PROJECT: 15BPR.102.3

CONTRACT: C204902

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

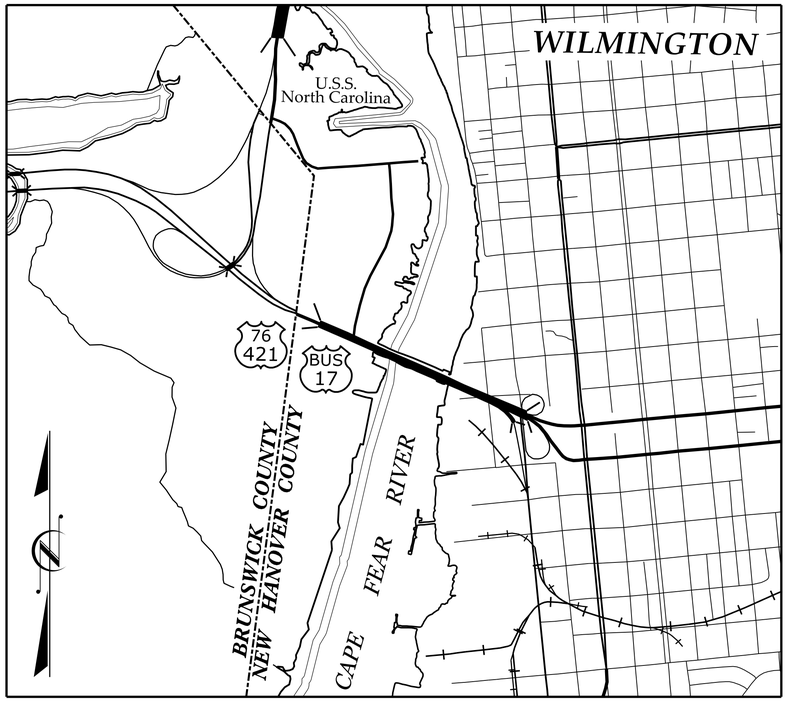
NEW HANOVER COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	15BPR.102.3	1	21

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
15BPR.102.1		P.E.
15BPR.102.3		CONSTRUCTION

LOCATION: MEMORIAL LIFT BRIDGE ON US 76, US 421, BUS. 17 (OCEAN HWY) OVER CAPE FEAR RIVER

TYPE OF WORK: GRID DECK REPLACEMENT ON THE LIFT SPAN, REPLACING STEEL STRINGERS AND DIAPHRAGMS, RAISING FINGER JOINT, CLEANING AND LUBRICATING THE COUNTERWEIGHT ROPES, AND MAINTAINING THE BALANCE OF THE LIFT SPAN



VICINITY MAP

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

DESIGN DATA

LENGTH OF STRUCTURE = 0.575 MI

Prepared for the Office of:

DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR., RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

LETTING DATE:
NOVEMBER 21, 2023

Prepared in the Office of:

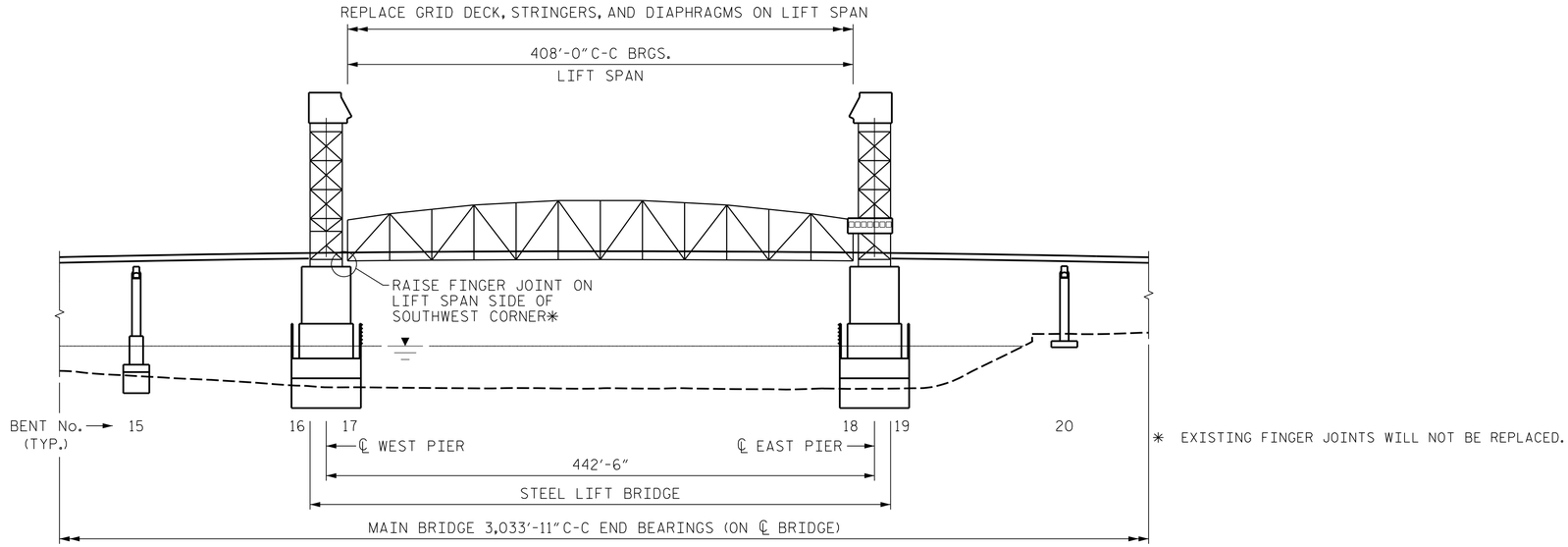
MODJESKI and MASTERS
Experience great bridges.

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

BRYAN J. LOFLIN, PE, SE
DESIGN ENGINEER OF RECORD

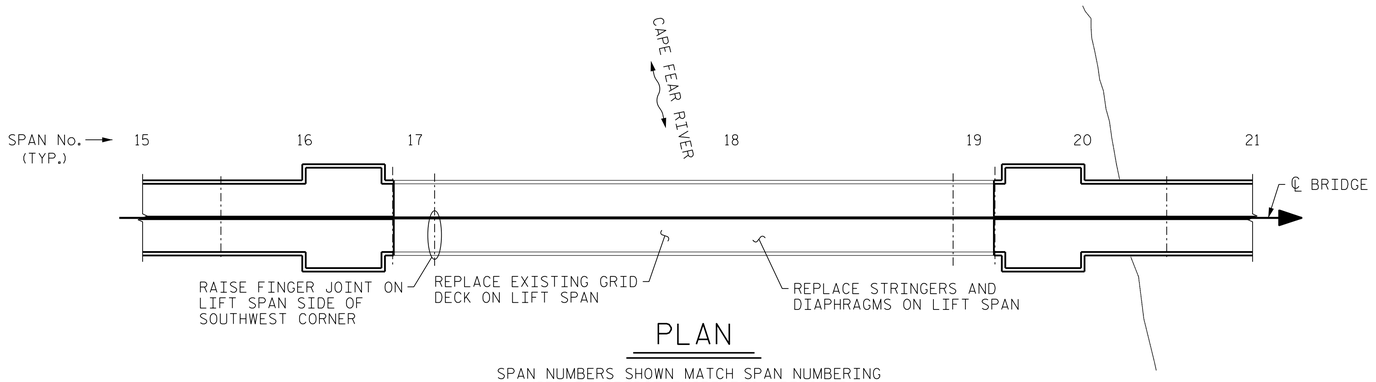
9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
96975AE68AD44DB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ELEVATION

BENT NUMBERS SHOWN MATCH BENT NUMBERING
USED IN BRIDGE INSPECTION REPORTS



PLAN

SPAN NUMBERS SHOWN MATCH SPAN NUMBERING
USED IN BRIDGE INSPECTION REPORTS.

SCOPE OF WORK

STRUCTURAL:

1. GRID DECK REPLACEMENT ON LIFT SPAN.
2. REPLACE STRINGERS AND DIAPHRAGMS ON LIFT SPAN.
3. RAISE FINGER JOINT ON LIFT SPAN SIDE AT SOUTHWEST CORNER OF THE LIFT SPAN.

