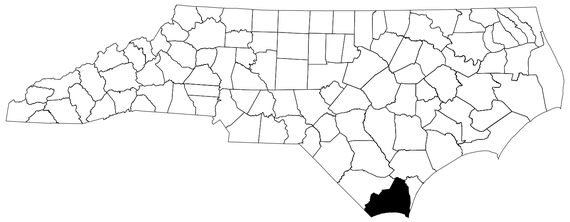
PROJECT NUMBER: 15BPR.24

CONTRACT: C204561



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

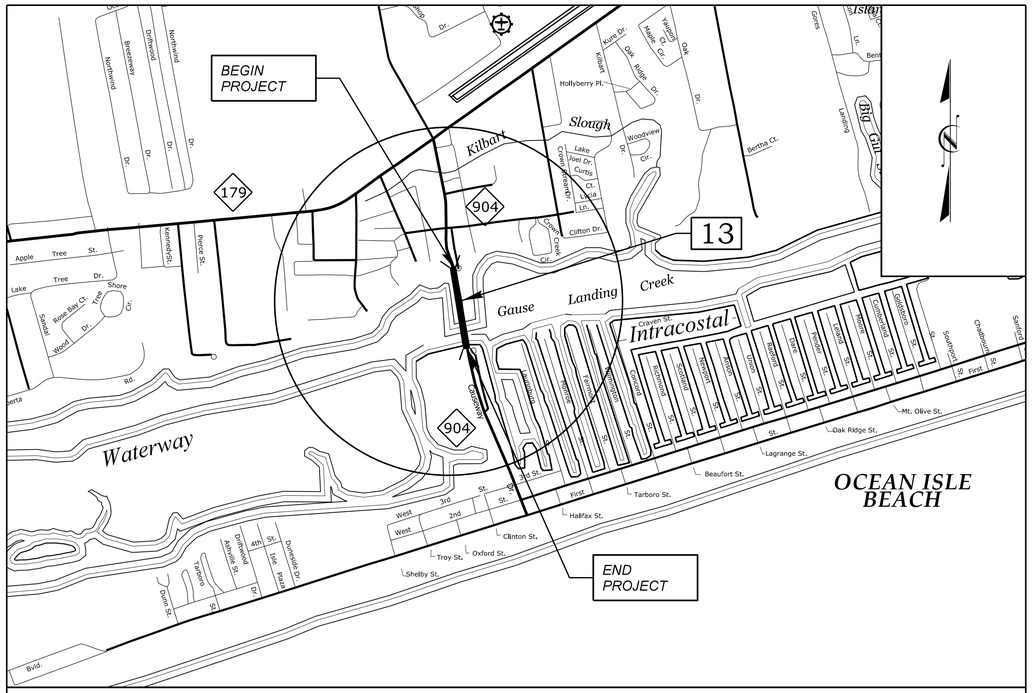
BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	15BPR.24	1	45

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
15BPR.24	–	P.E.
15BPR.24	–	CONST.

LOCATION: ***BRUNSWICK COUNTY***
BRIDGE #090013 ON NC 904 OVER THE INTRACOASTAL WATERWAY

TYPE OF WORK: ***BRIDGE PRESERVATION – LATEX MODIFIED CONCRETE DECK OVERLAY, SILANE DECK TREATMENT, JOINT REPAIR, SUPERSTRUCTURE REPAIR, BEARING REPLACEMENT, SUBSTRUCTURE REPAIR, CATHODIC PROTECTION, AND INTEGRAL PILE JACKETS***



VICINITY MAP N.T.S.

STRUCTURES

DESIGN DATA

BRUNSWICK COUNTY
#13 ADT 2014 = 11,000

PROJECT LENGTH

BRUNSWICK COUNTY
#13 = 0.36 MILE

2018 STANDARD SPECIFICATIONS

LETTING DATE :
December 15, 2020

Prepared for the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

KCA KISINGER CAMPO & ASSOCIATES
301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601 (919) 882-7839
LICENSE #: C-1506
DocuSigned by: Jacob Duke 29530C8054E94D9...
11/16/2020
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

JACOB H. DUKE
PROJECT ENGINEER

DIEGO A. AGUIRRE
PROJECT DESIGN ENGINEER

SUMMARY OF QUANTITIES

TOTAL BILL OF MATERIAL

	INCIDENTAL MILLING	ASPHALT CONCRETE SURFACE COURSE TYPE, S9.5C	ASPHALT BINDER FOR PLANT MIX	POLYUREA, PAVEMENT MARKING LINES (4", 20 MILS)	REMOVAL OF PAVEMENT MARKING LINES (4")	PERMAMEMT RAISED PAVEMENT MARKING	GROOVING BRIDGE FLOORS	CLASS II, SURFACE PREPARATION	ELASTOMERIC BEARINGS	CONCRETE REPAIRS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	INTEGRAL PILE JACKETING	FOAM JOINT SEALS FOR PRESERVATION	WATER LINE REMOVAL	VOLUMETRIC MIXER
	SQ. YD.	TON	TON	LIN. FT.	LIN. FT.	EA.	SQ. FT.	SQ. YD.	LUMP SUM	CU. FT.	CU. FT.	LIN. FT.	LF.	LIN. FT.	LUMP SUM	LUMP SUM
TOTAL	305	26	2	8069	5565	49	14417	2	LUMP SUM	20	439	848	5	720	LUMP SUM	LUMP SUM

	RAIL RETROFIT	LATEX MODIFIED CONCRETE OVERLAY-VERY EARLY STRENGTH	ELASTOMERIC CONCRETE FOR PRESERVATION	REPAIRS TO PRESTRESSED CONCRETE GIRDERS	BRIDGE JOINT DEMOLITION	EPOXY COATING	SCARIFYING BRIDGE DECK	SHOTBLASTING BRIDGE DECK	PLACING AND FINISHING LATEX MODIFIED CONC. OVERLAY - VERY EARLY STRENGTH	SILANE DECK TREATMENT	HYDRO-DEMOLITION OF BRIDGE DECK	TYPE I BRIDGE JACKING BRIDGE NO.13	CATHODIC PROTECTION SYSTEM-SUBMERGED ZINC BULK ANODE
	LIN. FT.	CU. YD.	CU. FT.	CU. FT.	SQ. FT.	SQ. FT.	SQ. YD.	SQ.YD.	SQ.YD.	SQ. YD.	SQ. YD.	EA.	EA.
TOTAL	3795	103	78	191	244	6282	1790	4801	1790	4801	1790	6	50

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
11/16/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL

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

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

11/16/2020
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User:jduke

DRAWINGS AND DIMENSIONS:

1. DO NOT SCALE DRAWINGS FOR DIMENSIONS NOT GIVEN.
2. VERIFY ALL EXISTING FIELD CONDITIONS AND DIMENSIONS (INCLUDING MINIMUM VERTICAL CLEARANCE) PRIOR TO COMMENCING REPAIRS OR ORDERING ANY MATERIAL. NOTIFY ENGINEER OF ANY DISCREPANCIES FOUND.
3. ALL DIMENSIONS ARE IN FEET AND INCHES.

DESIGN SPECIFICATIONS:

1. LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION, 2017)
2. 2018 NCDOT STANDARD SPECIFICATIONS AND PROJECT SPECIAL PROVISIONS.

PROJECT SCOPE:

1. LATEX MODIFIED - VERY EARLY STRENGTH CONCRETE (LMC) OVERLAY
2. SILANE DECK TREATMENT
3. SUPERSTRUCTURE CONCRETE REPAIRS
4. SUBSTRUCTURE CONCRETE REPAIRS
5. EXPANSION JOINT REPLACEMENT/INSTALLATION
6. BEARING REPLACEMENT
7. INTEGRAL PILE JACKETING
8. GALVANIC CATHODIC PROTECTION - BULK ANODE
9. RAIL RETROFIT (TYP.)
10. APPROACH ROADWAY MILLING AND RESURFACING
11. EPOXY COATING BEAM ENDS.
12. WATER LINE REMOVAL
13. PAVEMENT MARKING

GENERAL NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL REQUIREMENTS.
2. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
3. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
4. FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLAN.
5. FOR LMC SURFACE PREPARATION, SEE SPECIAL PROVISIONS.
6. FOR LATEX MODIFIED CONCRETE - VERY EARLY STRENGTH (LMC), SEE SPECIAL PROVISIONS.
7. FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.
8. FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
9. FOR CONCRETE REPAIRS, SEE PLAN DETAILS AND SPECIAL PROVISIONS.
10. FOR CONCRETE FOR DECK REPAIRS, SEE SPECIAL PROVISIONS.
11. FOR VOLUMETRIC MIXER, SEE SPECIAL PROVISIONS.
12. FOR ADHESIVELY ANCHORED RODS AND DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.
13. ALL PROPOSED EXPANSION JOINT DIMENSIONS, OPENINGS AND BLOCKOUTS ARE SHOWN AT 65°F, CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION GUIDELINES AND MAKE ANY NECESSARY ADJUSTMENTS.
14. WORK ON BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
15. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL, A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR VEHICLE/MARINE TRAFFIC.
16. ANY DAMAGE TO EXISTING REINFORCING STEEL, DURING CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED AS DIRECTED BY THE ENGINEER AND PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.
17. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
18. FOR MAINTENANCE OF WATER TRAFFIC, SEE SPECIAL PROVISIONS.
19. FOR WORK IN, OVER OR ADJANCE TO NAVIGABLE WATERS, SEE SPECIAL PROVISIONS.
20. FOR INTEGRAL PILE JACKETING, SEE SPECIAL PROVISIONS.
21. FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.
22. FOR COORDINATION WITH THE U.S. COAST GUARD, SEE SPECIAL PROVISIONS.
23. EXISTING JOINTS AND DRAINS SHALL BE SEALED PRIOR TO BEGINNING REPAIRS OF BRIDGE DECK.
24. FOR PAVEMENT MARKINGS AND MARKERS, SEE TRASPORTATION MANAGEMENT PLANS.

PROJECT COORDINATES:

NC 904/OCEAN ISLE BEACH ROAD SW IS AN EAST/WEST ROUTE AND THE BRIDGE BEGINS ON THE MAINLAND SIDE AND ENDS ON THE BEACH SIDE. ALTHOUGH THE BRIDGE IS ORIENTED IN THE NORTH/SOUTH CARDINAL DIRECTION, REFERENCE IN THESE PLANS, BRIDGE INSPECTION REPORTS, AND OTHER DATA IS BASED ON END BENT 1 BEING LOCATED AT THE MAINLAND SIDE AND END BENT 2 BEING LOCATED AT THE BEACH SIDE. IN AN ATTEMPT TO BE CONSISTENT WITH THE CURRENT BRIDGE INSPECTION REPORT, END BENT 1 WILL BE LABELED THE "WEST" END, AND END BENT 2 WILL BE LABELED THE "EAST" END OF THE BRIDGE. THE ACTUAL BRIDGE COORDINATES GIVEN IN THE BRIDGE INSPECTION REPORT ARE LATITUDE: 33° 53' 45.9" AND LONGITUDE: 78° 26' 23.4"

DATUM:

ALL ELEVATIONS REFER TO NGVD '29 UNLESS NOTED OTHERWISE.

ENVIRONMENT:

SUPERSTRUCTURE: EXTREMELY AGGRESSIVE - COASTAL
SUBSTRUCTURE: EXTREMELY AGGRESSIVE - COASTAL

SITE CONDITIONS:

HABITAT BEYOND THE LIMITS OF CONSTRUCTION SHALL NOT BE DISTURBED.

CONCRETE CLASS:

SEE PROJECT SPECIAL PROVISIONS FOR CONCRETE REPAIR MATERIALS.

CONCRETE COVER:

1. CONCRETE COVER SHOWN IN THE PLANS DOES NOT INCLUDE PLACEMENT OR FABRICATION TOLERANCES UNLESS SHOWN AS "MINIMUM COVER." SEE NCDOT SPECIFICATIONS FOR ALLOWABLE REINFORCEMENT PLACEMENT TOLERANCES.
2. CONSTRUCTION JOINTS ARE PERMITTED ONLY AT LOCATIONS SPECIFIED IN THE PLANS. ADDITIONAL CONSTRUCTION JOINTS OR ALTERATIONS TO THOSE SHOWN REQUIRE THE ENGINEER'S APPROVAL.

CONCRETE FINISHES:

FINISH IN ACCORDANCE WITH THE LATEST NCDOT SPECIFICATIONS. MATCH EXISTING FINISH ON ALL EXPOSED EDGES UNLESS OTHERWISE NOTED. A CLASS 5 FINISH COATING SHALL BE APPLIED TO THE BEAM ENDS WHERE CONCRETE REPAIRS HAVE BEEN PERFORMED, MATCHING THE COLOR OF SURROUNDING CONCRETE.

ADJACENT EDGE CONCRETE REPAIRS:

WHEN PROPOSED CONCRETE REPAIRS (OR DETERMINED LOCATIONS) ARE ADJACENT TO A CORNER, REPAIR ON THE ADJACENT EDGE SHOULD BE ANTICIPATED IN ADDITION TO THE AREA SHOWN ON SUBSTRUCTURE CONCRETE REPAIR SHEETS. CONTRACTOR IS RESPONSIBLE FOR THIS REPAIR AT ALL LOCATIONS REGARDLESS OF CALL-OUT ON RESPECTIVE SHEET(S).

REINFORCING STEEL:

1. ALL REINFORCING STEEL SHALL BE ASTM A615-96, GRADE 60.
2. ALL DIMENSIONS PERTAINING TO LOCATION OF REINFORCEMENT ARE TO CENTERLINE OF BARS EXCEPT WHERE THE CLEAR DIMENSION IS SHOWN TO FACE OF CONCRETE.
3. REINFORCEMENT DETAIL DIMENSIONS ARE OUT-TO-OUT OF BARS.

LIMIT OF REPAIRS:

1. LIMITS OF REPAIRS PROVIDED IN THESE PLANS ARE BASED ON PREVIOUS NBIS ELEMENT INSPECTIONS AND LIMITED FIELD WORK. THE EXTENT OF THE REPAIRS IS EXPECTED TO VARY DURING CONSTRUCTION.
2. DUE TO TIME SINCE INSPECTION, DEFICIENCIES MAY HAVE DETERIORATED OR INCREASED IN NUMBER. NOTIFY THE ENGINEER OF SIGNIFICANT CHANGES.

FORMS CONSTRUCTION:

FORMS MUST BE SUPPORTED BY THE EXISTING STRUCTURE. FULL DEPTH COFFERDAMS WILL NOT BE ACCEPTED. THE CONTRACTOR SHALL SUBMIT DETAILED PLANS FOR FORMS AND FALSEWORK TO BE USED FOR CONSTRUCTION OF THE PIER AND CONCRETE REPAIR.

CONSTRUCTION SURVEYING:

ALL SURVEYING AND STAKING NECESSARY TO COMPLETE THE PROPOSED WORK IS INCIDENTAL TO ALL OTHER PAY ITEMS FOR THIS PROJECT.

ENVIRONMENTAL NOTES:

STANDARD CONSTRUCTION CONDITIONS SHALL BE IMPLEMENTED FOR THE FOLLOWING PROTECTED/ENDANGERED SPECIES AS APPLICABLE AND INCLUDED IN CONTRACT DOCUMENTS.

A. ATLANTIC RIDLEY SEA TURTLE
B. LEATHERBACK SEA TURTLE
C. RED-COCKADED WOODPECKER
D. WEST INDIAN MANATEE
E. COOLEY'S MEADOWRUE
F. ROUGH-LEAVED LOOSESTRIFE

POLLUTION CONTROL:

1. THE CONTRACTOR SHALL SUBMIT A POLLUTION CONTROL PLAN TO THE ENGINEER IN ACCORDANCE THE NCDOT STANDARD SPECIFICATIONS, PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR SHALL NOT ALLOW, AT ANY TIME, ANY DISCHARGE OR MATERIALS TO FALL INTO THE WATERWAY.
3. THE CONTRACTORS SHALL SUBMIT TO THE ENGINEER AN EROSION CONTROL PLAN AS REQUIRED BY THE NCDOT STANDARD SPECIFICATIONS AND BEST MANAGEMENT PRACTICES.
4. NO OFFSITE IMPACTS SHALL BE PERMITTED.
5. A CONTAINMENT PLAN IS REQUIRED FOR CONCRETE REPAIRS.

MISCELLANEOUS NOTES:

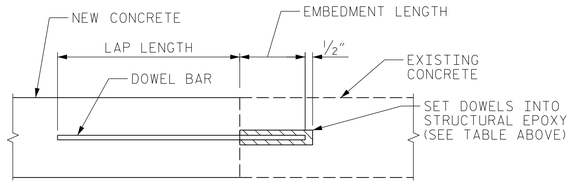
1. THE CONTRACTOR IS RESPONSIBLE TO SUBMIT A JACKING PLAN FOR EACH OPERATION TO THE ENGINEER FOR APPROVAL PRIOR TO BRIDGE JACKING.
2. PAYMENT FOR INCIDENTAL ITEMS NOT SPECIFICALLY COVERED IN THE INDIVIDUAL BID ITEMS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE BID ITEMS CONTAINED IN THE CONTRACT.
3. FOR ICT, SEE CONTRACT DOCUMENTS AND TRANSPORTATION MANAGEMENT PLANS.

DOWEL DETAIL:

1. ANY REQUIRED DOWEL HOLES SHALL BE DRILLED INTO EXISTING CONCRETE ACCORDING TO THE DETAIL AND NCDOT SPECIFICATIONS.
2. NOTIFY THE ENGINEER OF ANY BROKEN BARS OR BARS WHICH ARE DETERMINED TO HAVE A SECTION LOSS OF 25% OR GREATER.
3. INSTALL DOWELS IN ACCORDANCE WITH NCDOT SPECIFICATIONS.

DOWEL DIMENSIONS (UNLESS OTHERWISE NOTED)

DOWEL SIZE	HOLE DIAMETER	EMBEDMENT LENGTH	MIN LAP LENGTH
4	5/8"	8"	1'-9"
5	3/4"	9"	2'-2"
6	7/8"	11"	2'-7"
8	1 1/8"	1'-4"	4'-6"



PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043777 JACOB H. DUKE
11/16/2020

KCA KISINGER CAMPO & ASSOCIATES
301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL NOTES

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
CHECKED BY : JACOB H. DUKE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

11/16/2020
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User:jduke

CONSTRUCTION OPERATIONS:

1. FOR WORK ADJACENT TO THE PUBLIC, THE CONTRACTOR IS RESPONSIBLE TO ADEQUATELY PROTECT THE TRAVELING PUBLIC. THIS INCLUDES, BUT IS NOT LIMITED TO FENCING OFF OPERATIONS, SIDEWALK CLOSURES, LANE CLOSURES, DEBRIS SHIELDS, ETC.
2. COORDINATE ANY FACILITY CLOSURES IN ACCORDANCE WITH THE TRAFFIC MANAGEMENT PLANS AND THE SPECIAL PROVISIONS.
3. EXISTING JOINTS AND DRAINS SHALL BE SEALED PRIOR TO BEGINNING REPAIRS OF BRIDGE DECK.

WORK ON THE WATER:

1. CONTACT THE US COAST GUARD 30 DAYS PRIOR TO IN-WATER CONSTRUCTION ACTIVITIES. THE NAVIGABLE CHANNEL SHALL NOT BE BLOCKED DURING CONSTRUCTION. FOR U.S. COAST GUARD CONTACT INFORMATION, SEE SPECIAL PROVISION FOR "COORDINATION WITH THE U.S. COAST GUARD".
2. THE CONTRACTOR SHALL LIMIT SUBSTRUCTURE REPAIRS AND CONTAINMENT, TO HALF OF THE CHANNEL SPAN AT A TIME IN ORDER TO REDUCE THE IMPACTS TO BOATERS.
3. THE CONTRACTOR SHALL MONITOR VHF RADIO AND COMMUNICATE WITH MARINE TRAFFIC AS NECESSARY. CONTRACTOR SHALL MONITOR CHANNEL 16.
4. THE CONTRACTOR SHALL NOTIFY AND/OR COORDINATE WITH THE COAST GUARD WHENEVER THE CONTRACTOR PLANS TO BE IN THE WATER FOR ANY PERIOD OF TIME.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AND ADJUSTING ALL NAVIGATIONAL LIGHTS AS NECESSARY THROUGHOUT THE LIFE OF THE PROJECT.
6. NEVER BLOCK MORE THAN 1/2 THE NAVIGABLE CHANNEL.

MARINE TRAFFIC:

MARINE TRAFFIC CONSTRUCTION SIGNS SHALL BE PLACED ON BOTH FACES OF EACH BRIDGE AT THE LOCATIONS WHERE WORK IS BEING PERFORMED. PLACEMENT OF THE SIGNS SHALL BE SUCH THAT THEY ARE CLEARLY VISIBLE TO THE APPROACHING MARINE TRAFFIC. BARGES LEFT IN WATER IN LOW-LIGHT CONDITIONS SHALL BE ILLUMINATED SO AS TO BE VISIBLE TO MARINE TRAFFIC.

LOCAL TRAFFIC AND PUBLIC USAGE:

1. FOR LANE CLOSURE TIMES AND RESTRICTIONS, SEE TRANSPORTATION MANAGEMENT PLAN.
2. ONLY CLOSE OR NARROW LANES UNDER THE BRIDGE AT AREAS WHERE WORK IS BEING PERFORMED. DO NOT CLOSE OR NARROW LANES IN AREAS UNDER THE BRIDGE IF NO WORK IS BEING PERFORMED.
3. ACCESS TO ALL PUBLIC FACILITIES SHALL REMAIN OPEN THROUGHOUT THE LIFE OF THE PROJECT. SUCH FACILITIES ARE INCLUDED BUT ARE NOT LIMITED TO: BOAT RAMPS, GAZEBOS, PARKING AREAS, RESTROOMS, ETC.

FINAL PAVEMENT MARKINGS AND MARKERS

1. FOR FINAL PAVEMENT MARKING PLANS, SEE TRANSPORTATION MANAGEMENT PLANS.
2. FOR FINAL PAVEMENT MARKINGS AND MARKERS, SEE STANDARD SPECIFICATIONS.
3. PLACE (PERMANENT) (4") THERMOPLASTIC MARKINGS ON FINAL ASPHALT SURFACES.
4. PLACE (PERMANENT) (4") COLD APPLIED PLASTIC MARKINGS ON FINAL CONCRETE SURFACES.
5. ANY UNANTICIPATED REMOVAL OF PAVEMENT MARKINGS AND MARKERS SHALL BE REPLACED IN KIND.

MIN. CONCRETE COVER TABLE

Structure Element	Cover: All Other Sites	Cover: Corrosive Sites
Bridge Deck		
to top of slab	2 ½" (65 mm)	2 ½" (65 mm)
to bottom of slab	1 ¼" (32 mm)	1 ¼"(32 mm)*
Footings and Pile Caps		
to top face	2" (50 mm)	4" (100 mm)
to all other faces	3" (75 mm)	4" (100 mm)
Bent Caps		
to bottom of cap	3" (75 mm)	4" (100 mm)
to ends of cap	2" (50 mm)	3" (75 mm)
to top of cap (stirrups)	2" (50 mm)	3" (75 mm)
to sides of cap (stirrups)	2" (50 mm)	3" (75 mm)
Columns (spiral)	2" (50 mm)	3" (75 mm)
Drilled Piers (spiral)	5" (125 mm)**	6" (150 mm)**
Culverts		
to bottom of bottom slabs and footings	3" (75 mm)	3" (75 mm)
to all other faces	2" (50 mm)	2" (50 mm)
Approach Slabs	2" (50 mm)	2" (50 mm)

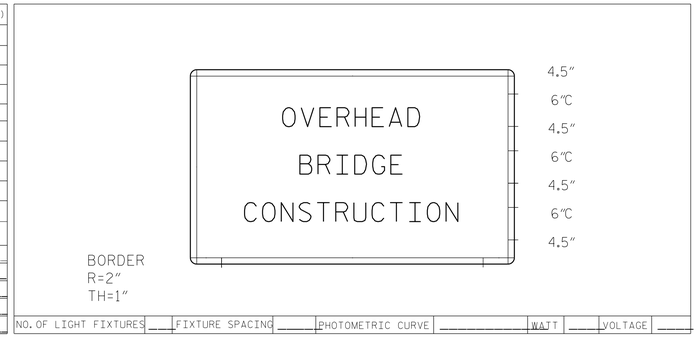
* WHEN USING REMOVEABLE FORMS, COVER SHALL BE INCREASED TO 2½"

** IN THE EVENT THE DRILLED PIER EXTENDS INTO A BENT CAP OR PILE CAP, THE COVER MAY BE REDUCED TO 4"

SIGN NAME	OHBC	QTY	2	SIGN NO.	STATION(S)
PANEL		BORDER			
WIDTH	5'-0"	WIDTH	1"		
HEIGHT	3'-0"	RADII	2"		
LEGEND	Black	COLOR	Black		
COLOR	Yellow				

SYMBOL(S)	ANGLE	X	Y	WID	HT

SIGN NO.	NO. OF POSTS	EDGE OF LANE CLEARANCE	COLUMN SIZE	AVERAGE LENGTH



NO. OF LIGHT FIXTURES ___ FIXTURE SPACING _____ PHOTOMETRIC CURVE _____ WATT ____ VOLTAGE _____

COPY		O	V	E	R	H	E	A	D		L												
SPACE	13.2	4.3	4.6	4.1	4.4	4.7	3.6	4.7	3.4	13.2	33.6												
COPY		B	R	I	D	G	E		L														
SPACE	18.5	4.4	4.4	2.2	4.4	4.6	3.1	18.5	23														
COPY		C	O	N	S	T	R	U	C	T	I	O	N		L								
SPACE	5.8	4.4	4.7	4.4	3.9	3.9	4.4	4.6	4.1	3.9	2	4.7	3.4	5.8	48.4								
COPY																							
SPACE																							
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SPACE																							
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SPACE																							

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 2 OF 2

DocuSigned by: Jacob Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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GENERAL NOTES

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-2B
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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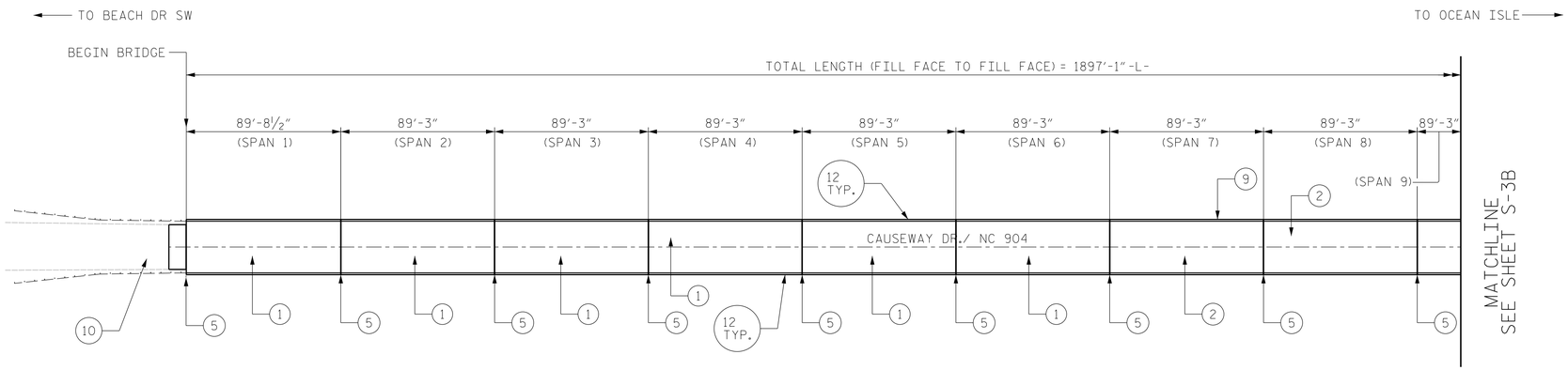
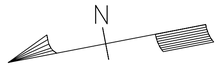
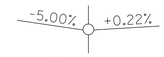
User:jdebone

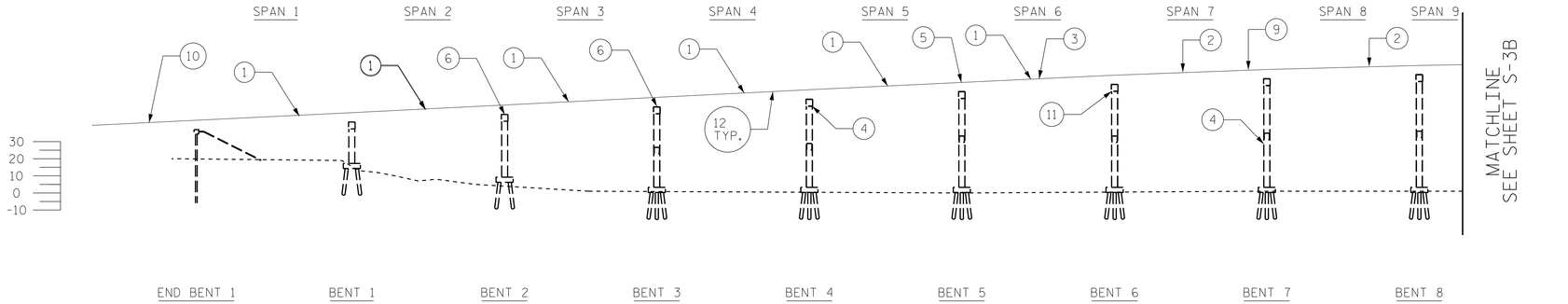




PLAN

(SUBSTRUCTURE UNITS NOT SHOWN FOR CLARITY)





ELEVATION

BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION
END BENT 1	47+16.79	BENT 5	42+70.00	BENT 10	38+23.75	BENT 15	33+49.75	BENT 20	29+08.50
BENT 1	46+27.00	BENT 6	41+80.75	BENT 11	37+34.50	BENT 16	32+61.50	END BENT 2	28+18.17
BENT 2	45+37.75	BENT 7	40+91.50	BENT 12	36+14.50	BENT 17	31+73.25		
BENT 3	44+48.50	BENT 8	40.02.25	BENT 13	35+26.25	BENT 18	30+85.00		
BENT 4	43+59.25	BENT 9	39+13.00	BENT 14	34+38.00	BENT 19	29+96.75		

HYDRAULIC DATA FROM INITIAL DESIGN:

DESIGN HIGH WATER ELEVATION: (HURRICANE HAZEL)	16.4 FT.
FREQUENCY OF FLOOD:	500 YR.

NOTES:

CURVE AND HYDRAULIC DESIGN DATA BASED ON INITIAL DESIGN.

STATIONING BASED ON EXISTING PLANS.

SPAN AND BENT NUMBERS BASED ON CURRENT BRIDGE INSPECTION REPORT.

1. LMC OVERLAY
2. SILANE DECK TREATMENT
3. SUPERSTRUCTURE CONCRETE REPAIRS (TYP)
4. SUBSTRUCTURE CONCRETE REPAIRS (TYP)
5. EXPANSION JOINT REPLACEMENT/INSTALLATION (TYP.)
6. BEARING REPLACEMENT
7. INTEGRAL PILE JACKETING
8. GALVANIC CATHODIC PROTECTION - BULK ANODE
9. RAIL RETROFIT (TYP.)
10. APPROACH ROADWAY MILLING AND RESURFACING
11. EPOXY COATING BEAM ENDS
12. WATER LINE REMOVAL

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 1 OF 2

DocuSigned by: Jacob H. Duke 2903...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER THE INTRACOASTAL WATERWAY BETWEEN BEACH DR. SW AND E. 1ST ST.

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

DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/3/2020
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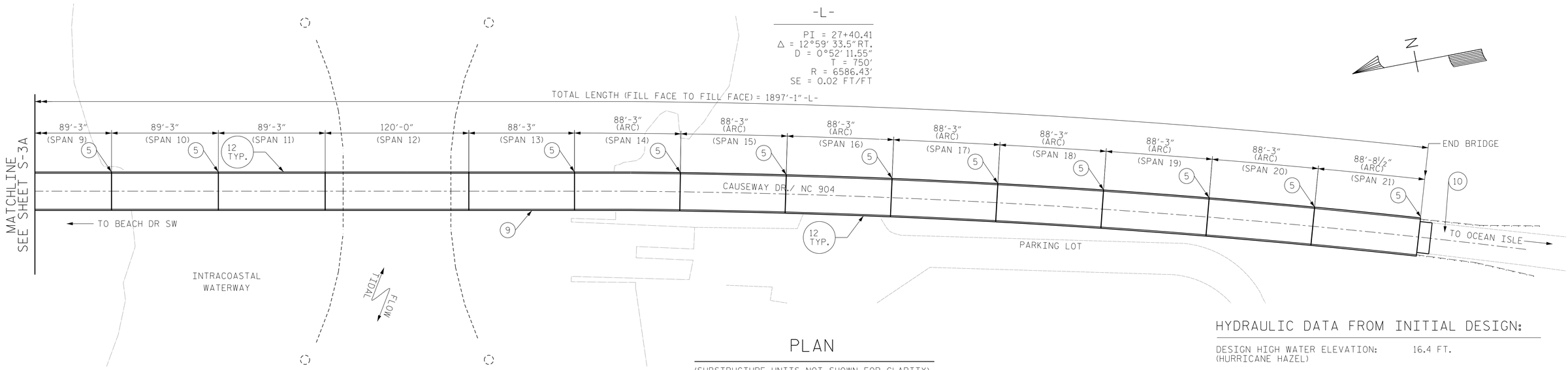
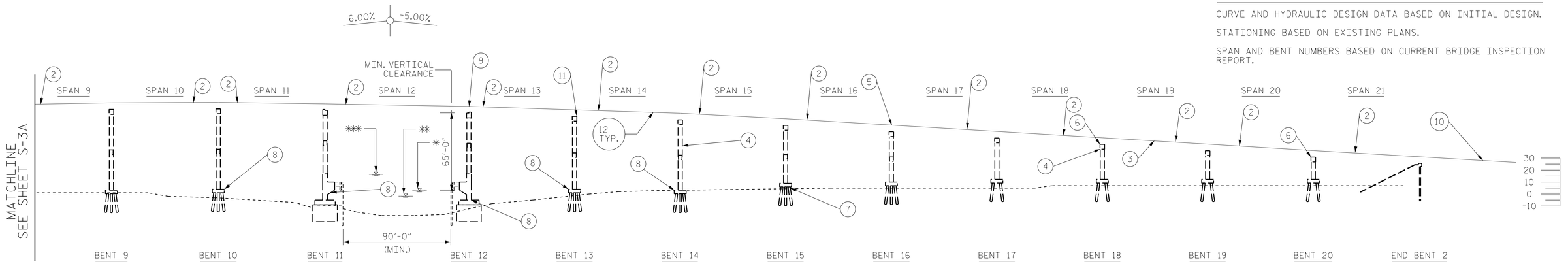
User:jdebone



PLAN

(SUBSTRUCTURE UNITS NOT SHOWN FOR CLARITY)



ELEVATION

* MEAN HIGH TIDE EL. 2.80

** MEAN LOW TIDE EL. -1.80

*** HURRICANE HAZEL (1954) EL. 16.40

HYDRAULIC DATA FROM INITIAL DESIGN:

DESIGN HIGH WATER ELEVATION: (HURRICANE HAZEL)	16.4 FT.
FREQUENCY OF FLOOD:	500 YR.

