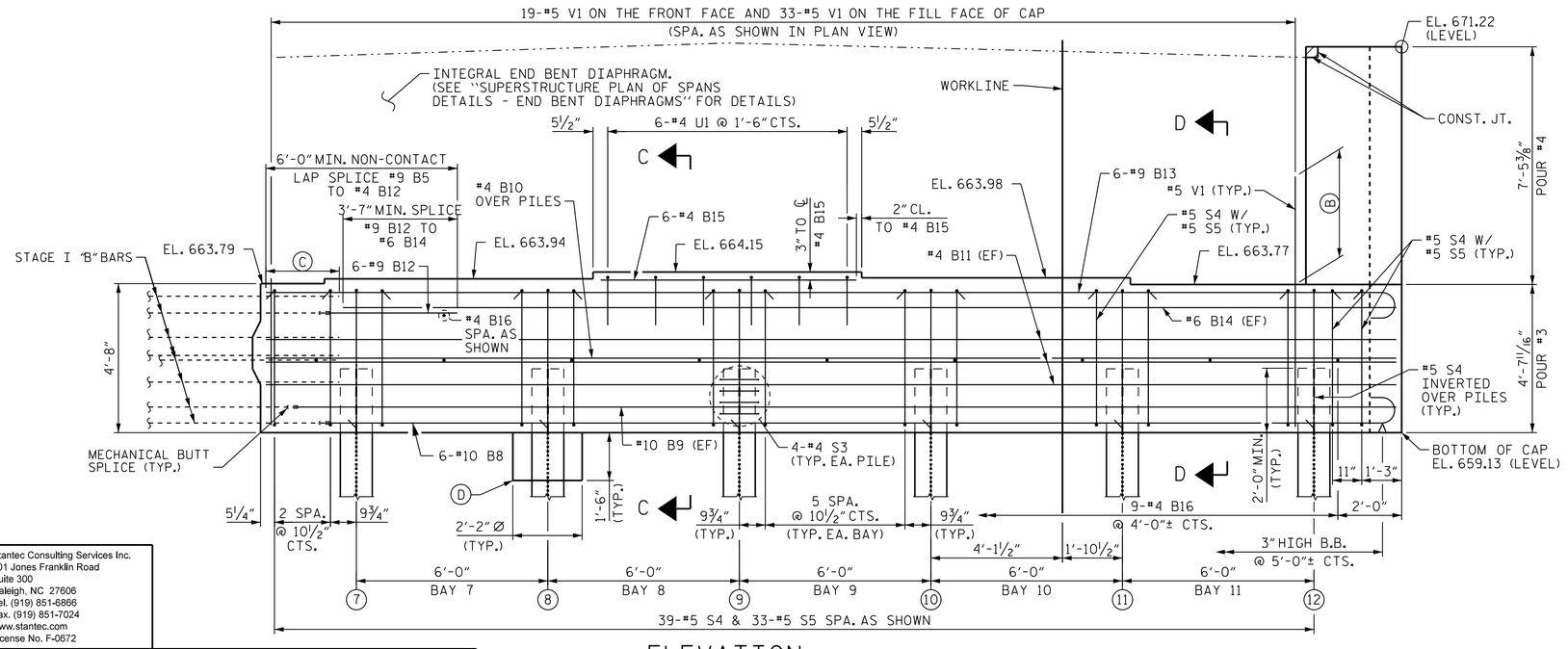
FOR SECTIONS C-C AND D-D, SEE END BENT 2 DETAILS, SHEET 5 OF 5.

(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILS, SHEET. 3 OF 5.

(B) #5 V1 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT.

(C) 2'-5" MIN. SPLICE LENGTH (TYP.).

(D) PILE COLLAR (TYP. EA. PILE) OTHERS NOT SHOWN FOR CLARITY



ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 (STAGE II)

(LEFT LANE)

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DRAWN BY : J. B. GEILE DATE : 01/04/23
CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

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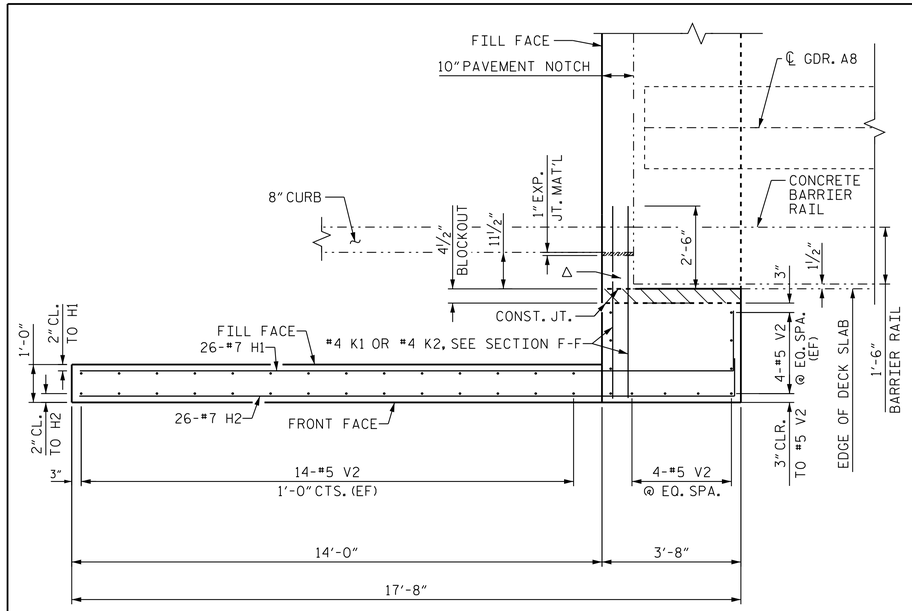
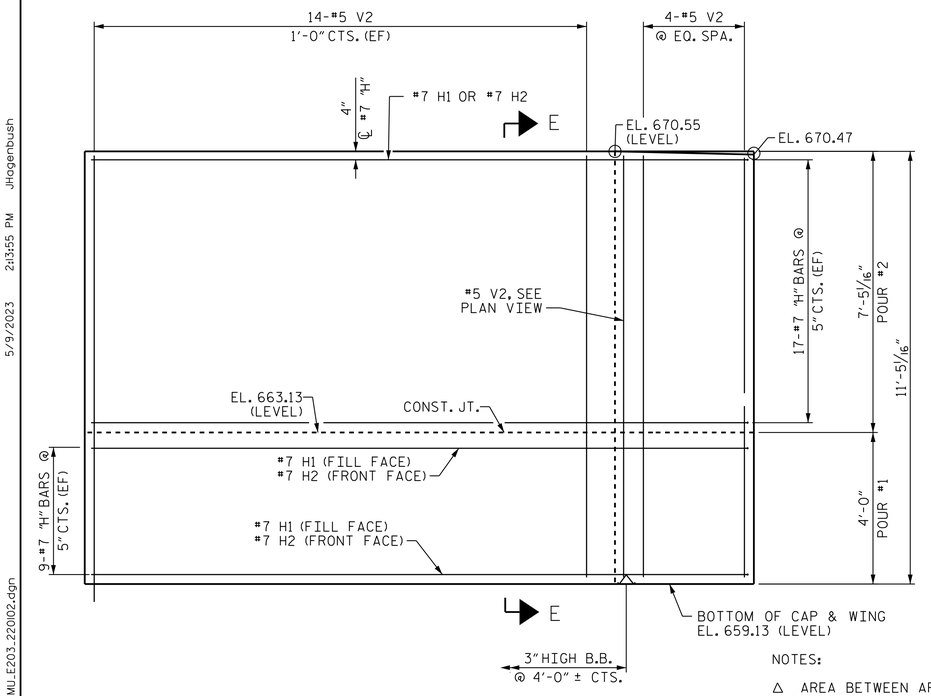
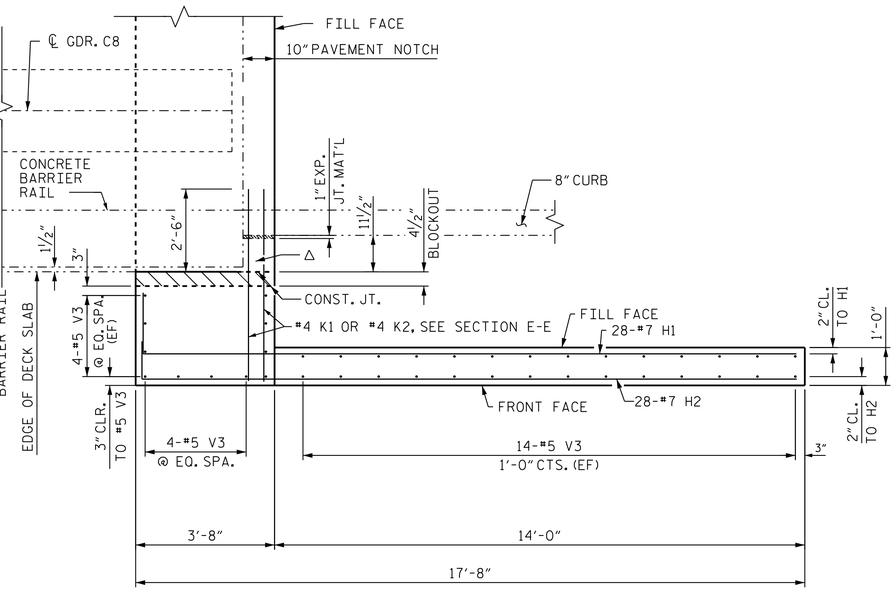


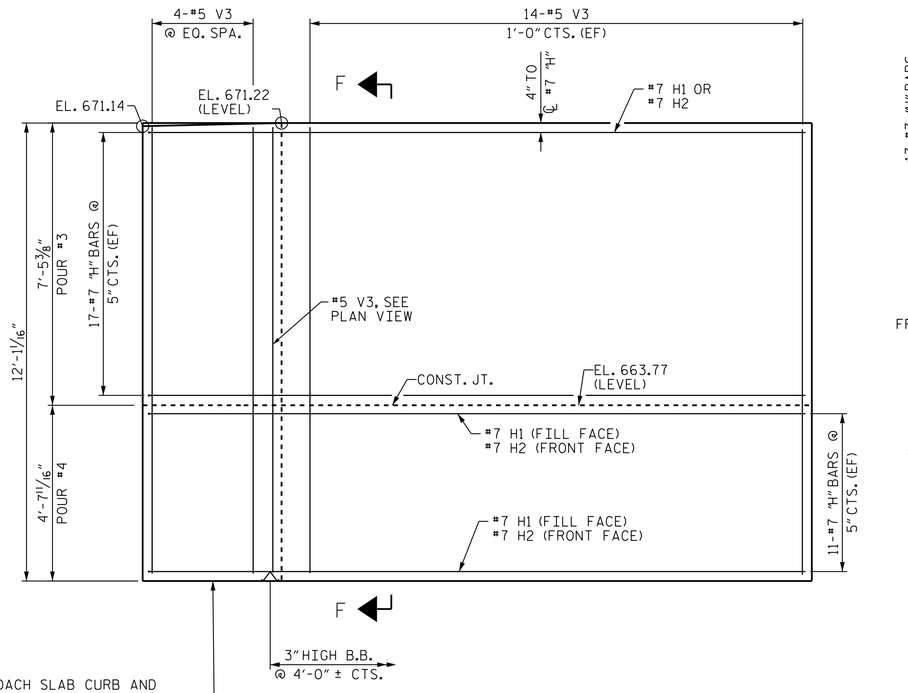
PLAN OF LEFT WING (W3)



ELEVATION OF LEFT WING (W3)



PLAN OF RIGHT WING (W4)



ELEVATION OF RIGHT WING (W4)

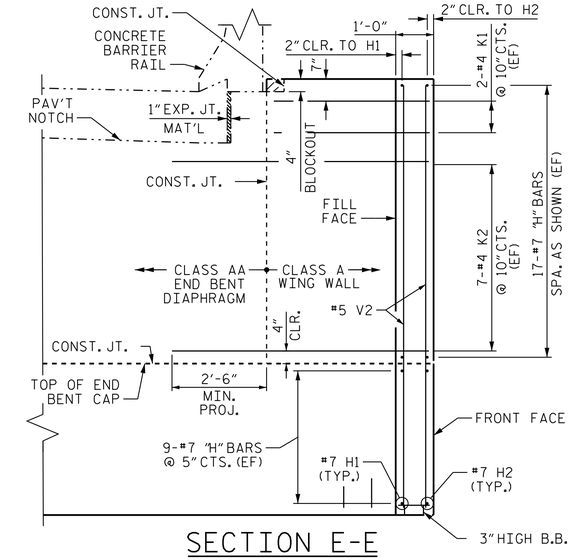
NOTES:

Δ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.

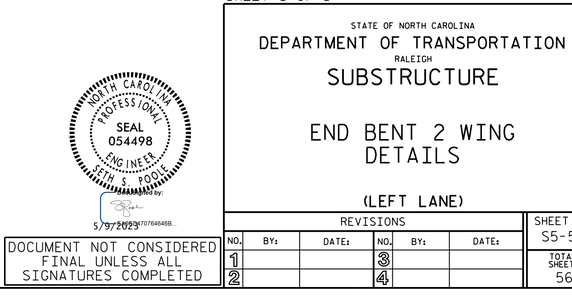
(EF) DENOTES EACH FACE.

CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.

THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.



SECTION E-E



SECTION F-F

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

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CHECKED BY : S.S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE
5/9/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 WING DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-50
1			3			TOTAL SHEETS
2			4			56

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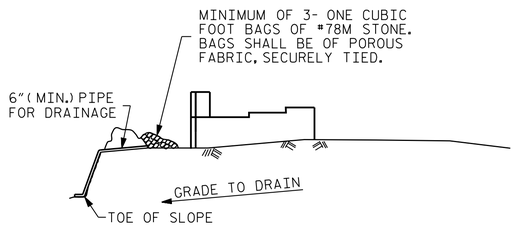
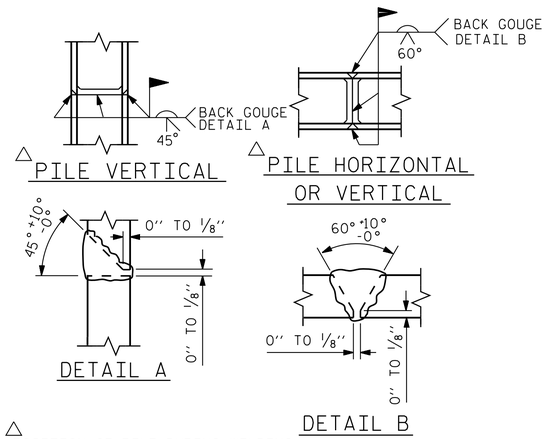


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

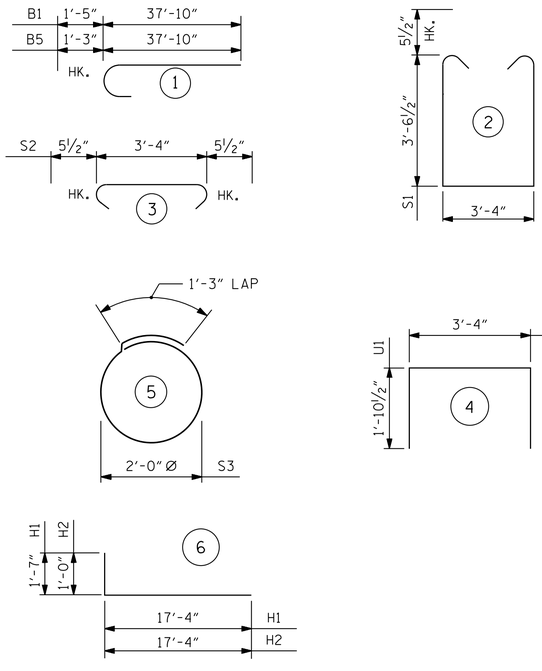
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



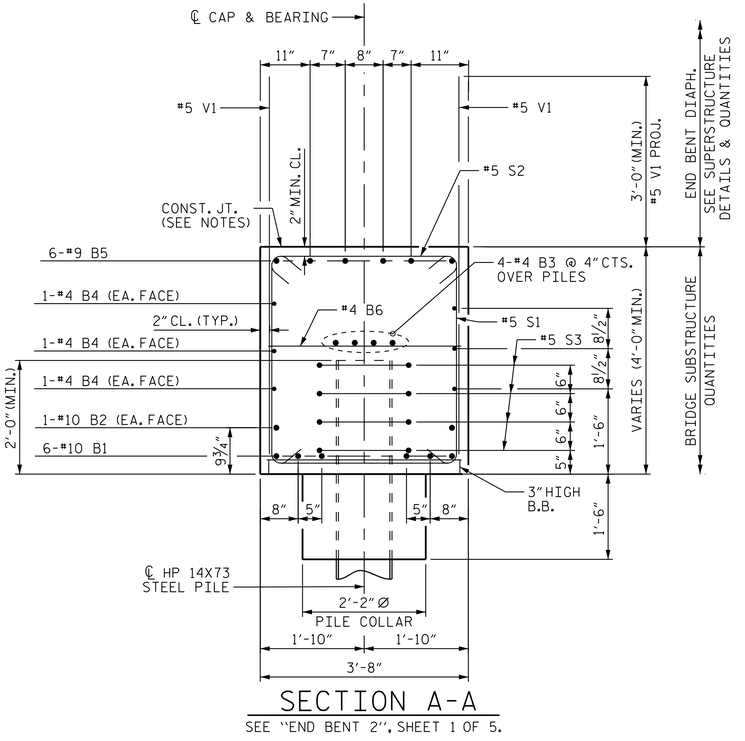
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2 - STAGE I

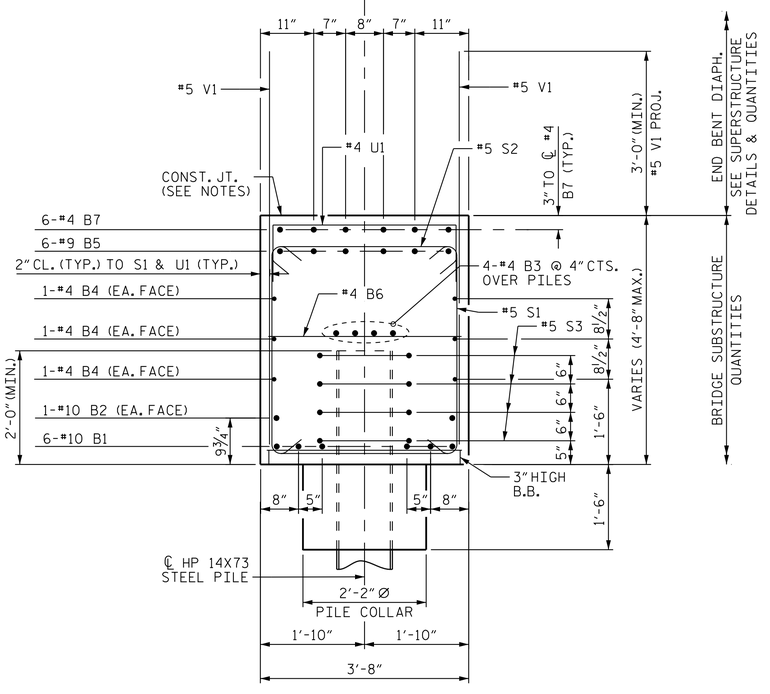
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	39'-3"	1014
B2	2	#10	STR	36'-10"	317
B3	4	#4	STR	38'-5"	103
B4	6	#4	STR	38'-5"	154
B5	6	#9	1	39'-1"	798
B6	9	#4	STR	3'-4"	21
B7	6	#4	STR	15'-4"	62
H1	26	#7	6	18'-10"	1001
H2	26	#7	6	18'-3"	485
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S1	41	#5	2	11'-4"	473
S2	35	#5	3	4'-3"	156
S3	24	#4	5	7'-7"	122
U1	9	#4	4	7'-1"	43
V1	55	#5	STR	7'-5"	426
V2	39	#5	STR	11'-0"	448

REINFORCING STEEL	LBS. 6,177
CLASS A CONCRETE BREAKDOWN:	
POUR#1: CAP, COLLARS, & WINGS	C.Y. 24.2
POUR#2: UPPER WINGS	C.Y. 7.0
CLASS A CONCRETE TOTAL	C.Y. 31.2



SECTION A-A

SEE "END BENT 2", SHEET 1 OF 5.



SECTION B-B

SEE "END BENT 2", SHEET 1 OF 5.

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS (STAGE I)

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

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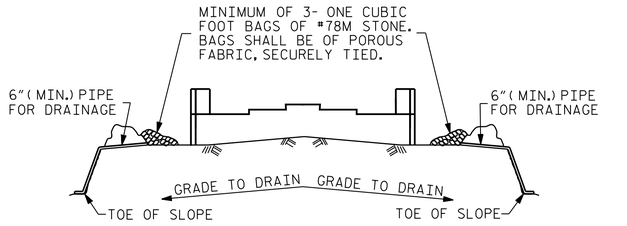
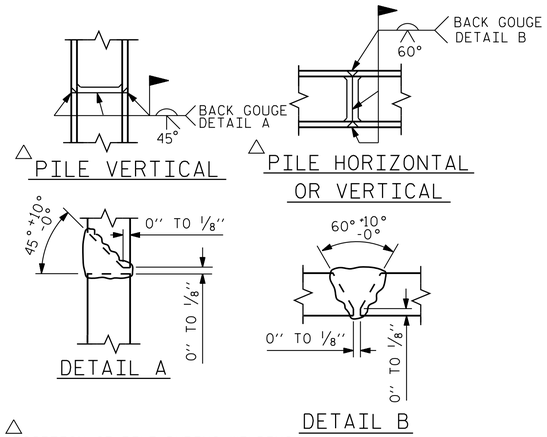


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

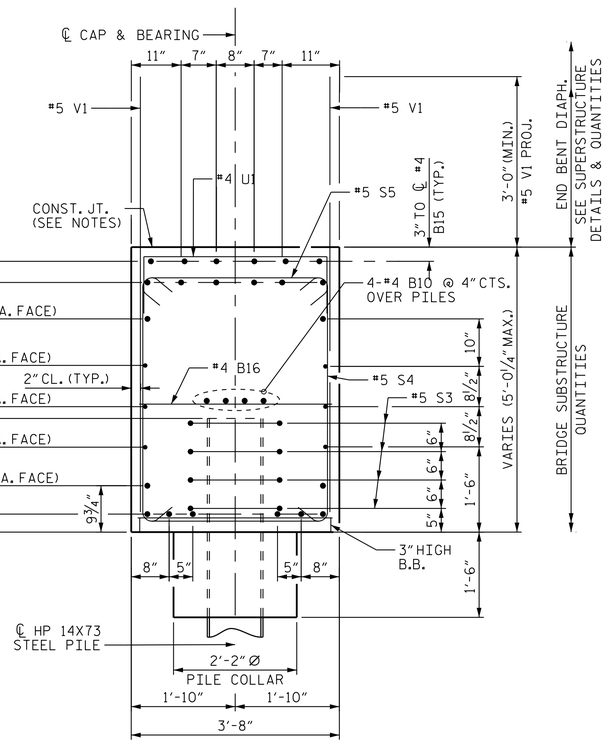
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



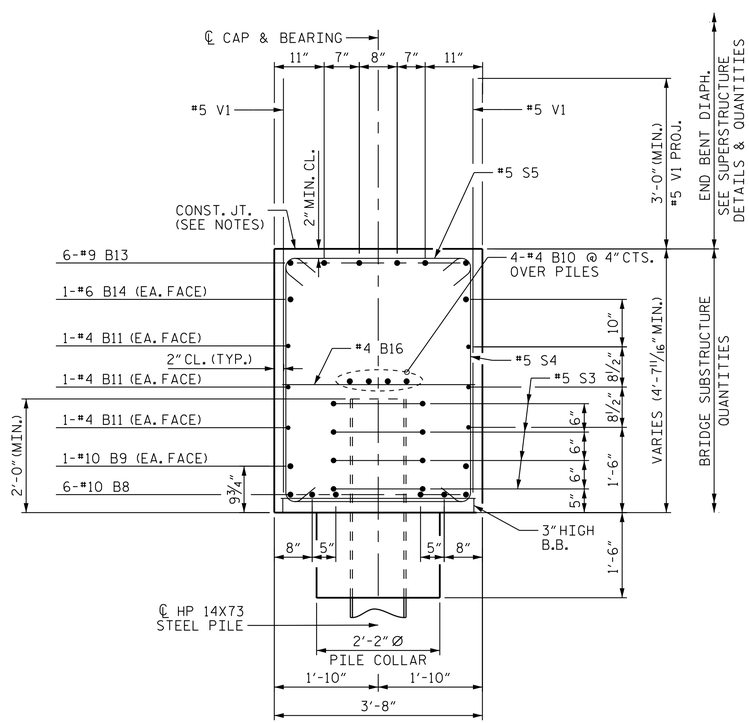
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION C-C

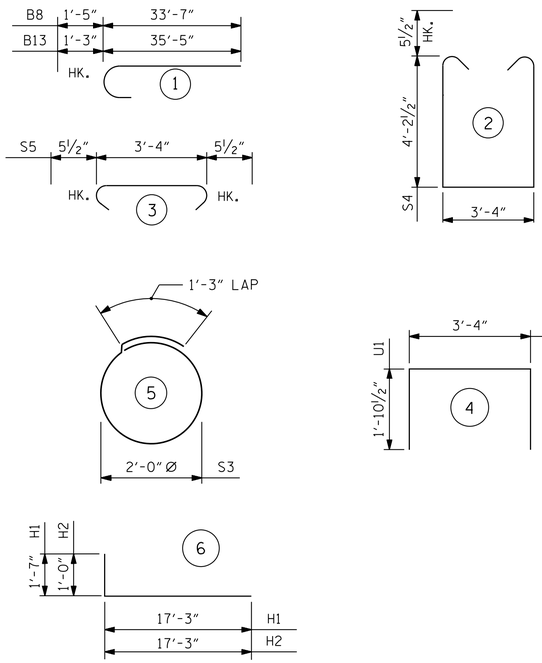
SEE "END BENT 2", SHEET 2 OF 5.



SECTION D-D

SEE "END BENT 2", SHEET 2 OF 5.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B8	6	#10	1	35'-0"	904
B9	2	#10	STR	34'-7"	298
B10	4	#4	STR	35'-5"	95
B11	6	#4	STR	35'-5"	142
B12	6	#9	STR	4'-2"	86
B13	6	#9	1	36'-8"	748
B14	2	#6	STR	33'-0"	100
B15	6	#4	STR	8'-1"	33
B16	10	#4	STR	3'-4"	23
H1	28	#7	6	18'-10"	1078
H2	28	#7	6	18'-3"	1045
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S3	24	#4	5	7'-7"	122
S4	41	#5	2	12'-8"	542
S5	35	#5	3	4'-3"	156
U1	6	#4	4	7'-1"	29
V1	52	#5	STR	7'-5"	403
V3	39	#5	STR	11'-8"	475

REINFORCING STEEL LBS. 6,353

CLASS A CONCRETE BREAKDOWN:	
POUR#3: CAP, COLLARS, & WINGS	C.Y. 27.3
POUR#4: UPPER WINGS	C.Y. 7.0
CLASS A CONCRETE TOTAL	C.Y. 34.3

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS (STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-52
1			3			TOTAL SHEETS
2			4			56

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DRAWN BY : J. B. GEILE DATE : 01/08/23
CHECKED BY : S. S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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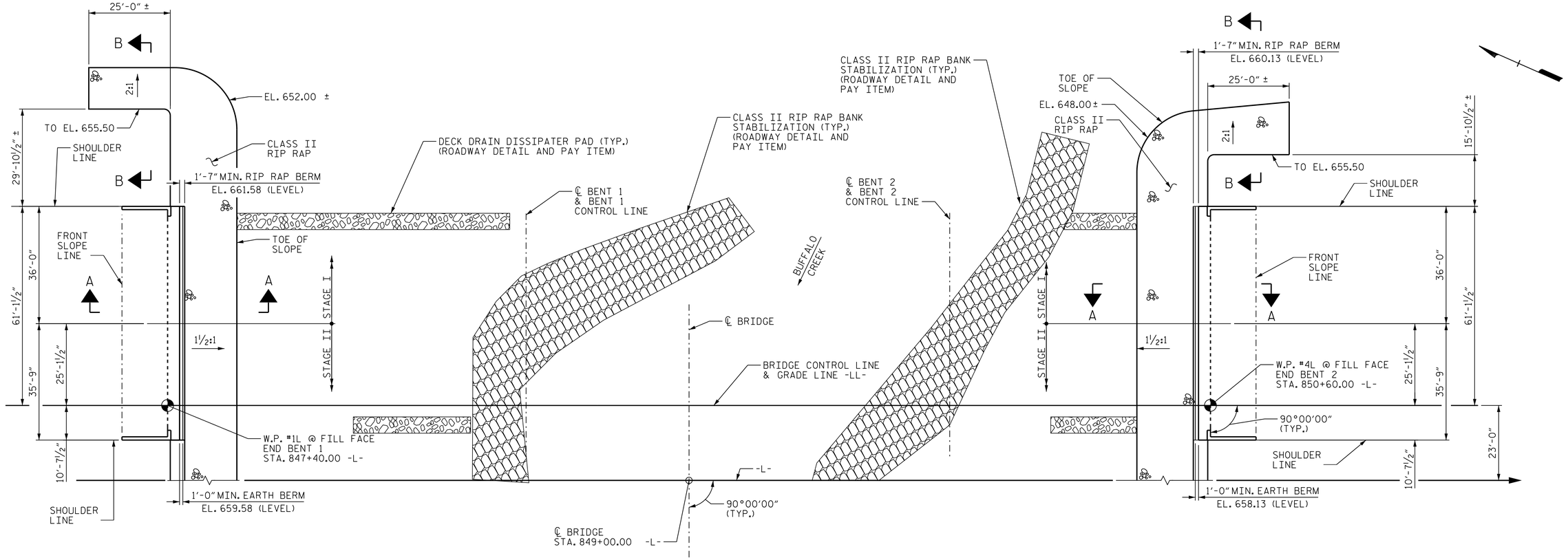
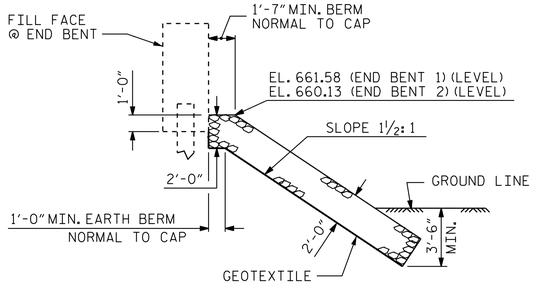
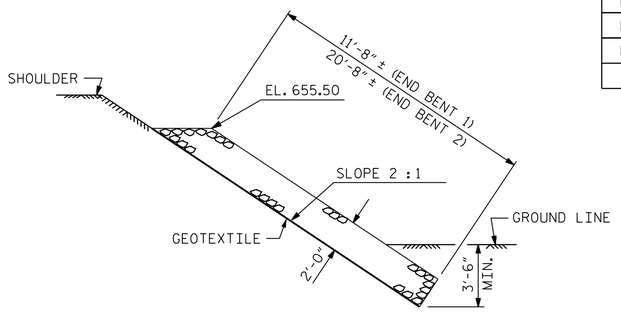


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 849+00.00 -L- (LT.)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT #1 - STAGE I	168	185
END BENT #1 - STAGE II	110	125
END BENT #1 - TOTAL	278	310
END BENT #2 - STAGE I	209	235
END BENT #2 - STAGE II	132	150
END BENT #2 - TOTAL	341	385
TOTAL	619	695



SECTION A-A



SECTION B-B

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

SLOPE PROTECTION RIP RAP

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/9/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-53
1			3			TOTAL SHEETS
2			4			56

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DRAWN BY : J. B. GEILE DATE : 03/02/23
CHECKED BY : S. S. POOLE DATE : 03/05/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

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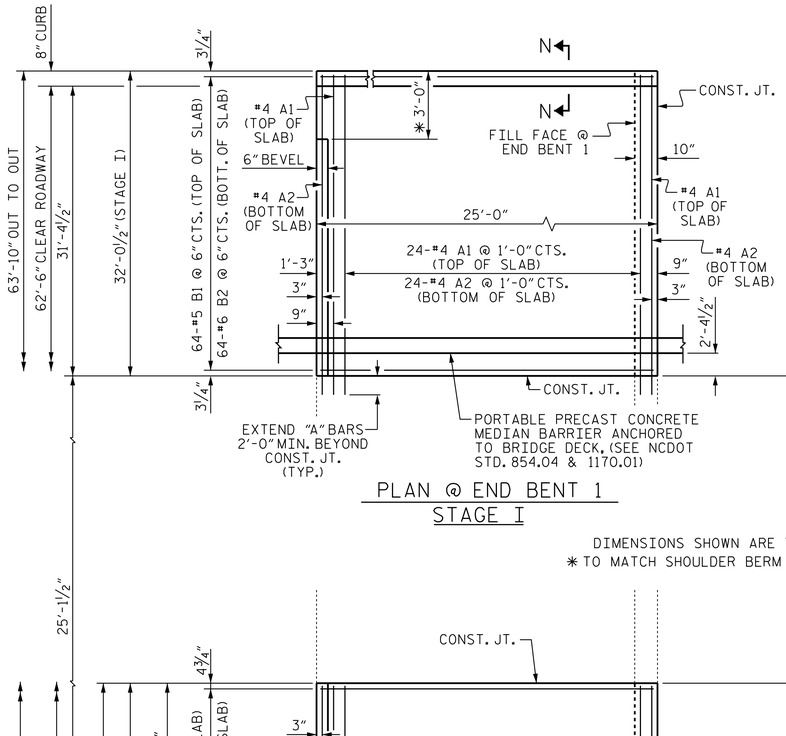
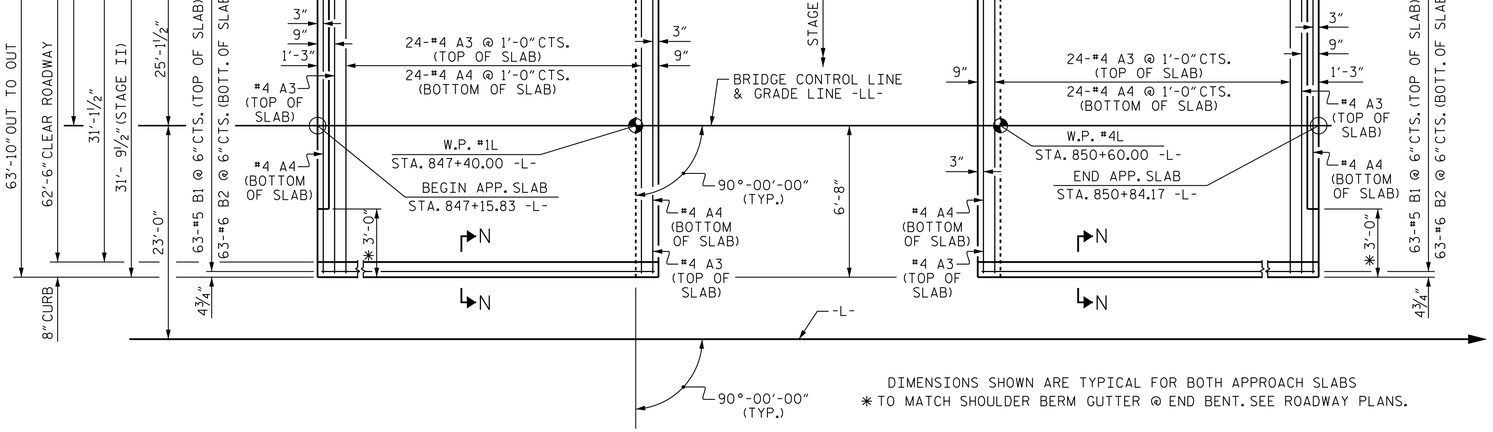


PLAN @ END BENT 1
STAGE I

PLAN @ END BENT 2
STAGE I

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* TO MATCH SHOULDER BERM GUTTER @ END BENT. SEE ROADWAY PLANS.



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* TO MATCH SHOULDER BERM GUTTER @ END BENT. SEE ROADWAY PLANS.

PLAN @ END BENT 1
STAGE II

PLAN @ END BENT 2
STAGE II

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.

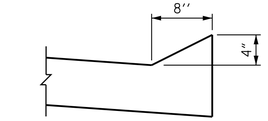
FOR THE 6"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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.

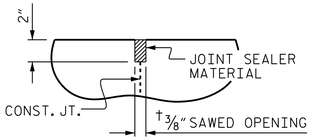
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS 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 3 OF 3 FOR DETAILS AND NOTES.

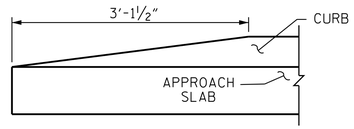
FOR SECTION THROUGH APPROACH SLAB, SEE BRIDGE APPROACH SLAB DETAILS, SHEET 2 OF 3.



SECTION N-N



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER

STAGE I BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	33'-9"	586
A2	26	#4	STR	33'-9"	586
* B1	64	#5	STR	24'-1"	1608
B2	64	#6	STR	24'-7"	2364
REINFORCING STEEL				LBS.	2950
* EPOXY COATED REINFORCING STEEL				LBS.	2194
CLASS AA CONCRETE				C.Y.	34.6

STAGE II BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	26	#4	STR	31'-4"	544
A4	26	#4	STR	31'-4"	544
* B1	63	#5	STR	24'-1"	1583
B2	63	#6	STR	24'-7"	2327
REINFORCING STEEL				LBS.	2871
* EPOXY COATED REINFORCING STEEL				LBS.	2127
CLASS AA CONCRETE				C.Y.	34.3

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-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

(LEFT LANE)

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ASSEMBLED BY : J.B. GEILE DATE : 01/23/23
CHECKED BY : S.S. POOLE DATE : 01/25/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signature not verified
Digitally signed by:
5/9/2023

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REVISIONS						SHEET NO.
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SHEET 1 15 FT APPROACH SLAB AT 90 SKEW

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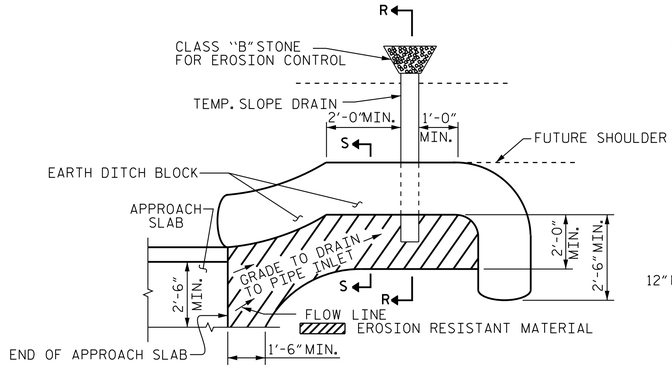
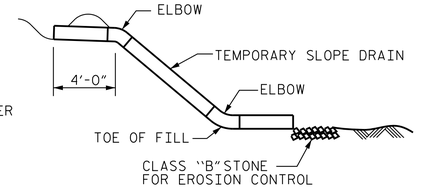
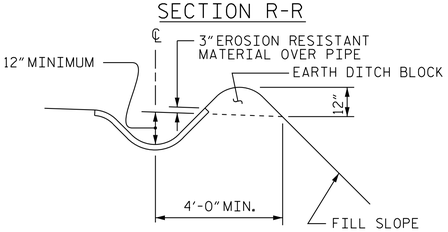


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



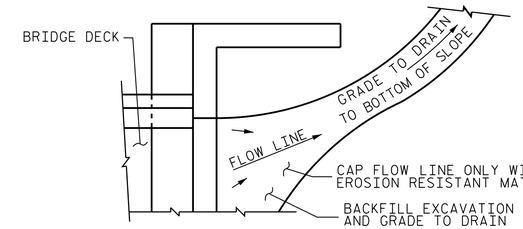
SECTION R-R



SECTION S-S

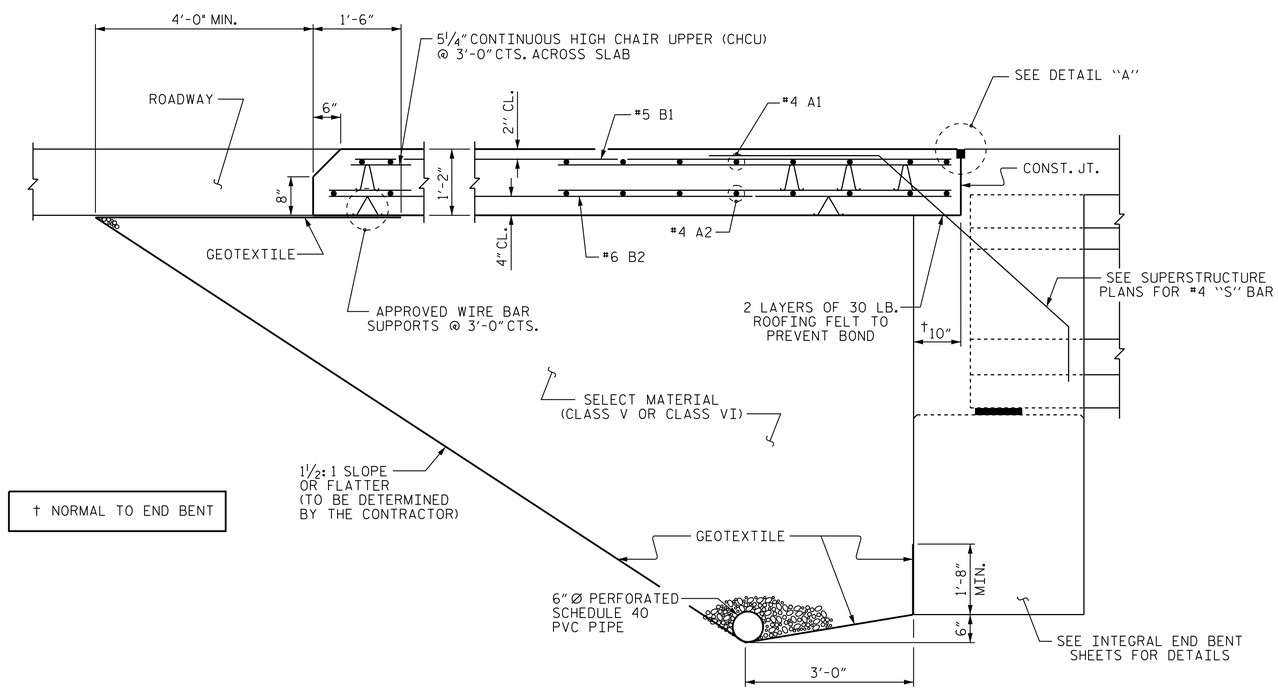
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-55
1			3			TOTAL SHEETS
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ASSEMBLED BY : J.B. GEILE DATE : 01/09/23
CHECKED BY : J.T. KELVINGTON DATE : 05/03/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/9/2023

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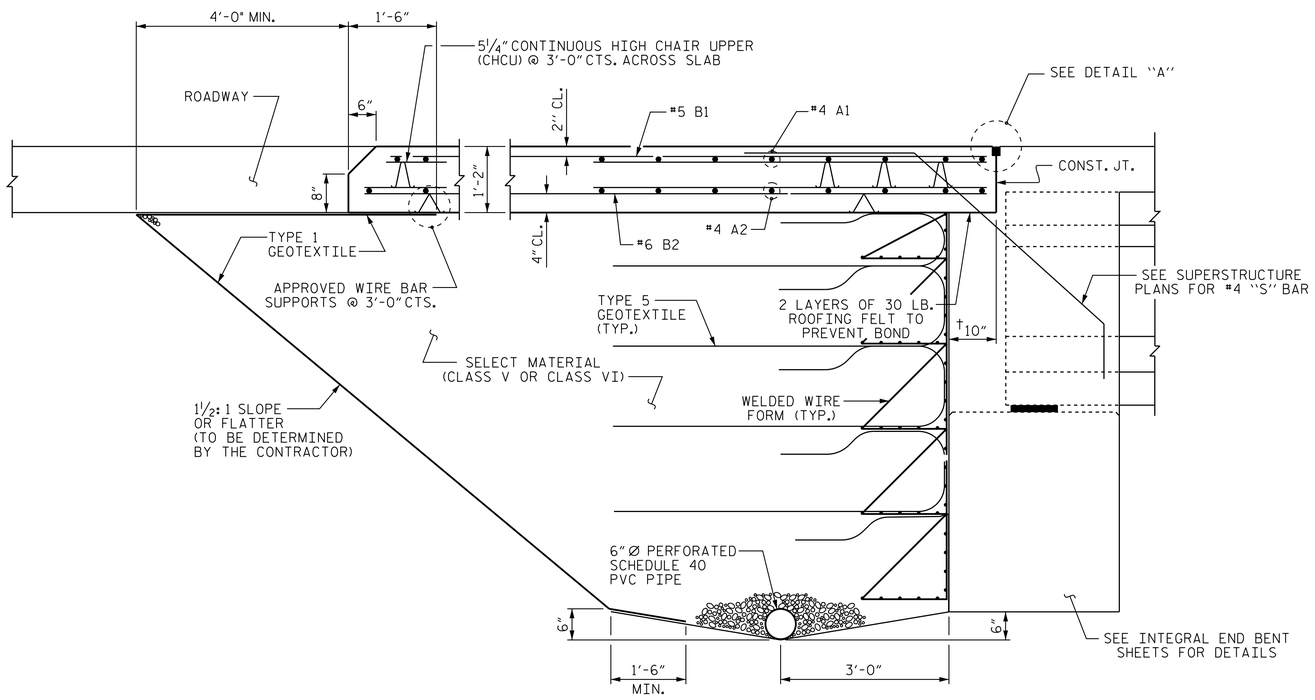
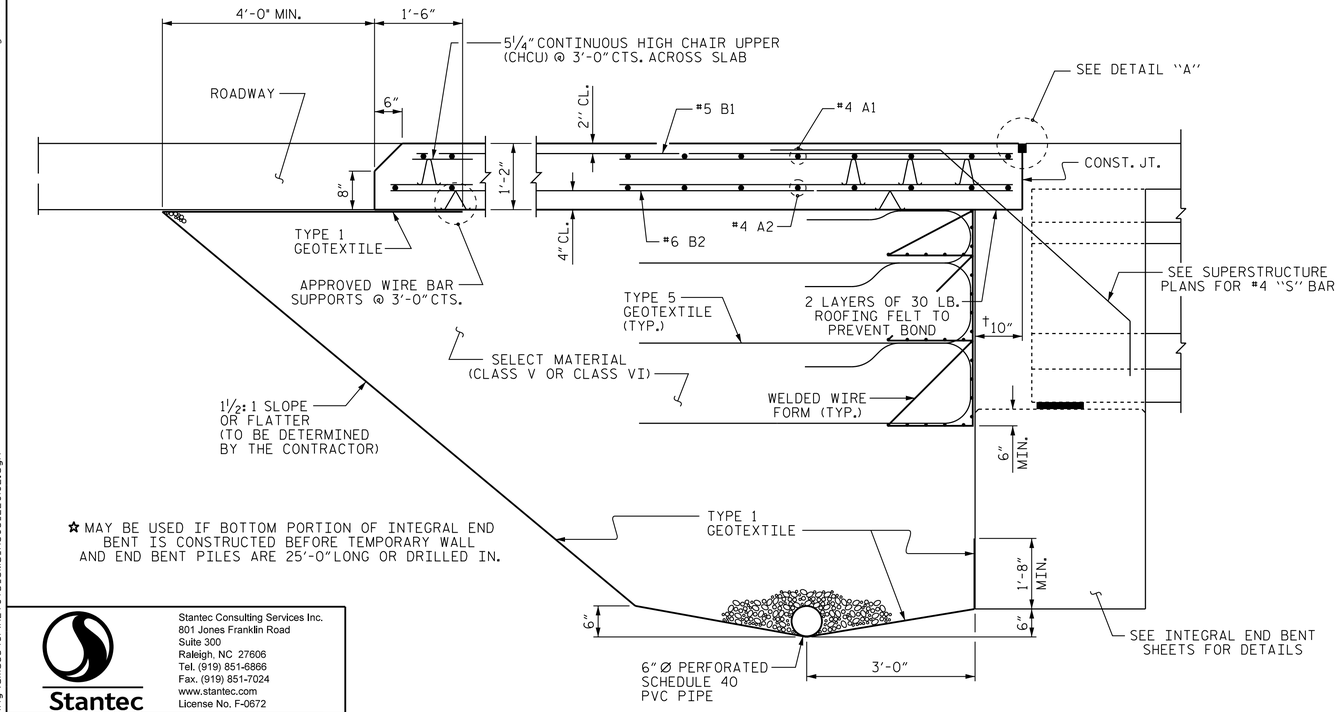


SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



SECTION THRU SLAB

☆ (TYPE A - ALTERNATE APPROACH FILL)

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.

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ASSEMBLED BY : J.B. GEILE DATE : 01/09/23
CHECKED BY : J.T. KELVINGTON DATE : 05/03/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-56
1			3			TOTAL SHEETS
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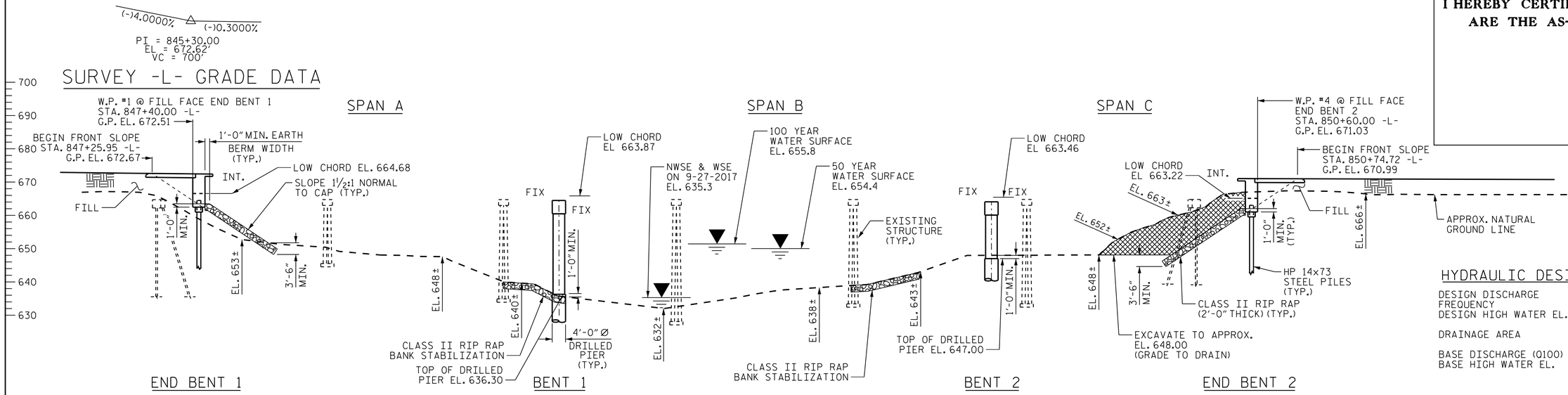
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

SURVEY -L- GRADE DATA



SECTION ALONG BRIDGE CONTROL LINE

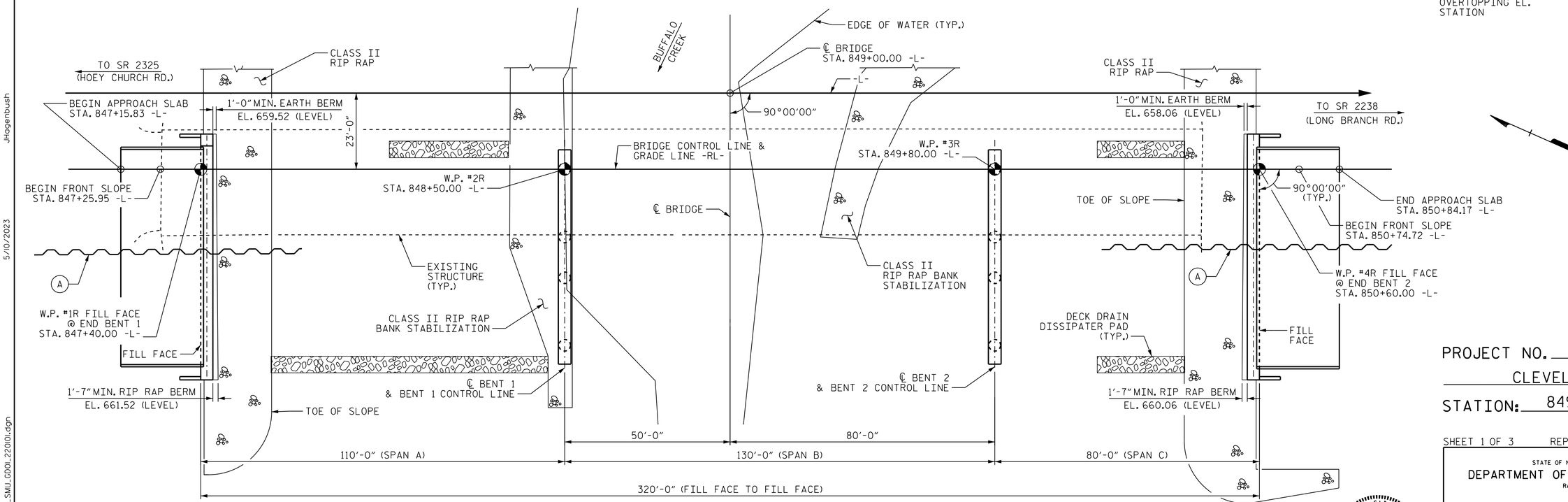
DENOTES UNCLASSIFIED STRUCTURE EXCAVATION

HYDRAULIC DESIGN DATA

DESIGN DISCHARGE	14,290 CFS.
FREQUENCY	50 YR.
DESIGN HIGH WATER EL.	654.4
DRAINAGE AREA	116 SQ. MI
BASE DISCHARGE (Q100)	16,860 CFS.
BASE HIGH WATER EL.	655.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	55,000 CFS.
FREQUENCY	>500 YR.
OVERTOPPING EL.	671.2
STATION	851+66.00 -L-



PLAN

(PILES NOT SHOWN FOR CLARITY)

(A) - TEMPORARY SHORING APPROX. LOCATION SHOWN. SEE TRANSPORTATION MANAGEMENT PLANS FOR SHORING DETAILS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 220101

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER BUFFALO CREEK ON US 74 BETWEEN SR 2325 (HOEY CHURCH RD.) AND SR 2238 (LONG BRANCH RD.)

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-01
1			3			TOTAL SHEETS
2			4			56

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DRAWN BY : J.E. HAGENBUSH DATE : 11/01/17
CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 054498 SETH S. POOLE

Signed by: 5/10/2023

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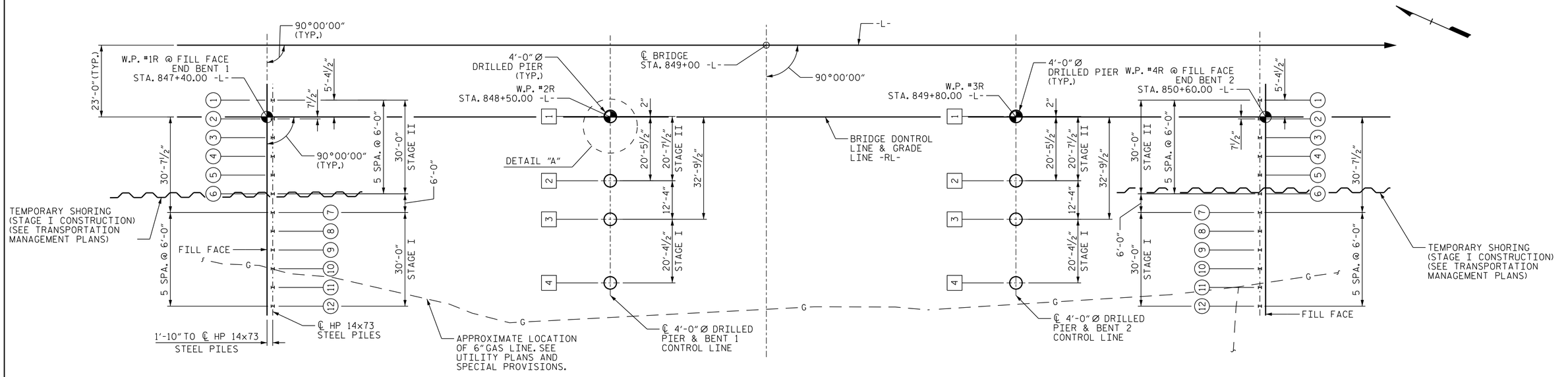
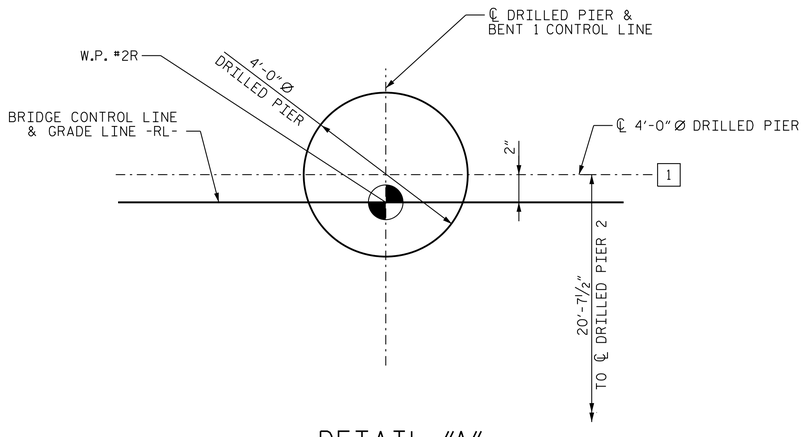


FOUNDATION LAYOUT

ALL SUBSTRUCTURE WORK LINES PASS THROUGH WORK POINTS.

(#) - DENOTES PILE NUMBER.

[#] - DENOTES DRILLED PIER NUMBER.



DETAIL "A"

PLAN @ BENT 1 SHOWN, BENT 2 TYPICAL

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DRAWN BY : J. B. GEILE DATE : 10/10/18
CHECKED BY : S. S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/10/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER BUFFALO CREEK
ON US 74 BETWEEN
SR 2325 (HOEY CHURCH RD.) AND
SR 2238 (LONG BRANCH RD.)
(RIGHT LANE)

REVISIONS						SHEET NO.
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SUMMARY OF PILE INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PILE TONS	PILE CUT-OFF (TOP OF PILE) ELEVATION FT	ESTIMATED PILE LENGTH PER PILE FT	SCOUR CRITICAL ELEVATION FT	DRIVEN PILES			PREDRILLING FOR PILES*			DRILLED-IN PILES		
					MIN. PILE TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED DRIVING RESISTANCE (RDR)** PER PILE TONS	TOTAL PILE REDRIVES QUANTITY EACH	PREDRILLING LENGTH PER PILE LIN FT	PREDRILLING ELEVATION (ELEV NOT TO PREDRILL BELOW) FT	MAXIMUM PREDRILLING DIA INCHES	PILE EXCAVATION (BOTTOM OF HOLE) ELEV FT	PILE EXC NOT IN SOIL PER PILE LIN FT	PILE EXC IN SOIL PER PILE LIN FT
END BENT NO. 1, PILES 1-6	145	662.52	40			245							
END BENT NO. 1, PILES 7-12	145	662.52	30			245							
END BENT NO. 2, PILES 1-12	125	661.06	25			210							

* PREDRILLING FOR PILES IS REQUIRED FOR END BENTS/ BENTS WITH A PREDRILLING LENGTH AND AT THE CONTRACTOR'S OPTION FOR END BENTS/ BENTS WITH PREDRILLING INFORMATION BUT NO PREDRILLING LENGTH.