MECHANICAL:

1. CLEAN AND LUBRICATE COUNTERWEIGHT ROPES.
2. MAINTAIN THE BALANCE OF THE LIFT SPAN DURING DECK AND STRINGER REPLACEMENT OPERATIONS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON US 76, US 421, BUS. 17 OVER CAPE FEAR RIVER

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

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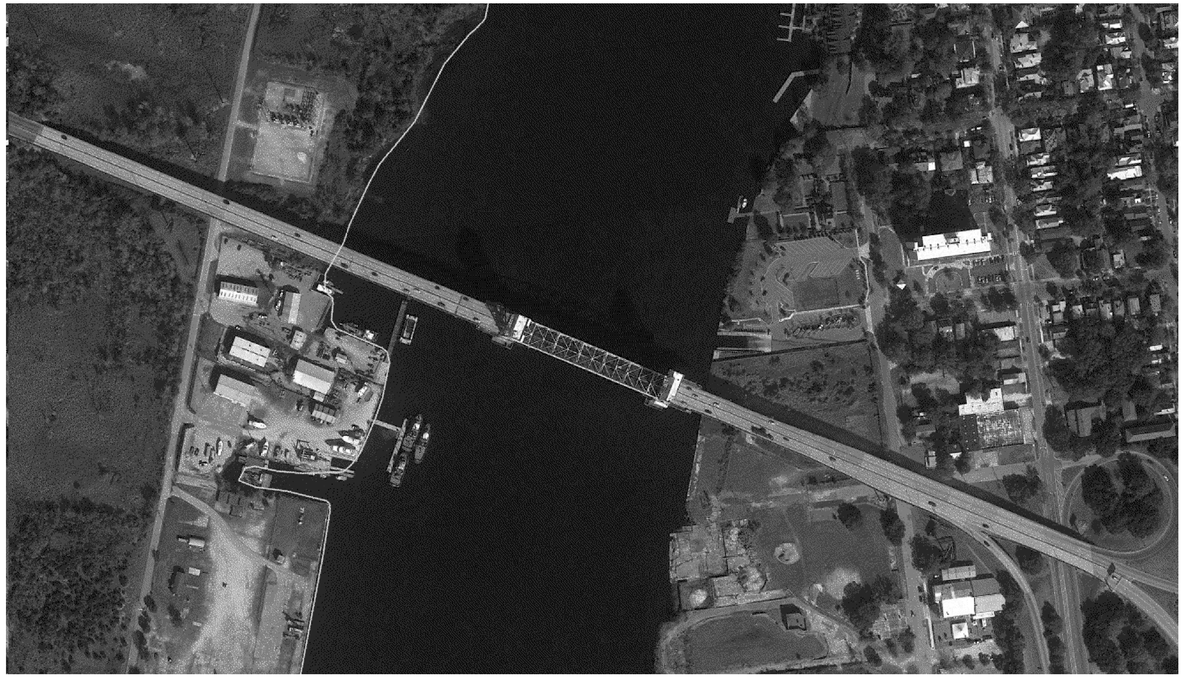
RALEIGH, NC 27601
NC LICENSE NO. C-2979

9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
Docusigned by: 9697SAE68AD44DB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	M. NIFONG	DATE : JUL 2023
DRAWN BY:	R. JOHNSON	DATE : JUL 2023
CHECKED BY:	B. LOFLIN	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

9/8/2023
401.003.15BPR.102_SMU_GD_2.dgn



LOCATION SKETCH

INFORMATION ON THE LOCATION SKETCH SHALL BE CONSIDERED GENERAL INFORMATION ONLY.

TOTAL BILL OF MATERIAL

	REPLACEMENT OF STRUCTURAL STEEL	REPLACEMENT OF STEEL GRID DECK	UNDER STRUCTURE WORK PLATFORM	WIRE ROPE CLEANING AND RELUBRICATION
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

GENERAL NOTES:

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

IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL SAFETY REQUIREMENTS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING OF CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLAN.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR COAST GUARD COORDINATION, SEE SPECIAL PROVISIONS.

ACCESS TO OPERATOR'S HOUSE FOR BRIDGE TENDER SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.

FOR MAINTENANCE OF WATER TRAFFIC, SEE SPECIAL PROVISIONS.

FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.

WORK ON BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL BELOW. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE TO ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS.

PRIOR TO BEGINNING WORK, CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR TRAFFIC.

PERFORM CHAPRY V-NOTCH TESTING ON NEW STRINGERS IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR WORK IN, OVER, OR ADJACENT TO NAVIGABLE WATERS, SEE SPECIAL PROVISIONS.

FOR STEEL TEMPORARY BARRIER RAIL, SEE TRAFFIC MANAGEMENT PLAN.

FOR WIRE ROPE CLEANING AND RELUBRICATION, SEE SPECIAL PROVISIONS.

ANY PAINT REMOVED DURING CONSTRUCTION OR PAINT DAMAGED DURING CONSTRUCTION SHALL BE CLEANED AND PAINTED IN ACCORDANCE WITH SYSTEM 1 OF SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS. PAYMENT FOR THIS CLEANING AND PAINTING SHALL BE INCLUDED IN THE REPLACEMENT OF STRUCTURAL STEEL PAY ITEM.

THE CONTRACTOR'S ATTENTION IS BROUGHT TO THE FACT THAT THERE IS CONDUIT CLAMPED TO THE BOTTOM FLANGE OF THE STRINGERS NEAR FB2, FB6, AND FB10 THAT CARRIES THE WIRING FOR THE NAVIGATION LIGHTS. CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL A METHOD TO TEMPORARILY SUPPORT THE CONDUIT, TEMPORARILY REROUTE THE CONDUIT, OR PROVIDE TEMPORARY NAVIGATION LIGHTING. NAVIGATION LIGHTS SHALL BE FUNCTIONAL AT ALL TIMES. CONDUIT SHALL BE RE-CLAMPED TO THE PROPOSED STRINGERS AFTER THEY ARE INSTALLED.

ALL FAYING SURFACES EXPOSED DURING CONSTRUCTION SHALL BE CLEANED AND PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND NCDOT STRUCTURAL STEEL SHOP COATINGS PROGRAM.

GRID DECK WILL BE SUPPLIED BY THE DEPARTMENT. FOR REPLACEMENT OF STEEL GRID DECK, SEE SPECIAL PROVISIONS.

STRUCTURAL STEEL WILL BE SUPPLIED BY THE DEPARTMENT FOR REPLACEMENT OF THE STRINGERS AND DIAPHRAGMS. CONTRACTORS COST FOR REPLACEMENT OF STRUCTURAL STEEL SHOULD NOT INCLUDE THE COST TO SUPPLY THE STRUCTURAL STEEL.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 AND PAINTED IN ACCORDANCE WITH SYSTEM 1 OF SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICES FOR ITEMS ASSOCIATED WITH REPLACEMENT OF STRUCTURAL STEEL.

FOR UNDER STRUCTURE WORK PLATFORM, SEE SPECIAL PROVISIONS.

FOR REQUIREMENTS OF MAINTAINING BALANCE OF THE LIFT SPAN DURING CONSTRUCTION, SEE MECHANICAL SPECIAL PROVISION. COST SHALL BE INCLUDED IN THE REPLACEMENT OF STRUCTURAL STEEL PAY ITEM.

THE COLOR OF THE FINAL PAINT COATING SHALL MATCH THE COLOR OF THE EXISTING STRUCTURAL STEEL ON THE LIFT SPAN AND SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.

CONTRACTOR SHALL SUBMIT A PLAN FOR MAINTAINING BALANCE ON THE STRUCTURE DURING CONSTRUCTION FOR REVIEW AND APPROVAL.

THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE SO THAT THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE WILL NOT BE DAMAGED. IF THE CONTRACTOR DAMAGES ANY PART OF THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE, THE DAMAGED AREA SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT NO ADDITIONAL COST TO THE DEPARTMENT.

REMOVAL AND DISPOSAL OF EXISTING STRUCTURAL STEEL SHALL BE INCLUDED IN THE REPLACEMENT OF STRUCTURAL STEEL PAY ITEM.

CONTRACTOR SHALL NOTIFY ENGINEER IF ANY CONNECTION ANGLES, OR OTHER EXISTING MEMBERS TO REMAIN, HAVE SECTION LOSS OF 25% OR GREATER. THE DEPARTMENT WILL SUPPLY (24) BLANK L4x4x3/8 STRINGER TO FLOORBEAM CONNECTION ANGLES.

BECAUSE THE PROFILE OF THE GRID DECK IS DETERMINED BY THE VERTICAL LOCATION OF THE STRINGERS, EXTREME CARE SHOULD BE TAKEN WHEN LOCATING THE FIELD DRILLED HOLES FOR THE STRINGER CONNECTIONS TO ENSURE A SMOOTH GRID DECK PROFILE.

POSITION STRINGER MILL CAMBER UP.

FOR REPLACEMENT OF STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

DESIGNED BY: M. NIFONG DATE : JUL 2023
DRAWN BY: R. JOHNSON DATE : JUL 2023
CHECKED BY: B. LOFLIN DATE : AUG 2023
DESIGN ENGINEER OF RECORD: B. LOFLIN DATE : SEP 2023

10/6/2023
401.005.15BPR.102_SMU_BM_3.dgn

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

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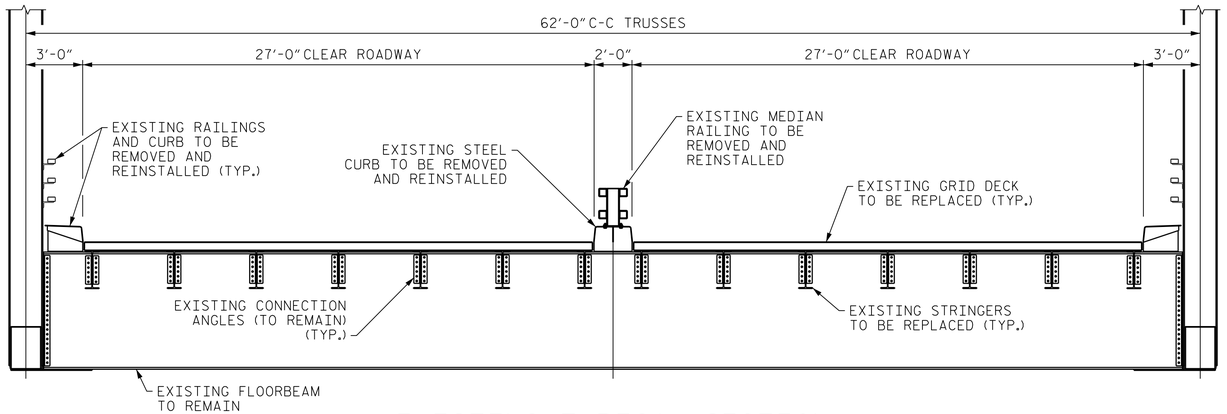
10/6/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
96975AE68AD44DB...