NOTES:

CURVE AND HYDRAULIC DESIGN DATA BASED ON INITIAL DESIGN.

STATIONING BASED ON EXISTING PLANS.

SPAN AND BENT NUMBERS BASED ON CURRENT BRIDGE INSPECTION REPORT.

SCOPE LEGEND:

1. LMC OVERLAY
2. SILANE DECK TREATMENT
3. SUPERSTRUCTURE CONCRETE REPAIRS (TYP)
4. SUBSTRUCTURE CONCRETE REPAIRS (TYP)
5. EXPANSION JOINT REPLACEMENT/INSTALLATION (TYP.)
6. BEARING REPLACEMENT
7. INTEGRAL PILE JACKETING
8. GALVANIC CATHODIC PROTECTION - BULK ANODE
9. RAIL RETROFIT (TYP.)
10. APPROACH ROADWAY MILLING AND RESURFACING
11. EPOXY COATING BEAM ENDS
12. WATER LINE REMOVAL

BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION
END BENT 1	47+16.79	BENT 5	42+70.00	BENT 10	38+23.75	BENT 15	33+49.75	BENT 20	29+08.50
BENT 1	46+27.00	BENT 6	41+80.75	BENT 11	37+34.50	BENT 16	32+61.50	END BENT 2	28+18.17
BENT 2	45+37.75	BENT 7	40+91.50	BENT 12	36+14.50	BENT 17	31+73.25		
BENT 3	44+48.50	BENT 8	40.02.25	BENT 13	35+26.25	BENT 18	30+85.00		
BENT 4	43+59.25	BENT 9	39+13.00	BENT 14	34+38.00	BENT 19	29+96.75		

DocuSigned by: Jacob H. Duke 2BC1A1D0C7E4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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LICENSE #: C-1506

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DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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User:jdebone

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

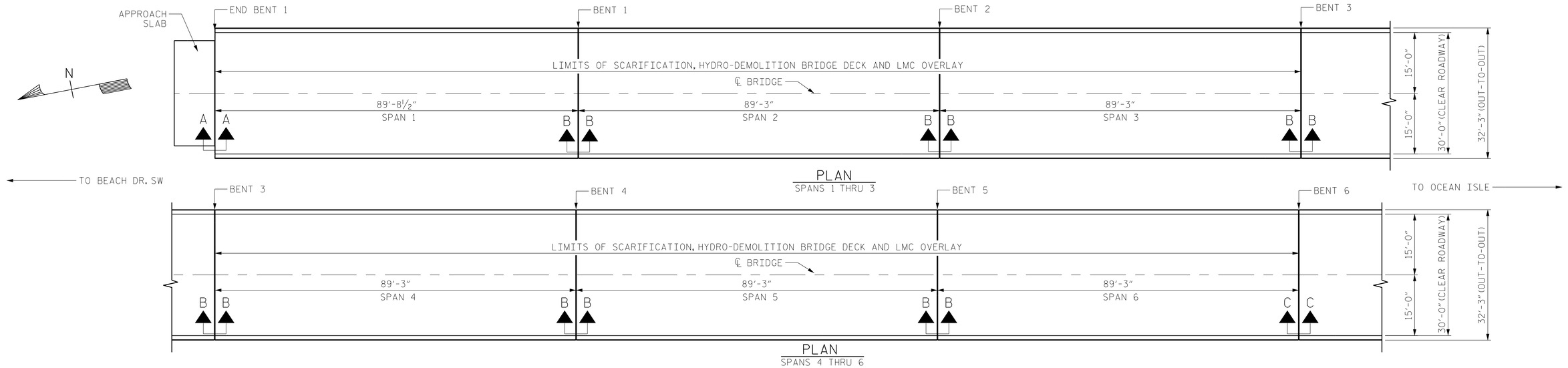
SHEET 2 OF 2

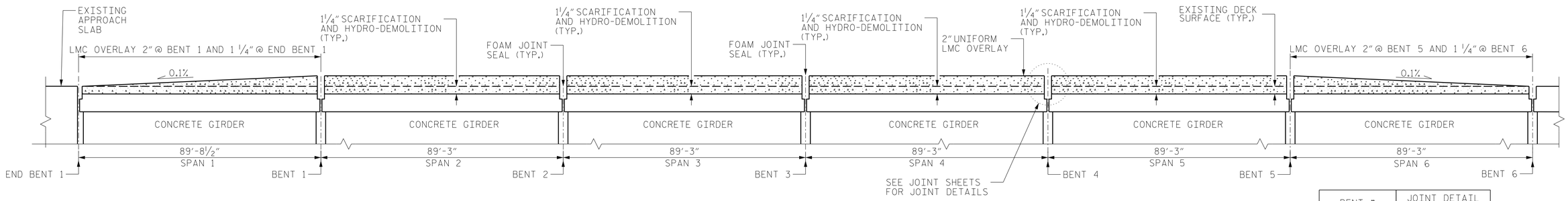
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER THE INTRACOASTAL WATERWAY BETWEEN BEACH DR. SW AND E. 1ST ST.

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





LMC OVERLAY THICKNESS DETAIL

SPANS 1 THRU 6 (NOT TO SCALE)

BENT #	JOINT DETAIL DESIGNATION
END BENT 1	A - A
1	B - B
2	B - B
3	B - B
4	B - B
5	B - B
6	C - C

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANITITES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

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

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2½″ PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1½″ TO 2″ BASED ON VISUAL INSPECTION EXCEPT FOR SPAN 3, WHERE THE CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 0″ TO ½″.

MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.

FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATIONS.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

FOR BRIDGE DECK RIDEABILITY AND GROOVING, SEE SPECIAL PROVISIONS.

FOR CONCRETE FOR DECK REPAIR, SEE SPECIAL PROVISIONS.

FOR VOLUMETRIC MIXER, SEE SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

	SPAN 1		SPAN 2 THRU 5		SPAN 6	
	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL
SCARIFYING BRIDGE DECK	299 SY		298 SY		298 SY	
CLASS II SURFACE PREPARATION	0.2 SY		0.2 SY		0.2 SY	
CLASS III SURFACE PREPARATION	0.0 SY		0.0 SY		0.0 SY	
HYDO-DEMOLITION OF BRIDGE DECK	299 SY		298 SY		298 SY	
LATEX OVERLAY - VERY EARLY STRENGTH	14.9 CY		18.3 CY		14.9 CY	
PLACING & FINISHING LMC OVERLAY	299 SY		298 SY		298 SY	
GROOVING BRIDGE FLOORS	2413 SF		2401 SF		2401 SF	

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

Jacob Duke DocuSigned by:

11/16/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN SPANS 1 THRU 6

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

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

11/16/2020
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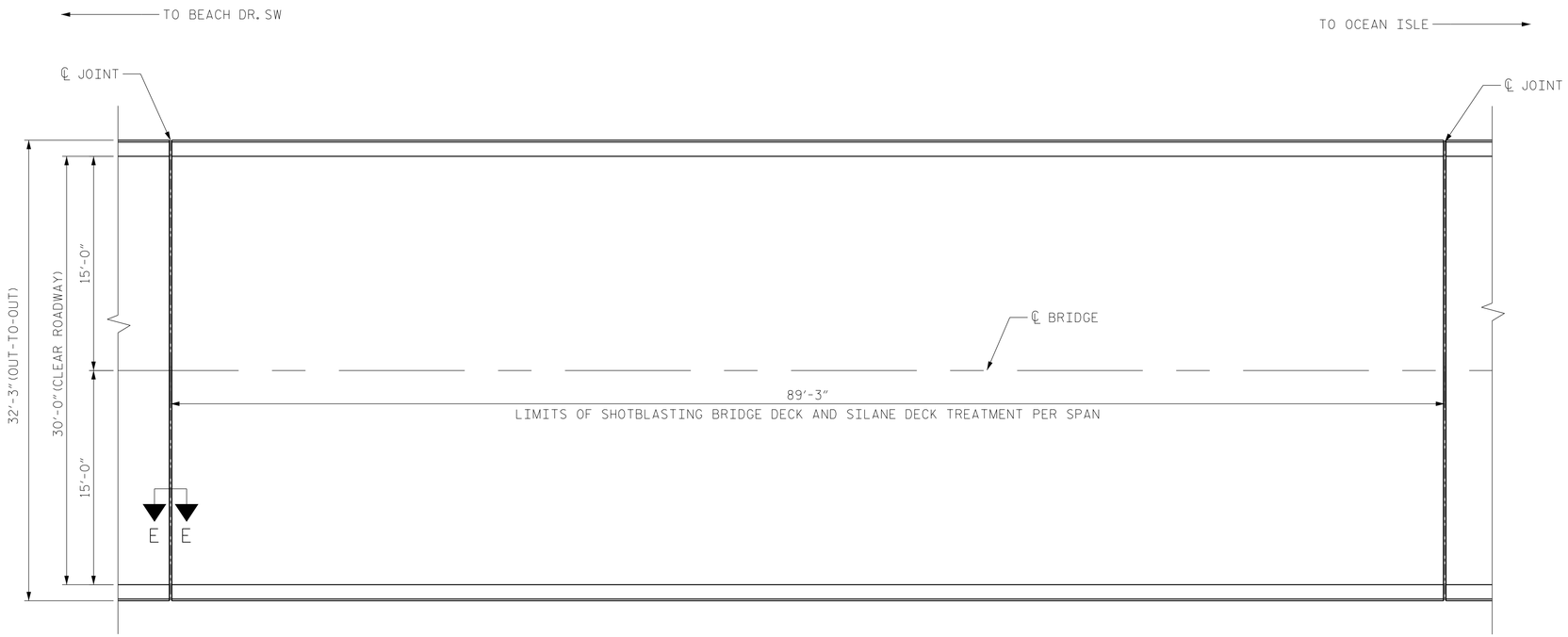
User:jduke



PLAN

AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

	SPANS 7 THRU 11	
	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	298 SY	
SILANE DECK TREATMENT	298 SY	

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANITITES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

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

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2½" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SURFACE PREPARATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1½" TO 2" BASED ON VISUAL INSPECTION.

MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.

FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

BENT #	JOINT DETAIL DESIGNATION
7	D - D
8	E - E
9	E - E
10	E - E

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2903B3B3B3B3B3B...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN
SPANS 7 THRU 11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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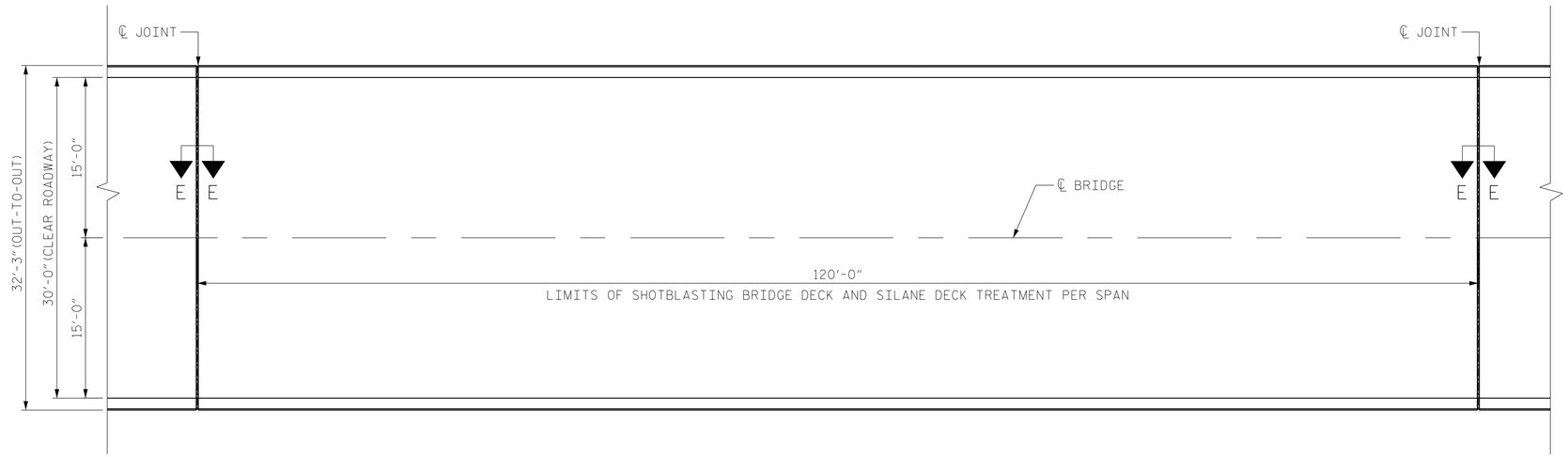
User:jdebone

TO BEACH DR. SW

TO OCEAN ISLE



PLAN

AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

SPAN 12

	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	400 SY	
SILANE DECK TREATMENT	400 SY	

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANITITES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

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

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2½" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SURFACE PREPARATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1½" TO 2" BASED ON VISUAL INSPECTION.

MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.

FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

BENT #	JOINT DETAIL DESIGNATION
11	E - E
12	E - E

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2DC4B4B4B2C1...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 852-7839
LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN SPAN 12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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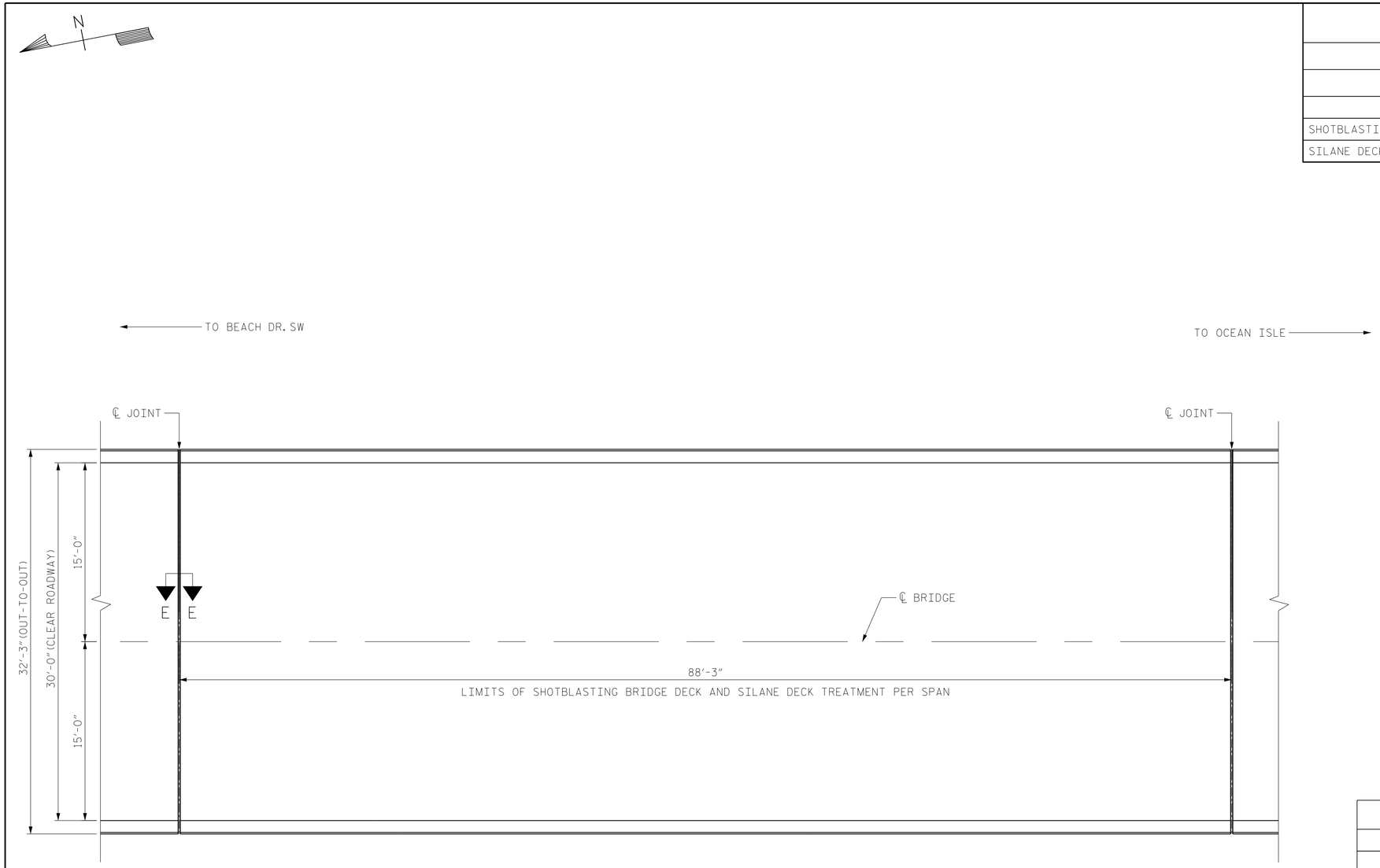
User:jdebone

AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

	SPANS 13 THRU 20	
	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	294 SY	
SILANE DECK TREATMENT	294 SY	



PLAN

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANITITES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

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

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2½" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SURFACE PREPARATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1½" TO 2" BASED ON VISUAL INSPECTION.

MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.

FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

BENT #	JOINT DETAIL DESIGNATION
13	E - E
14	E - E
15	E - E
16	D - D
17	E - E
18	E - E
19	E - E
20	E - E

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2DE4B0B0C3E4E4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN
SPANS 13 THRU 20

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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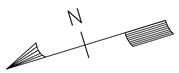
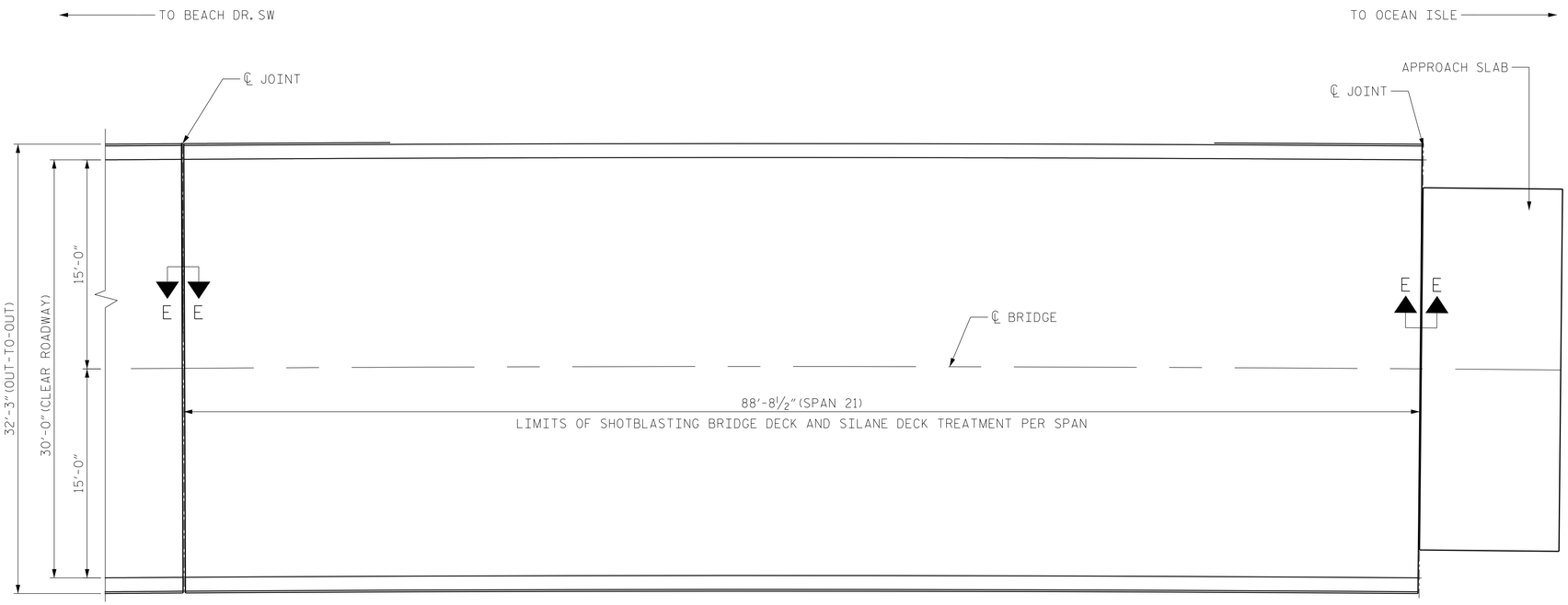
User:jdebone





PLAN

AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

SPAN 21

	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	299 SY	
SILANE DECK TREATMENT	299 SY	

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANITITES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

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

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2½" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SURFACE PREPARATION.

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FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

BENT #	JOINT SECTION
20	E - E
END BENT 2	E - E

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2DB8A8B8A3E4E4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN SPAN 21

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/3/2020
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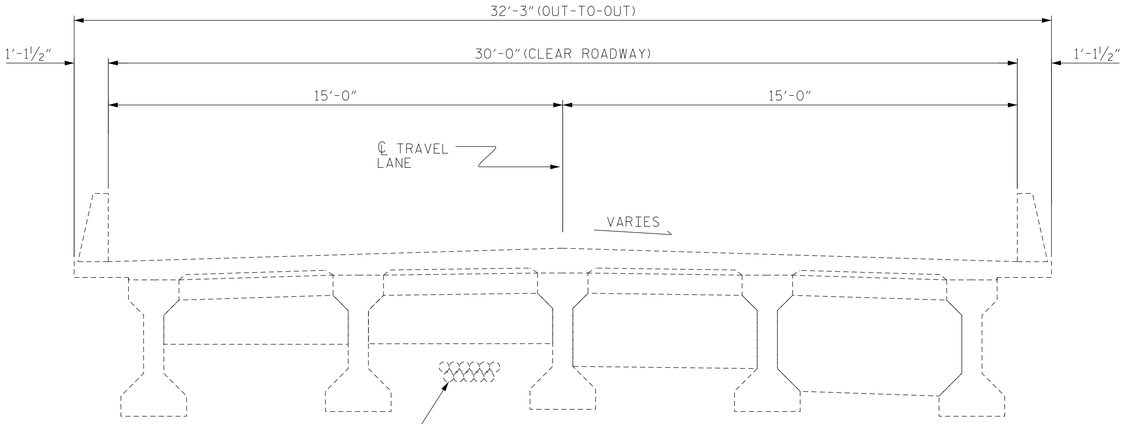
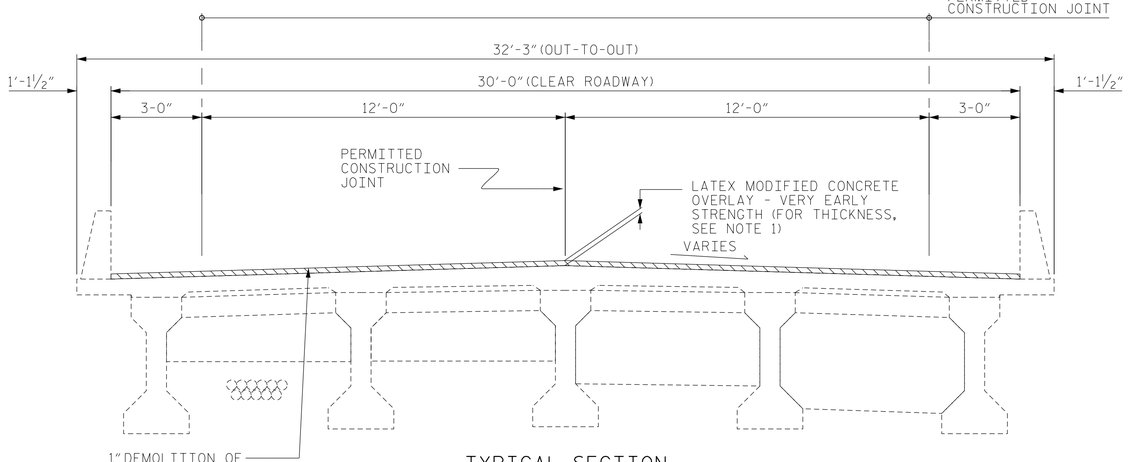
User:jdebone



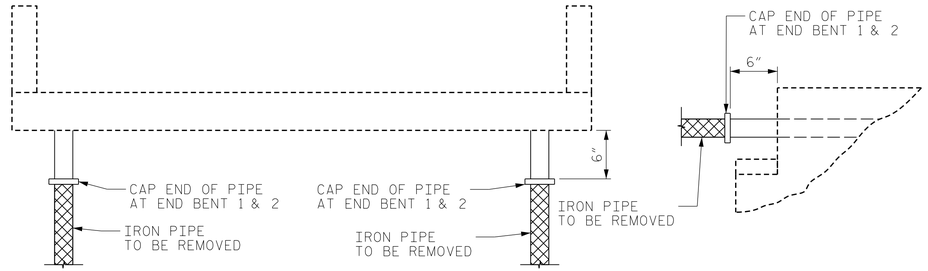
TYPICAL SECTION

(EXISTING SPANS 1 THRU 6)
(PROPOSED RAIL RETROFIT NOT SHOWN)



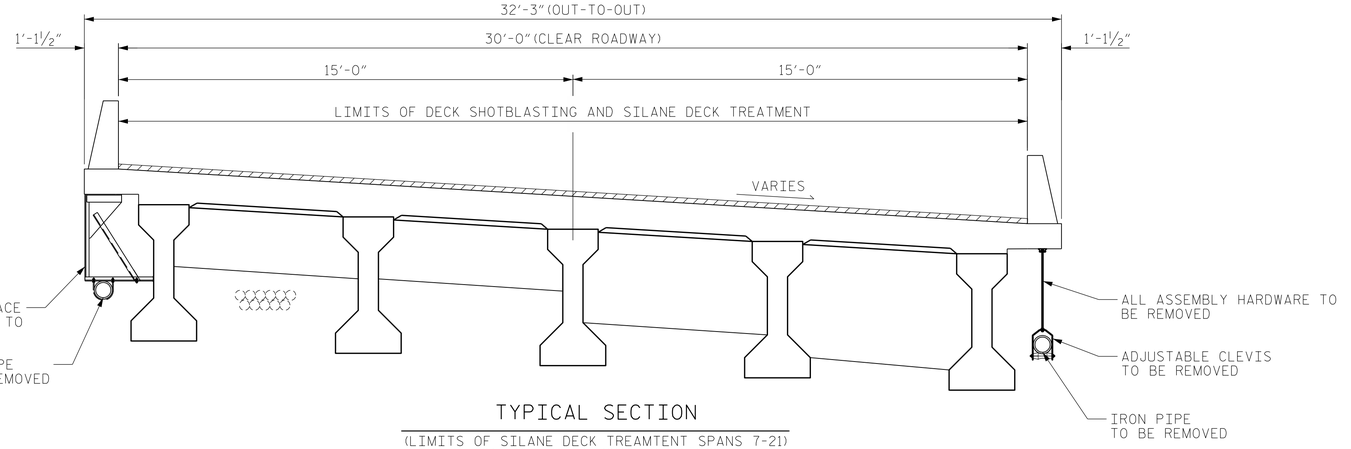
TYPICAL SECTION

(PROPOSED SPANS 1 THRU 6)
(PROPOSED RAIL RETROFIT NOT SHOWN)



WATER LINE REMOVAL DETAILS AT END BENT 1 & 2

PLAN

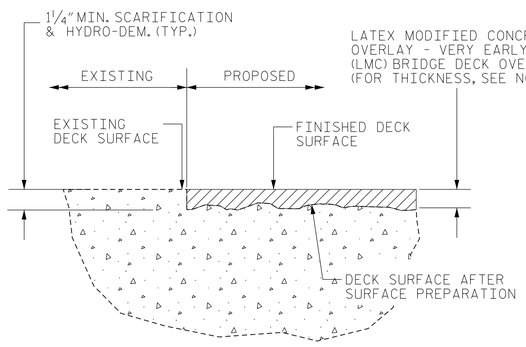


TYPICAL SECTION

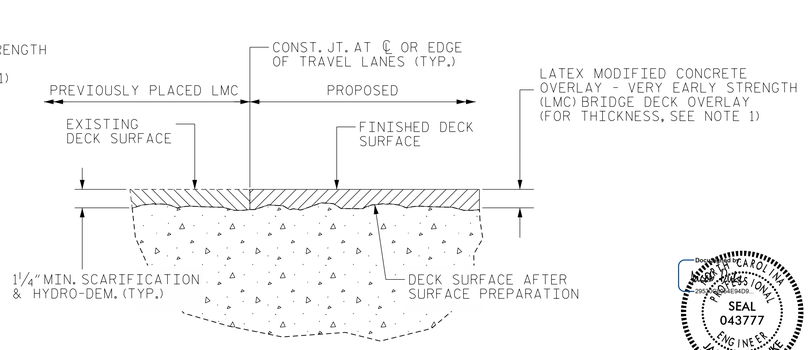
(LIMITS OF SILANE DECK TREAMTENT SPANS 7-21)
(WATER LINE REMOVAL DETAILS)

NOTES:

1. LMC BRIDGE DECK OVERLAY IS TO BE APPLIED ON SPANS 1 THRU 6 ONLY. SPAN 2 THROUGH 5 HAVE A 2" UNIFORM THICKNESS, WHILE THE THICKNESS ON SPANS 1 AND 6 TRANSITIONS FROM 1¼" TO 2". FOR FURTHER DETAILS SEE "PLAN OF SPAN - SPANS 1 THRU 6" SHEET.
2. LONGITUDINAL CONSTRUCTION JOINTS OF OVERLAYS SHALL BE LOCATED ALONG THE CENTERLINE OR EDGE OF TRAVEL LANES.
3. SEE TRAFFIC MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING, AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF LATEX MODIFIED CONCRETE OVERLAY - VERY EARLY STRENGTH (LMC) SYSTEM AND SURFACE PREPARATION.
4. FOR PROPOSED RAIL RETROFIT DETAILS, SEE "RAIL RETROFIT" SHEETS.
5. WATER LINE HANGER ASSEMBLIES VARY BY LOCATION AT BOTH BRIDGE OVERHANGS. THE ASSEMBLIES SHOWN ARE FOR REPRESENTATIVE PURPOSES. FULLY REMOVE THE WATER LINE HANGER ASSEMBLIES.
6. FOR WATER LINE REMOVAL, SEE SPECIAL PROVISIONS.
7. THE CONTRACTOR'S ATTENTION IS CALLED TO THE PRESENCE OF PVC UTILITY LINES IN BAY 2 ALONG THE LENGTH OF THE BRIDGE. THE CONTRACTOR SHALL PLAN WORK ACTIVITIES ACCORDINGLY OR WORK WITH THE UTILITY OWNERS TO MOVE LINES IF NECESSARY. COST FOR SUCH ACTIVITIES AND COORDINATION DUE TO THE PRESENCE OF THE UTILITY SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS FOR THE PROJECT
8. PORTIONS OF WATER LINES THAT REMAIN IN PLACE AFTER REMOVAL FROM THE BRIDGE SHALL BE FILLED WITH FLOWABLE FILL PRIOR TO CAPPING. FLOWABLE FILL SHALL MEET REQUIREMENTS OF SUBARTICLE 1000-6 OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND THE APPROPRIATE UTILITIES TO DETERMINE THE APPROPRIATE LOCATION OF VALVES AND OTHER TRUNCATION LOCATIONS OF THE REMAINING WATER LINES TO BE FILLED. BASED ON THE BEST INFORMATION AVAILABLE, IT IS ANTICIPATED THAT THE QUANTITY OF FLOWABLE FILL NECESSARY FOR FILLING THE REMAINING WATER LINES IS APPROXIMATELY 15 CUBIC YARDS. COST FOR FILLING THE REMAINING WATER LINES SHALL BE INCIDENTAL TO THE WATER LINE REMOVAL PAY ITEM.