** RDR= $\frac{\text{FACTORED RESISTANCE + FACTORED DOWNDRAG LOAD + FACTORED DEAD LOAD}}{\text{DYNAMIC RESISTANCE FACTOR}}$ + NOMINAL DOWNDRAG RESISTANCE + $\frac{\text{NOMINAL SCOUR RESISTANCE}}{\text{SCOUR RESISTANCE FACTOR}}$

PILE DESIGN INFORMATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED AXIAL LOAD PER PILE TONS	FACTORED DOWNDRAG LOAD PER PILE TONS	FACTORED DEAD LOAD* PER PILE TONS	DYNAMIC RESISTANCE FACTOR	NOMINAL DOWNDRAG RESISTANCE PER PILE TONS	NOMINAL SCOUR RESISTANCE PER PILE TONS	SCOUR RESISTANCE FACTOR (DEFAULT=1.00)
END BENT 1, PILES 1-12	145			0.60			
END BENT 2, PILES 1-12	125			0.60			

* FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

SUMMARY OF DRILLED PIER INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PIER TONS	MIN. PIER TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED TIP RESISTANCE PER PIER TSF	SCOUR CRITICAL ELEVATION FT	MIN. DRILLED PIER PENETRATION INTO ROCK PER PIER LIN FT	DRILLED PIER LENGTH* PER PIER LIN FT	DRILLED PIER LENGTH NOT IN SOIL* PER PIER LIN FT	DRILLED PIER LENGTH IN SOIL* PER PIER LIN FT	PERMANENT STEEL CASING REQUIRED? YES OR MAYBE	PERMANENT STEEL CASING TIP ELEVATION (ELEV NOT TO EXTEND CASING BELOW) FT	PERMANENT STEEL CASING LENGTH** PER PIER LIN FT
BENT NO. 1, PIERS 1-2	750	605.0	25	622	9.9		18.4	12.9	YES	625.0	11.0
BENT NO. 1, PIERS 3-4	750	607.0	40	622	10.8		11.1	18.2	YES	625.0	11.0
BENT NO. 2, PIERS 1-2	650	629.0	45	638	6.8		8.3	9.7	YES	635.8	11.2
BENT NO. 2, PIERS 3-4	650	625.0	35	638	7.8		8.2	13.8	YES	632.8	14.2
TOTAL QTY.							92.0	109.2			94.8

* DRILLED PIER LENGTH, DRILLED PIER LENGTH NOT IN SOIL AND DRILLED PIER LENGTH IN SOIL REPRESENT ESTIMATED DRILLED PIER QUANTITIES AND ARE MEASURED AND PAID FOR AS EITHER "48 IN. DIA. DRILLED PIERS" OR "48 IN. DIA. DRILLED PIERS NOT IN SOIL" AND "48 IN. DIA. DRILLED PIERS IN SOIL" IN ACCORDANCE WITH ARTICLE 411-7 OF THE NCDOT STANDARD SPECIFICATIONS.

** PERMANENT STEEL CASING LENGTH EQUALS THE DIFFERENCE BETWEEN THE GROUND LINE OR TOP OF DRILLED PIER ELEVATION, WHICHEVER IS HIGHER, AND THE PERMANENT CASING TIP ELEVATION AND IS MEASURED AND PAID FOR AS "PERMANENT STEEL CASTING FOR 48 IN. DIA. DRILLED PIER" IN ACCORDANCE WITH ARTICLE 411-7 OF THE NCDOT STANDARD SPECIFICATIONS.

NOTES:

1. THE PILE AND DRILLED PIER FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (STEPHEN CROCKETT #048207) ON 03-15-2023.
2. TOTAL PILE DRIVING EQUIPMENT SETUP QUANTITY (NOT SHOWN IN PILE FOUNDATION TABLES) EQUALS THE NUMBER OF DRIVEN PILES, I.E., THE NUMBER OF PILES WITH A REQUIRED DRIVING RESISTANCE.
3. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING, PERMANENT STEEL CASING, SPTS, CSL TESTING, SID INSPECTIONS AND PITS WHEN THESE ITEMS MAY BE REQUIRED.

SUMMARY OF PDA/ PILE ORDER LENGTHS

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

PILE DRIVING ANALYZER (PDA)				PILE ORDER LENGTHS	
END BENT/ BENT NO.	PDA TESTING REQUIRED? YES OR MAYBE	PDA TEST PILE LENGTH FT	TOTAL PDA TESTING QUANTITY EACH	END BENT/ BENT NO(s)	PILE ORDER LENGTH BASIS* EST OR PDA

* EST=PILE ORDER LENGTHS FROM ESTIMATED PILE LENGTHS; PDA=PILE ORDER LENGTHS BASED ON PDA TESTING. FOR GROUPS OF END BENTS/BENTS WITH PILE ORDER LENGTHS BASED ON PDA TESTING, THE FIRST END BENT/ BENT NO. LISTED FOR EACH GROUP IS THE REPRESENTATIVE END BENT/ BENT WITH THE PDA.

SUMMARY OF PILE ACCESSORIES

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	PIPE PILE PLATES REQUIRED YES OR MAYBE	STEEL PILE POINTS			STEEL PILE TIPS REQUIRED? YES
		PIPE PILE CUTTING SHOES REQUIRED? YES	PIPE PILE CONICAL POINTS REQUIRED? YES	H-PILE POINTS REQUIRED? YES	
END BENT 1, PILES 1-6				YES	
TOTAL QTY.				6	

SUMMARY OF DRILLED PIER TESTING

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	STANDARD PENETRATION TEST (SPT) REQUIRED? YES OR MAYBE	CROSSHOLE SONIC LOGGING (CSL) REQUIRED?* YES OR MAYBE	TOTAL CSL TUBE LENGTH (FOR ALL TUBES) PER PIER LIN FT	SHAFT INSPECTION DEVICE (SID) REQUIRED? YES OR MAYBE	PILE INTEGRITY TEST (PIT) REQUIRED? MAYBE
BENT 1, PIERS 1-2		MAYBE	131.2	MAYBE	
BENT 1, PIERS 3-4		MAYBE	123.2	MAYBE	
BENT 2, PIERS 1-2		MAYBE	78.0	MAYBE	
BENT 2, PIERS 3-4		MAYBE	94.0	MAYBE	
TOTAL QTY.		1	852.8		

* CSL TUBES ARE REQUIRED IF CSL TESTING IS OR MAY BE REQUIRED. THE NUMBER OF CSL TUBES PER DRILLED PIER IS EQUAL TO ONE TUBE PER FOOT OF DESIGN PIER DIAMETER WITH AT LEAST 4 TUBES PER PIER. THE LENGTH OF EACH CSL TUBE IS EQUAL TO THE DRILLED PIER LENGTH PLUS 1.5 FT.

FOUNDATION NOTES:

1. FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
2. SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES AT END BENT NO. 1.
3. OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
4. OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
5. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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DRAWN BY : J.E.HAGENBUSH DATE : 05/17/22
CHECKED BY : S. S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
PILE AND DRILLED PIER FOUNDATION TABLES

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-03
1			3			TOTAL SHEETS
2			4			56

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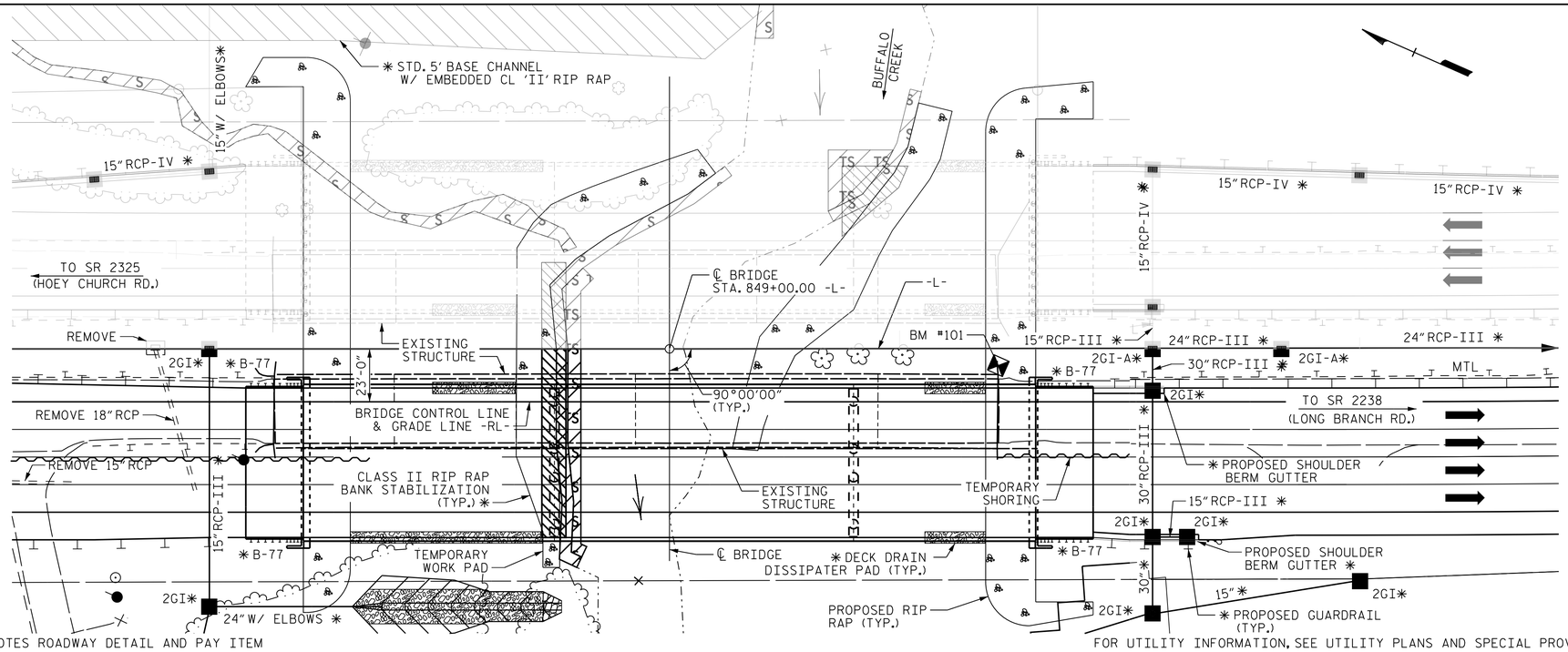
BM #101: . -L- STA. 850+42.89, 7.27' RT. EL. 667.84, TOP OF EARWALL @ SE CORNER OF BRIDGE 220101



LOCATION SKETCH

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" DIA DRILLED PIERS IN SOIL	4'-0" DIA DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" DIA DRILLED PIERS	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	L.F.	L.F.	L.F.	EA.	EA.	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE										21,840	22,775		LUMP SUM	
END BENT NO.1												66.2		12,541
BENT NO.1				62.2	59.0	45.2						87.6		26,553
BENT NO.2				47.0	33.0	54.8						71.6		21,830
END BENT NO.2									LUMP SUM			67.1		12,582
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	109.2	92.0	100.0	1	1	LUMP SUM	21,840	22,775	292.5	LUMP SUM	73,506

TOTAL BILL OF MATERIAL (CONT'D)

	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONC. GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP14x73 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LBS.	NO.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	TON	SY	LUMP SUM
SUPERSTRUCTURE		24	2,528.67					636.67			LUMP SUM
END BENT NO.1				12	12	420	6		237	265	
BENT NO.1	5,604										
BENT NO.2	3,268										
END BENT NO.2				12	12	300			367	410	
TOTAL	8,872	24	2,528.67	24	24	720	6	636.67	604	675	LUMP SUM

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 849+00.

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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 23 FT LEFT OF THE BRIDGE CONTROL LINE AND 25 FT RIGHT OF THE BRIDGE CONTROL LINE AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

(AFTER SERVING AS A TEMPORARY STRUCTURE) THE EXISTING STRUCTURE CONSISTING OF 6 SPANS; 6 @ 52'-6", TOTAL LENGTH 315' W/ 28 FEET CLEAR ROADWAY PROVIDED BY CAST IN PLACE REINFORCED CONCRETE DECK GIRDERS SUPPORTED ON CONCRETE SOLID WEB PIERS AND CONCRETE ABUTMENTS, LOCATED AT THE PROPOSED BRIDGE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY (NOT) POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

NOTES (CONT. AT LEFT)

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DRAWN BY : J. B. GEILE DATE : 09/20/18
CHECKED BY : S. S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Docusigned by: 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER BUFFALO CREEK
ON US 74 BETWEEN
SR 2325 (HOEY CHURCH RD.) AND
SR 2238 (LONG BRANCH RD.)
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-04
1			3			TOTAL SHEETS
2			4			56

JHagenbush
5/10/2023
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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 x 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⟩	1.07	-	1.75	0.880	1.12	A	EL	53.50	0.880	2.03	B	EL	12.20	0.80	0.880	1.07	B	EL	63.90	
		HL-93 (OPERATING)	N/A		1.45	-	1.35	0.880	1.45	A	EL	53.50	0.880	2.68	B	EL	12.20	N/A	--	--	-	-	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.60	57.6	1.75	0.880	1.60	A	EL	53.50	0.880	3.01	B	EL	12.20	0.80	0.880	1.60	B	EL	63.90	
		HS-20 (OPERATING)	36.000		2.08	74.9	1.35	0.880	2.08	A	EL	53.50	0.880	3.96	B	EL	12.20	N/A	--	--	-	-	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.57	21.2	1.40	0.880	1.95	A	EL	53.50	0.880	3.77	B	EL	12.20	0.80	0.880	1.57	B	EL	63.90	
		SNGARBS2	20.000		2.58	51.6	1.40	0.880	3.21	A	EL	53.50	0.880	6.56	B	EL	12.20	0.80	0.880	2.58	B	EL	63.90	
		SNAGRIS2	22.000		1.94	42.7	1.40	0.880	2.39	A	EL	53.50	0.880	4.90	B	EL	12.20	0.80	0.880	1.94	B	EL	63.90	
		SNCOTTS3	27.250		2.77	75.5	1.40	0.880	3.46	A	EL	53.50	0.880	7.14	B	EL	12.20	0.80	0.880	2.77	B	EL	63.90	
		SNAGGRS4	34.925		1.54	53.8	1.40	0.880	1.91	A	EL	53.50	0.880	3.62	B	EL	12.20	0.80	0.880	1.54	B	EL	63.90	
		SNS5A	35.550		1.39	49.4	1.40	0.880	1.73	A	EL	53.50	0.880	3.25	B	EL	12.20	0.80	0.880	1.39	B	EL	63.90	
		SNS6A	39.950		1.32	52.7	1.40	0.880	1.65	A	EL	53.50	0.880	3.14	B	EL	12.20	0.80	0.880	1.32	B	EL	63.90	
		SNS7B	42.000		3.90	163.8	1.40	0.880	4.82	A	EL	53.50	0.880	10.34	B	EL	12.20	0.80	0.880	3.90	B	EL	63.90	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.38	45.5	1.40	0.880	1.74	A	EL	53.50	0.880	3.10	B	EL	12.20	0.80	0.880	1.38	B	EL	63.90	
		TNT4A	33.075		1.36	45.0	1.40	0.880	1.70	A	EL	53.50	0.880	3.21	B	EL	12.20	0.80	0.880	1.36	B	EL	63.90	
		TNT6A	41.600		1.36	56.6	1.40	0.880	1.70	A	EL	53.50	0.880	3.40	B	EL	12.20	0.80	0.880	1.36	B	EL	63.90	
		TNT7A	42.000		1.69	71.0	1.40	0.880	2.11	A	EL	53.50	0.880	3.99	B	EL	12.20	0.80	0.880	1.69	B	EL	63.90	
		TNT7B	42.000		1.27	53.3	1.40	0.880	1.58	A	EL	53.50	0.880	3.02	B	EL	12.20	0.80	0.880	1.27	B	EL	63.90	
		TNAGRIT4	43.000		1.28	55.0	1.40	0.880	1.59	A	EL	53.50	0.880	3.05	B	EL	12.20	0.80	0.880	1.28	B	EL	63.90	
		TNAGT5A	45.000		1.69	76.1	1.40	0.880	2.11	A	EL	53.50	0.880	4.05	B	EL	12.20	0.80	0.880	1.69	B	EL	63.90	
		TNAGT5B	45.000	⟨3⟩	1.26	56.7	1.40	0.880	1.57	A	EL	53.50	0.880	3.10	B	EL	12.20	0.80	0.880	1.26	B	EL	63.90	

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.

SPAN LENGTH AND SUPPORT CONDITIONS SHOWN IN THE LRFR SKETCH CONFORMS TO THE ANALYSIS MODEL USED FOR ALL LOAD CONDITIONS.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

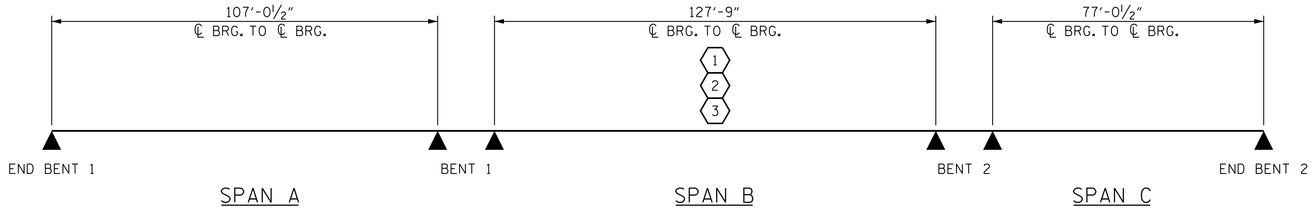
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨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-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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ASSEMBLED BY : J.E. HAGENBUSH DATE : 9/26/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

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

DESIGN ENGINEER OF RECORD: S. S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-05
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2			4			56

STD. NO. LRFR1

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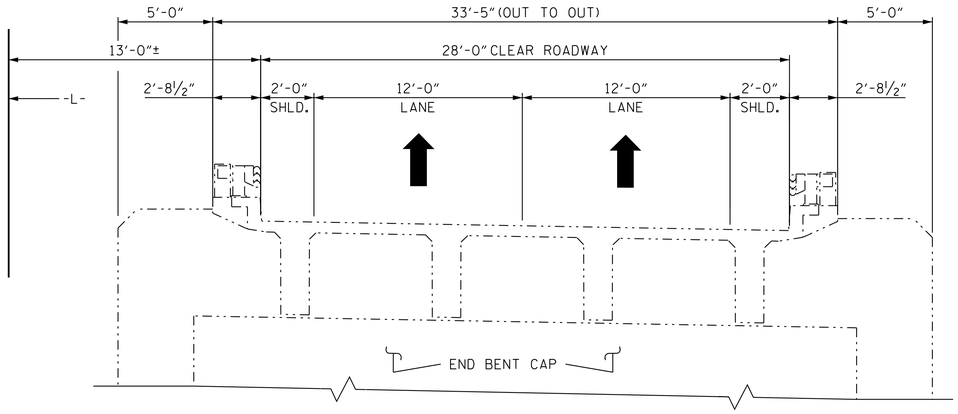
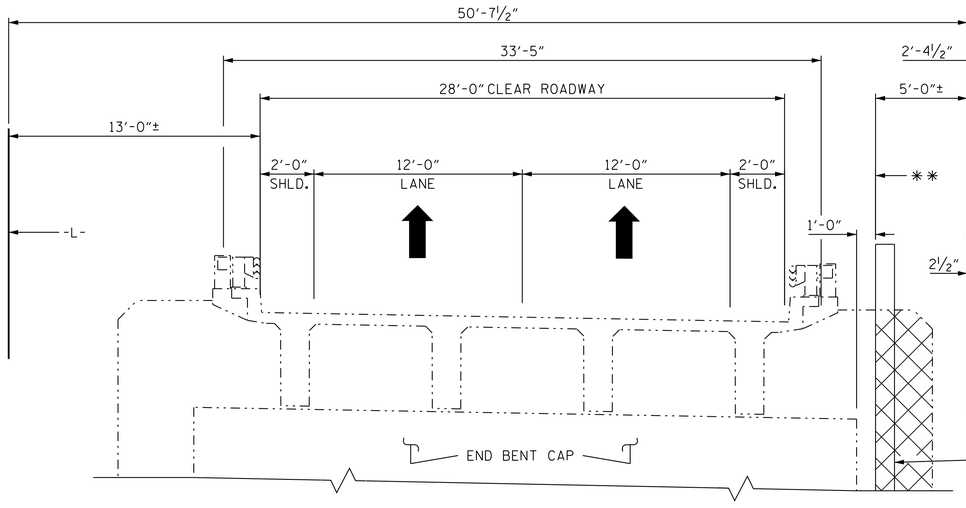
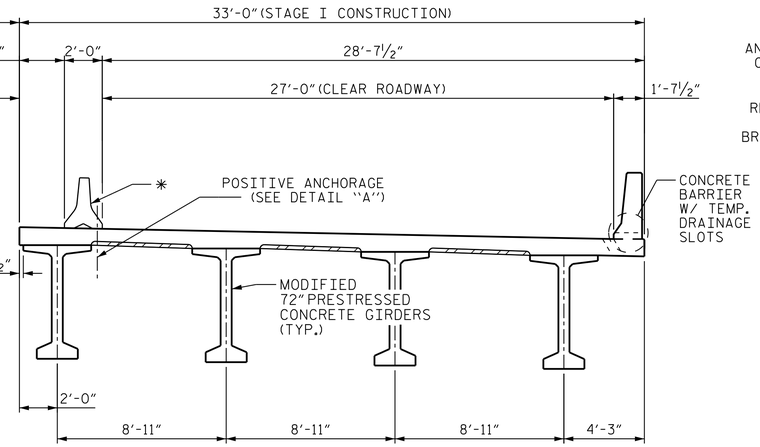
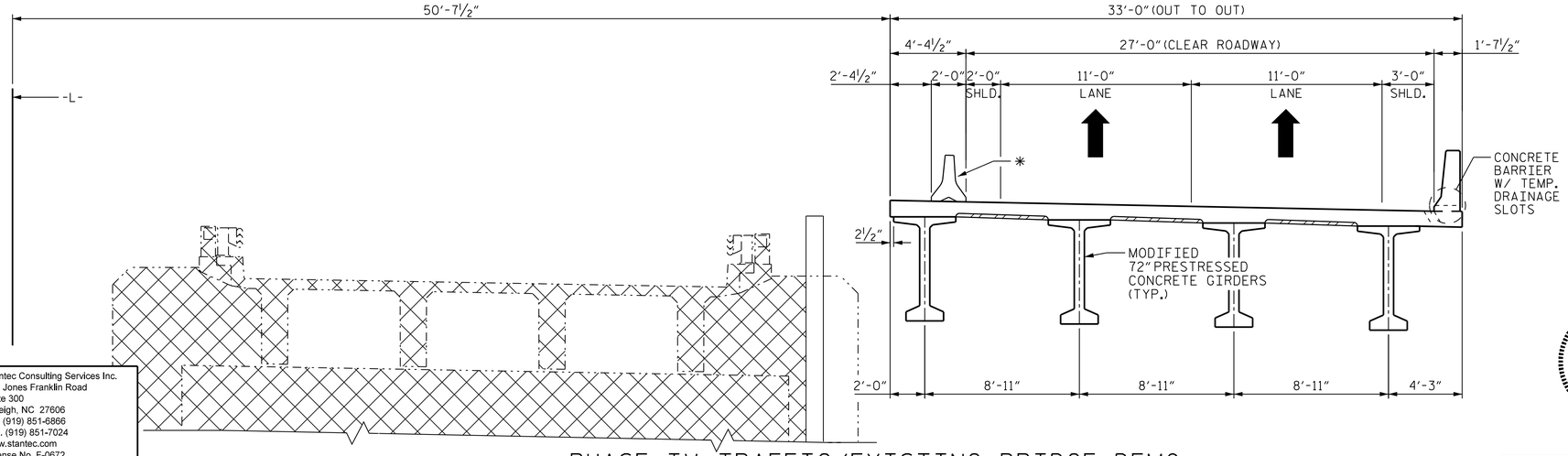


EXISTING CONDITION





PHASE I TRAFFIC/STAGE I CONSTRUCTION



PHASE IV TRAFFIC/EXISTING BRIDGE DEMO

NOTES:

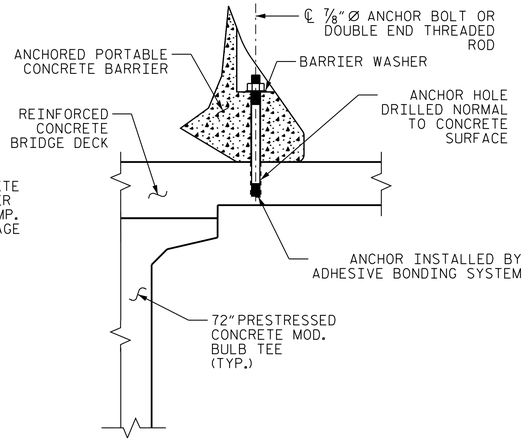
* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** END BENT WING WALL MAY BE REMOVED RIGHT OF THIS LINE

DIMENSIONS SHOWN FOR EXISTING STRUCTURE ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED

□ CONTRACTOR'S ATTENTION IS DIRECTED TO SHORING REQUIREMENTS AT SOUTHEAST WINGWALL. THE EXISTING FOOTING MAY INTERFERE WITH PILE DRIVING OPERATIONS AT END BENT 2. CONTRACTOR SHALL DESIGN TEMPORARY SHORING TO ACCOMMODATE REMOVAL OF EXISTING WING WALL AND FOOTING.

DENOTES STRUCTURE DEMOLITION



DETAIL "A"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE (FOR STAGED CONSTRUCTION)

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

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DRAWN BY : J. B. GEILE DATE : 11/05/17
CHECKED BY : S. S. POOLE DATE : 11/06/17

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

JHagenbush
5/10/2023
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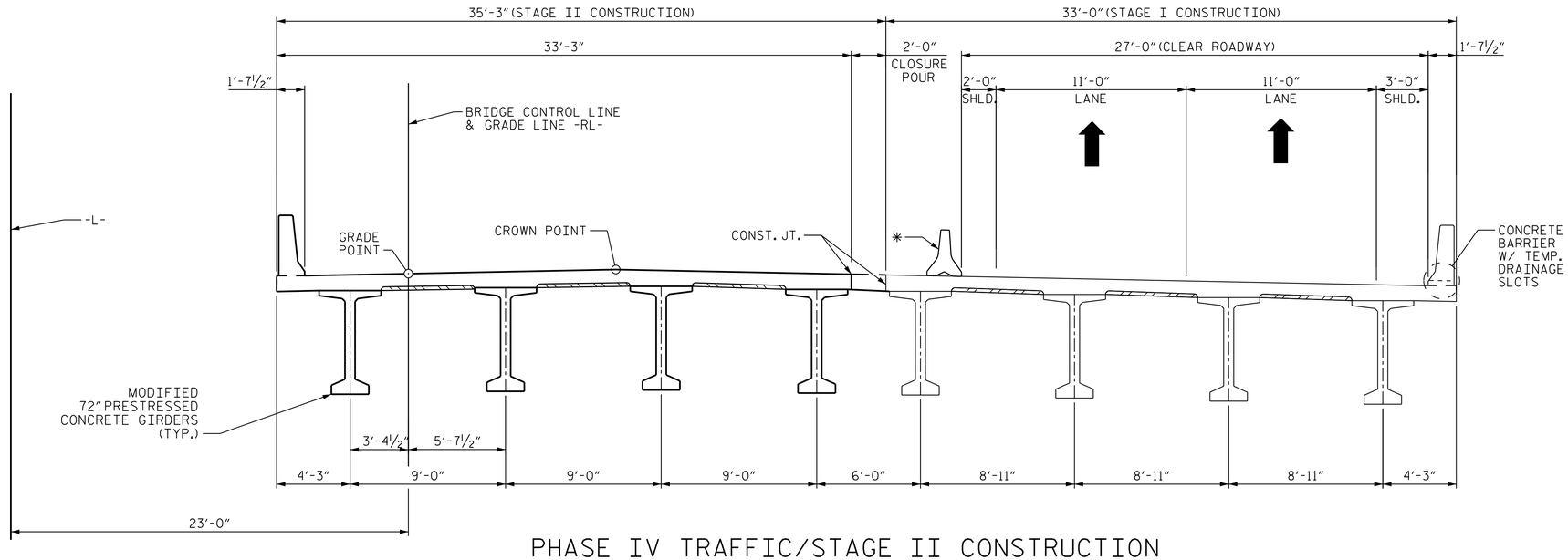
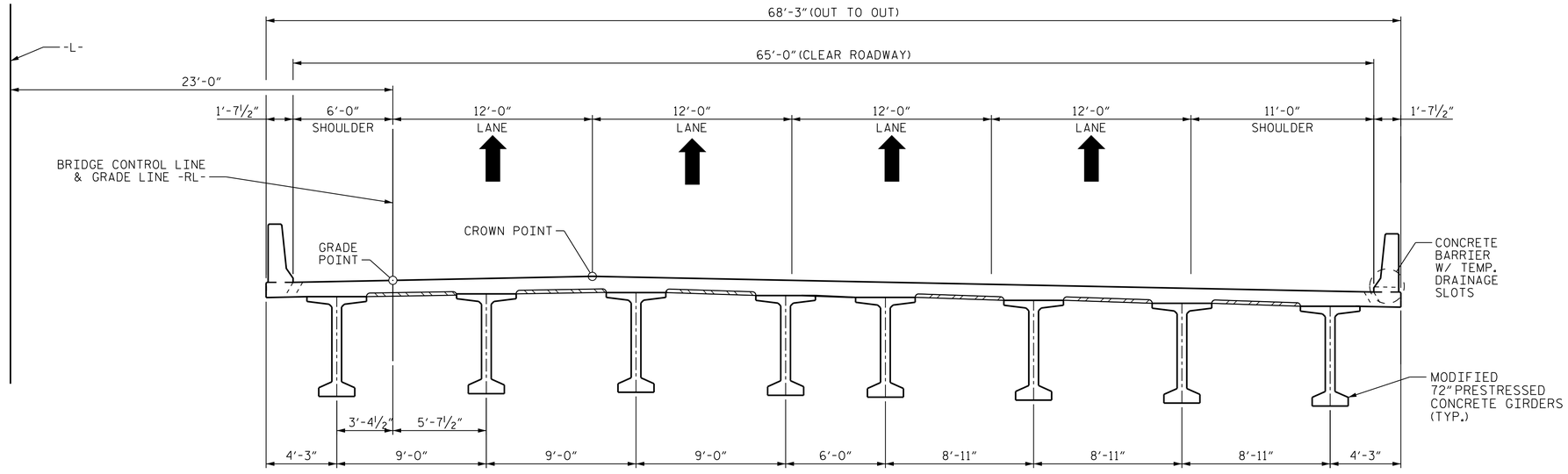


PHASE IV TRAFFIC/STAGE II CONSTRUCTION



FINAL CONDITION

NOTES:

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK, (SEE NCDOT STD. 854.04 & 1170.01)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE
(FOR STAGED CONSTRUCTION)

(RIGHT LANE)

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DRAWN BY : J. B. GEILE DATE : 11/06/17
CHECKED BY : T. DUDECK DATE : 04/03/18
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by:
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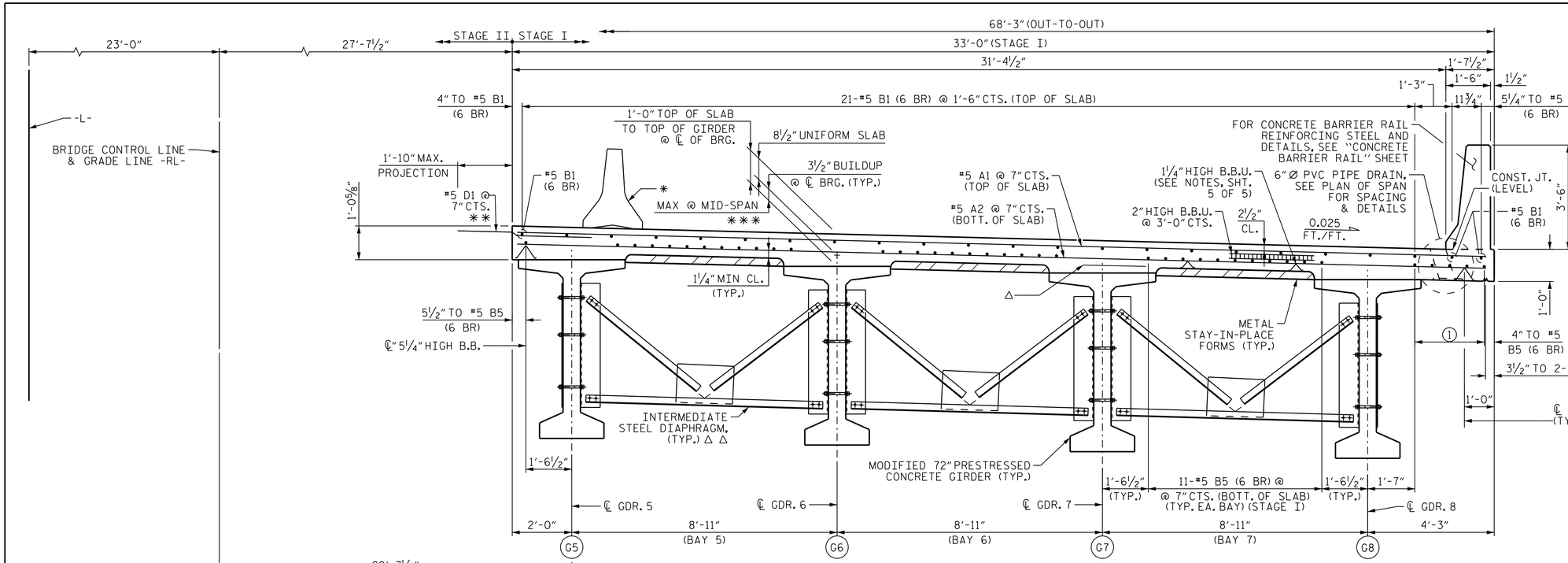


SECTION AT INTERMEDIATE DIAPHRAGMS (STAGE I)

TYPICAL SECTION

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

(6 BR) DENOTES 6 BAR RUN.

#5 B5 (6 BR) MAY BE REPOSITIONED AS NECESSARY TO CLEAR PIPE DRAINS.

Δ TOP OF METAL SIP FORMS TO MATCH REQUIRED BOTTOM OF SLAB.

Δ Δ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDERS" SHEET.

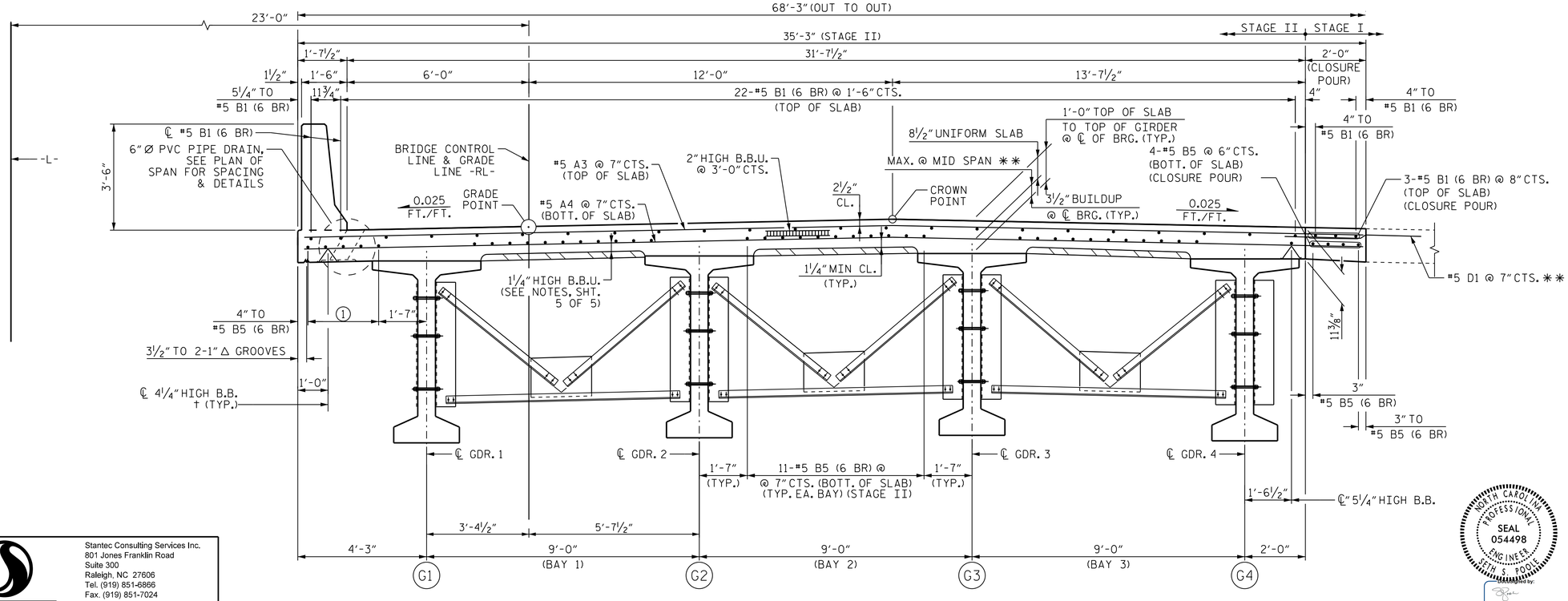
✱ PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

✱✱ DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

✱✱✱ SEE DETAIL "A" ON "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

① 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.

† 4¼" B.B. SHALL BE CUT AS REQUIRED TO CLEAR PIPE DRAINS.



SECTION AT INTERMEDIATE DIAPHRAGMS (STAGE II)

TYPICAL SECTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

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Signed by: 5/10/2023

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JHagenbush
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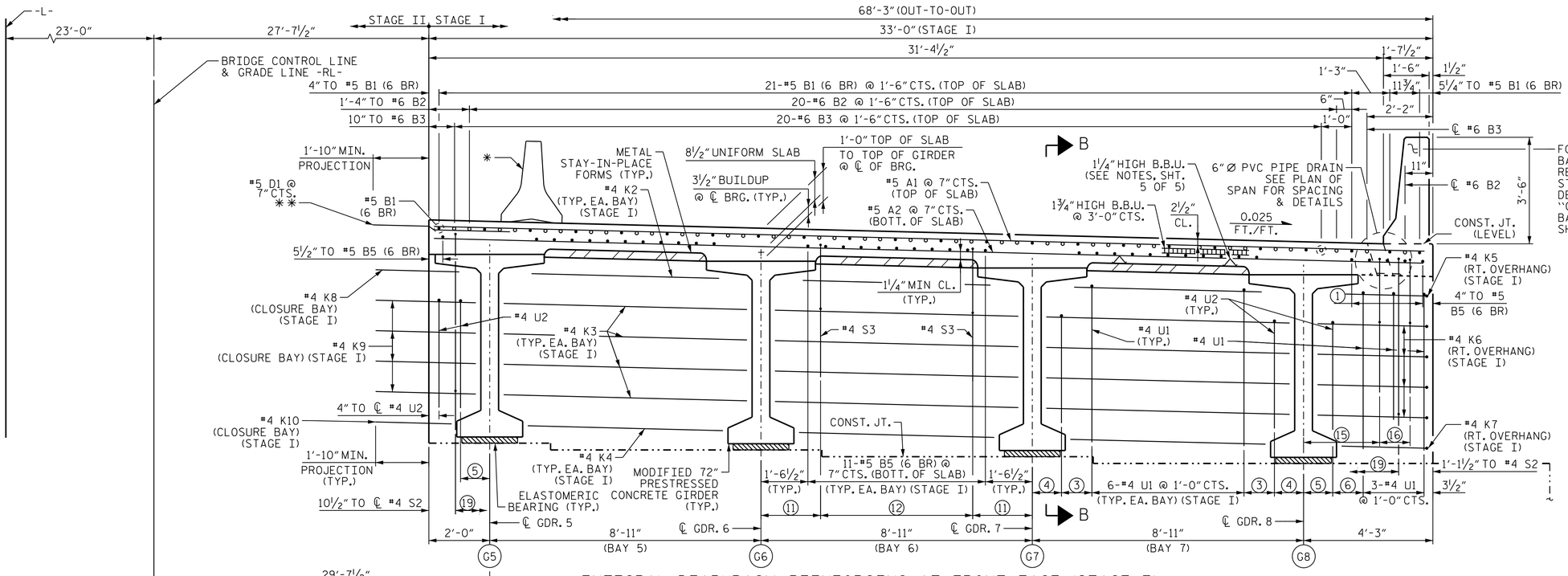
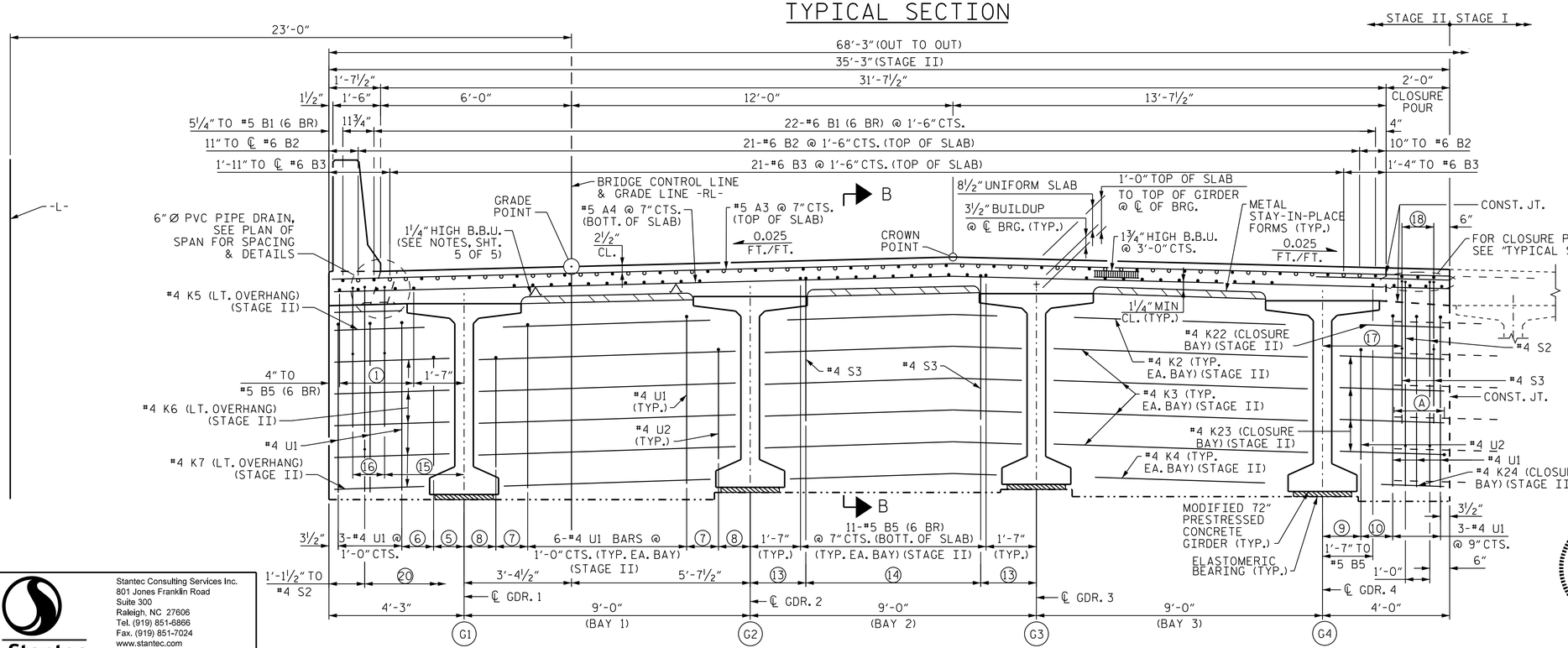


INTEGRAL DIAPHRAGM REINFORCING AT FRONT FACE (STAGE I)

TYPICAL SECTION



INTEGRAL DIAPHRAGM REINFORCING AT FRONT FACE (STAGE II)

TYPICAL SECTION

Ⓐ 1'-7" MIN. SPLICE LENGTH (TYP.)

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

FOR APPROACH SLAB PAVEMENT NOTCH DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

#4 S2 MAY BE REPOSITIONED AS NECESSARY TO CLEAR GIRDERS.

(6 BR) DENOTES 6 BAR RUN.

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

① 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.

③ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)

④ 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)

⑤ 11½" TO #4 U2

⑥ 1'-0" TO #4 U1

⑦ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)

⑧ 1'-0" TO #4 U2 (TYP. EA. BAY) (STAGE II)

⑨ 1'-2½" TO #4 U2 (STAGE II)

⑩ 1'-0" TO #4 U1 (STAGE II)

⑪ 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)

⑫ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)

⑬ 2'-0" TO #4 S3 (TYP. EA. BAY) (STAGE II)

⑭ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE II)

⑮ 2'-6" TO #4 S3

⑯ 2-#4 S3 @ 1'-0" MAX. CTS.

⑰ 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)

⑱ #4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

⑲ 32-#4 S2 @ 1'-0" ± CTS. (STAGE I)

⑳ 32-#4 S2 @ 1'-0" ± CTS. (STAGE II). SEE "PLAN OF SPANS DETAILS", SHEET 7 OF 8 FOR PLACEMENT.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/10/2023

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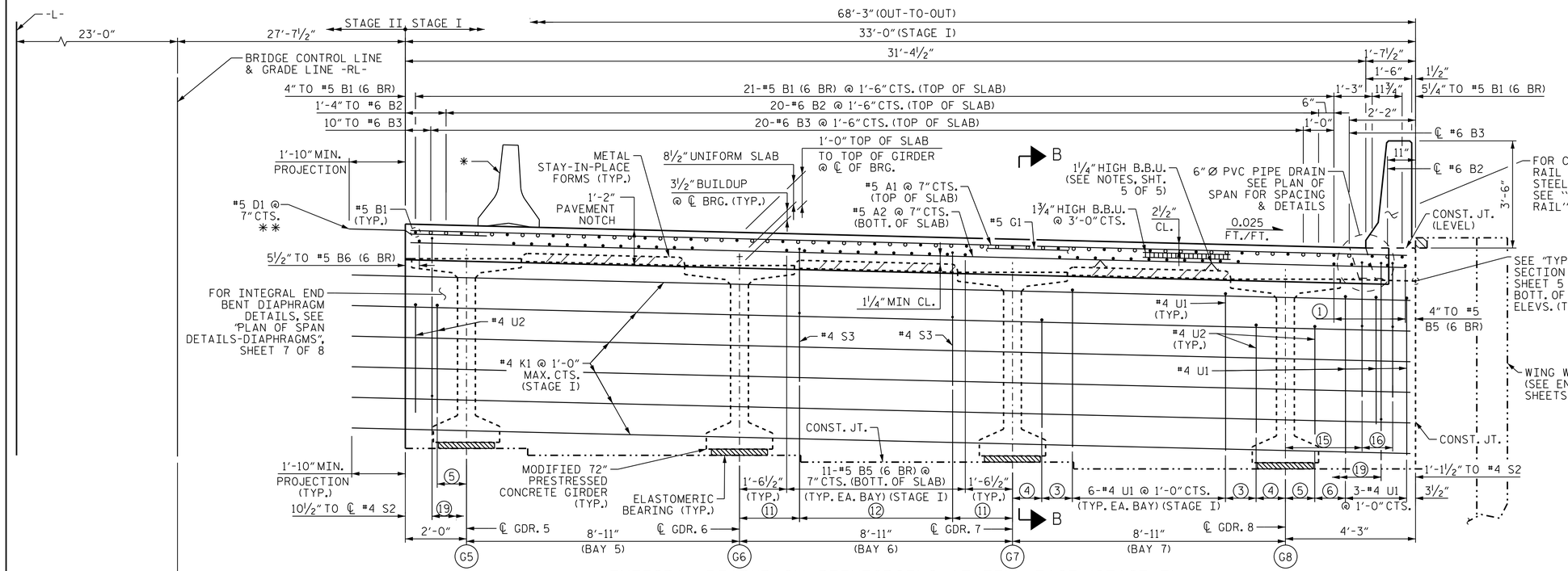
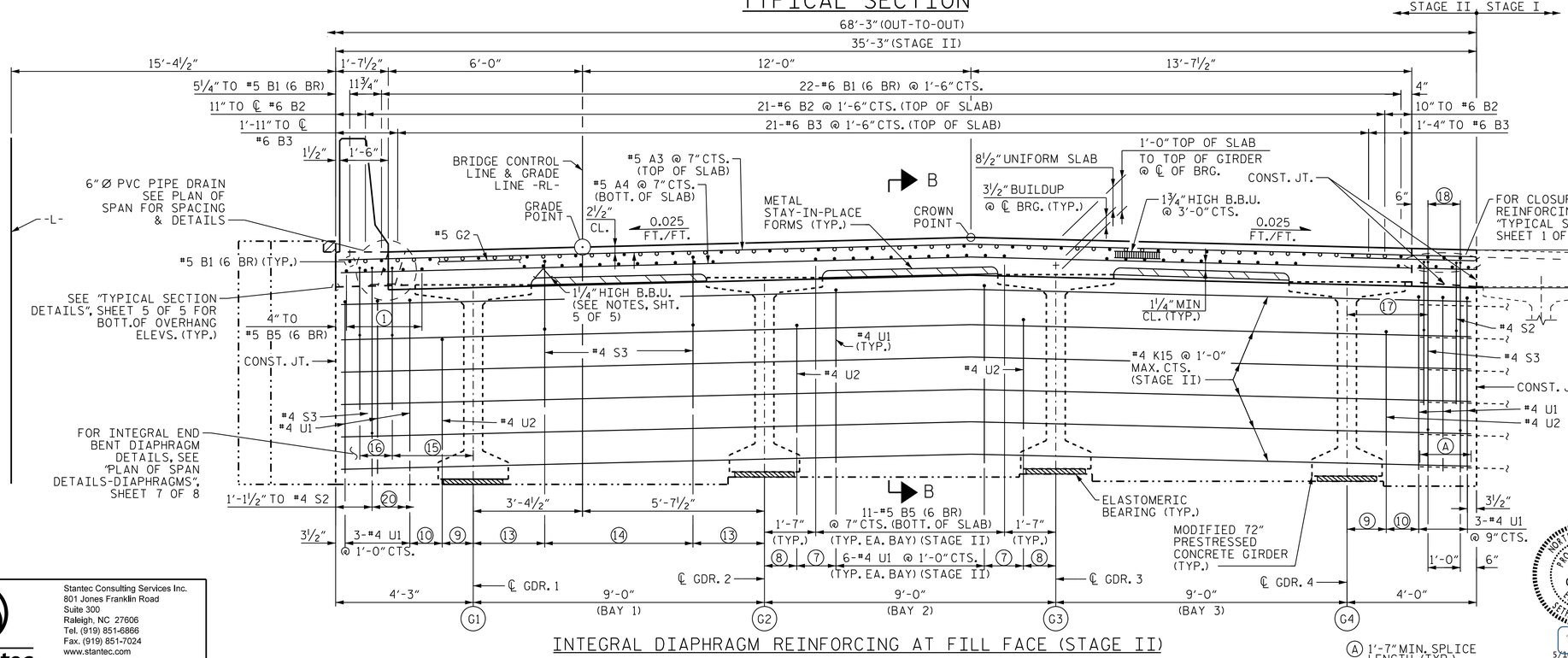


INTEGRAL DIAPHRAGM REINFORCING AT FILL FACE (STAGE I)

TYPICAL SECTION



INTEGRAL DIAPHRAGM REINFORCING AT FILL FACE (STAGE II)

TYPICAL SECTION

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

- • DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.
- ○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

2 BR DENOTES 2 BAR RUN.

4 BR DENOTES 4 BAR RUN.

△ △ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

FOR CONCRETE BARRIER RAIL REINFORCING STEEL AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET

1. 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.
3. 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)
4. 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)
5. 11½" TO #4 U2 (STAGE I)
6. 1'-0" TO #4 U1 (STAGE I)
7. 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)
8. 1'-0" TO #4 U2 (TYP. EA. BAY) (STAGE II)
9. 11½" TO #4 U2 (STAGE II)
10. 1'-0" TO #4 U1 (STAGE II)
11. 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)
12. 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)
13. 2'-0" TO #4 S3 (TYP. EA. BAY) (STAGE II)
14. 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE II)
15. 2'-6" TO #4 S3
16. 2-#4 S3 @ 1'-0" MAX. CTS.
17. 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)
18. #4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)
19. 32-#4 S2 @ 1'-0" ± CTS. (STAGE I)
20. 32-#4 S2 @ 1'-0" ± CTS. (STAGE II)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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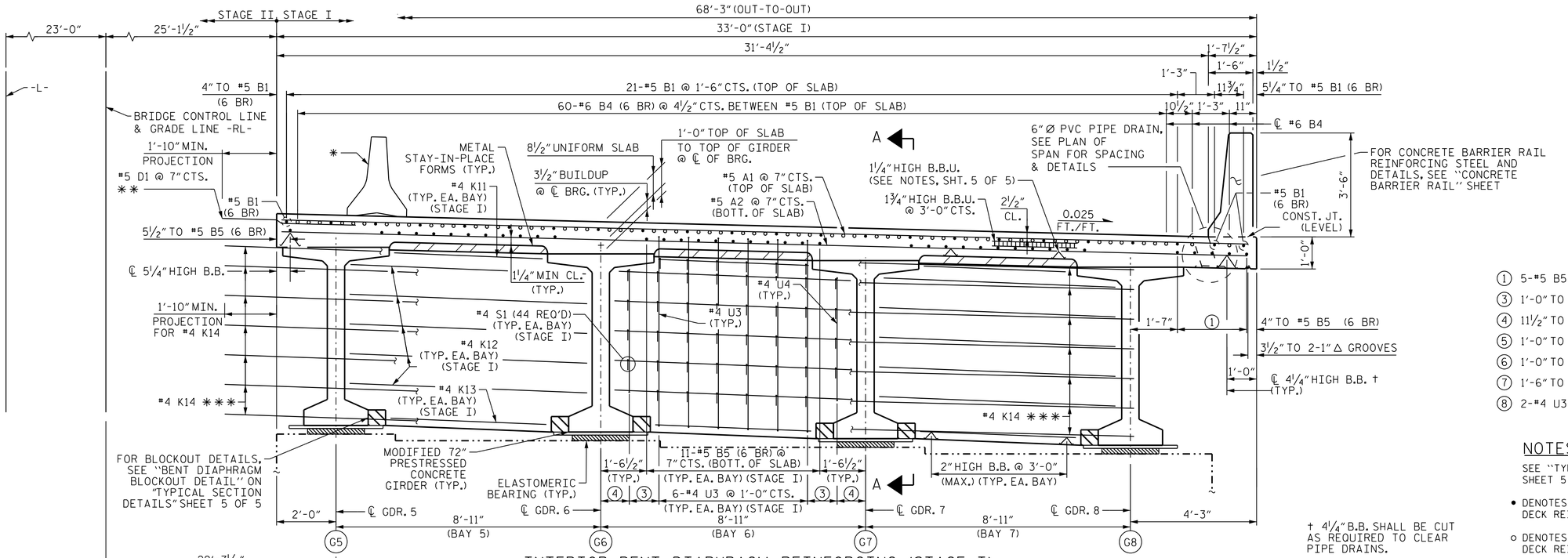
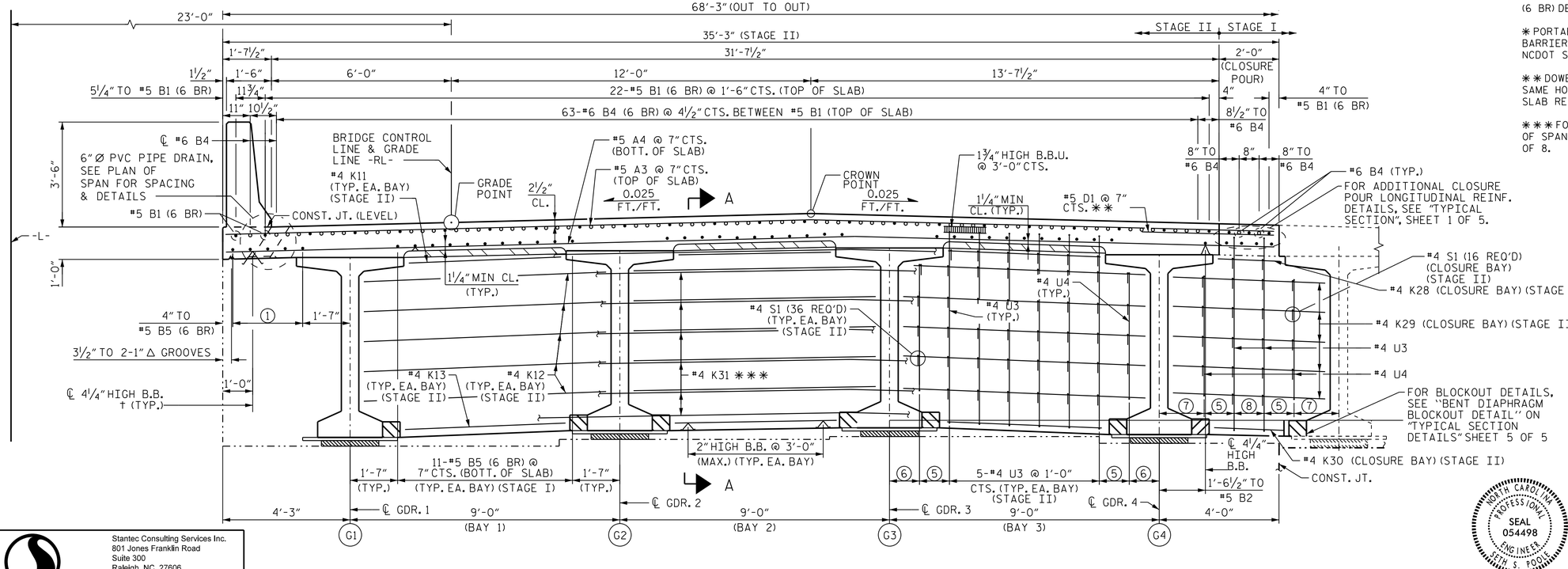


INTERIOR BENT DIAPHRAGM REINFORCING (STAGE I)

TYPICAL SECTION



INTERIOR BENT DIAPHRAGM REINFORCING (STAGE II)

TYPICAL SECTION

① 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB)
③ 1'-0" TO #4 U3 (TYP. EA. BAY) (STAGE I)
④ 11½" TO #4 U4 (TYP. EA. BAY) (STAGE I)
⑤ 1'-0" TO #4 U3 (STAGE II)
⑥ 1'-0" TO #4 U4 (TYP. EA. BAY) (STAGE II)
⑦ 1'-6" TO #4 U4 (CLOSURE BAY) (STAGE II)
⑧ 2-#4 U3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

#5 B5 (6 BR) MAY BE REPOSITIONED AS NECESSARY TO CLEAR PIPE DRAINS.