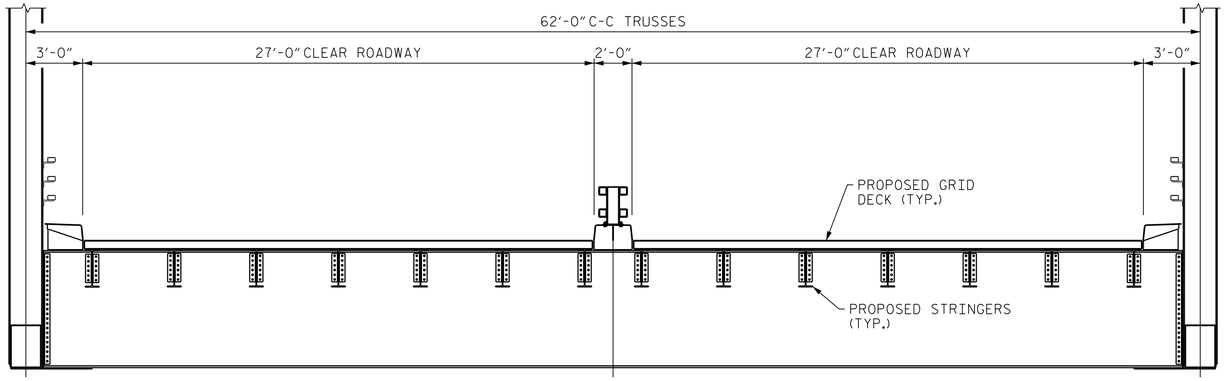
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL NOTES AND TOTAL BILL OF MATERIAL

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



EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION

NOTES:

FOR GRID DECK DETAILS, SEE SHEET NO. S-9 THRU S-11.

FOR STRINGER DETAILS, SEE SHEET NO. S-12 THRU S-18.

EXISTING RAILINGS ALONG THE EXTERIOR AND MEDIAN OF THE LIFT SPAN, WILL BE REMOVED DURING CONSTRUCTION, STORED, AND REATTACHED. SEE SHEET NO. S-19 FOR ADDITIONAL DETAILS AND S-5 AND S-6 FOR CONSTRUCTION STAGING REQUIREMENTS.

REFER TO TRAFFIC MANAGEMENT PLANS FOR TRAFFIC PHASING AND WORK ZONE INFORMATION.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LIFT SPAN TYPICAL SECTION

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

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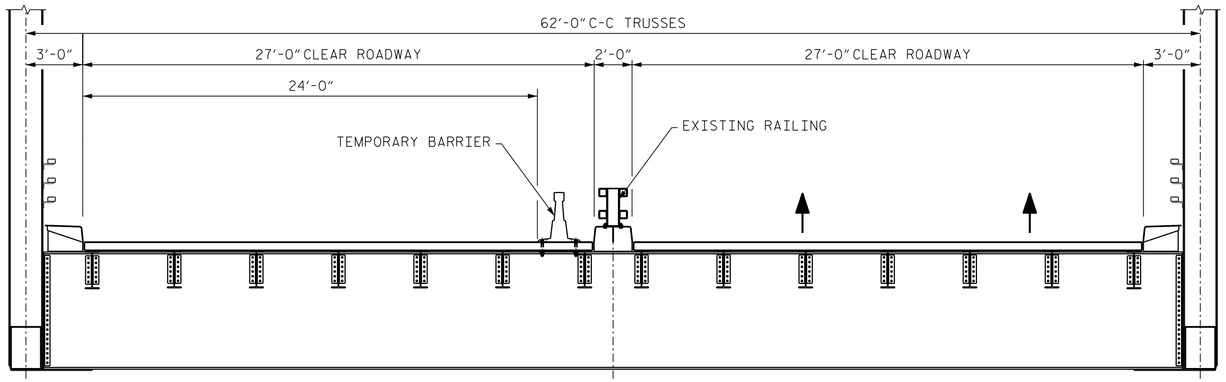
9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

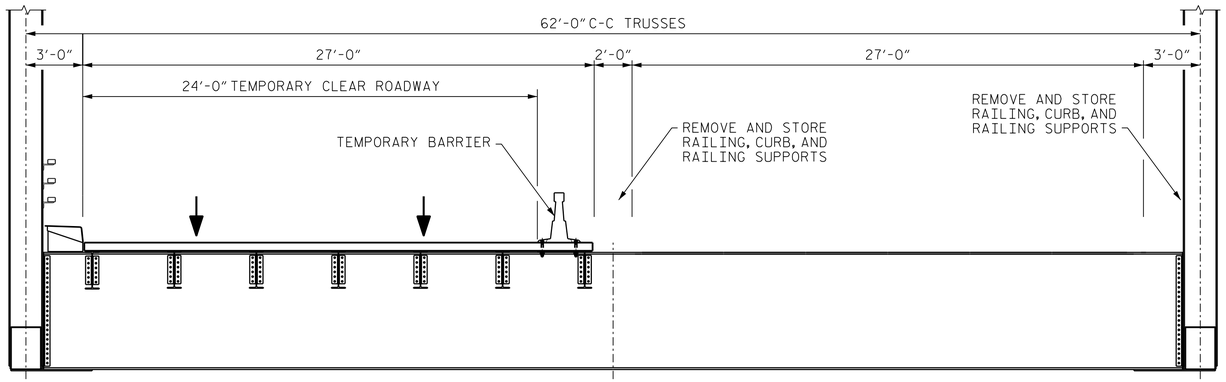
DESIGNED BY:	M. NIFONG	DATE : JUL 2023
DRAWN BY:	R. JOHNSON	DATE : JUL 2023
CHECKED BY:	B. LOFLIN	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

9/8/2023
401.007.15BPR.102.SMU_TYP_4.dgn



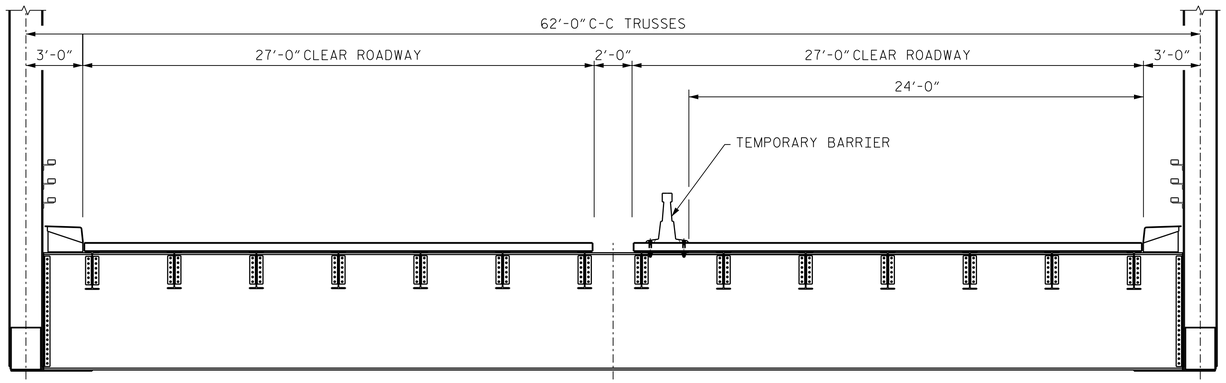
STAGE I CONSTRUCTION

(INSTALL TEMPORARY BARRIER ON WESTBOUND DIRECTION.)



STAGE II CONSTRUCTION

(PERFORM EASTBOUND WORK. REMOVE AND STORE MEDIAN AND EASTBOUND EXTERIOR RAILINGS, CURBS, AND RAILING SUPPORTS. REPLACE STRINGERS AND GRID DECK. REINSTALL EXTERIOR EASTBOUND RAILING, CURB, AND RAILING SUPPORTS.)



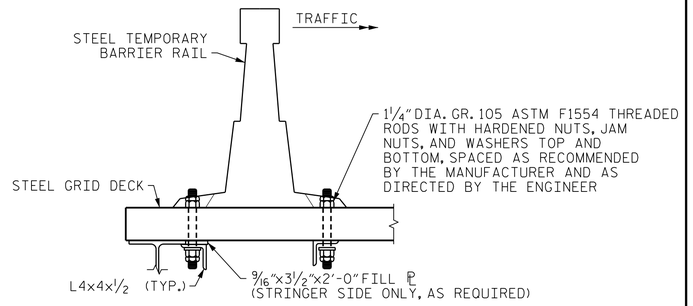
STAGE III CONSTRUCTION

(REMOVE TEMPORARY BARRIER FROM WESTBOUND SIDE AND INSTALL ON EASTBOUND SIDE.)

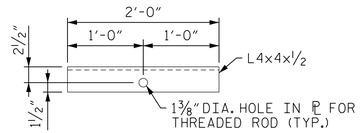
NOTES:

REFER TO TRAFFIC MANAGEMENT PLANS FOR TRAFFIC PHASING AND WORK ZONE INFORMATION.