DETAIL FOR LMC OVERLAY



DETAIL FOR STAGED LMC OVERLAY

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

12/4/2020
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User:jduke

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043777 JACOB H. DUKE
12/4/2020

KCA KISINGER CAMPO & ASSOCIATES
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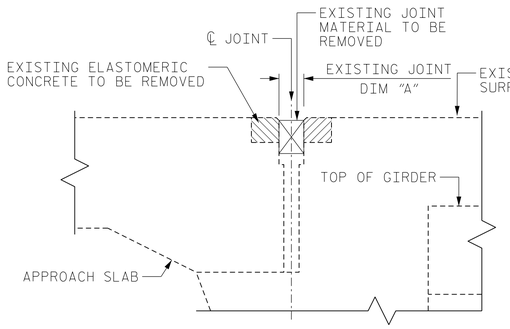
(919) 882-7839
LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

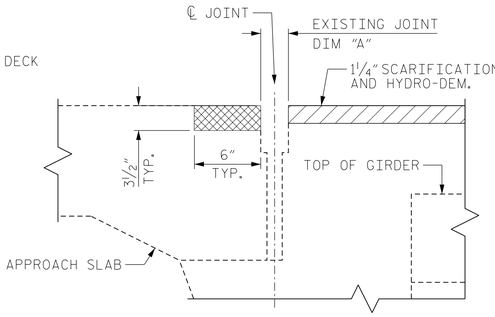
TYPICAL SECTIONS LMC OVERLAY & WATER LINE REMOVAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			45



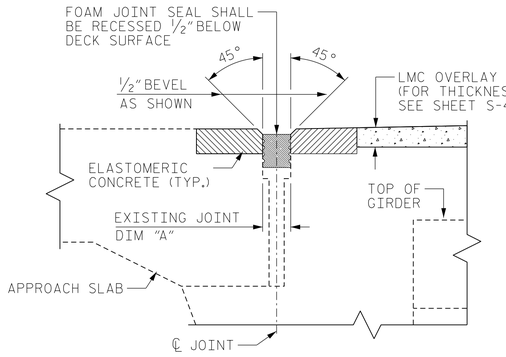
SECTION A-A

(EXISTING JOINT)



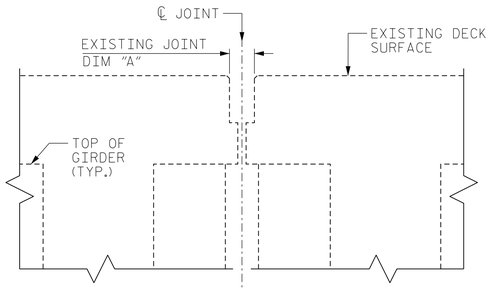
SECTION A-A

(MIN. EXISTING JOINT DEMOLITION)



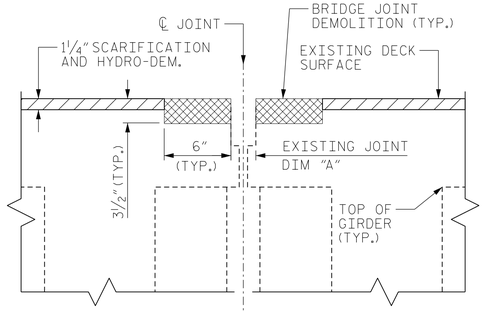
SECTION A-A

(PROPOSED JOINT SEAL)



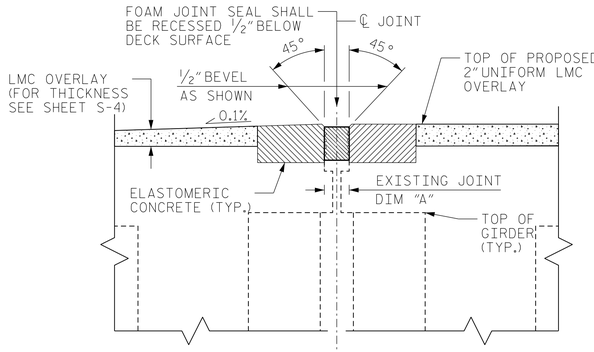
SECTION B-B

(EXISTING JOINT PRIOR TO LMC OVERLAY)



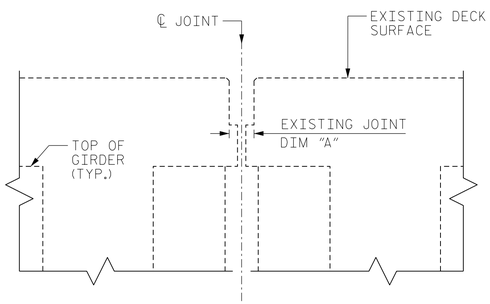
SECTION B-B

(SCARIFICATION AND HYDRO-DEMOLITION)



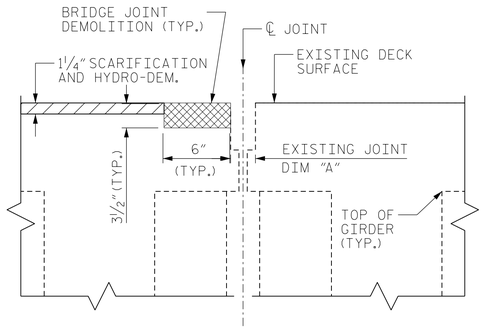
SECTION B-B

(PROPOSED FOAM JOINT SEAL)



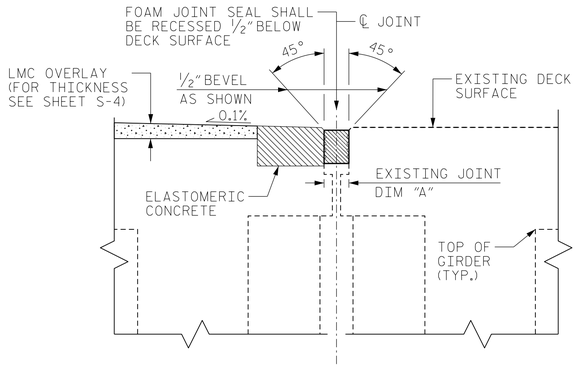
SECTION C-C

(EXISTING JOINT PRIOR TO LMC OVERLAY)



SECTION C-C

(SCARIFICATION AND HYDRO-DEMOLITION)



SECTION C-C

(PROPOSED FOAM JOINT SEAL)

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF THE ACTUAL OPENING VARIES FROM THE OPENING INDICATED IN THE DETAIL BY MORE THAN ¼", NOTIFY THE ENGINEER. REVISION OF THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

FOAM JOINTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL THAT FALLS BELOW THE BRIDGE, WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRDIGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRATCTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLED FOAM JOINT SHALL BE WATER TIGHT.

QUANTITIES SHOWN IN THE ELASTOMERIC CONCRETE FOR PRESERVATION TABLE BASED ON THE MINIMUM JOINT DEMOLITION SHOWN.

FOR EXCAVATION BELOW THE BOTTOM OF THE PLANNED JOINT DECK DEMOLITION, CONCRETE FOR DECK REPAIRS SHALL BE PLACED IN THE EXCAVATED AREA TO THE ELEVATION AT BOTTOM OF THE PROPOSED ELASTOMERIC CONCRETE FOR PRESERVATION HEADERS SHOWN.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR CONCRETE FOR DECK REPAIR, SEE SPECIAL REVISION.

FOR DIM "A", SEE TABLE 1 ON SHEET S-11

FOR JOINT QUANTITIES, SEE SHEET S-11.

FOR JOINT AT END BENT 2, REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS (SIMILAR TO SECTION E-E, PROPOSED JOINT SEAL).

BRIDGE JOINT DEMOLITION

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 1 OF 2

DocuSigned by: Jacob Duke
SIGNATURE

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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RALEIGH, NC 27601
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LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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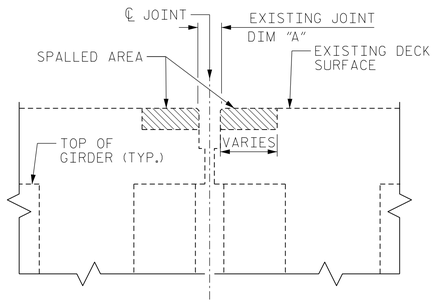
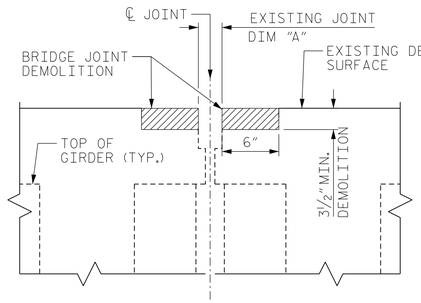
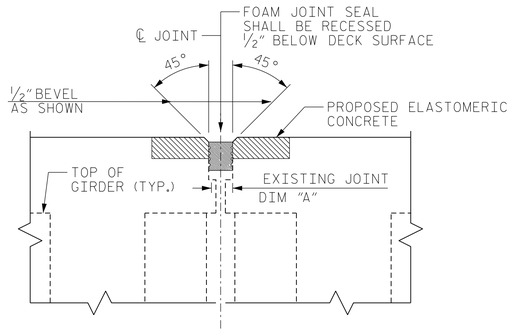
User:jdebone



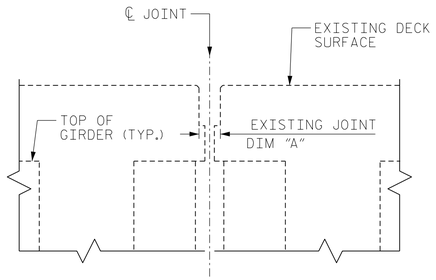
SECTION D-D
(EXISTING JOINT)



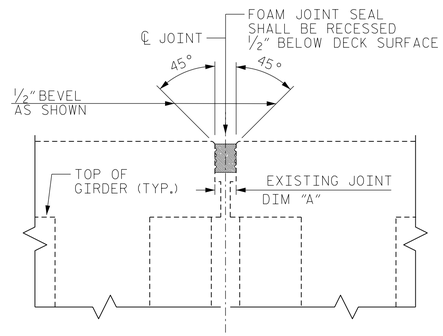
SECTION D-D
(MIN. EXISTING JOINT DEMOLITION)



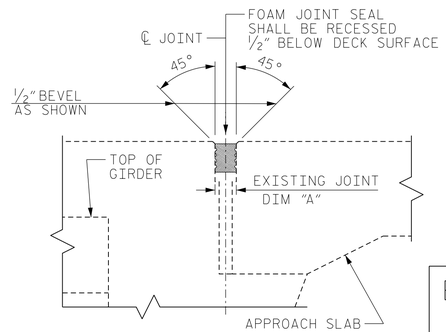
SECTION D-D
(PROPOSED JOINT SEAL)



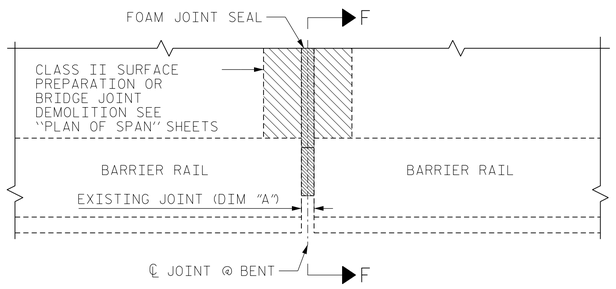
SECTION E-E
(EXISTING JOINT)



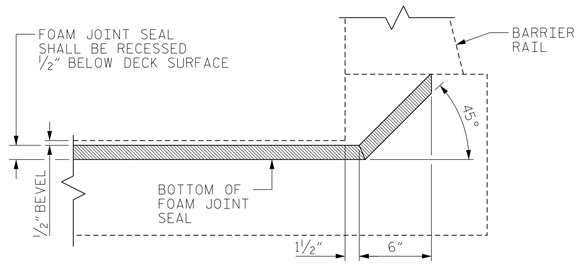
SECTION E-E
(PROPOSED JOINT SEAL)



SECTION E-E
(PROPOSED JOINT SEAL)
(AT END BENT 2)



PLAN AT BARRIER
(PROPOSED JOINT SEAL)



SECTION F-F
(PROPOSED JOINT SEAL)

TABLE 1	
Table Date 10-2018	
BENT/ JOINTS	DIM "A" @ 65°F
END BENT 1	2.00"
1	1.75"
2	1.50"
3	2.00"
4	1.75"
5	1.50"
6	1.50"
7	2.00"
8	1.75"
9	1.50"
10	1.50"
11	3.00"
12	3.00"
13	2.00"
14	2.00"
15	1.50"
16	1.50"
17	1.50"
18	1.50"
19	1.50"
20	2.00"
END BENT 2	2.00"

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF THE ACTUAL OPENING VARIES FROM THE OPENING INDICATED IN THE DETAIL BY MORE THAN ¼", NOTIFY THE ENGINEER. REVISION OF THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

FOAM JOINTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL THAT FALLS BELOW THE BRIDGE, WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRDIGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRATCTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLED FOAM JOINT SHALL BE WATER TIGHT.

QUANTITIES SHOWN IN THE ELASTOMERIC CONCRETE FOR PRESERVATION TABLE BASED ON THE MINIMUM JOINT DEMOLITION SHOWN.

FOR EXCAVATION BELOW THE BOTTOM OF THE PLANNED JOINT DECK DEMOLITION, CONCRETE FOR DECK REPAIRS SHALL BE PLACED IN THE EXCAVATED AREA TO THE ELEVATION AT BOTTOM OF THE PROPOSED ELASTOMERIC CONCRETE FOR PRESERVATION HEADERS SHOWN.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR CONCRETE FOR DECK REPAIR, SEE SPECIAL REVISION.

FOR DIM "A", SEE TABLE 1 ON SHEET S-11

FOR JOINT QUANTITIES, SEE SHEET S-11.

FOR JOINT AT END BENT 2, REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS (SIMILAR TO SECTION E-E, PROPOSED JOINT SEAL).

ELASTOMERIC CONCRETE FOR PRESERVATION		
LOCATION	ESTIMATED (CU.FT.)	ACTUAL (CU.FT.)
END BENT 1	4.6	
BENTS 1 - 5	10.8	
BENT 6	6.1	
BENT 7	8.7	
BENT 16	4.4	

BRIDGE JOINT DEMOLITION		
LOCATION	ESTIMATED (SQ.FT.)	ACTUAL (SQ.FT.)
END BENT 1	16.2	
BENTS 1 - 5	32.5	
BENT 6	16.2	
BENT 7	32.5	
BENT 16	16.2	

JOINT REPAIR QUANTITY		
	ESTIMATED (LIN.FT.)	ACTUAL (LIN.FT.)
FOAM JOINT SEALS FOR PRESERVATION	720 LF	

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013
SHEET 2 OF 2

DocuSigned by: Jacob H. Duke 2954B3E3B8E4B4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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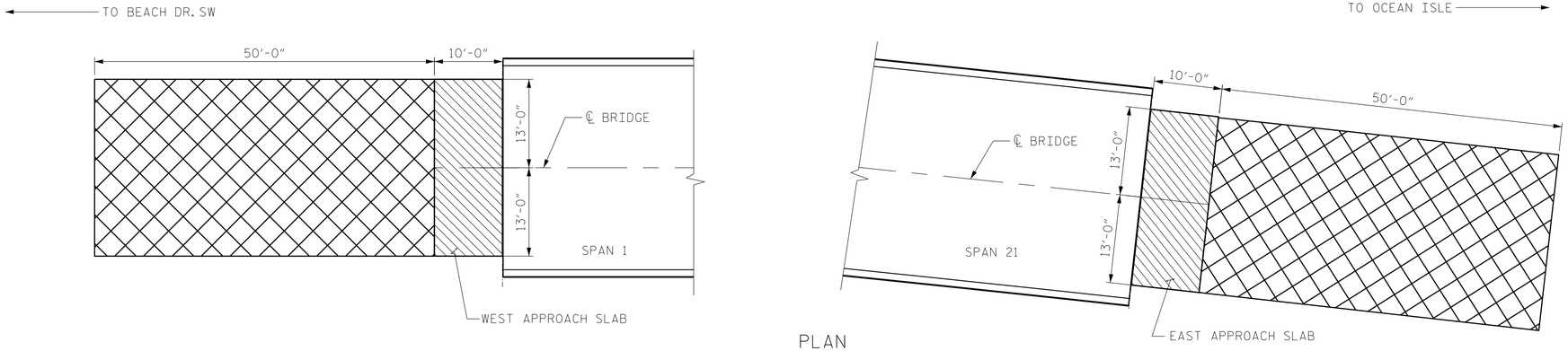
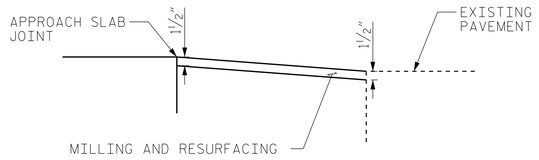
User:jdebonie



PLAN



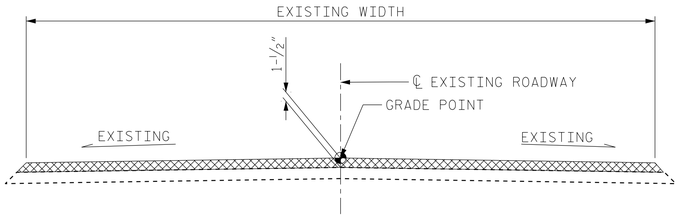
PAVEMENT KEY-IN DETAIL FOR BOTH END BENTS

AS-BUILT QUANTITY TABLE

	ESTIMATE	ACTUAL
INCIDENTAL MILLING	290 SY	
ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C	24.5 TONS	
ASPHALT BINDER FOR PLAN MIXER	1.5 TONS	
SHOTBLASTING BRIDGE DECK (BOTH SLABS)	260 SY	
SILANE DECK TREATMENT (BOTH SLABS)	260 SY	

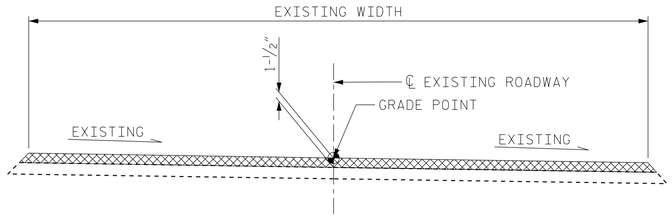
NOTES:

1. INCIDENTAL MILLING - EXISTING APPROACH ASPHALT PAVEMENT TO BE MILLED AS NECESSARY TO ATTAIN MINIMUM 1½" DEPTH OF NEW ASPHALT PAVEMENT. NEW ASPHALT PAVEMENT SHALL BE OF THICKNESS NECESSARY TO PROVIDE A SMOOTH TRANSITION BETWEEN THE ROADWAY AND THE BRIDGE DECK. THE NEW ASPHALT PAVEMENT THICKNESS MAY EXCEED 1½" DUE TO SETTLEMENT OF THE EXISTING APPROACH.
2. FOR NEW ASPHALT PLACEMENT, SEE STANDARD SPECIFICATIONS.
3. GRADE MAY BE ADJUSTED BY THE ENGINEER TO ENSURE PROPER TIE-IN AT THE END BENT 1 APPROACH ROADWAY.



EXISTING SECTION
BEGIN BRIDGE

TYPICAL ROADWAY MILLING SECTION



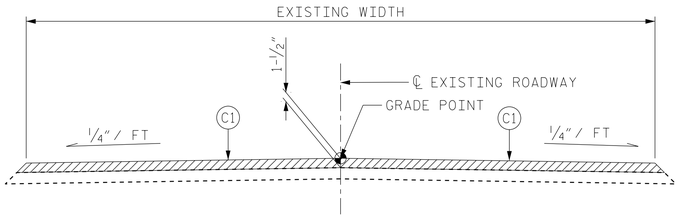
EXISTING SECTION
END BRIDGE

INCIDENTAL MILLING

ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C

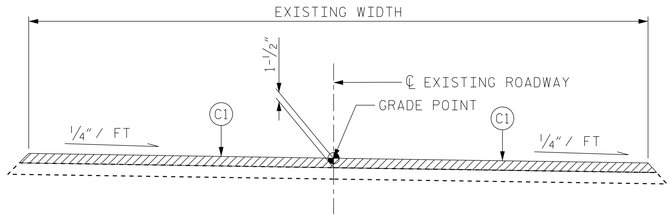
SHOTBLASTING AND SILANE DECK TREATEMENT

C1	PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 2" IN DEPTH.



PROPOSED SECTION
BEGIN BRIDGE

TYPICAL ROADWAY SECTION



PROPOSED SECTION
END BRIDGE

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2DB8A1B3D3E4E4...
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

KCA KISINGER CAMPO & ASSOCIATES
301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

APPROACH ROADWAY
MILLING AND RESURFACING

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/3/2020
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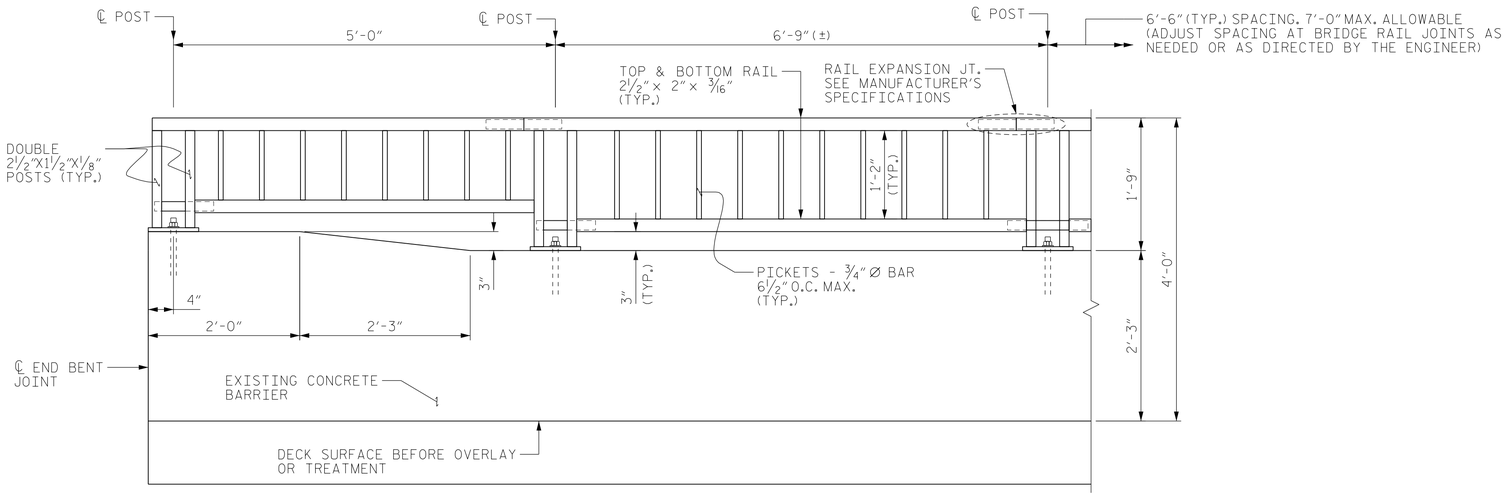
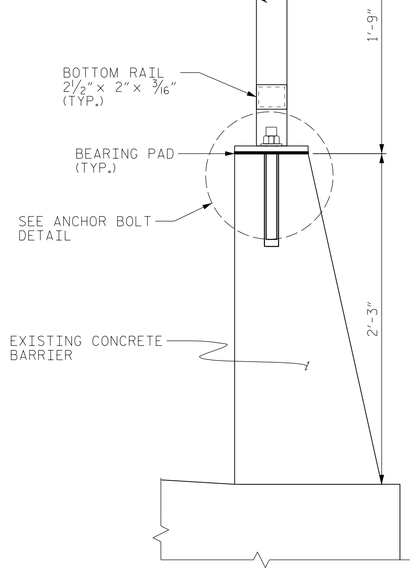
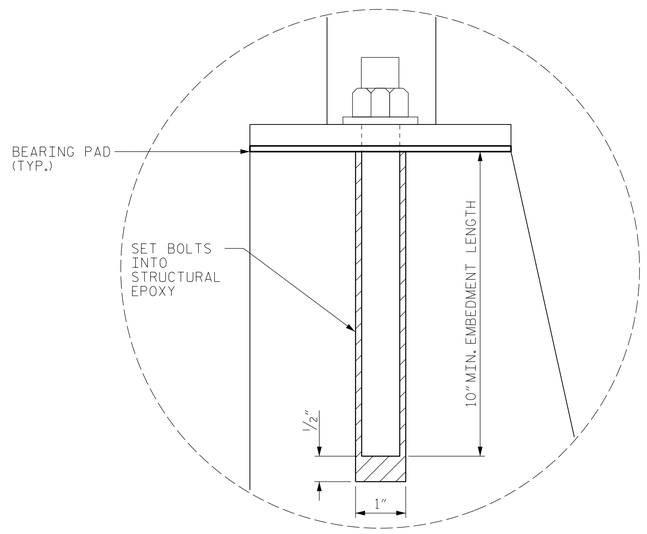
User:jdebone



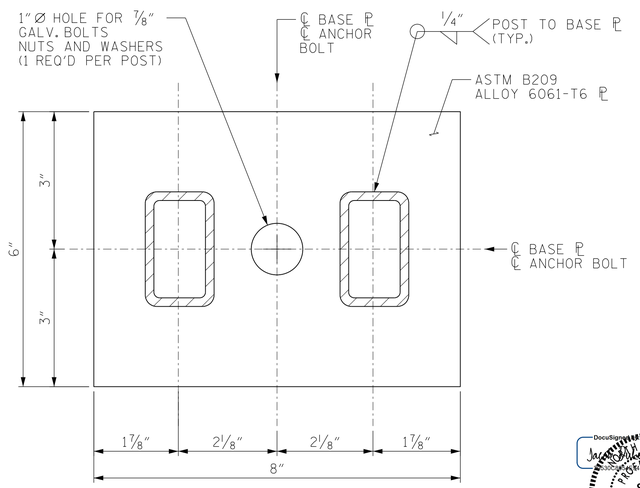
RAIL END ELEVATION



SECTION THROUGH RAIL



ANCHOR BOLT DETAIL



BASE PLATE DETAILS

RAIL RETROFIT NOTES:

1. PROVIDE AN ALUMINUM RAIL RAIL SYSTEM IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. FOR RAIL RETROFIT, SEE SPECIAL PROVISIONS.
3. FOR RAIL POST LOCATIONS, SEE SHEET S-14.
4. ALL BARRIER RAIL POSTS ARE TO BE VERTICALLY PLUMB. PROVIDE SHORTER POSTS AT THE FOUR END LOCATIONS TO MAINTAIN LEVEL HORIZONTAL RAILS AS SHOWN IN THIS SHEET.
5. POSTS, BASES AND RAILS SHALL BE ASTM B-221 ALLOY-T6. THE CONTRACTOR SHALL USE SUITABLE HARDWARE. WELDING SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 1074 OF THE STANDARD SPECIFICATIONS.
6. THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE, SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.
7. FOR ADHESIVELY ANCHORED BOLTS, SEE STANDARD SPECIFICATIONS SECTION 420-13.
8. FOR ADHESIVELY ANCHORED BOLTS, LEVEL ONE FIELD TESTING IS REQUIRED. THE REQUIRED PULLOUT STRENGTH IS 5 KIPS FOR THE SPECIFIED EMBEDMENT LENGTH.
9. BEARING PADS SHALL BE ⅛" THICK, PLAIN, FABRIC REINFORCED OR FABRIC LAMINATED BEARING PADS. FOR FURTHER DETAILS, SEE SPECICAL PROVISIONS FOR RAIL RETROFIT.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043777 JACOB H DUKE
11/25/2020

KCA KISINGER CAMPO & ASSOCIATES

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LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RAIL RETROFIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : SAMUEL L. CULLUM DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

11/25/2020
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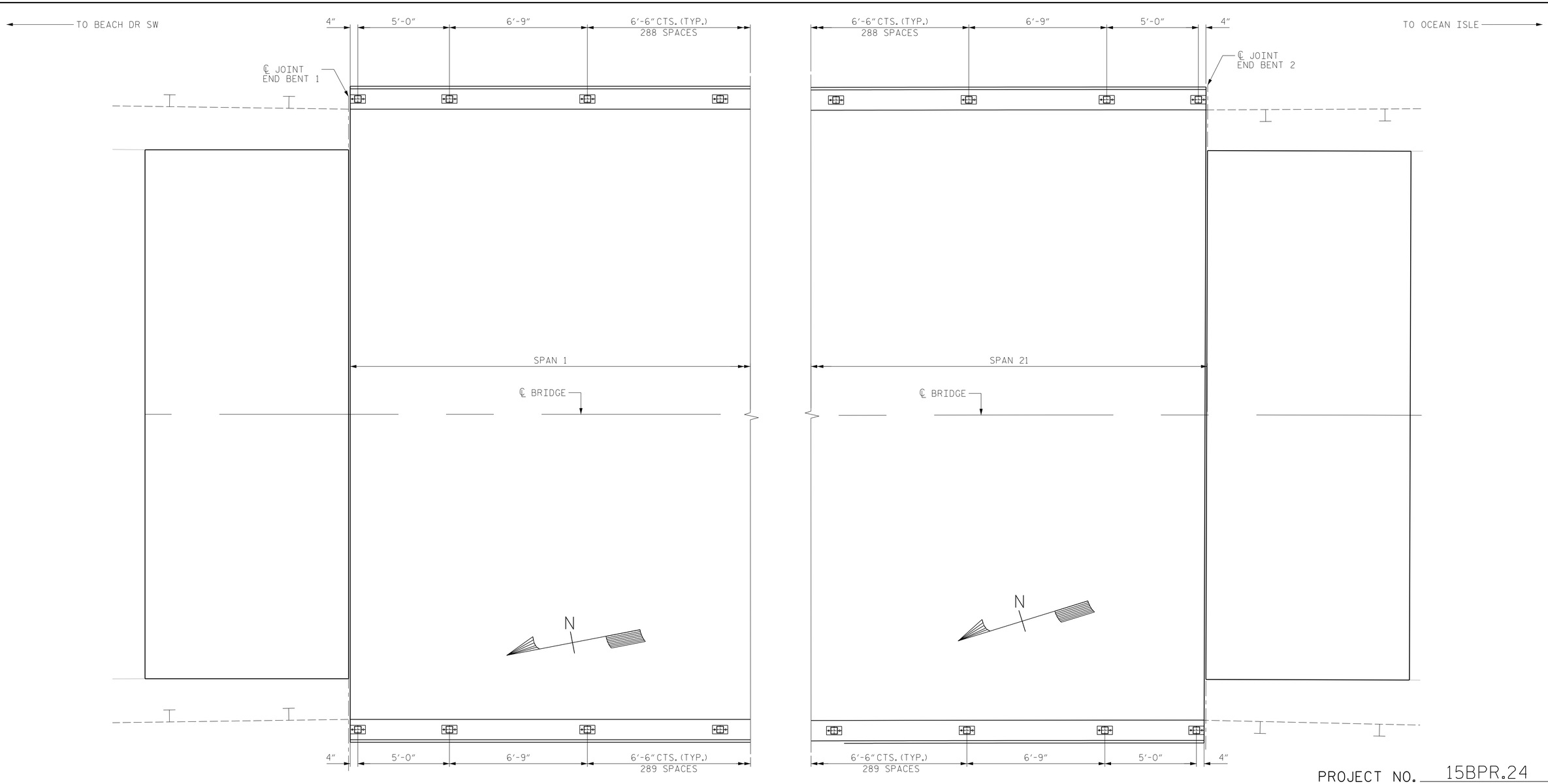
User:jduke



NOTES:

1. DO NOT PLACE ANY POST BASEPLATE OVER A BENT JOINT.
2. FIELD ADJUST POST LOCATIONS AT LOCATIONS WHERE POST BASEPLATE FALLS OVER A BRIDGE JOINT.
3. TYPICAL POST SPACING: 6'-6", MAX. ALLOWED POST SPACING: 7'-0"
4. COORDINATE THIS SHEET WITH "RAIL RETROFIT" SHEET 1 OF 2.