(6 BR) DENOTES 6 BAR RUN.

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

*** FOR "K" BAR PLACEMENT, SEE "PLAN OF SPANS DETAILS - DIAPGRAM", SHEET 8 OF 8.

† 4¼" B.B. SHALL BE CUT AS REQUIRED TO CLEAR PIPE DRAINS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5 BRIDGE #220101

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

TYPICAL SECTION

(RIGHT LANE)

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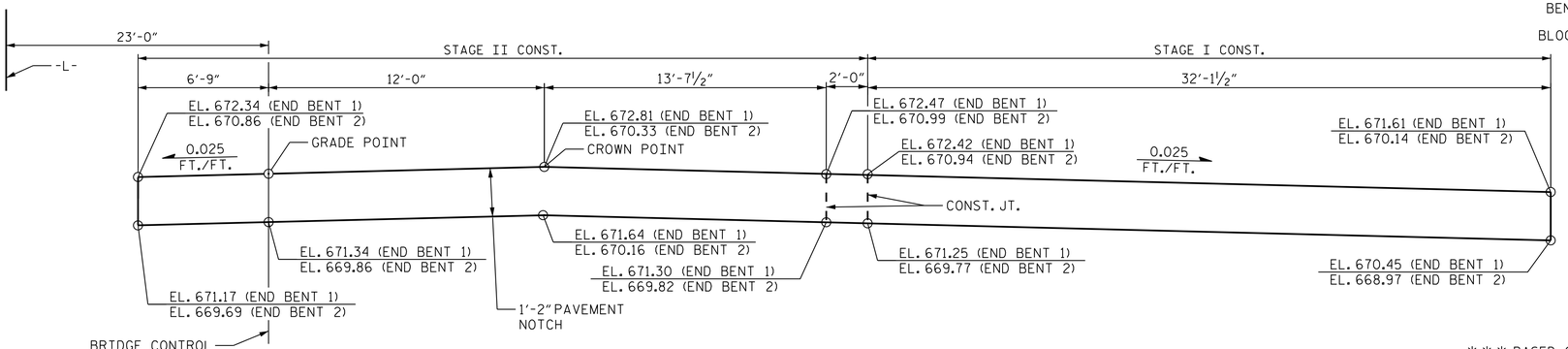
NOTES:

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.

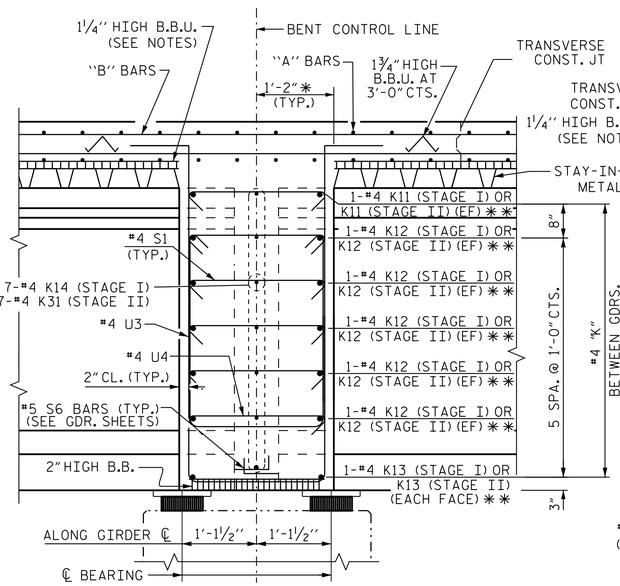
NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

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.



APPROACH SLAB PAVEMENT NOTCH DETAIL

ELEVATIONS ARE ALONG FILL FACE OF END BENT
DIMENSIONS ARE NORMAL TO -L-

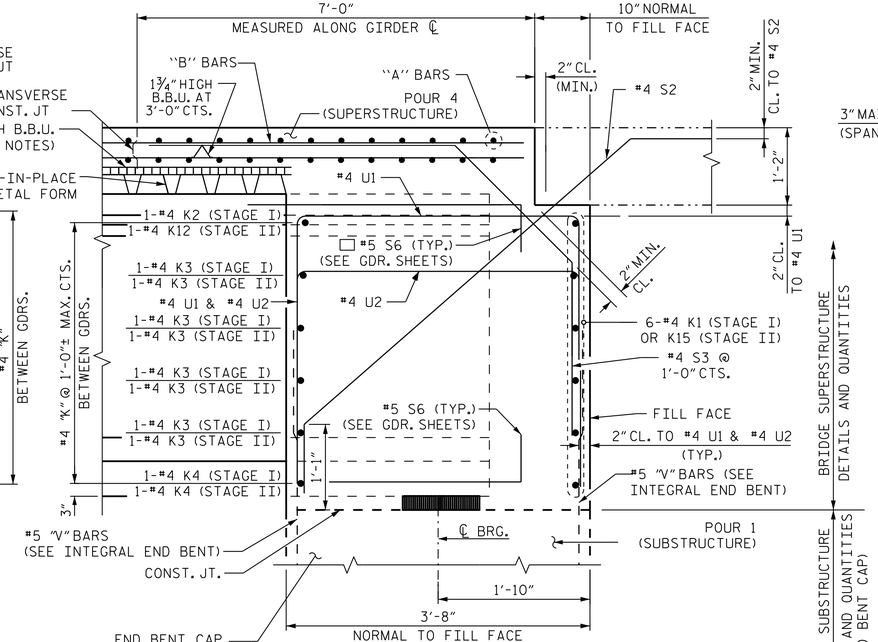


SECTION A-A

SECTION THRU DIAPHRAGM @ INTERIOR BENT
SEE "PLAN OF SPANS DETAILS - INTERIOR BENT DIAPHRAGMS", SHEET 8 OF 8

(EF) DENOTES EACH FACE

* NORMAL TO ℄ BENT
** TYP. EA. BAY, EXCEPT FOR STAGE II CLOSURE BAY.

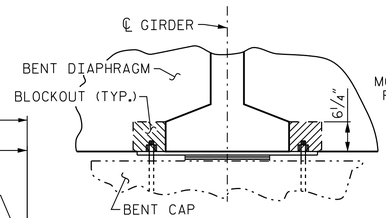


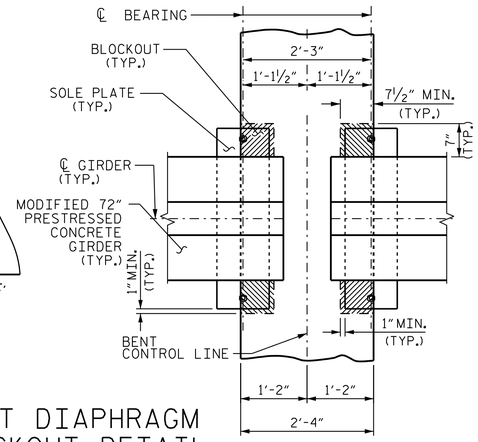
SECTION B-B

SECTION THRU INTEGRAL END BENT DIAPHRAGM
SEE "PLAN OF SPANS - END BENT DIAPHRAGMS", SHEET 7 OF 8

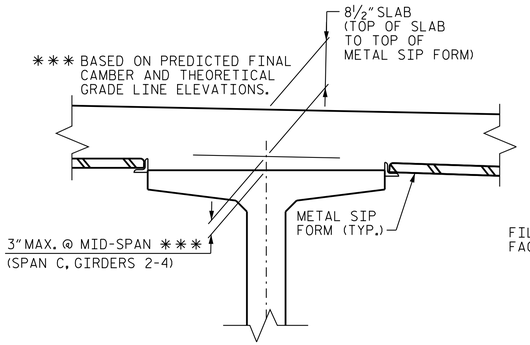
#4 S2 & S3 BARS MAY BE REPOSITIONED AS NECESSARY TO CLEAR SLAB REINFORCING STEEL AND GIRDERS.

☐ #5 S6 MAY BE FIELD BENT TO CLEAR 1'-2" DEEP PAVEMENT NOTCH.

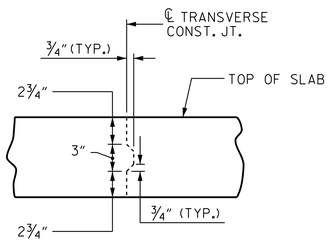




BENT DIAPHRAGM BLOCKOUT DETAIL

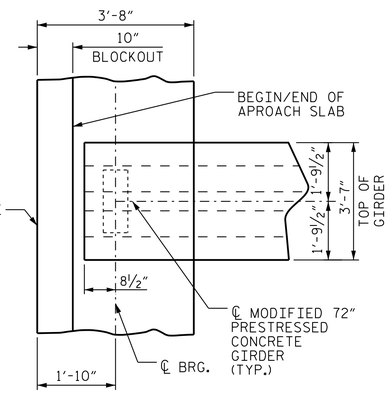


DETAIL "A"



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



PLAN OF INTEGRAL END BENT

BOTTOM OF OVERHANG ELEVS. @ OUTSIDE EDGE OF SUPERSTR.

OVERHANG	END BENT	ELEV.
LEFT SIDE	1	671.32
RIGHT SIDE	1	670.60
LEFT SIDE	2	669.89
RIGHT SIDE	2	669.17

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SHEET 5 OF 5

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(RIGHT LANE)

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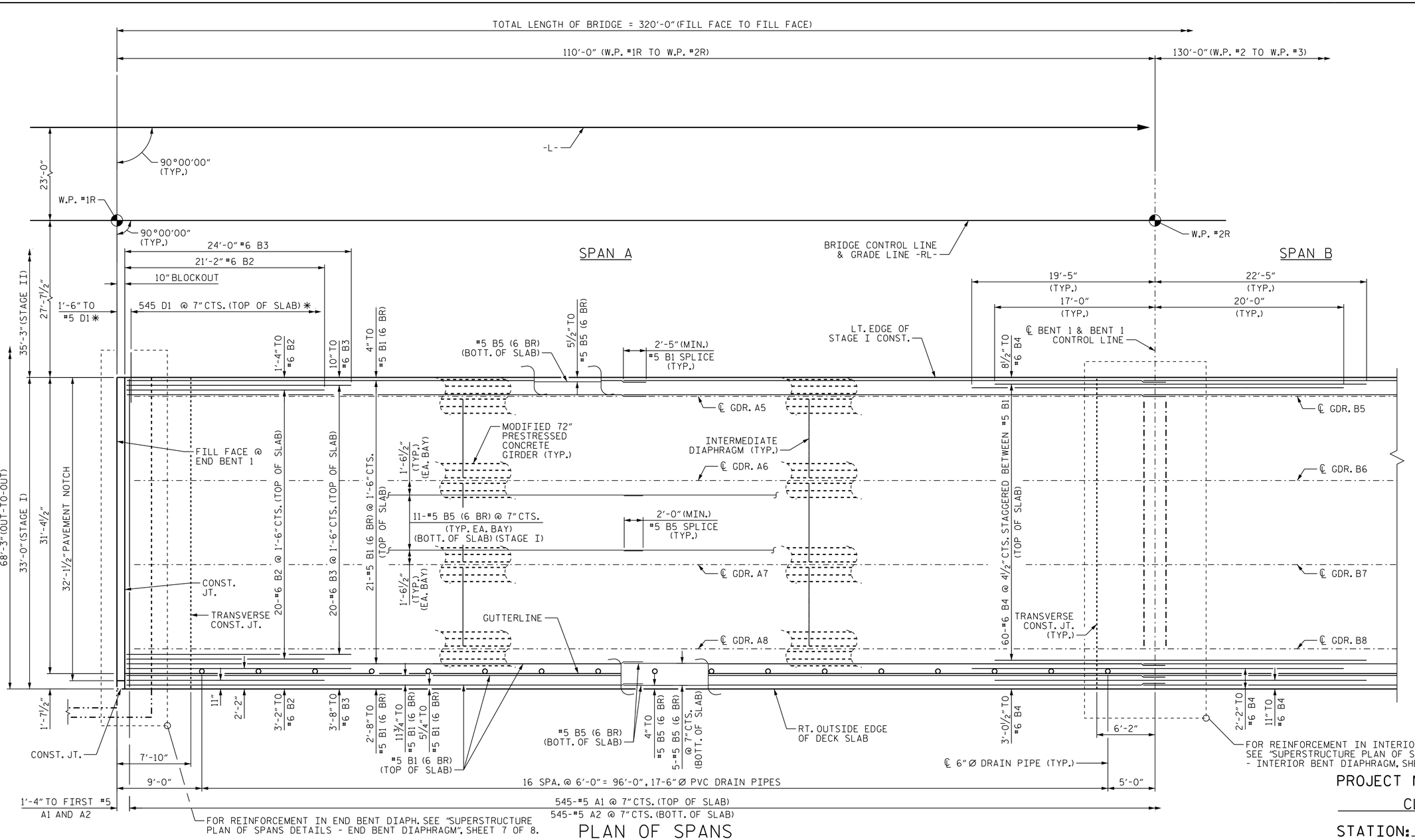


PLAN OF SPANS
(SPAN A & PARTIAL SPAN B)

NOTE:

(6 BR) DENOTES 6 BAR RUN

D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A1) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

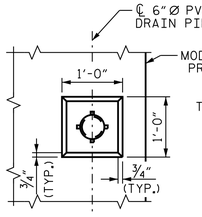
(CONT.)

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

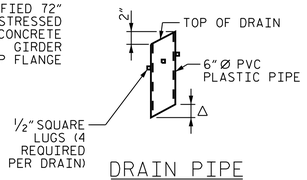
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE ''INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER'' SHEET.

TRANSVERSE AND LONGITUDINAL REINFORCING MAY BE ADJUSTED HORIZONTALLY IN THE VICINITY OF THE DRAIN PIPE.



PLAN OF RECESS

DRAIN DETAILS



DRAIN PIPE

△ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (25 DRAINS REQUIRED)

DRAIN PIPE NOTES:

TOP OF FLOOR DRAIN TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

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SHEET 1 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS (SPAN A) (STAGE I)

(RIGHT LANE)

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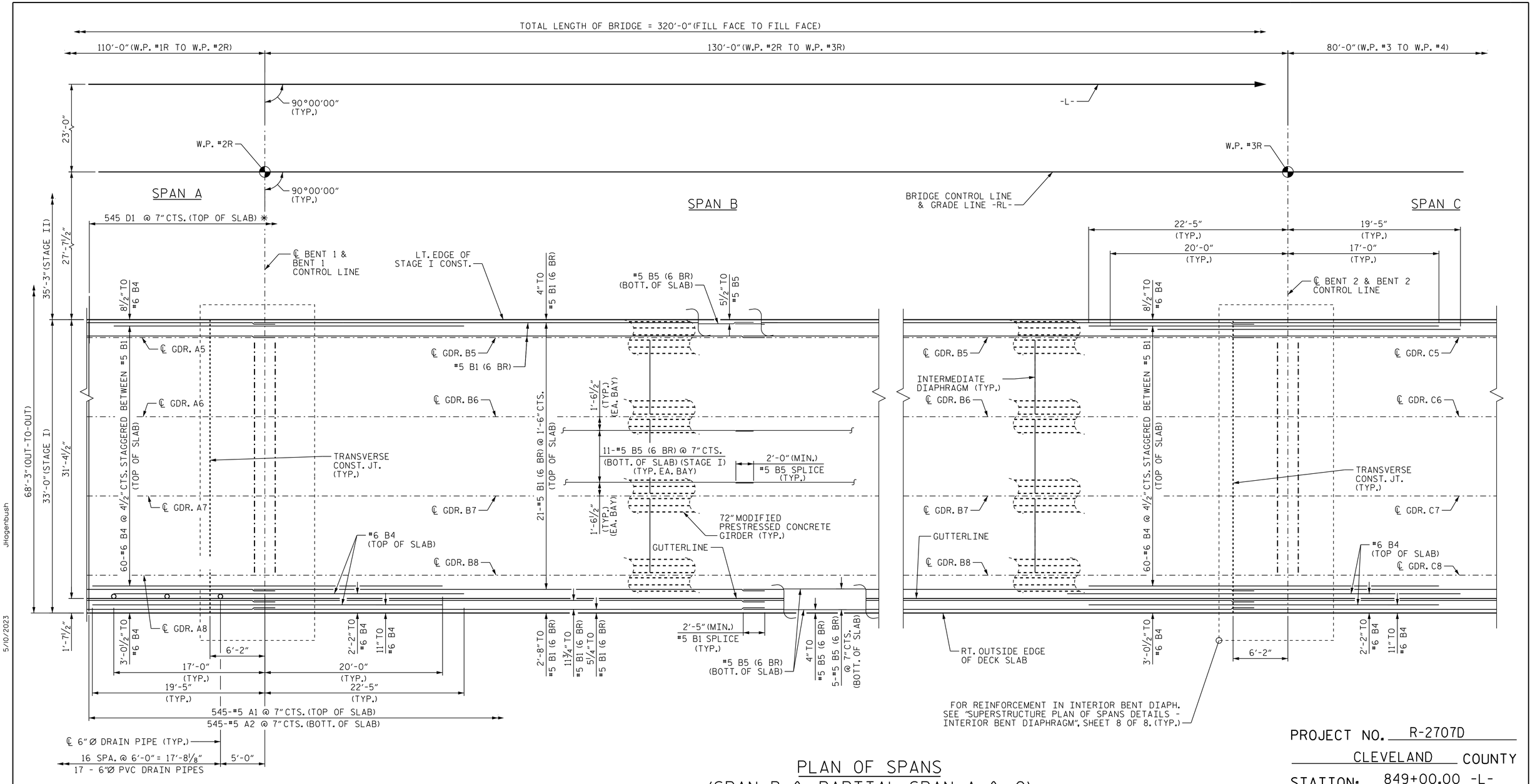

PLAN OF SPANS
(SPAN B & PARTIAL SPAN A & C)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A1) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 8

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
(SPAN B)
(STAGE I)
(RIGHT LANE)

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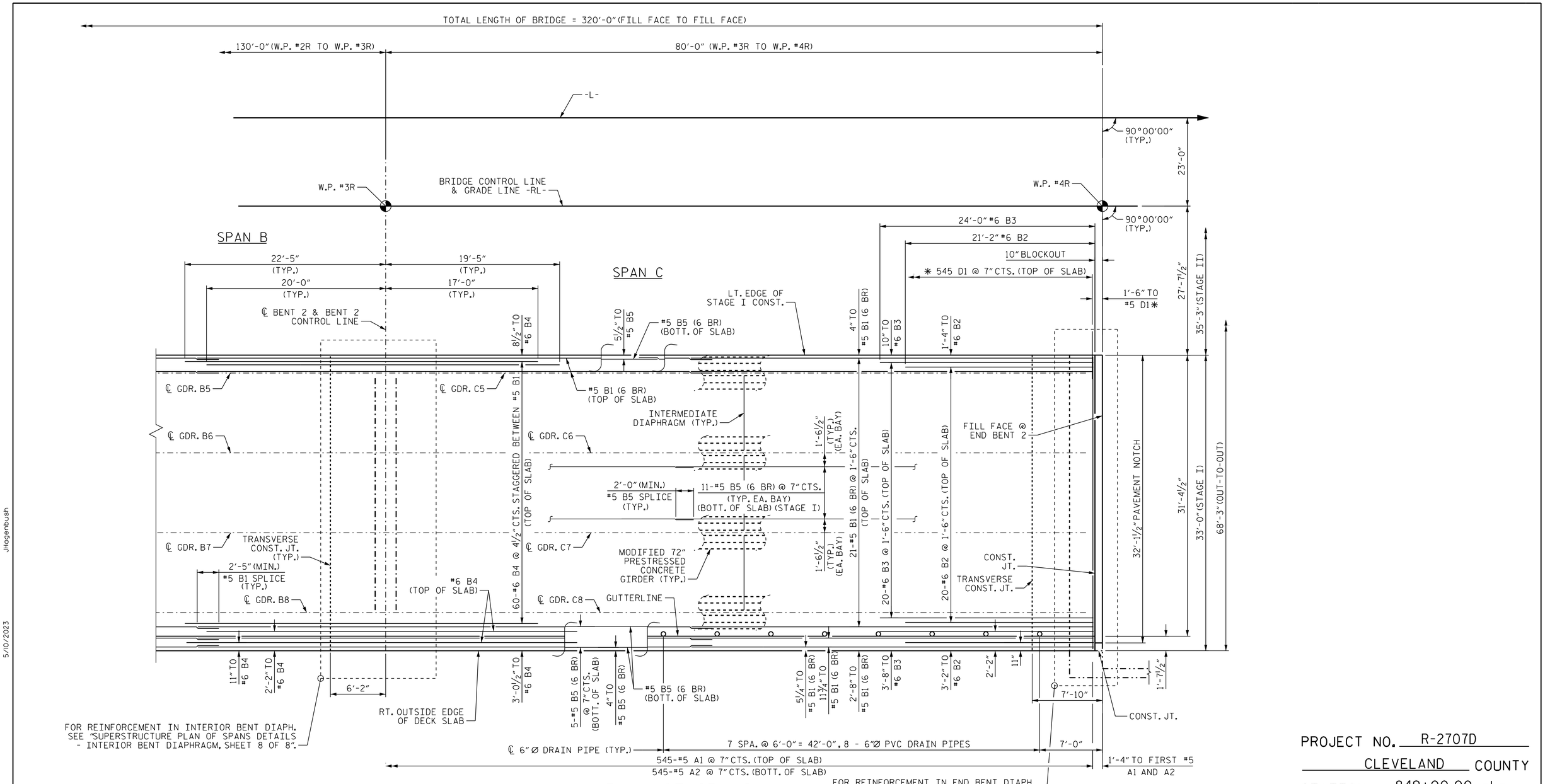

PLAN OF SPANS
(SPAN C & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A1) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

FOR DRAIN PIPE DETAILS, SEE "PLAN OF SPANS", SHEET 1 OF 8.

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CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN C)
(STAGE I)
(RIGHT LANE)

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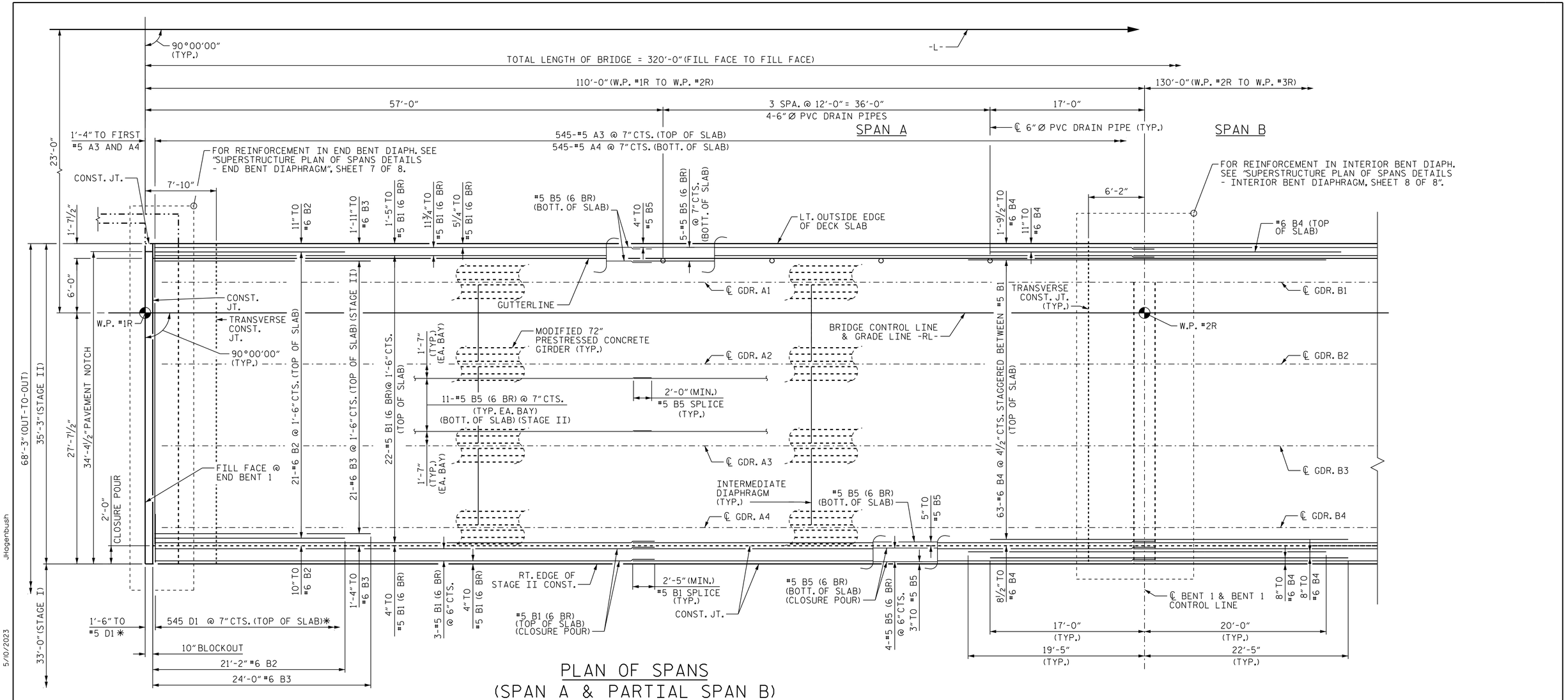

PLAN OF SPANS (SPAN A & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

✱ D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A3) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

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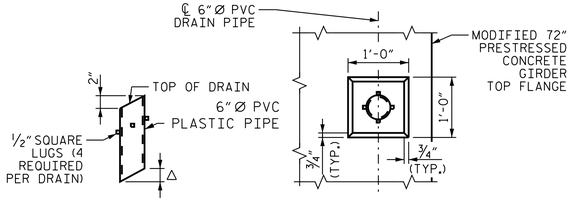

DRAIN PIPE — PLAN OF RECESS

△ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (8 DRAINS REQUIRED)

DRAIN DETAILS

DRAIN PIPE NOTES:

TOP OF FLOOR DRAIN TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - 1"#2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

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SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS (SPAN A) (STAGE II)

(RIGHT LANE)

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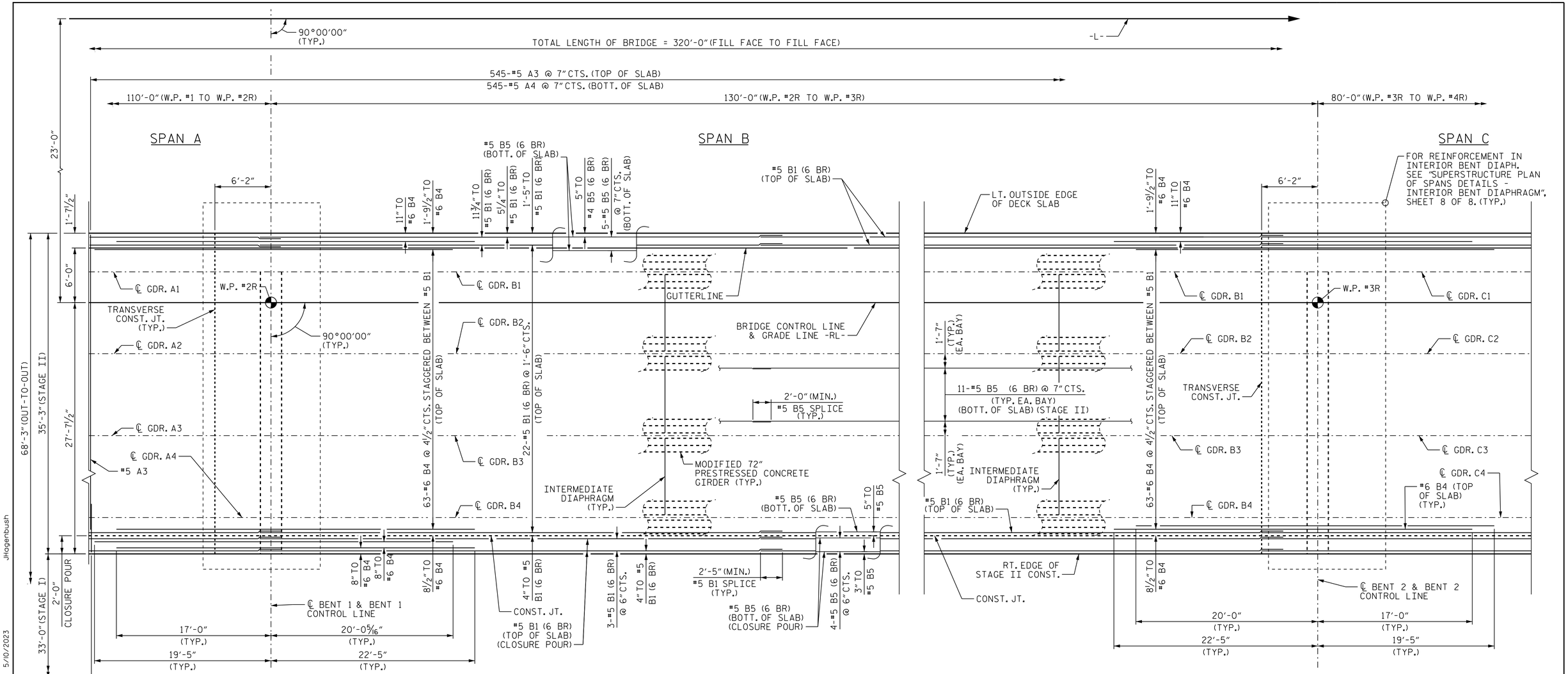

PLAN OF SPANS
(SPAN B & PARTIAL SPAN A & C)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A3) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

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SHEET 5 OF 8

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RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN B)
(STAGE II)
(RIGHT LANE)

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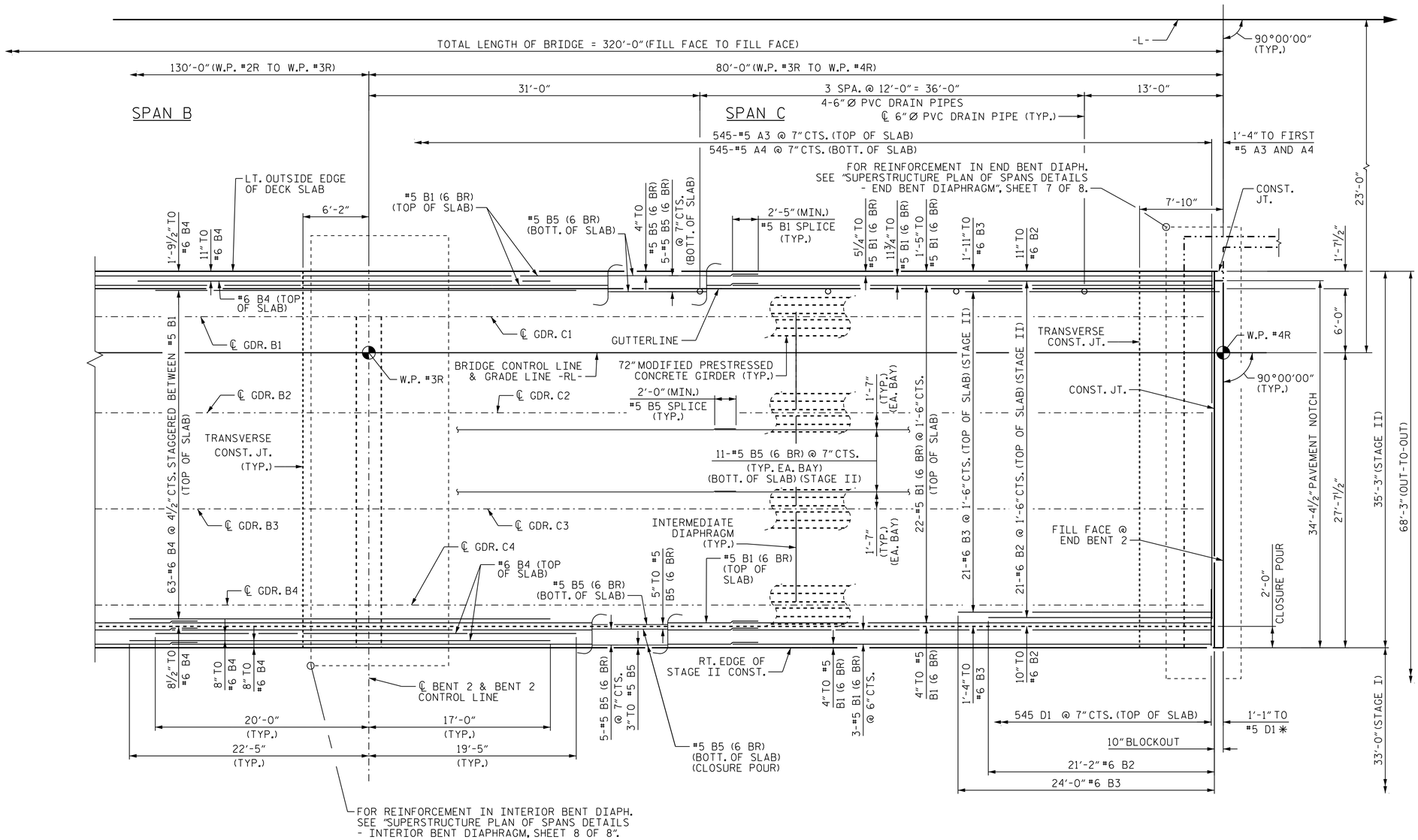

PLAN OF SPANS
(SPAN C & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP (A3) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

FOR DRAIN PIPE DETAILS, SEE "PLAN OF SPANS", SHEET 4 OF 8.

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SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN C)
(STAGE II)
(RIGHT LANE)

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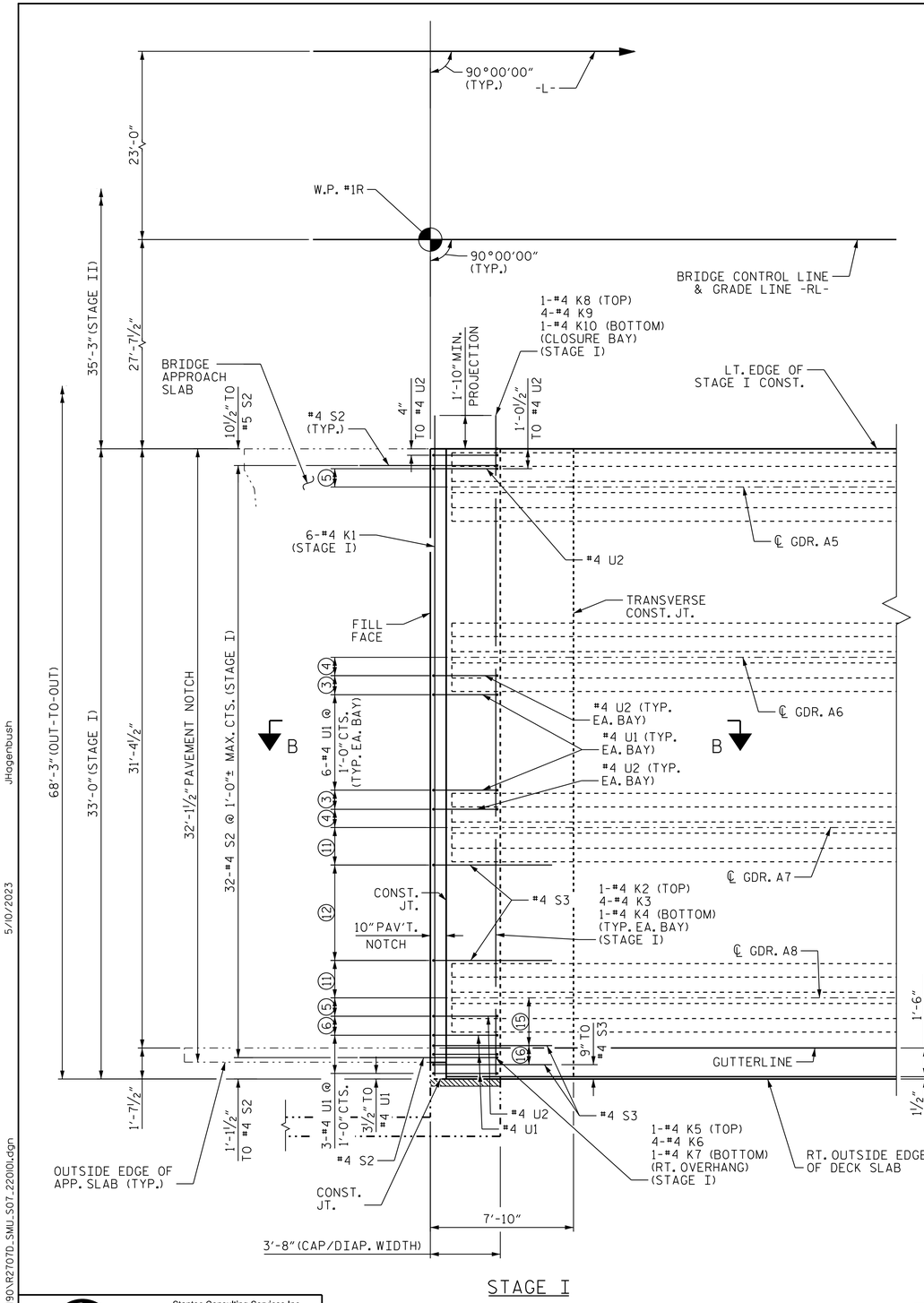
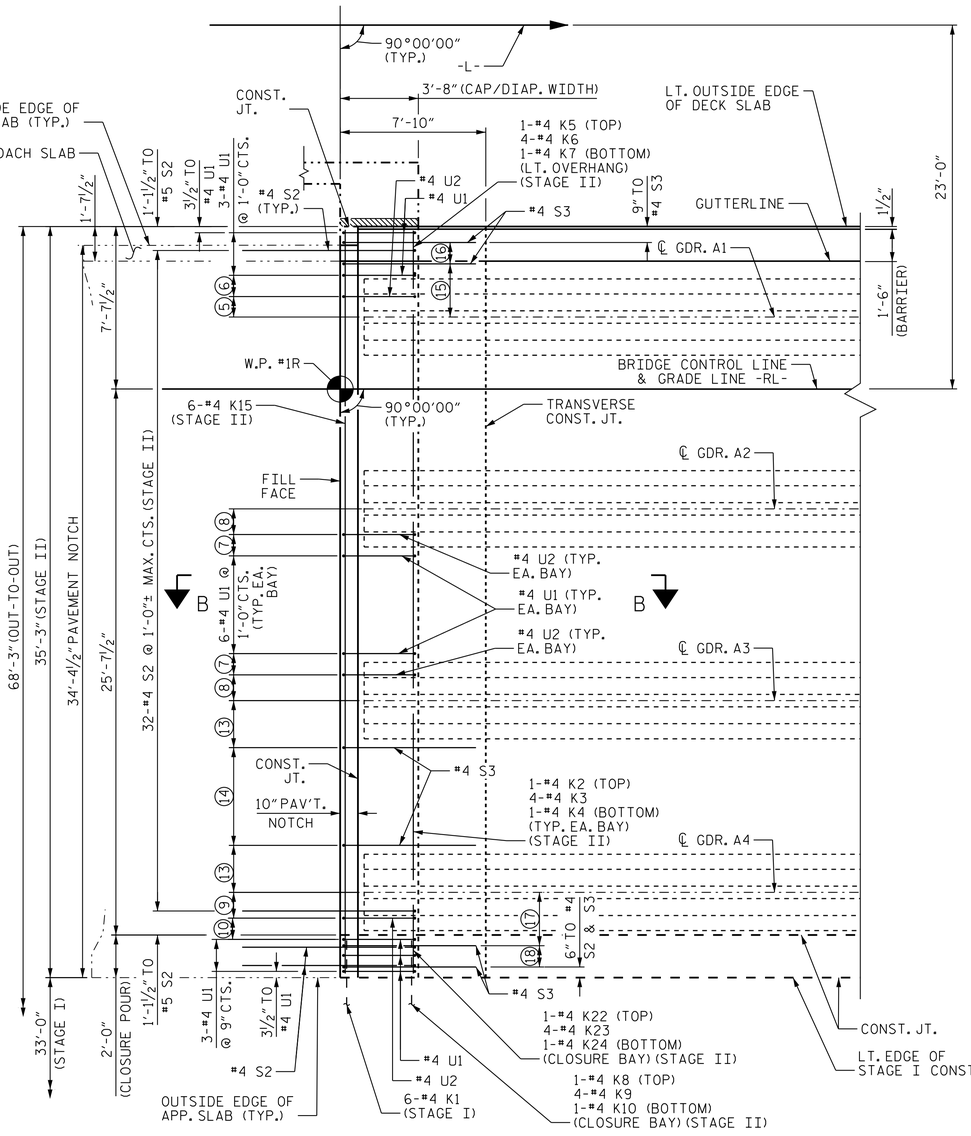


STAGE I



STAGE II

NOTES:

S2 AND S3 BARS MAY BE REPOSITIONED AS NECESSARY TO CLEAR PRESTRESSED GIRDERS AND OTHER REINFORCING BAR CONFLICTS.

SEE "END BENT 1 DETAILS - WING WALLS" AND "END BENT 2 DETAILS - WING WALLS" FOR REINFORCMENT IN WINGS.

FOR SECTION B-B, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

③ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)
④ 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)
⑤ 11½" TO #4 U2
⑥ 1'-0" TO #4 U1 (LT. OVERHANG)
⑦ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)
⑧ 1'-0" TO #4 U2 (TYP. EA. BAY) (STAGE II)
⑨ 1'-2½" TO #4 U2 (STAGE II)
⑩ 1'-0" TO #4 U1 (STAGE II)
⑪ 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)
⑫ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)
⑬ 2'-0" TO #4 S3 (TYP. EA. BAY) (STAGE II)
⑭ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE II)
⑮ 2'-6" TO #4 S3
⑯ 2-#4 S3 @ 1'-0" MAX. CTS.
⑰ 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)
⑱ 2-#4 S2 & #4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

TYPICAL END BENT DIAPHRAGM REINFORCING DETAIL

DETAILS AT END BENT 1 SHOWN.

DETAILS AT END BENT 2 ARE SIMILAR BY ROTATION.

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DRAWN BY : J. B. GEILE DATE : 10/04/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/10/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS DETAILS - END BENT DIAPHRAGMS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-19
1			3			TOTAL SHEETS
2			4			56

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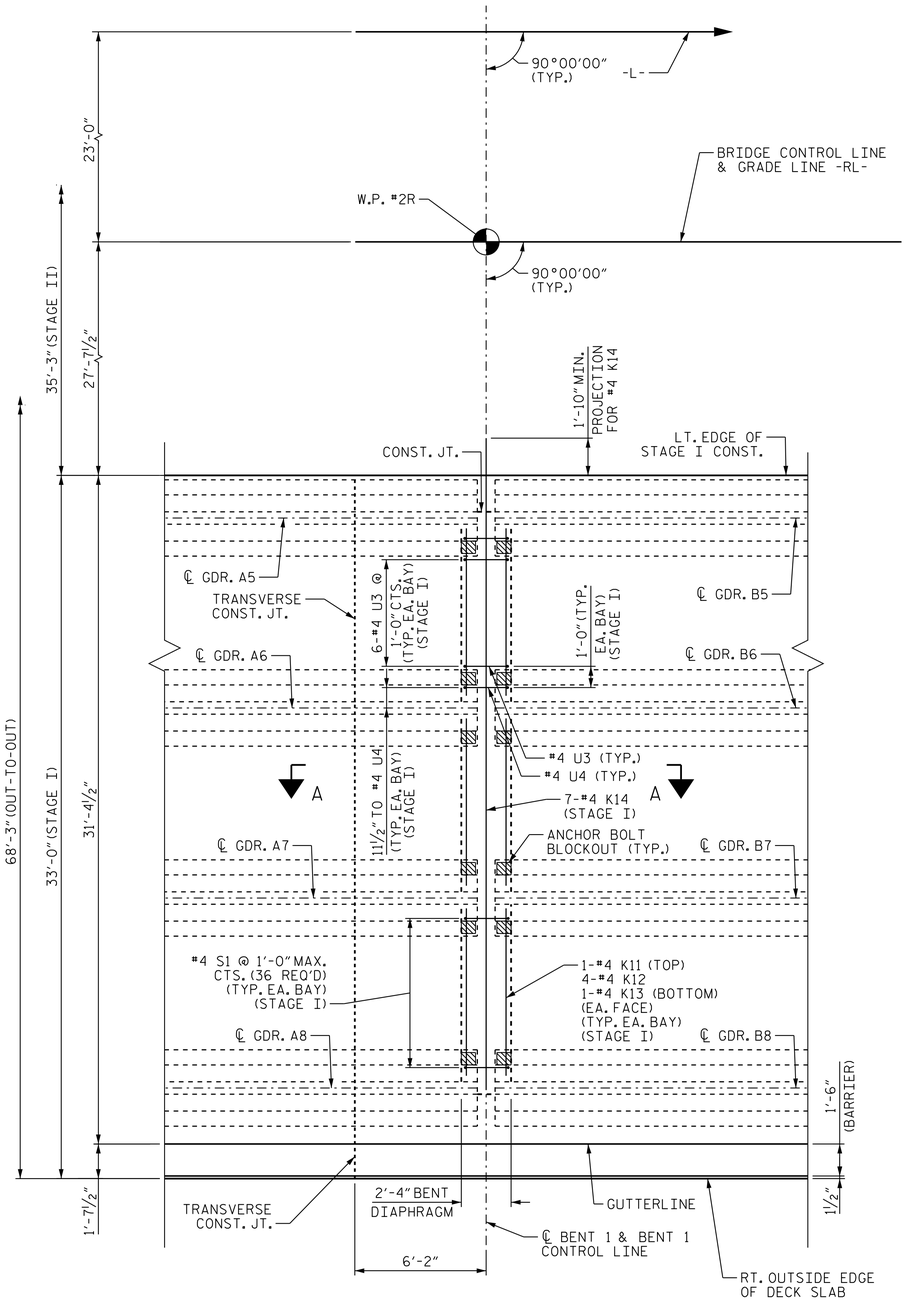
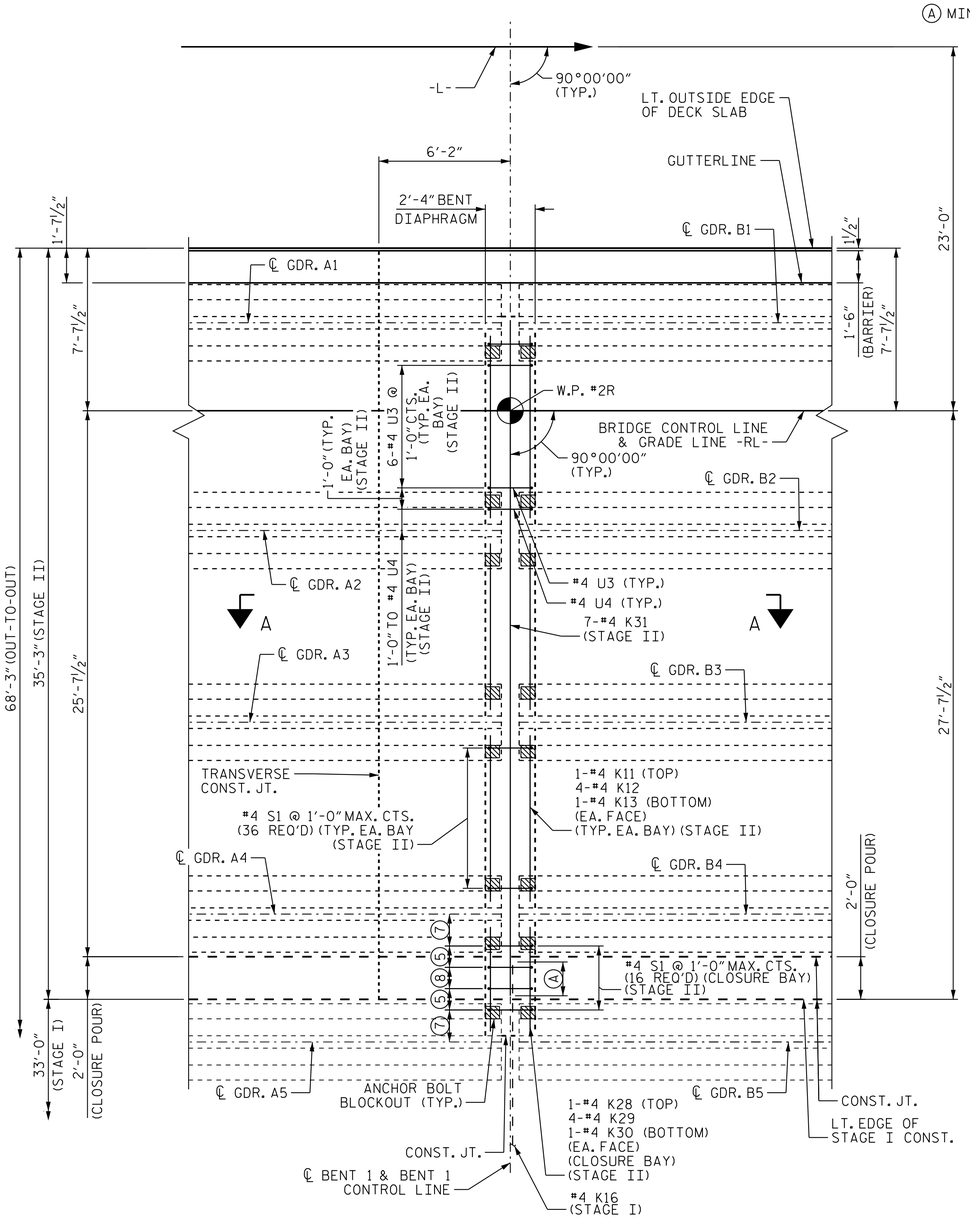


STAGE I



STAGE II

Ⓐ MIN. SPLICE - #4 K14 (STAGE I) TO #4 K31 (STAGE II)

⑤ 1'-0" TO #4 U3 (STAGE II)

⑦ 1'-6" TO #4 U4 (CLOSURE BAY) (STAGE II)

⑧ 2-#4 U3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

NOTES:

S1 BARS MAY BE REPOSITIONED AS NECESSARY TO CLEAR PRESTRESSED GIRDERS AND OTHER REINFORCING BAR CONFLICTS.

FOR SECTION A-A, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

DENOTES CONC. BLOCKOUT. SEE END BENT SHEETS AND "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

TYPICAL INTERIOR BENT DIAPHRAGM REINFORCING DETAIL

DETAILS AT BENT 1 SHOWN.

DETAILS AT BENT 2 SIMILAR.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS DETAILS - INTERIOR BENT DIAPHRAGMS
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-20
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

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DRAWN BY : J. B. GEILE DATE : 10/04/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

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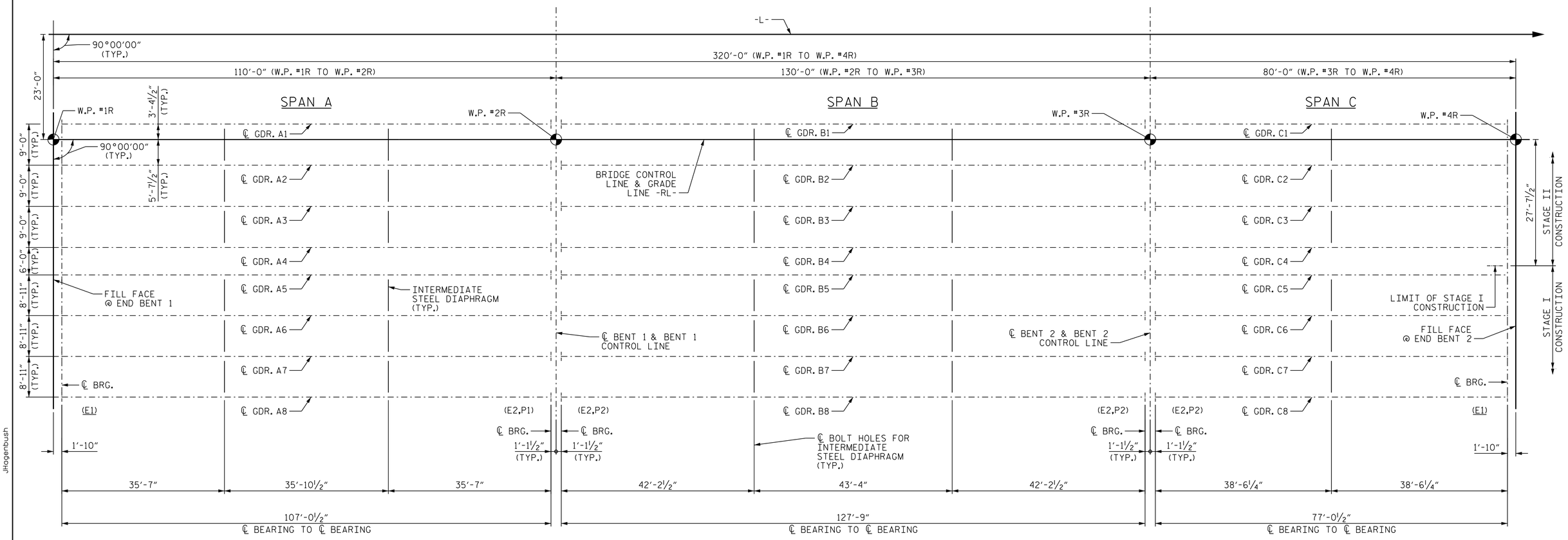

FRAMING PLAN

NOTES:

(E1, E2, P1, & P2) DENOTES ELASTOMERIC BEARING OR SOLE PLATE. SEE "ELASTOMERIC BEARING DETAILS".

REFER TO "PLAN OF SPANS DETAILS - END BENT DIAPRAGMS" AND "PLAN OF SPANS DETAILS - INTERIOR BENT DIAPGRAMS", SHEETS 7 OF 8 AND 8 OF 8, FOR END BENT AND INTERIOR BENT DIAPHRAGM DETAILS.