CONTRACTOR SHALL HAVE NO MORE THAN TWO ADJACENT BAYS OF STRINGERS AND GRID DECK REMOVED AT ONE TIME.



SECTION VIEW



PLAN VIEW OF ANGLE

STEEL TEMPORARY BARRIER CONNECTION TO DECK

EASTBOUND SIDE SHOWN, WESTBOUND SIDE OPPOSITE HAND

STEEL TEMPORARY BARRIER ANCHOR NOTES:

1. FOR STEEL TEMPORARY BARRIER, SEE TRAFFIC MANAGEMENT PLANS AND SPECIAL PROVISIONS.
2. ALL STEEL ℙ SHALL BE AASHTO M270 GRADE 50 OR 50W.
3. ANCHORS SHALL BE TIGHTENED AS RECOMMENDED BY THE BARRIER MANUFACTURER AND THEN JAM NUTS SHALL BE INSTALLED TO PREVENT THE NUTS FROM LOOSENING.
4. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293.
5. CONTRACTOR SHALL PERIODICALLY INSPECT ANCHORS TO CONFIRM CONNECTIONS ARE TIGHT.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LIFT SPAN CONSTRUCTION STAGING

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY:	M. NIFONG	DATE : JUL 2023
DRAWN BY:	R. JOHNSON	DATE : JUL 2023
CHECKED BY:	B. LOFLIN	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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

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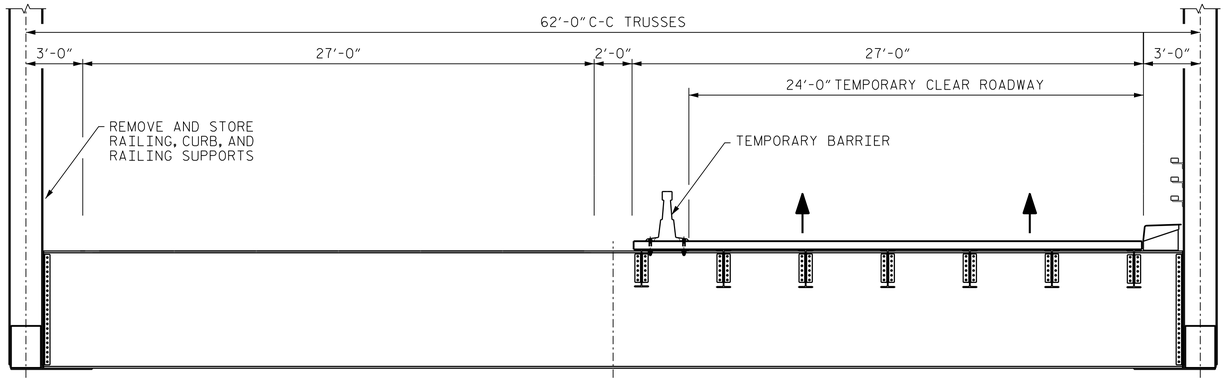
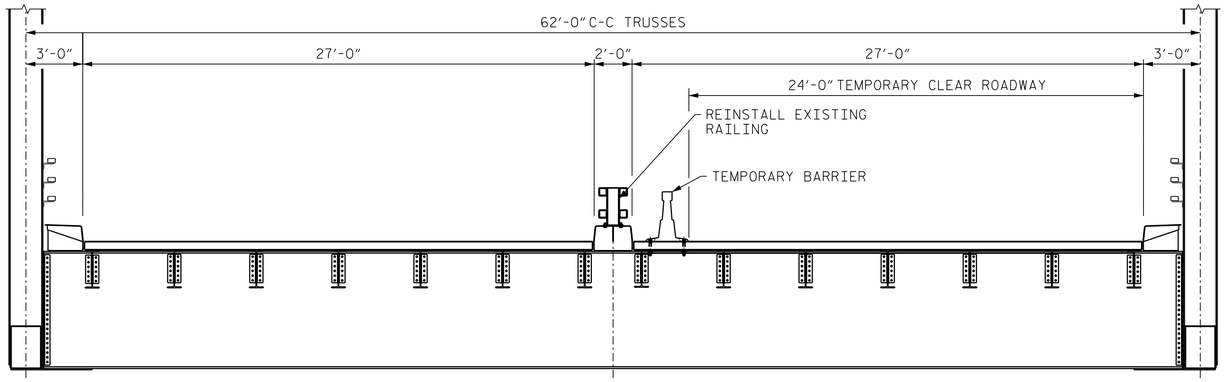
11/7/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

11/6/2023
401.009_15BPR.102_SMU_CS1_5.dgn



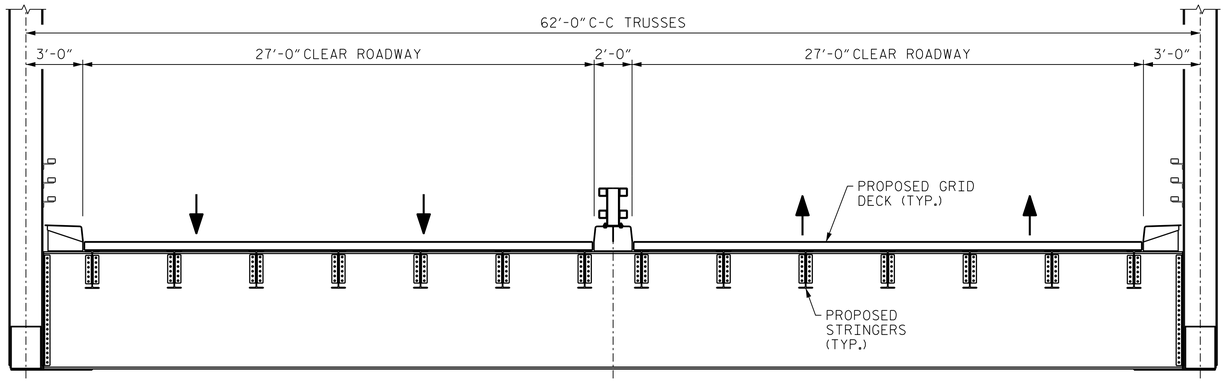
STAGE IV CONSTRUCTION

(PERFORM WESTBOUND WORK. REMOVE AND STORE WESTBOUND EXTERIOR RAILING, CURBS, AND RAILING SUPPORTS. REPLACE STRINGERS AND GRID DECK. REINSTALL EXTERIOR WESTBOUND RAILING, CURB, AND RAILING SUPPORTS)



STAGE V CONSTRUCTION

(REINSTALL EXISTING MEDIAN RAILING, CURBS, AND RAILING SUPPORT.)



STAGE VI CONSTRUCTION

(REMOVE TEMPORARY BARRIER.)

NOTES:

FOR TEMPORARY BARRIER ANCHOR DETAILS, SEE SHEET NO. S-5.

REFER TO TRAFFIC MANAGEMENT PLANS FOR TRAFFIC PHASING AND WORK ZONE INFORMATION.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LIFT SPAN CONSTRUCTION SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY:	M. NIFONG	DATE : JUL 2023
DRAWN BY:	R. JOHNSON	DATE : JUL 2023
CHECKED BY:	B. LOFLIN	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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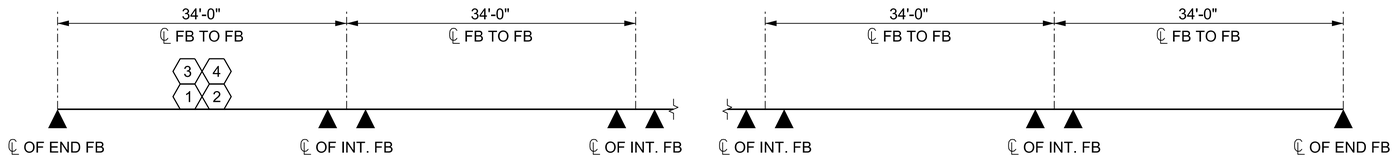
11/7/2023
NORTH CAROLINA PROFESSIONAL SEAL 036854 ENGINEER BRYAN J. LOFLIN
Docusigned by: 96975AE68AD44DB...