RAIL POST SPACING

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 2 OF 2

DocuSigned by: Jacob Duke 2008A1B0D6E7...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

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STATE OF NORTH CAROLINA
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RALEIGH

RAIL RETROFIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			45

DRAWN BY :	JACOB H. DUKE	DATE : 10/2018
CHECKED BY :	SAMUEL L. CULLUM	DATE : 10/2018
DESIGN ENGINEER OF RECORD :	JACOB H. DUKE	DATE : 10/2018

9/3/2020
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User:jdebone

Brunswick #13

Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length (ft.)	Width (ft.)	Assumed Depth (ft.)	As-Built Quantities: Actual (C.F.)	As-Built Quantities: Actual Depth (ft.)
1	Deck	at random throughout		(x7) Spall	7	1.5	0.5		
1	Girder 1	at end of beam, at Bent 1	1	Spall	1.5	1	0.5		
1	Girder 1	3 places on beam bottom	1	Spall/Exposed Rebar	1.5	1	0.5		
1	Girder 2	at end of beam, at Bent 1	1	Spall	2	1.5	0.5		
1	Girder 2	3 places on beam bottom	1	Spall/Exposed Rebar	1.5	1	0.5		
1	Girder 3	at end of girder, at bent 1	1	Spall	1	1	0.5		
1	Girder 3	3 places on beam bottom	1	Spall/Exposed Rebar	1.5	1	0.5		
1	Girder 4	3 places on beam bottom	1	Spall/Exposed Rebar	1.5	1	0.5		
1	Girder 5	3 places on beam bottom	1	Spall/Exposed Rebar	1.5	1	0.5		
2	Girder 1	at end of girder, at bent 1	1	Spall	2	1	0.5		
2	Girder 1	at bottom flange, at end of girder, at bent 2	2	Spall	1.5	1.5	0.5		
2	Girder 1	3 places on beam bottom	2	Spall/Exposed Rebar	1.5	1	0.5		
2	Girder 2	at end of girder, at bent 1	1	Spall	1.5	1.5	0.5		
2	Girder 2	at end of girder, at bent 2	2	Cracking (PSC)	6				
2	Girder 2	3 places on beam bottom	2	Spall/Exposed Rebar	1.5	1	0.5		
2	Girder 3	at end of girder, at bent 1	1	Cracking (PSC)	6				
2	Girder 3	3 places on beam bottom	2	Spall/Exposed Rebar	1.5	1	0.5		
2	Girder 4	at end of girder, at bent 1	1	Spall/Exposed Rebar	2	1.5	0.5		
2	Girder 4	at end of girder, at bent 1	1	Spall	2	1.5	0.5		
2	Girder 4	3 places on beam bottom	2	Spall/Exposed Rebar	1.5	1	0.5		
2	Girder 5	at end of girder, at bent 1	1	Cracking (PSC)	6				
2	Girder 5	at end of girder, at bent 2	2	Cracking (PSC)	6				
3	Girder 1	at end of girder, at bent 3	3	(x2) Spalls/Exposed bar	5	4.5	0.5		
3	Girder 1	bottom flange, at end of girder, at bent 2	2	Spall	1.5	1.5	0.5		
3	Girder 1	at end of girder, at bent 3	3	Cracking (PSC)	6				
3	Girder 1	at end of girder, at bent 2	2	Cracking (PSC)	6				
3	Girder 2	bottom flange, at end of girder, at bent 2	2	Spall	1.5	1	0.5		
3	Girder 2	at end of girder, at bent 2	2	Cracking (PSC)	6				
3	Girder 2	at end of girder, at bent 3	3	Cracking (PSC)	6				
3	Girder 3	bottom flange, at end of girder, at bent 2	2	Spall/Exposed Rebar	3	3	0.5		
3	Girder 3	at end of girder, at bent 3	3	Cracking (PSC)	6				
3	Girder 3	at end of girder, at bent 2	3	Cracking (PSC)	6				
3	Girder 4	at end of girder, at bent 2	2	Spall/Exposed Rebar	3	3	0.5		
3	Girder 4	at end of girder, at bent 2	2	Cracking (PSC)	6				
3	Girder 5	bottom flange, at end of girder, at bent 2	2	Spall/Exposed Rebar	3	3	0.5		
3	Girder 5	Top flange, at end of girder, at bent 3	3	Spall	2.5	2.5	0.5		
3	Girder 5	at end of girder, at bent 2	2	Cracking (PSC)	6				
4	Girder 1	bottom flange, at end of girder, at bent 3	3	Spall/Exposed Rebar	2	2.75	0.5		
4	Girder 1	at end of girder, at bent 3	3	Cracking (PSC)	6				
4	Girder 1	at end of girder, at bent 4	4	Cracking (PSC)	6				
4	Girder 2	bottom flange, at end of girder, at bent 3	3	Spall/Exposed Rebar	1.5	0.75	0.5		
4	Girder 2	at end of girder, at bent 3	3	Cracking (PSC)	6				
4	Girder 2	at end of girder, at bent 4	4	(x2) Painted spall/Exposed R	1.5	1.5	0.5		
4	Girder 3	at end of girder, at bent 4	4	Spall/Exposed Rebar	3	2.75	0.5		
4	Girder 3	at end of girder, at bent 3	3	Cracking (PSC)	6				
4	Girder 4	North face, at bent 3	3	Spall	0.75	0.75	0.5		
4	Girder 4	Bottom flange at bent 3	3	(x2) spall /Exposed Rebar	4	1	0.5		
4	Girder 4	at end of girder, at bent 4	4	Spall/Exposed Rebar	2	1	0.5		
4	Girder 4	at end of girder, at bent 3	3	Cracking (PSC)	6				
4	Girder 4	at end of girder, at bent 4	4	Cracking (PSC)	6				
4	Girder 5	at end of girder, at bent 3	3	Spall	1.5	1	0.5		
4	Girder 5	at end of girder, at bent 4	4	Spall	1.5	1.5	0.5		
5	Girder 1	Top flange, at end of girder, at bent 4	4	Spall	2.5	2.5	0.5		
5	Girder 1	at end of girder, at bent 5	5	Cracking (PSC)	6				
5	Girder 2	Bottom flange, end of girder, at bent 4	4	Spall/Exposed Rebar	1.5	1.75	0.5		
5	Girder 2	at end of girder, at bent 5	5	Cracking (PSC)	6				
5	Girder 2	at end of girder, at bent 4	4	Cracking (PSC)	6				
5	Girder 3	At end of Girder at bent 4	4	Cracking (PSC)	6				
5	Girder 3	At end of Girder at bent 5	5	Cracking (PSC)	6				
5	Girder 4	At end of Girder at bent 4	4	Spall/Exposed Rebar	2	2.5	0.5		
5	Girder 4	At end of Girder at bent 4	4	Cracking (PSC)	6				
5	Girder 4	At end of Girder at bent 5	5	Cracking (PSC)	6				
5	Girder 5	At end of Girder at bent 4	4	Spall	1.5	1.5	0.5		
5	Girder 5	At end of Girder at bent 5	5	Spall	1	1.5	0.5		
6	Girder 1	East corner, at end girder at bent 6	6	Spall	2	1	0.5		

Brunswick #13

Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length(ft.)	Width(ft.)	Depth(ft.)	As-Built Quantities: Actual (C.F.)	As-Built Quantities: Actual Depth (ft.)
6	Girder 1	At end of girder at bent 5	5	Cracking (PSC)	6				
6	Girder 1	3 places on beam bottom	6	Spall/Exposed Rebar	1.5	1	0.5		
6	Girder 2	Bottom of beam at bent 5	5	Spall	1	1.5	0.5		
6	Girder 2	End of girder, at bent 5	5	Spall	2.5	2.5	0.5		
6	Girder 2	At end of girder, at bent 6	6	Cracking (PSC)	6				
6	Girder 2	3 places on beam bottom	6	Spall/Exposed Rebar	1.5	1	0.5		
6	Girder 3	At beam end, at bent 6	6	Spall	1.5	1.5	0.5		
6	Girder 3	Top of flange, at end of girder, at bent 6	6	Spall	2.5	2.5	0.5		
6	Girder 3	At end of girder at bent 5	5	Cracking (PSC)	6				
6	Girder 4	Bottom of beam, at bent 5	5	Spall	2	1	0.5		
6	Girder 4	At end of girder, at bent 5	5	Cracking (PSC)	6				
6	Girder 4	At end of girder, at bent 6	6	Cracking (PSC)	6				
6	Girder 5	At end of girder, at bent 5	5	Cracking (PSC)	6				
6	Girder 5	At end of girder, at bent 6	6	Spall	2.5	2.5	0.5		
7	Deck	Top of deck, 10' from left bridge rail	7	Spall	2	1	0.5		
7	Girder 1	North face, at bent 6	6	Spall	1	1	0.5		
7	Girder 1	End of girder, at bent 6	6	Cracking (PSC)	6				
7	Girder 1	Bottom of Beam 1' from near end	6	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 1	End of girder, at bent 7	7	Spall	1	1.5	0.5		
7	Girder 1	3 places on beam bottom	7	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 2	At end of girder at bent 6	6	Cracking (PSC)	6				
7	Girder 2	End of girder, at bent 7	7	Cracking (PSC)	6				
7	Girder 2	3 places on beam bottom	7	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 2	Web, Right side 1' from far end	7	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 3	South Face, at bent 6	6	Spall	1	1	0.5		
7	Girder 3	End of girder, at bent 7	7	Cracking (PSC)	6				
7	Girder 3	3 places on beam bottom	7	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 4	Diagonal crack, South face at bent 6	6	Cracking (PSC)	1				
7	Girder 4	End of girder, at bent 6	6	Cracking (PSC)	6				
7	Girder 4	End of girder, at bent 7	7	Cracking (PSC)	6				
7	Girder 4	3 places on beam bottom	7	Spall/Exposed Rebar	1.5	1	0.5		
7	Girder 5	End of girder, at bent 6	6	Cracking (PSC)	6				
7	Girder 5	End of girder, at bent 7	7	Cracking (PSC)	6				
7	Girder 5	3 places on beam bottom	7	Spall/Exposed Rebar	1.5	1	0.5		
8	Deck	Top of deck, 10' from left bridge rail	7	Spall	3.5	1	0.5		
8	Girder 1	End of girder, at bent 8	8	Cracking (PSC)	6				
8	Girder 1	End of girder, at bent 7	7	Cracking (PSC)	6				
8	Girder 2	South face, at bent 7	7	Spall	2	1	0.5		
8	Girder 2	North face, at bent 7	7	Spall	1	1	0.5		
8	Girder 2	End of girder, at bent 8	8	Cracking (PSC)	6				
8	Girder 2	End of girder, at bent 7	7	Cracking (PSC)	6				
8	Girder 3	End of girder, at bent 7	7	Cracking (PSC)	6				
8	Girder 3	End of girder, at bent 8	8	Cracking (PSC)	6				
8	Girder 4	North face, bottom flange at beam end	7	(x2) Spall	2	1	0.5		
8	Girder 4	North face at bent 7	7	(x2) Spall	3.5	1	0.5		
8	Girder 4	North face at bent 8	8	Spall	1.25	1	0.5		
8	Girder 4	South face at bent 8	8	Spall	1	1	0.5		
8	Girder 4	End of girder, at bent 7	7	Cracking (PSC)	6				
8	Girder 4	End of girder, at bent 8	8	Cracking (PSC)	6				
8	Girder 5	End of girder, at bent 8	8	Spall	1	1	0.5		
8	Girder 5	End of girder, at bent 7	7	Cracking (PSC)	6				
9	Girder 1	South face, at beam end, at Bent 8	8	Spall	1.5	1	0.75		
9	Girder 1	Southewest corner at end of girder at bent 8	8	Spall	1	1.5	0.75		
9	Girder 1	3 places on beam bottom	9	Spall/Exposed Rebar	1.5	1	0.5		
9	Girder 2	End of girder at bent 8	8	Cracking (PSC)	6				
9	Girder 2	3 places on beam bottom	9	Spall/Exposed Rebar	1.5	1	0.5		
9	Girder 3	End of girder at bent 8	8	Cracking (PSC)	6				
9	Girder 3	End of girder at bent 9	9	Cracking (PSC)	6				
9	Girder 3	3 places on beam bottom	9	Spall/Exposed Rebar	1.5	1	0.5		
9	Girder 4	End of girder at bent 9	9	Cracking (PSC)	6				
9	Girder 4	Bottom of beam Near End	8	Spall/Delam	1	1	0.5		
9	Girder 4	Bottom of beam Far End	9	Spall/Delam	1	1	0.5		
9	Girder 4	3 places on beam bottom	8	Spall/Exposed Rebar	1.5	1	0.5		
9	Girder 5	South face over bent 8	8	(x2) Spall	3	1	0.5		
9	Girder 5	North face at bent 8	8	Spall	1	1	0.5		
9	Girder 5	End of girder at bent 8	8	Cracking (PSC)	6				

NOTES:

1. ALL DEFECTS WERE TAKEN FROM THE 2017 BRIDGE INSPECTION REPORT.
2. REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE.
3. THE ENGINEER SHALL FILL OUT THE AS-BUILT REPAIR QUANTITY FOR EACH LISTED DEFICIENCY.
4. COORDINATE THIS SHEET WITH "CONCRETE RESTORATION DETAILS" AND "SUPERSTRUCTURE CONCRETE REPAIRS" SHEETS.
5. IF ADDITIONAL REPAIRS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE CORRESPONDING SHEET THE APPROXIMATE LOCATIONS AND THE DESCRIPTION OF THE REPAIRS, AND WILL ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITIES TABLE.
6. FOR REPAIRS TO PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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User:jdebone

DocuSigned by: Jacob Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE REPAIRS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			45

Brunswick #13

Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length(ft.)	Width(ft.)	Depth(ft.)	As-Built Quantities Actual (C.F.)	As-Built Quantities Actual Depth (ft.)
9	Girder 5	End of girder at bent 9	9	Spall	1	1	0.5		
10	Girder 1	2" from South face, at bent 10	10	Cracking (PSC)	2.5				
10	Girder 1	At end of girder, at bent 10	10	Cracking (PSC)	12				
10	Girder 2	End of girder at bent 9	9	Cracking (PSC)	6				
10	Girder 3	End of girder at bent 9	9	Cracking (PSC)	6				
10	Girder 3	Near Right Corner	9	Spall/Exposed Rebar	1	1	0.5		
10	Girder 3	3 places on beam bottom	10	Spall/Exposed Rebar	1.5	1	0.5		
10	Girder 4	At end of girder, at bent 10	10	Cracking (PSC)	6				
10	Girder 4	End of girder at bent 9	9	Spall	1.5	1	0.5		
10	Girder 4	3 places on beam bottom	10	Spall/Exposed Rebar	1.5	1	0.5		
10	Girder 5	End of beam over bent 10	10	Spall	3	3	0.5		
10	Girder 5	End of girder at bent 9	9	Cracking (PSC)	6				
10	Girder 5	3 places on beam bottom	10	Spall/Exposed Rebar	1.5	1	0.5		
11	Girder 1	End of beam over bent 10	10	Cracking (PSC)	6				
11	Girder 2	End of beam over bent 10	10	Cracking (PSC)	6				
11	Girder 3	End of beam over bent 10	10	Spall	2.75	2.5	0.5		
11	Girder 3	3 places on beam bottom	10	Spall/Exposed Rebar	1.5	1	0.5		
11	Girder 4	End of beam over bent 10	10	Cracking (PSC)	6				
11	Girder 5	End of beam over bent 11	11	Spall	1.5	1	0.5		
11	Girder 5	End of beam over bent 10	10	Spall	1.25	1	0.5		
12	Deck	8' from left bridge rail, at bent 12	12	spall / Unsound Patched Are	6.5	1			
12	Girder 1	North and bottom face 20' from bent 12	12	Spall	1.5	1.5	0.75		
12	Girder 1	20' and 30' from Bent 12	12	(x2) Spall	1.5	1	0.5		
12	Girder 2	2' from Bent 12	12	Spall/Delam	1.5	1	0.5		
12	Girder 3	South face at bent 11	11	Spall	3	1.5	1.5		
13	Girder 1	At end of girder, at bent 13	13	Cracking (PSC)	6				
13	Girder 2	Bottom of beam over bent 12	12	(x2) Spall	2	1	0.5		
13	Girder 2	Around Perimeter of Girder, Far End	13	Cracking (PSC)	6				
13	Girder 3	Around Perimeter of Girder, Far End	13	Cracking (PSC)	6				
13	Girder 4	End of girder at bent 13	13	Cracking (PSC)	6				
14	Girder 1	End of girder at bent 13	13	Spall	1.5	1	0.5		
14	Girder 1	End of girder at bent 14	14	Spall	2	1.5	0.5		
14	Girder 1	3 places on beam bottom	14	Spall/Exposed Rebar	1.5	1	0.5		
14	Girder 2	End of girder at bent 13	13	Cracking (PSC)	6				
14	Girder 2	End of girder at bent 14	14	Cracking (PSC)	6				
14	Girder 2	3 places on beam bottom	14	Spall/Exposed Rebar	1.5	1	0.5		
14	Girder 3	End of girder at bent 14	14	Cracking (PSC)	6				
14	Girder 3	3 places on beam bottom	14	Spall/Exposed Rebar	1.5	1	0.5		
14	Girder 4	End of girder at bent 14	14	Cracking (PSC)	6				
14	Girder 4	End of girder at bent 13	13	Cracking (PSC)	6				
14	Girder 4	3 places on beam bottom	14	Spall/Exposed Rebar	1.5	1	0.5		
14	Girder 5	End of girder at bent 13	13	Cracking (PSC)	6				
14	Girder 5	End of girder at bent 14	14	Cracking (PSC)	6				
15	Girder 1	End of girder at bent 15	15	Cracking	6				
15	Girder 1	End of girder at bent 14	14	Cracking	6				
15	Girder 1	3 places on beam bottom	15	Spall/Exposed Rebar	1.5	1	0.5		
15	Girder 2	End of girder at bent 15	15	Cracking	6				
15	Girder 2	End of girder at bent 14	14	Cracking	6				
15	Girder 2	3 places on beam bottom	15	Spall/Exposed Rebar	1.5	1	0.5		
15	Girder 3	End of girder at bent 14	14	Cracking	6				
15	Girder 3	End of girder at bent 15	15	Cracking	6				
15	Girder 3	3 places on beam bottom	15	Spall/Exposed Rebar	1.5	1	0.5		
15	Girder 4	3 places on beam bottom	15	Spall/Exposed Rebar	1.5	1	0.5		
15	Girder 5	End of girder at bent 14	14	Cracking	6				
15	Girder 5	End of girder at bent 15	15	Cracking	6				
15	Girder 5	3 places on beam bottom	15	Spall/Exposed Rebar	1.5	1	0.5		
16	Girder 1	End of girder at bent 15	15	Cracking	6				
16	Girder 1	End of girder at bent 16	16	Cracking	6				
16	Girder 1	3 places on beam bottom	16	Spall/Exposed Rebar	1.5	1	0.5		
16	Girder 2	End of girder at bent 15	15	Cracking	6				
16	Girder 2	End of girder at bent 16	16	Cracking	6				
16	Girder 2	3 places on beam bottom	16	Spall/Exposed Rebar	1.5	1	0.5		
16	Girder 3	1' from end of beamat bent 16	16	(x2) Spalls	3	1	0.5		
16	Girder 3	End of girder at bent 15	15	Cracking	6				
16	Girder 3	End of girder at bent 16	16	Cracking	6				
16	Girder 3	3 places on beam bottom	16	Spall/Exposed Rebar	1.5	1	0.5		
16	Girder 4	End of girder at bent 15	15	Cracking	6				
16	Girder 4	End of girder at bent 16	16	Cracking	6				
16	Girder 4	3 places on beam bottom	16	Spall/Exposed Rebar	1.5	1	0.5		
16	Girder 5	End of beam, over bent 16	16	(x3) Spall	3.5	1.5	0.25		
16	Girder 5	Bottom of beam over bent 15	15	Spall	1	0.75	0.5		
16	Girder 5	South face, 1' from bent 16	16	Spall / Exposed Rebar	1	0.75	0.5		
16	Girder 5	End of girder at bent 15	15	Cracking	6				
16	Girder 5	3 places on beam bottom	16	Spall/Exposed Rebar	1.5	1	0.5		
17	Deck	11' from left bridge rail	16	Spall	2	1.5	0.75		
17	Girder 1	South face, over bent 17	17	(x3) spall	4.5	1	0.5		
17	Girder 1	End of girder at bent 16	16	Cracking	6				
17	Girder 1	3 places on beam bottom	17	Spall/Exposed Rebar	1.5	1	0.5		
17	Girder 2	South face, over bent 16	16	(x2) Spalls	3	0.75	0.5		
17	Girder 2	End of girder at bent 17	17	Cracking	6				
17	Girder 2	End of girder at bent 16	16	Cracking	6				
17	Girder 2	3 places on beam bottom	17	Spall/Exposed Rebar	1.5	1	0.5		
17	Girder 3	At beam end, at bent 16	16	Spall	1.5	1.5	0.5		
17	Girder 3	End of girder at bent 17	17	Cracking	6				
17	Girder 3	End of girder at bent 16	16	Cracking	6				
17	Girder 3	3 places on beam bottom	17	Spall/Exposed Rebar	1.5	1	0.5		
17	Girder 4	At end of beam over bent 17	17	Spall	1	0.75	0.5		
17	Girder 4	End of girder at bent 16	16	Cracking	6				
17	Girder 4	End of girder at bent 17	17	Cracking	6				
17	Girder 4	3 places on beam bottom	17	Spall/Exposed Rebar	1.5	1	0.5		
17	Girder 5	End of girder at bent 17	17	Cracking	6				
17	Girder 5	End of girder at bent 16	16	Cracking	6				
17	Girder 5	3 places on beam bottom	17	Spall/Exposed Rebar	1.5	1	0.5		
18	Girder 1	End of girder at bent 17	17	Cracking	6				
18	Girder 1	End of girder at bent 18	18	Cracking	6				
18	Girder 2	At beam end, at bent 17	17	Spall	1	0.75	0.5		
18	Girder 2	End of girder at bent 18	18	Cracking	6				
18	Girder 3	South face, at bent 17	17	(x2) Spalls	3	1	0.5		
18	Girder 3	At beam end, at bent 17	17	Spall	1	0.75	0.5		
18	Girder 3	At end of girder, at bent 18	18	Cracking	6				
18	Girder 4	South face of beam, 1' from bent 18	18	Spall	1	1	0.5		
18	Girder 4	End of beam at bent 17	17	Spall	1	1	0.5		
18	Girder 4	End of beam at bent 18	18	Cracking	6				
18	Girder 4	End of beam at bent 17	17	Cracking	6				
18	Girder 5	South face, near bent 18	18	(x3) spall	3	1	0.5		
18	Girder 5	End of beam at bent 18	18	Cracking	6				
19	Girder 1	At end of girder, at bent 19	19	Cracking	6				
19	Girder 2	Bottom of beam at bent 19	19	Spall	1.5	1	0.5		
19	Girder 3	South face, 1' from end of beam 3 at bent 18	18	(x2) Spall	3	1.5	0.5		
19	Girder 4	Bottom of beam, 1' from bent 18	18	Spall	1	1	0.5		
19	Girder 4	At end of girder at bent 19	19	Cracking	6				
19	Girder 4	At end of girder at bent 18	18	Cracking	6				
19	Girder 5	At end of girder at bent 19	19	Cracking	6				
20	Deck	East face of deck, 8' from left bridge rail		Spall	1.5	1.5	0.75		
20	Girder 1	Bottom of beam, near bent 19	19	Spall	2	1	0.5		
20	Girder 1	At end of girder at bent 19	19	Cracking	6				
20	Girder 1	At end of girder at bent 20	20	Cracking	6				
21	Girder 3	Bottom face at bent 20	20	Spall / Delam	1.5	1	0.5		
21	Girder 4	South corner, end of beam at bent 20	20	spall / Delam	1.5	1	1		

NOTES:

1. ALL DEFECTS WERE TAKEN FROM THE 2017 BRIDGE INSPECTION REPORT.
2. REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE.
3. THE ENGINEER SHALL FILL OUT THE AS-BUILT REPAIR QUANTITY FOR EACH LISTED DEFICIENCY.
4. COORDINATE THIS SHEET WITH "CONCRETE RESTORATION DETAILS" AND "SUPERSTRUCTURE CONCRETE REPAIRS" SHEETS.
5. IF ADDITIONAL REPAIRS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE CORRESPONDING SHEET THE APPROXIMATE LOCATIONS AND THE DESCRIPTION OF THE REPAIRS, AND WILL ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITIES TABLE.
6. FOR REPAIRS TO PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 2 OF 2

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043777 JACOB H. DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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(919) 882-7839
LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE REPAIRS

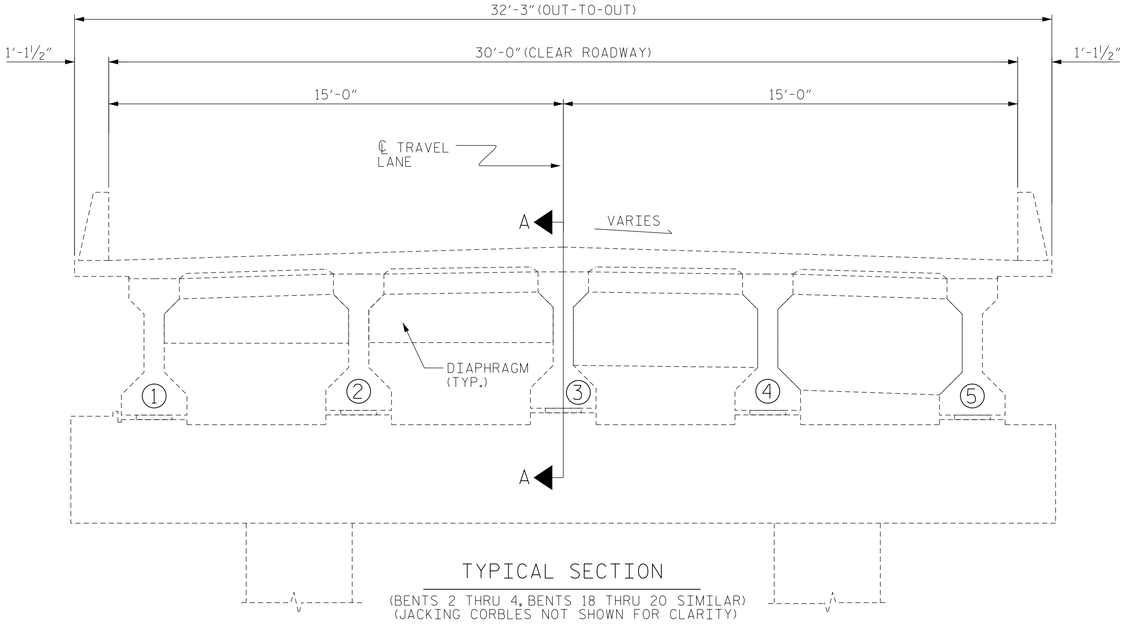
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

SHEET NO. S-16
TOTAL SHEETS 45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

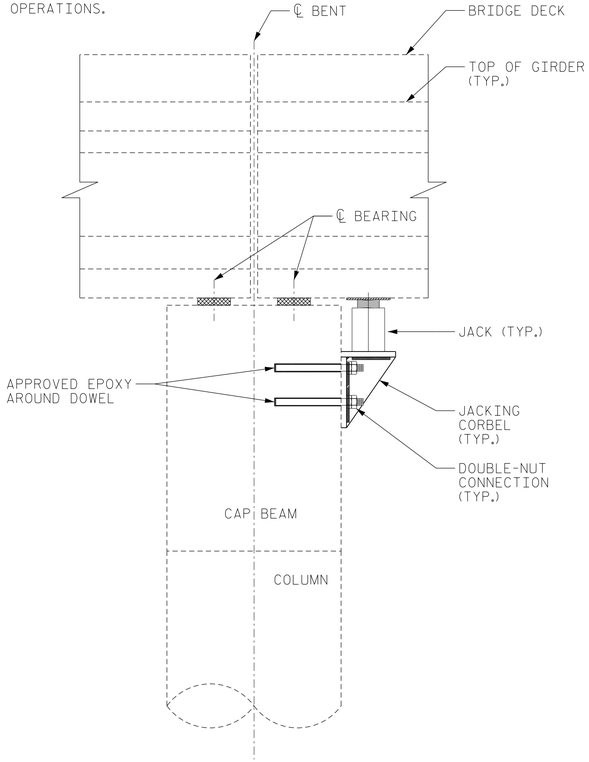
JACKING NOTES:

1. THIS DETAIL IS A GENERIC EXAMPLE OF A JACKING SCHEME AND DOES NOT NECESSARILY REPRESENT SPECIFIC CONDITIONS AT A PARTICULAR BRIDGE. ACTUAL BRIDGE GEOMETRIES, DIMENSIONS AND CONDITIONS MAY DIFFER FROM THIS DETAIL, PRIOR TO BEGINNING WORK, THE CONCTRACTOR SHALL INVISTIGATE THE BRIDGE AND DEVELOP A PROPER STRENGTH JACKING SCHEME TO BE SUBMITTED FOR REVIEW.
2. PRIOR TO BRIDGE JACKING OPERATIONS, THE ENGINEER AND CONTRACTOR SHALL INSPECT THE STRUCTURE FOR ANY NOTABLE DEFECTS TO THE PRIMARY AND SECONDARY STRUCTURAL MEMBERS. ALL NOTABLE DEFECTS SHALL BE DOCUMENTED AND REPORTED TO THE AREA BRIDGE MAINTENANCE ENGINEER PRIOR TO THE COMMENCEMENT OF BRIDGE JACKING. THE CONTRACTOR SHALL PROVIDE SAFE AND SUFFICIENT ACCESS TO ALL STRUCTURAL MEMBERS FOR THE ENGINEER TO ESTABLISH PROPER DOCUMENTATION.
3. PRIOR TO JACKING, THE CONTRACTOR SHALL ENSURE THERE ARE NO OBSTACLES PREVENTING THE BEAM FROM BEING LIFTED.
4. THE BEAMS SHALL BE LIFTED ENOUGH THAT THE BEAM CLEARS THE BEARINGS AND ALL LOAD IS SUPPORTED BY THE JACKS. AFTER JACKING IS COMPLETE, THE CONTRACTOR SHALL PROVIDE FOR A METHOD TO REMOVE THE JACKS AND SUPPORT THE BEAM FOR DEAD AND LIVE LOAD DURING THE REPAIR OPERATIONS IF THE JACKS REMAIN IN PLACE DURING THE ENTIRE JACKING AND REPAIR OPERATION, THEY SHALL HAVE MECHANICAL LOCK OFF CAPABILITIES.
5. IF, DURING THE JACKING PROCESS, OR WHILE THE BEAM IS BEING SUPPORTED, THE BEAM SHIFTS FROM ITS ORIGINAL POSITION, ALL WORK SHALL CEASE AND THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
6. BEARINGS ADJACENT TO THE BEAM BEING JACKED MAY BE LOOSENED TO DECREASE THE RESISTANCE OF THE DECK SLAB DURING JACKING. ALL BEARINGS LOOSENED SHALL BE TIGHTENED BACK AFTER REPAIR OPERATIONS ARE COMPLETED AND THE JACKS AND BLOCKING HAVE BEEN REMOVED.
7. THE MAXIMUM DIFFERENTIAL BETWEEN ADJACENT BEAMS THAT ARE BEING JACKED IS ⅛".
8. LOADS PROVIDED IN THE "BRIDGE JACKING TABLE" ARE SHOWN FOR INFORMATION PURPOSES ONLY, THE CONTRACTOR'S ENGINEER SHALL DETERMINE THE EXPECTED LOADS TO BE LIFTED DURING THE BRIDGE JACKING OPERATIONS.
9. THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS AND CALCULATIONS OF THE JACKING PROCEDURE(S) SEALED BY A PROFESSIONAL ENGINEER IN THE STATE OF NORTH CAROLINA TO THE ENGINEER FOR APPROVAL PRIOR TO BRIDGE JACKING OPERATIONS.
10. FOR TYPE I OR TYPE II BRIDGE JACKING, SEE SPECIAL PROVISONS.
11. FOR WORKING DRAWING SUBMITTALS, SEE SPECIAL PROVISIONS.
12. TYPE II BRIDGE JACKING SHALL BE DONE WITH A HYDRAULIC JACKING SYSTEM THAT LIFTS EACH BEAM ALONG ENTIRE SPAN END WITH EQUAL FORCE AND AT AN EQUAL RATE.
13. THE CONTRACTOR SHALL BE RESPOSNIBLE FOR REPAIRING ANY DAMAGE CAUSED TO THE EXISTING STRUCTURE BY BRIDGE JACKING OPERATIONS AT NO ADDITIONAL COST TO THE DEPARTMENT.
14. PRIOR TO JACKING, LOOSEN ANY ATTACHMENTS TO ALLOW MOVEMENT AND COMPLETE ALL JOINT AND BARRIER SAWCUTS.
15. JACKS SHALL BE IN FULL COMPLIANCE WITH ANSI B30.1.
16. A PRE-JACKING MEETING SHALL BE REQUIRED BETWEEN THE CONTRACTOR, THE UTILITY REPRESENTATIVE, AND THE ENGINEER PRIOR TO ANY JACKING OPERATIONS.
17. THE CONTRACTOR SHALL BE AWARE OF UTILITY CONDUITS THROUGHOUT BRIDGE AND SHALL MAKE ARRANGEMENTS FOR JACKING OPERATIONS. A UTILITY REPRESENTATIVE SHALL BE ON SITE DURING JACKING OPERATIONS.

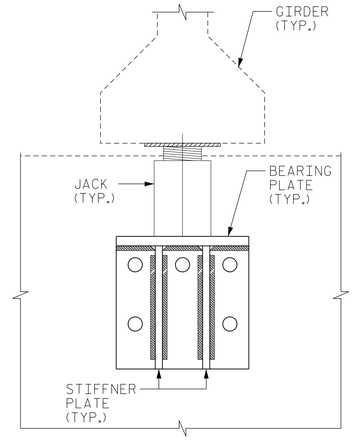


TYPICAL SECTION

(BENTS 2 THRU 4, BENTS 18 THRU 20 SIMILAR)
(JACKING CORBLES NOT SHOWN FOR CLARITY)



SECTION A-A



JACKING CORBEL

FRONT ELEVATION

PRELIMINARY JACKING LOADS

	BEAM	FACTORED DEAD LOAD (KIPS)	FACTORED LIVE LOAD NO IMPACT (KIPS)	MIN. JACK CAPACITY LIVE & DEAD LOAD (TONS)
SPAN 2 & 3	EXTERIOR	110	120	120
	INTERIOR	110	160	140
SPAN 18 & 20	BEAM	FACTORED DEAD LOAD (KIPS)	FACTORED LIVE LOAD NO IMPACT (KIPS)	MIN. JACK CAPACITY LIVE & DEAD LOAD (TONS)
	EXTERIOR	110	120	120
	INTERIOR	110	160	140

NOTES:
DL FACTOR: 1.25
LL FACTOR: 1.75

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DocuSigned by: Jacob Duke
9/3/2020
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

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(919) 882-7839
LICENSE #: C-1506

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DEPARTMENT OF TRANSPORTATION
RALEIGH

JACKING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
CHECKED BY : JACOB H. DUKE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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User:jdebone

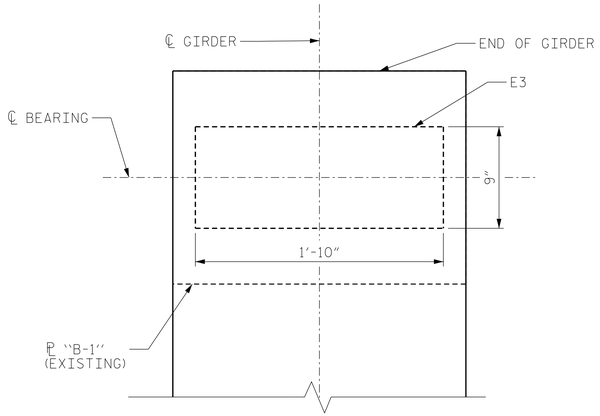
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

NOTES:

1. THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.
2. FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS AND PROJECT SPECIAL PROVISIONS.
3. FOR BRIDGE JACKING, SEE JACKING DETAILS SHEET.