ALL DIMENSIONS ARE HORIZONTAL.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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DRAWN BY : J.E. HAGENBUSH DATE : 10/08/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by:
5/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

(RIGHT LANE)

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

SHEET NO. S6-21
TOTAL SHEETS 56

JHagenbush
5/10/2023
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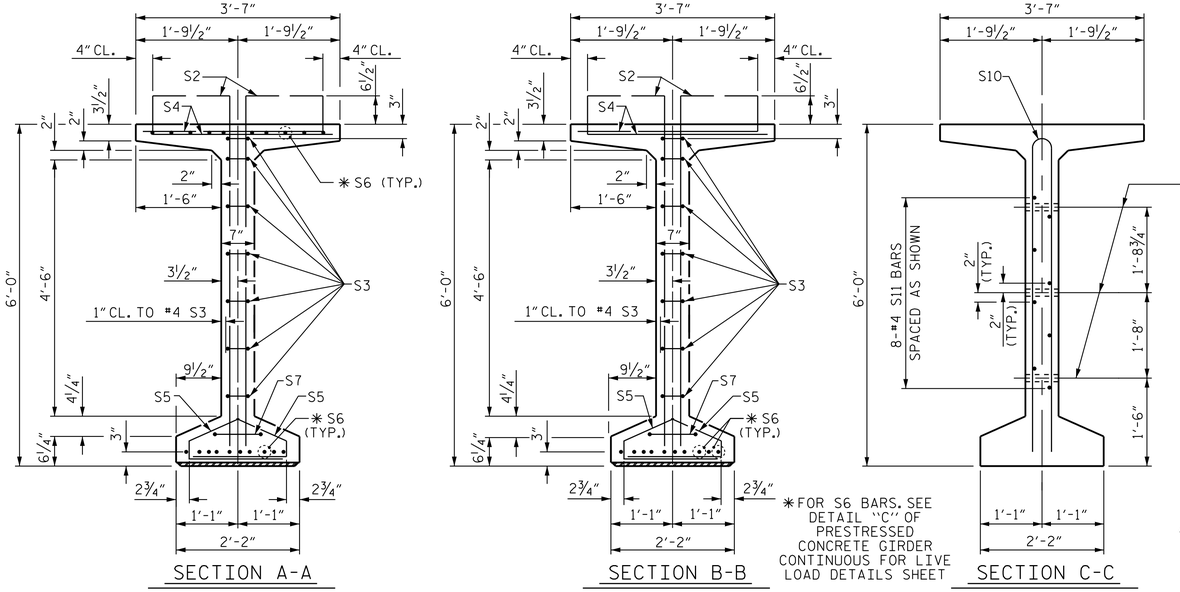
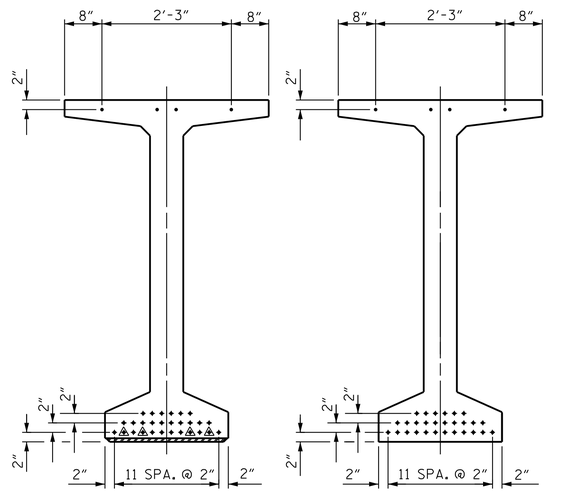


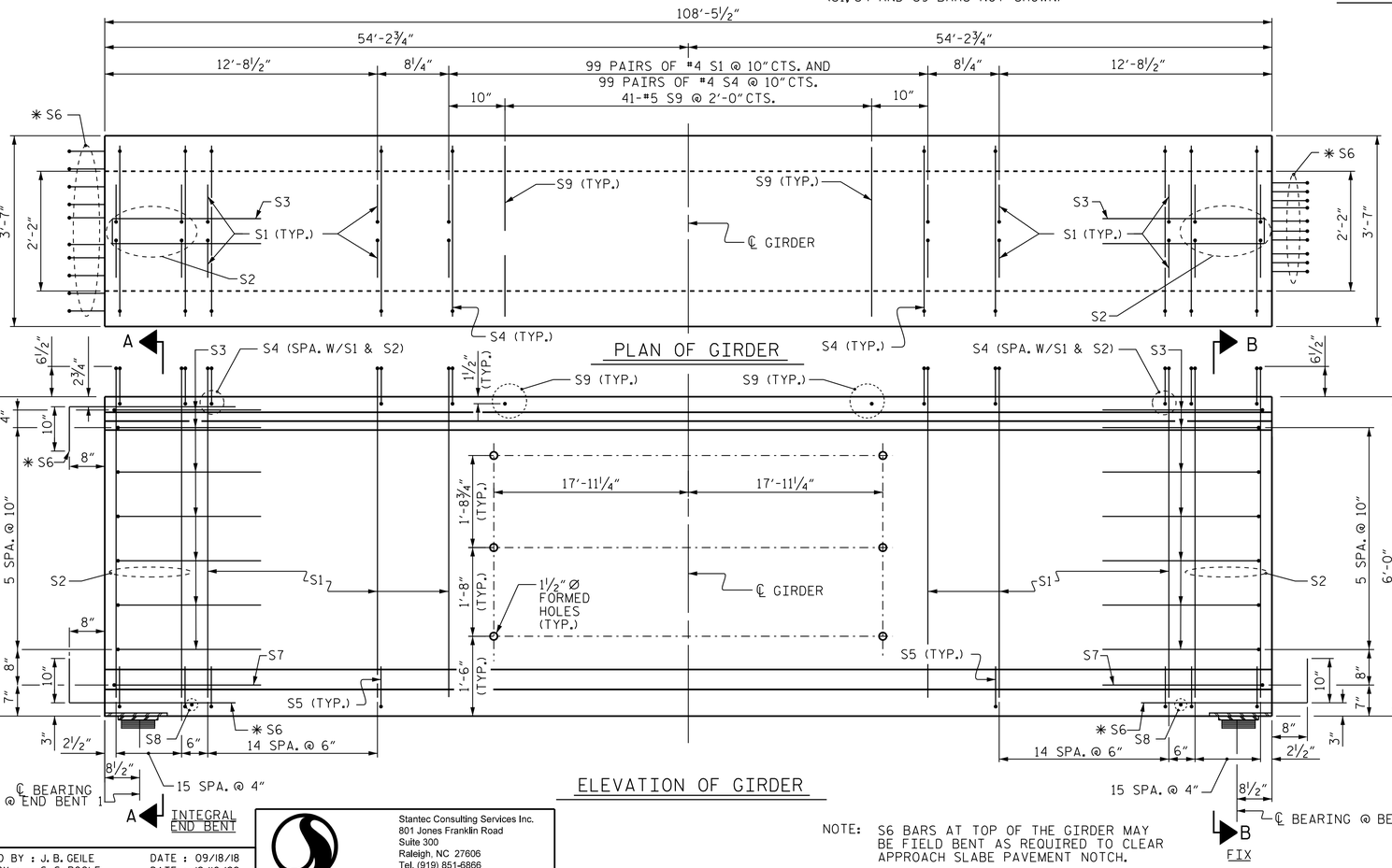
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

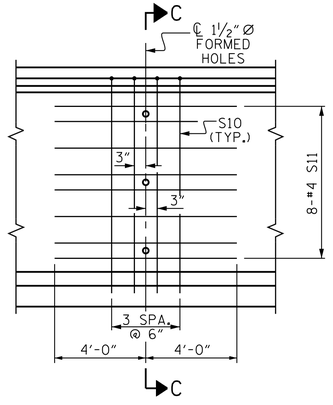


AT END OF GIRDER AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



NOTE: S6 BARS AT TOP OF THE GIRDER MAY BE FIELD BENT AS REQUIRED TO CLEAR APPROACH SLABE PAVEMENT NOTCH.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

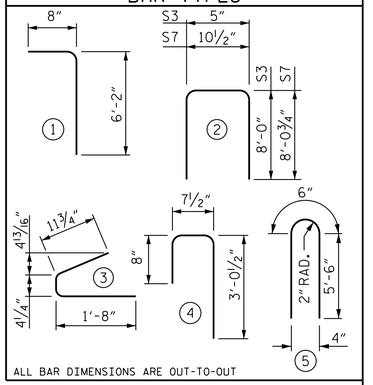
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	258	#4	1	6'-10"	1178
S2	64	#5	1	6'-10"	457
S3	14	#4	2	16'-5"	154
S4	322	#4	4	4'-4"	933
S5	124	#4	3	3'-0"	249
✱ S6	30	#5	STR	3'-8"	115
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	41	#5	STR	3'-3"	139
S10	8	#5	5	11'-6"	96
S11	16	#4	STR	8'-0"	86

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	3445	23.2	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	108'-5½"	867'-8"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN A
(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by: [redacted]
5/10/2023

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REVISIONS

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1			3		
2			4		

SHEET NO. S6-22

TOTAL SHEETS 56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : EEM 2/6/97
CHECKED BY : VAP 2/6/97

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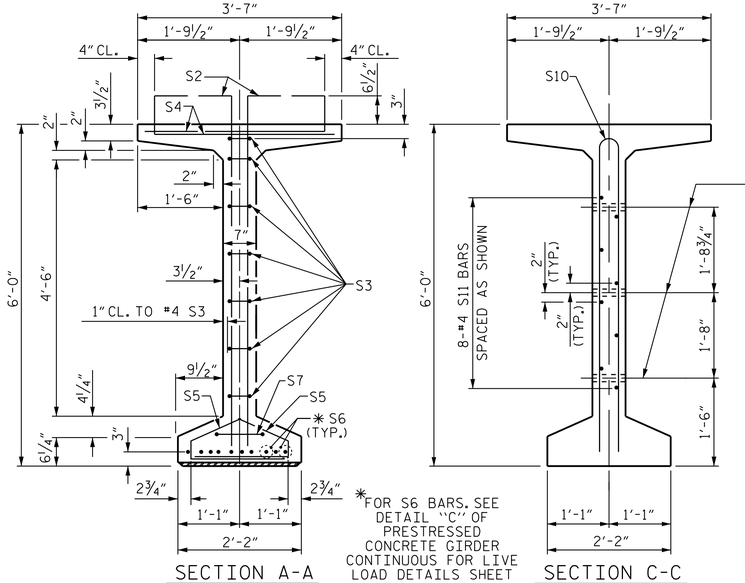


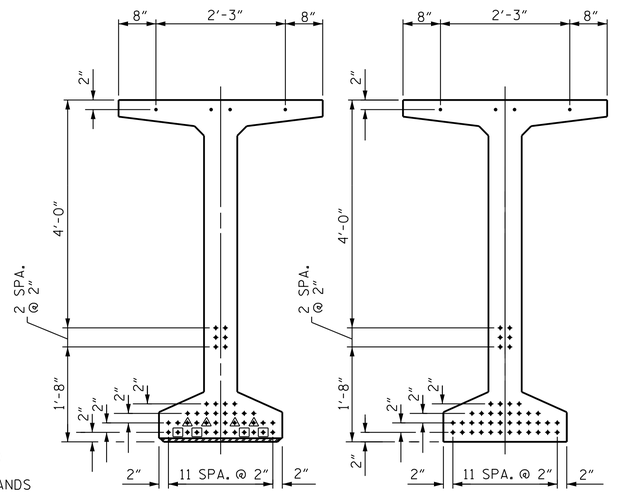
SECTION A-A

SECTION C-C

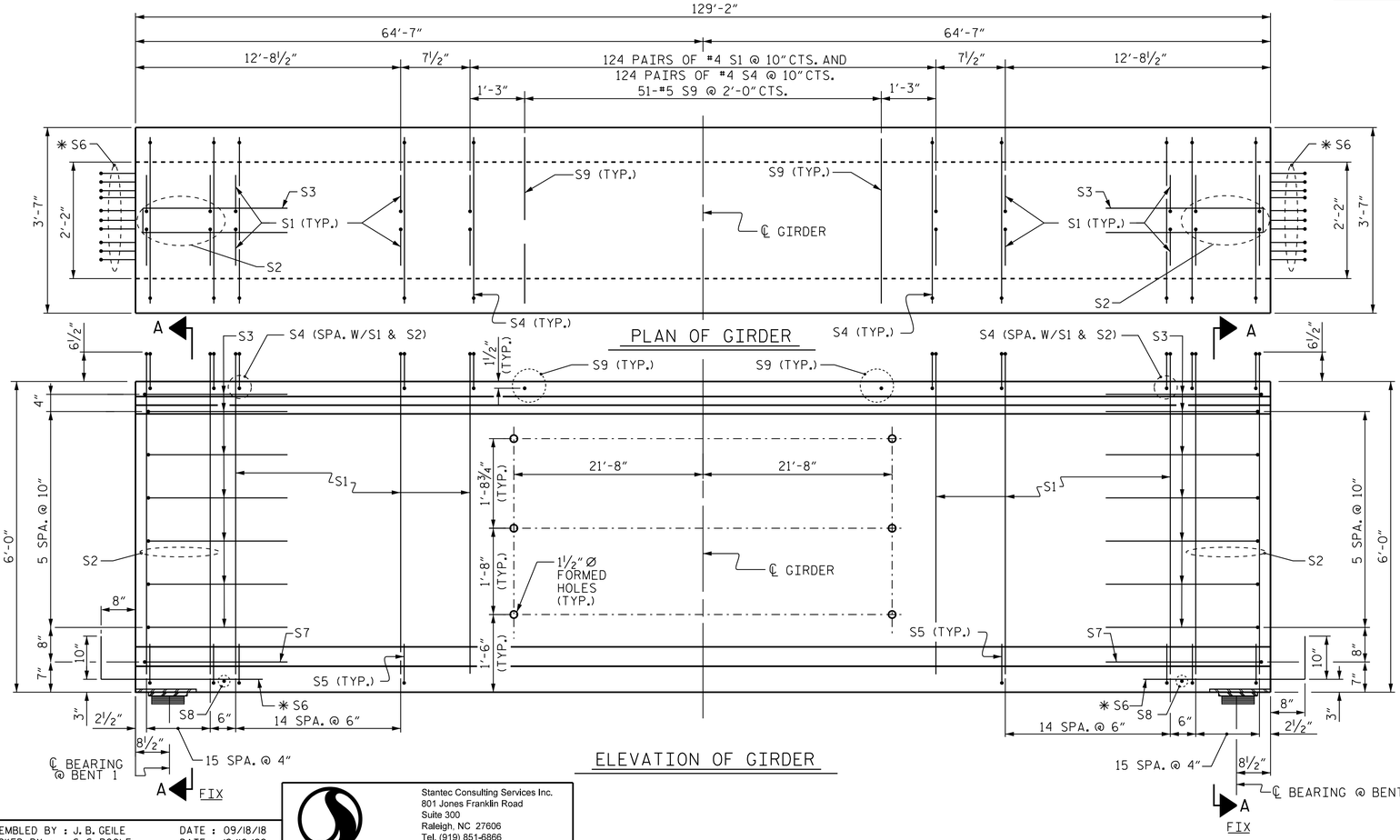
(S1, S4 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◬ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER

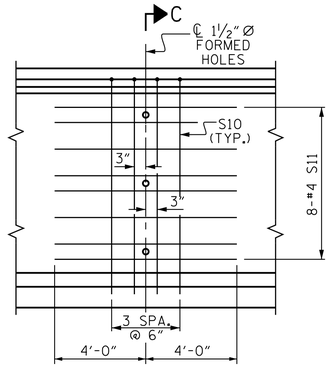


0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

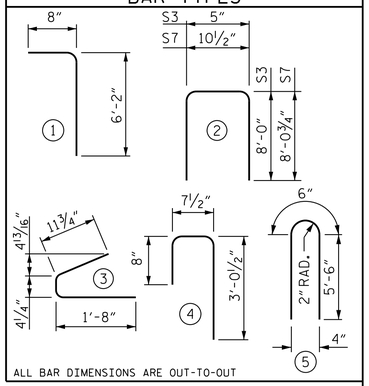
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	308	#4	1	6'-10"	1406
S2	64	#6	1	6'-10"	657
S3	14	#4	2	16'-5"	154
S4	380	#4	4	4'-4"	1100
S5	132	#4	3	3'-0"	265
✱S6	20	#5	STR	3'-8"	77
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	51	#5	STR	3'-3"	173
S10	8	#5	5	11'-6"	96
S11	16	#4	STR	8'-0"	86

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	4052	27.7	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	129'-2"	1,033'-4"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN B
(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-23
1			3			TOTAL SHEETS
2			4			56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : EEM 2/6/97
CHECKED BY : VAP 2/6/97

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DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

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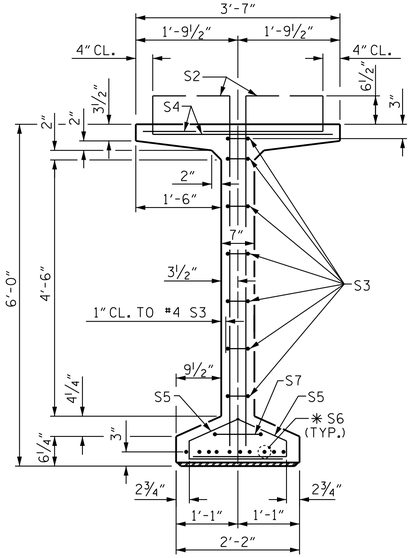
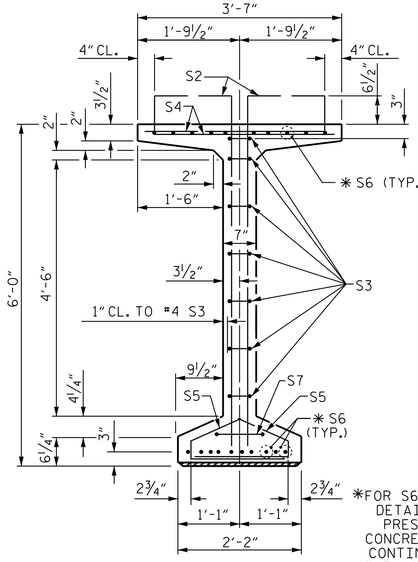
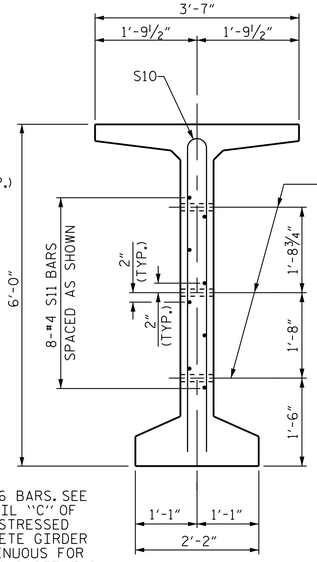


SECTION A-A



SECTION B-B



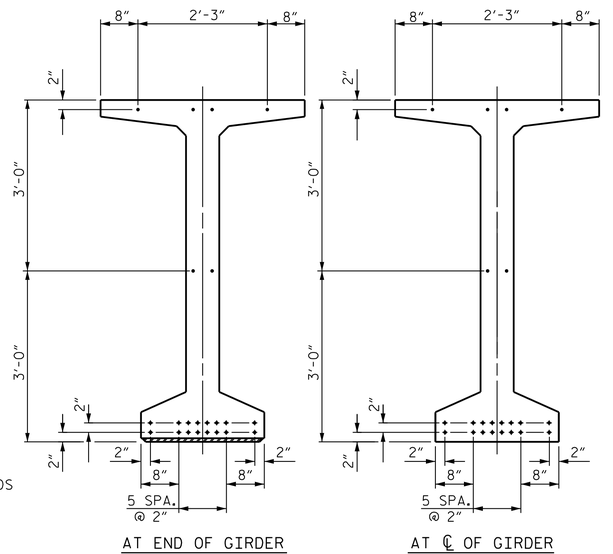
SECTION C-C

✱FOR S6 BARS. SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET 4 OF 5

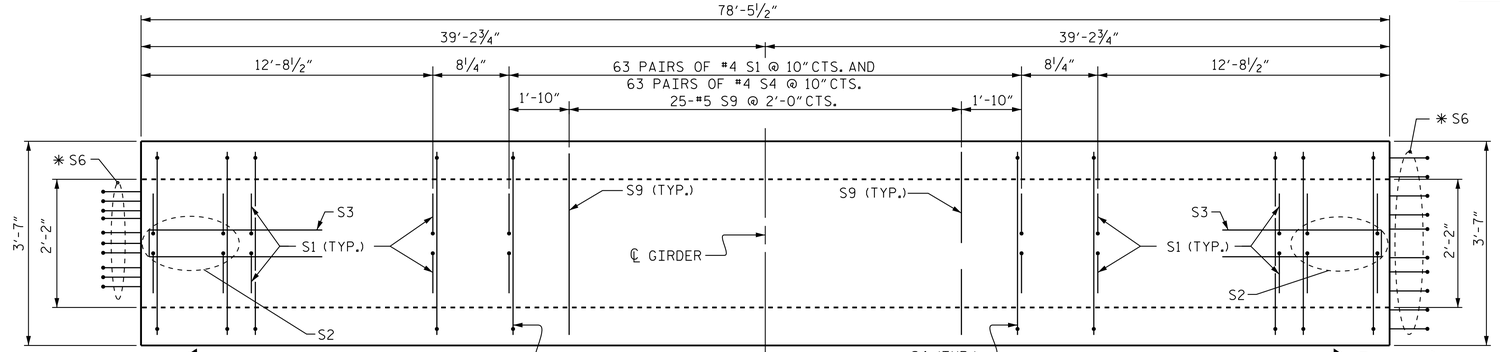
(S1, S4 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

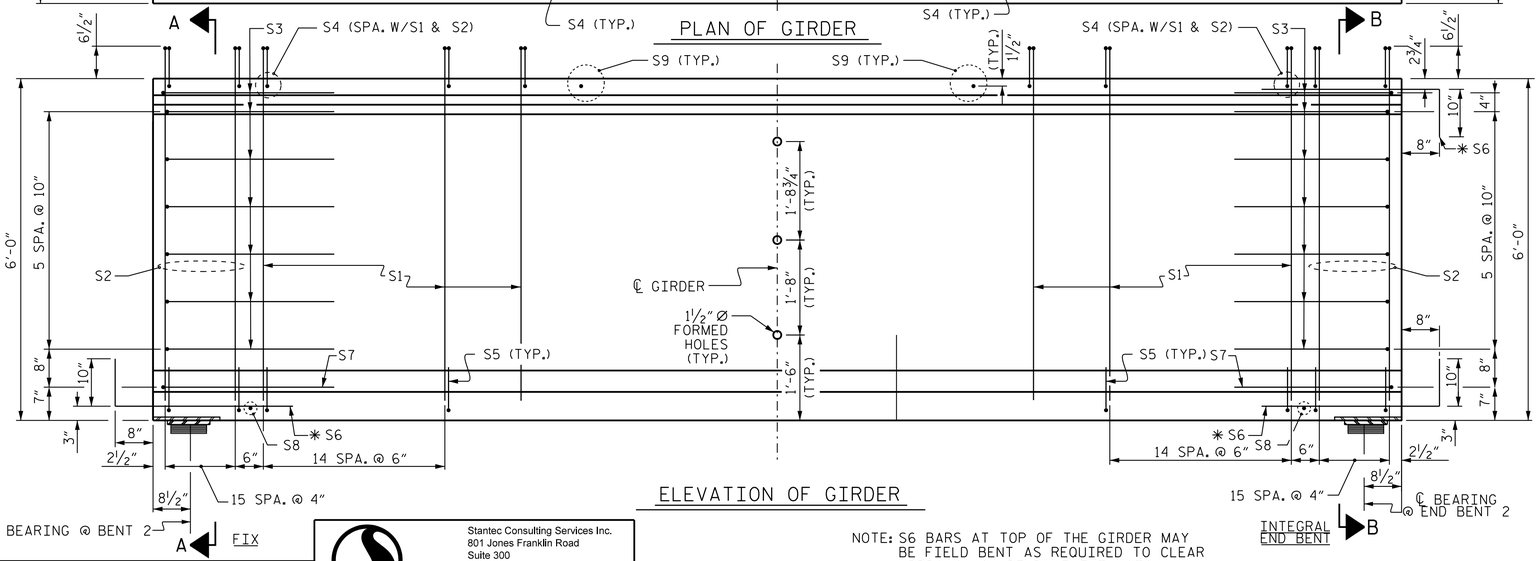
● FULLY BONDED STRANDS



0.6" Ø LOW RELAXATION STRAND LAYOUT

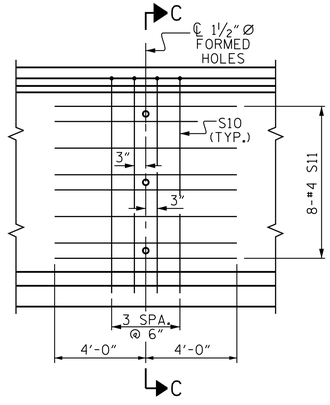


PLAN OF GIRDER



ELEVATION OF GIRDER

NOTE: S6 BARS AT TOP OF THE GIRDER MAY BE FIELD BENT AS REQUIRED TO CLEAR APPROACH SLABE PAVEMENT NOTCH.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

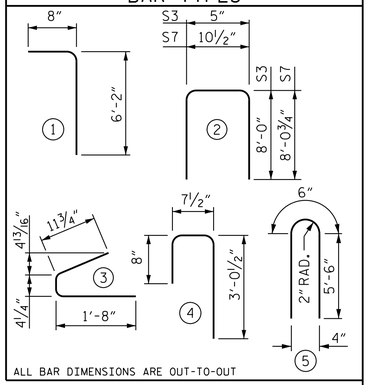
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	186	#4	1	6'-10"	850
S2	64	#5	1	6'-10"	457
S3	14	#4	2	16'-5"	154
S4	250	#4	4	4'-4"	724
S5	124	#4	3	3'-0"	249
✱ S6	30	#5	STR	3'-8"	115
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	25	#5	STR	3'-3"	85
S10	4	#5	5	11'-6"	48
S11	8	#4	STR	8'-0"	43

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	5,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	2763	16.8	22

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	78'-5½"	627'-8"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN C
(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

Digitally signed by: SETH S POOLE
5/10/2023

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REVISIONS

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1			3		
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SHEET NO. S6-24

TOTAL SHEETS 56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : EEM 2/6/97
CHECKED BY : VAP 2/6/97

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DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

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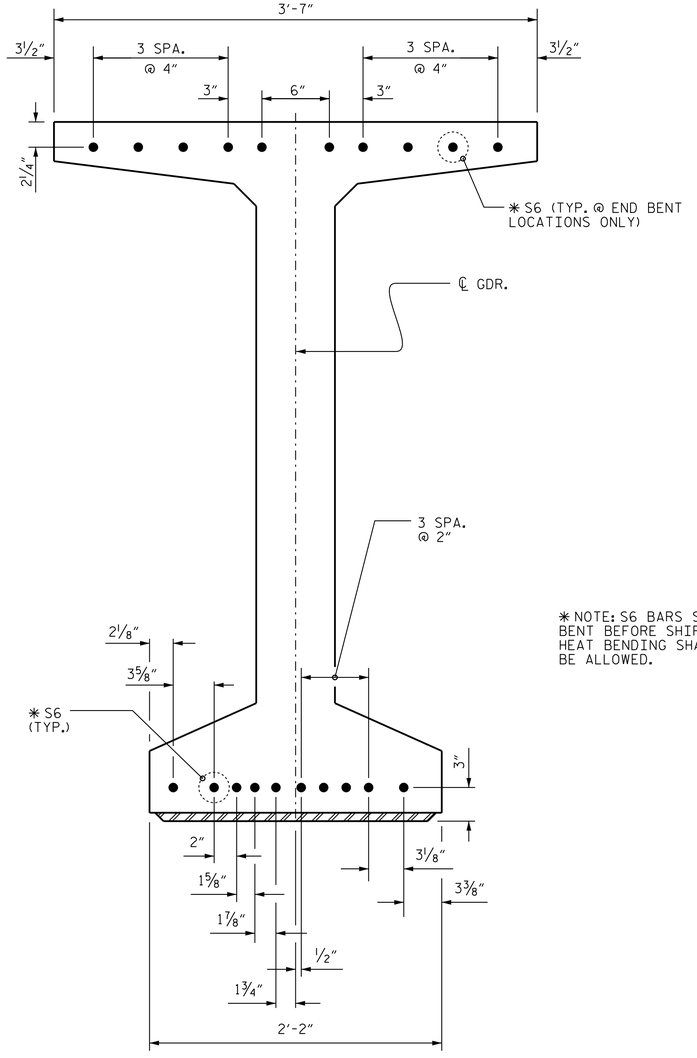
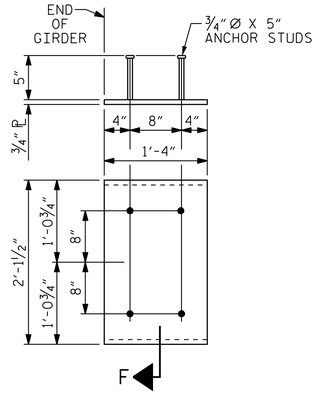


✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

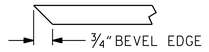
DETAIL "C"

S6 BARS IN BOTTOM FLANGE MAY BE ADJUSTED SLIGHTLY AS NECESSARY TO CLEAR ¾"X5" ANCHOR STUDS MOUNTED ON EMBEDDED PLATE B-1.



EMBEDDED PLATE "B-1" DETAILS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,500, 8,000, AND 4,000 PSI FOR SPANS A, B, AND C, RESPECTIVELY.

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".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023 | 0764646B...

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
PRELIMINARY

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-25
1			3			TOTAL SHEETS
2			4			56

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JHagenbush

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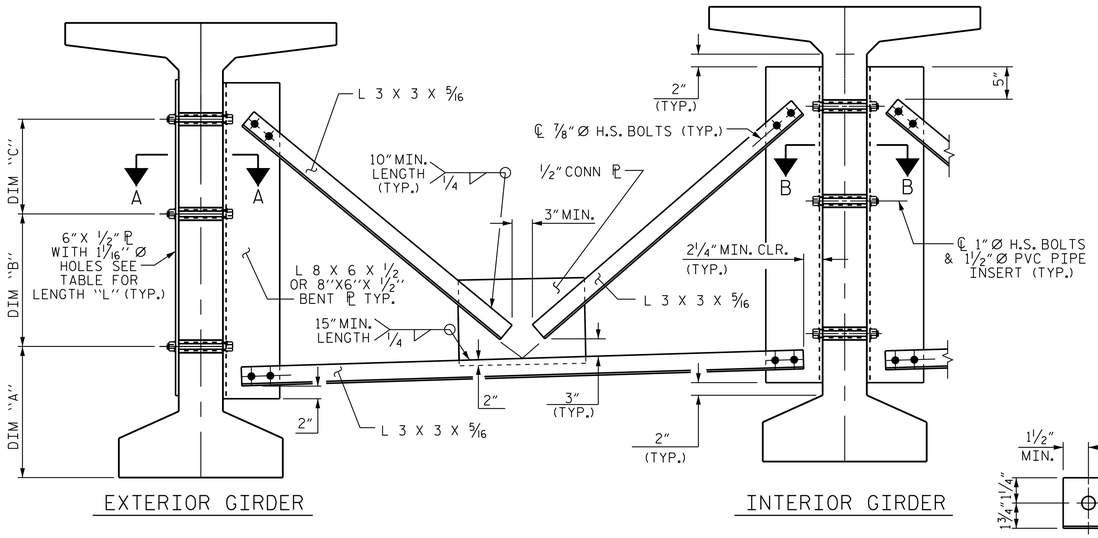
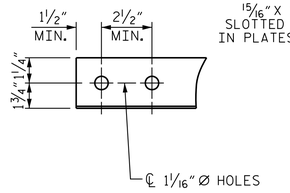


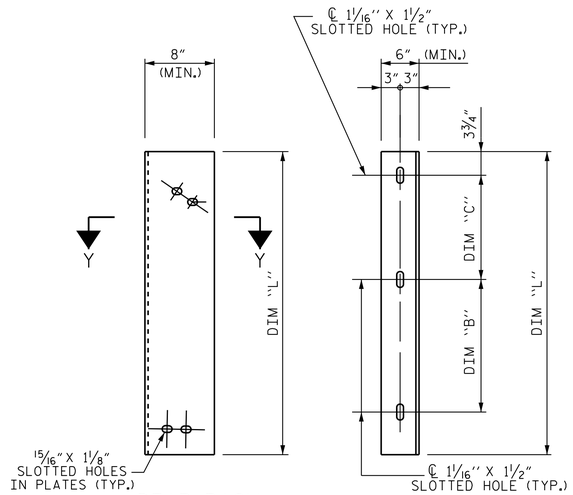
PART SECTION AT INTERMEDIATE DIAPHRAGM

(MODIFIED 72" PRESTRESSED CONC. GIRDER SHOWN)



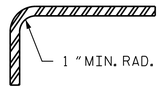
ANGLE END

(L 3 X 3 X 5/16)



DIAPHRAGM FACE

WEB FACE



SECTION Y-Y

CONNECTOR PLATE DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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 1/4" PROJECTION BEYOND THE NUT.

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

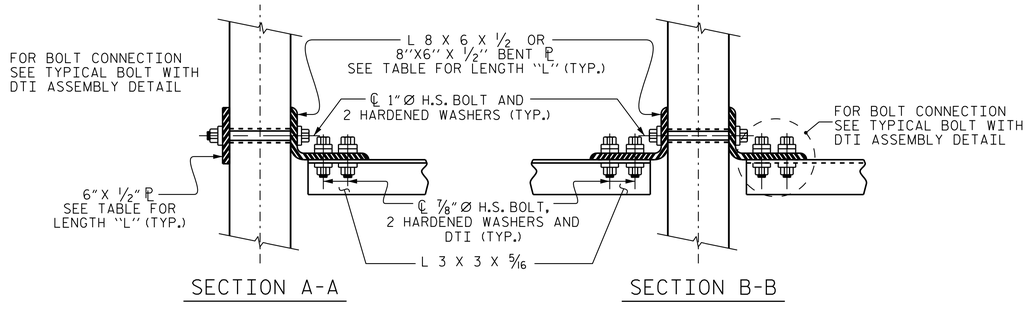
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

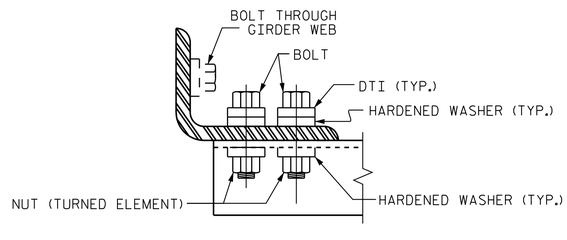
TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
MODIFIED 72" PRESTRESSED CONCRETE GIRDER	1'-6"	1'-8"	1'-8 3/4"	4'-2"



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRELIMINARY

INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-26
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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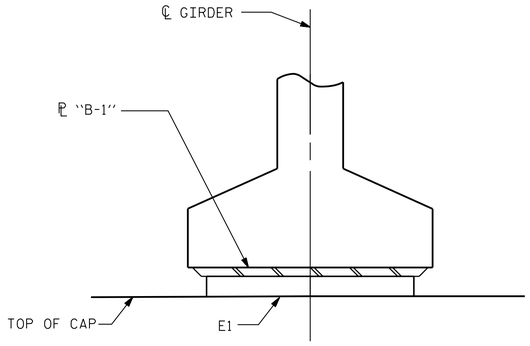
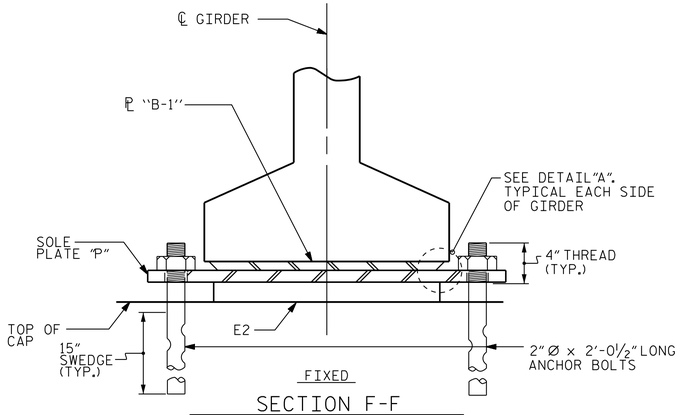


INTEGRAL

SECTION E-E



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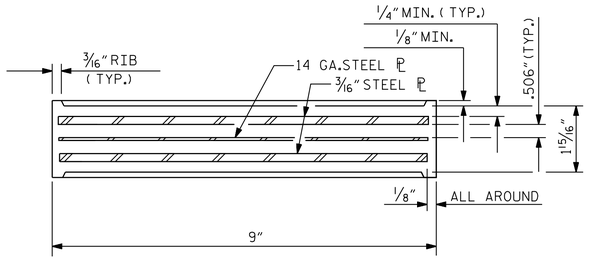
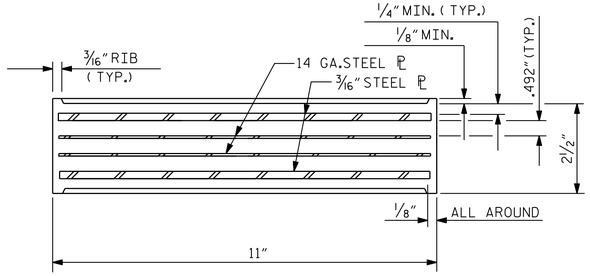
SECTION F-F



TYPICAL SECTION OF ELASTOMERIC BEARINGS



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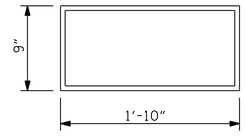
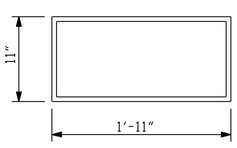


E1 (16 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

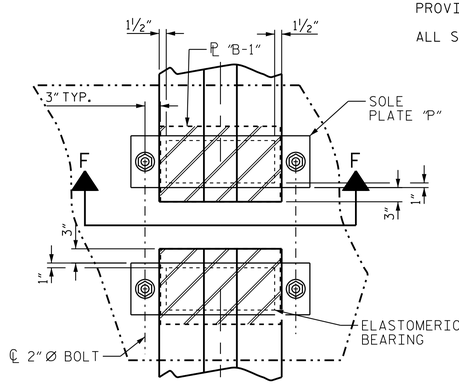


E2 (32 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE VI	420 k



TYPICAL PLAN

(SHOWING BOTTOM FLANGE @ CONTINUOUS BENT)

NOTES

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

STEEL SOLE PLATES, ANCHOR BOLTS, AND NUTS 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, AND NUTS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

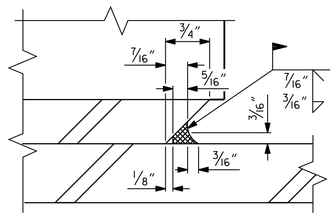
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

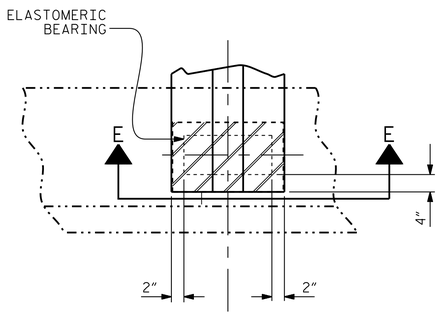
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

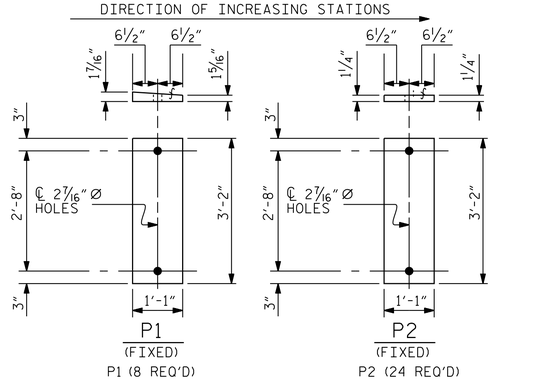


DETAIL "A"



TYPICAL PLAN

(SHOWING BOTTOM FLANGE @ INTEGRAL END BENT)



SOLE PLATE DETAILS ("P")

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

(RIGHT LANE)

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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SHEET NO. S6-27

TOTAL SHEETS 56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

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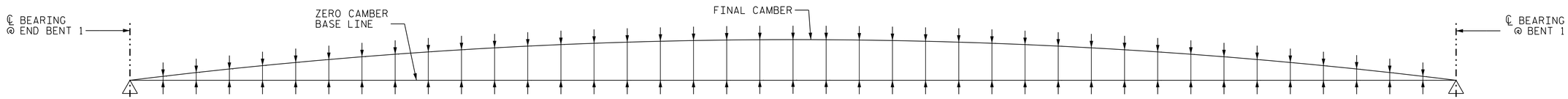

GIRDER 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.009	0.018	0.027	0.035	0.043	0.052	0.060	0.068	0.074	0.080	0.087	0.093	0.097	0.101	0.105	0.109	0.111	0.112	0.113	0.115	0.113	0.112	0.111	0.109	0.105	0.101	0.097	0.093	0.086	0.080	0.074	0.067	0.059	0.051	0.043	0.035	0.026	0.017	0.009	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	9/16"	9/16"	9/16"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/8"	1/16"	0"

GIRDERS 2 & 3

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.009	0.017	0.026	0.034	0.042	0.050	0.057	0.065	0.071	0.078	0.084	0.090	0.094	0.98	0.101	0.105	0.107	0.108	0.109	0.111	0.109	0.108	0.107	0.105	0.101	0.097	0.094	0.090	0.083	0.077	0.071	0.065	0.057	0.049	0.041	0.034	0.025	0.017	0.008	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	5/8"	11/16"	11/16"	5/8"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 4 & 5

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.007	0.013	0.020	0.026	0.032	0.038	0.044	0.050	0.055	0.060	0.064	0.069	0.072	0.075	0.078	0.081	0.082	0.083	0.084	0.085	0.084	0.083	0.082	0.081	0.078	0.075	0.072	0.069	0.064	0.059	0.055	0.050	0.044	0.038	0.02	0.026	0.019	0.013	0.006	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	13/16"	7/8"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	7/8"	13/16"	13/16"	3/4"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 6 & 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.008	0.016	0.025	0.033	0.040	0.048	0.055	0.063	0.069	0.075	0.081	0.087	0.090	0.094	0.098	0.102	0.103	0.104	0.106	0.107	0.106	0.104	0.103	0.102	0.098	0.094	0.090	0.086	0.080	0.075	0.069	0.063	0.055	0.048	0.040	0.033	0.025	0.016	0.008	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDER 8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.009	0.018	0.027	0.035	0.044	0.052	0.060	0.068	0.074	0.081	0.087	0.093	0.097	0.102	0.106	0.110	0.111	0.112	0.114	0.115	0.114	0.112	0.111	0.110	0.105	0.101	0.097	0.093	0.087	0.080	0.074	0.068	0.059	0.051	0.043	0.035	0.026	0.018	0.009	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	1/2"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	5/8"	5/8"	5/8"	5/8"	5/8"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/8"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN A

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN A

(RIGHT LANE)

Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : J.E. HAGENBUSH DATE : 09/27/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by:
5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-28
1			3			TOTAL SHEETS
2			4			56

JHagenbush
5/10/2023
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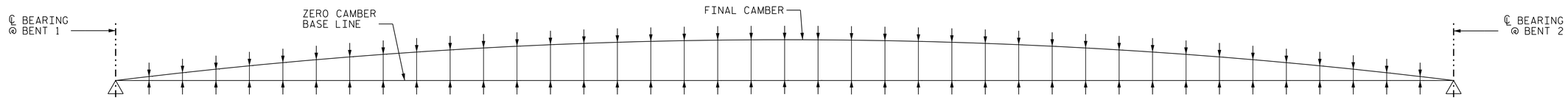
DocuSign Envelope ID: AF35AE94-8CF6-4059-8CA9-D14342CA853A



GIRDER 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.046	0.069	0.091	0.112	0.133	0.153	0.172	0.190	0.207	0.221	0.236	0.247	0.259	0.268	0.276	0.281	0.287	0.288	0.290	0.288	0.287	0.281	0.276	0.268	0.259	0.247	0.236	0.221	0.207	0.190	0.172	0.153	0.133	0.112	0.091	0.069	0.046	0.023	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.018	0.035	0.053	0.070	0.086	0.102	0.118	0.135	0.147	0.160	0.173	0.185	0.194	0.202	0.210	0.218	0.221	0.223	0.226	0.229	0.226	0.223	0.221	0.218	0.210	0.202	0.194	0.185	0.173	0.160	0.147	0.135	0.118	0.102	0.086	0.070	0.053	0.035	0.018	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 2 & 3

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.046	0.069	0.091	0.112	0.133	0.153	0.172	0.190	0.207	0.221	0.236	0.247	0.259	0.268	0.276	0.281	0.287	0.288	0.290	0.288	0.287	0.281	0.276	0.268	0.259	0.247	0.236	0.221	0.207	0.190	0.172	0.153	0.133	0.112	0.091	0.069	0.046	0.023	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.016	0.033	0.049	0.066	0.081	0.096	0.111	0.126	0.138	0.150	0.162	0.174	0.182	0.189	0.197	0.204	0.207	0.210	0.212	0.215	0.212	0.210	0.207	0.204	0.197	0.189	0.182	0.174	0.162	0.150	0.138	0.126	0.111	0.096	0.081	0.066	0.049	0.033	0.016	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	11/16"	3/4"	13/16"	13/16"	7/8"	7/8"	7/8"	15/16"	15/16"	7/8"	15/16"	15/16"	7/8"	7/8"	7/8"	13/16"	13/16"	3/4"	11/16"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 4 & 5

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.046	0.069	0.091	0.112	0.133	0.153	0.172	0.190	0.207	0.221	0.236	0.247	0.259	0.268	0.276	0.281	0.287	0.288	0.290	0.288	0.287	0.281	0.276	0.268	0.259	0.247	0.236	0.221	0.207	0.190	0.172	0.153	0.133	0.112	0.091	0.069	0.046	0.023	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.013	0.026	0.039	0.052	0.064	0.075	0.087	0.099	0.109	0.118	0.127	0.137	0.143	0.149	0.155	0.161	0.163	0.165	0.167	0.169	0.167	0.165	0.163	0.161	0.155	0.149	0.143	0.137	0.127	0.118	0.108	0.099	0.087	0.075	0.0634	0.052	0.039	0.026	0.013	0.000
FINAL CAMBER ↑	0"	1/8"	1/4"	3/8"	1/2"	9/16"	11/16"	13/16"	7/8"	1"	1 1/16"	1 1/8"	1 3/16"	1 1/4"	1 5/16"	1 3/8"	1 3/8"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 3/8"	1 3/8"	1 5/16"	1 1/4"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	13/16"	11/16"	9/16"	1/2"	3/8"	1/4"	1/8"	0"

GIRDERS 6 & 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.046	0.069	0.091	0.112	0.133	0.153	0.172	0.190	0.207	0.221	0.236	0.247	0.259	0.268	0.276	0.281	0.287	0.288	0.290	0.288	0.287	0.281	0.276	0.268	0.259	0.247	0.236	0.221	0.207	0.190	0.172	0.153	0.133	0.112	0.091	0.069	0.046	0.023	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.016	0.033	0.049	0.065	0.080	0.095	0.110	0.125	0.137	0.149	0.161	0.173	0.180	0.188	0.195	0.203	0.205	0.208	0.211	0.213	0.211	0.208	0.205	0.203	0.195	0.188	0.180	0.173	0.161	0.149	0.137	0.125	0.110	0.095	0.080	0.065	0.049	0.033	0.016	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	13/16"	7/8"	7/8"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	7/8"	7/8"	13/16"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDER 8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.046	0.069	0.091	0.112	0.133	0.153	0.172	0.190	0.207	0.221	0.236	0.247	0.259	0.268	0.276	0.281	0.287	0.288	0.290	0.288	0.287	0.281	0.276	0.268	0.259	0.247	0.236	0.221	0.207	0.190	0.172	0.153	0.133	0.112	0.091	0.069	0.046	0.023	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.018	0.035	0.053	0.071	0.087	0.103	0.119	0.135	0.148	0.161	0.173	0.186	0.194	0.202	0.211	0.219	0.221	0.224	0.227	0.230	0.227	0.224	0.221	0.219	0.211	0.202	0.194	0.186	0.173	0.161	0.148	0.135	0.119	0.103	0.087	0.071	0.053	0.035	0.018	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN B

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 3

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DRAWN BY : J.E. HAGENBUSH DATE : 09/27/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS SPAN B

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-29
1			3			TOTAL SHEETS
2			4			56

JHagenbush
5/10/2023
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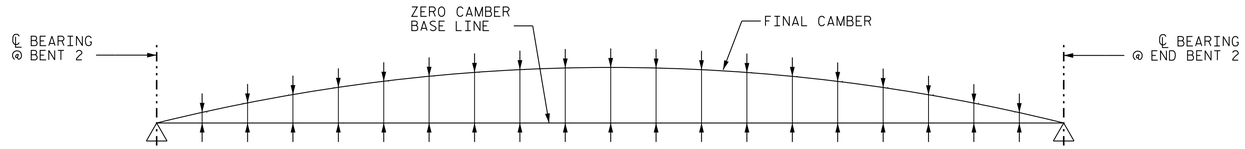

GIRDER 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.011	0.016	0.021	0.024	0.028	0.031	0.033	0.034	0.035	0.034	0.033	0.031	0.028	0.025	0.021	0.016	0.010	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 2 & 3

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.015	0.020	0.024	0.028	0.030	0.033	0.033	0.034	0.033	0.033	0.030	0.028	0.024	0.020	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 4 & 5

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.004	0.008	0.012	0.016	0.019	0.022	0.024	0.026	0.026	0.027	0.026	0.026	0.024	0.022	0.019	0.016	0.012	0.008	0.004	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 6 & 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.015	0.019	0.023	0.027	0.029	0.032	0.032	0.033	0.032	0.032	0.029	0.027	0.023	0.020	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDER 8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.011	0.016	0.021	0.024	0.028	0.031	0.033	0.034	0.035	0.034	0.033	0.031	0.028	0.025	0.021	0.016	0.011	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN C

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT
"FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN C

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Docusigned by:
5/10/2023
...97644648...

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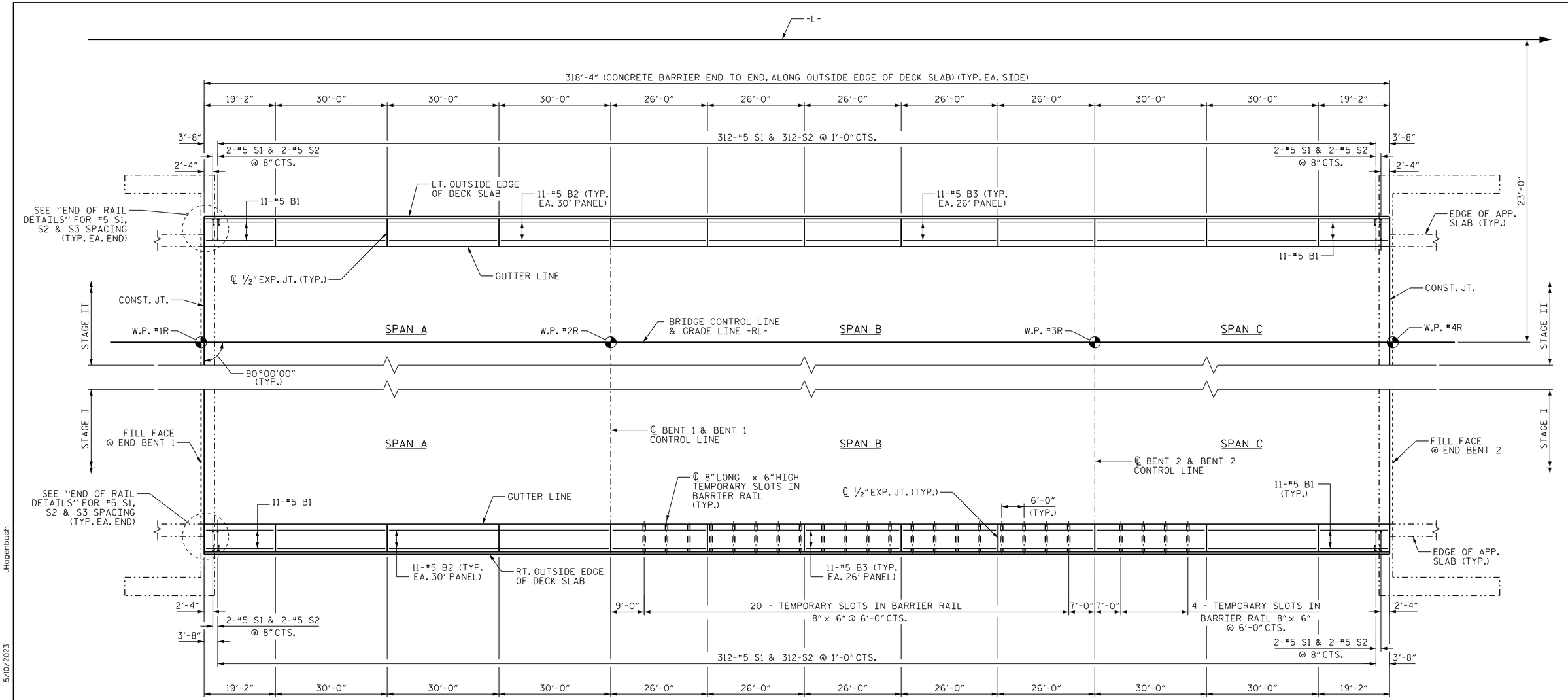

BARRIER RAIL PLAN

FOR REINFORCEMENT BILL OF MATERIALS, NOTES AND BARRIER RAIL DETAILS SEE "CONCRETE BARRIER RAIL DETAILS", SHEET 2 OF 2.

ALL HORIZONTAL DIMENSIONS ARE ALONG THE OUTSIDE EDGE OF DECK SLAB.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
PRELIMINARY

CONCRETE BARRIER RAIL

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE
Authorized by: 5/10/2023

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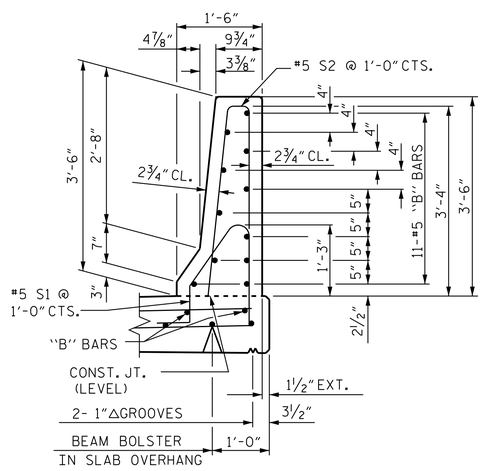
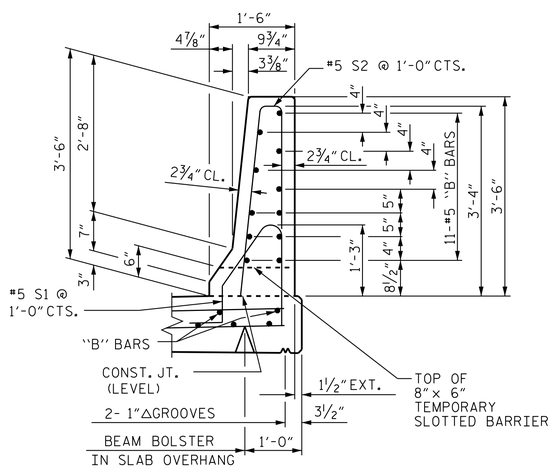


TYPICAL SECTION THRU RAIL



SECTION THRU RAIL WITH TEMPORARY SLOTS IN BARRIER RAIL

NOTES

TEMPORARY SLOTS MAY BE RE-POSITIONED SLIGHTLY AS NECESSARY TO PROVIDE 1" MINIMUM COVER TO #5 S1 AND #5 S2 BARS.

FOR TRAFFIC PHASING OPERATIONS, SEE TRAFFIC CONTROL PLANS AND SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRIOR TO PLACEMENT OF GROUT, ALL TEMPORARY SLOTS SHALL BE THROUGHLY CLEANED AND ALL INTERIOR SURFACES SAND BLASTED TO REMOVE LOOSE MATERIALS AND OTHER CONTAMINANTS. ALL WORK SHALL BE APPROVED BY THE ENGINEER.

ONCE TEMPORARY TRAFFIC ON THE BRIDGE HAS BEEN SHIFTED INTO THE FINAL PHASE, TEMPORARY SLOTS IN THE BARRIER RAIL SHALL BE FILLED WITH A NON-SHRINK, NON-METALLIC GROUT.

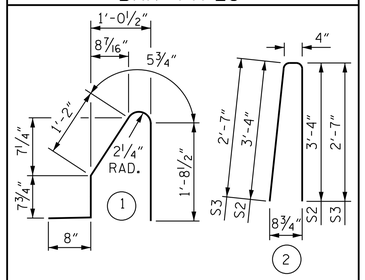
NO SEPARATE PAYMENT FOR MATERIALS, LABOR, AND EQUIPMENT REQUIRED TO FILL TEMPORARY SLOTS SHALL BE MADE. ALL COSTS FOR THIS WORK SHALL BE INCIDENTAL TO THE PRICE OF THE CONCRETE BARRIER RAIL.

THE BARRIER RAIL IN THE CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT 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, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	18'-9"	861
* B2	110	#5	STR	29'-7"	3395
* B3	110	#5	STR	25'-7"	2936
* S1	640	#5	1	4'-8"	3116
* S2	632	#5	2	7'-0"	4615
* S3	8	#5	2	5'-6"	46

* EPOXY COATED REINFORCING STEEL	14,969 LBS.
CLASS AA CONCRETE	87.0 CU. YDS.
CONCRETE BARRIER RAIL	636.67 LIN. FT.

PLAN

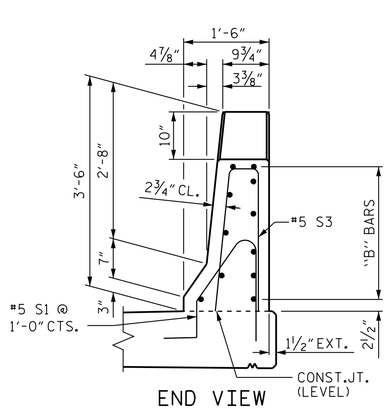
TEMPORARY SLOTS IN BARRIER RAIL DETAIL

ELEVATION AT EXPANSION JOINTS

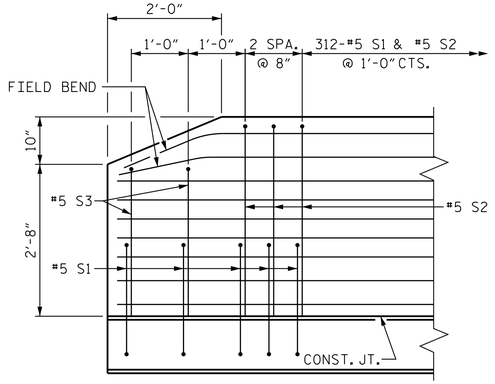
SECTION S-S

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

BARRIER RAIL DETAILS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

RIGHT SIDE AT END BENT 1 SHOWN, LEFT SIDE SIMILAR

PROJECT NO. R-2707D

CLEVELAND COUNTY

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SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

(RIGHT LANE)

STD. NO. CBR1

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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ASSEMBLED BY : J.E. HAGENBUSH	DATE : 09/28/18		
CHECKED BY : S. S. POOLE	DATE : 12/10/22		
DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM	DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/GM	

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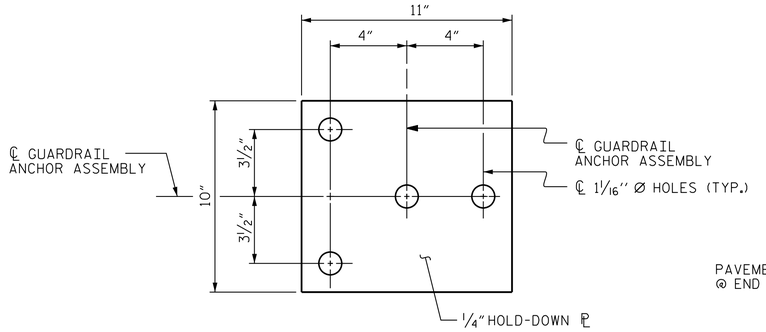
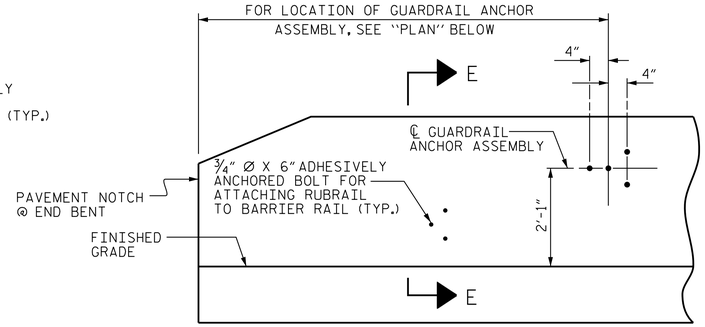
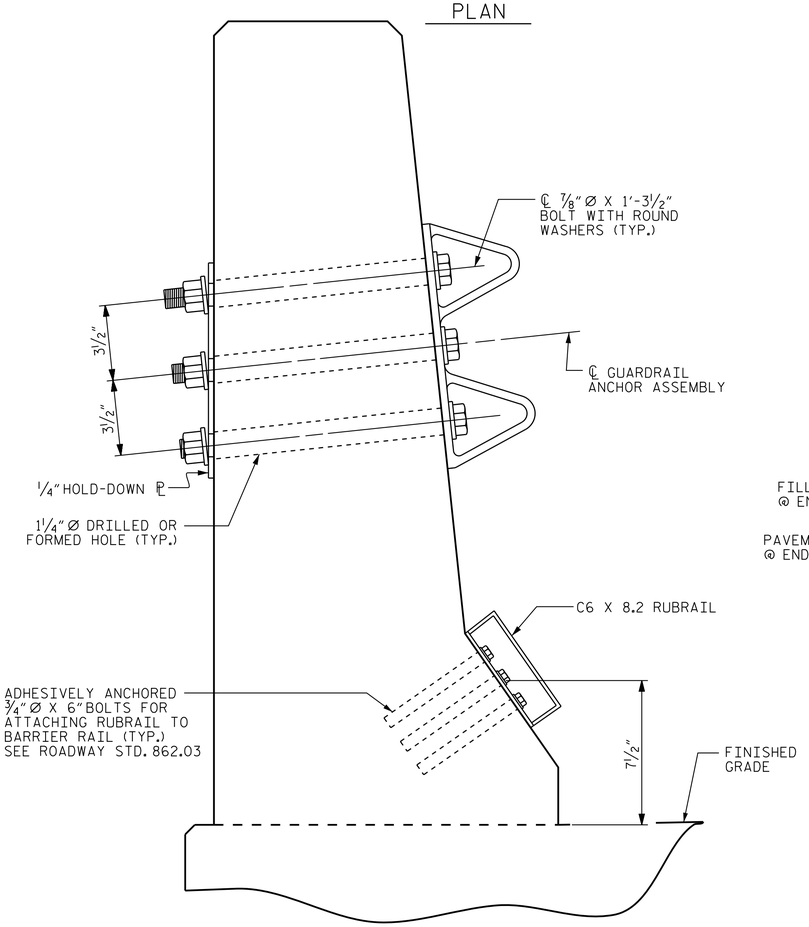


PLAN

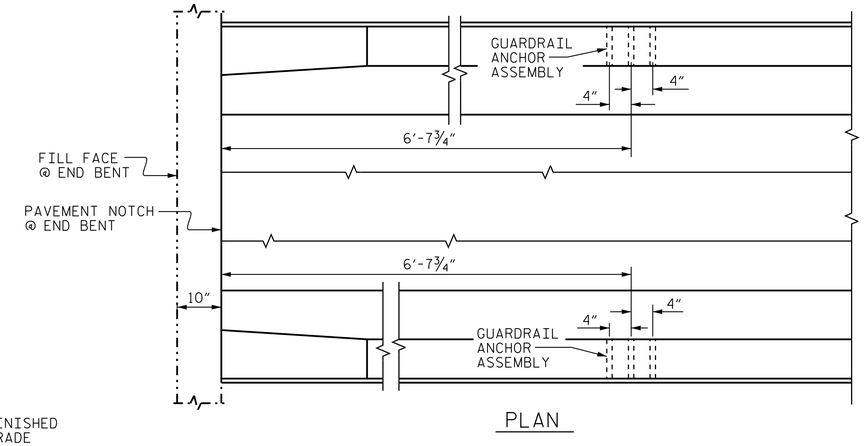


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD-DOWN PLATE AND 4 - ⅞" 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 ⅞" 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.)