11/6/2023
401.011.15BPR.102.SMU.CS2.6.dgn

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE II LIMIT STATE							COMMENT NUMBER
							LIVE-LOAD FACTORS (γ LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ LL)	MOMENT						
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	⟨1⟩	1.33	-	1.75	0.433	1.33	1	I	17	0.6	2.10	1	I	0	1.30	0.433	1.43	1	I	17	1
		HL-93 (OPERATING)	N/A		1.72	-	1.35	0.433	1.72	1	I	17	0.6	2.72	1	I	0	N/A	-	-	-	-	-	1
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.72	62.1	1.75	0.433	1.72	1	I	17	0.6	2.42	1	I	0	1.30	0.433	1.86	1	I	17	
		HS-20 (OPERATING)	36.000		2.24	80.5	1.35	0.433	2.24	1	I	17	0.6	3.14	1	I	0	N/A	-	-	-	-	-	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.26	44.0	1.40	0.433	3.78	1	I	17	0.6	6.35	1	I	0	1.30	0.433	3.26	1	I	17	
		SNGARBS2	20.000		2.72	54.5	1.40	0.433	3.16	1	I	17	0.6	4.77	1	I	0	1.30	0.433	2.72	1	I	17	
		SNAGRIS2	22.000		2.71	59.5	1.40	0.433	3.14	1	I	17	0.6	4.53	1	I	0	1.30	0.433	2.71	1	I	17	
		SNCOTTS3	27.250		1.65	44.9	1.40	0.433	1.91	1	I	17	0.6	3.21	1	I	0	1.30	0.433	1.65	1	I	17	
		SNAGGRS4	34.925		1.50	52.5	1.40	0.433	1.75	1	I	17	0.6	2.83	1	I	0	1.30	0.433	1.50	1	I	17	
		SNS5A	35.550		1.47	52.4	1.40	0.433	1.71	1	I	17	0.6	2.97	1	I	0	1.30	0.433	1.47	1	I	17	
		SNS6A	39.950		1.42	56.6	1.40	0.433	1.64	1	I	17	0.6	2.80	1	I	0	1.30	0.433	1.42	1	I	17	
		SNS7B	42.000	⟨3⟩	1.35	56.8	1.40	0.433	1.57	1	I	17	0.6	2.86	1	I	0	1.30	0.433	1.35	1	I	17	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.76	58.0	1.40	0.433	2.04	1	I	17	0.6	3.26	1	I	0	1.30	0.433	1.76	1	I	17	
		TNT4A	33.075		1.75	58.0	1.40	0.433	2.04	1	I	17	0.6	3.09	1	I	0	1.30	0.433	1.75	1	I	17	
		TNT6A	41.600		1.53	63.6	1.40	0.433	1.77	1	I	17	0.6	3.05	1	I	0	1.30	0.433	1.53	1	I	17	
		TNT7A	42.000		1.55	65.3	1.40	0.433	1.80	1	I	17	0.6	2.80	1	I	0	1.30	0.433	1.55	1	I	17	
		TNT7B	42.000		1.55	65.0	1.40	0.433	1.80	1	I	17	0.6	2.72	1	I	0	1.30	0.433	1.55	1	I	17	
		TNAGRIT4	43.000		1.54	66.2	1.40	0.433	1.79	1	I	17	0.6	2.60	1	I	0	1.30	0.433	1.54	1	I	17	
		TNAGT5A	45.000		1.46	65.6	1.40	0.433	1.69	1	I	17	0.6	2.73	1	I	0	1.30	0.433	1.46	1	I	17	
		TNAGT5B	45.000		1.39	62.4	1.40	0.433	1.61	1	I	17	0.6	2.46	1	I	0	1.30	0.433	1.39	1	I	17	
FATIGUE		HL-93 (INVENTORY)	γLL=0.75		1.05	-	-	0.361	1.05	1	I	17	-	-	-	-	-	-	-	-	-	-	-	2
EMERGENCY VEHICLE (EV)		EV2	28.750		2.45	70.5	1.30	0.433	2.45	1	I	17	0.6	3.63	1	I	0	-	-	-	-	-	-	
		EV3	43.000	⟨4⟩	1.62	69.5	1.30	0.433	1.62	1	I	17	0.6	2.47	1	I	0	-	-	-	-	-	-	



LRFR SUMMARY

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

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

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

FB = FLOORBEAM

COMMENTS:

1. HL-93 IS CONTROLLED BY THE DESIGN TANDEM FOR MOMENT AND THE DESIGN TRUCK FOR SHEAR.
2. NOTE THAT THE STRINGER FATIGUE I STRESS IS BELOW THE INFINITE FATIGUE THRESHOLD.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING
⟨1⟩ DESIGN LOAD RATING (HL-93)
⟨2⟩ DESIGN LOAD RATING (HS-20)
⟨3⟩ LEGAL LOAD RATING * *
⟨4⟩ EMERGENCY VEHICLE LOAD RATING
* * SEE CHART FOR VEHICLE TYPE
STRINGER LOCATION
I - INTERIOR STRINGER
EL - EXTERIOR LEFT STRINGER
ER- EXTERIOR RIGHT STRINGER

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR STEEL STRINGERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			21

STD. NO. LRFR3

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

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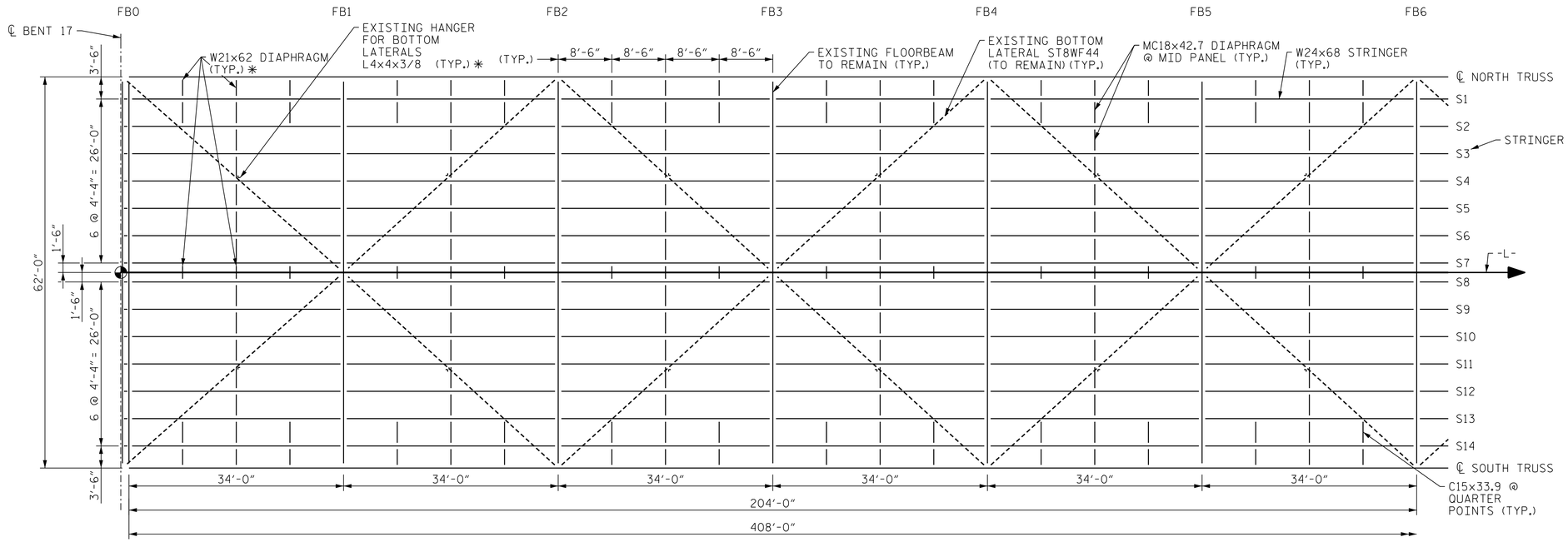
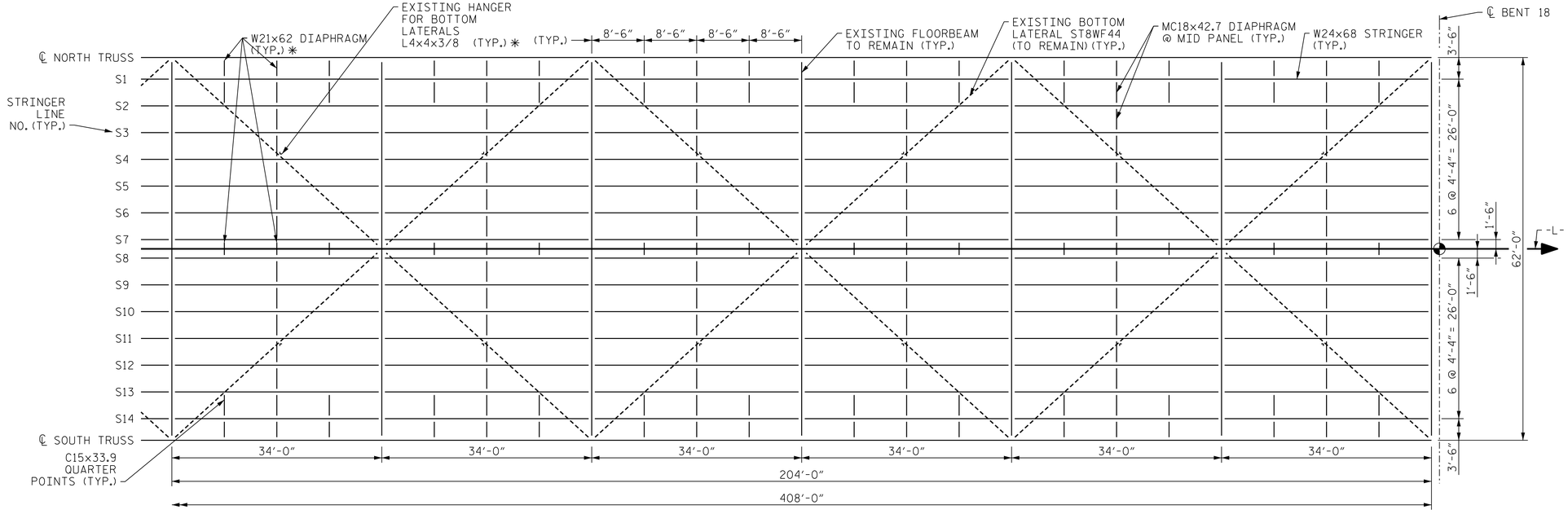
9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 9697SAE68AD44DB...