BEARING REPLACEMENT TABLE

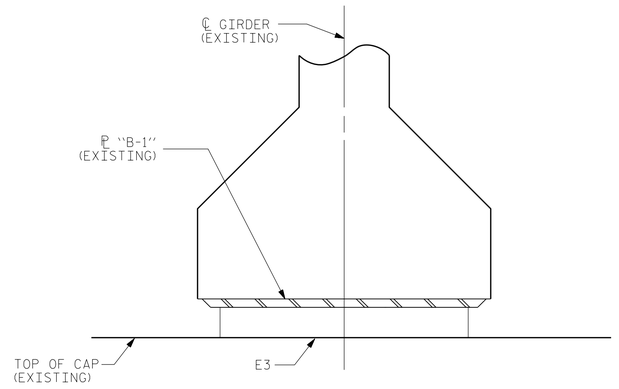
SPAN	BENT	BEARING	TYPE	"T"	ELASTOMER VOLUME (CU. IN.)
2	2	1	E3	2 5/16"	458
2	2	5	E3	2 5/16"	458
3	3	2	E3	2 5/16"	458
18	18	1	E3	2 5/16"	458
20	20	4	E3	2 5/16"	458
20	20	5	E3	2 5/16"	458



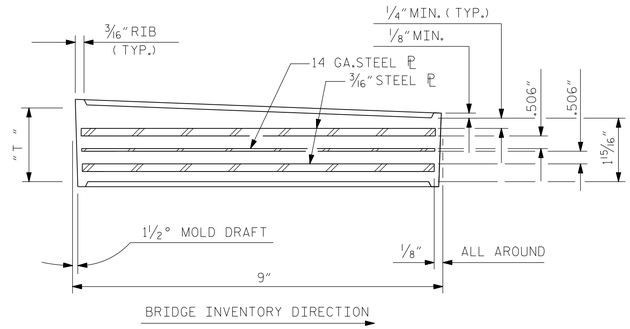
TYPICAL PLAN VIEW OF ELASTOMERIC BEARING

(CAP NOT SHOWN)

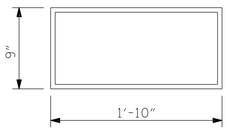
SPAN 2, BENT 2, BRG. 1 (1 REQ'D)
SPAN 2, BENT 2, BRG. 5 (1 REQ'D)
SPAN 3, BENT 3, BRG. 2 (1 REQ'D)
SPAN 18, BENT 18, BRG. 1 (1 REQ'D)
SPAN 20, BENT 20, BRG. 4 (1 REQ'D)
SPAN 20, BENT 20, BRG. 5 (1 REQ'D)



EXPANSION BEARINGS



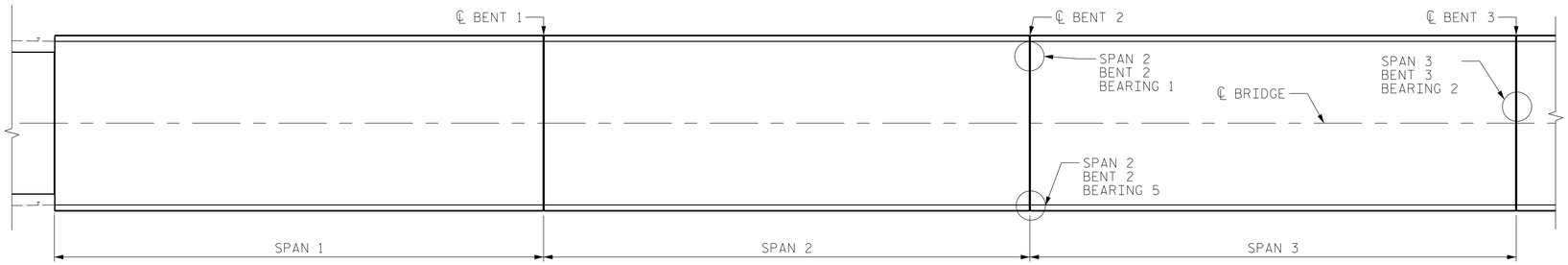
TYPICAL SECTION OF ELASTOMERIC BEARINGS

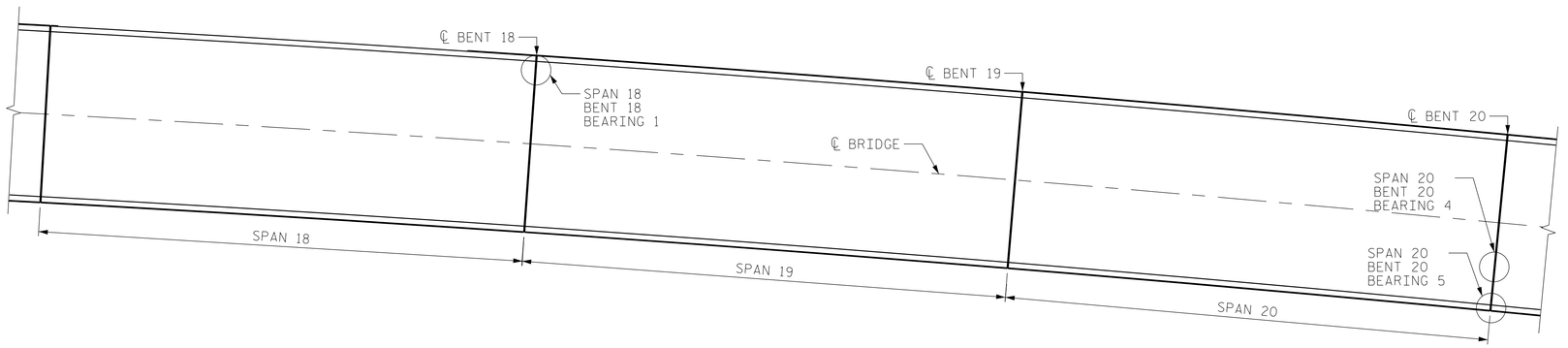


E3 (6 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV (EXPANSION BEARING)





REPLACEMENT BEARING LOCATIONS

(PLAN OF SPANS 1 THRU 3 AND 18 THRU 20)

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2903...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING REPLACEMENT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
CHECKED BY : JACOB H. DUKE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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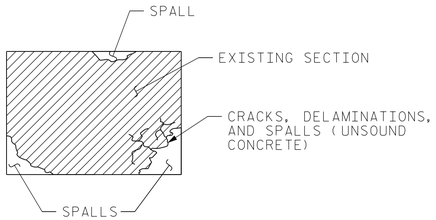
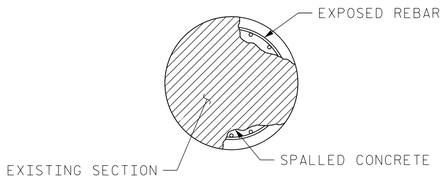
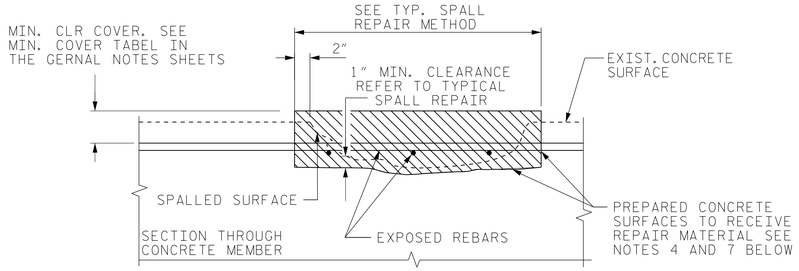
User:jdebone



TYPICAL DELAMINATIONS AND SPALLS

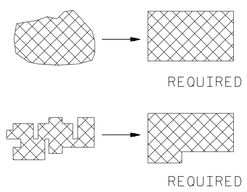


TYPICAL SPALL WITH EXPOSED REBAR



EXPOSING AND UNDERCUTTING REINFORCING STEEL

APPLICABLE TO HORIZONTAL, VERTICAL, AND OVERHEAD LOCATIONS



SIMPLE PATCH CONFIGURATION

AT CORNER LOCATIONS PROVIDE RIGHT ANGLE CUTS. PATCH CONFIGURATION SHALL BE KEPT AS SIMPLE AS POSSIBLE. INDIVIDUAL REPAIR AREAS WITHIN 2 FEET SHALL BE JOINED AT THE DIRECTION OF THE ENGINEER.

TYPICAL SPALL REPAIR

1. FOR CONCRETE RESTORATION, REMOVE AND REPAIR UNSOUND CONCRETE FROM AREAS TO BE REPAIRED IN ACCORDANCE WITH THIS SHEET AND THE PROJECT SPECIAL PROVISIONS. AREAS WELL ADHERED TO EXISTING STRAND OR REINFORCEMENT SHALL REMAIN.
2. ALL UNSOUND CONCRETE MUST BE REMOVED. HOWEVER, PRESTRESSED STRANDS SHOULD NOT BE DISTURBED UNLESS ABSOLUTELY NECESSARY. USE EXTREME CARE TO NOT DAMAGE STRANDS.
3. ALL REPAIRS SHALL BE MARKED FOR APPROVAL OF APPROXIMATE PERIMETER PRIOR TO INITIATION OF WORK.
4. THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
5. ANY REINFORCEMENT WHICH IS LOOSE SHALL BE SECURED IN PLACE BY TYING TO OTHER SECURED BARS OR BY OTHER APPROVED METHODS. LAP SPLICES SHALL BE INSTALLED IN ACCORDANCE WITH THE TABLE BELOW. REFER TO GENERAL NOTES FOR DOWEL DETAIL (IF NECESSARY).
6. CLEAN EXPOSED REBARS AND ANY LOOSE CONCRETE OR ABRASIVES BY SANDBLASTING OR APPROVED ALTERNATE. CLEANED STEEL SHALL NOT BE LEFT EXPOSED FOR MORE THAN 72 HOURS PRIOR TO ENCAPSULATION OF CONCRETE.
7. AN APPROVED CEMENTITIOUS BASED BONDING AGENT SHALL BE USED ON ALL EXPOSED CONCRETE SURFACES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BEFORE THE REPAIR MATERIAL IS APPLIED.
8. FILL VOIDS WITH REPAIR MATERIAL IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS AND NCDOT SPECIFICATIONS. NOTE THAT ANY REPAIR MATERIAL APPLIED TO OVERHEAD LOCATIONS SHALL BE SPECIFICALLY DESIGNATED FOR OVERHEAD USE BY THE MANUFACTURER'S SPECIFICATIONS.

TYPICAL CRACK REPAIR

1. OBTAIN ENGINEER'S APPROVAL TO CARRY OUT CRACK REPAIR (IN LIEU OF SPALL REPAIR) FOR CASES WHERE ADJACENT CONCRETE IS OTHERWISE SOUND AND CRACKING IS NOT A RESULT OF CORRODING REINFORCEMENT.
2. ADDRESS CRACKS IN NEW CONSTRUCTION IN ACCORDANCE WITH PROJECT SPECIAL PROVISIONS. ADDRESS EXISTING CRACKS IN ACCORDANCE WITH THIS SHEET AND PROJECT SPECIAL PROVISIONS.
3. REMOVE UNSOUND CONCRETE FROM CRACK AREA.
4. THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
5. FOR CRACKS UP TO $\frac{1}{8}$"USE AN EPOXY RESIN WITH MINIMUMS OF VISCOSITY OF 325 CPS, 28 DAY COMPRESSIVE STRENGTH OF 13000 PSI. FOR CRACKS $\frac{1}{8}$" TO $\frac{1}{4}$", USE AN INJECTION GEL OR EQUAL NON-SAG PASTE WITH 28 DAY COMPRESSIVE STRENGTH OF 10000 PSI.
6. TO SEAL CRACK SURFACES PRIOR TO CRACK INJECTION, USE INJECTION GEL WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 12000 PSI.
7. ENGINEER TO APPROVE CRACK AND CAP SEAL MATERIAL PRIOR TO BEGINNING OF CONSTRUCTION.
8. APPLY CLASS II FINISH AT COMPLETION OF CRACK REPAIR TO REMOVE FINS OR KNOBS.

RC GIRDER REPAIR

1. SOUND CONCRETE TO DETERMINE EXTENTS OF REPAIR LOCATION.
2. IF AFTER UNSOUND CONCRETE REMOVAL ON GIRDERS, MORE THAN 50% SECTION LOSS IS NOTED ON THE REBAR, OR IF SEVERED REBAR IS ENCOUNTERED, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONCRETE REPAIR.
3. REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF $\frac{1}{2}$".
4. REMOVE CONCRETE WITHIN SAW CUT AREA TO A MINIMUM $\frac{1}{2}$" DEPTH. IF CONCRETE IS DAMAGED BEYOND THE ORIGINAL SAW CUT, A NEW SAW CUT IS REQUIRED.
5. IF MORE THAN HALF THE CIRCUMFERENCE OF A REINFORCING BAR IS EXPOSED DURING THIS PROCESS, REMOVE ADDITIONAL CONCRETE TO 1" BEHIND THE BAR.
6. CLEAN ALL EXPOSED REINFORCING BARS. FOR BARS WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED.
8. REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE REPAIR AREA OF DIRT, GREASE, OIL, AND FOREIGN MATTER.
9. PREPARE SURFACE AND PLACE APPROVED PREPACKAGED MATERIAL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MAXIMUM AGGREGATE SIZE FOR REPAIR MATERIAL SHALL NOT EXCEED $\frac{2}{3}$ THE MINIMUM REPAIR DEPTH.
10. FOR GIRDER REPAIRS, SEE SPECIAL PROVISION FOR CONCRETE REPAIRS AND SEE "SUPERSTRUCTURE REPAIRS" SHEETS.

CONCRETE REPAIR NOTES

1. PERFORM A SOUNDING SURVEY IN THE PRESENCE OF THE ENGINEER TO IDENTIFY ALL LOCATIONS IN NEED OF CONCRETE REPAIR.
2. GAIN CONCURRENCE ON ALL REPAIR AREAS AT EACH LOCATION PRIOR TO COMMENCING WORK AT THE BENT.
3. THE DETERIORATED AREAS SHOWN ON OTHER PAGES ARE BASED ON BRIDGE INSPECTION REPORT, AND PARTIAL FIELD REVIEWS OF THE STRUCTURE. AS SUCH, THEY ARE FOR INFORMATIONAL PURPOSES AND SUBJECT TO CHANGE BASED ON CONTINUING DETERIORATION.
4. GENERALLY EXTEND REPAIR AREAS 2"-3" INTO SOUND CONCRETE BEYOND EDGE OF SPALLS AND SQUARE OFF AREAS IN ACCORDANCE WITH DETAILS ON THIS SHEET.
5. THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETETO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL, OR REQUIRE HARS CHEMICALS TO REMOVE.
6. THE CONTRACTOR SHALL REMOVE THE DETIRIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE PROJECT SPECIAL PROVISIONS, AND THE STANDARD SPECIFICATIONS.
7. REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY. MINIMMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT.
8. REINFORCING STEEL, WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED, SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET.
9. FOR REPAIRS OVER TRAFFIC AND SHALLOW REPAIRS THAT DO NOT ENGAGE REINFORCEMENT, ANCHOR PATCH MATERIAL USING $\frac{1}{4}$" GALVANIZED BOLTS, EPOXY ANCHORED WITH 2" EMBEDMENT. PLACE BOLTS IN A 6" GRID. USE A LATEX OR EPOXY PATCH MATERIAL FOR IMPROVED BOND.
10. FOR ADHESIVELY ANCHORED DOWELS OR ANCHOR BOLTS, SE STANDARD SPECIFICATIONS.
11. FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
12. FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.
13. FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.
14. FOR SUPERTRUCTURE REPAIRS SEE "SUPERSTRUCTURE REPAIRS" SHEETS.
15. FOR SUBSTRUCTURE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3 AND "SUBSTRUCTURE CONCRETE REPAIRS" SHEETS.

CONCRETE REPAIR SCHEDULE	
REPAIR AREA	APPROVED MATERIAL
BEAMS	CONCRETE REPAIRS (RC GIRDERS)
SUBSTRUCTURE	"FORM AND POUR" CONCRETE REPAIR, SHOTCRETE, OR CONTRACTOR OPTION

LAP SPLICE TABLE	
REBAR SIZE	LAP SPLICE LENGTH
4	1'-9"
5	2'-2"
6	2'-7"
7	3'-6"
8	4'-6"
9	5'-10"
10	7'-4"

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 1 OF 3

DocuSigned by: Jacob H. Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE RESTORATION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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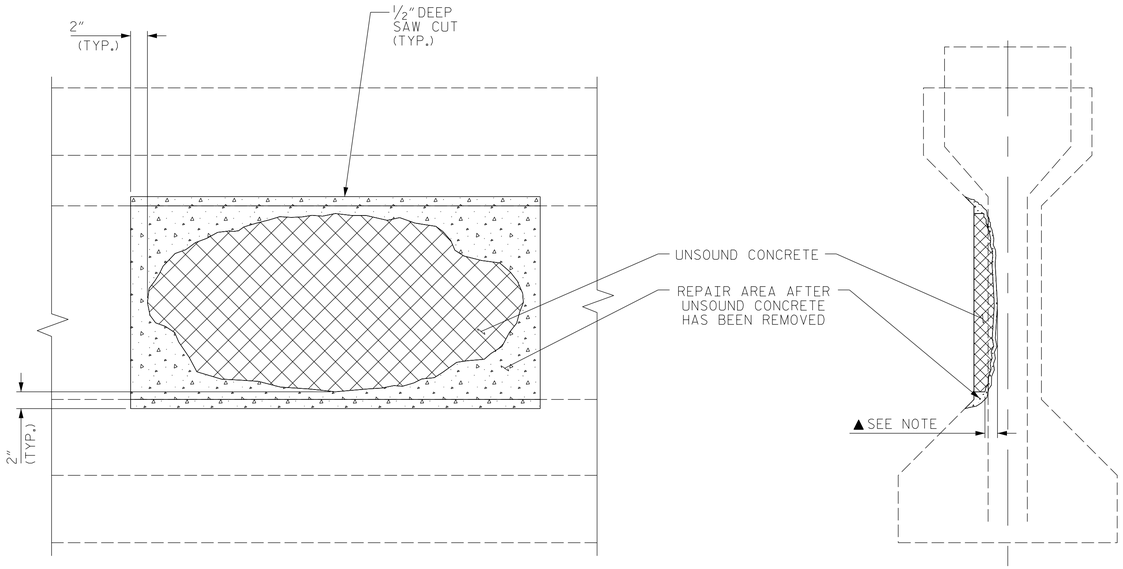
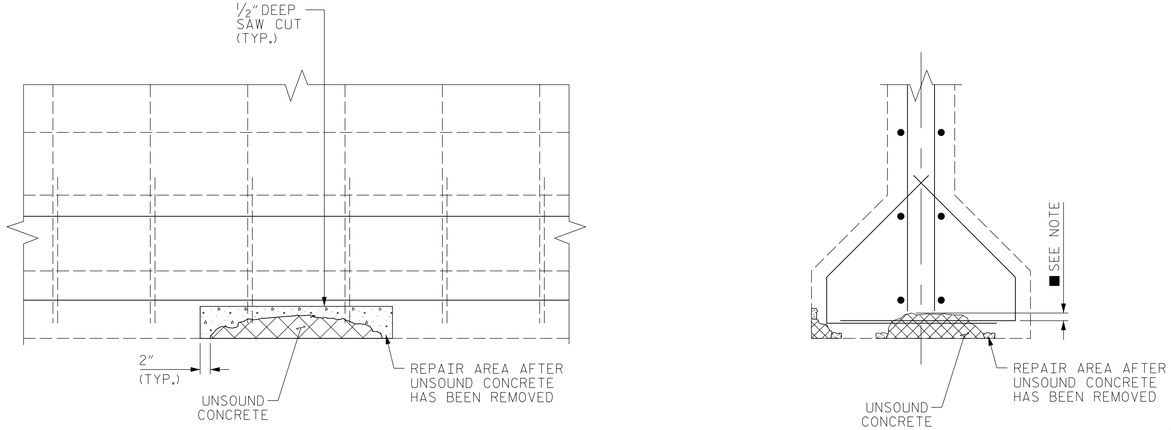
User:jdebone



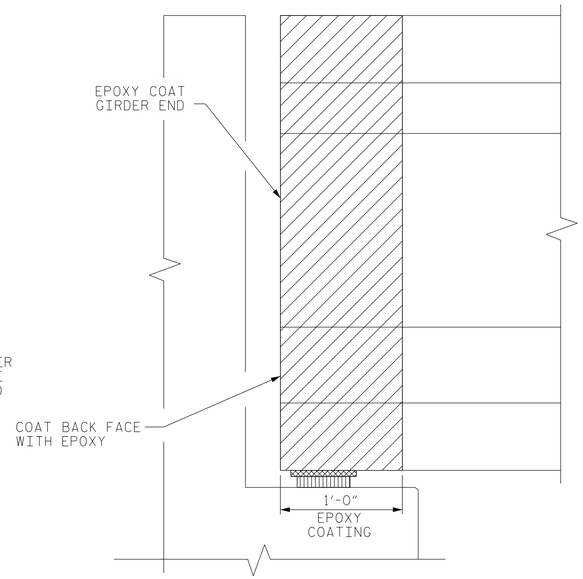
ELEVATION SECTION

GIRDER WEB REPAIR



ELEVATION SECTION

GIRDER FLANGE REPAIR



LIMITS OF PCG EPOXY COATING GIRDER ELEVATION

PRESTRESSED GIRDER REPAIR SEQUENCE:

1. SOUND CONCRETE TO DETERMINE EXTENTS OF REPAIR LOCATION (PHOTO REQUIRED).
2. REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF 1/2".
3. REMOVE CONCRETE WITHIN SAW CUT AREA TO MINIMUM DEPTH 1/2" DEPTH. IF CONCRETE IS DAMAGED BEYOND THE ORIGINAL SAW CUT, A NEW SAW CUT IS REQUIRED.
4. ▲ IF MORE THAN HALF THE CIRCUMFERENCE OF A REINFORCING BAR IS EXPOSED DURING THIS PROCESS, REMOVE ADDITIONAL CONCRETE TO 1" BEHIND THE BAR. THIS DOES NOT APPLY TO PRESTRESS STRANDS.
5. ■ ALL UNSOUND CONCRETE MUST BE REMOVED. HOWEVER, PRESTRESSED STRAND SHOULD NOT BE DISTURBED UNLESS ABSOLUTELY NECESSARY. USE EXTREME CARE TO NOT DAMAGE STRANDS.
6. CLEAN ALL EXPOSED REINFORCING BARS AND PRESTRESSED STRANDS. FOR BAR WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED. NOTE AND PROVIDE DETAILED DOCUMENTATION, INCLUDING LOCATION AND SEVERITY OF ALL DAMAGE TO PRESTRESSED STRANDS THAT EXCEEDS 10% SECTION LOSS. IF FIVE OR MORE STRANDS ARE DAMAGED, NOTIFY THE ENGINEER PRIOR TO PLACEMENT OF REPAIR MATERIAL.
7. REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE REPAIR AREA OF DIRT, GREASE, OIL, AND FOREIGN MATTER.
8. PREPARE SURFACE AND PLACE APPROVED MATERIAL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MAXIMUM AGGREGATE SIZE FOR REPAIR MATERIAL SHALL NOT EXCEED 2/3 THE MINIMUM REPAIR DEPTH.
9. FOR GIRDER REPAIRS, SEE PROJECT SPECIAL PROVISION FOR REPAIRS TO PRESTRESSED CONCRETE GIRDERS AND SEE "SUPERSTRUCTURE DEFICIENCIES" SHEETS.

NOTES:

PREPACKAGED MATERIAL IS REQUIRED.

FOR REPAIRS OVER TRAFFIC AND SHALLOW REPAIRS THAT DO NOT ENGAGE REINFORCEMENT, ANCHOR PATCH MATERIAL USING 1/4" GALVANIZED BOLTS, EPOXY ANCHORED WITH 2" EMBEDMENT. PLACE BOLTS IN A 6" GRID. USE A LATEX OR EPOXY PATH MATERIAL FOR IMPROVED BOND. USE EXTREME CARE TO NOT DAMAGE STRANDS.

DocuSigned by: Jacob H. Duke 2903...
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE
9/3/2020

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE RESTORATION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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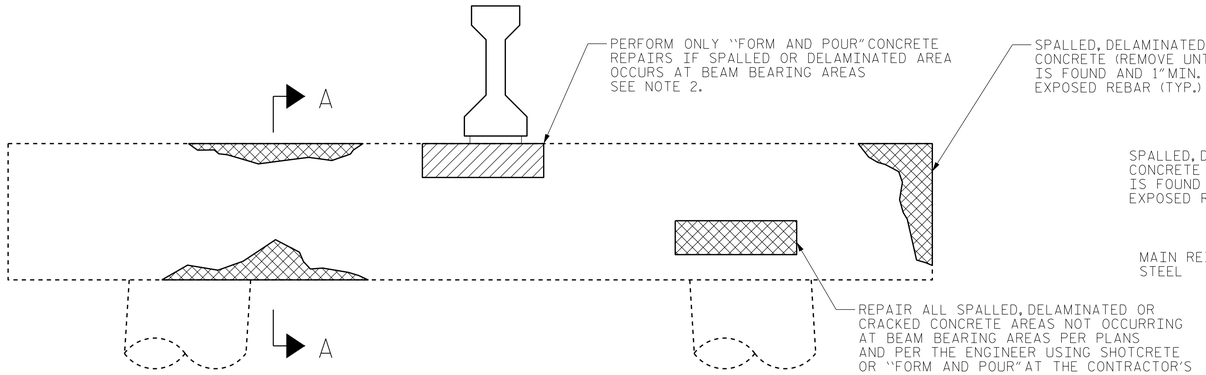
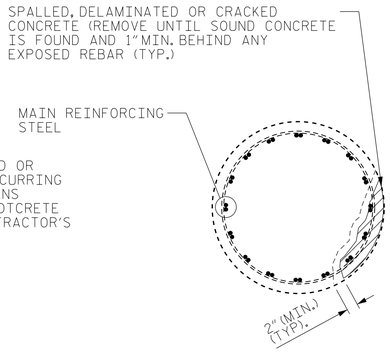
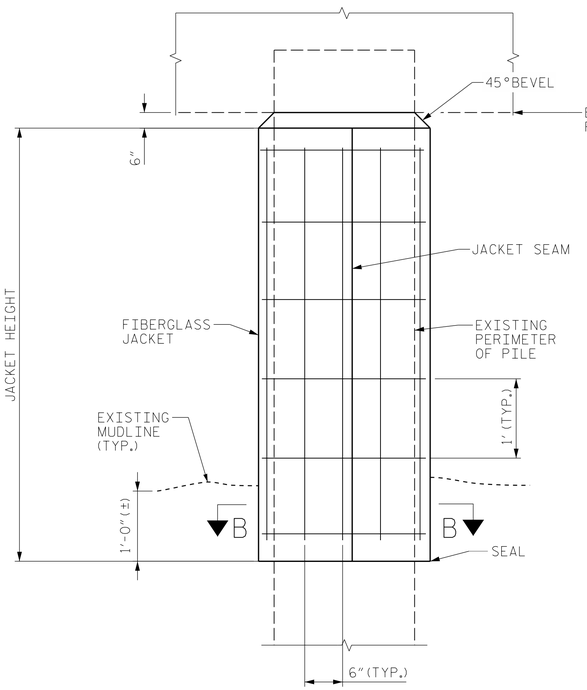
User:jdebone



CAP REPAIRS

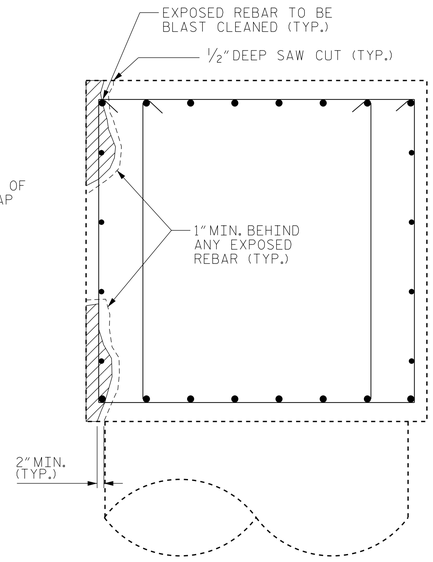


PLAN OF COLUMN

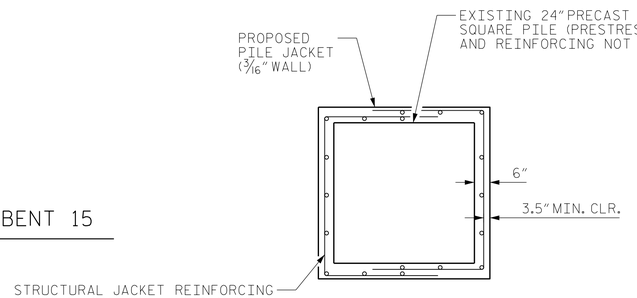


TYPICAL INTEGRAL PILE JACKETS AT BENT 15

ELEVATION



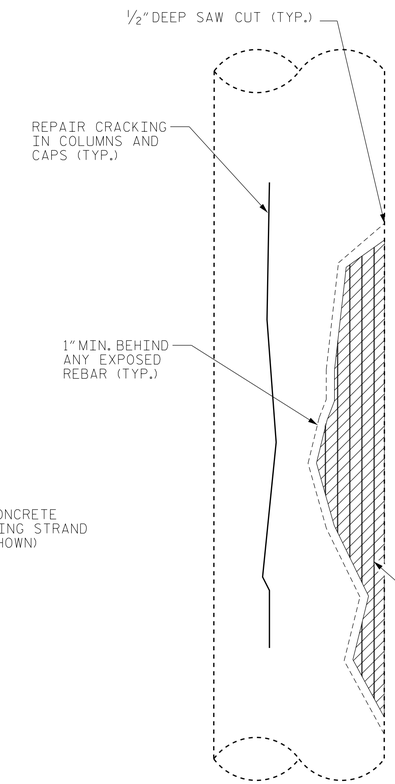
SECTION A-A



SECTION B-B

TYPICAL STRUCTURAL JACKET

BENT CAP REPAIRS



ELEVATION OF COLUMN

* REPAIR LENGTH SHALL NOT EXCEED 10 VERTICAL FEET AT ONCE OR 1/2 COLUMN DIAMETER.

COLUMN REPAIRS

CONSTRUCTION SEQUENCE FOR PILE JACKETS:

1. PREPARE SPALL AREAS WITHIN THE LIMITS OF THE PILE JACKETS IN ACCORDANCE WITH THIS SHEET PRIOR TO INSTALLING STRUCTURAL PILE JACKETS.
2. POSITION JACKET FORMS AND STEEL AROUND THE ENTIRE PILE PERIMETER FOR THE LENGTH OF THE JACKET IN PREPARATION FOR POUR.
3. POUR CONCRETE JACKET AS INDICATED ON THIS SHEET.
4. REMOVE FORMS. NO FORMS SHALL BE LEFT IN PLACE.
5. EXTEND JACKETS 1 FT. INTO THE MUDLINE AND FILL BACK AS APPROPRIATE.
6. REPAIR SPALLS ABOVE THE LIMITS OF THE APPROVED JACKETS LENGTHS IN ACCORDANCE WITH THIS SHEET.
7. PATCH AND FILL ANY REMAINING EXCAVATIONS WITH APPROVED MATERIAL.