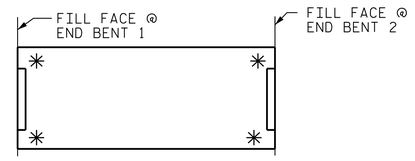
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 ¼" 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 ¾" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" 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-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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CHECKED BY : S. S. POOLE DATE : 12/10/22

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

DESIGN ENGINEER OF RECORD: S. S. POOLE DATE : 05/10/23

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5/10/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(RIGHT LANE)

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SUPERSTRUCTURE BILL OF MATERIAL (STAGE I)

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1A	106.4		
POUR #2A	165.8		
POUR #3A	107.3		
POUR #4A	70.5		
TOTALS**	450.0	34,580	39,887

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

SUPERSTRUCTURE BILL OF MATERIAL (STAGE II)

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1B	99.2		
POUR #2B	166.5		
POUR #3B	115.8		
POUR #4B	74.4		
POUR #5	23.6		
TOTALS**	483.2	36,247	41,409

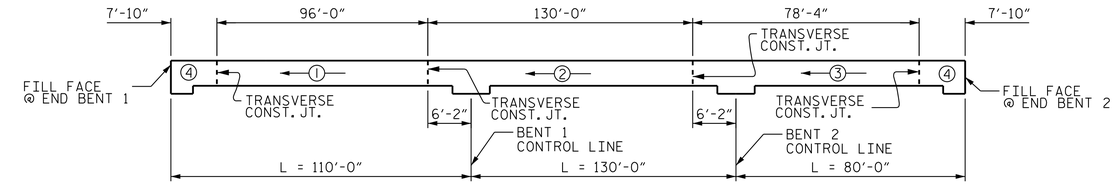
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

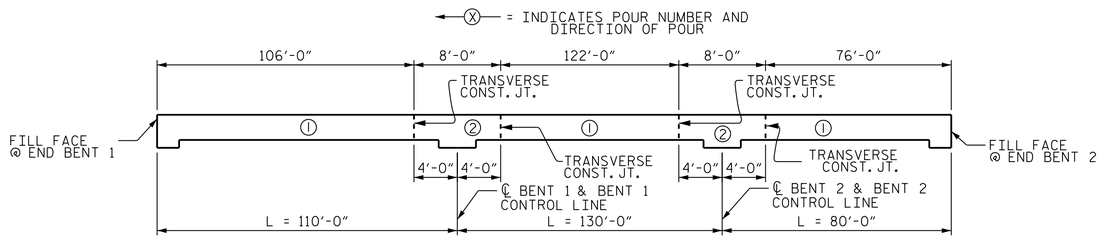
APPROACH SLABS	3,038 SQ.FT.
BRIDGE DECK	19,737 SQ.FT.
TOTAL	22,775 SQ.FT.

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	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"			

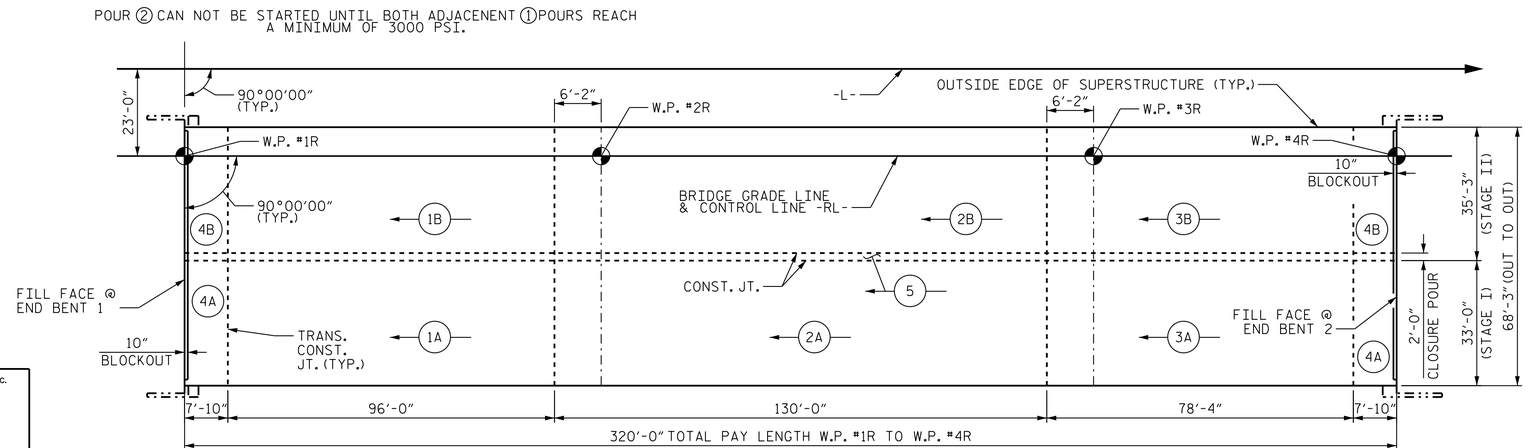


POURING SEQUENCE



POURING SEQUENCE

POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENENT ①POURS REACH A MINIMUM OF 3000 PSI.



LAYOUT FOR COMPUTING AREA OF REINFORCED DECK SLAB (SQ.FT. = 21,840)

STAGE I REINF. BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	545	#5	STR	32'-8"	18569
A2	545	#5	STR	32'-8"	18569
✳B1	138	#5	STR	55'-1"	7929
✳B2	42	#6	STR	21'-0"	1325
✳B3	42	#6	STR	23'-10"	1504
✳B4	124	#6	STR	39'-5"	7342
B5	234	#5	STR	54'-8"	13302
✳D1	545	#5	STR	4'-3"	2416
K1	12	#4	STR	34'-8"	278
K2	6	#4	STR	6'-2"	25
K3	24	#4	STR	8'-0"	129
K4	6	#4	STR	6'-5"	26
K5	2	#4	3	5'-10"	8
K6	8	#4	3	6'-9"	37
K7	2	#4	3	6'-0"	9
K8	2	#4	STR	2'-9"	4
K9	8	#4	STR	3'-1"	17
K10	2	#4	STR	2'-3"	4
K11	12	#4	STR	5'-0"	41
K12	60	#4	STR	8'-0"	321
K13	12	#4	STR	5'-3"	43
K14	14	#4	STR	30'-7"	287
U1	42	#4	1	14'-8"	412
U2	18	#4	1	10'-8"	129
U3	36	#4	4	15'-8"	377
U4	12	#4	5	9'-7"	77
S1	264	#4	6	2'-9"	485
✳S2	64	#4	2	11'-8"	499
✳S3	40	#4	2	11'-4"	303

REINFORCING STEEL	34,580 LBS.
✳EPOXY COATED REINFORCING STEEL	39,887 LBS.

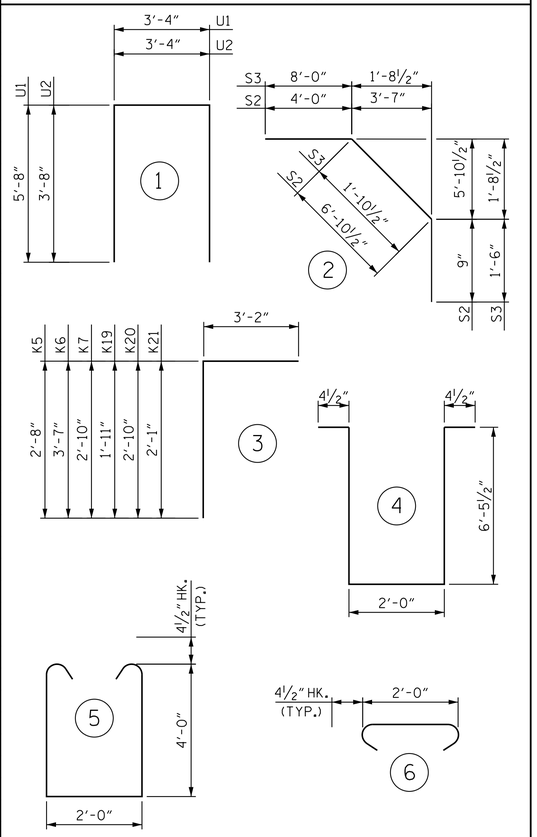
STAGE II REINF. BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	545	#5	STR	32'-11"	18711
A4	545	#5	STR	32'-11"	18711
✳B1	156	#5	STR	55'-1"	8963
✳B2	44	#6	STR	21'-0"	1388
✳B3	42	#6	STR	23'-10"	1504
✳B4	128	#6	STR	39'-5"	7579
B5	258	#5	STR	54'-6"	14666
✳D1	545	#5	STR	4'-3"	2416
K2	6	#4	STR	6'-2"	25
K3	24	#4	STR	8'-0"	129
K4	6	#4	STR	6'-5"	26
K5	2	#4	3	5'-10"	8
K6	8	#4	3	6'-9"	37
K7	2	#4	3	6'-0"	9
K11	12	#4	STR	5'-0"	41
K12	60	#4	STR	8'-0"	321
K13	12	#4	STR	5'-3"	43
K15	12	#4	STR	34'-11"	280
K22	2	#4	STR	2'-5"	4
K23	8	#4	STR	3'-4"	18
K24	2	#4	STR	2'-7"	4
K28	4	#4	STR	2'-1"	6
K29	16	#4	STR	5'-1"	68
K30	4	#4	STR	2'-4"	7
K31	14	#4	STR	30'-11"	290
U1	42	#4	1	14'-8"	412
U2	18	#4	1	10'-8"	129
U3	36	#4	4	15'-8"	377
U4	12	#4	5	9'-7"	77
S1	304	#4	6	2'-9"	559
✳S2	68	#4	2	11'-8"	530
✳S3	42	#4	2	11'-4"	318

REINFORCING STEEL	36,247 LBS.
✳EPOXY COATED REINFORCING STEEL	41,409 LBS.

TOTAL STAGE I AND STAGE II	
REINFORCING STEEL	70,827 LBS.
EPOXY COATED REINFORCING STEEL	81,296 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

(RIGHT LANE)

Stantec
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www.stantec.com
License No. F-0672

DRAWN BY : J. B. GEILE DATE : 10/11/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			56

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JHagenbush
5/10/2023

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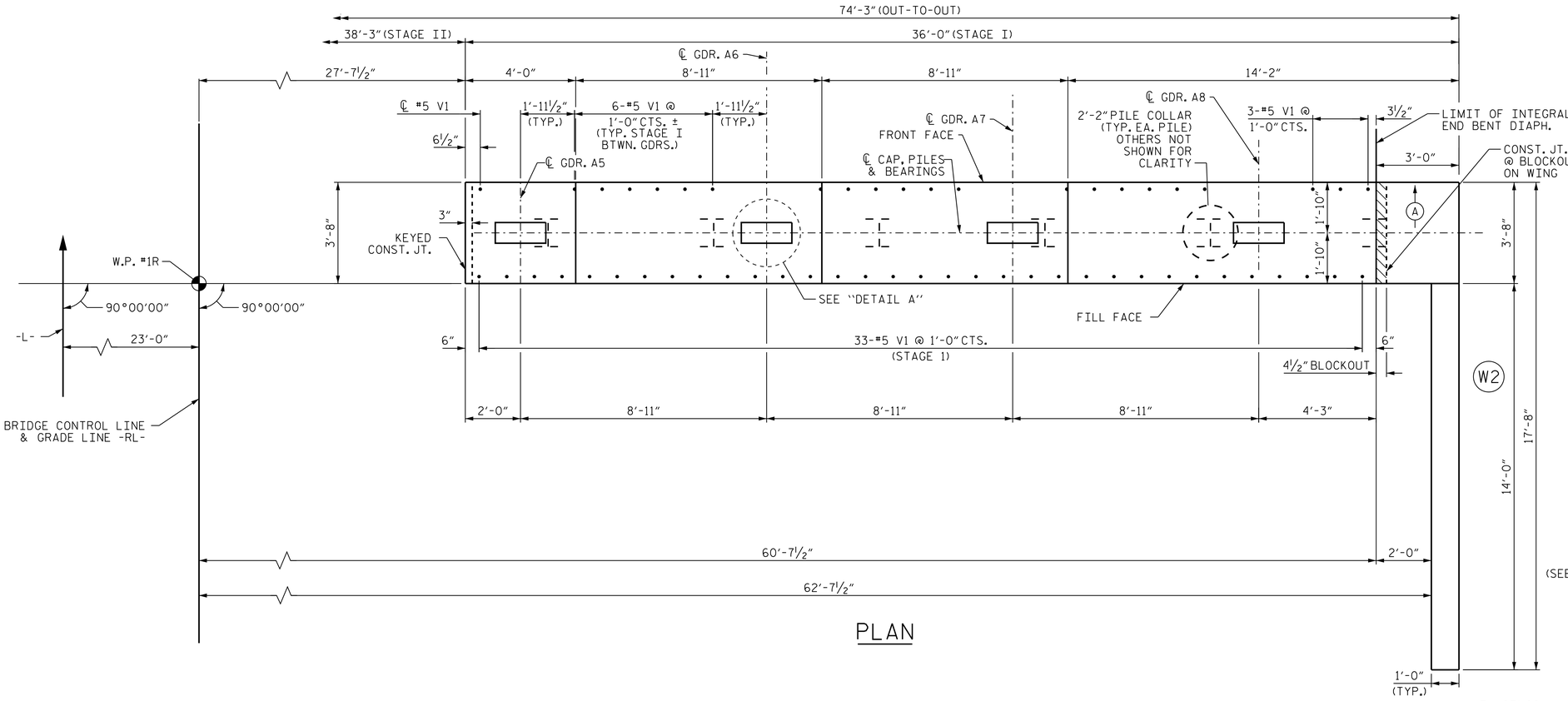


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHEET. 3 OF 5.

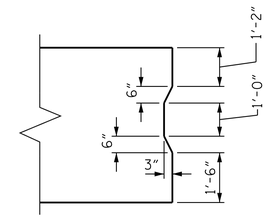
(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

FOR SECTIONS A-A AND B-B, SEE END BENT 1 DETAILS, SHEET 4 OF 5.

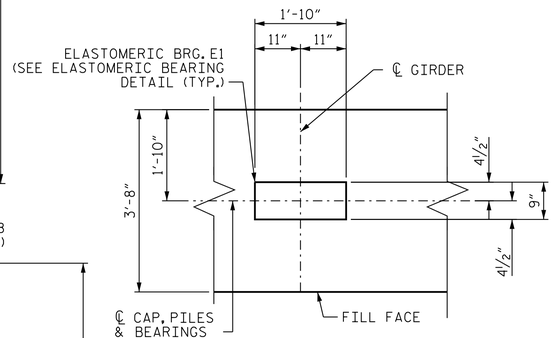
(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 1 WING WALL DETAILS, SHEET. 3 OF 5.

(B) #5 V1 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT



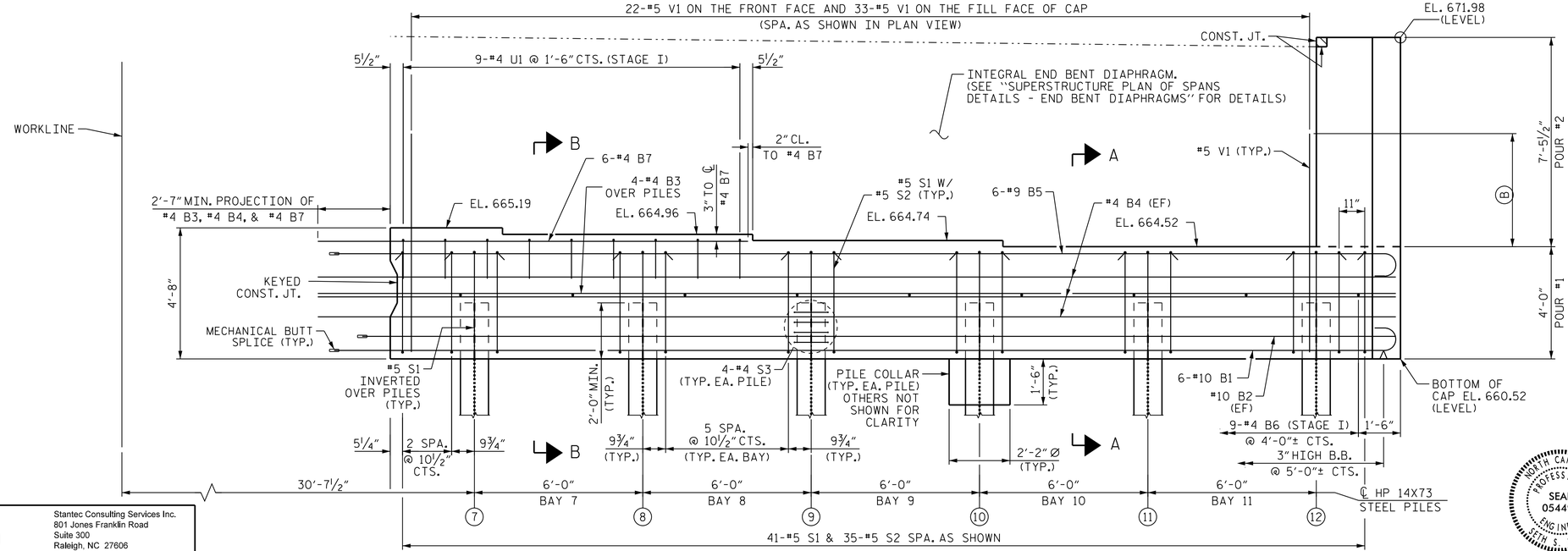
KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING



ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (STAGE I)

(RIGHT LANE)

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CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/10/2023

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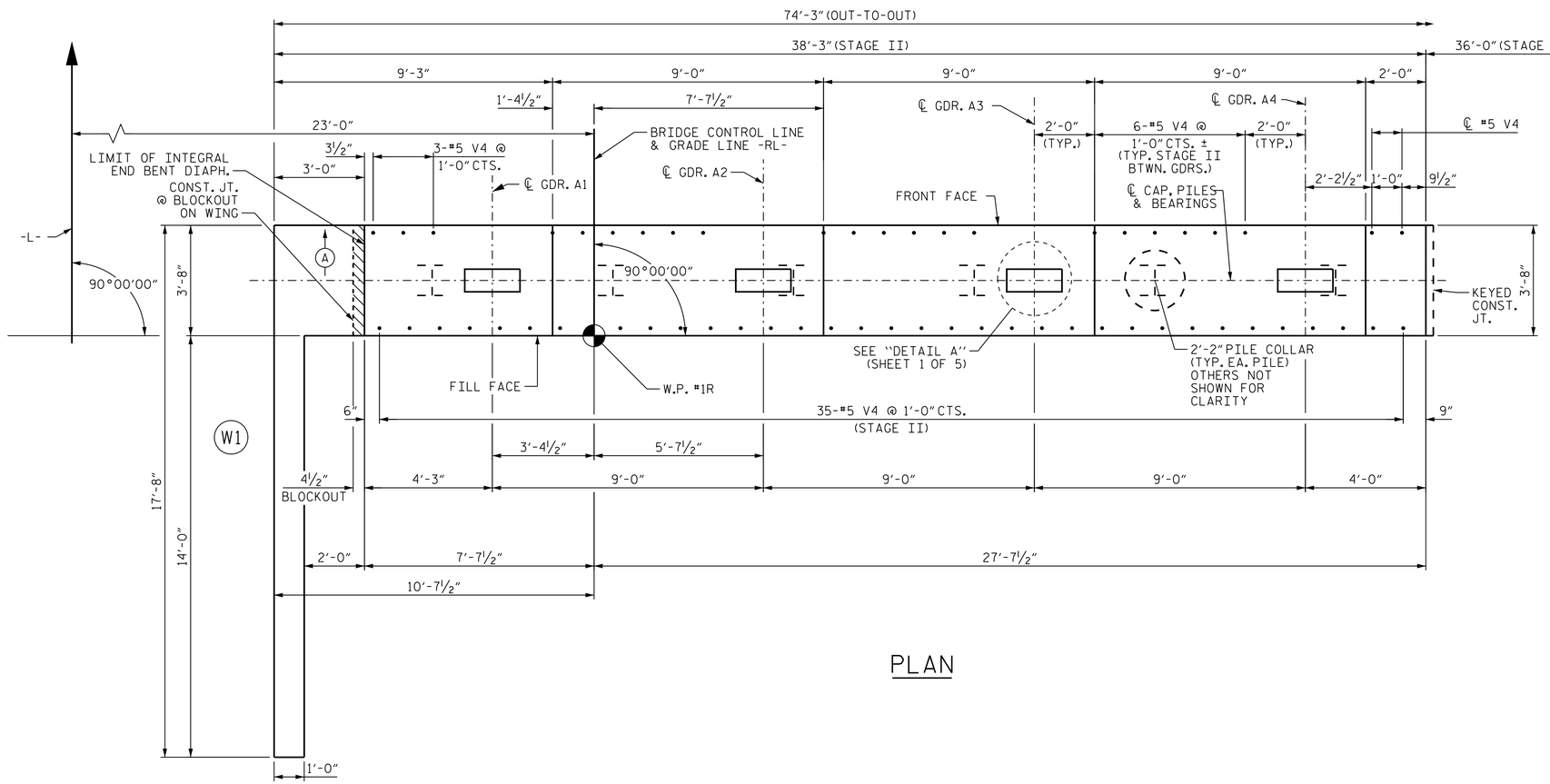


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHEET. 3 OF 5.

(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

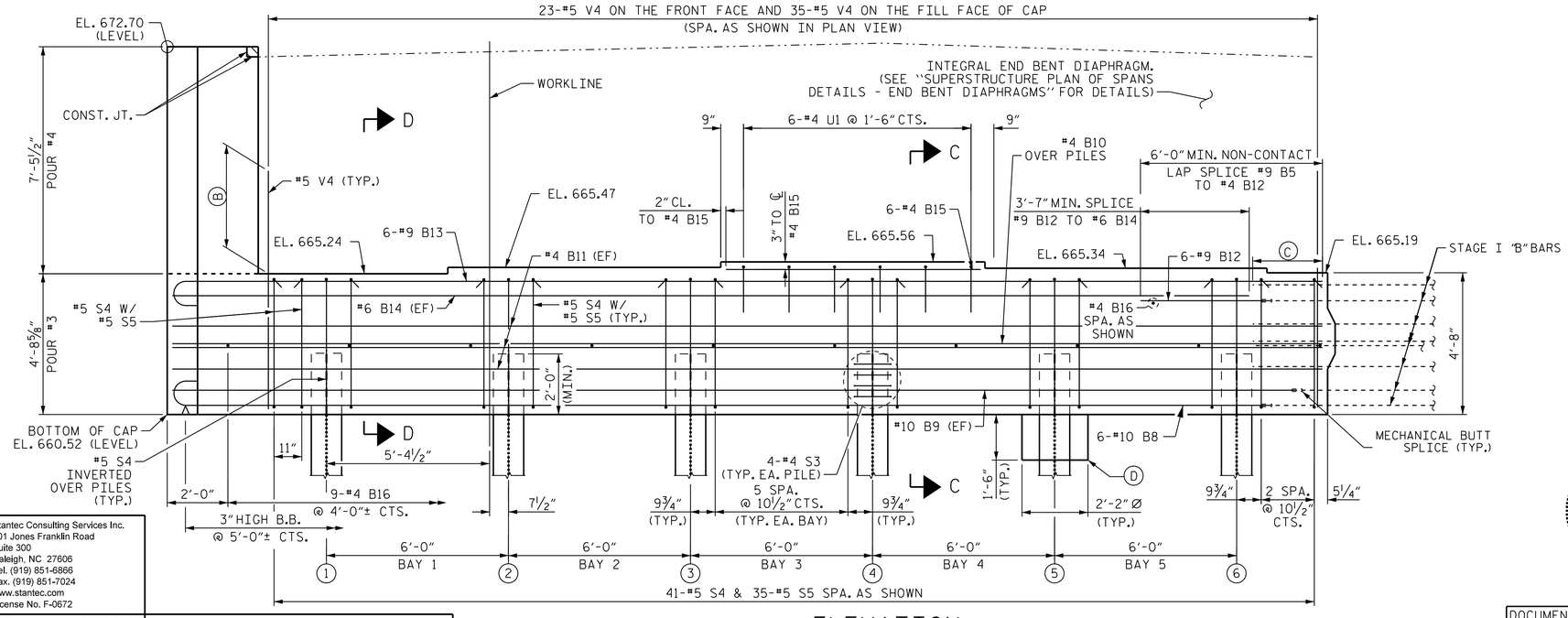
FOR SECTIONS C-C AND D-D, SEE END BENT 1 DETAILS, SHEET 5 OF 5.

(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 1 WING WALL DETAILS, SHEET. 3 OF 5.

(B) #5 V4 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT.

(C) 2'-5" MIN. SPLICE LENGTH (TYP.).

(D) PILE COLLAR (TYP. EA. PILE) OTHERS NOT SHOWN FOR CLARITY.



ELEVATION

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DRAWN BY : J. B. GEILE DATE : 01/04/23
CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Digitally signed by:
5/10/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (STAGE II)

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-36
1			3			TOTAL SHEETS
2			4			56

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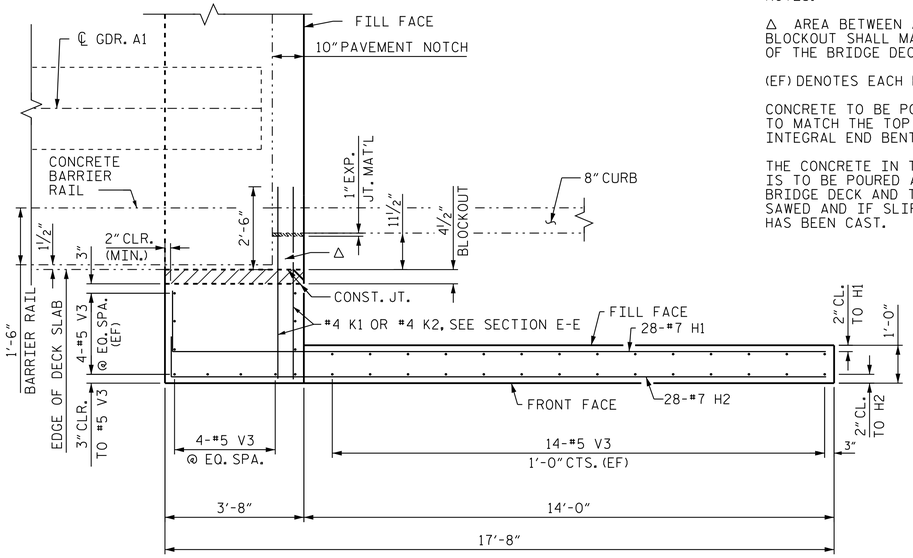
NOTES:

△ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.

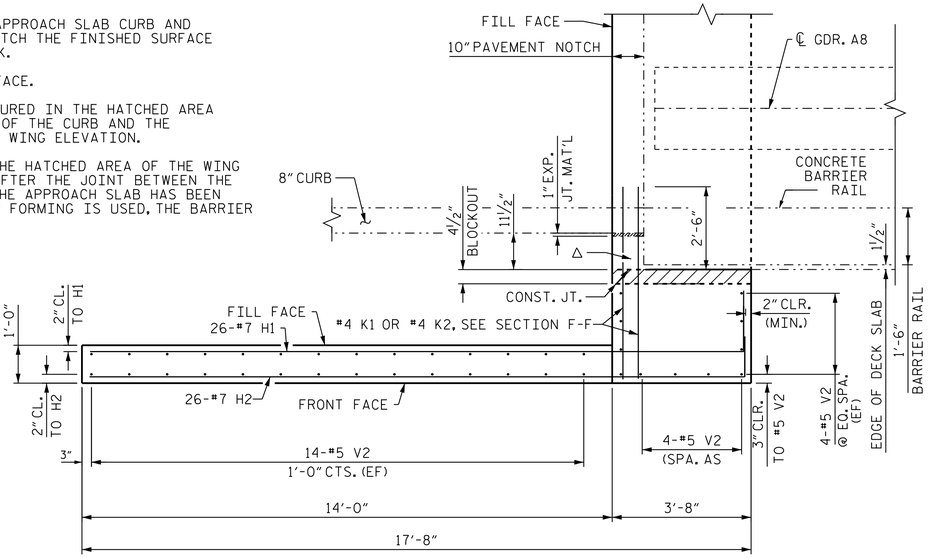
(EF) DENOTES EACH FACE.

CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.

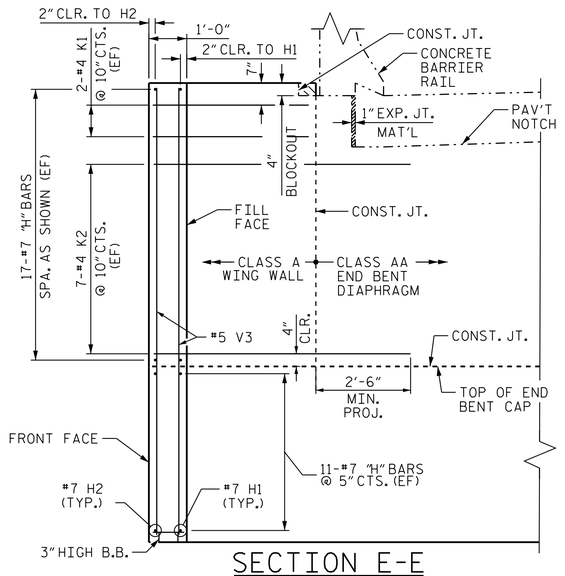
THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.



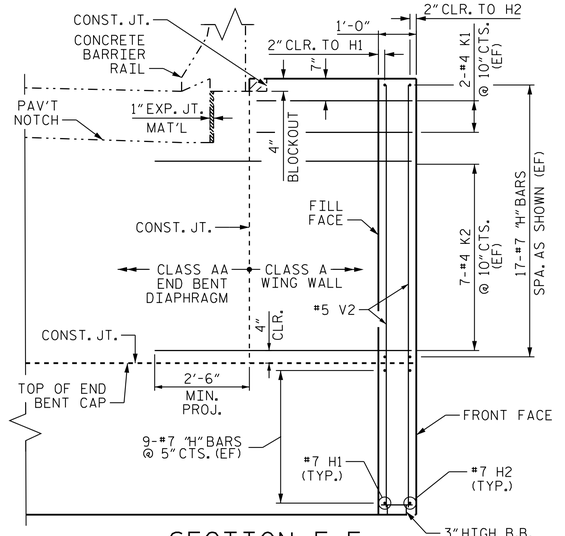
PLAN OF LEFT WING (W1)



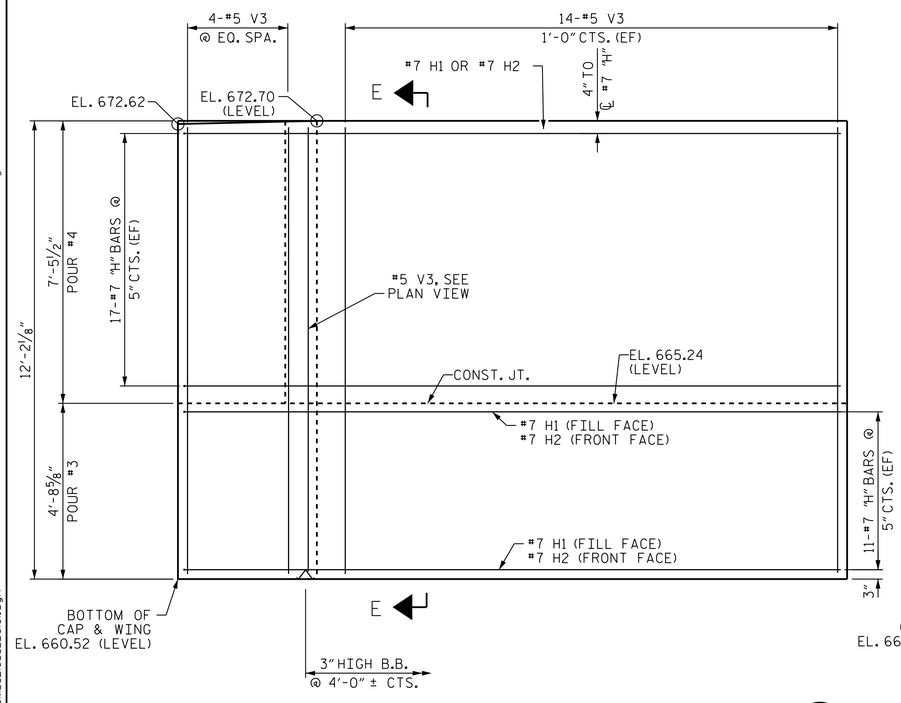
PLAN OF RIGHT WING (W2)



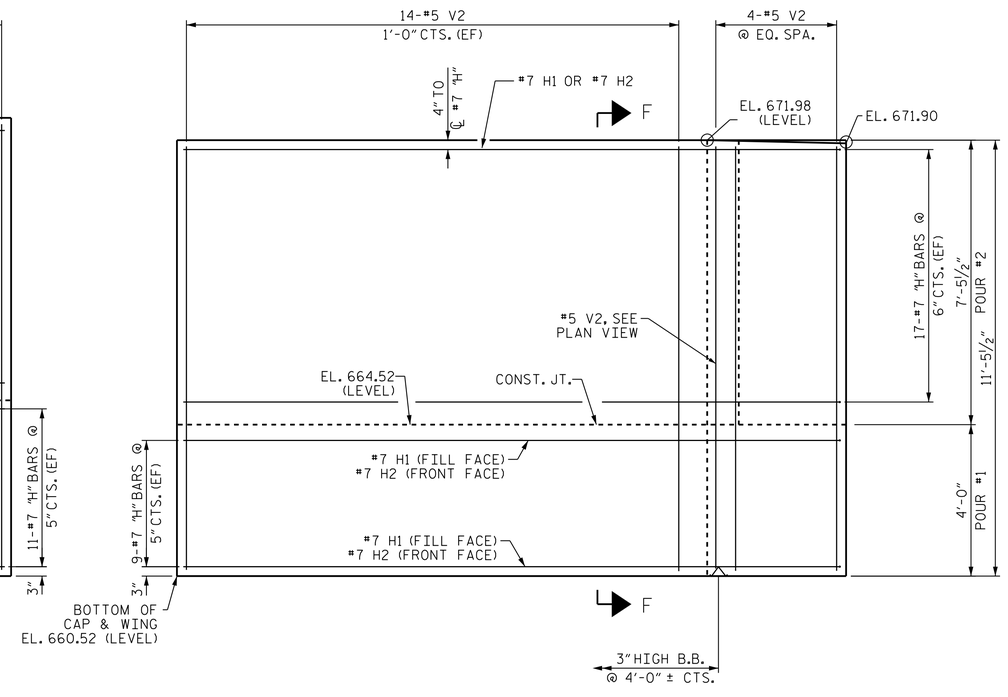
SECTION E-E



SECTION F-F



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

PROJECT NO. R-2707D

CLEVELAND COUNTY

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SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 WING DETAILS

(RIGHT LANE)

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DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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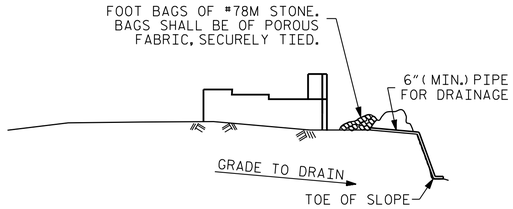
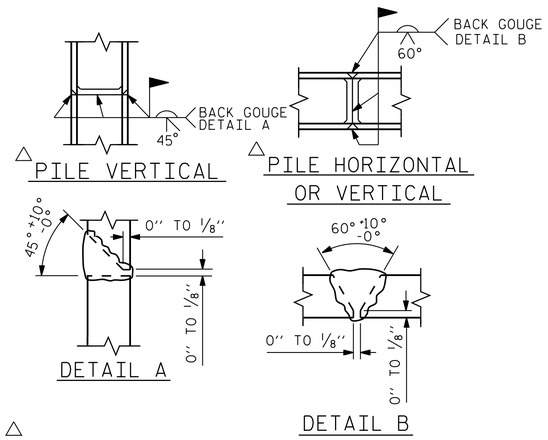


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

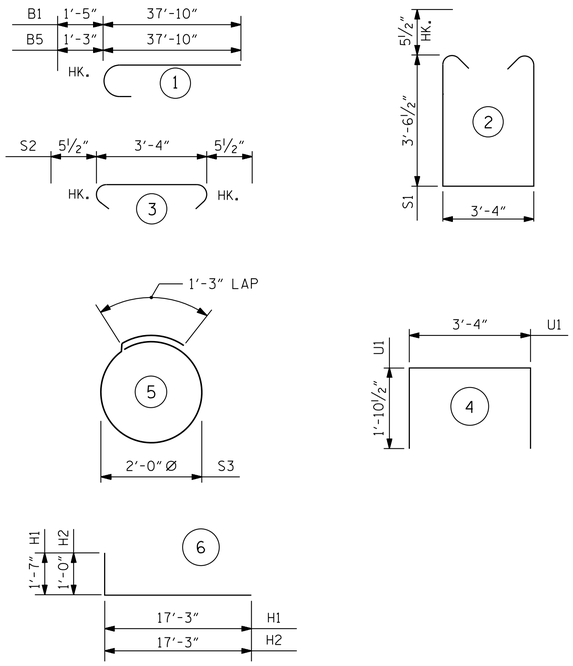
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



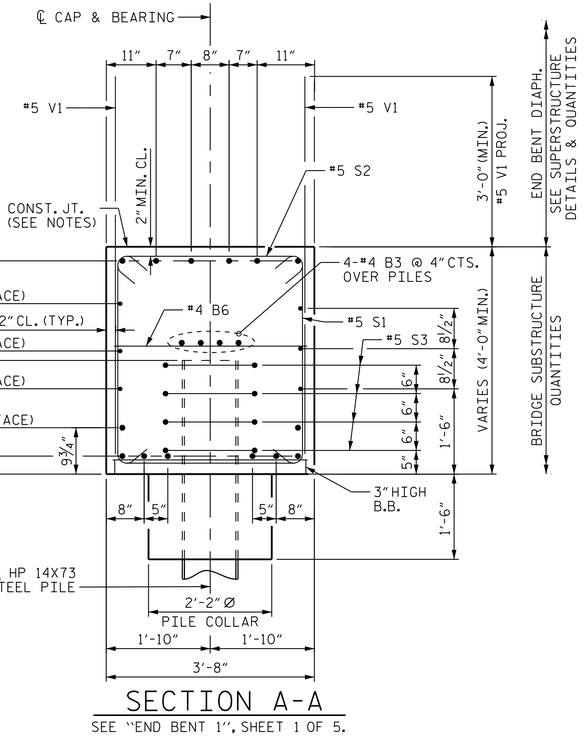
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1 - STAGE I

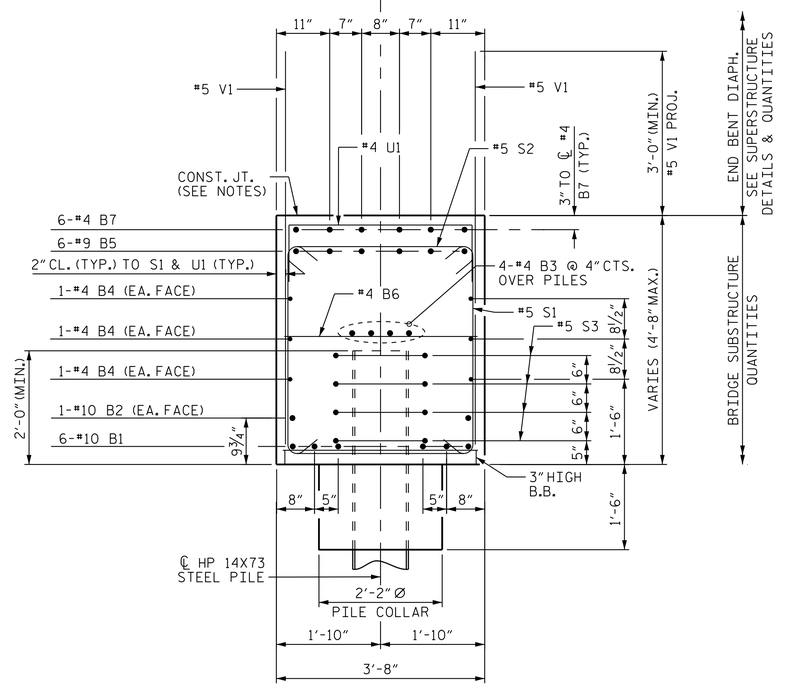
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	39'-3"	1014
B2	2	#10	STR	36'-10"	317
B3	4	#4	STR	38'-5"	103
B4	6	#4	STR	38'-5"	154
B5	6	#9	1	39'-1"	798
B6	9	#4	STR	3'-4"	21
B7	6	#4	STR	15'-4"	62
H1	26	#6	6	18'-10"	1001
H2	26	#6	6	18'-3"	970
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S1	41	#5	2	11'-4"	485
S2	35	#5	3	4'-3"	156
S3	24	#4	5	7'-7"	122
U1	9	#4	4	7'-1"	43
V1	55	#5	STR	7'-5"	426
V2	39	#5	STR	11'-0"	448

REINFORCING STEEL	LBS. 6,177
CLASS A CONCRETE BREAKDOWN:	
POUR#1: CAP, COLLARS, & WINGS	C.Y. 24.2
POUR#2: UPPER WINGS	C.Y. 6.0
CLASS A CONCRETE TOTAL	C.Y. 30.2



SECTION A-A

SEE "END BENT 1", SHEET 1 OF 5.



SECTION B-B

SEE "END BENT 1", SHEET 1 OF 5.

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS (STAGE I)

(RIGHT LANE)

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CHECKED BY : S. S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

Signed by: 5/10/2023

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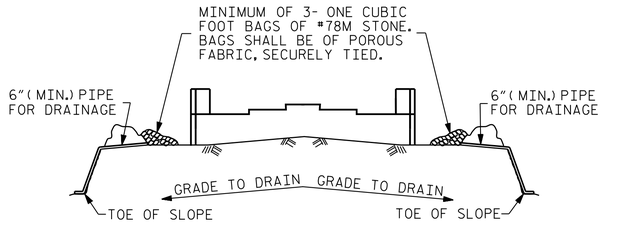
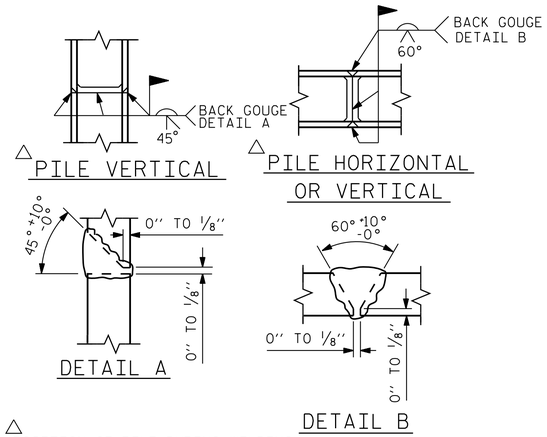


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

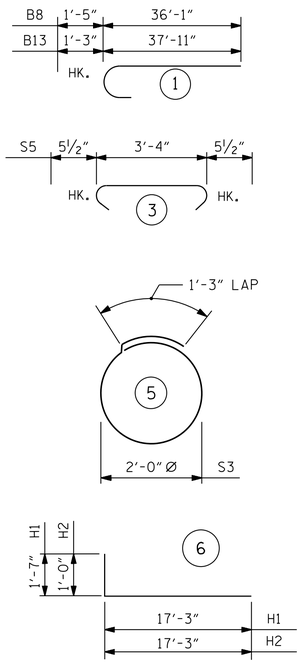
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

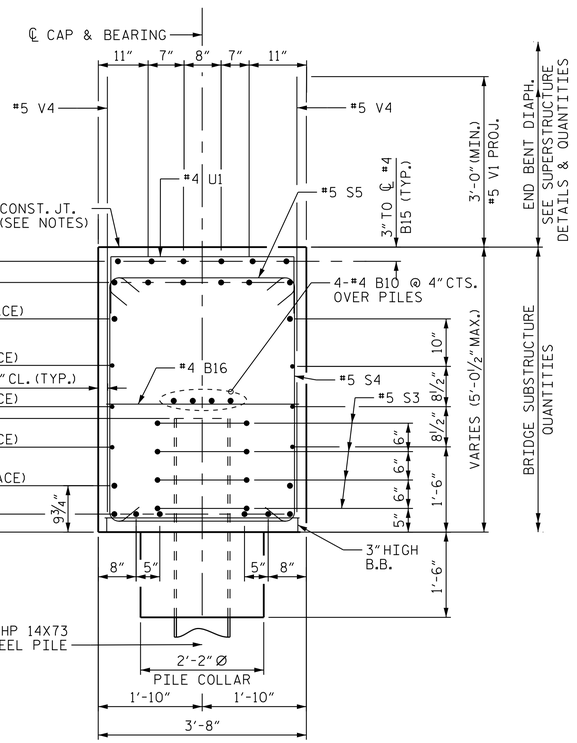
BILL OF MATERIAL

END BENT 1 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B8	6	#10	1	37'-6"	969
B9	2	#10	STR	37'-1"	320
B10	4	#4	STR	37'-11"	102
B11	6	#4	STR	37'-11"	152
B12	6	#9	STR	4'-2"	85
B13	6	#9	1	39'-2"	799
B14	2	#6	STR	35'-6"	107
B15	6	#4	STR	8'-6"	35
B16	10	#4	STR	3'-4"	23
H1	28	#7	6	18'-10"	1001
H2	28	#7	6	18'-3"	970
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S3	24	#4	5	7'-7"	122
S4	41	#5	2	12'-8"	542
S5	35	#5	3	4'-3"	156
U1	6	#4	4	7'-1"	29
V3	39	#5	STR	11'-8"	475
V4	52	#5	STR	7'-9"	420

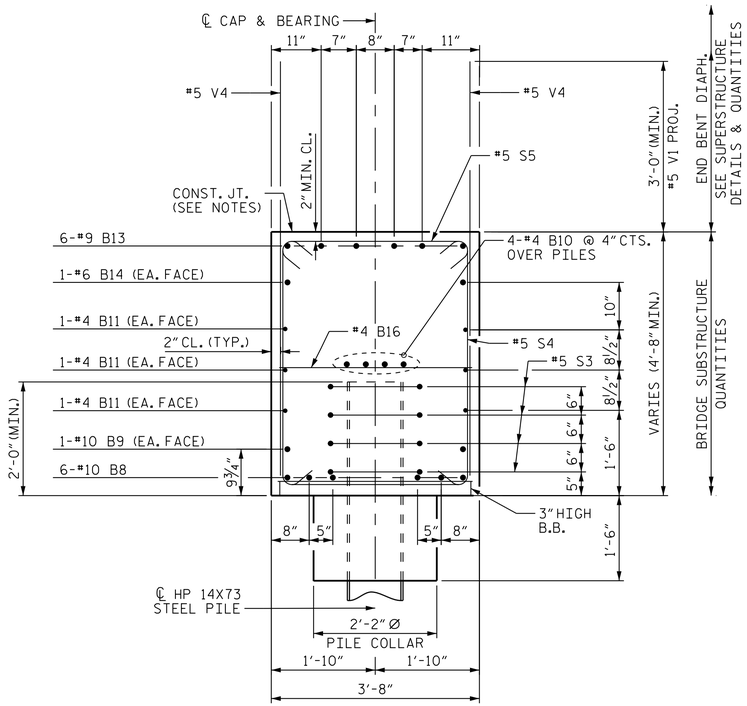
REINFORCING STEEL LBS. 6,364

CLASS A CONCRETE BREAKDOWN:	
POUR#3: CAP, COLLARS, & WINGS	C.Y. 29.1
POUR#4: UPPER WINGS	C.Y. 6.9
CLASS A CONCRETE TOTAL	C.Y. 36.0



SECTION C-C

SEE "END BENT 1", SHEET 2 OF 5.



SECTION D-D

SEE "END BENT 1", SHEET 2 OF 5.

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

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PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS (STAGE II)

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/10/2023

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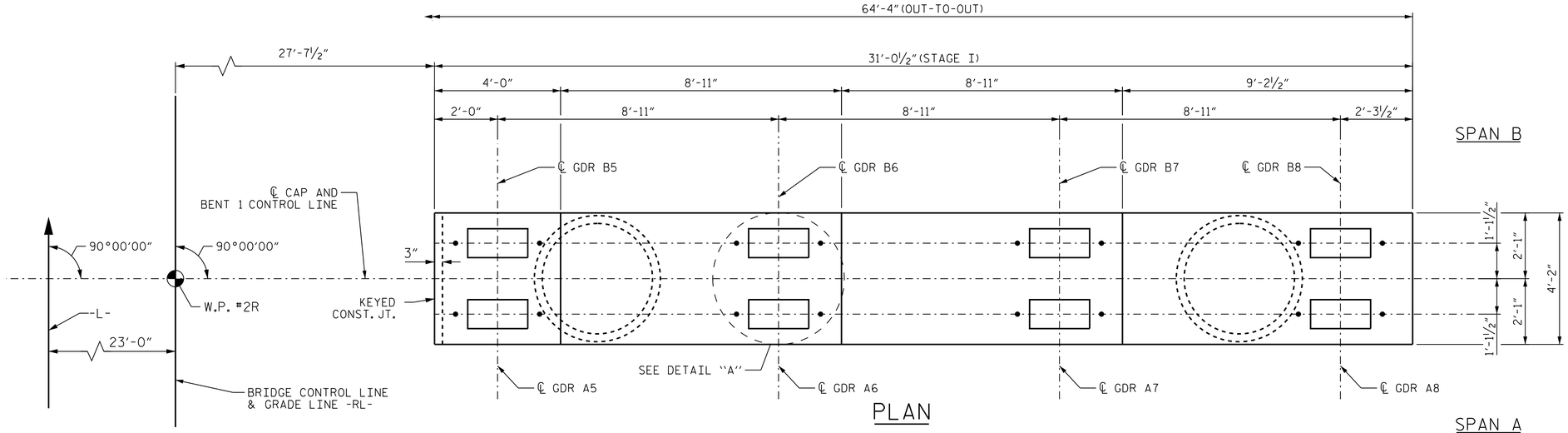


SPAN B

PLAN

SPAN A

NOTES:

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

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR VIEW A-A, AND SECTION B-B, SEE "BENT 1 DETAILS", SHEET 4 OF 4.

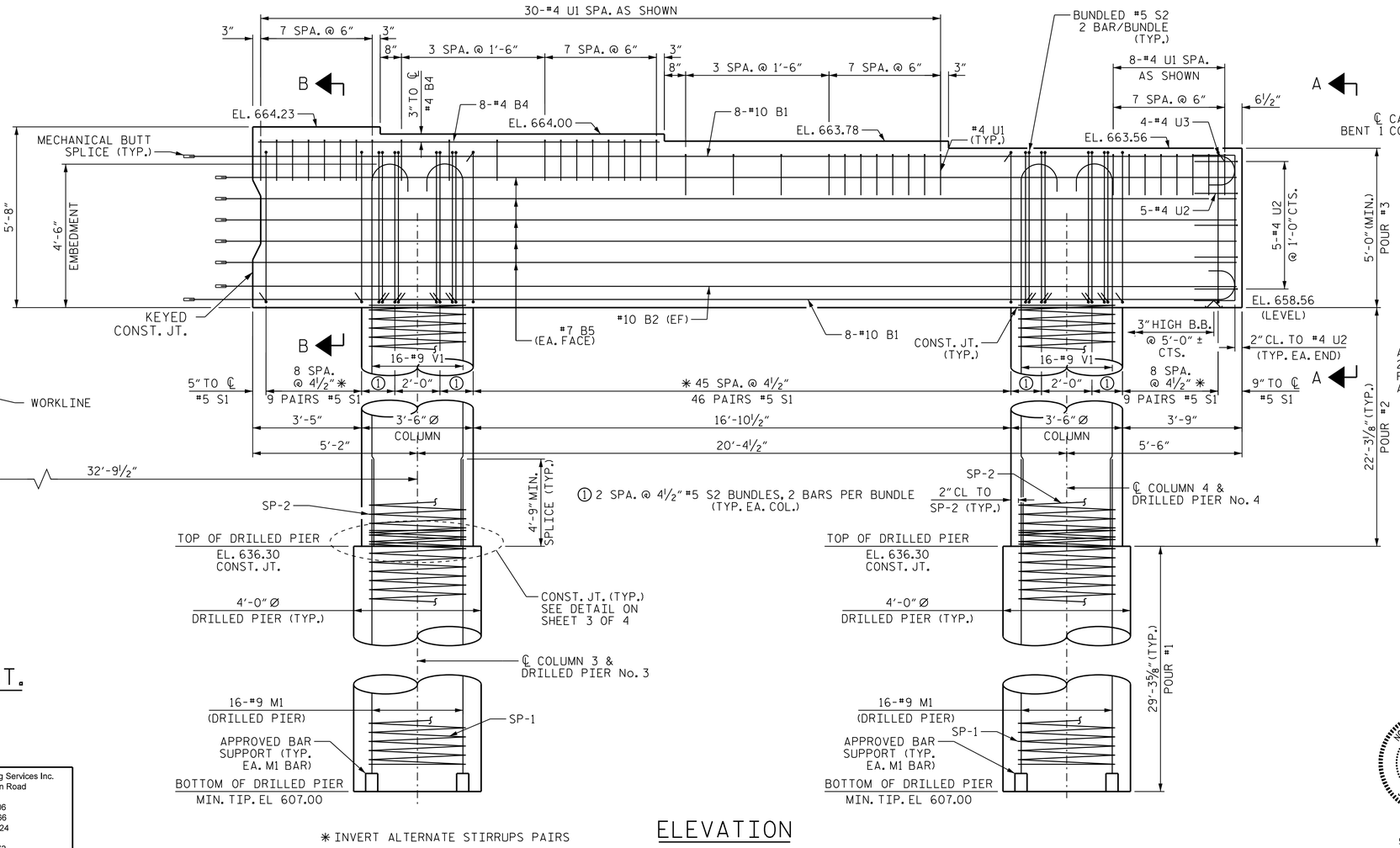
(EF) DENOTES EACH FACE.

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

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

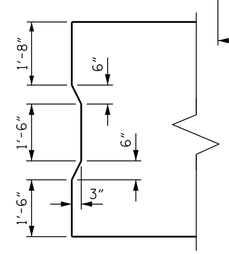
DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR PIERS LOCATED IN WATER.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.

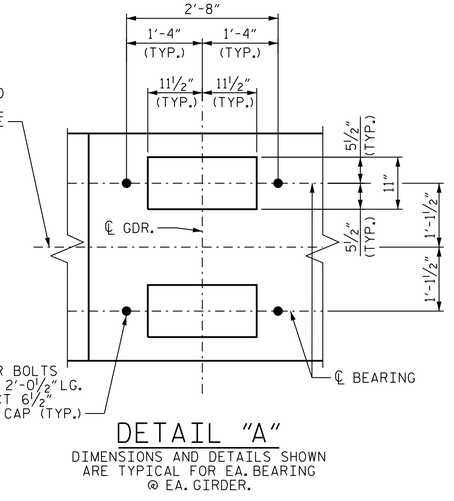


✱ INVERT ALTERNATE STIRRUPS PAIRS

ELEVATION



KEYED CONST. JT. DETAIL



DETAIL "A"

DIMENSIONS AND DETAILS SHOWN ARE TYPICAL FOR EA. BEARING @ EA. GIRDER.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

BENT 1 (STAGE I)

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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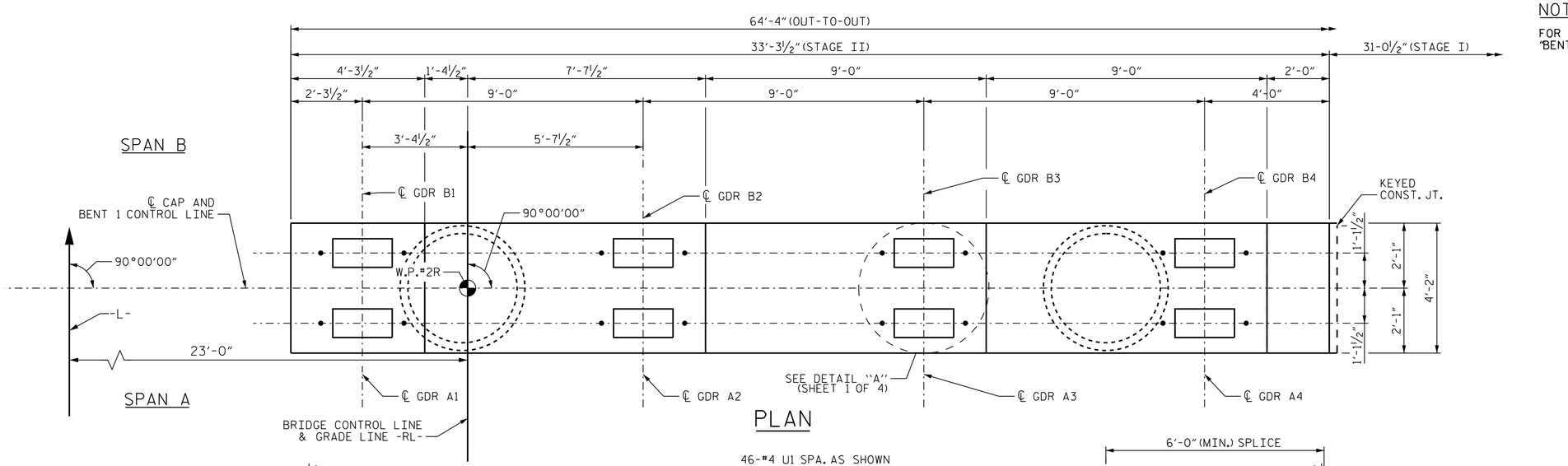
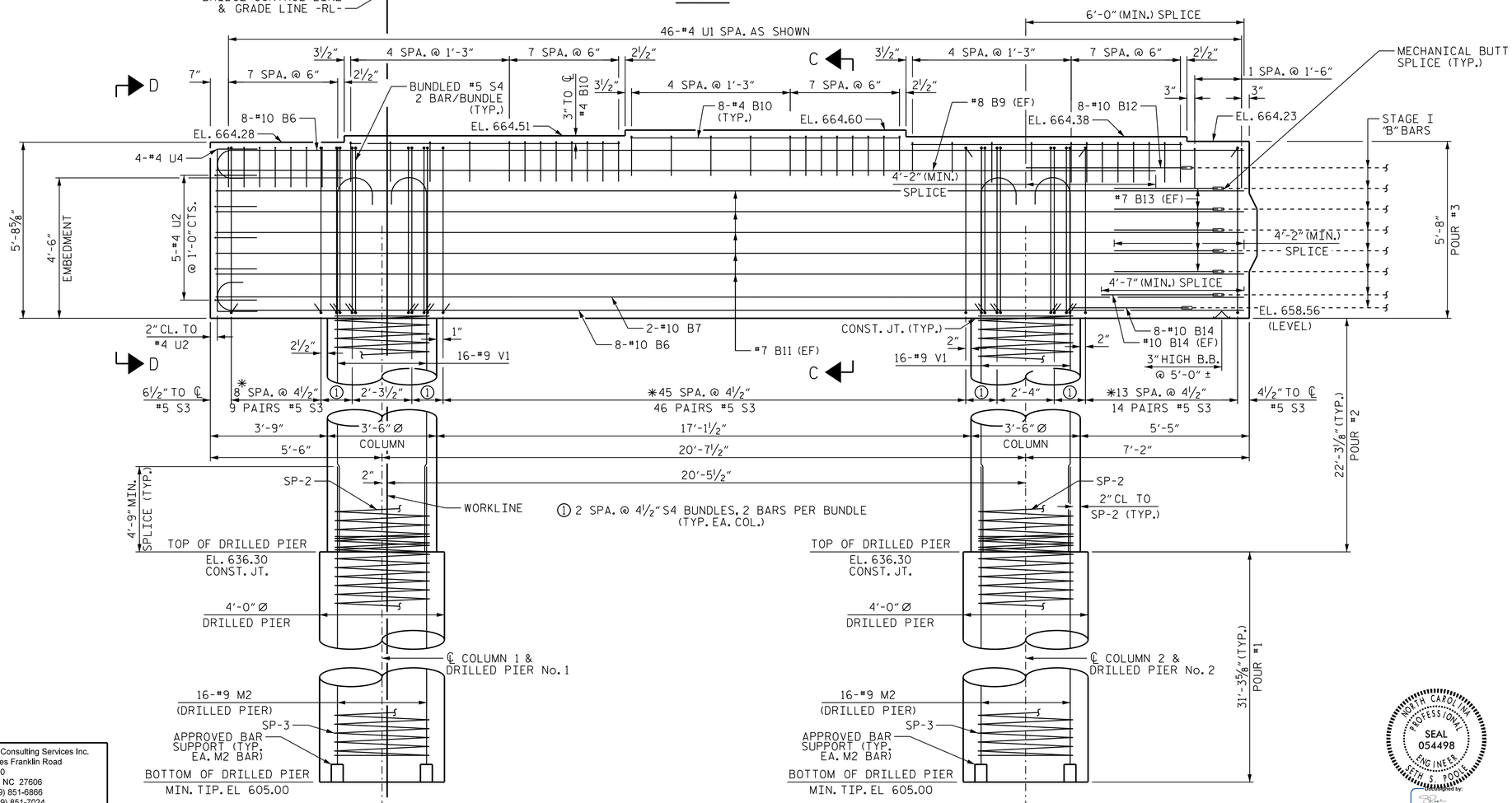
NOTES:

FOR SECTION C-C AND VIEW D-D, SEE "BENT 1 DETAILS", SHEET 4 OF 4.





PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 (STAGE II)

(RIGHT LANE)

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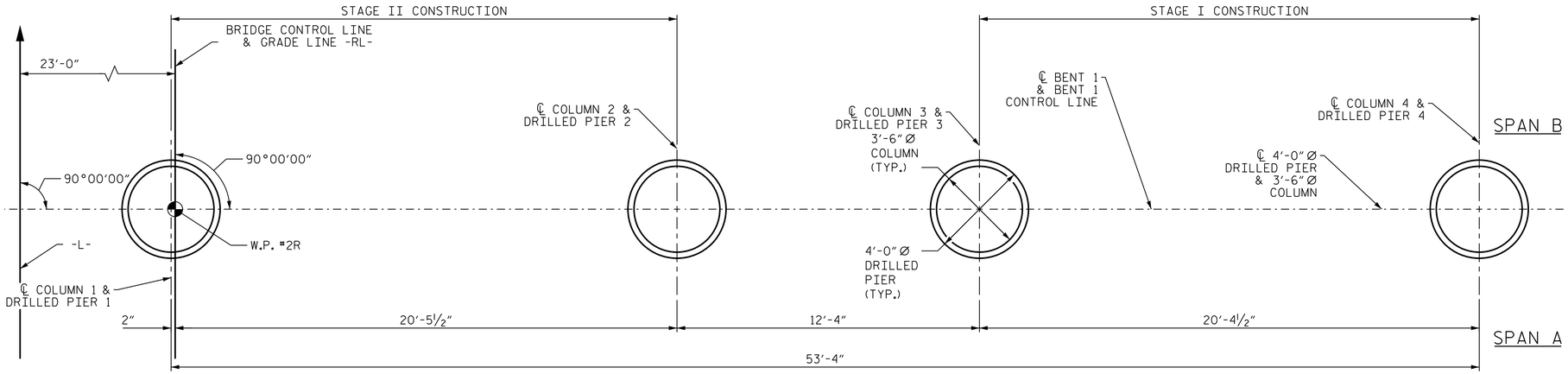
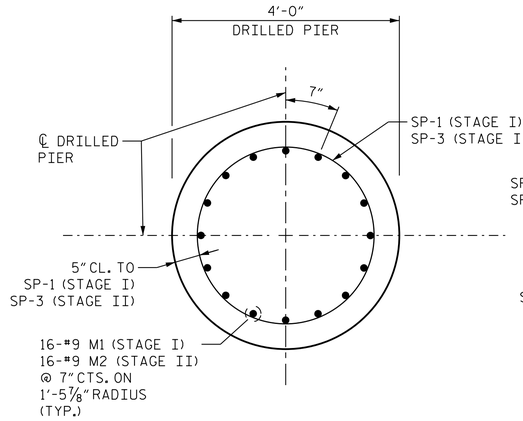
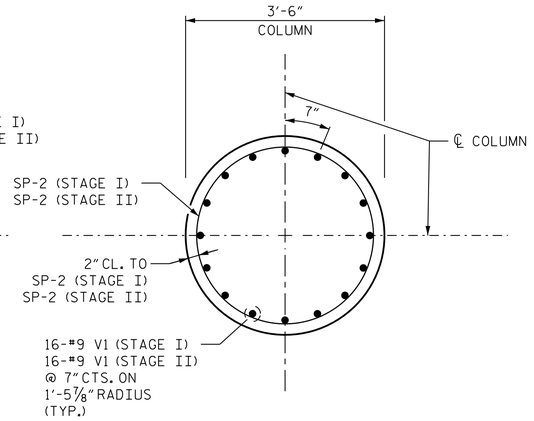


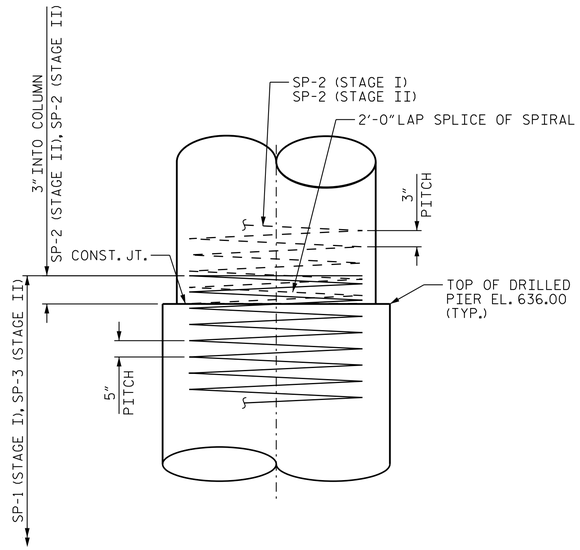
PLAN OF DRILLED PIERS



SECTION THRU DRILLED PIER TYPICAL ALL DRILLED PIERS

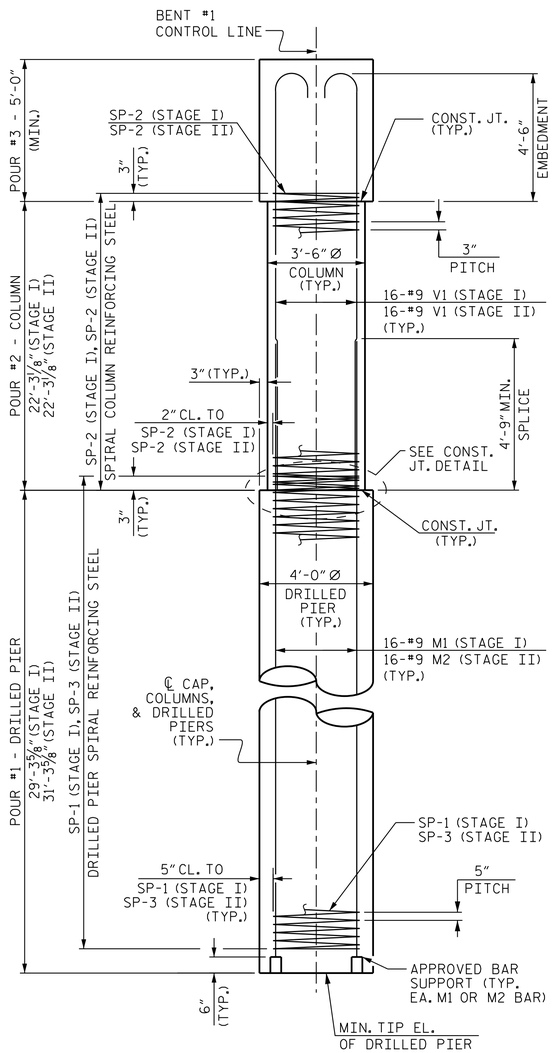


SECTION THRU COLUMN TYPICAL ALL COLUMNS



CONSTRUCTION JOINT DETAIL

LONGITUDINAL STEEL NOT SHOWN FOR CLARITY.



END ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

(RIGHT LANE)

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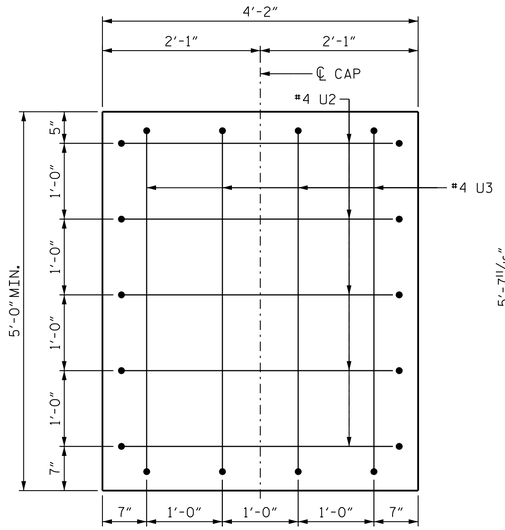
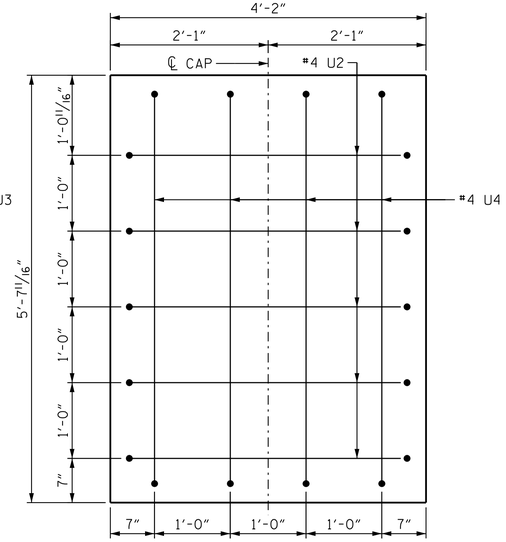
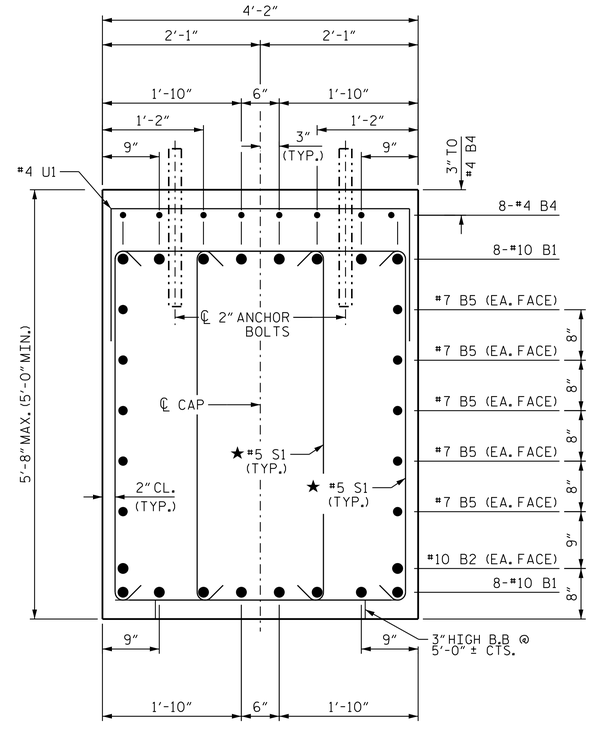


VIEW A-A

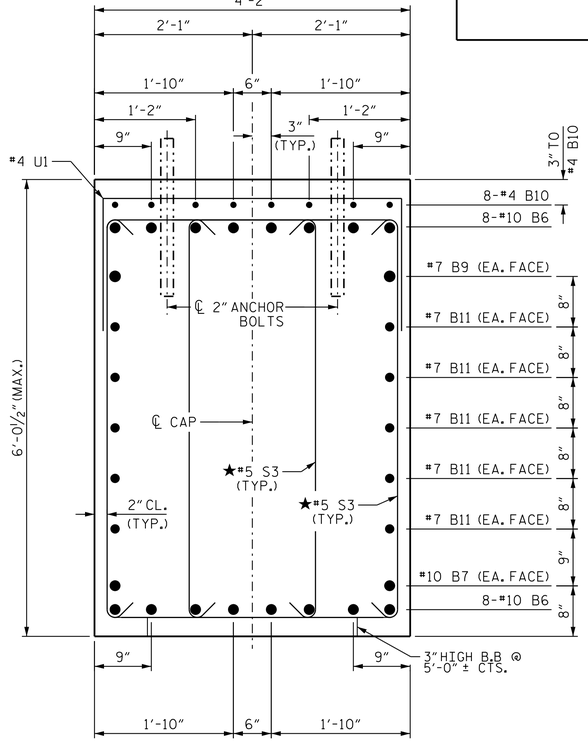


VIEW D-D



SECTION B-B

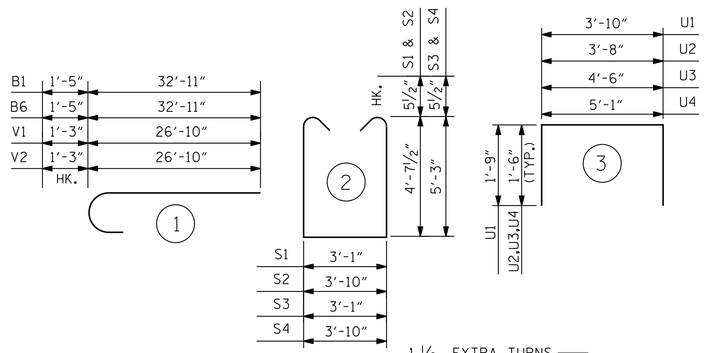
★ INVERT ALTERNATE STIRRUPS



SECTION C-C

★ INVERT ALTERNATE STIRRUPS

BAR TYPES



★★★ THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

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

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	1	34'-4"	2364
B2	2	#10	STR	31'-11"	275
B4	8	#4	STR	12'-7"	68
B5	10	#7	STR	31'-11"	653
M1	32	#9	STR	36'-10"	4008
S1	128	#5	2	13'-3"	1769
S2	16	#5	2	14'-0"	234
U1	38	#4	3	7'-4"	187
U2	5	#4	3	6'-8"	23
U3	4	#4	3	7'-6"	21
V1	32	#9	1	28'-1"	3056
REINFORCING STEEL				LBS.	12,658
SP-1	2	★★★	3	726'-9"	1,517
SP-2	2	★★	4	923'-2"	1,234
SPIRAL COLUMN REINFORCING STEEL				LBS.	2,751
DRILLED PIER CONC. BREAKDOWN:					
POUR #1 DRILLED PIERS				C.Y.	27.4
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				C.Y.	16.0
POUR #3 CAP				C.Y.	25.3
TOTAL CLASS A CONC.				C.Y.	41.3

BENT 1 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	16	#10	1	34'-4"	2364
B7	2	#10	STR	32'-11"	284
B9	2	#8	STR	31'-1"	166
B10	24	#4	STR	8'-8"	139
B11	10	#7	STR	32'-11"	673
B12	8	#10	STR	4'-2"	143
B13	10	#7	STR	3'-4"	69
B14	10	#10	STR	3'-9"	162
M2	32	#9	STR	38'-10"	4226
S3	138	#5	2	14'-6"	2087
S4	16	#5	2	15'-3"	255
U1	46	#4	3	7'-4"	226
U2	5	#4	3	6'-8"	23
U4	4	#4	3	8'-1"	22
V1	32	#9	1	28'-1"	3056
REINFORCING STEEL				LBS.	13,895
SP-3	2	★★★	3	775'-10"	1,619
SP-2	2	★★	4	923'-2"	1,234
SPIRAL COLUMN REINFORCING STEEL				LBS.	2,853
DRILLED PIER CONC. BREAKDOWN:					
POUR #1 DRILLED PIERS				C.Y.	29.2
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				C.Y.	16.0
POUR #3 CAP				C.Y.	30.3
TOTAL CLASS A CONC.				C.Y.	46.3

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: [redacted]

5/10/2023

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JHagenbush

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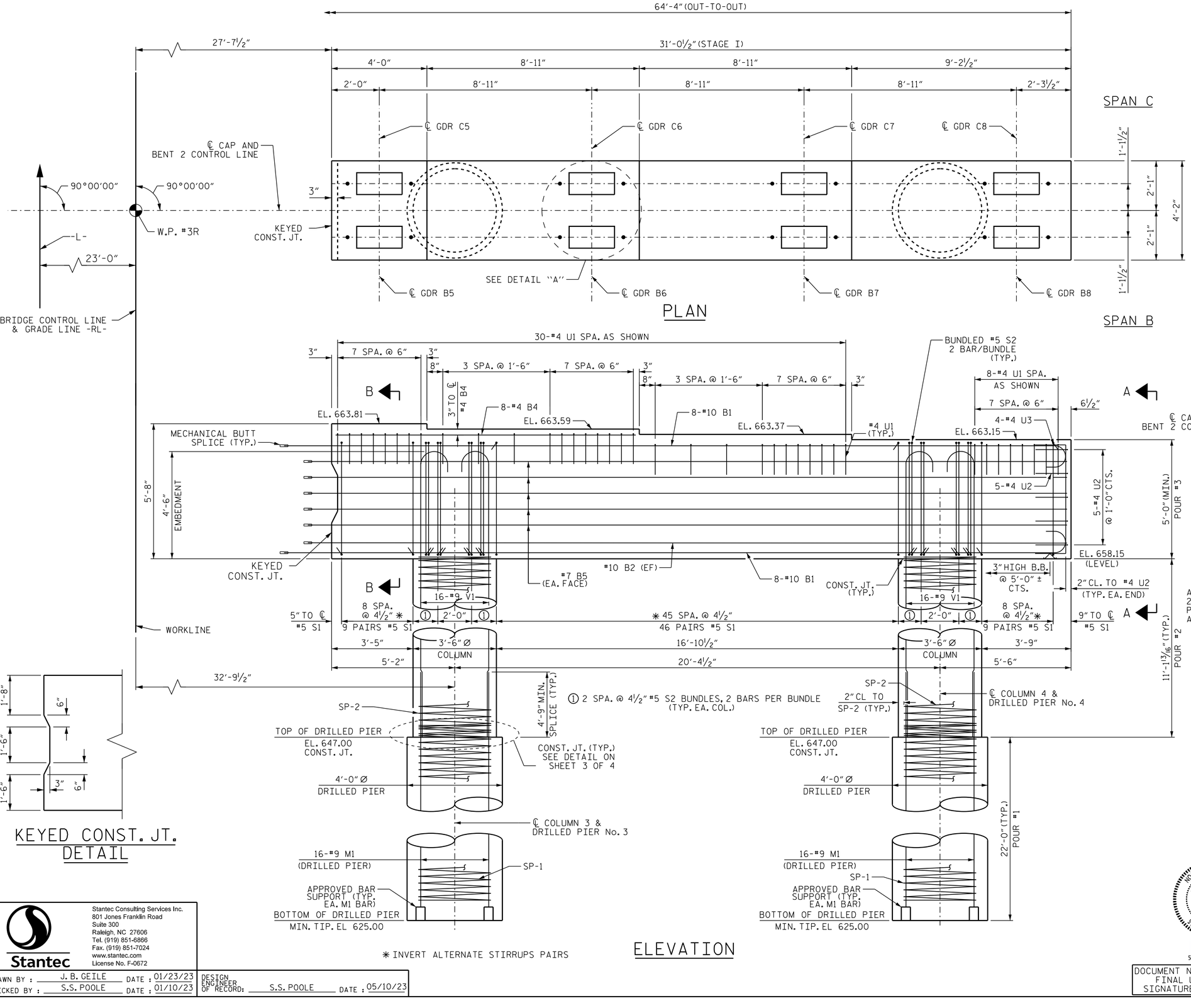

NOTES:

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

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR VIEW A-A, AND SECTION B-B, SEE "BENT 2 DETAILS", SHEET 4 OF 4.

(EF) DENOTES EACH FACE.

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

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

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR PIERS LOCATED IN WATER.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.

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DRAWN BY : J. B. GEILE DATE : 01/23/23
CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/10/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 (STAGE I)

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-44
1			3			TOTAL SHEETS
2			4			56

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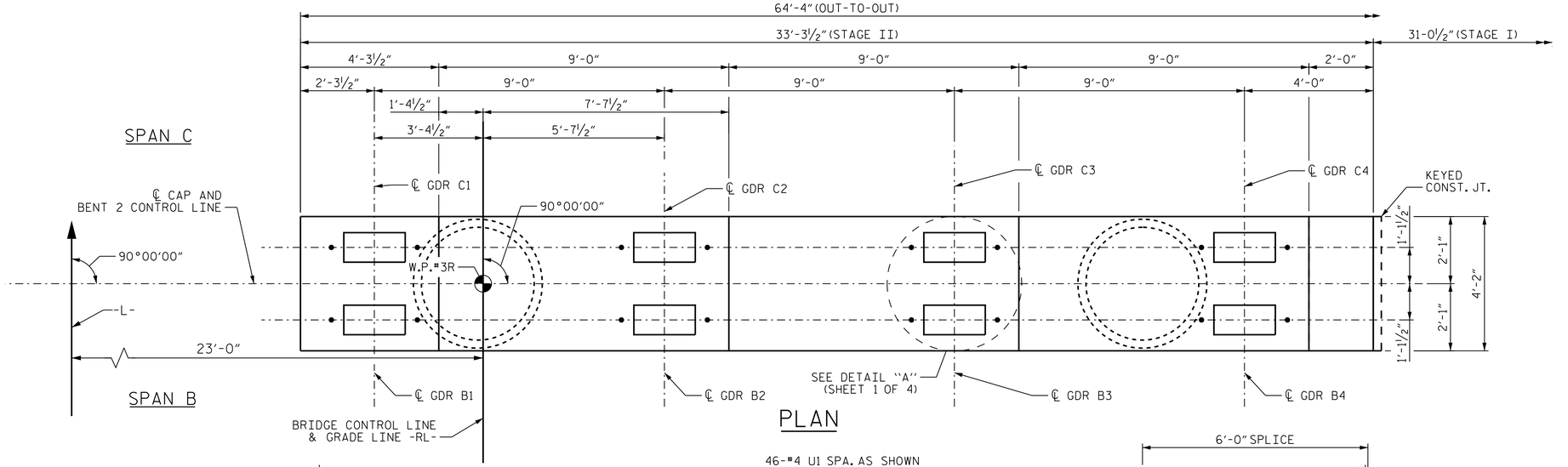
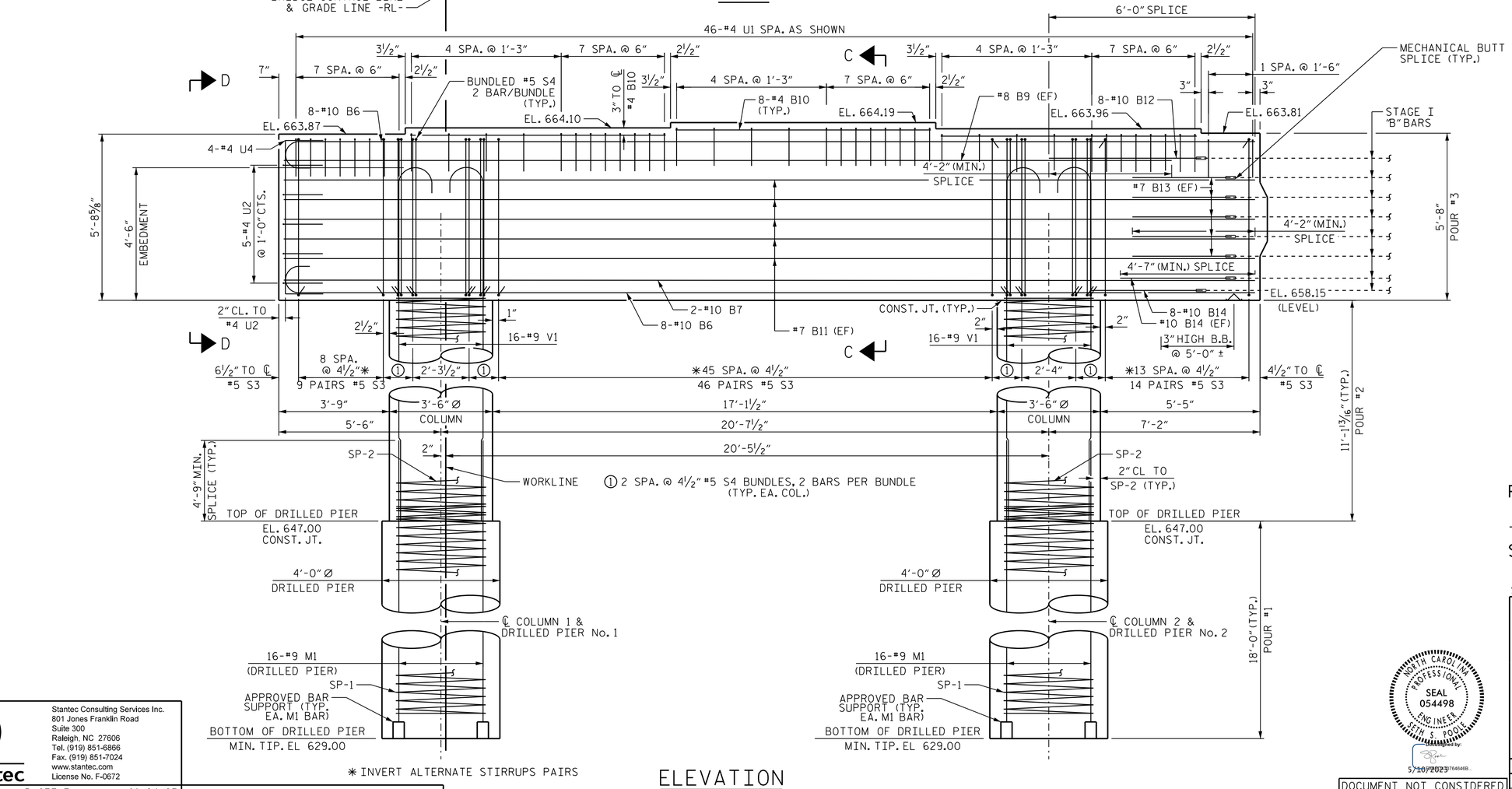
NOTES:

FOR SECTION C-C AND VIEW D-D, SEE "BENT 2 DETAILS", SHEET 4 OF 4.





ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 (STAGE II)

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-45
1			3			TOTAL SHEETS
2			4			56

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CHECKED BY : S.S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by: SETH POOLE
5/10/2023

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JHaggenbush
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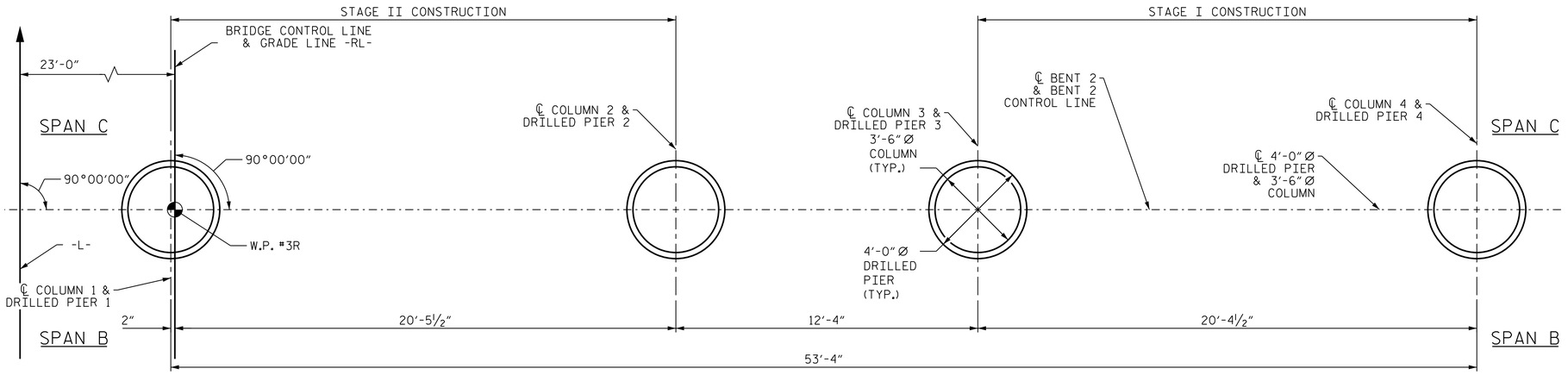
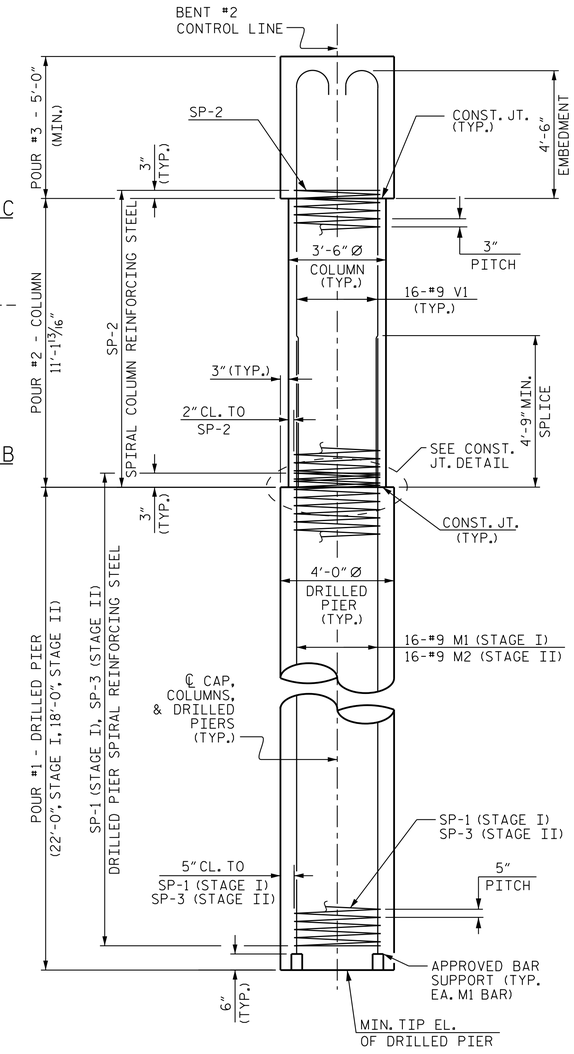
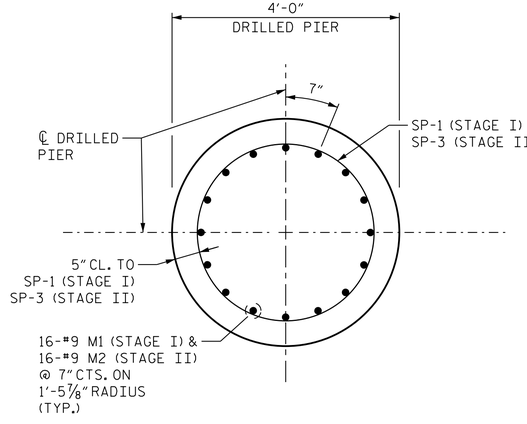


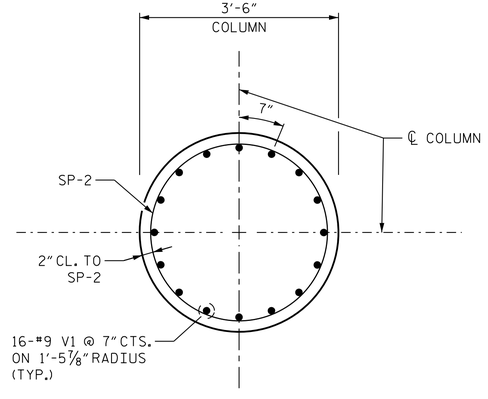
PLAN OF DRILLED PIERS



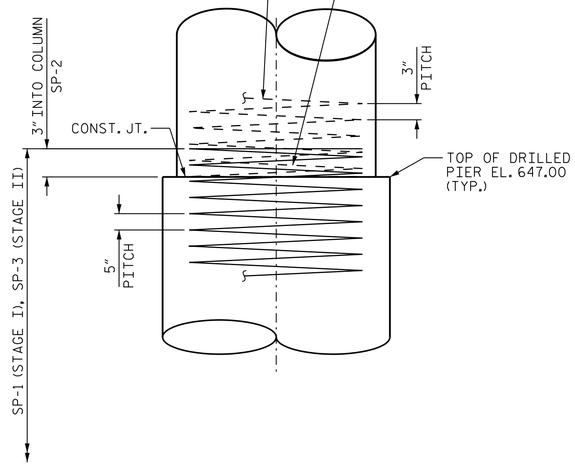
END ELEVATION



SECTION THRU DRILLED PIER TYPICAL ALL DRILLED PIERS



SECTION THRU COLUMN TYPICAL ALL COLUMNS



CONSTRUCTION JOINT DETAIL

LONGITUDINAL STEEL NOT SHOWN FOR CLARITY.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 DETAILS

(RIGHT LANE)

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DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

Signed by: 5/10/2023

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5/10/2023
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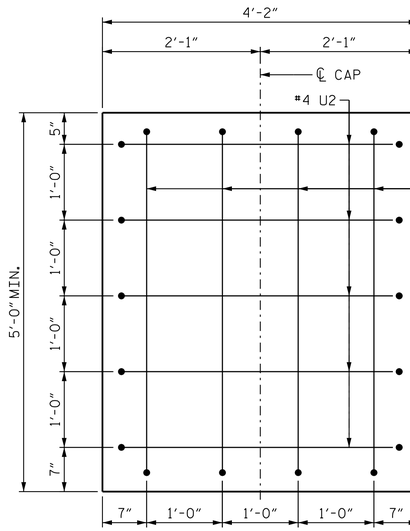
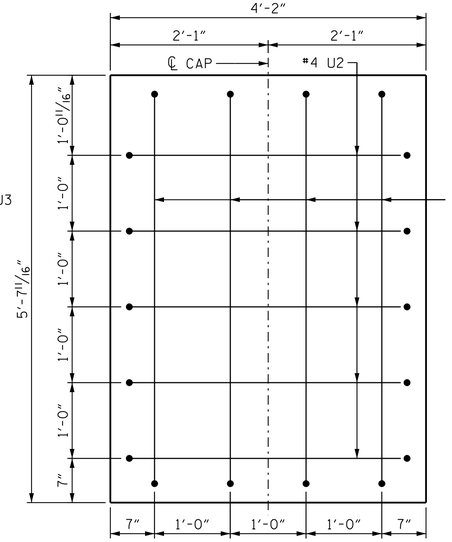
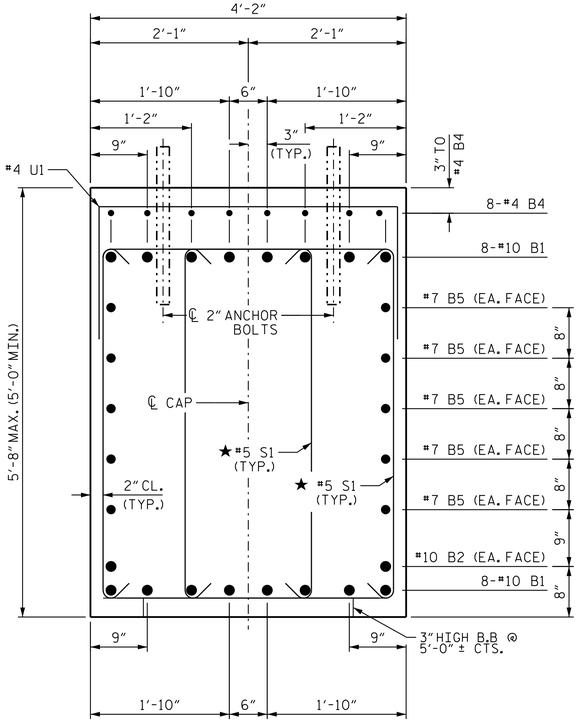


VIEW A-A

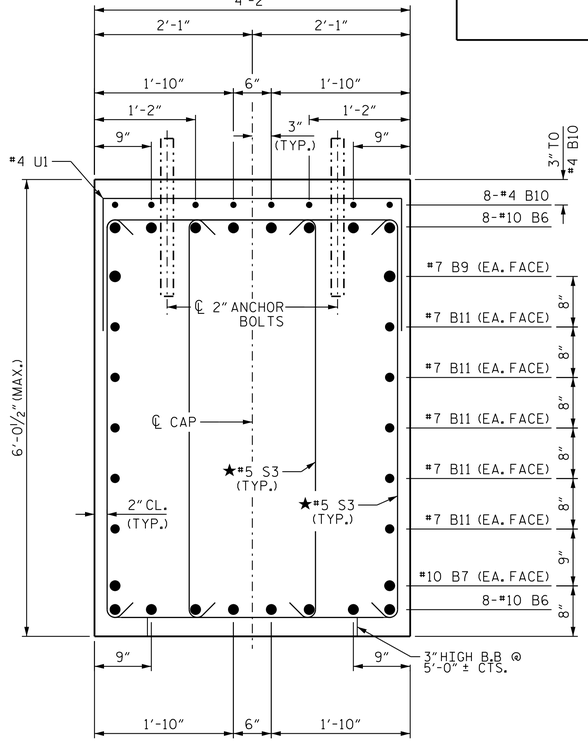


VIEW D-D



SECTION B-B

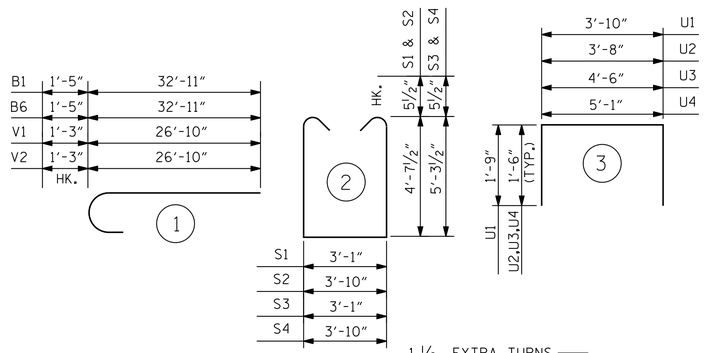
★ INVERT ALTERNATE STIRRUPS

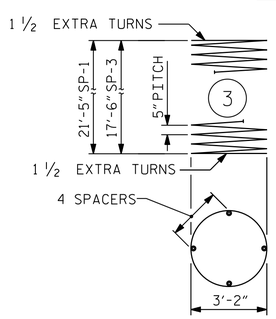


SECTION C-C

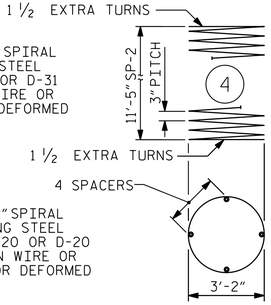
★ INVERT ALTERNATE STIRRUPS

BAR TYPES





★★★ THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.



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

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2 - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	1	34'-4"	2364
B2	2	#10	STR	31'-11"	275
B4	8	#4	STR	12'-7"	68
B5	10	#7	STR	31'-11"	653
M1	32	#9	STR	29'-3"	3182
S1	128	#5	2	13'-3"	1769
S2	16	#5	2	14'-0"	234
U1	38	#4	3	7'-4"	187
U2	5	#4	3	6'-8"	23
U3	4	#4	3	7'-6"	21
V1	32	#9	1	16'-11"	1841

REINFORCING STEEL			LBS.	10,617
SP-1	2	★★★	3	522'-1"	1089
SP-2	2	★★	4	481'-3"	643

SPIRAL COLUMN REINFORCING STEEL	LBS.	1,732
DRILLED PIER CONC. BREAKDOWN:		
POUR #1 DRILLED PIERS	C.Y.	20.4
CLASS A CONCRETE BREAKDOWN		
POUR #2 COLUMNS	C.Y.	8.0
POUR #3 CAP	C.Y.	25.3
TOTAL CLASS A CONC.	C.Y.	33.3

BENT 2 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	16	#10	1	34'-4"	2364
B7	2	#10	STR	32'-11"	284
B9	2	#8	STR	31'-1"	166
B10	24	#4	STR	8'-8"	139
B11	10	#7	STR	32'-11"	673
B12	8	#10	STR	4'-2"	143
B13	10	#7	STR	3'-4"	69
B14	10	#10	STR	3'-9"	162
M2	32	#9	STR	25'-3"	2747
S3	138	#5	2	14'-7"	2099
S4	16	#5	2	15'-3"	255
U1	46	#4	3	7'-4"	226
U2	5	#4	3	6'-8"	23
U4	4	#4	3	8'-1"	22
V1	32	#9	1	16'-11"	1841

REINFORCING STEEL			LBS.	11,213
SP-3	2	★★★	3	428'-1"	893
SP-2	2	★★	4	481'-3"	643

SPIRAL COLUMN REINFORCING STEEL	LBS.	1,536
DRILLED PIER CONC. BREAKDOWN:		
POUR #1 DRILLED PIERS	C.Y.	16.7
CLASS A CONCRETE BREAKDOWN		
POUR #2 COLUMNS	C.Y.	8.0
POUR #3 CAP	C.Y.	30.3
TOTAL CLASS A CONC.	C.Y.	38.3

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 DETAILS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Sealed by: SETH S. POOLE 5/10/2023

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2			4			56

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DRAWN BY : J. B. GEILE DATE : 01/24/23
CHECKED BY : S.S. POOLE DATE : 01/10/23

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

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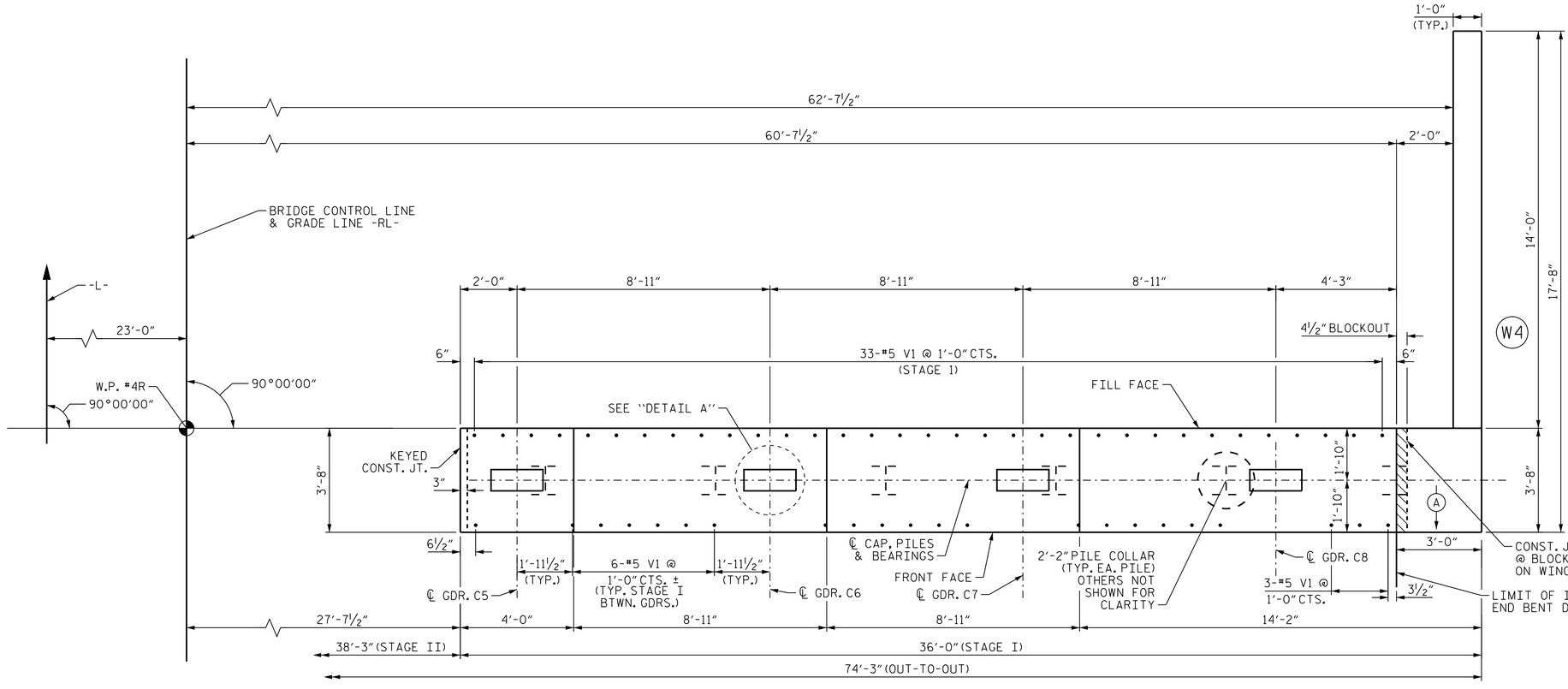


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 2, DETAILS - WING WALLS" SHEET. 3 OF 5.

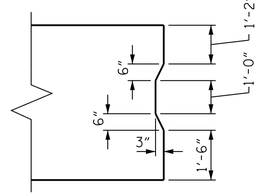
(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

FOR SECTIONS A-A AND B-B, SEE END BENT 2 DETAILS, SHEET 4 OF 5.

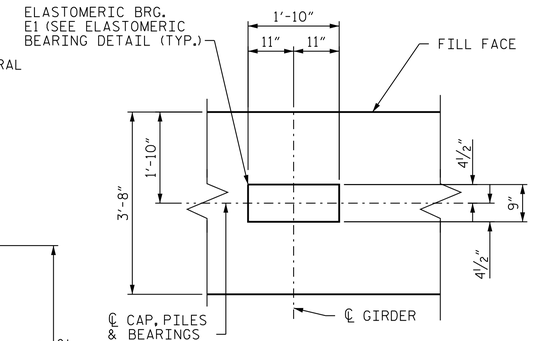
(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 2 WING WALL DETAILED, SHEET. 3 OF 5.

(B) #5 V1 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT



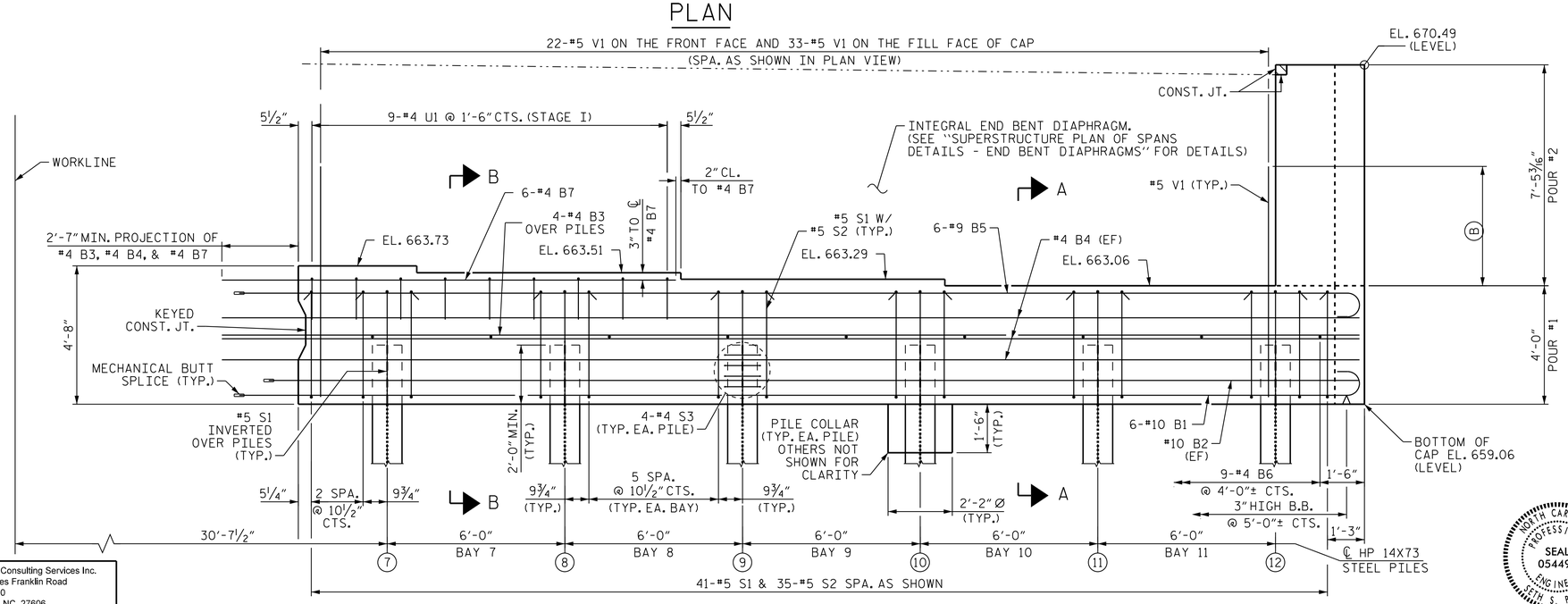
KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING



ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 (STAGE I)

(RIGHT LANE)

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DocuSigned by: 5/10/2023

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1			3			TOTAL SHEETS
2			4			56

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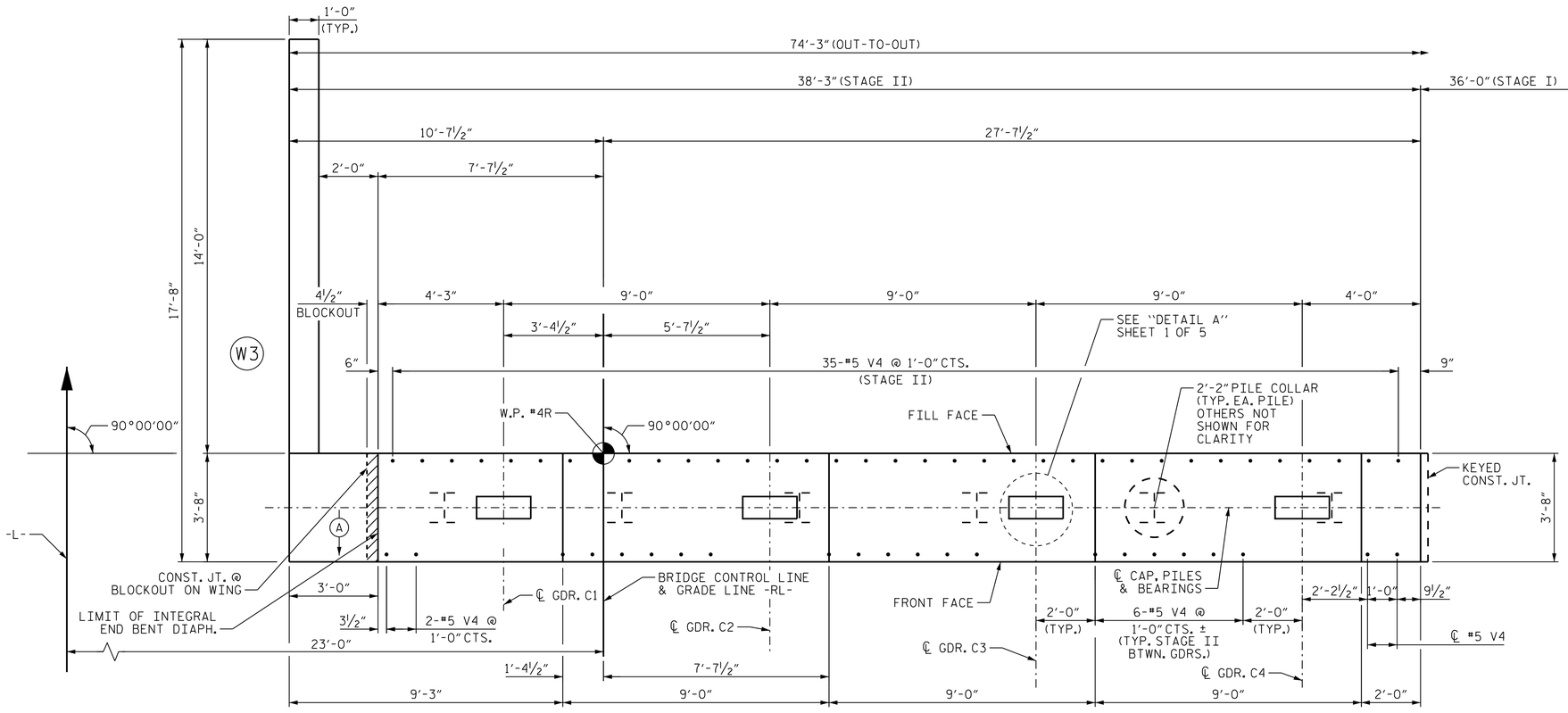


PLAN

NOTES

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHEET. 3 OF 5.

(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

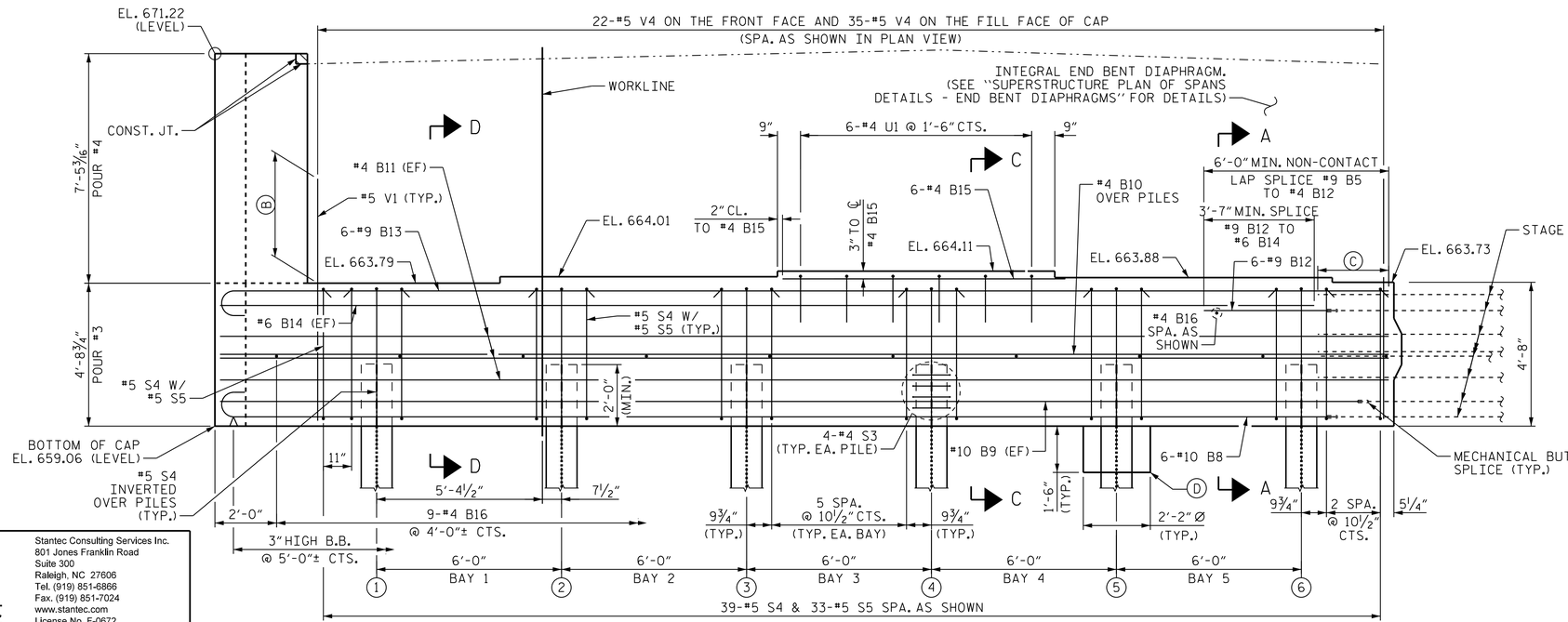
FOR SECTIONS C-C AND D-D, SEE END BENT 1 DETAILS, SHEET 5 OF 5.

(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 1 WING WALL DETAILS, SHEET. 3 OF 5.

(B) #5 V4 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT.

(C) 2'-5" MIN. SPLICE LENGTH (TYP.).

(D) PILE COLLAR (TYP. EA. PILE) OTHERS NOT SHOWN FOR CLARITY.