DESIGNED BY:	A. DUTTA	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	B. LOFLIN	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

9/11/2023
401_013.15BPR.102.SMU.LRFR.7.dgn





LIFT SPAN FRAMING PLAN

NOTES:

FOR GENERAL NOTES, SEE SHEET S-3.

FOR TYPICAL SECTION, SEE SHEET S-4.

* REMOVE, STORE, AND REINSTALL AS REQUIRED.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL FRAMING PLAN

DESIGNED BY:	C. CORMAN	DATE :	JUL 2023		
DRAWN BY:	R. JOHNSON	DATE :	JUL 2023		
CHECKED BY:	M. NIFONG	DATE :	AUG 2023		
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023		

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DocuSigned by: 9697SAE68AD44DB...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			21

9/8/2023
401.015.15BPR.102.SMU.FP_8.dgn

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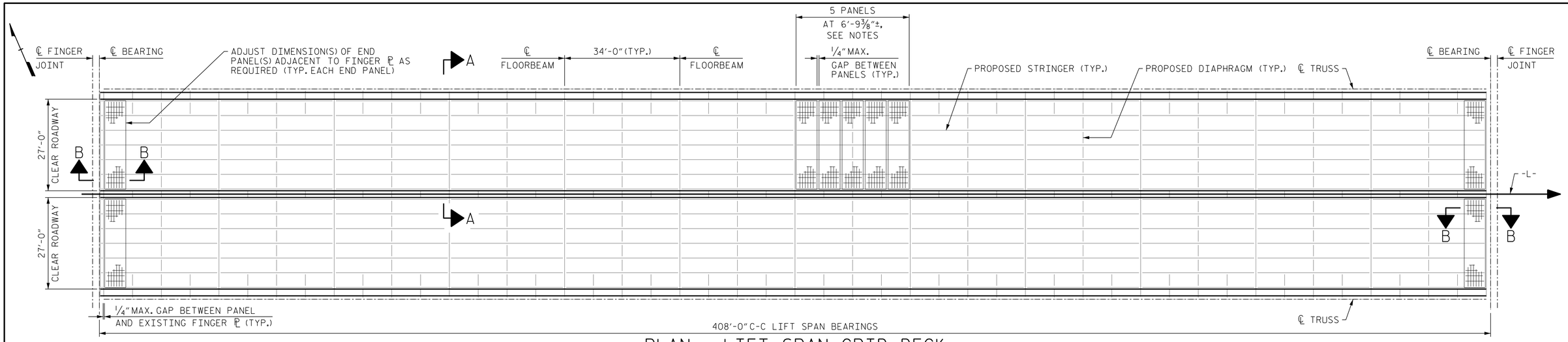


PLAN - LIFT SPAN GRID DECK

NOTES:

GRID DECK WILL BE SUPPLIED BY THE DEPARTMENT. FOR REPLACEMENT OF STEEL GRID DECK, SEE SPECIAL PROVISIONS.

GRID DECK MANUFACTURER MAY ADJUST THE DIMENSIONS AND NUMBER OF PANELS BETWEEN FLOORBEAMS. GRID DECK PANEL WIDTHS SHALL NOT BE LESS THAN 5'-0" OR GREATER THAN 8'-8". NEW GRID DECK SHOP DRAWINGS SHALL INDICATE THAT PROPOSED PANEL DIMENSIONS HAVE BEEN FIELD VERIFIED AND ARE CONSISTENT WITH EXISTING AND PROPOSED FLOOR SYSTEM DIMENSIONS.

EXISTING FINGER JOINTS AT ENDS OF LIFT SPAN SHALL REMAIN, EXCEPT FOR SOUTHWEST CORNER THAT WILL BE RAISED AND REINSTALLED.

DIMENSIONS SHOWN ARE HORIZONTAL UNLESS OTHERWISE NOTED.

FOR MAINTAINING BALANCE OF LIFT SPAN, SEE MECHANICAL SPECIAL PROVISIONS.

GRID DECK REPLACEMENT PROCEDURE:

EXISTING GRID DECK PANELS AND EXISTING STRINGERS SHALL BE REMOVED AND REPLACED IN A PROGRESSIVE MANNER. GROUPS OF PANELS REMOVED SHALL BE REPLACED WITH NEW PANELS, WITH MINIMAL CLAMPS TO PROPOSED STRINGERS, BEFORE MOVING TO THE NEXT WORK AREA.

CONTRACTOR SHALL SUBMIT A PANEL AND STRINGER REMOVAL AND REPLACEMENT SEQUENCE TO THE ENGINEER FOR REVIEW PRIOR TO IMPLEMENTING ANY PARTIAL OR TOTAL BRIDGE CLOSURE.

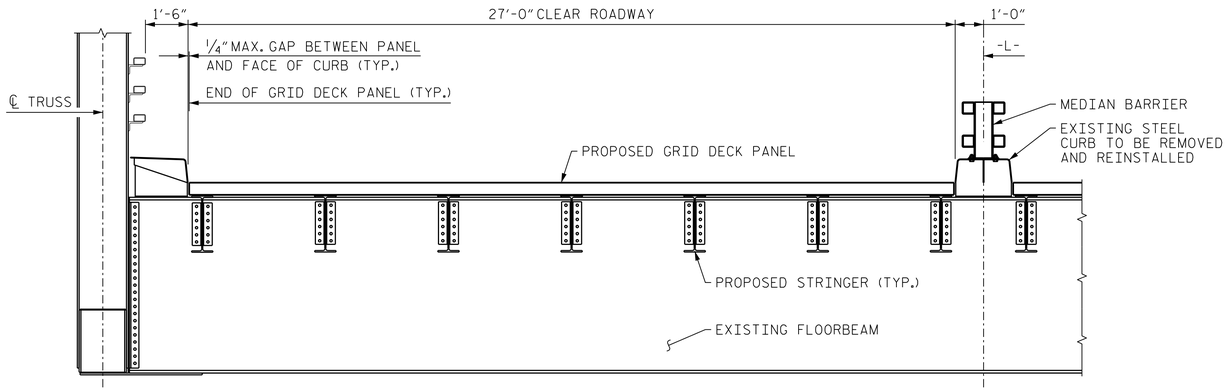
1. IMPLEMENT REQUIRED TRAFFIC CONTROL SCHEME PER THE TRAFFIC MANAGEMENT PLANS.
2. REMOVE EXISTING GRID DECK PANELS AND EXISTING STRINGERS. MINIMIZE UNBALANCED LOADING AND DEAD LOAD VARIATIONS DURING REMOVAL AND REPLACEMENT OPERATIONS. CONTRACTOR SHALL COORDINATE WITH THE DEPARTMENT AND COAST GUARD TO DETERMINE THE TIMELINE CONSTRAINTS FOR OPENING AND CLOSING THE LIFT SPAN.

GRID DECK REPLACEMENT PROCEDURE CONT.:

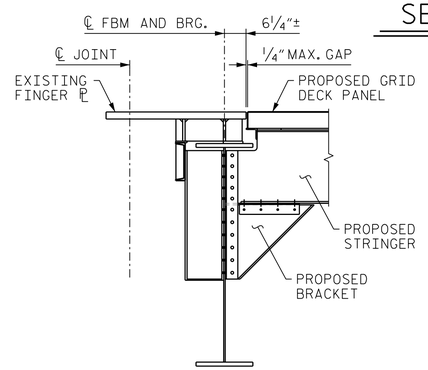
3. REMOVE THE FILL PLATES ON THE TOP FLANGE OF THE FLOORBEAMS AND GRIND SMOOTH. CLEAN AND PREPARE THE SURFACE IN ACCORDANCE WITH THE HRCSA MANUFACTURER'S RECOMMENDATIONS AND TO THE SATISFACTION OF THE ENGINEER. FIELD PAINT THE TOP OF THE FLANGE WITH HRCSA AS DEFINED BELOW.
4. AFTER LAYING OUT SEVERAL PANELS FOR ALIGNMENT, DETERMINE THE LOCATIONS WHERE THE GRID DECK WILL BE BOLTED TO THE STRINGER TOP FLANGE AND FIELD DRILL THE HOLES. CARE MUST BE TAKEN TO ASSURE PROPER ALIGNMENT. IT IS SUGGESTED TO HAVE A FLOORBEAM BAY (5 PANELS) LOCATED AND HELD IN PLACE BEFORE MARKING THE HOLES TO BE FIELD DRILLED THROUGH STRINGER AND FLOORBEAM TOP FLANGES.
5. PRIOR TO INSTALLING THE GRID DECK ONTO THE STRINGERS, EPOXY MASTIC SHALL BE APPLIED TO THE OUTSIDE EDGES OF THE SURFACES OF THE PLATE THAT WILL BE IN CONTACT WITH THE TOP OF THE TOP FLANGE OF THE NEW STRINGERS AND AROUND THE BOLT HOLES. WHILE THE EPOXY MASTIC IS STILL WET, PLACE THE GRID DECK AND HOLD-DOWN PLATES ON THE STRINGERS AND BOLT TOGETHER, SO AFTER BOLT TIGHTENING, EXCESS EPOXY MASTIC SHALL BE FORCED FROM ALL EXTERIOR EDGES OF THE PLATES. EXCESS EPOXY MASTIC AROUND THE EDGES OF THE REPAIR PLATES OR FABRICATED ANGLES SHALL BE REMOVED FOLLOWING THE MANUFACTURERS RECOMMENDATIONS.
6. REPEAT STEPS 2 THROUGH 5.