NOTES:

1. WORK THIS SHEET WITH REPAIR METHODS AND CONCRETE REPAIR NOTES IN "CONCRETE RESTORATION DETAILS" SHEET 1 OF 3.
2. TYPICAL BENT CAP REPAIRS ARE SHOWN IN THIS SHEET. REPAIR DETAILS SIMILAR FOR END BENT CAPS.
3. THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL, OR REQUIRE HARS CHEMICALS TO REMOVE.
4. THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE SPECIAL PROVISIONS, AND THE STANDARD SPECIFICATIONS.
5. REMOVE UNSOUND CONCRETE TO THE EXTEND NECESSARY, ENSURING A MINIMUM OF 1" BEHIND REBAR, AND A MINIMUM CLEARANCE OF 2" TO SAWCUT.
6. REINFORCING STEEL WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED, SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE IN THE "GENERAL NOTES" SHEET 1 OF 2.
7. IF ANY AREA IS DETERMINED TO BE UNSTABLE DURING THE REPAIR PROCESS AS DETERMINED BY THE ENGINEER, STOP THE CURRENT REPAIR PROCEDURE, SHORE THE AREA AND PERFORM A "FORM AND POUR" CONCRETE REPAIR.
8. NO MORE THAN 30% OF THE CAP OR PILE CROSS SECTIONAL AREA SHALL BE REMOVED AT ONE TIME. SHOULD IT BECOME NECESSARY TO REMOVE MORE THAN 30% OF THE CROSS SECTIONAL AREA, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.
9. SIMULTANEOUS REMOVAL OF UNSOUND CONCRETE MAY BE PERMITTED ON MORE THAN ONE FACE OF A CAP AND/OR PILE, IF THE AREAS OF REMOVAL ARE NOT ADJECENT TO OR DIRECTLY OPPOSITE ONE ANOTHER. IF REMOVAL EXTENDS MORE THAN 1/2" BEHIND THE MAIN REINFORCING BARS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.
10. COAT ALL THE SURFACE AREA ON THE TOP OF CAPS, INCLUDING CHAMFERS, WITH EPOXY COATING. DO NOT COAT AREA UNDER BEARINGS.
11. FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.
12. FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
13. FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.
14. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.
15. FOR SUBSTRUCTURE REPAIRS, SEE "SUBSTRUCTURE REPAIRS" SHEETS.
16. FOR INTEGRAL PILE JACKETS, SEE SPECIAL PROVISIONS.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 3 OF 3

DocuSigned by: Jacob H. Duke 2903B3D5B5E4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

9/3/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE RESTORATION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	JACOB H. DUKE	DATE : 10/2018
CHECKED BY :	DIEGO A. AGUIRRE	DATE : 10/2018
DESIGN ENGINEER OF RECORD :	JACOB H. DUKE	DATE : 10/2018

9/3/2020
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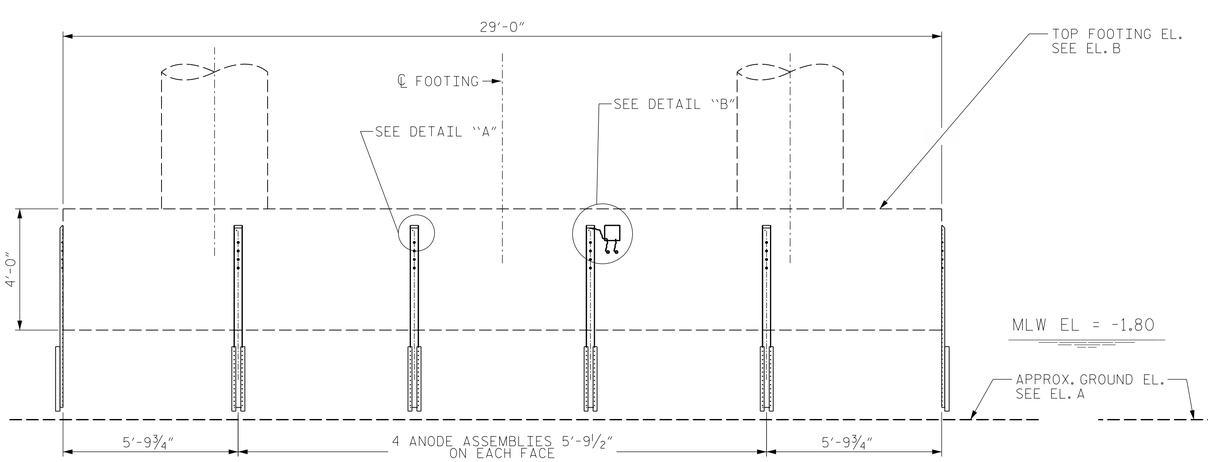
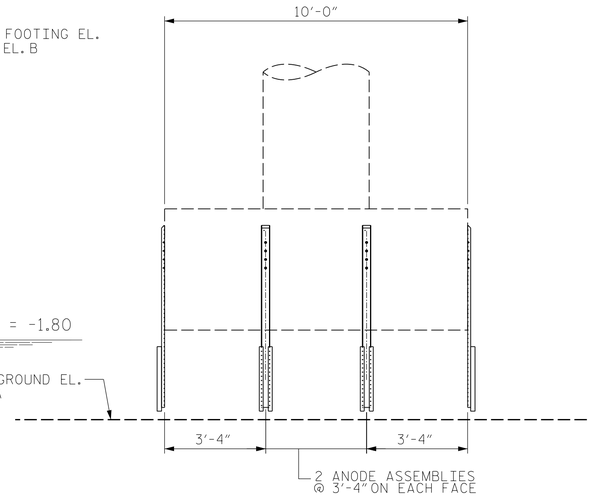
User:jdebone



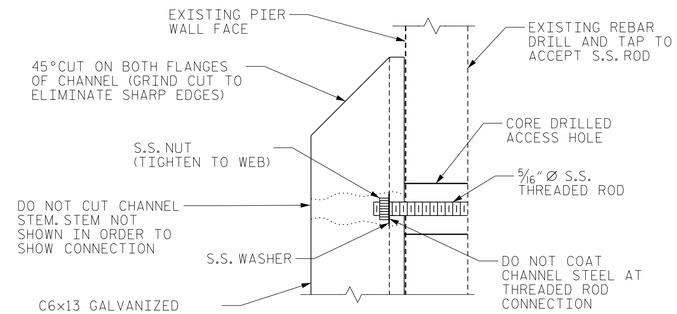
ELEVATION

WEST OR EAST FACE
PILES NOT SHOWN FOR CLARITY



ELEVATION

NORTH OR SOUTH FACE
PILES NOT SHOWN FOR CLARITY



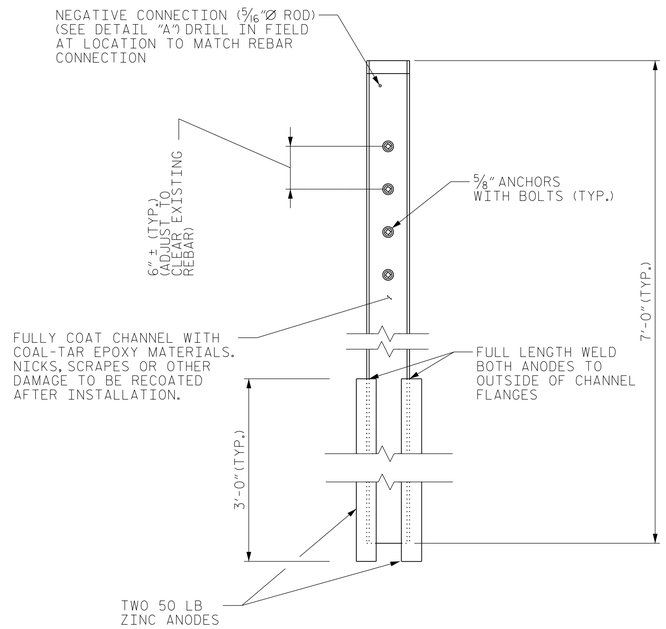
DETAIL "A"

CONNECTION TO EXISTING REBAR DETAIL
(SIDE VIEW)
(CHANNEL STEM NOT SHOWN AT CONNECTION)

ELEVATIONS		
BENT NO.	EL. A	EL. B
10	-3.00	4.00
13	-1.00	4.00

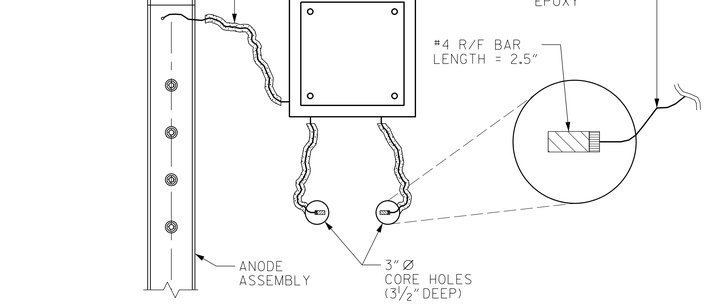
NOTES:

1. THOROUGHLY CLEAN THE FOOTINGS OF MARINE GROWTH AND DEBRIS BEFORE PERFORMING ANY WORK ASSOCIATED WITH THE INSTALLATION OF THE PROPOSED BULK ANODES.
2. ANODES SHALL BE ASTM B418-01 TYPE I.
3. EXCEPT FOR ANODE WELDING, ALL CHANNEL MANUFACTURING SHALL BE PERFORMED PRIOR TO GALVANIZING.
4. ANCHORS TO BE DROP-IN TYPE 5⁄8″ × 27⁄32″ GALVANIZED HILTI HDI 243262 OR APPROVED EQUAL.
5. SEAL ACCESS HOLE WITH APPROVED EPOXY GROUT MATERIAL AFTER S.S. ROD INSTALLATION.
6. ANODE ASSEMBLIES SHALL BE PLACED SUCH THAT THE ANODE BE SUBMERGED A MINIMUM OF 1′-0″ BELOW MEAN LOW WATER ELEVATION AT ALL TIMES. SPACING AND ELEVATION ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER.
7. WELDING OF S.S. ROD TO THE REBAR IN LIEU OF DRILL AND TAP MAY BE APPROVED AT THE DISCRETION OF THE ENGINEER.
8. ELECTRICAL CONTINUITY OF REINFORCING STEEL BETWEEN AT LEAST TWO OTHER CONNECTIONS SHALL BE PERFORMED PER CONNECTION PRIOR TO AND AFTER ANODE ASSEMBLY INSTALLATION.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE REINFORCING STEEL AND PATCH ALL CORES WITH APPROVED CONCRETE REPAIR MATERIAL.
10. DIMENSIONS AND ELEVATIONS SHOWN ON THIS SHEET ARE BASED ON LIMITED AVAILABLE DATA. DIFFERENT DIMENSIONS AND TYPES OF ANODE SYSTEM MAY BE USED BASED ON ACTUAL FIELD CONDITIONS.
11. PAYMENT FOR ALL WORK AND HARDWARE DESCRIBED ASSOCIATED WITH FURNISHING AND INSTALLING OF THE ZINC ANODES SHALL BE INCIDENTAL TO THE PAY ITEM FOR "CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODES".
12. SEE PROJECT SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND ACCEPTANCE CRITERIA. (PSP: CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODE)



ANODE ASSEMBLY DETAIL

(FRONT VIEW)



DETAIL "B"

MONITORING JUNCTION BOX DETAIL
(FRONT VIEW)

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DocuSigned by: Jacob Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

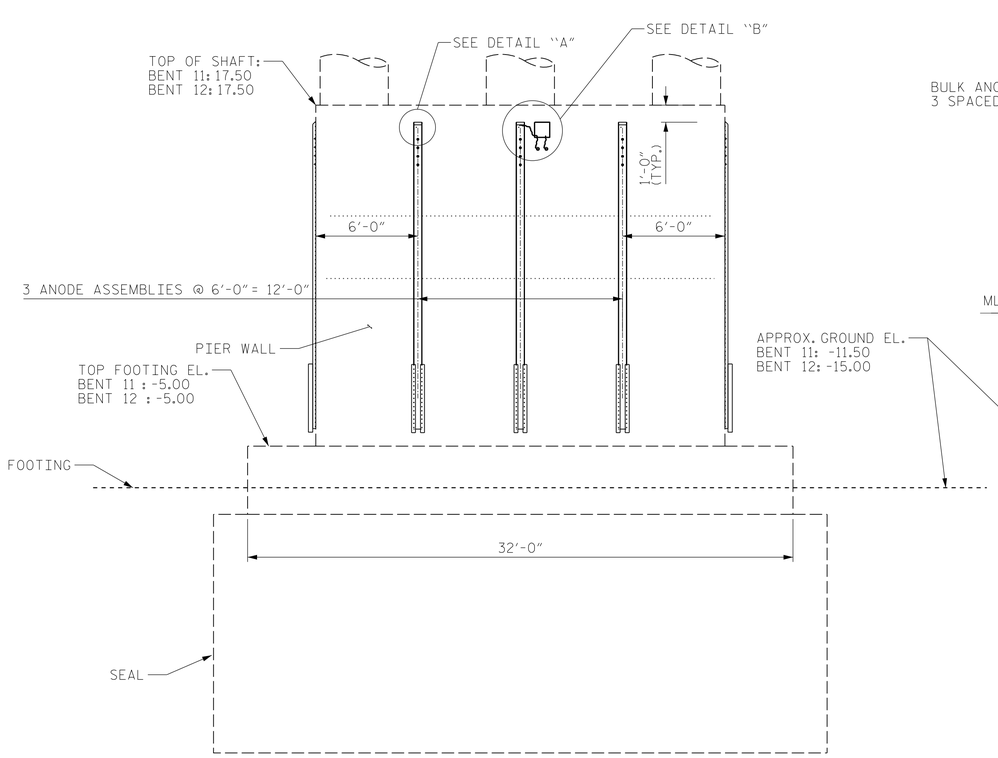
CHANNEL BENT FOOTING RESTORATION

BULK ANODE DETAILS
BENTS 10 & 13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			45

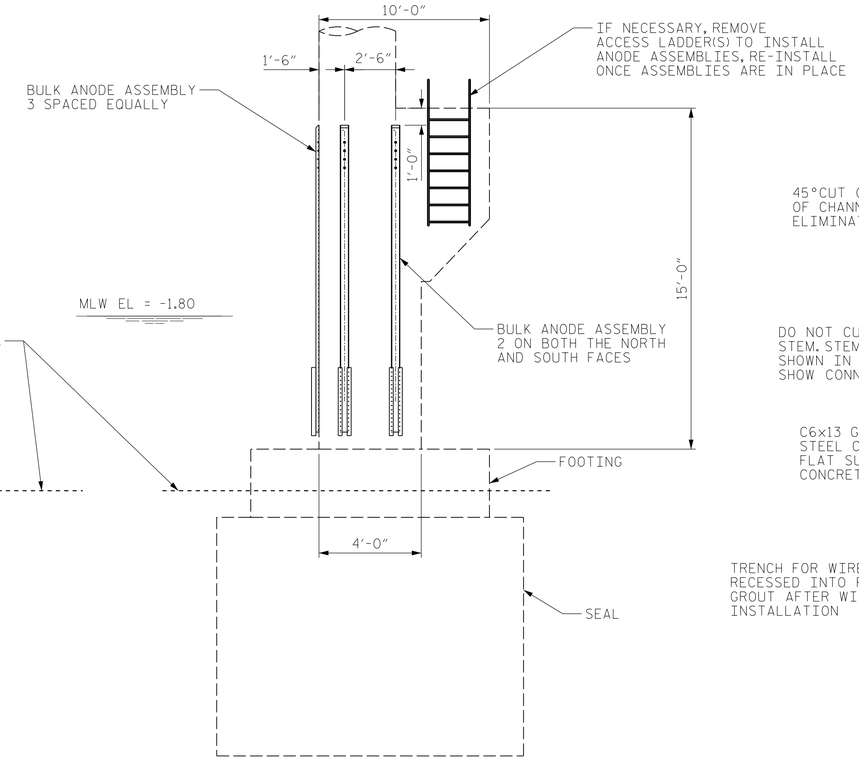
DRAWN BY : OMAR M KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_CBR01_090013.dgn
User:jdebone



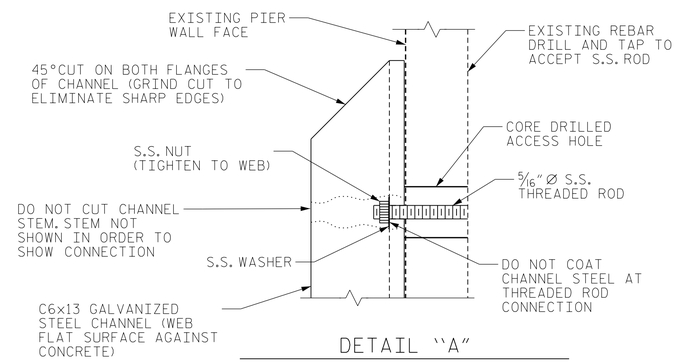
ELEVATION

(WEST FACE OF BENT 11)
(EAST FACE OF BENT 12)



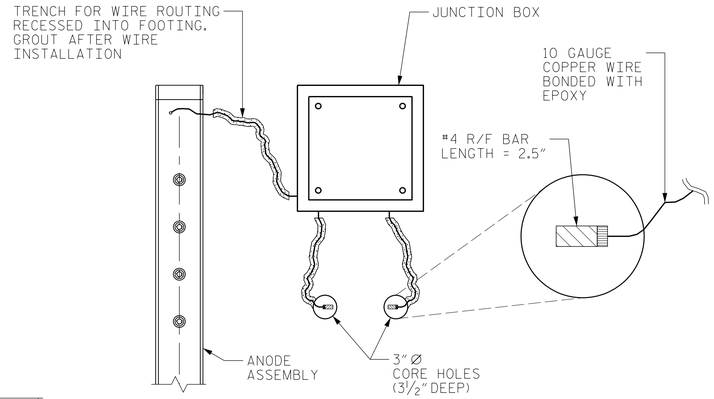
ELEVATION

(SOUTH FACE OF BENT 11)
(NORTH FACE OF BENT 12)
(ACCESS LADDER ON SOUTH FACES OF FOOTINGS ONLY)



DETAIL "A"

CONNECTION TO EXISTING REBAR DETAIL
(SIDE VIEW)
(CHANNEL STEM NOT SHOWN AT CONNECTION)



DETAIL "B"

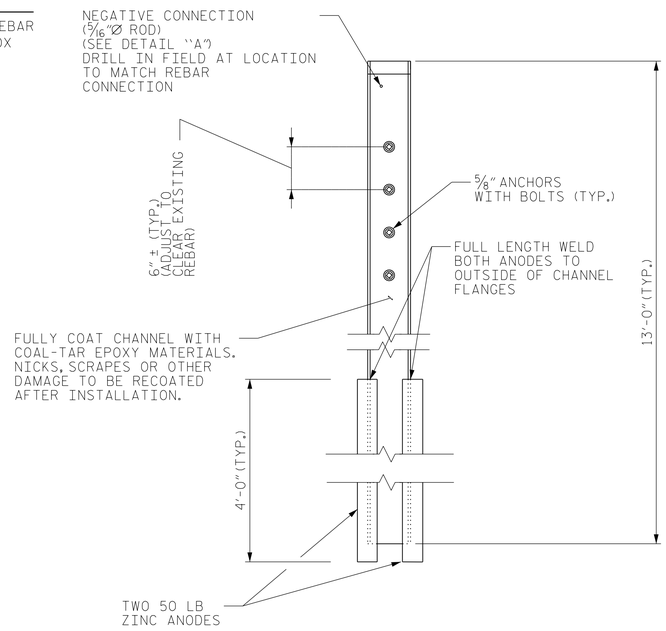
MONITORING JUNCTION BOX DETAIL
(FRONT VIEW)

ANODE PLACEMENT

SEE DETAIL "A" FOR CONNECTION TO EXISTING REBAR
SEE DETAIL "B" FOR MONITORING JUNCTION BOX

NOTES:

1. THOROUGHLY CLEAN THE FOOTINGS OF MARINE GROWTH AND DEBRIS BEFORE PERFORMING ANY WORK ASSOCIATED WITH THE INSTALLATION OF THE PROPOSED BULK ANODES.
2. ANODES SHALL BE ASTM B418-01 TYPE I.
3. EXCEPT FOR ANODE WELDING, ALL CHANNEL MANUFACTURING SHALL BE PERFORMED PRIOR TO GALVANIZING.
4. ANCHORS TO BE DROP-IN TYPE 5/8" x 27/32" GALVANIZED HILTI HDI 243262 OR APPROVED EQUAL.
5. SEAL ACCESS HOLE WITH APPROVED EPOXY GROUT MATERIAL AFTER S.S. ROD INSTALLATION.
6. ANODE ASSEMBLIES SHALL BE PLACED SUCH THAT THE ANODE BE SUBMERGED A MINIMUM OF 3'-0" BELOW MEAN LOW WATER ELEVATION AT ALL TIMES. SPACING AND ELEVATION ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER.
7. PER EXISTING PLANS, TYPICAL CONCRETE COVER ON EXISTING PIER WALL IS 4".
8. WELDING OF S.S. ROD TO THE REBAR IN LIEU OF DRILL AND TAP MAY BE APPROVED AT THE DISCRETION OF THE ENGINEER.
9. ELECTRICAL CONTINUITY OF REINFORCING STEEL BETWEEN AT LEAST TWO OTHER CONNECTIONS SHALL BE PERFORMED PER CONNECTION PRIOR TO AND AFTER ANODE ASSEMBLY INSTALLATION.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE REINFORCING STEEL AND PATCH ALL CORES WITH APPROVED CONCRETE REPAIR MATERIAL.
11. PAYMENT FOR ALL WORK AND HARDWARE DESCRIBED ASSOCIATED WITH FURNISHING AND INSTALLING OF THE ZINC ANODES SHALL BE INCIDENTAL TO THE PAY ITEM FOR "CP SYSTEM (ZINC BULK ANODES)".
12. SEE PROJECT SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND ACCEPTANCE CRITERIA. (PSP: CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODE)



ANODE ASSEMBLY DETAIL

(FRONT VIEW)

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2904E0E0E0E0E0E...
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE
9/3/2020

KCA KISINGER CAMPO & ASSOCIATES
301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

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DEPARTMENT OF TRANSPORTATION
RALEIGH

CHANNEL BENT FOOTING RESTORATION

BULK ANODE DETAILS BENT 11 & 12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_CBR02_090013.dgn
User:jdebone

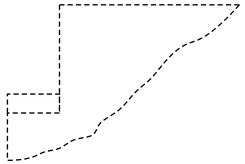
LEGEND:

CONCRETE REPAIR AREA

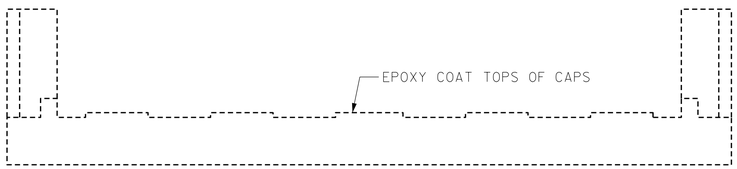
SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION (ERI)

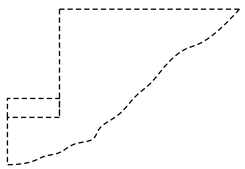
END BENT 1



ELEVATION



END BENT 2



ELEVATION

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	-	-		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	152.6			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2BC1A1D6C1E4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7838
LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS END BENTS 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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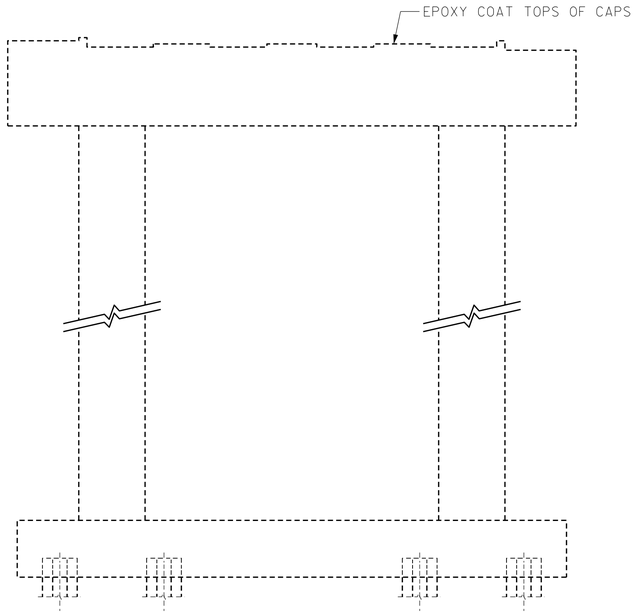
User:jdebone

LEGEND:

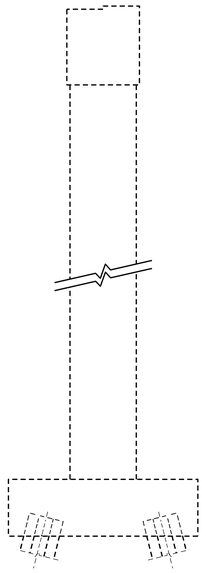
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

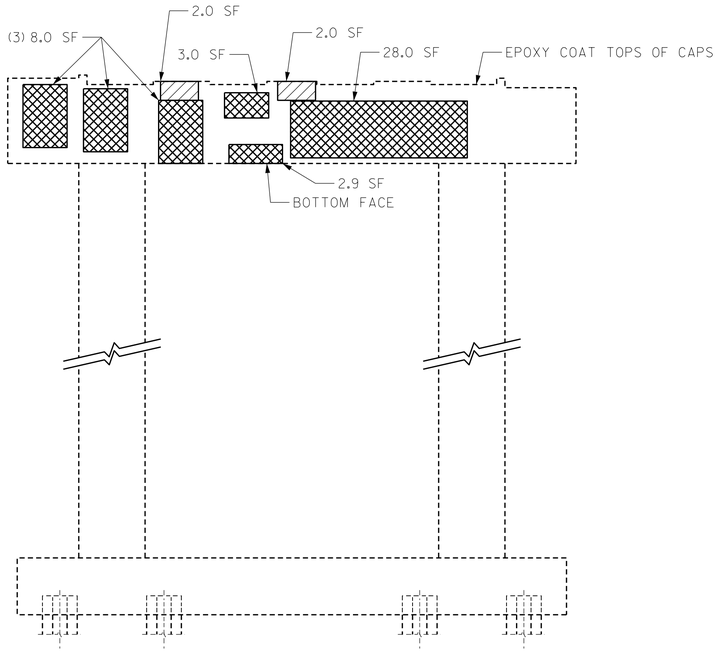
EPOXY RESIN INJECTION (ERI)



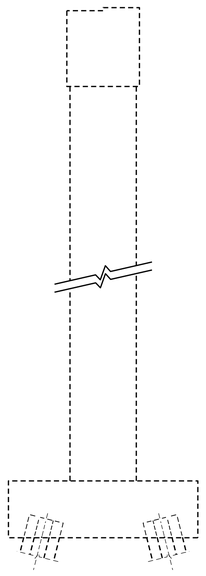
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	57.9	29		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	4.0	2.0		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2953...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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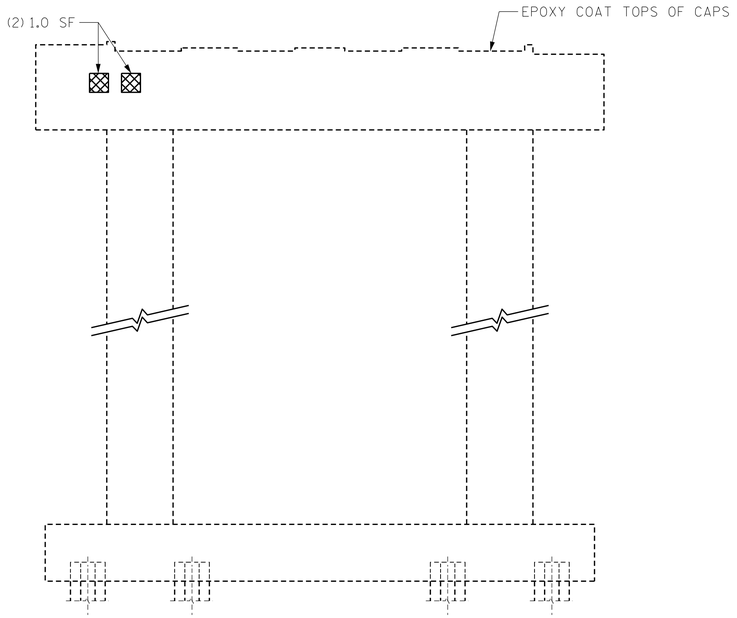
User:jdebone

LEGEND:

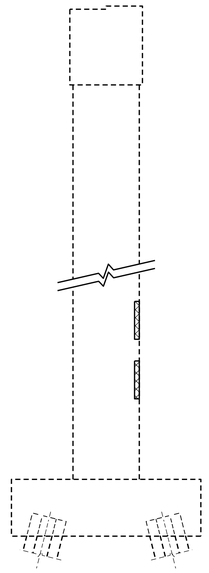
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

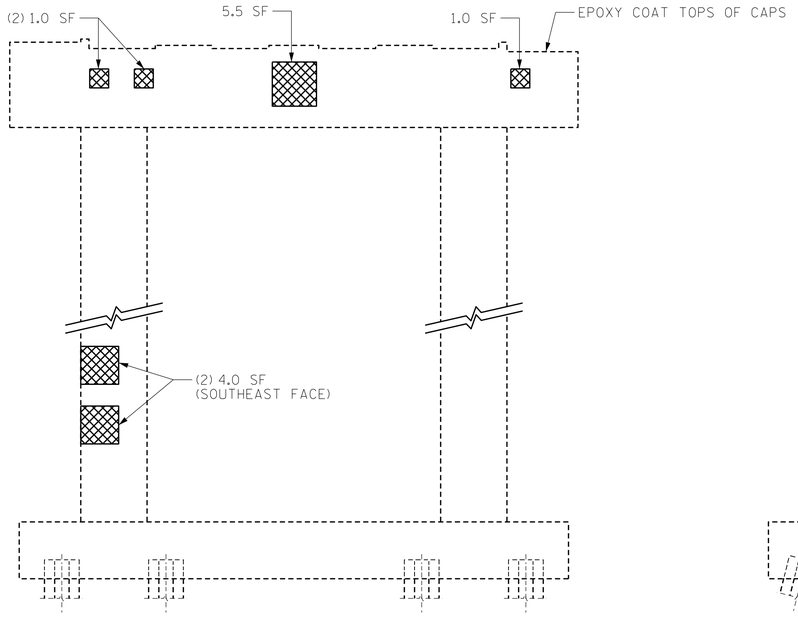
EPOXY RESIN INJECTION (ERI)



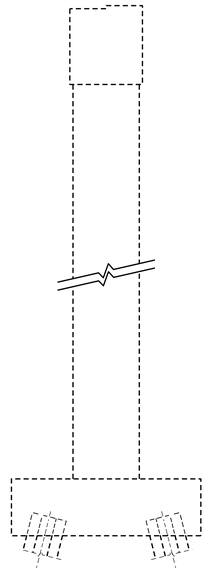
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	18.5	9.25		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.9	1.0		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke
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NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

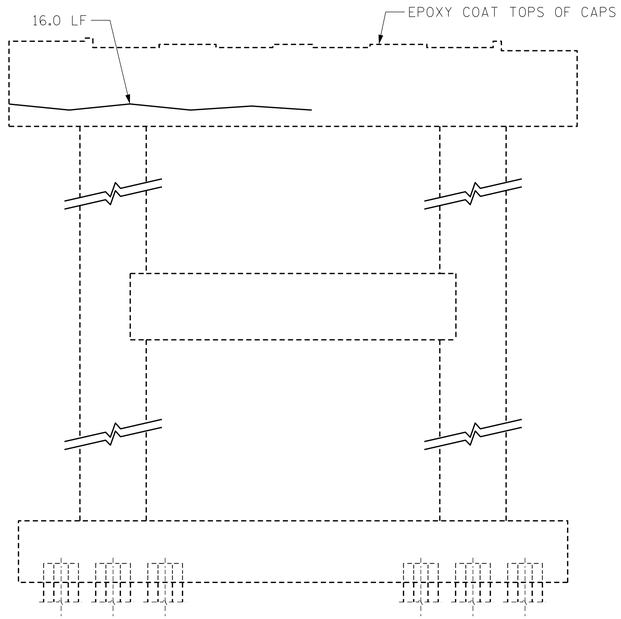
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B02_090013.dgn
User:jdebone

LEGEND:

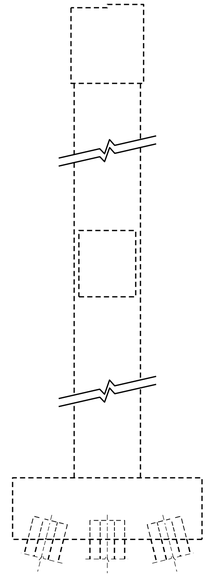
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

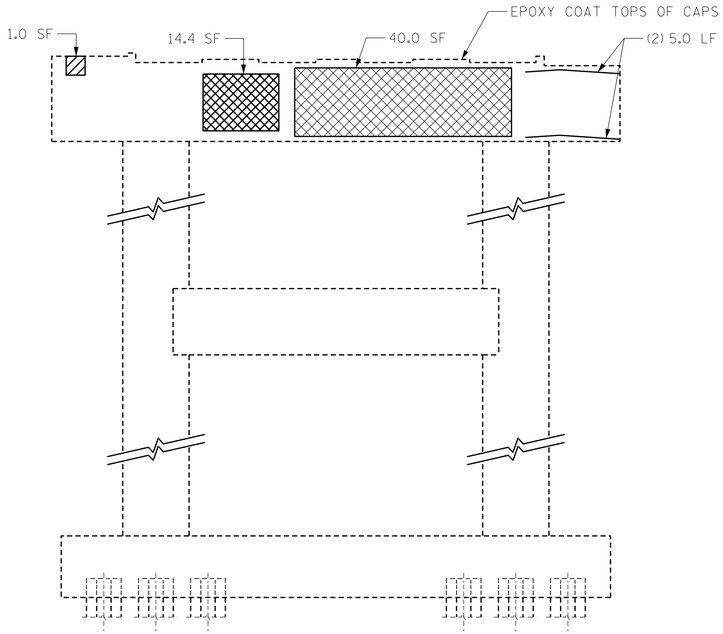
EPOXY RESIN INJECTION (ERI)



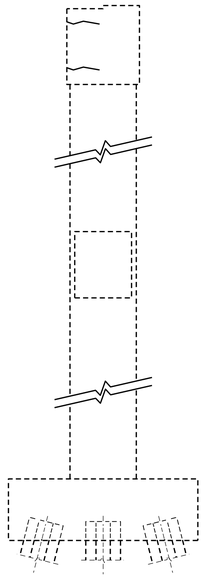
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	54.4	27.2		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		26.0		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2DC3A3A0C7F4...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