ELEVATION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 (STAGE II)

(RIGHT LANE)

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DRAWN BY : J. B. GEILE DATE : 01/04/23
CHECKED BY : S.S. POOLE DATE : 01/10/23

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Docusigned by: 5/10/2023

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2			4			56

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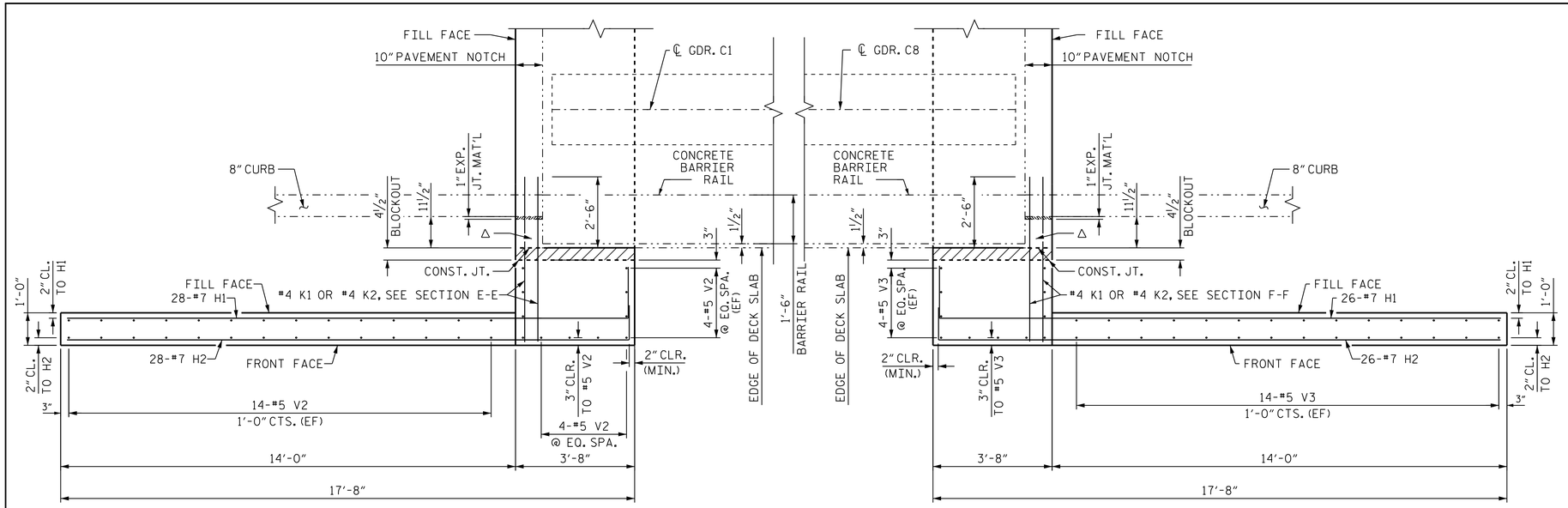
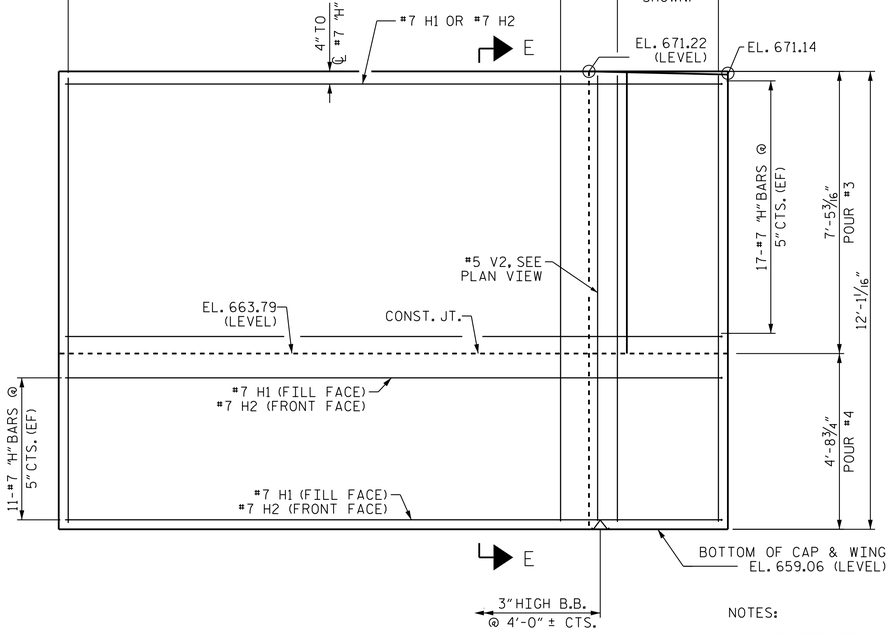
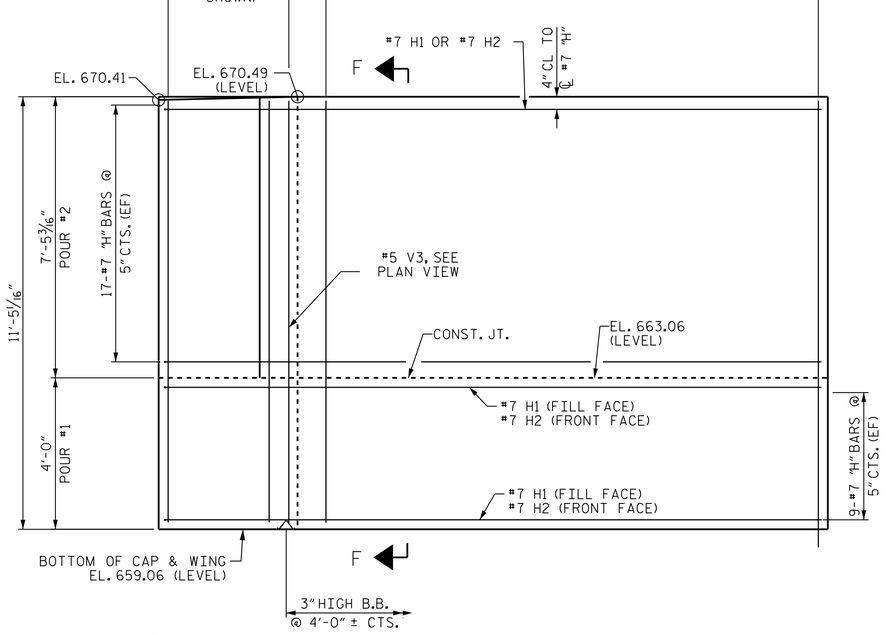


PLAN OF LEFT WING (W3)

PLAN OF RIGHT WING (W4)





ELEVATION OF LEFT WING (W3)

ELEVATION OF RIGHT WING (W4)

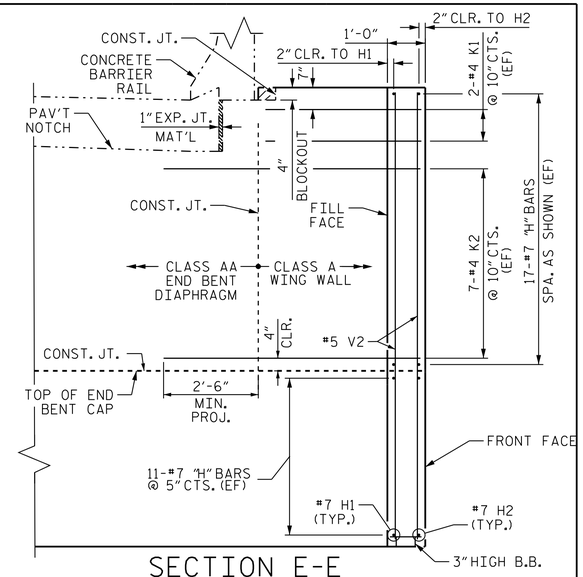
NOTES:

△ AREA BETWEEN APPROACH SLAB CURB AND BLOCKOUT SHALL MATCH THE FINISHED SURFACE OF THE BRIDGE DECK.

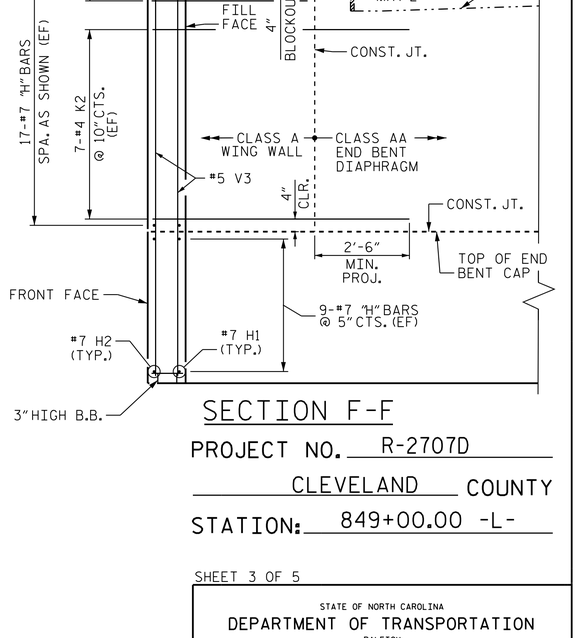
(EF) DENOTES EACH FACE.

CONCRETE TO BE POURED IN THE HATCHED AREA TO MATCH THE TOP OF THE CURB AND THE INTEGRAL END BENT WING ELEVATION.

THE CONCRETE IN THE HATCHED AREA OF THE WING IS TO BE POURED AFTER THE JOINT BETWEEN THE BRIDGE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND IF SLIP FORMING IS USED, THE BARRIER HAS BEEN CAST.



SECTION E-E



SECTION F-F

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

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CHECKED BY : S.S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

SEAL 054498 ENGINEER S. S. POOLE NORTH CAROLINA PROFESSIONAL
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 WING DETAILS

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-50
1			3			TOTAL SHEETS
2			4			56

JHagenbush
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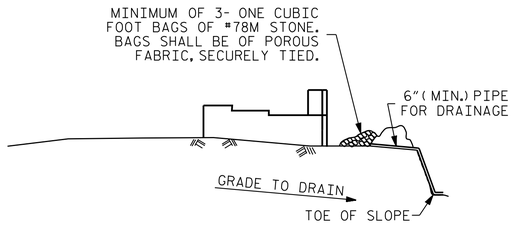
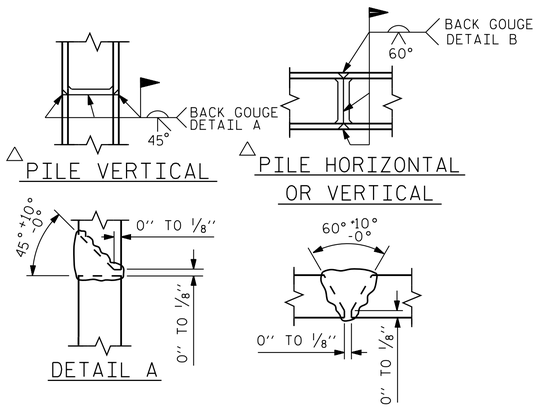


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

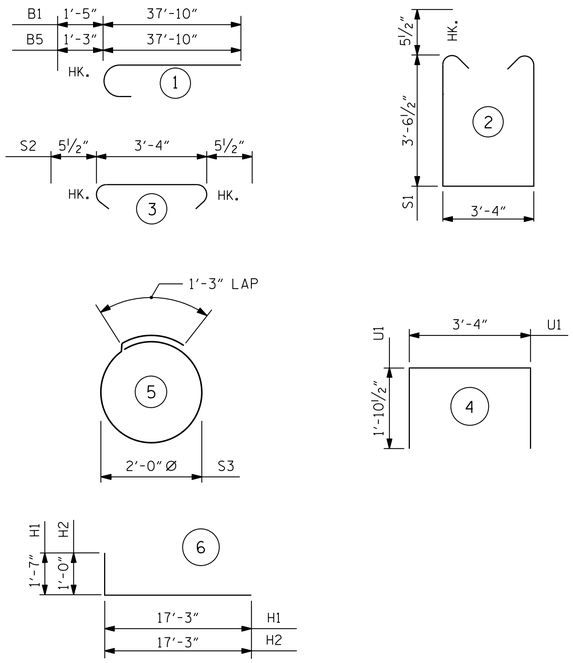
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



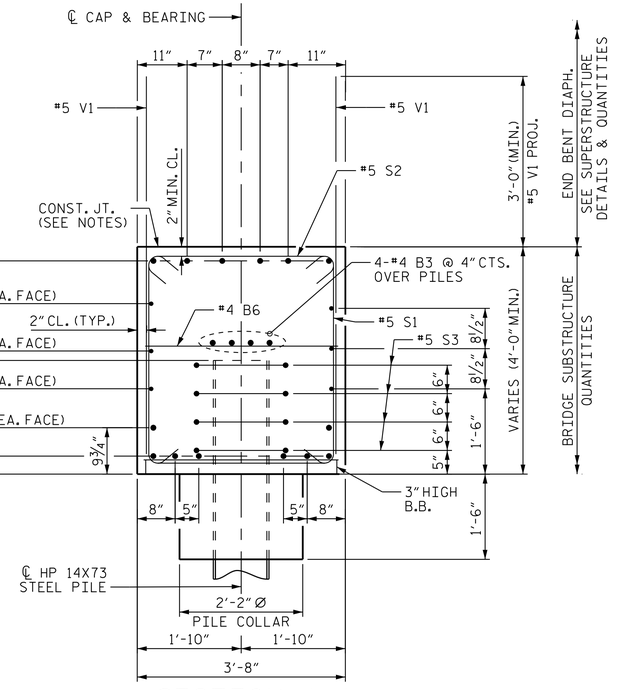
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2 - STAGE I

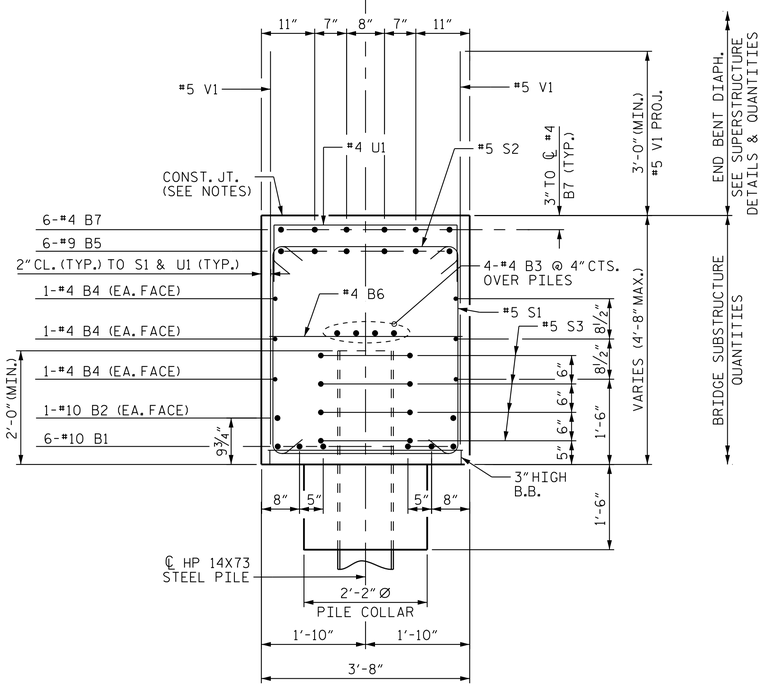
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	39'-3"	1014
B2	2	#10	STR	36'-10"	317
B3	4	#4	STR	38'-5"	103
B4	6	#4	STR	38'-5"	154
B5	6	#9	1	39'-1"	798
B6	9	#4	STR	3'-4"	21
B7	6	#4	STR	15'-4"	62
H1	26	#7	6	18'-10"	1001
H2	26	#7	6	18'-3"	970
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S1	41	#5	2	11'-4"	485
S2	35	#5	3	4'-3"	156
S3	24	#4	5	7'-7"	122
U1	9	#4	4	7'-1"	43
V1	55	#5	STR	7'-5"	426
V3	39	#5	STR	11'-0"	448

REINFORCING STEEL	LBS. 6,177
CLASS A CONCRETE BREAKDOWN:	
POUR#1: CAP, COLLARS, & WINGS	C.Y. 24.2
POUR#2: UPPER WINGS	C.Y. 6.9
CLASS A CONCRETE TOTAL	C.Y. 31.1



SECTION A-A

SEE "END BENT 2", SHEET 1 OF 5.



SECTION B-B

SEE "END BENT 2", SHEET 1 OF 5.

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF ¼", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS (STAGE I)

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

Signed by: 5/10/2023

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2			4			56

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JHagenbush
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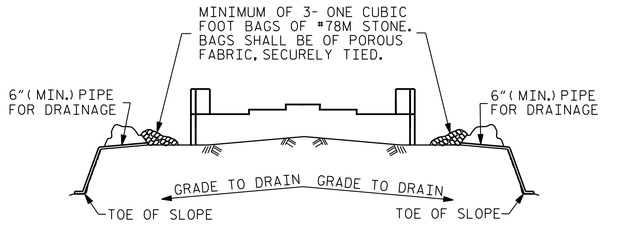

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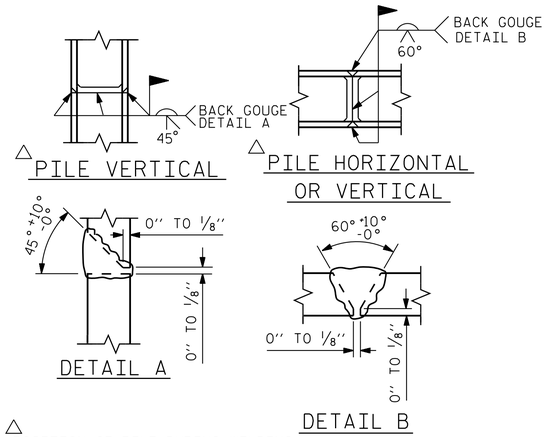
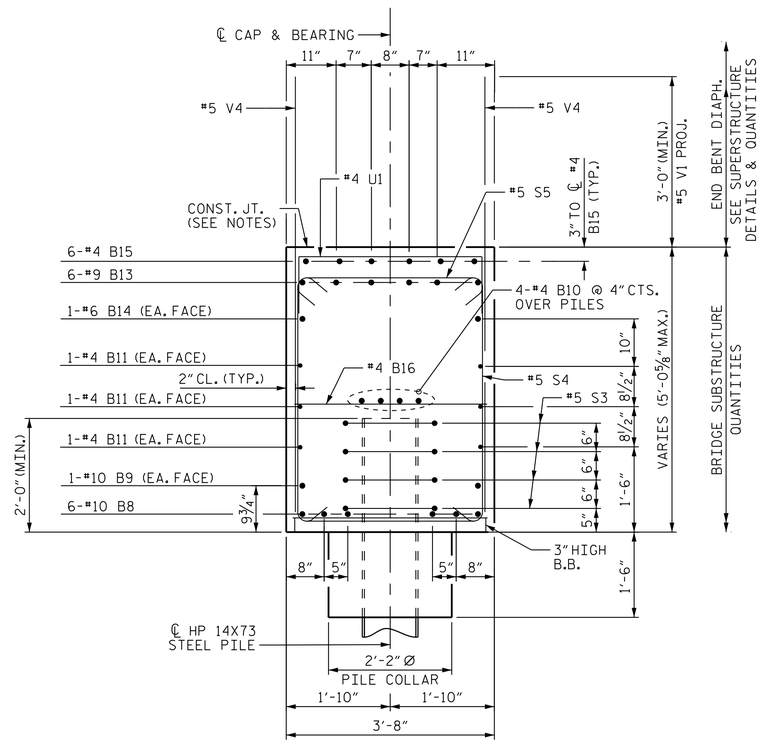
TEMPORARY DRAINAGE AT END BENT



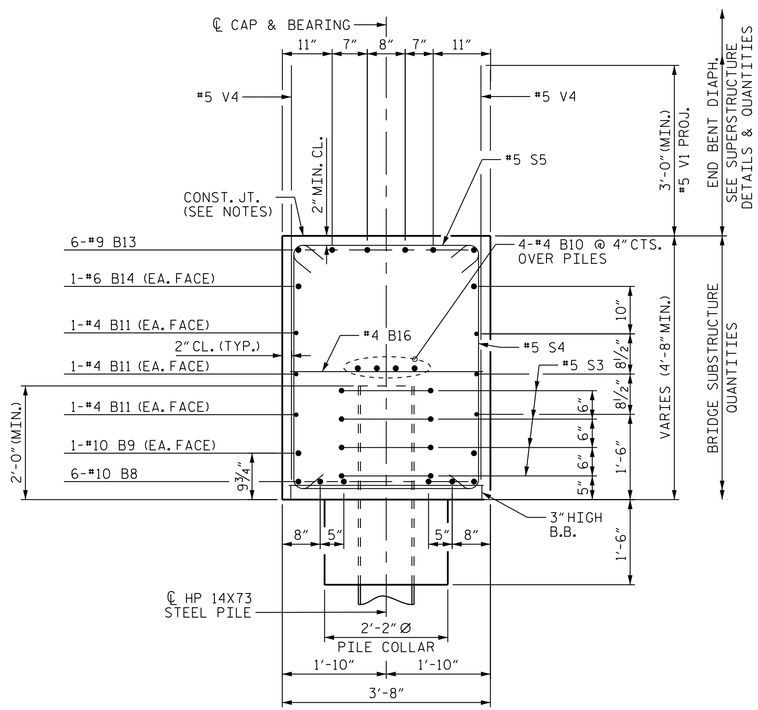
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SECTION C-C

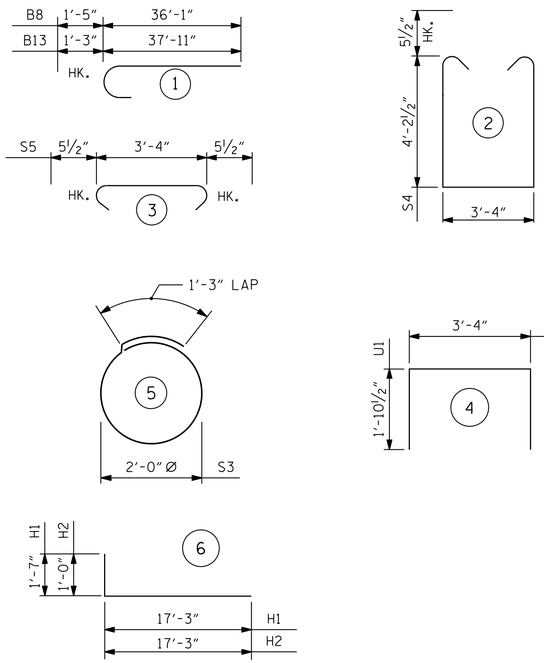
SEE "END BENT 2", SHEET 2 OF 5.



SECTION D-D

SEE "END BENT 2", SHEET 2 OF 5.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2 - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B8	6	#10	1	37'-6"	969
B9	2	#10	STR	37'-1"	320
B10	4	#4	STR	37'-11"	102
B11	6	#4	STR	37'-11"	152
B12	6	#9	STR	4'-2"	85
B13	6	#9	1	39'-2"	799
B14	2	#6	STR	35'-6"	107
B15	6	#4	STR	8'-6"	35
B16	10	#4	STR	3'-4"	23
H1	28	#7	6	18'-10"	1001
H2	28	#7	6	18'-3"	970
K1	4	#4	STR	2'-3"	7
K2	14	#4	STR	5'-4"	50
S3	24	#4	5	7'-7"	122
S4	41	#5	2	12'-8"	542
S5	35	#5	3	4'-3"	156
U1	6	#4	4	7'-1"	29
V2	39	#5	STR	11'-8"	475
V4	57	#5	STR	7'-9"	461

REINFORCING STEEL	LBS. 6,405
CLASS A CONCRETE BREAKDOWN:	
POUR#3: CAP, COLLARS, & WINGS	C.Y. 29.1
POUR#4: UPPER WINGS	C.Y. 6.9
CLASS A CONCRETE TOTAL	C.Y. 36.0

NOTES

TOP SURFACE AREAS OF THE END BENT CAP SHALL BE KEPT CLEAN AND FREE OF LAITANCE.

ROUGH FLOAT AND ROUGHEN THE TOP OF THE END BENT CAP UNDER END BENT DIAPHRAGM TO PROVIDE MIN. SURFACE AMPLITUDE OF 1/4", EXCEPT UNDER BEARING AREAS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS (STAGE II)

(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-52
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/10/2023

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DRAWN BY : J. B. GEILE DATE : 01/08/23
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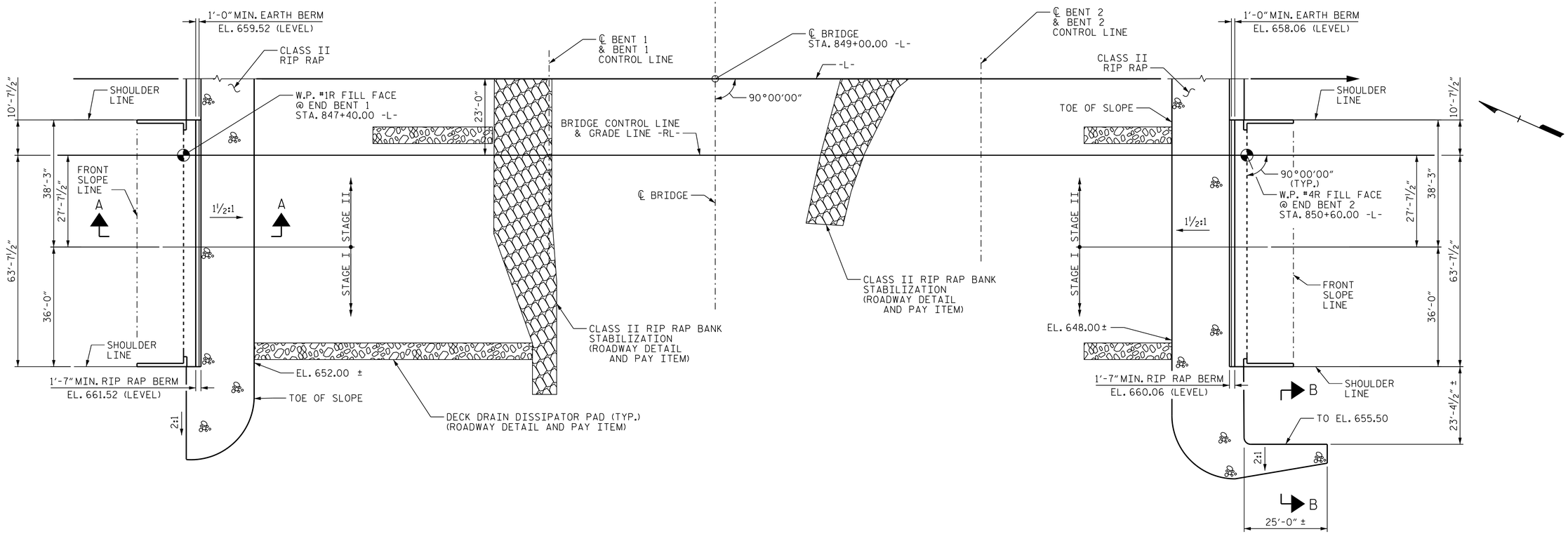
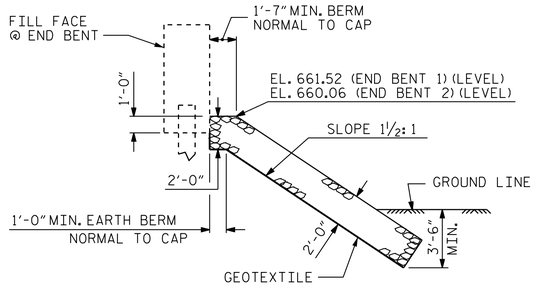
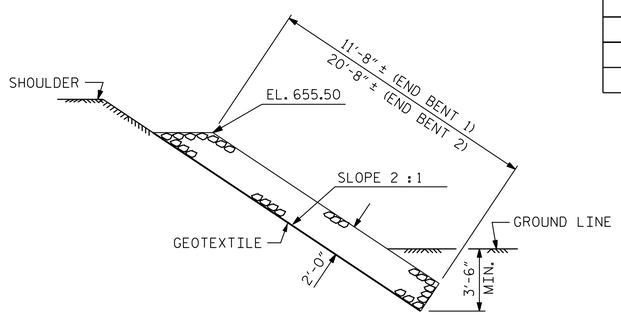




SECTION A-A



SECTION B-B

ESTIMATED QUANTITIES		
BRIDGE @ STA. 849+00.00 -L- (RT.)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT #1 - STAGE I	122	135
END BENT #1 - STAGE II	115	130
END BENT #1 - TOTAL	237	265
END BENT #2 - STAGE I	229	255
END BENT #2 - STAGE II	138	155
END BENT #2 - TOTAL	367	410
TOTAL	604	675

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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CHECKED BY : S. S. POOLE DATE : 03/03/23
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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Digitally signed by:
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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

SLOPE PROTECTION RIP RAP

REVISIONS						SHEET NO.
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2			4			56

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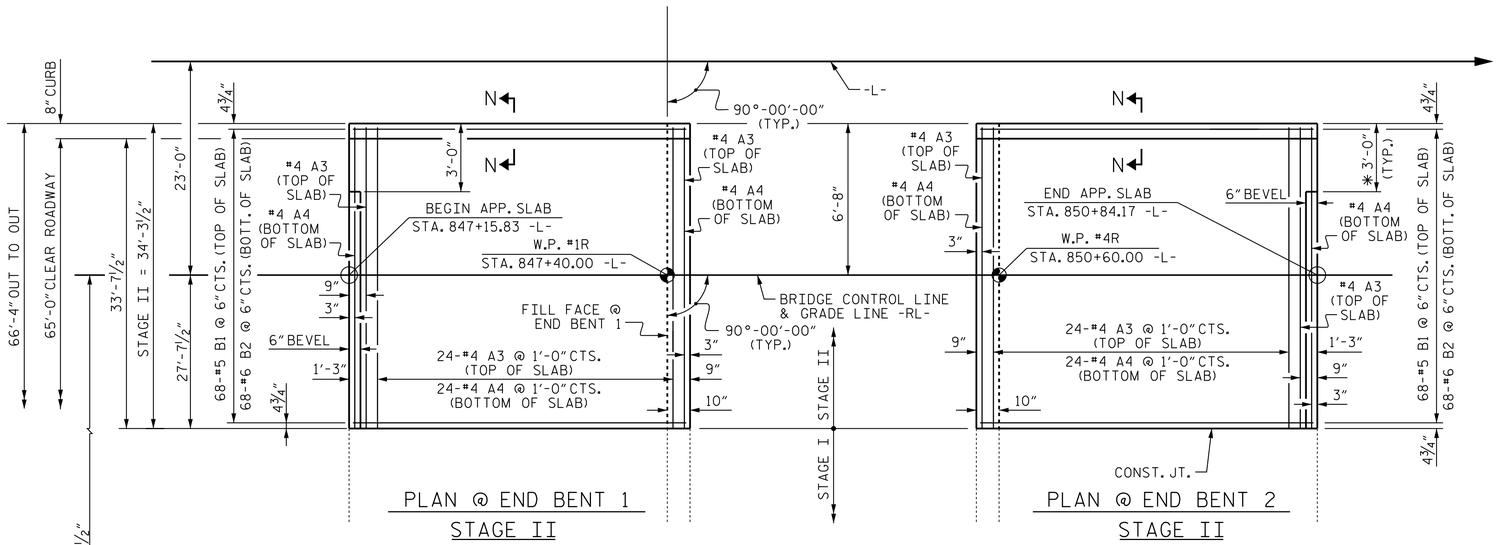
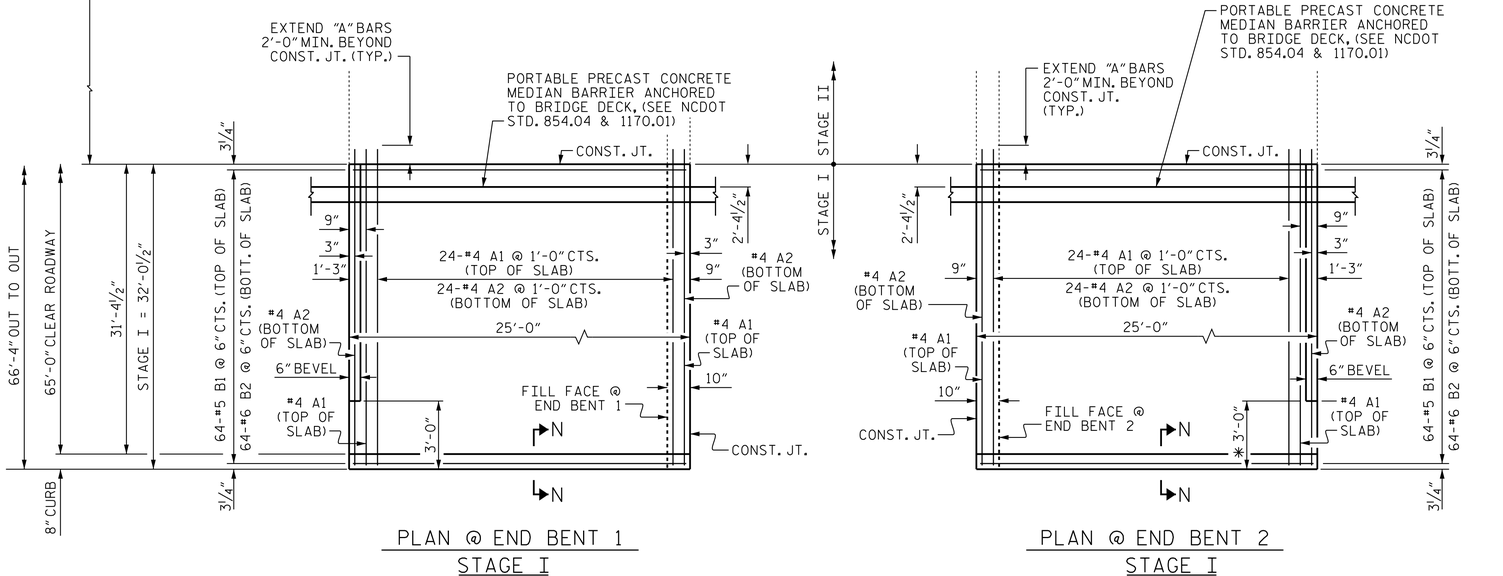


DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* TO MATCH SHOULDER BERM GUTTER @ END BENT. SEE ROADWAY PLANS.



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
* TO MATCH SHOULDER BERM GUTTER @ END BENT. SEE ROADWAY PLANS.

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 CONTRACTORS 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 3 OF 3 FOR DETAILS AND NOTES.

STAGE I BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	33'-11"	589
A2	26	#4	STR	33'-11"	589
* B1	64	#5	STR	24'-1"	1608
B2	64	#6	STR	24'-7"	2364
REINFORCING STEEL				LBS.	2,953
* EPOXY COATED REINFORCING STEEL				LBS.	2,197
CLASS AA CONCRETE				C.Y.	34.6

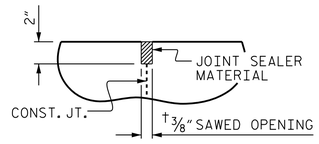
STAGE II BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

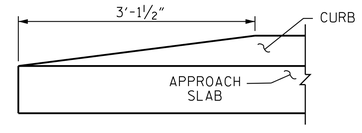
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	26	#4	STR	33'-10"	588
A4	26	#4	STR	33'-10"	588
* B1	68	#5	STR	24'-1"	1709
B2	68	#6	STR	24'-7"	2511
REINFORCING STEEL				LBS.	3,099
* EPOXY COATED REINFORCING STEEL				LBS.	2,297
CLASS AA CONCRETE				C.Y.	37.0

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

SECTION N-N



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/10/2023

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ASSEMBLED BY : J.B. GEILE DATE : 01/23/23
CHECKED BY : S.S. POOLE DATE : 01/25/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

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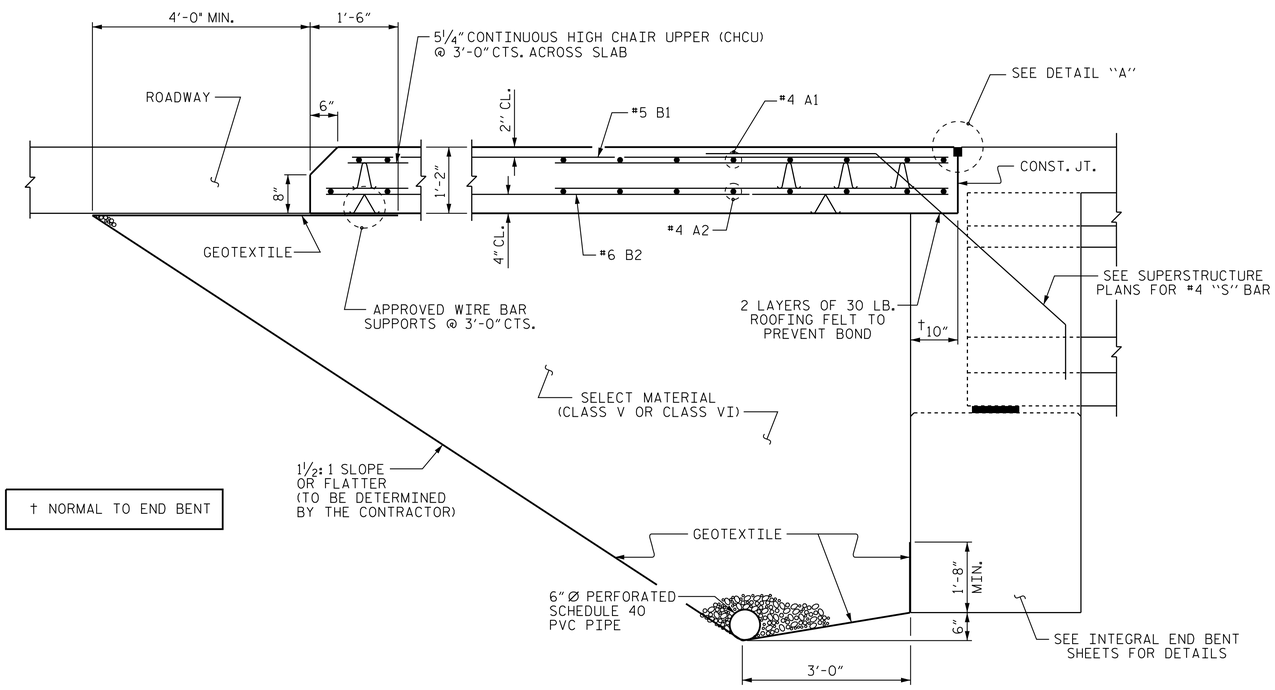
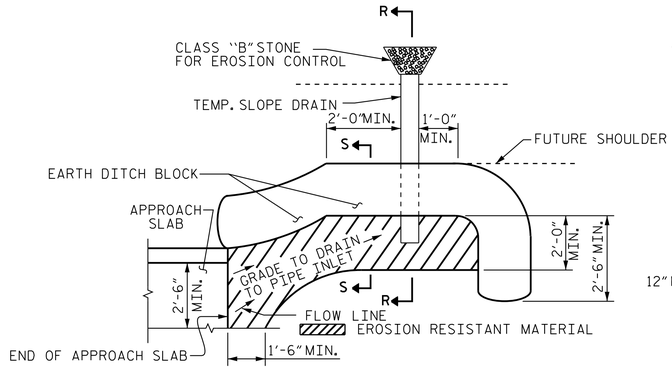


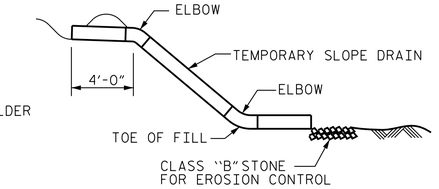
SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

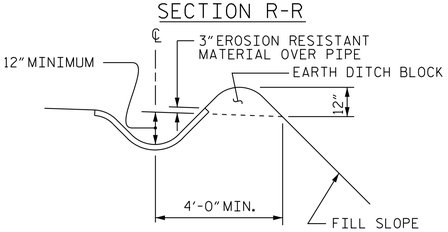


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



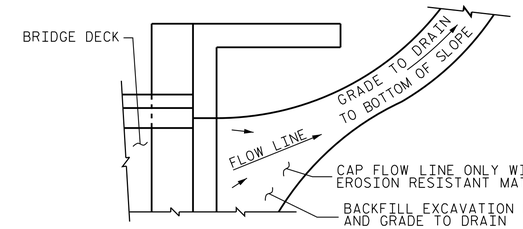
SECTION R-R



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

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

(RIGHT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Seth S. Poole
5/10/2023

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ASSEMBLED BY : J.B. GEILE DATE : 01/09/23
CHECKED BY : S.S. POOLE DATE : 01/25/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

JHagenbush
5/10/2023
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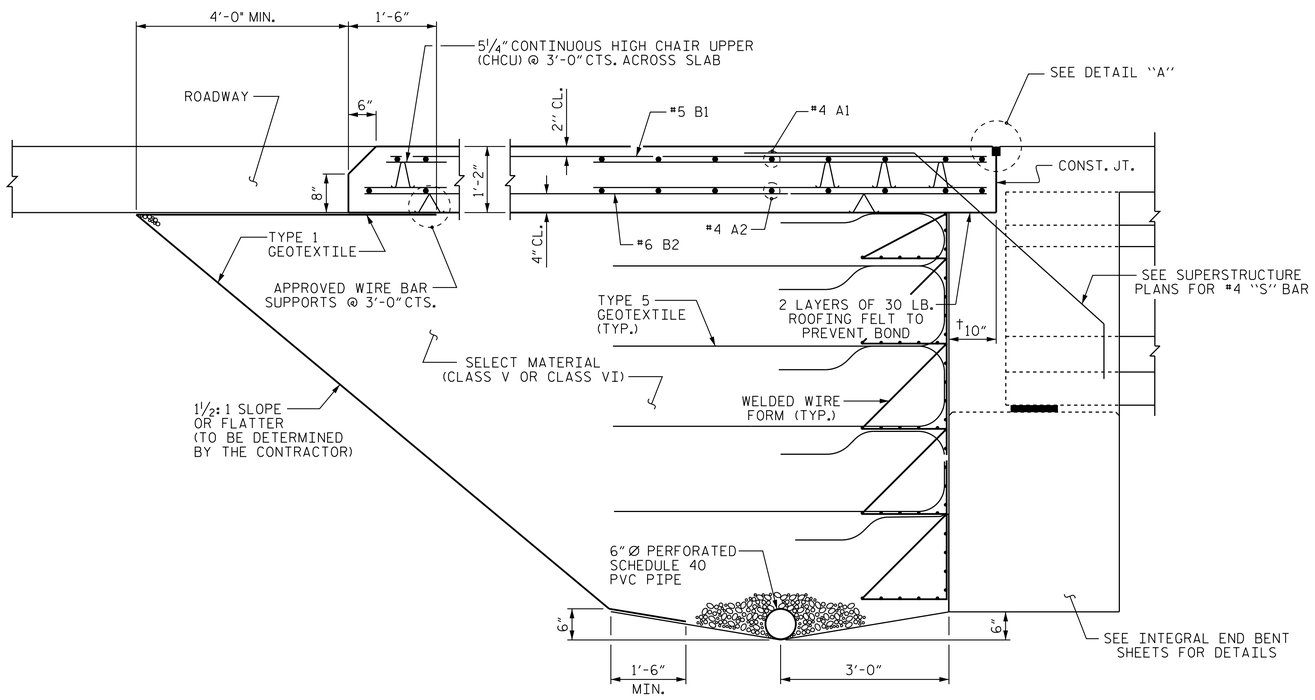
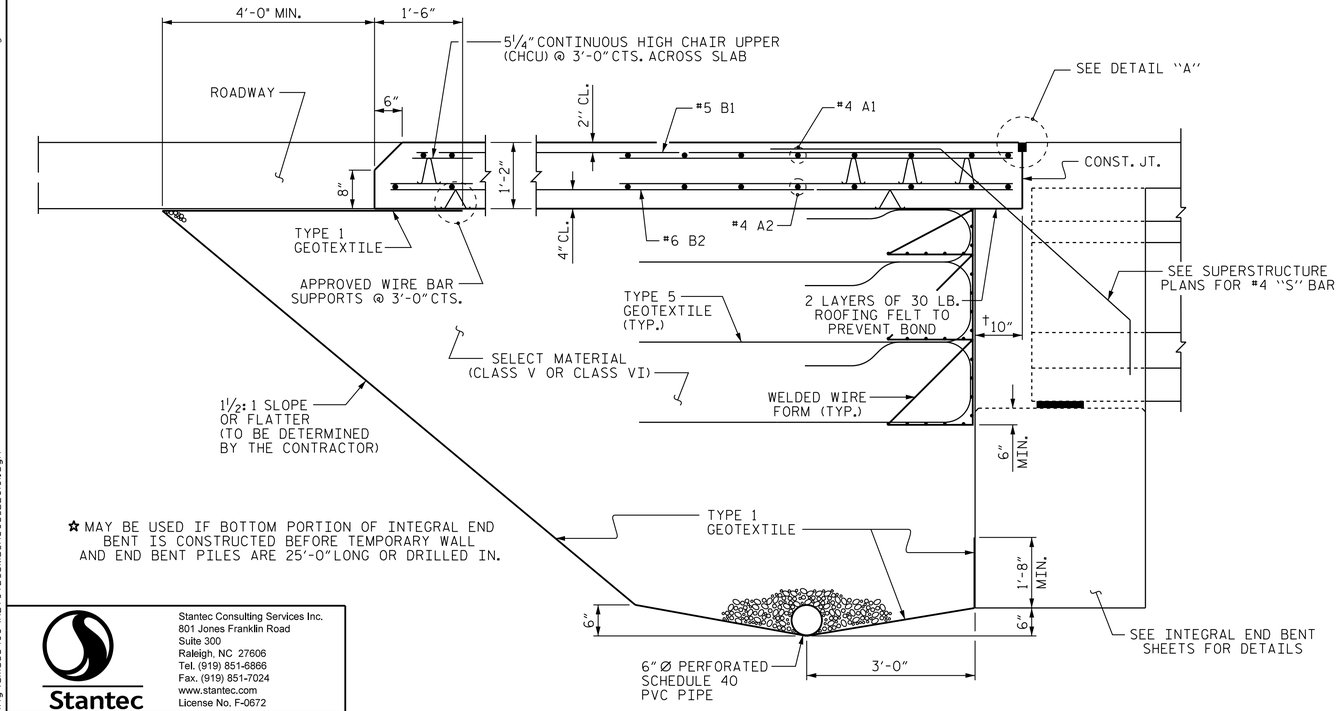


SECTION THRU SLAB

(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)

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.

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ASSEMBLED BY : J.B. GEILE DATE : 01/09/23
CHECKED BY : J.T. KELVINGTON DATE : 05/03/23

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/10/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Digitally signed by:
5/10/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

(RIGHT LANE)

REVISIONS						SHEET NO.
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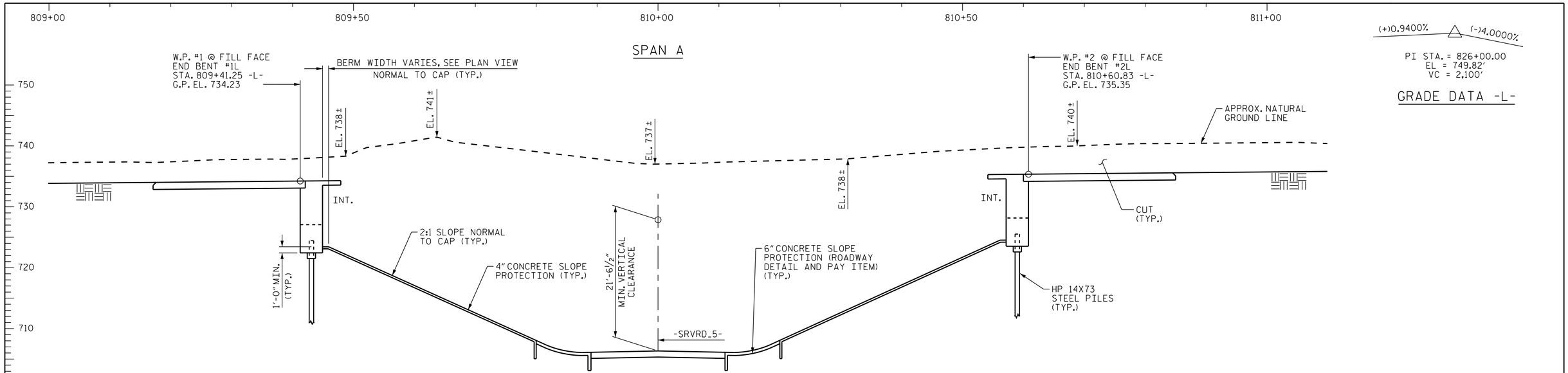
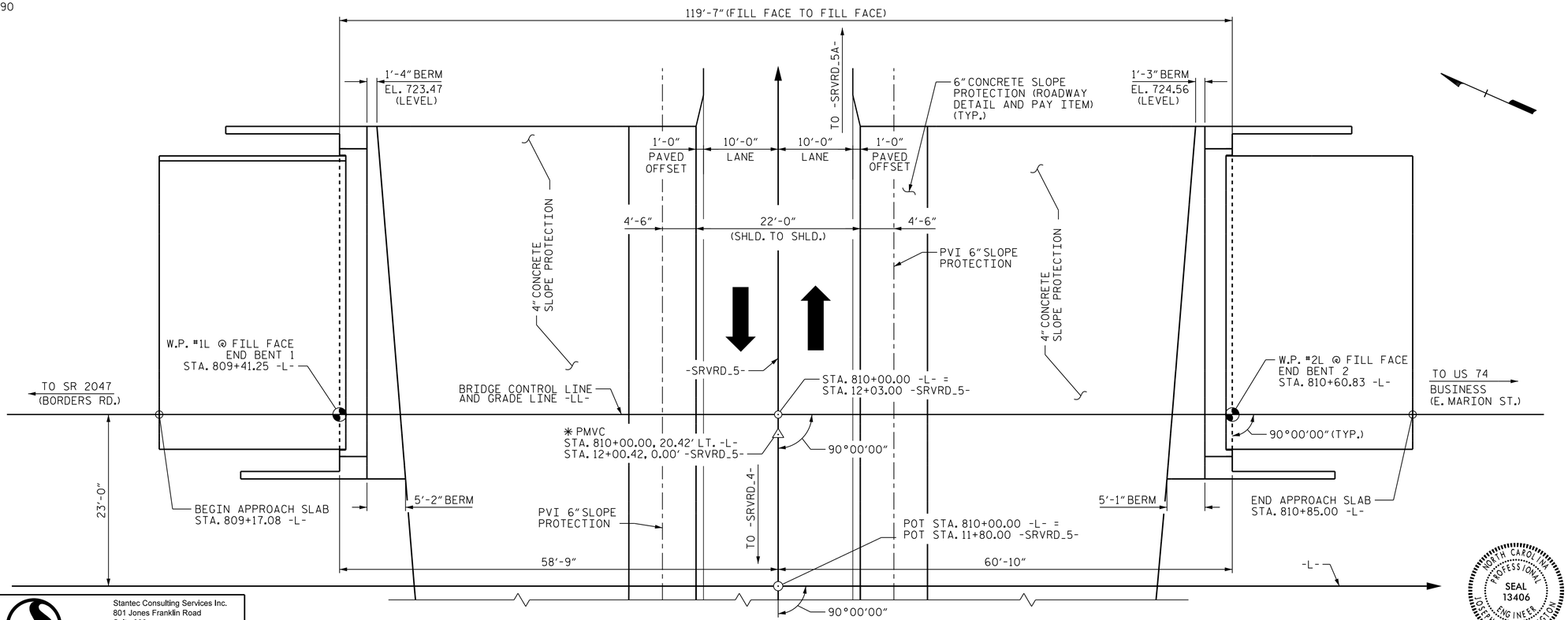


SECTION ALONG -L- (LEFT LANE)

SECTION TAKEN AT RIGHT ANGLE TO END BENTS



PLAN

(PILES NOT SHOWN FOR CLARITY)

✳ PMVC DENOTES PT. OF
MIN. VERTICAL CLEARANCE

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DRAWN BY : N. D'AIUTO	DATE : 05/02/18	DESIGN ENGINEER OF RECORD: J.T. KELVINGTON	DATE : 04/21/23
CHECKED BY : J.T. KELVINGTON	DATE : 12/05/22		

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON
Signed by: Joseph T. Kelvington
4/21/2023

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PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-
11+80.00 -SRVRD_5-

SHEET 1 OF 3 BRIDGE #220492

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 74 BYPASS
OVER -SRVRD_5- BETWEEN
SR 2047 (BORDERS RD.) AND
US 74 BUSINESS (E. MARION ST.)

(LL)

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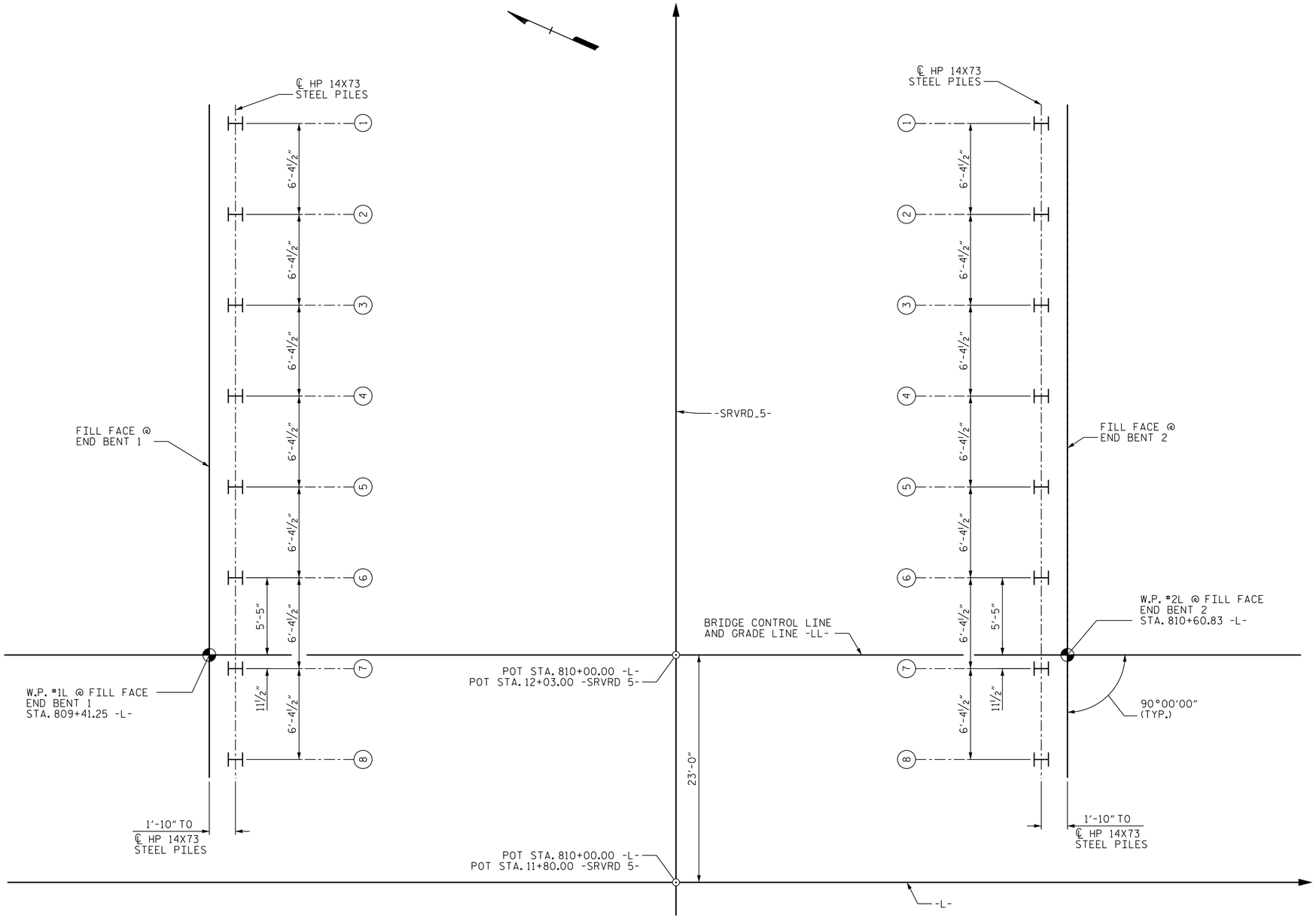

END BENT 1

END BENT 2

FOUNDATION LAYOUT

ALL SUBSTRUCTURE WORK LINES PASS THROUGH WORK POINTS.

(#) - DENOTES PILE NUMBER

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CHECKED BY : J.T. KELVINGTON	DATE : 12/05/22		

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON

Signed by: Joseph T. Kelvington
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CLEVELAND COUNTY

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SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

FOUNDATION LAYOUT

FOR BRIDGE ON US 74 BYPASS
OVER -SRVRD_5- BETWEEN
SR 2047 (BORDERS RD.) AND
US 74 BUSINESS (E. MARION ST.)

(LL)

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SUMMARY OF PILE INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PILE TONS	PILE CUT-OFF (TOP OF PILE) ELEVATION FT	ESTIMATED PILE LENGTH PER PILE FT	SCOUR CRITICAL ELEVATION FT	MIN. PILE TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED DRIVING RESISTANCE (RDR)** PER PILE TONS	TOTAL PILE REDRIVES QUANTITY EACH	PREDRILLING LENGTH PER PILE LIN FT	PREDRILLING ELEVATION (ELEV NOT TO PREDRILL BELOW) FT	MAXIMUM PREDRILLING DIA INCHES	PILE EXCAVATION (BOTTOM OF HOLE) ELEV FT	PILE EXC NOT IN SOIL PER PILE LIN FT	PILE EXC IN SOIL PER PILE LIN FT
END BENT 1, PILES 1-4	135	724.47	20			225					708.4	7.2	6.8
END BENT 1, PILES 5-8	135	724.47	25			225					702.4	5.1	14.9
END BENT 2, PILES 1-4	175	725.56	35			295							
END BENT 2, PILES 5-8	175	725.56	20			295					704.5	2.6	16.4

* PREDRILLING FOR PILES IS REQUIRED FOR END BENTS/ BENT WITH A PREDRILLING LENGTH AND AT THE CONTRACTOR'S OPTION FOR END BENTS/ BENTS WITH PREDRILLING INFORMATION BUT NO PREDRILLING LENGTH.

** $RDR = \frac{\text{FACTORED RESISTANCE + FACTORED DOWNDRAY LOAD + FACTORED DEAD LOAD}}{\text{DYNAMIC RESISTANCE FACTOR}} + \text{NORMAL DOWNDRAG RESISTANCE} + \frac{\text{NORMAL SCOUR RESISTANCE}}{\text{SCOUR RESISTANCE FACTOR}}$

SUMMARY OF PDA/ PILE ORDER LENGTHS

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

PILE DRIVING ANALYZER (PDA)				PILE ORDER LENGTHS	
END BENT/ BENT NO.	PDA TESTING REQUIRED? YES OR MAYBE	PDA TEST PILE LENGTH FT	TOTAL PDA TESTING QUANTITY EACH	END BENT/ BENT NO(s)	PILE ORDER LENGTH BASIS* EST OR PDA

* EST=PILE ORDER LENGTHS FROM ESTIMATED PILE LENGTHS; PDA=PILE ORDER LENGTHS BASED ON PDA TESTING. FOR GROUPS OF END BENTS/BENTS WITH PILE ORDER LENGTHS BASED ON PDA TESTING, THE FIRST END BENT/ BENT NO. LISTED FOR EACH GROUP IS THE REPRESENTATIVE END BENT/ BENT WITH THE PDA.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 50,000-75,000 FT.-LBS. PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3 (D)(2) OF THE STANDARD SPECIFICATIONS.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILE DESIGN INFORMATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED AXIAL LOAD PER PILE TONS	FACTORED DOWNDRAG LOAD PER PILE FT	FACTORED DEAD LOAD* PER PILE TONS	DYNAMIC RESISTANCE FACTOR	NOMINAL DOWNDRAG RESISTANCE PER PILE TONS	NOMINAL SCOUR RESISTANCE PER PILE TONS	SCOUR RESISTANCE FACTOR (DEFAULT=1.00)
END BENT 1, PILES 1-4	135			0.60			
END BENT 1, PILES 5-8	135			0.60			
END BENT 2, PILES 1-4	175			0.60			
END BENT 2, PILES 5-8	175			0.60			

* FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

SUMMARY OF PILE ACCESSORIES

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	PIPE PILE PLATES REQUIRED YES OR MAYBE	STEEL PILE POINTS			STEEL PILE TIPS REQUIRED? YES
		PIPE PILE CUTTING SHOES REQUIRED? YES	PIPE PILE CONICAL POINTS REQUIRED? YES	H-PILE POINTS REQUIRED? YES	
END BENT 2, PILES 1-4				YES	
TOTAL QTY.				4	

NOTES:

1. THE PILE FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (STEPHEN C. CROCKETT, 048207) ON 01-04-2023.
2. TOTAL PILE DRIVING EQUIPMENT SETUP QUANTITY (NOT SHOWN IN PILE FOUNDATION TABLES) EQUALS THE NUMBER OF DRIVEN PILES, I.E., THE NUMBER OF PILES WITH A REQUIRED DRIVING RESISTANCE.
3. THE ENGINEER WILL DETERMINE NEED FOR PDA TESTING WHEN PDA'S MAY BE REQUIRED.