UPON COMPLETION OF ALL BOLTING OF PANELS TO FLOOR SYSTEM, FIELD PAINT ANY DAMAGED AREAS OF PAINT ON STRINGERS WITH HIGH RATIO CO-POLYMERIZED CALCIUM SULFONATE (HRCSA) IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. HRCSA SHALL BE TERMARUST TR2100 OR APPROVED EQUAL.

THE EPOXY MASTIC FOR THIS WORK SHALL BE COMPATIBLE WITH THE PAINT SYSTEM USED FOR THE PAINTING OF STRINGERS AND THE GALVANIZED GRID DECK PLATES. THE EPOXY MASTIC PROPOSED FOR USE SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE NCDOT MATERIALS AND TEST UNIT. THE EPOXY MASTIC WILL BE ACCEPTED ON THE BASIS OF THE MANUFACTURERS WRITTEN CERTIFICATION THAT THE BATCH PRODUCED IS COMPATIBLE AND MEETS THEIR PRODUCT SPECIFICATION.



SECTION A-A



SECTION B-B

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

OPEN GRID DECK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY: C. CORMAN DATE : JUL 2023
DRAWN BY: R. JOHNSON DATE : JUL 2023
CHECKED BY: M. NIFONG DATE : AUG 2023
DESIGN ENGINEER OF RECORD: B. LOFLIN DATE : SEP 2023

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

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9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

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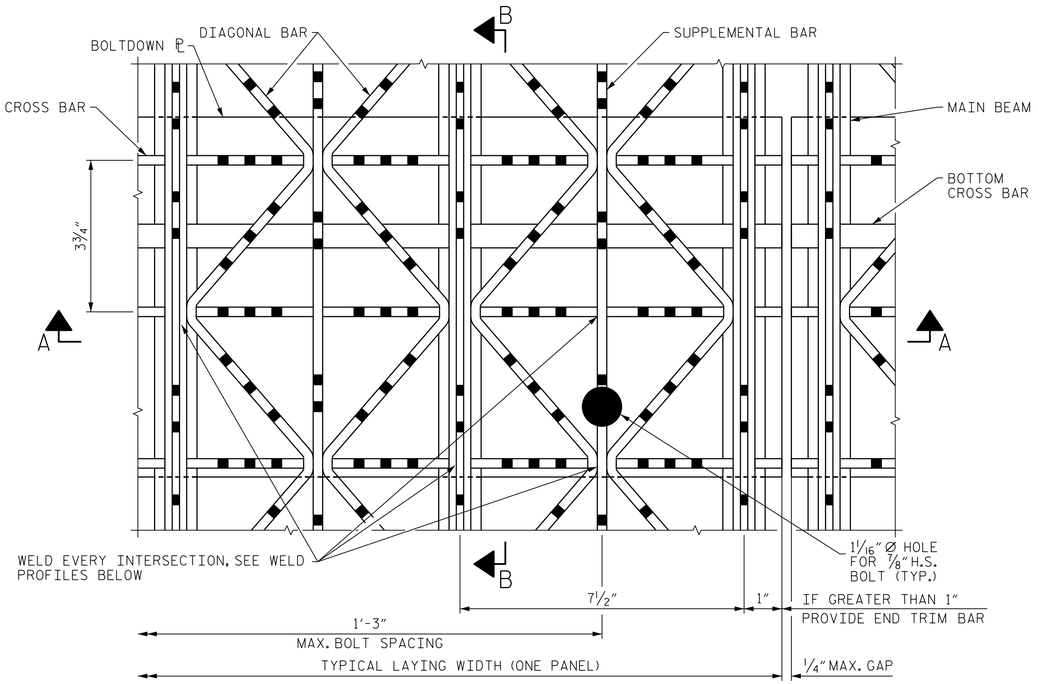
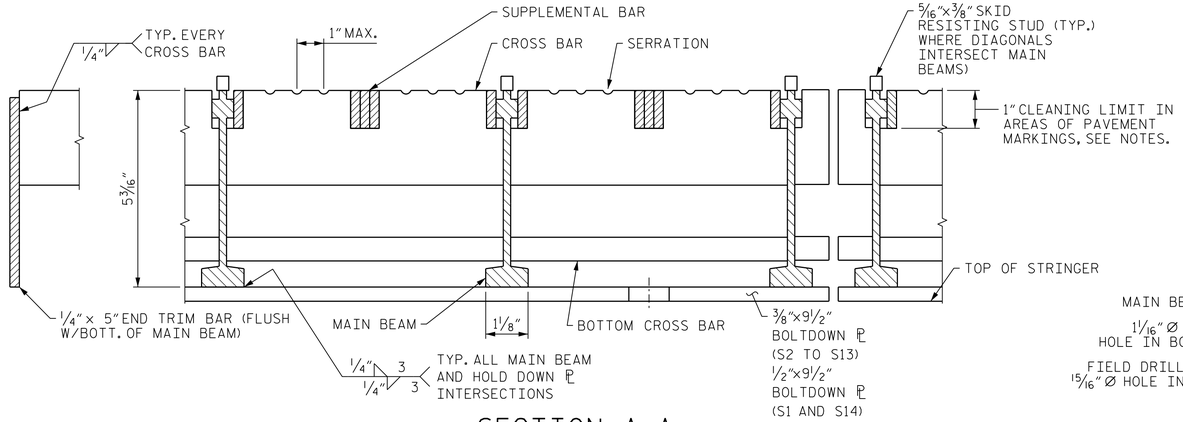
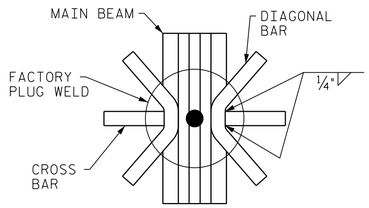


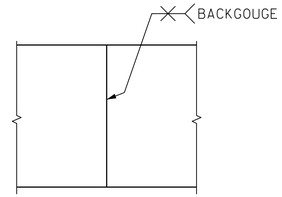


SECTION A-A



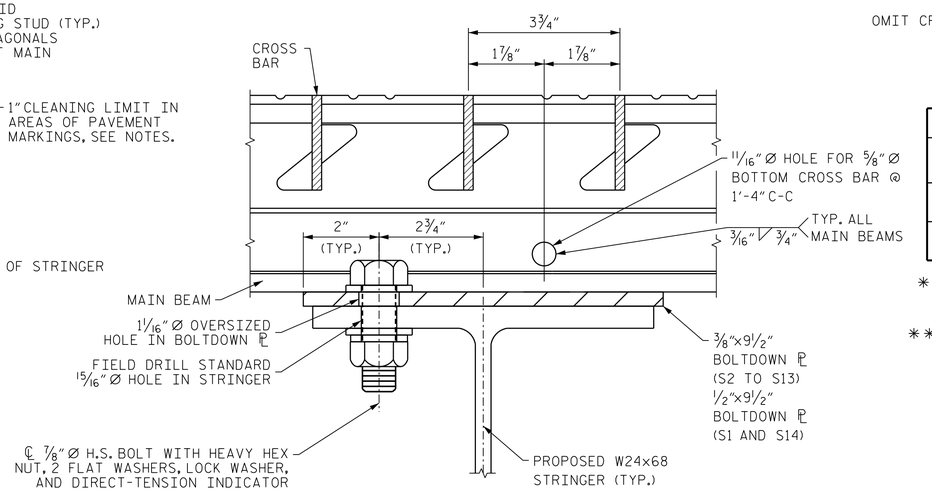
TYP. DIAG. BAR SPLICE

(WHERE REQ'D.)



TYP. SHOP TRIM SPLICE

(WHERE REQ'D.)



SECTION B-B

WELDING PROCESS

ALL WELDING TO BE DONE IN ACCORDANCE WITH AASHTO BRIDGE SPEC. AWS D1.5 LATEST VERSION.

MATERIAL SPECIFICATIONS

MAIN BEAM (5.3#/FT.) TO BE A.S.T.M. A588
CROSS BARS (¼" x 2½") TO BE A.S.T.M. A588
DIAGONAL BARS (¼" x 1") TO BE A.S.T.M. A588
SUPPLEMENTAL BARS (¼" x 1") TO BE A.S.T.M. A588
BOTTOM CROSS BARS (⅝" Ø) TO BE A.S.T.M. A588
BOLTDOWN PLATES (⅜"x9½", 1"x9½" AND ½"x9½") TO BE A.S.T.M. A588 OR APPROVED EQUAL

FINISH SPECIFICATIONS

AFTER ATTACHING BOLTDOWN PLATE, GRID DECK SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 PER NCDOT STANDARD SPECIFICATIONS.

NOTES:

CONTRACTOR MAY REQUEST TO MAKE MINOR CHANGES FOR PRODUCT IMPROVEMENT.

ALL MATERIAL SUBJECT TO MILL/SHOP TOLERANCES.

SERRATIONS TO BE APPROXIMATELY 3/16" DEEP BY ⅜" WIDE ON RANDOM CENTERS, 1" MAX. C-C SPACING.