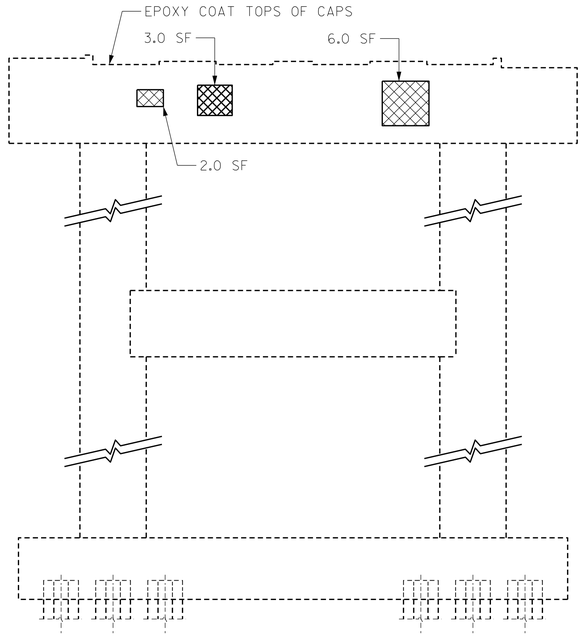
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B03_090013.dgn
User:jdebone

LEGEND:

CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION (ERI)



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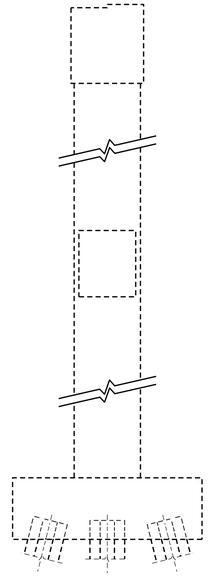
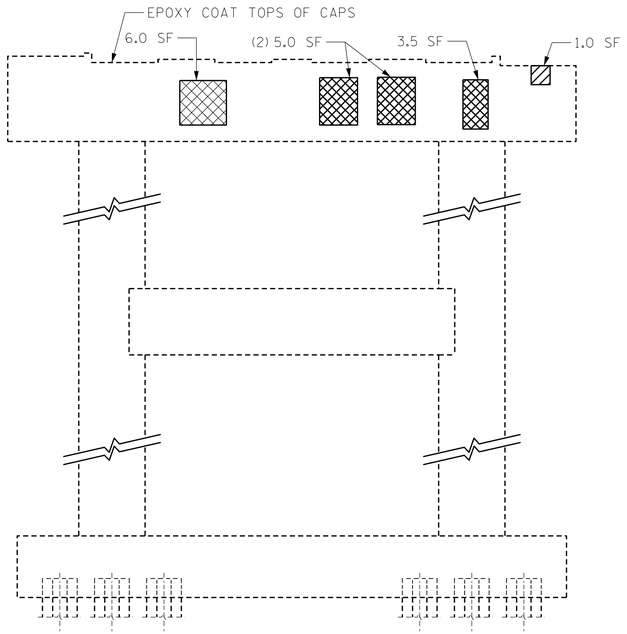
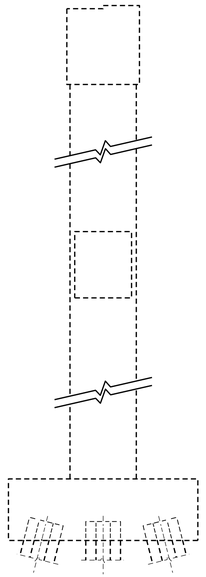


SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	30.5	15.25		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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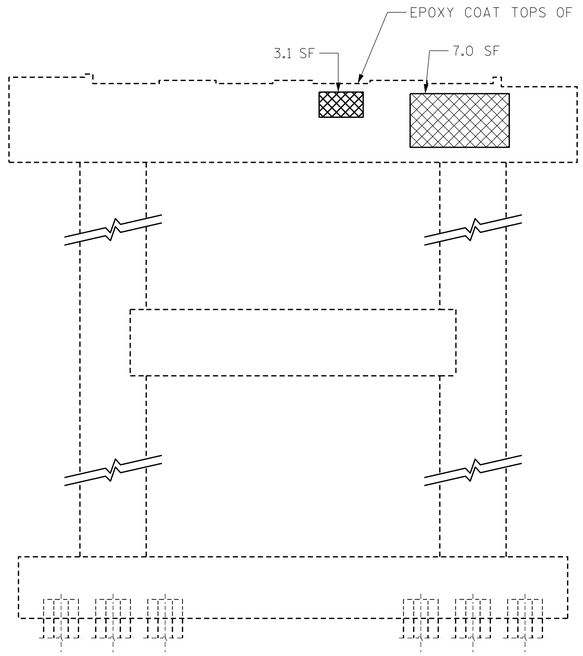
User:jdebone

LEGEND:

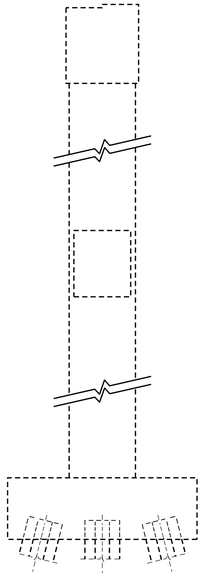
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

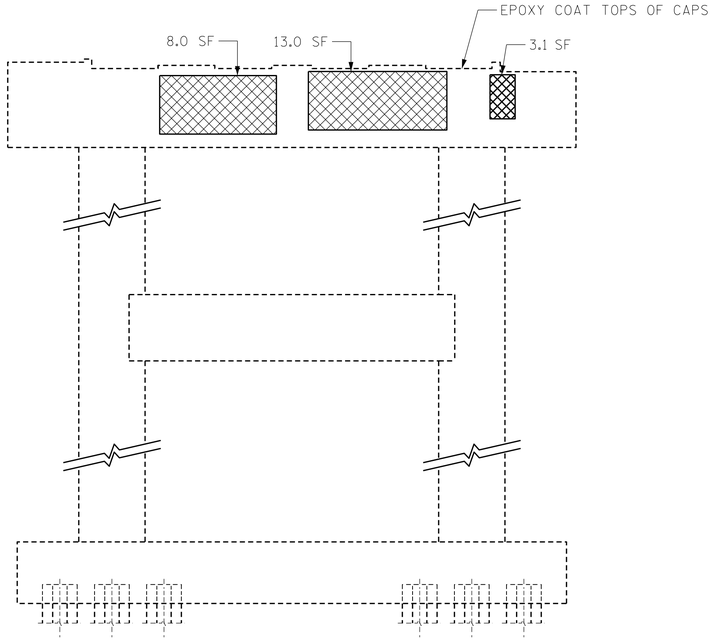
EPOXY RESIN INJECTION (ERI)



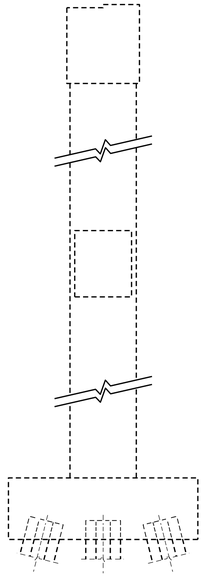
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	31.1	15.6		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.2	1.1		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2950A1E0A1E0A1E...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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RALEIGH, NC 27601
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LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 5

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

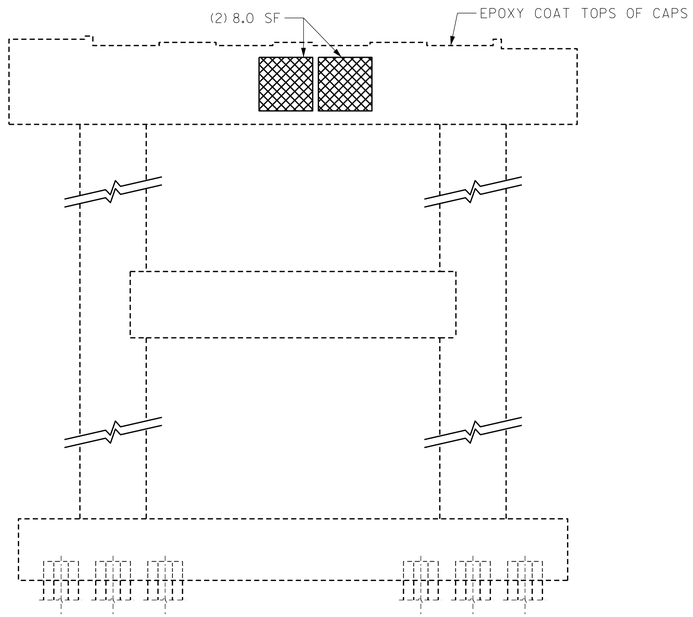
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B05_090013.dgn
User:jdebone

LEGEND:

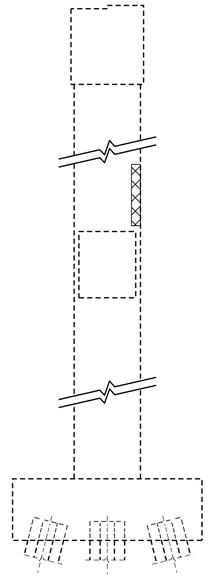
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

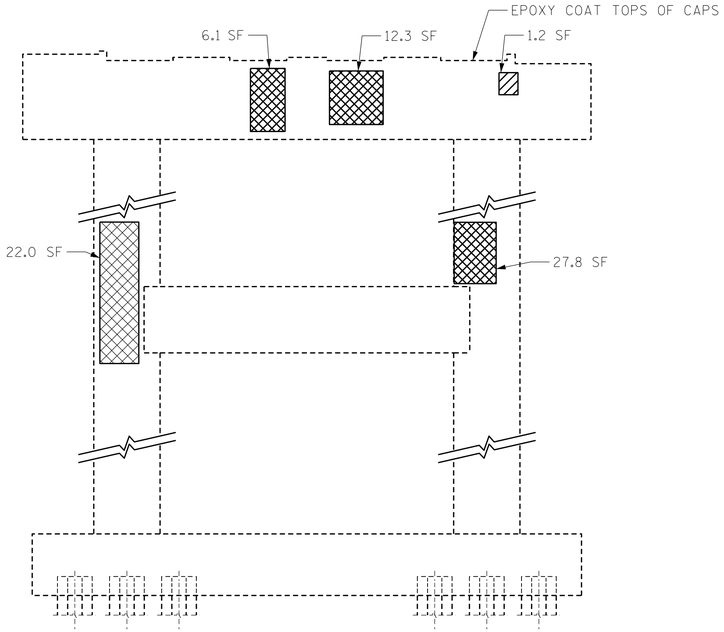
EPOXY RESIN INJECTION (ERI)



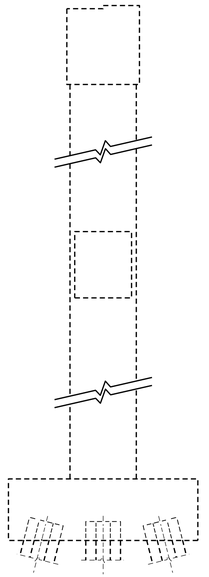
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	34.4	17.2		
COLUMN/PILE	49.8	24.9		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.2	0.6		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 6

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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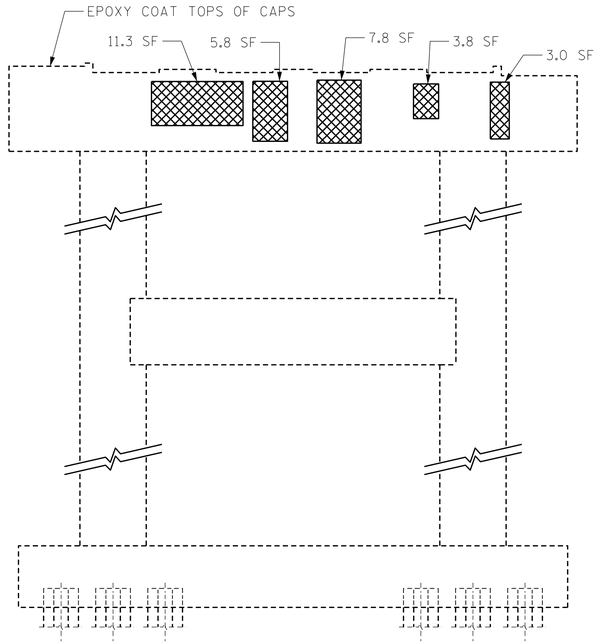
User:jdebone

LEGEND:

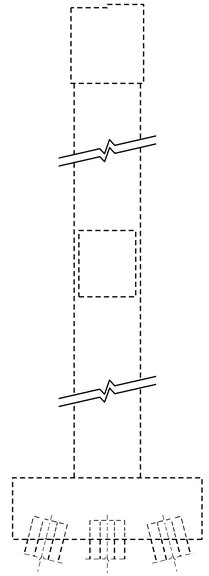
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

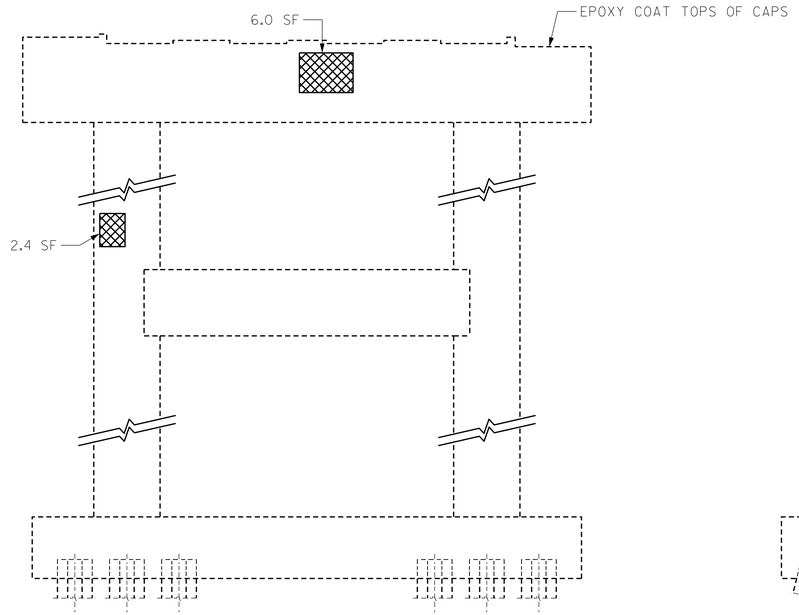
EPOXY RESIN INJECTION (ERI)



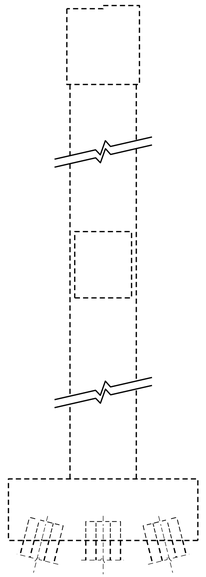
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	37.7	18.9		
COLUMN/PILE	2.4	1.2		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.8	1.9		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2005E0E0E0E0E0E0...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7838
LICENSE #: C-1506

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 7

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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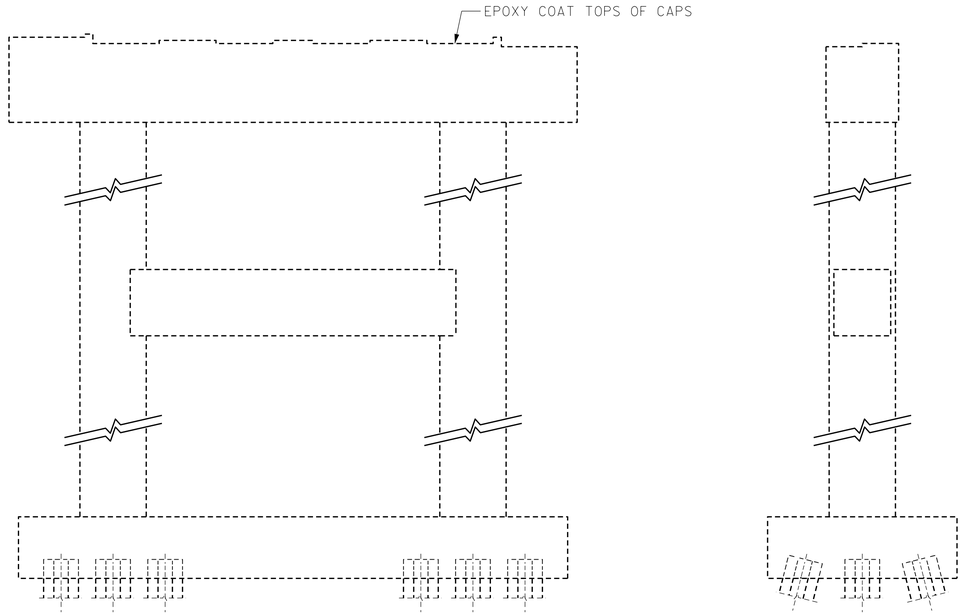
User:jdebone

LEGEND:

CONCRETE REPAIR AREA

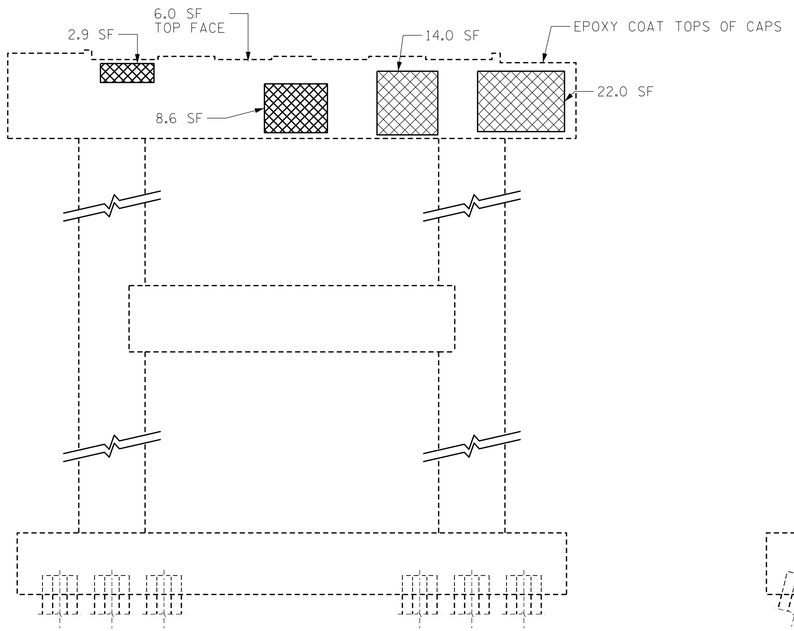
SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION (ERI)

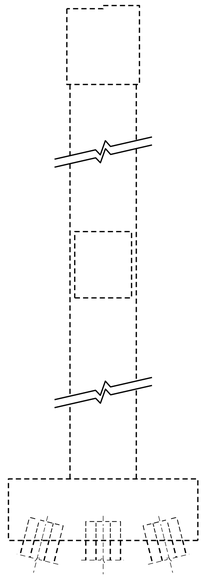


WEST ELEVATION

SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	53.5	26.8		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.9	1.0		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 8

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

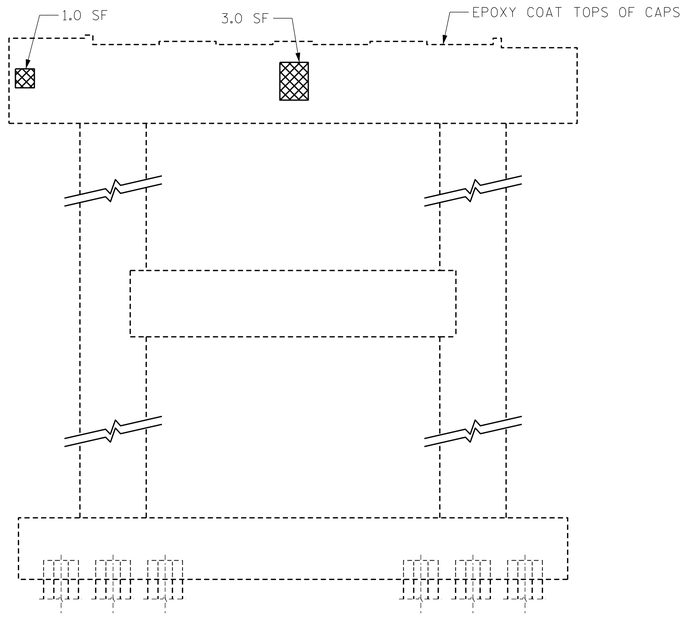
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B08_090013.dgn
User:jdebone

LEGEND:

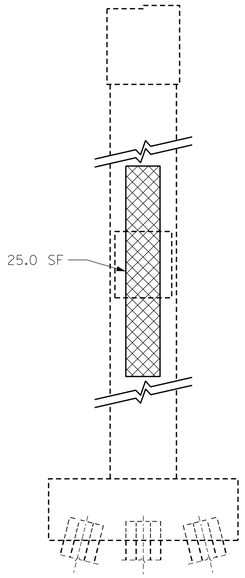
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

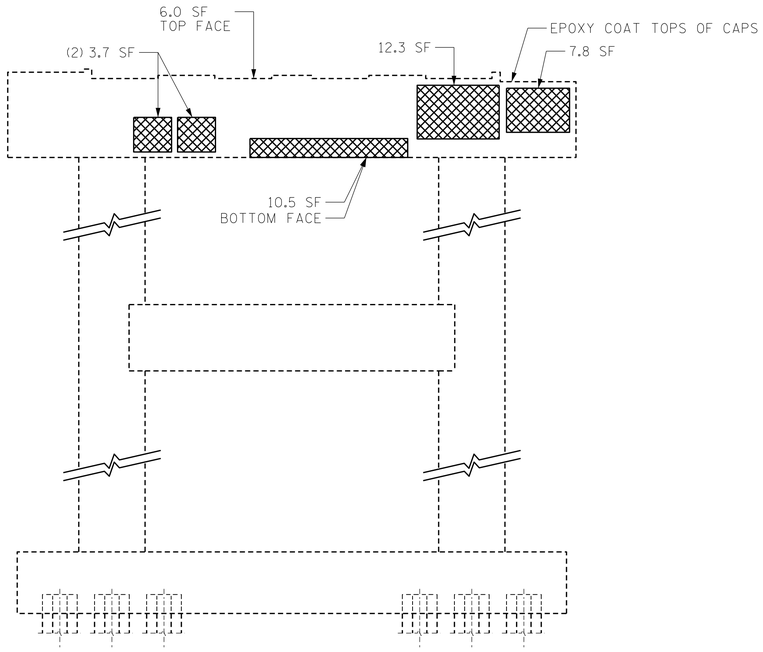
EPOXY RESIN INJECTION (ERI)



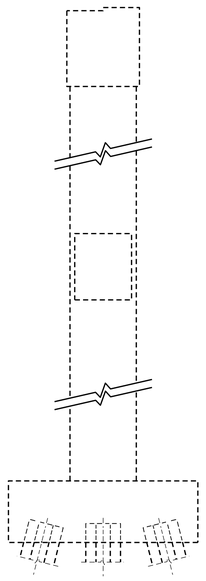
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	65.4	32.7		
COLUMN/PILE	25.0	12.5		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	4.3	2.2		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

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SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2953...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H. DUKE

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 9

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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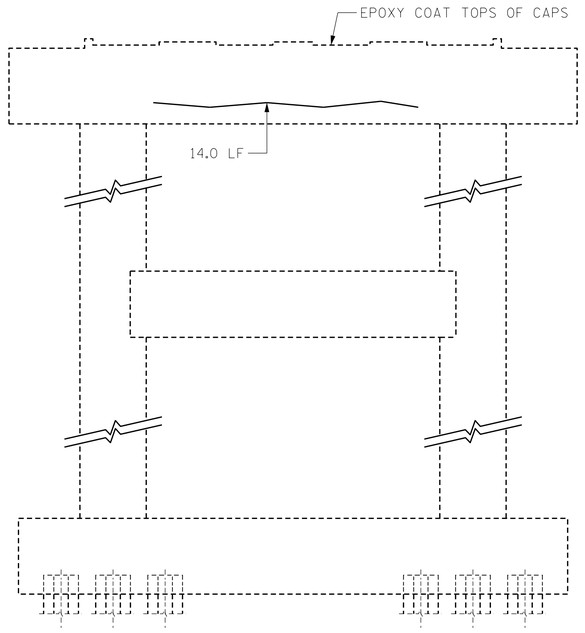
User:jdebone

LEGEND:

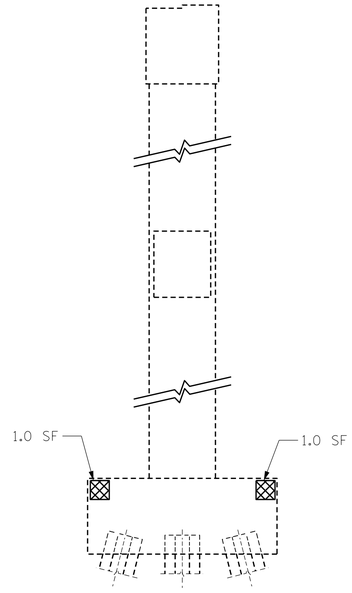
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

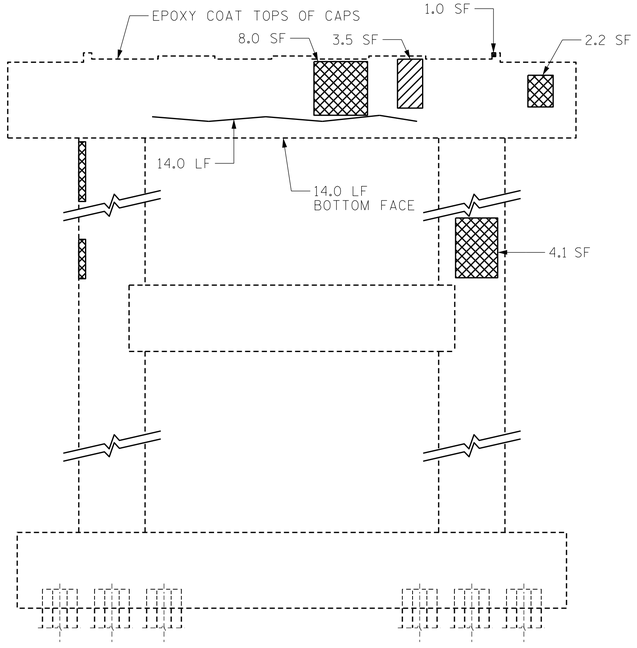
EPOXY RESIN INJECTION (ERI)



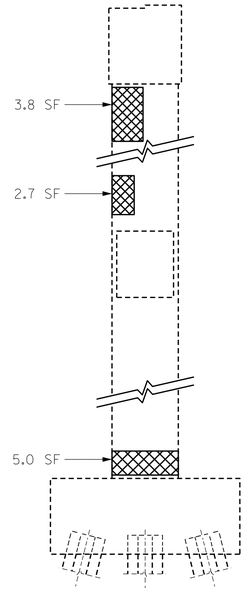
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	13.2	6.6		
COLUMN/PILE	15.6	7.8		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.5	1.8		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		42.0		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob H. Duke 2950A3E5A3E5A3E...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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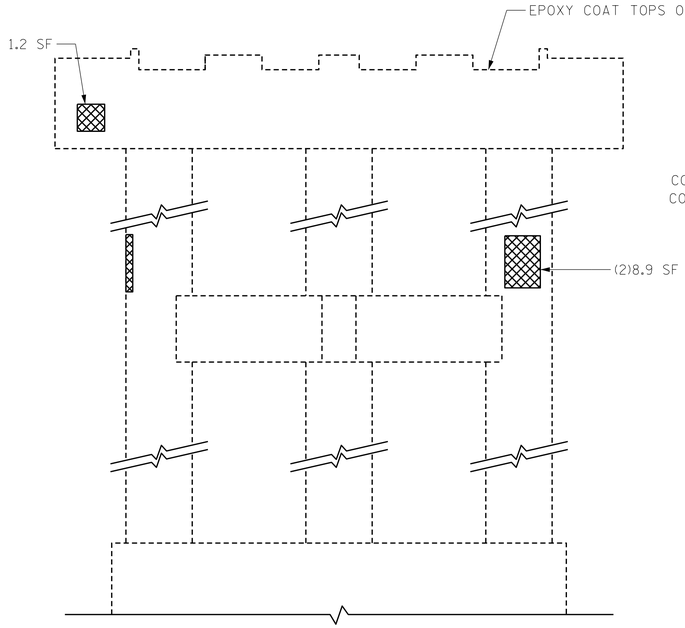
User:jdebone

LEGEND:

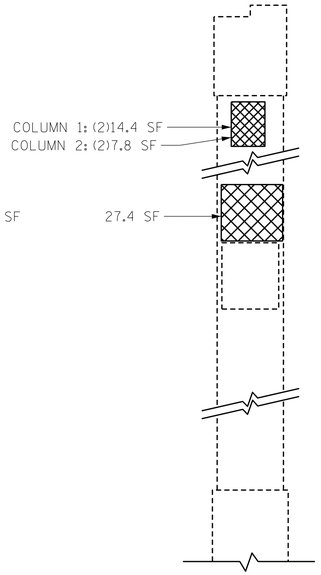
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

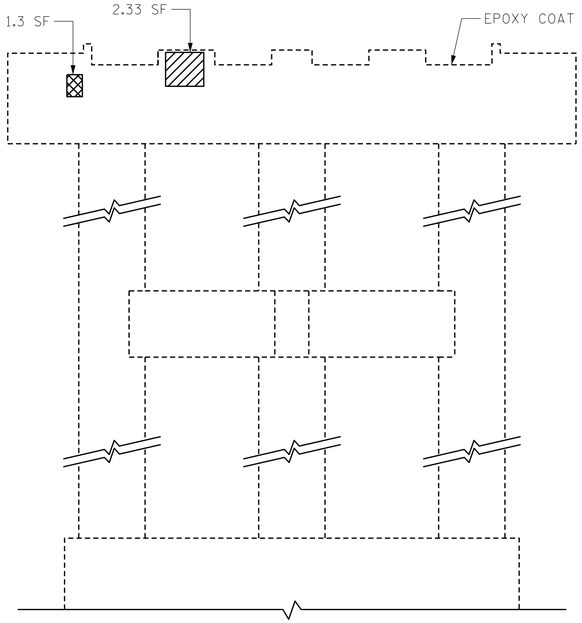
EPOXY RESIN INJECTION (ERI)



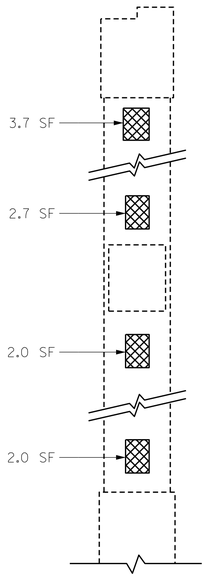
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	2.5	1.3		
COLUMN/PILE	100.0	50.0		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.3	1.2		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	143			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2005E0E0E0E0E0E0E0E0E0E0E0E0E0E0

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

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RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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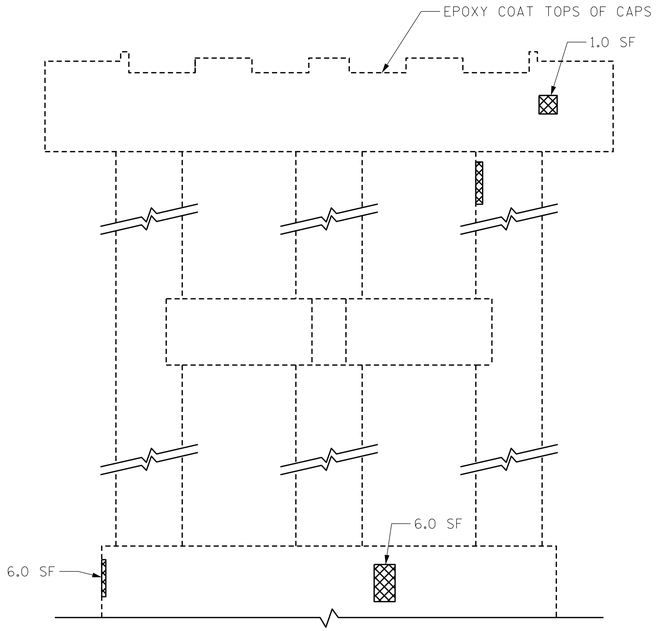
User:jdebone

LEGEND:

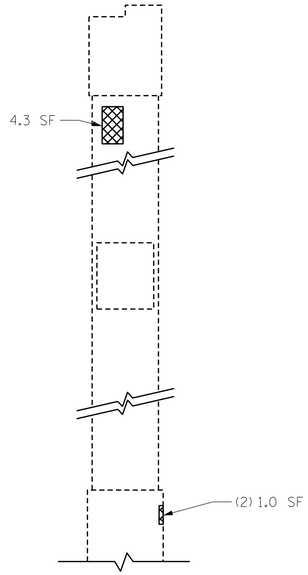
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