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DRAWN BY : J.E.HAGENBUSH DATE : 05/17/22
CHECKED BY : J.T. KELVINGTON DATE : 01/16/23
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER STEPHEN C. CROCKETT
Digitally signed by: Joseph T. Kelvington
4/21/2023

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CLEVELAND COUNTY
STATION: 810+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
PILE FOUNDATION TABLES

(LL)

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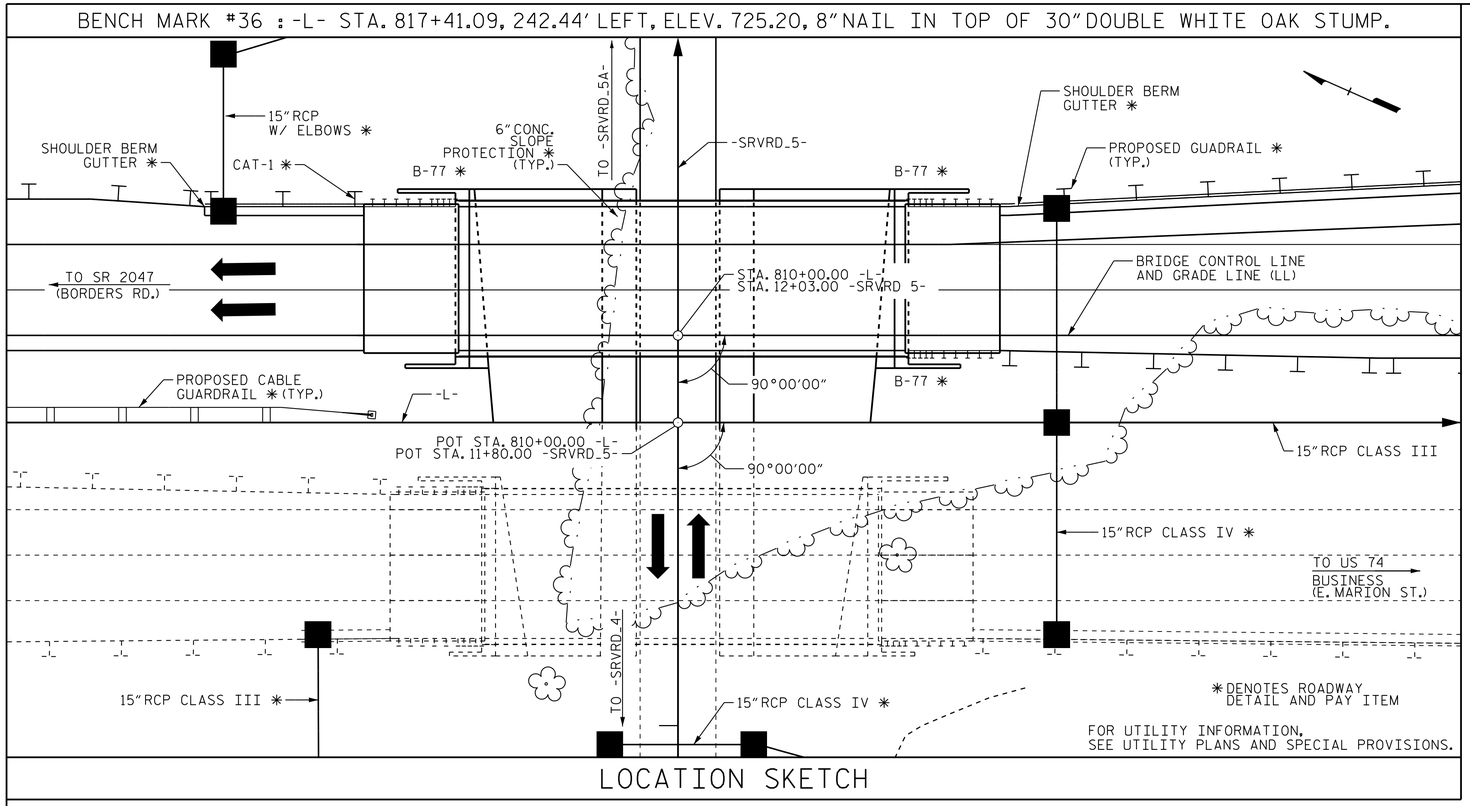

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATION.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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.

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

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.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	LIN. FT.	LIN. FT.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	SQ.YDS.	LUMP SUM
SUPERSTRUCTURE			4,933	5,808		LUMP SUM		4	469.33					235.83		LUMP SUM
END BENT 1	87.0	49.0			55.1		9,002			8	8	180			259	
END BENT 2	66.0	11.0			58.7		9,510			8	8	220	4		275	
TOTAL	153.0	60.0	4,933	5,808	113.8	LUMP SUM	18,512	4	469.33	16	16	400	4	235.83	534	LUMP SUM

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 74 BYPASS
OVER -SRVRD_5- BETWEEN
SR 2047 (BORDERS RD.) AND
US 74 BUSINESS (E. MARION ST.)
(LL)

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DRAWN BY : J. B. GEILE DATE : 11/14/17
CHECKED BY : J.T. KELVINGTON DATE : 12/05/22

DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON

Joseph T. Kelvington
4/21/2023

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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 x 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	1.02	--	1.75	0.936	1.35	A	ER	58.00	0.936	1.39	A	I	6.40	0.80	0.936	1.02	A	I	58.00	
		HL-93 (OPERATING)	N/A		1.75	--	1.35	0.936	1.75	A	ER	58.00	0.936	1.84	A	I	6.40	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.48	53.3	1.75	0.936	1.96	A	EL	58.00	0.936	1.99	A	I	6.40	0.80	0.936	1.48	A	I	58.00	
		HS-20 (OPERATING)	36.000		2.53	91.1	1.35	0.936	2.53	A	ER	58.00	0.936	2.61	A	I	6.40	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.58	48.3	1.40	0.936	5.91	A	ER	58.00	0.936	6.44	A	I	6.40	0.80	0.936	3.58	A	I	58.00	
		SNGARBS2	20.000		1.45	29.0	1.40	0.936	2.39	A	ER	58.00	0.936	2.53	A	I	6.40	0.80	0.936	1.45	A	I	58.00	
		SNAGRIS2	22.000		1.28	28.2	1.40	0.936	2.12	A	ER	58.00	0.936	2.26	A	I	6.40	0.80	0.936	1.28	A	I	58.00	
		SNCOTTS3	27.250		1.42	38.7	1.40	0.936	2.34	A	ER	58.00	0.936	2.52	A	I	6.40	0.80	0.936	1.42	A	I	58.00	
		SNAGGRS4	34.925		1.22	42.6	1.40	0.936	2.02	A	EL	58.00	0.936	2.19	A	I	6.40	0.80	0.936	1.22	A	I	58.00	
		SNS5A	35.550		1.78	63.3	1.40	0.936	2.93	A	ER	58.00	0.936	3.15	A	I	6.40	0.80	0.936	1.78	A	I	58.00	
		SNS6A	39.950		2.39	95.5	1.40	0.936	3.94	A	ER	58.00	0.936	4.08	A	I	6.40	0.80	0.936	2.39	A	I	58.00	
		SNS7B	42.000		2.56	107.5	1.40	0.936	4.23	A	ER	58.00	0.936	4.45	A	I	6.40	0.80	0.936	2.56	A	I	58.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.56	51.5	1.40	0.936	2.57	A	ER	58.00	0.936	2.74	A	I	6.40	0.80	0.936	1.56	A	I	58.00	
		TNT4A	33.075		1.29	42.7	1.40	0.936	2.12	A	ER	58.00	0.936	2.16	A	I	6.40	0.80	0.936	1.29	A	I	58.00	
		TNT6A	41.600		1.24	51.6	1.40	0.936	2.04	A	ER	58.00	0.936	2.10	A	I	6.40	0.80	0.936	1.24	A	I	58.00	
		TNT7A	42.000	3	1.17	49.1	1.40	0.936	1.94	A	EL	58.00	0.936	2.05	A	I	6.40	0.80	0.936	1.17	A	I	58.00	
		TNT7B	42.000	3	1.17	49.1	1.40	0.936	1.92	A	ER	58.00	0.936	2.00	A	I	6.40	0.80	0.936	1.17	A	I	58.00	
		TNAGRIT4	43.000		1.56	67.1	1.40	0.936	2.58	A	ER	58.00	0.936	2.70	A	I	6.40	0.80	0.936	1.56	A	I	58.00	
		TNAGT5A	45.000		1.26	56.7	1.40	0.936	2.08	A	ER	58.00	0.936	2.29	A	I	6.40	0.80	0.936	1.26	A	I	58.00	
		TNAGT5B	45.000		1.26	56.7	1.40	0.936	2.08	A	ER	58.00	0.936	2.25	A	I	6.40	0.80	0.936	1.26	A	I	58.00	

LOAD FACTORS:

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

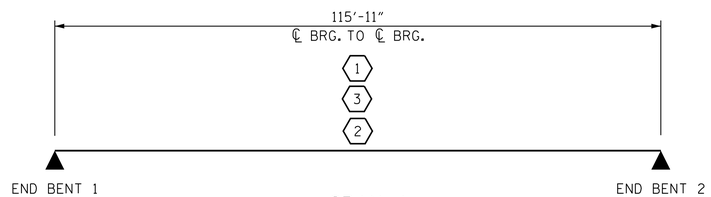
NOTES:

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.

SPAN LENGTH AND SUPPORT CONDITIONS SHOWN IN THE LRFR SKETCH CONFORMS TO THE ANALYSIS MODEL USED FOR ALL LOAD CONDITIONS.

(#) 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



SPAN A

LRFR SUMMARY

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

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CHECKED BY : A. BOYKIN JR. DATE : 12/08/22
DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON
Digitally signed by Joseph T. Kelvington
4/21/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S8-05
1			3			TOTAL SHEETS
2			4			30

STR. #8

STD. NO. LRFR3

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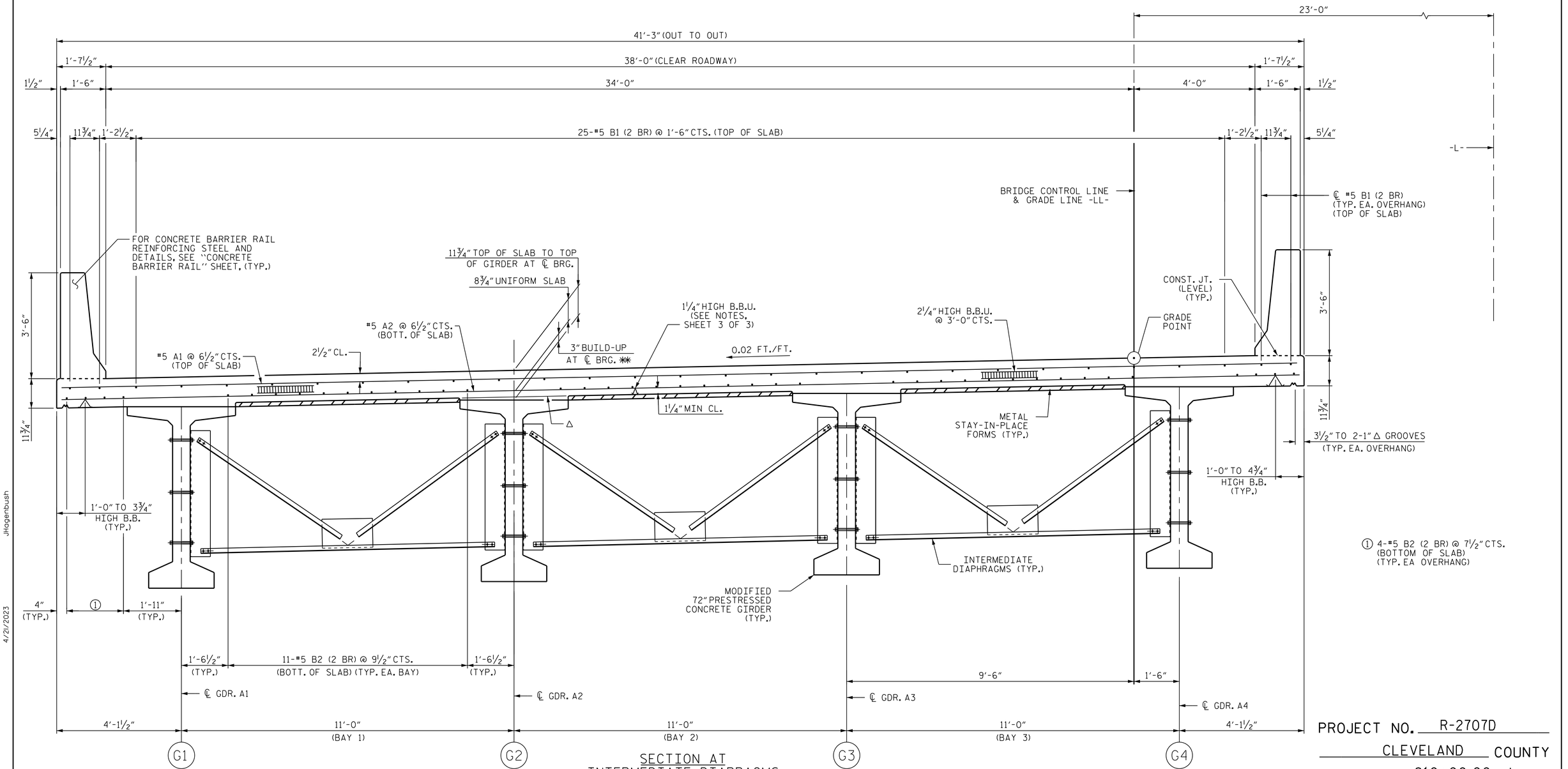

SECTION AT INTERMEDIATE DIAPRAGMS

** BUILD UP IN SPAN @ ALL POINTS BETWEEN BEARINGS VARIES, $1^{15}/_{16}$" MAX. @ MID-SPAN, GIRDERS 2 & 3

TYPICAL SECTION

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.
(2 BR) DENOTES 2 BAR RUN
△ TOP OF METAL STAY IN PLACE FORM TO MATCH REQUIRED BOTTOM OF SLAB.
MAX. BUILD-UP BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 810+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(LL)

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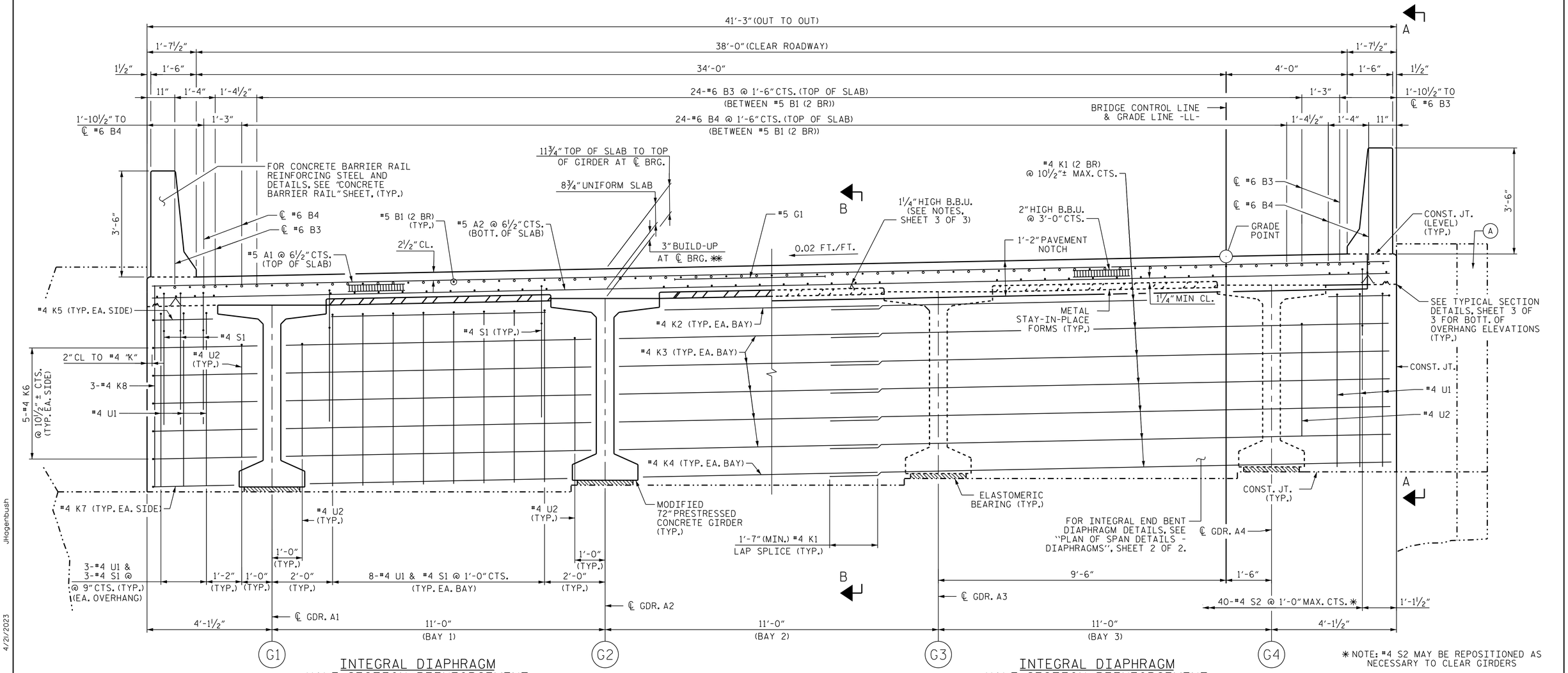


INTEGRAL DIAPHRAGM HALF-SECTION REINFORCEMENT AT FRONT FACE

TYPICAL SECTION

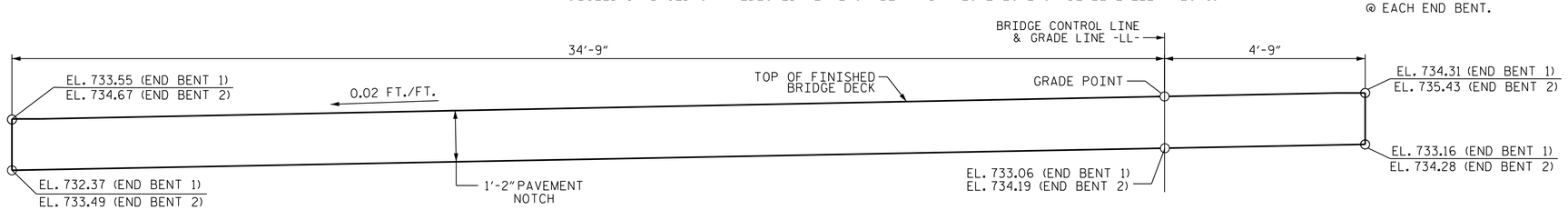
INTEGRAL DIAPHRAGM HALF-SECTION REINFORCEMENT AT FILL FACE

* NOTE: #4 S2 MAY BE REPOSITIONED AS NECESSARY TO CLEAR GIRDERS

SEE ELEV. A-A ON SHEET 3 OF 3 FOR DETAILS @ END OF DIAPH. AND SLAB OVERHANG.

SEE "TYPICAL SECTION DETAILS", SHEET 3 OF 3 FOR NOTES.
SEE SECTION B-B ON SHEET 3 OF 3 FOR SECTION THROUGH END BENT DIAPHRAGM
** BUILD UP IN SPAN @ ALL POINTS BETWEEN BRGS. VARIES. 1 15/16" MAX. @ MID-SPAN, GIRDERS 2 &3.
MAX. BUILD-UP BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

- DENOTES #5 B1 (2 BR) CONTINUOUS REINFORCEMENT. SEE "TYPICAL SECTION". SHT. 1 OF 3 FOR DETAILS
- DENOTES NON-CONTINUOUS REINFORCEMENT @ EACH END BENT.



APPROACH SLAB PAVEMENT NOTCH DETAIL

ELEVATIONS ARE ALONG FILL FACE OF END BENT
DIMENSIONS ARE NORMAL TO BRIDGE CONTROL LINE -LL-

(A) INTEGRAL END BENT CAP AND WING WALL. SEE END BENT DRAWINGS FOR DETAILS.

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4/21/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 810+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(LL)

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4/21/2023

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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.

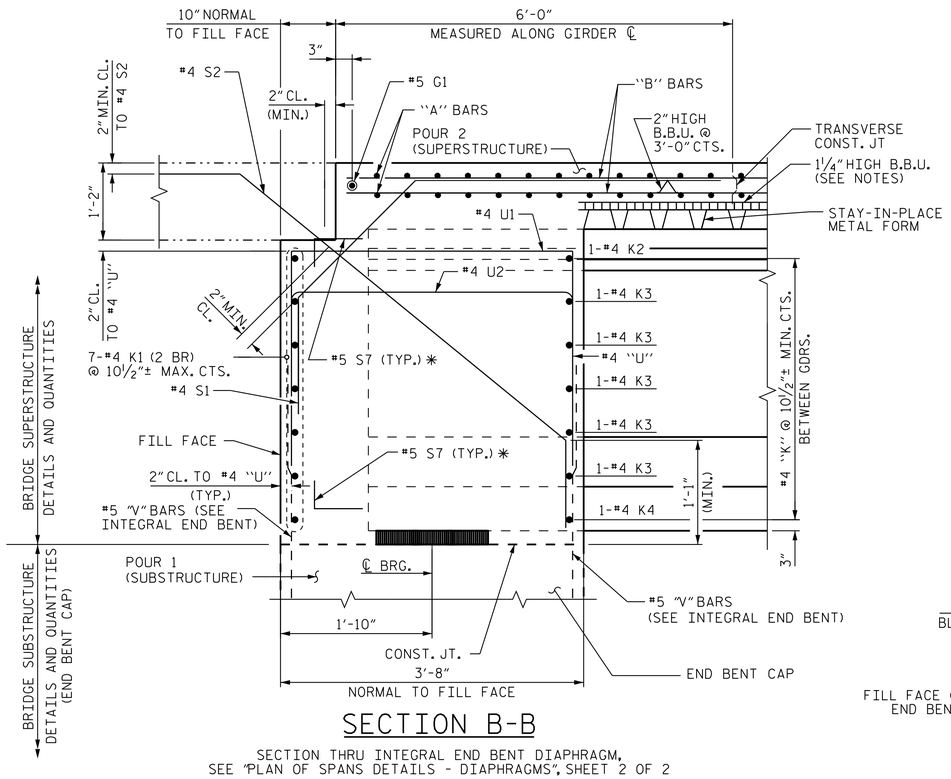
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

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

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

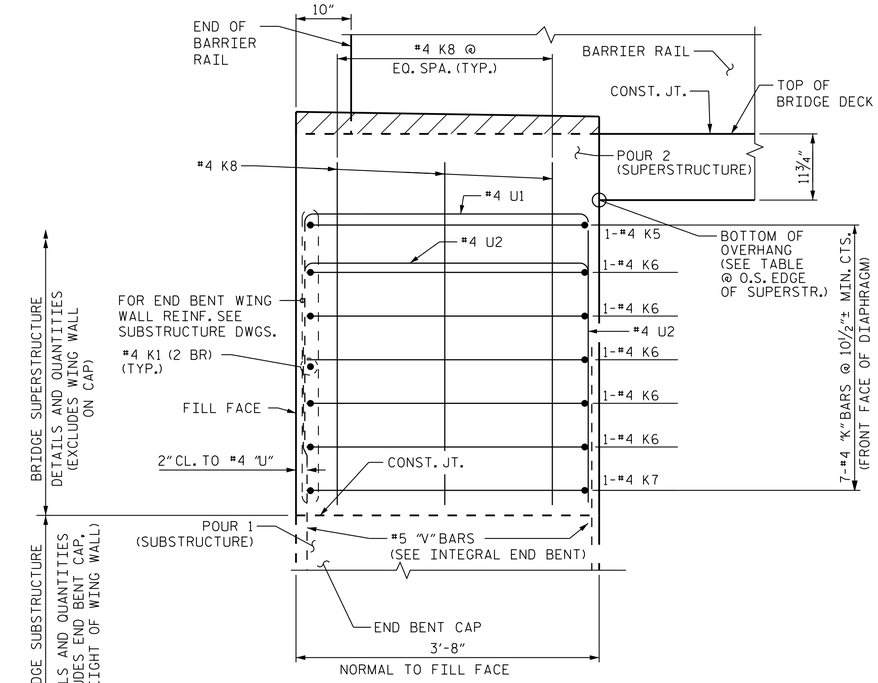
(2 BR) DENOTES 2 BAR RUN



SECTION B-B

SECTION THRU INTEGRAL END BENT DIAPHRAGM,
SEE "PLAN OF SPANS DETAILS - DIAPHRAGMS", SHEET 2 OF 2

✱ NOTE: FOR #5 S7 BARS, SEE GIRDER DWGS.
FOR #5 S7 @ TOP OF GIRDERS, FIELD BEND AS NECESSARY TO CLEAR 1'-2" DEEP PAVEMENT NOTCH.

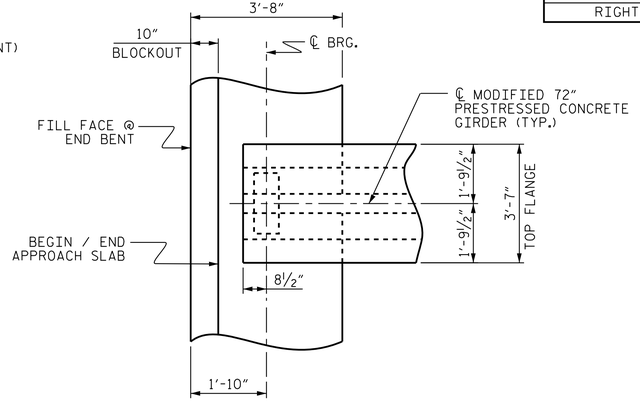


ELEVATION A-A

VIEW OF INTEGRAL END BENT DIAPHRAGM @ END BENT
CONST. JT. SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHEET 2 OF 2

BOTTOM OF OVERHANG ELEVS. @ OUTSIDE EDGE OF SUPERSTR.

OVERHANG	END BENT	ELEV.
LEFT SIDE	1	733.36
RIGHT SIDE	1	732.60
LEFT SIDE	2	734.42
RIGHT SIDE	2	733.60



PLAN OF INTEGRAL END BENT

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(LL)

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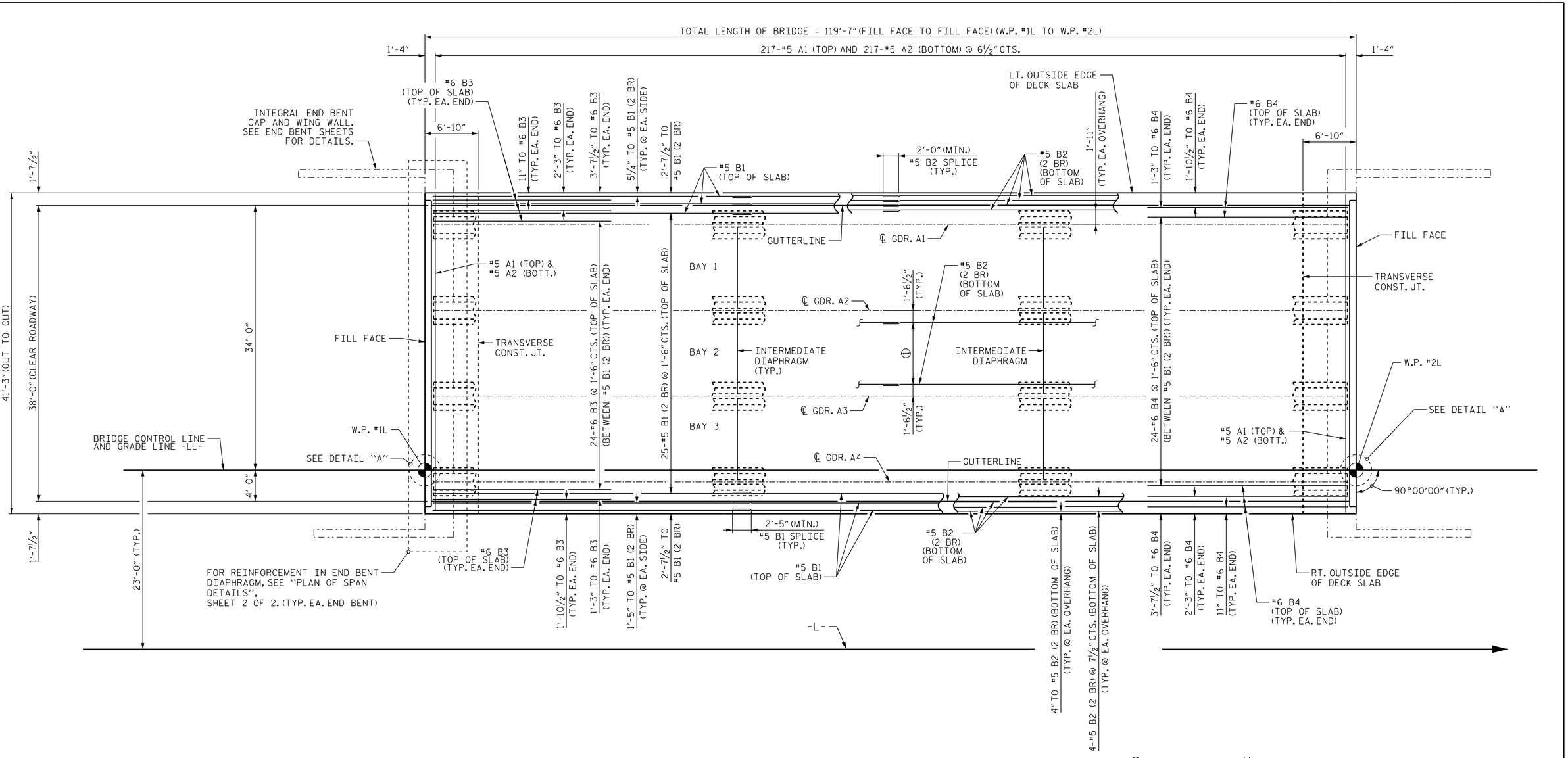
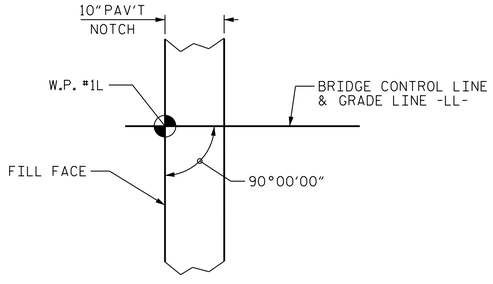


① 11-#5 B2 (2 BR) @ 9½" CTS. (BOTTOM OF SLAB) (TYP. EA. BAY)



DETAIL "A"
W.P. #2 SIMILAR BY ROTATION

PLAN OF SPAN A

NOTES:

(2 BR) DENOTES 2 BAR RUN

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "PLAN OF SPAN DETAILS - DIAPHRAGMS", SHEET 2 OF 2.

FOR POUR SEQUENCE, SEE "BILL OF MATERIALS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR MODIFIED 72" BULB TEE PRESTREED CONCRETE GIRDER" SHEET.

PLACE B3 AND B4 BARS 2" CLEAR OF THE 10" PAVEMENT NOTCH BLOCKOUT.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPANS (SPAN A)

(LL)

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2			4			30

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Joseph T. Kelvington
4/21/2023

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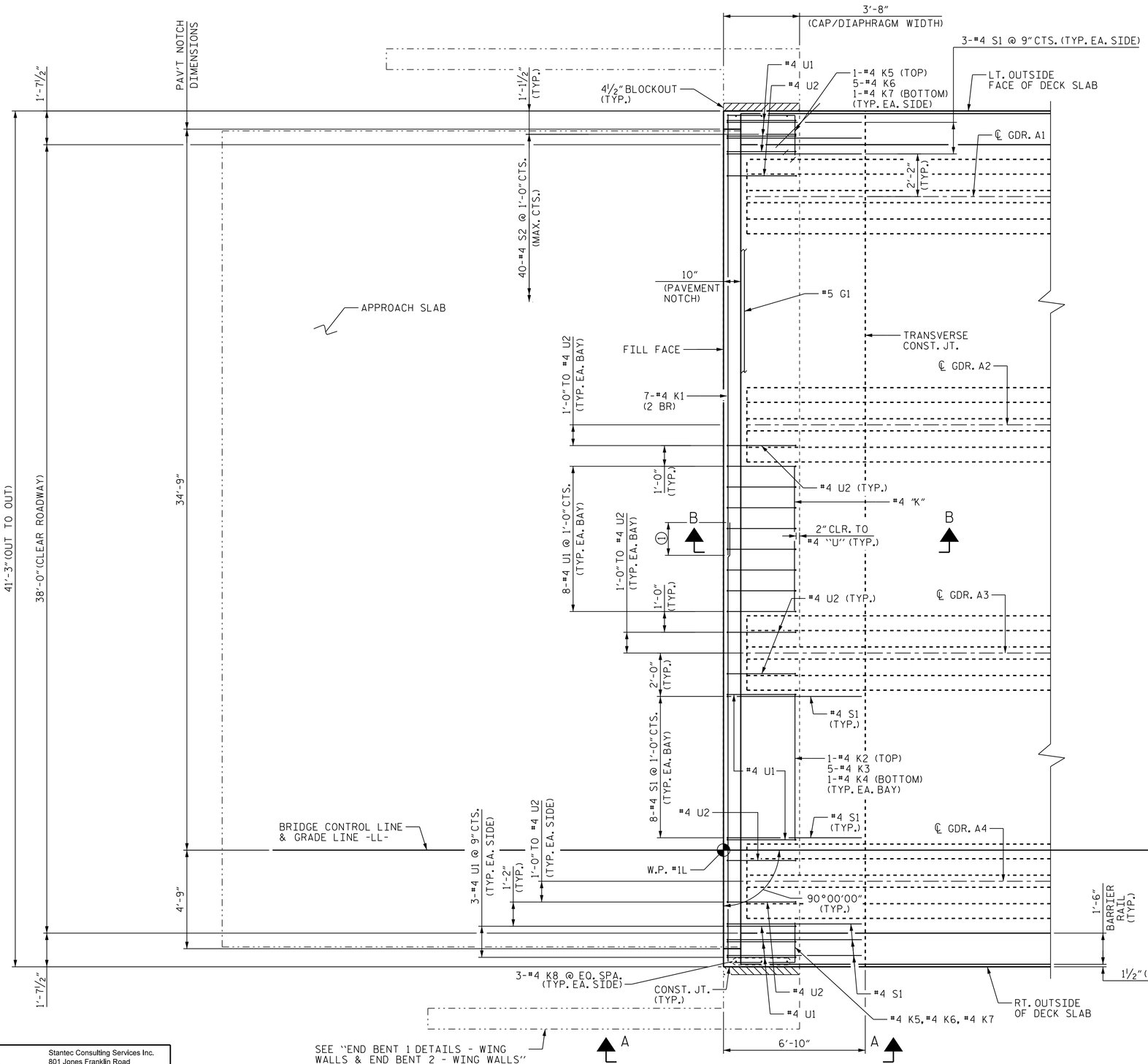
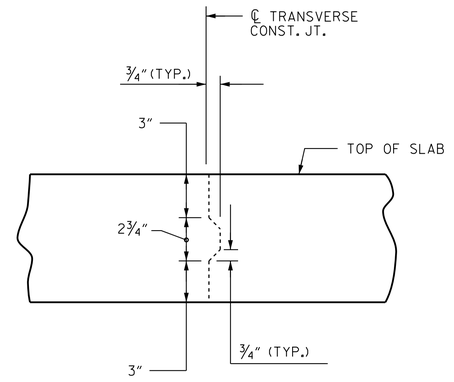


TYPICAL END BENT DIAPHRAGM REINFORCING DETAIL

DETAIL AT END BENT 1 SHOWN.
END BENT 2 SIMILAR BY ROTATION.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

NOTES:

FOR SECTION B-B, & ELEVAION A-A, SEE TYPICAL SECTION DETAILS, SHEET 3 OF 3.

"A" BARS, "B" BARS & BARRIER RAIL REINFORCEMENT. ARE NOT SHOWN IN DECK SLAB FOR CLARITY.

(2 BR) DENOTES 2 BAR RUN.

#4 S2 BARS MAY BE REPOSITIONED AS FOUND NECESSARY TO CLEAR PRESTRESSED GIRDERS.

DENOTES CONC. BLOCKOUT. SEE END BENT SHTS. AND SUPERSTRUCTURE TYPICAL SECTION DETAILS.

① - 1'-7" MIN. SPLICE FOR #4 K1

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPANS DETAILS - DIAPHRAGMS

(LL)

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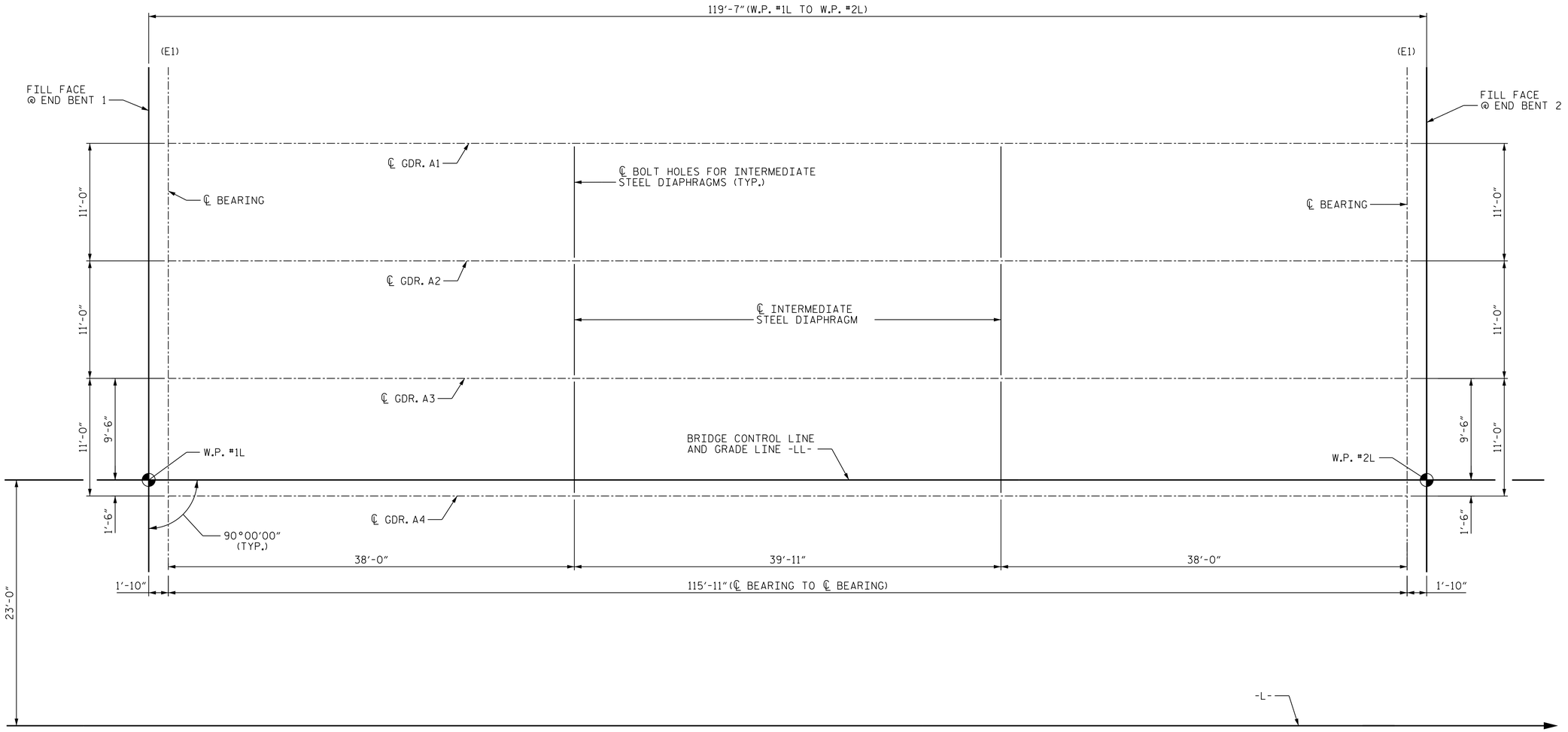

NOTES:

(E1) DENOTES ELASTOMERIC BEARING.
SEE "ELASTOMERIC BEARING DETAILS".

SEE TYPICAL SECTION FOR END BENT DIAPHRAGM DETAILS.

REFER TO "PLAN OF SPAN DETAILS-DIAPHRAGMS" FOR END BENT DIAPHRAGMS DETAILS.

ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED.

SPAN A

FRAMING PLAN

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

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DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON

Joseph T. Kelvington
4/21/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

(LL)

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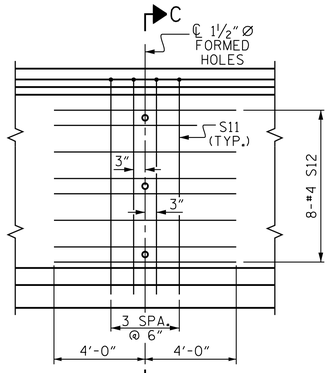
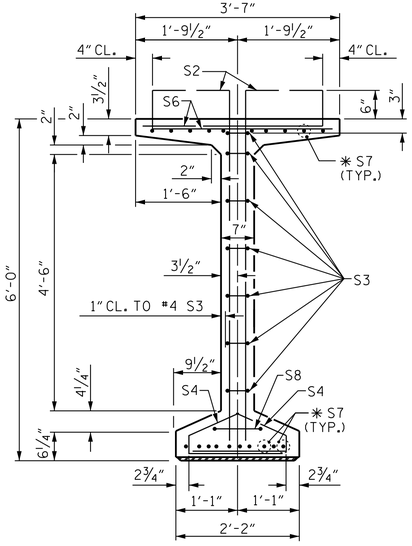
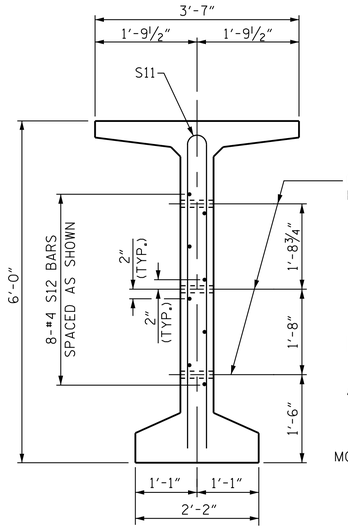


PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS A1-A4.



SECTION A-A



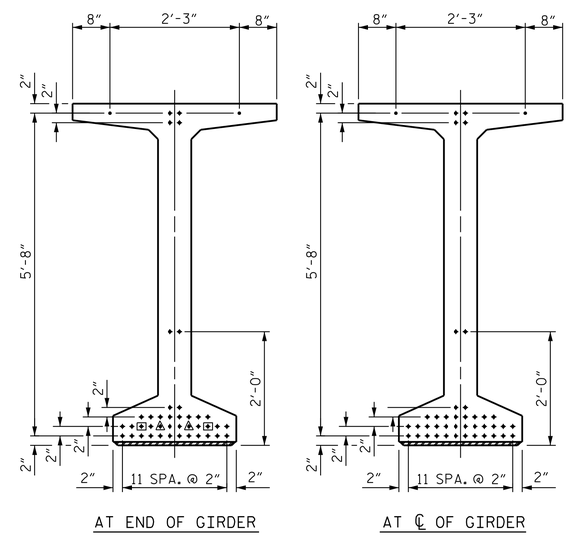
SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

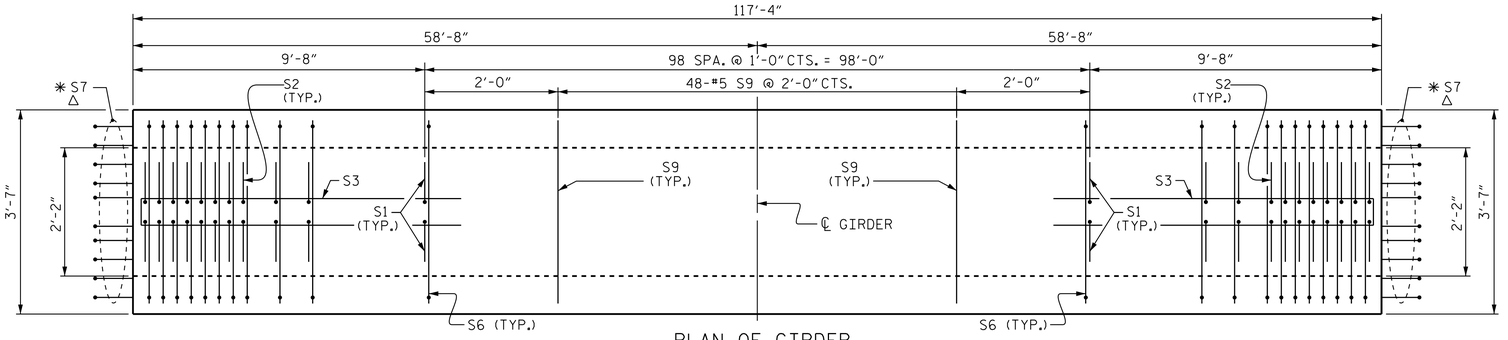
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ DEBOND STRAND 12'-0" FROM END OF GIRDER
- △ DEBOND STRAND 10'-0" FROM END OF GIRDER

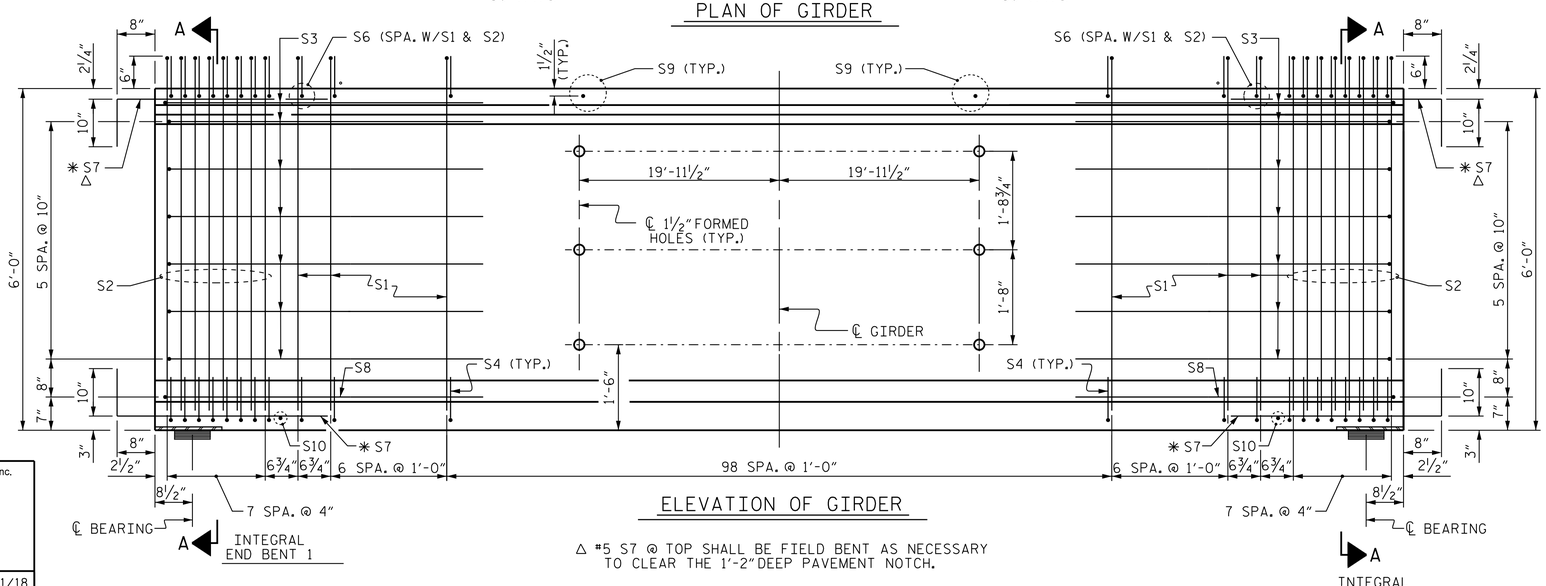
✳FOR S7 BARS, SEE DETAIL "C" OF MODIFIED 72" PRESTRESSED CONCRETE GIRDER DETAILS SHEET



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

△ #5 S7 @ TOP SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE 1'-2" DEEP PAVEMENT NOTCH.

NOTE: S1 AND S2 BAR PAIRS MAY BE REPOSITIONED AS NECESSARY TO CLEAR 1½" DIA. FORMED HOLES.

0.6" Ø L. R. GRADE 270 STRANDS

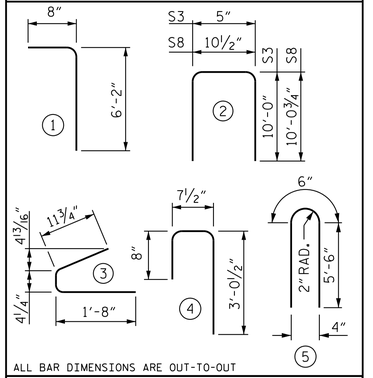
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	226	#4	1	6'-10"	1,032
S2	32	#6	1	6'-10"	328
S3	14	#4	2	20'-5"	191
S4	64	#4	3	3'-0"	128
S6	258	#4	4	4'-4"	747
✳S7	40	#5	STR	3'-8"	153
S8	2	#5	2	21'-0"	44
S9	48	#5	STR	3'-3"	163
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	11'-6"	96
S12	16	#4	STR	8'-0"	86

✳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	8,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	2,969	25.1	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	117'-4"	469'-4"

PROJECT NO. R-2707D

CLEVELAND COUNTY

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SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
MODIFIED 72" PRESTRESSED CONCRETE GIRDER

(LL)

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ASSEMBLED BY : N. D'AIUTO	DATE : 05/01/18		
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DRAWN BY : EEM 2/6/97	REV. 6/13	MAA/GM	DESIGN ENGINEER OF RECORD: J.T. KELVINGTON DATE : 04/21/23
CHECKED BY : VAP 2/6/97	REV. 1/15	MAA/TMG	
	REV. 12/17	MAA/THC	

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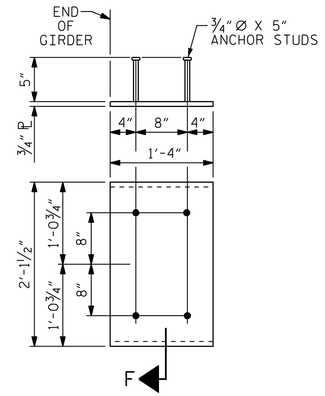
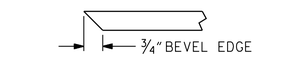


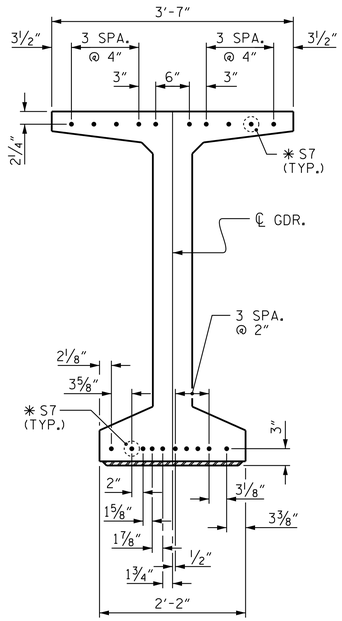
EMBEDDED PLATE ''B-1'' DETAILS
72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)



SECTION ''F''

(SEE NOTES)



DETAIL ''C''

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

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 6,000 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 1/4".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.

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PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER DETAILS

(LL)

NORTH CAROLINA PROFESSIONAL SEAL 13406 ENGINEER JOSEPH T. KELVINGTON

Digitally signed by: Joseph T. Kelvington
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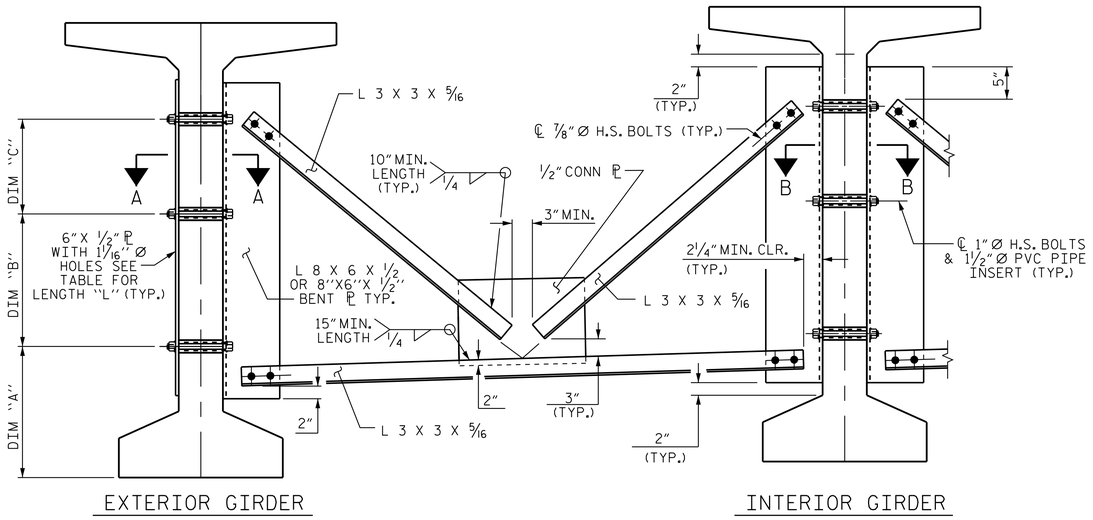
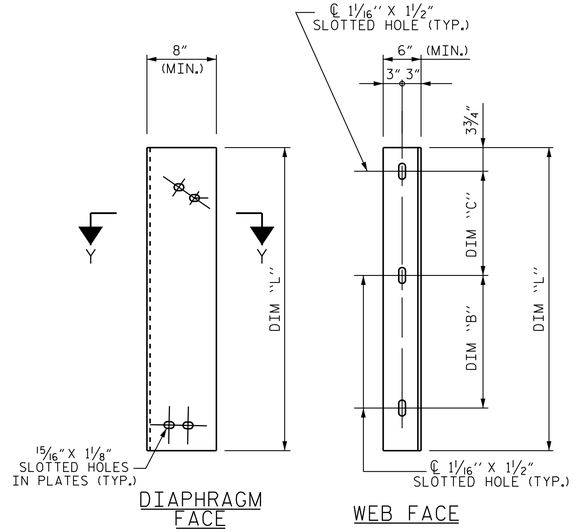
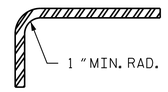


PART SECTION AT INTERMEDIATE DIAPHRAGM

(72" BULB TEE GIRDER SHOWN)





SECTION Y-Y

CONNECTOR PLATE DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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.

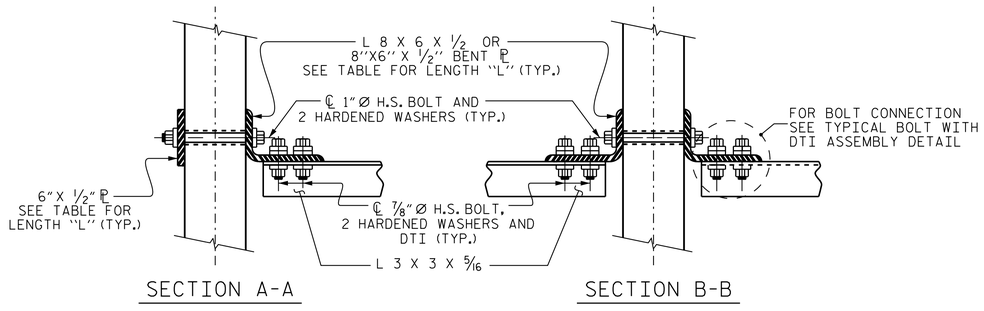
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4"PROJECTION BEYOND THE NUT.

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.

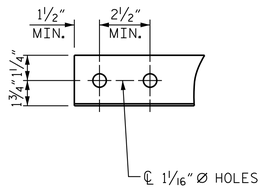
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



CONNECTION DETAILS

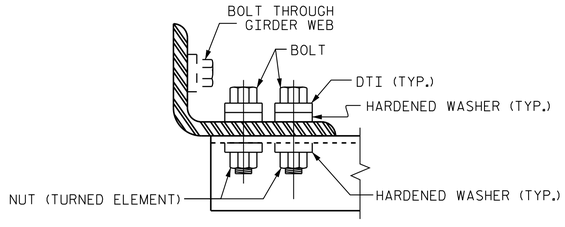
TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
MODIFIED 72" PRESTRESSED CONCRETE GIRDER	1'-6"	1'-8"	1'-8 3/4"	4'-2"



ANGLE END

(L 3 X 3 X 5/16)



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 810+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDERS

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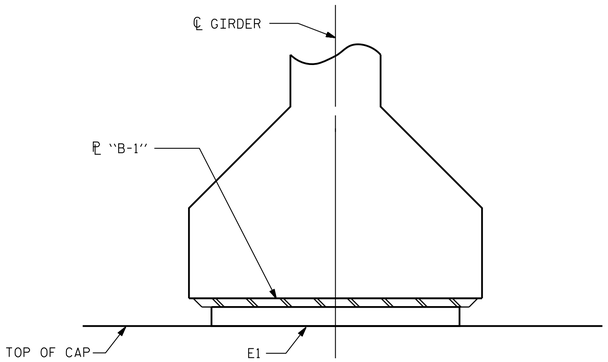
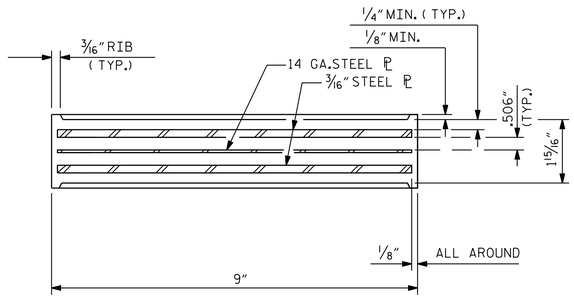
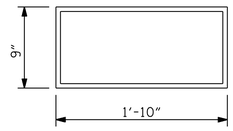


SECTION E-E



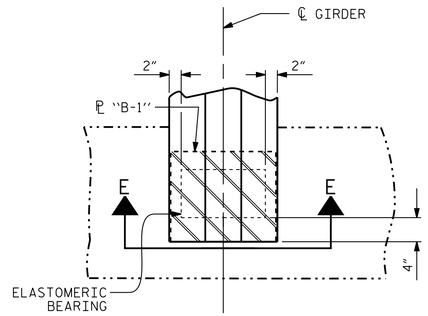
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



TYPICAL PLAN

SHOWING BOTTOM FLANGE
@ INTEGRAL END BENT

NOTES

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

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RALEIGH

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

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