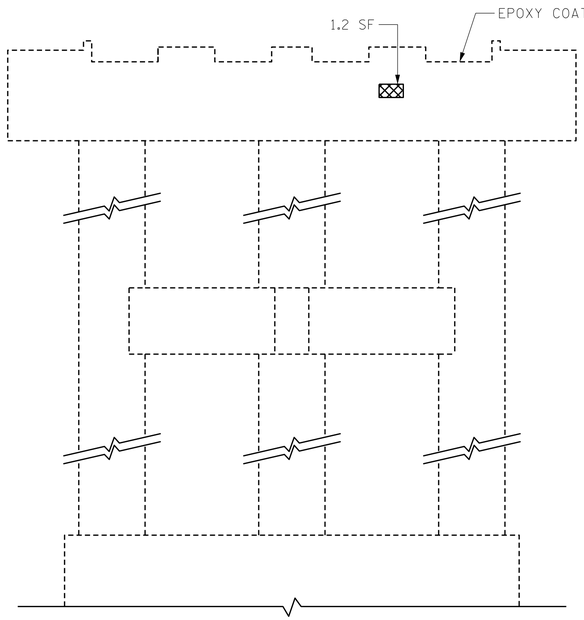
EPOXY RESIN INJECTION (ERI)



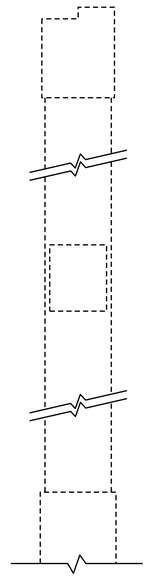
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	16.2	8.1		
COLUMN/PILE	4.3	2.2		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	143			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

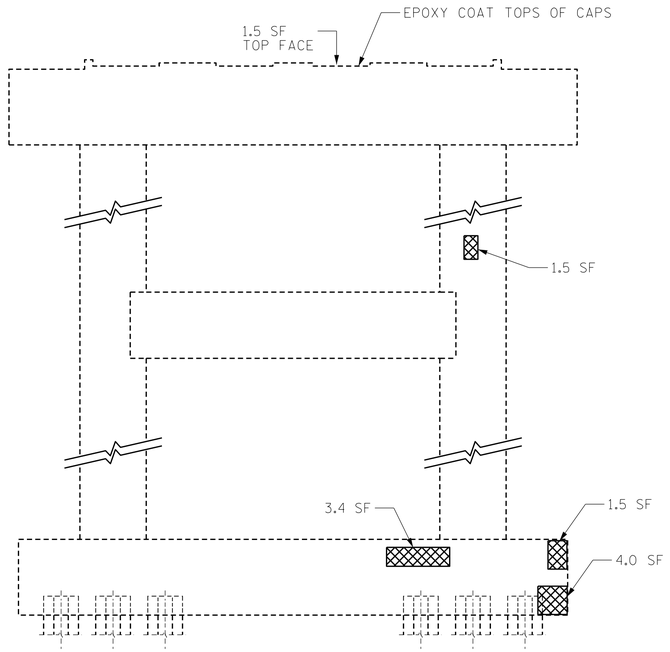
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B12_090013.dgn
User:jdebone

LEGEND:

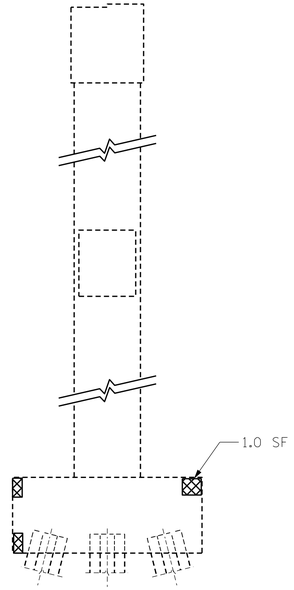
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

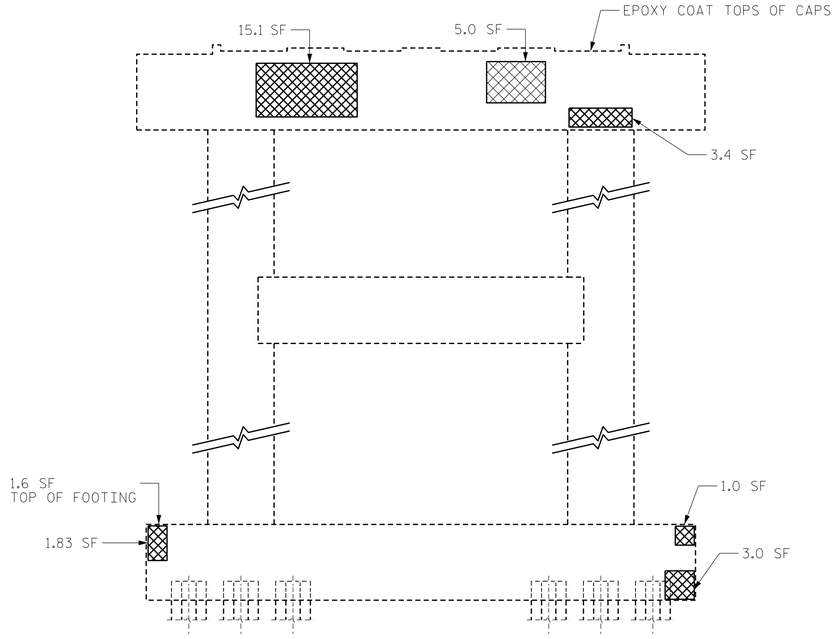
EPOXY RESIN INJECTION (ERI)



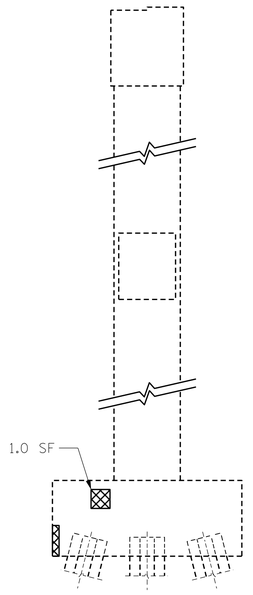
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	43.3	21.7		
COLUMN/PILE	1.5	0.8		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.2	1.6		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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LICENSE #: C-1506

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/3/2020
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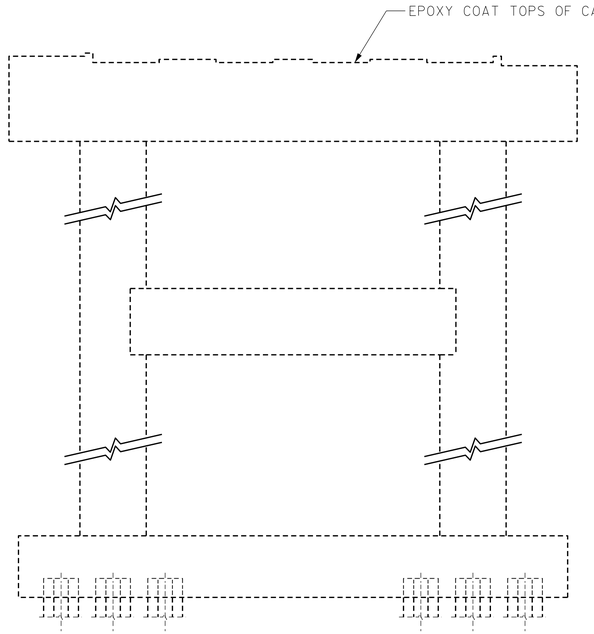
User:jdebone

LEGEND:

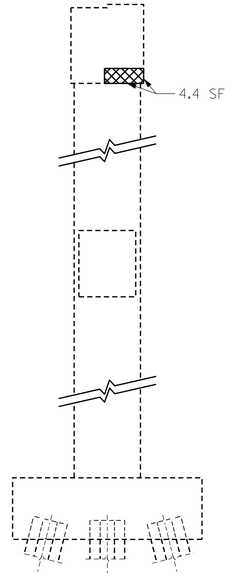
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

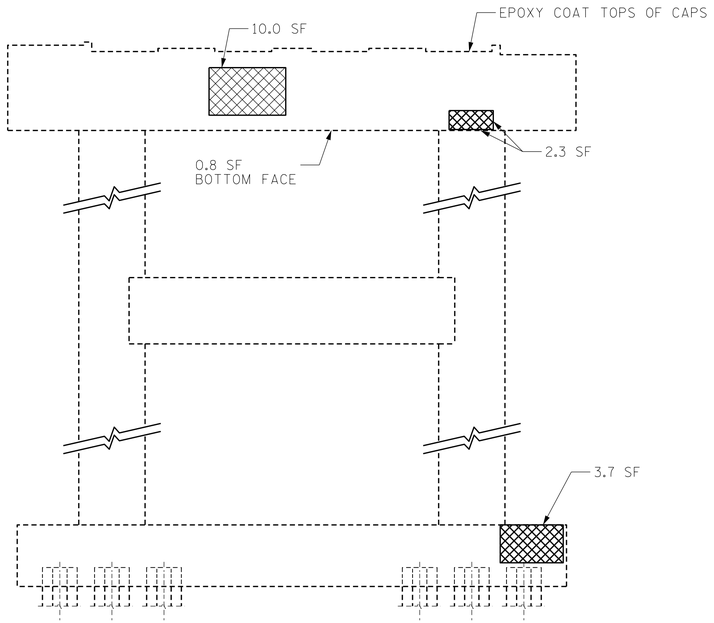
EPOXY RESIN INJECTION (ERI)



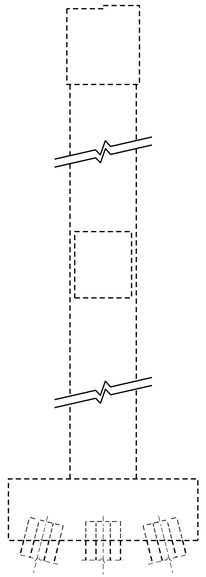
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	21.2	10.6		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

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SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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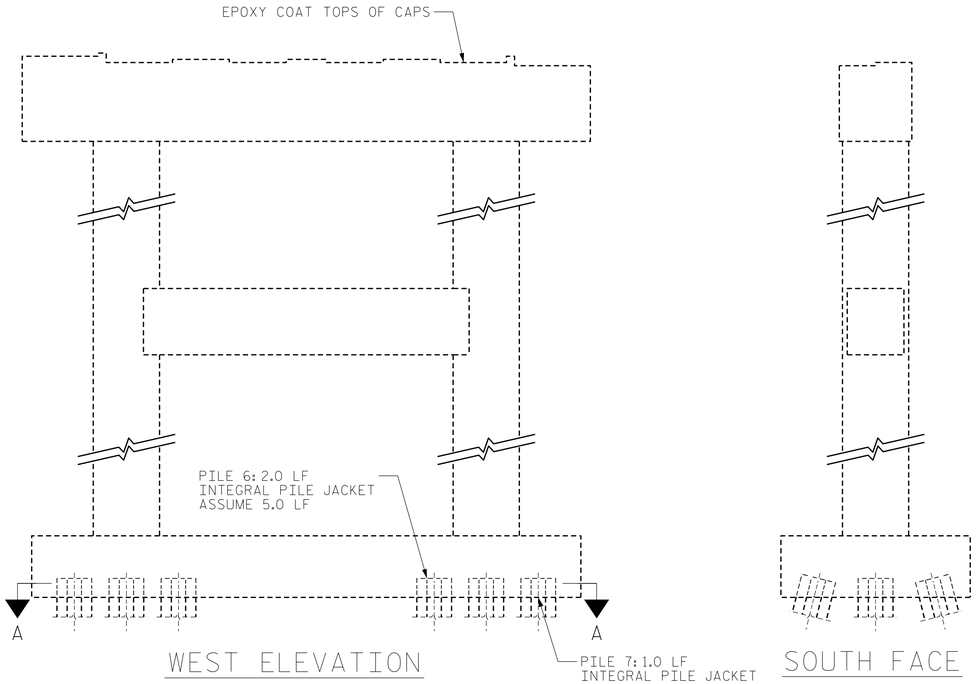
User:jdebone

LEGEND:

CONCRETE REPAIR AREA

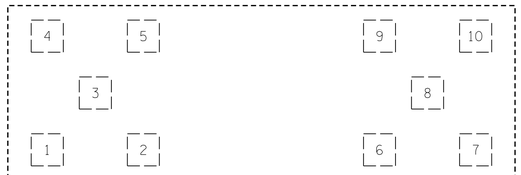
SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION (ERI)

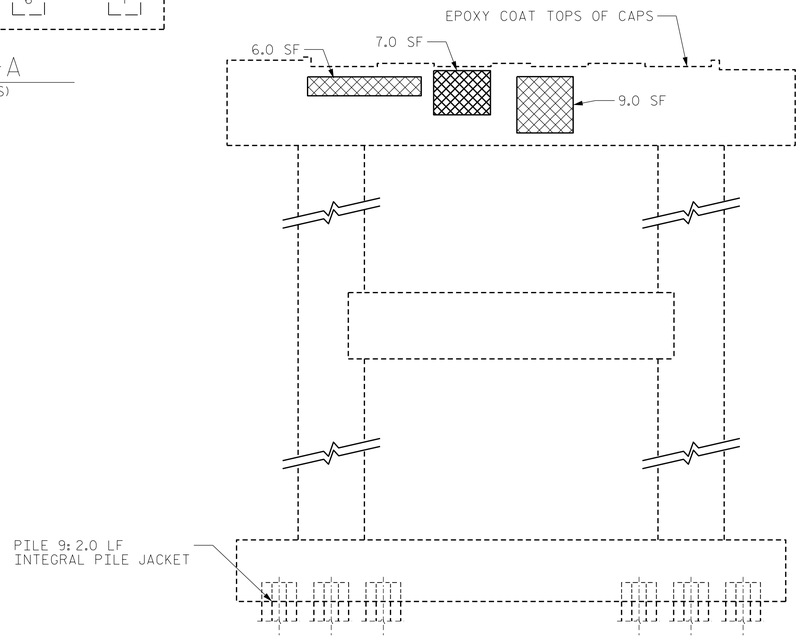


WEST ELEVATION

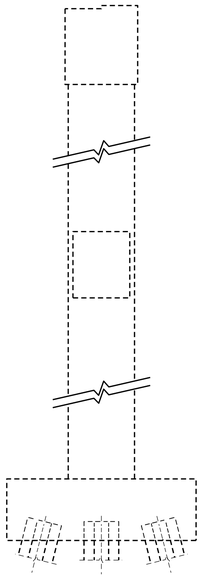
SOUTH FACE



SECTION A-A
(NUMBERING OF PILES)



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	22.0	11.0		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		2.0		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

DocuSigned by: Jacob Duke
NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE
9/3/2020

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 15

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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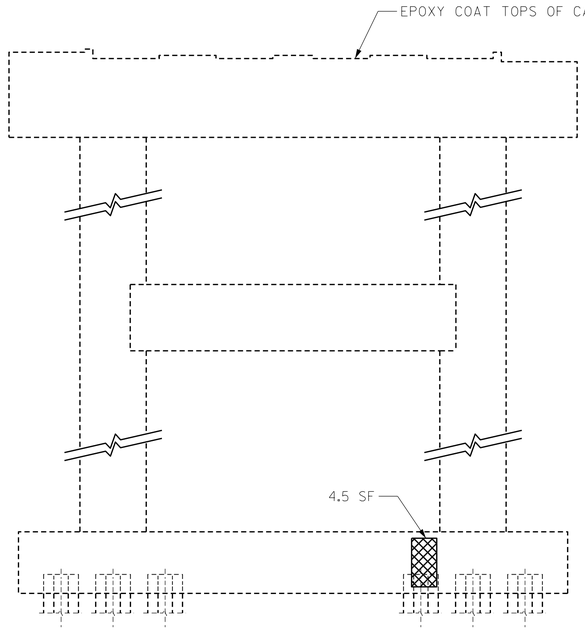
User:jdebone

LEGEND:

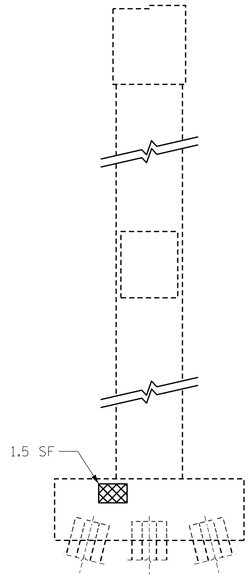
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

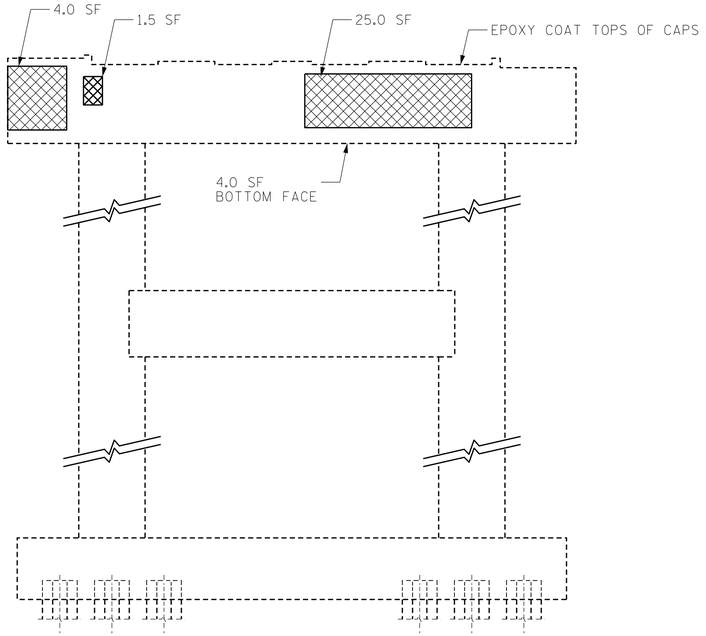
EPOXY RESIN INJECTION (ERI)



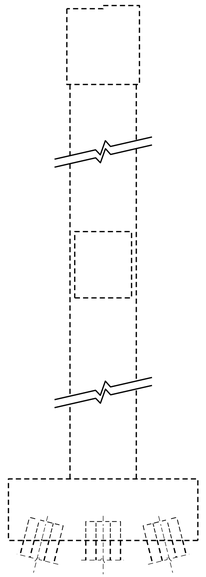
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	40.5	20.3		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.75	0.4		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2DC3E3E3E3E3E3E...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

KCA KISINGER CAMPO & ASSOCIATES

301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 16

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

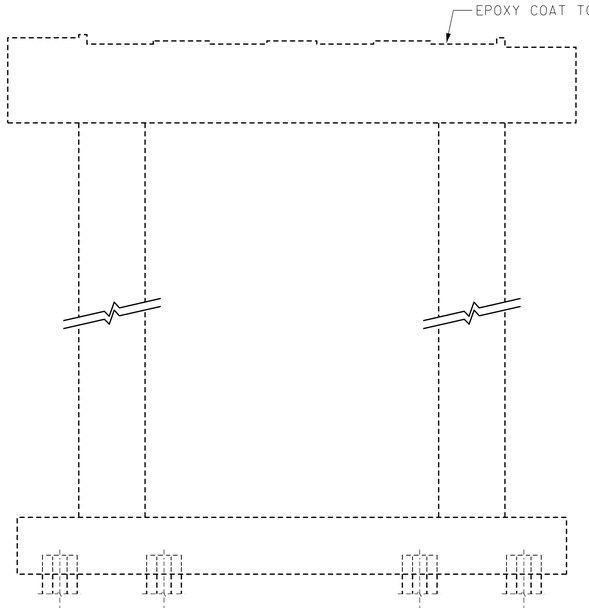
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B16_090013.dgn
User:jdebone

LEGEND:

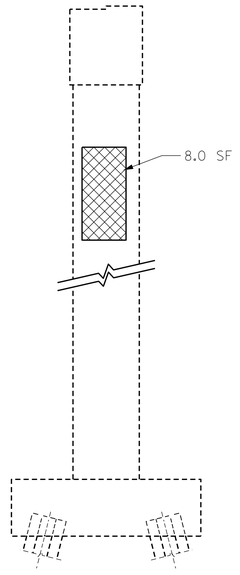
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

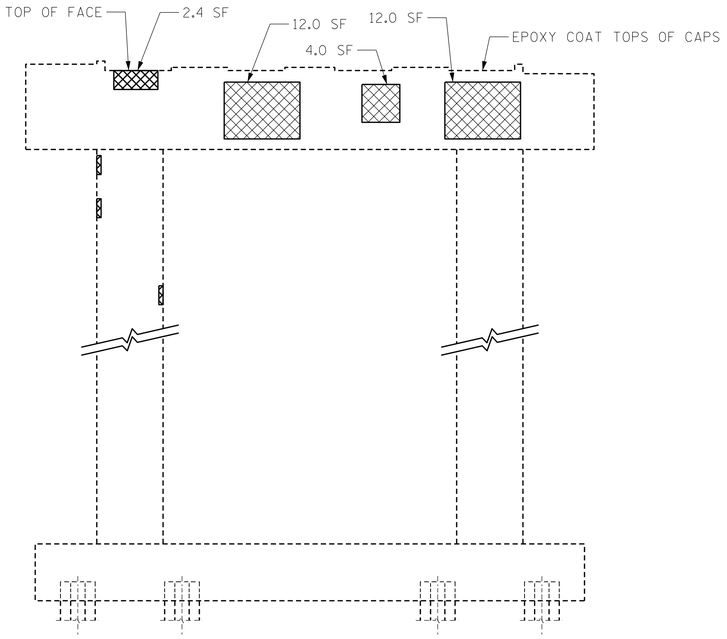
EPOXY RESIN INJECTION (ERI)



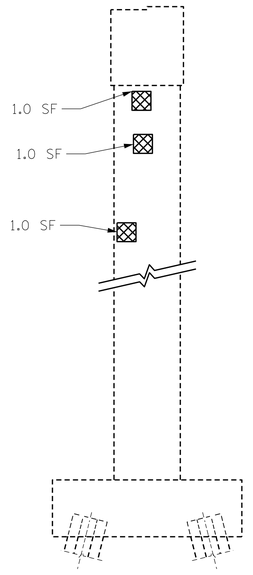
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	30.4	15.2		
COLUMN/PILE	11.0	5.5		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.24	0.12		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1½" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRDIGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

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BRIDGE NO. 090013

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RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 17

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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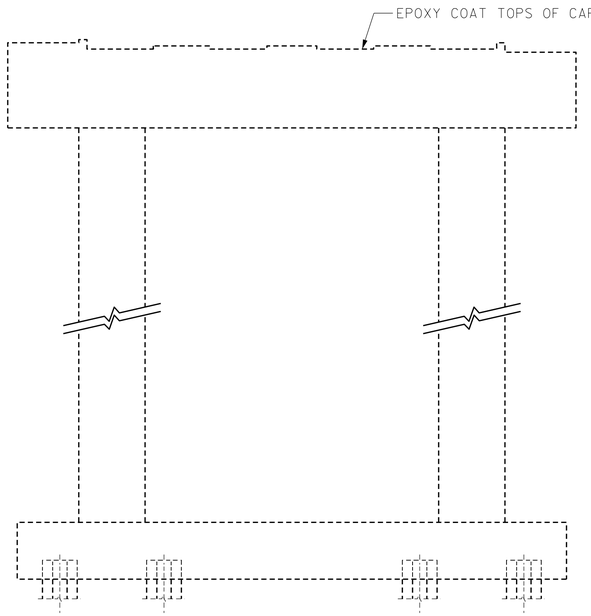
User:jdebone

LEGEND:

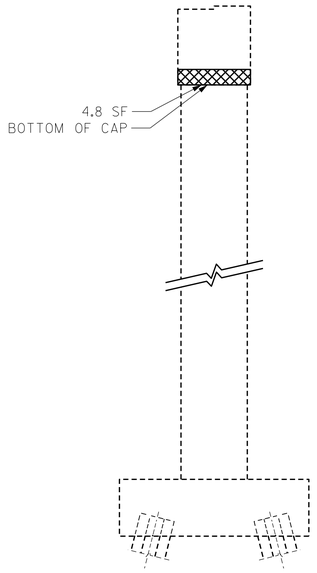
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

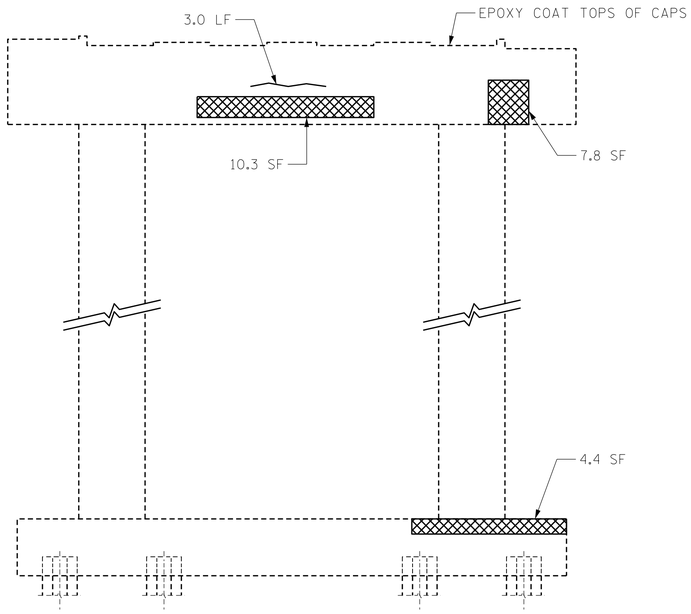
EPOXY RESIN INJECTION (ERI)



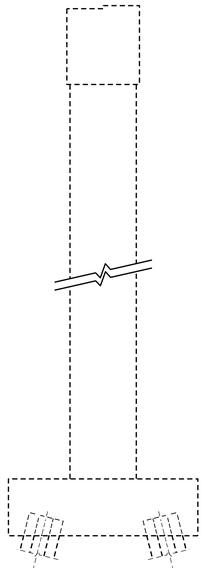
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	27.3	13.7		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.7	1.4		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		3.0		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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BRUNSWICK COUNTY

BRIDGE NO. 090013

DocuSigned by: Jacob Duke 2005A0E0A0E0A0E...

NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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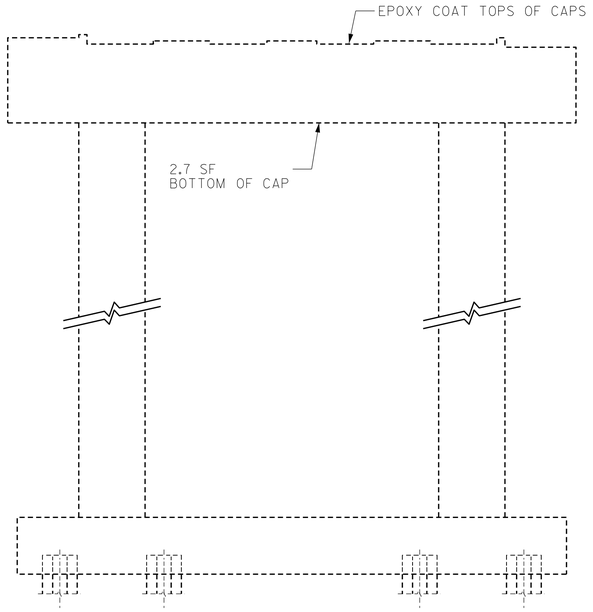
User:jdebone

LEGEND:

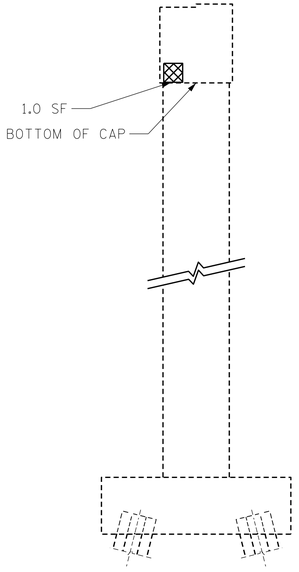
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

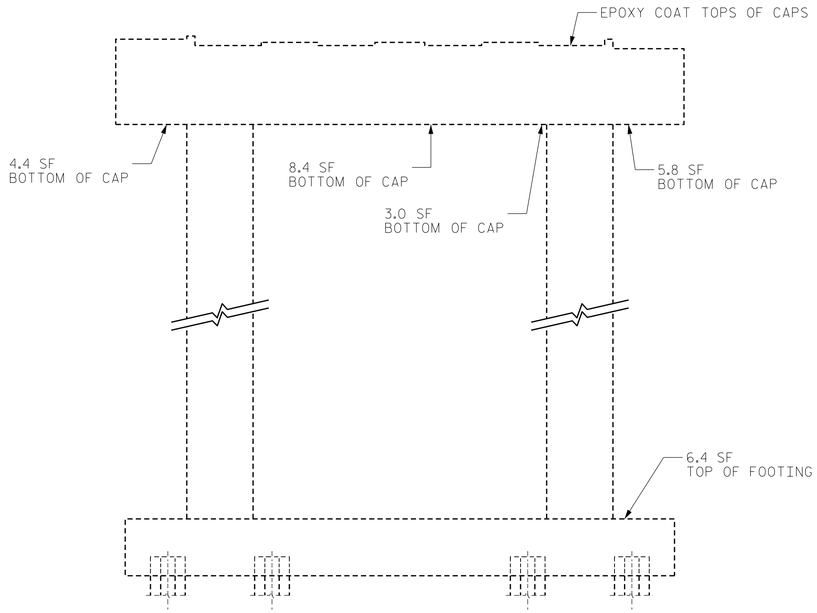
EPOXY RESIN INJECTION (ERI)



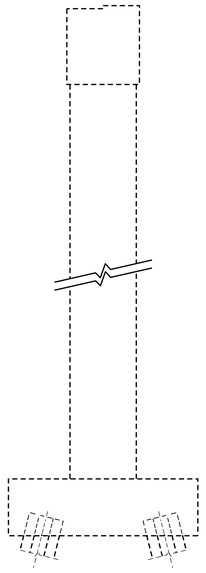
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	31.7	15.9		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.2	1.6		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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BRIDGE NO. 090013

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NORTH CAROLINA PROFESSIONAL SEAL 043777 ENGINEER JACOB H DUKE

9/3/2020

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RALEIGH

SUBSTRUCTURE CONCRETE REPAIRS BENT 19

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

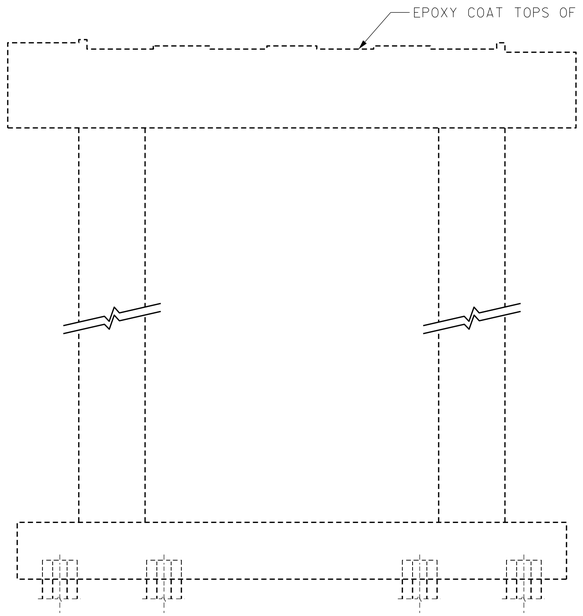
9/3/2020
G:\4201720.12-Brunswick-13\Structures\15BPR.24_SMU_B19_090013.dgn
User:jdebone

LEGEND:

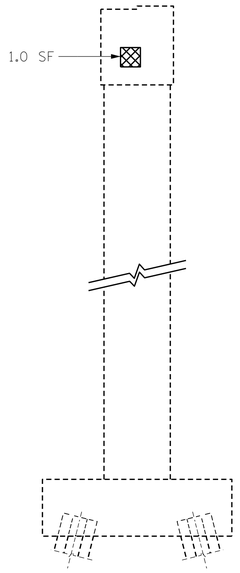
CONCRETE REPAIR AREA

SHOTCRETE REPAIR AREA

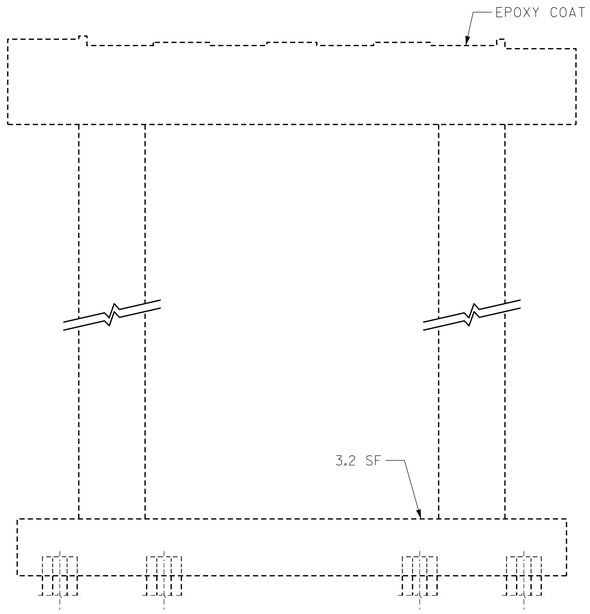
EPOXY RESIN INJECTION (ERI)



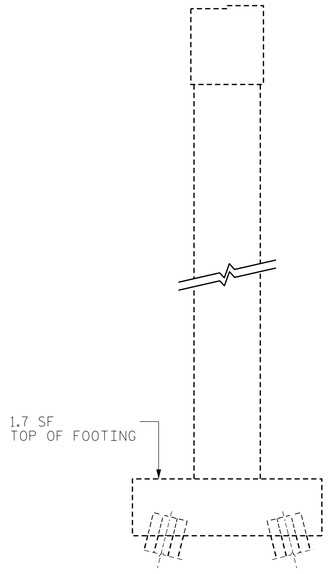
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	5.9	3.0		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.6	0.3		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

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SUBSTRUCTURE CONCRETE REPAIRS BENT 20

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			45

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

9/3/2020
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User:jdebone

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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