PROVIDE END TRIM BAR AT ALL MAIN BEAM ENDS.

VERTICAL FACES OF TRANSVERSE BARS SHALL BE CLEANED IN AREAS TO RECEIVE PAVEMENT MARKINGS (PAINT LINES). CLEANING SHALL EXTEND 1" BELOW TOP OF GRID.

FOR PAVEMENT MARKINGS, SEE PAVEMENT MARKING PLANS.

FOR BOLT, WASHER, AND NUT DETAILS SEE SHEET 3 OF 3.

OMIT CROSS BARS AT BOLT LOCATIONS.

GRID DECK PROPERTIES		
SECTION MODULUS * (IN^3 / FT)		APPROX. GRID WEIGHT (LBS / SF) **
TOP STEEL	BOTTOM STEEL	20.0
4.038	4.321	

* SECTION MODULUS BASED ON 50% OF DIAGONAL BARS ACTIVE.

** THE GRID WEIGHT IS BASED ON AN UNCOATED GRID. ACTUAL WEIGHTS MAY VARY DUE TO COATING WEIGHT AND DECK ATTACHMENTS. GRID DECK WEIGHT SHOWN DOES NOT INCLUDE BOLTDOWN PLATES.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

OPEN GRID DECK

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

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9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
9697SAE68AD44DB...

DESIGNED BY:	C. CORMAN	DATE : JUL 2023
DRAWN BY:	R. JOHNSON	DATE : JUL 2023
CHECKED BY:	M. NIFONG	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			21

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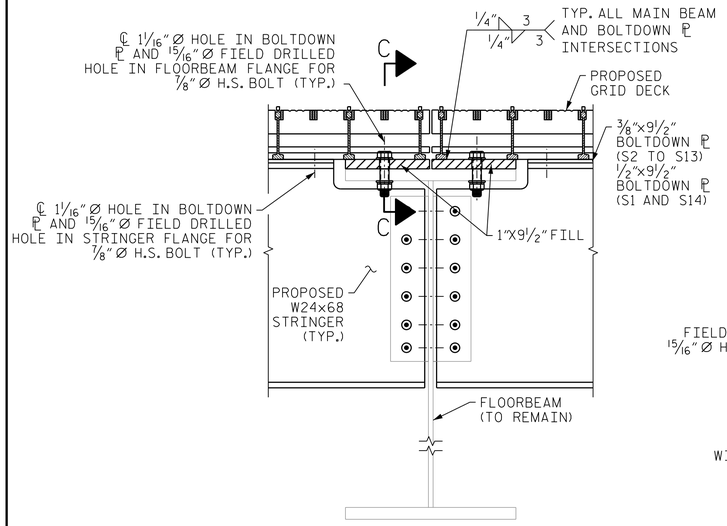
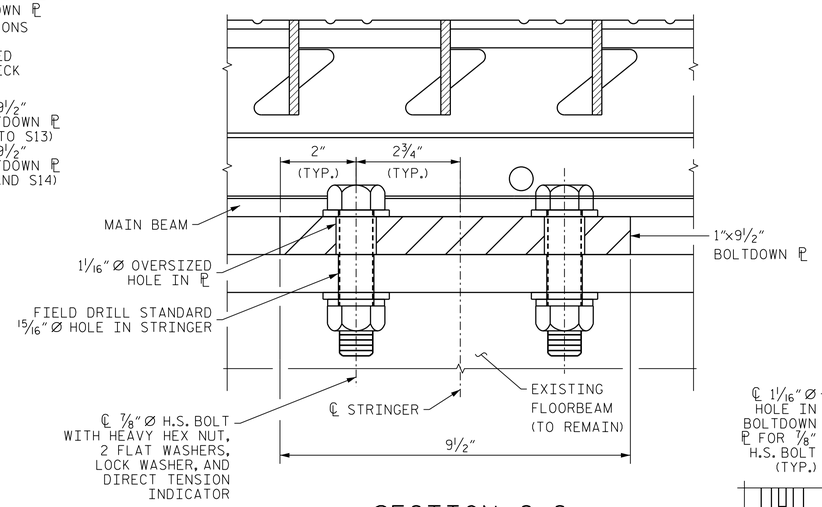


PROPOSED SECTION AT INTERIOR FLOORBEAM



SECTION C-C

(STRINGER CONNECTION TO FLOORBEAM NOT SHOWN)

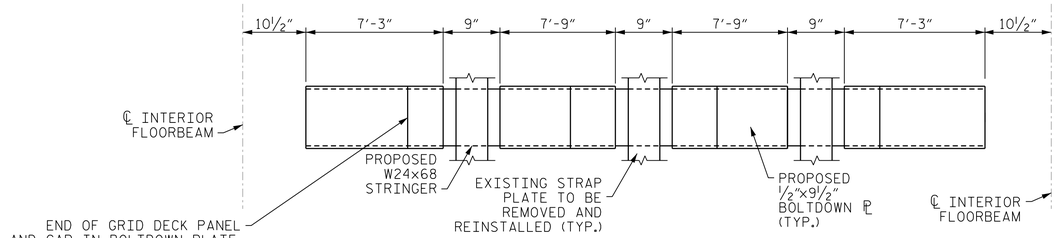
NOTES:

ALL BOLTS ARE 7/8" DIAMETER ASTM F3125 GRADE A325, GALVANIZED HIGH STRENGTH BOLTS.

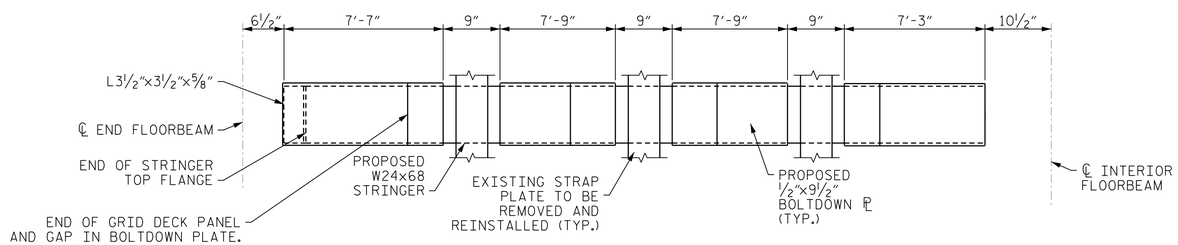
ALL NUTS, WASHERS, AND DIRECT-TENSION INDICATORS, SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NUTS, WASHERS, AND DIRECT-TENSION INDICATORS SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFCATIONS.

PRIOR TO FINAL TIGHTENING OF BOLTS, LOCTITE THREADLOCKER RED 271, OR APPROVED EQUAL, SHALL BE APPLIED TO THE THREADS AS RECOMMENDED BY THE MANUFACTURER.



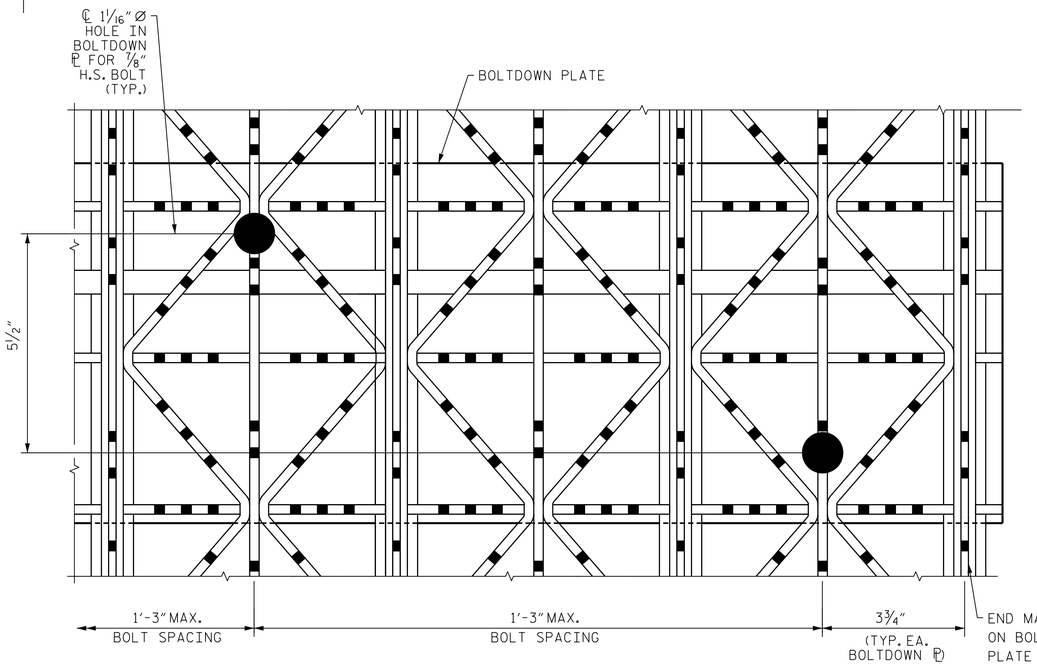
TYPICAL TOP FLANGE DETAIL AT S1 AND S14



TOP FLANGE DETAIL AT S1 AND S14 AT END FLOORBEAMS

EXTERIOR STRINGER BOLTDOWN PLATE LAYOUT

GRID DECK SHALL NOT BE WELDED TO STRAP PLATES.
BOLTS AND GRID DECK NOT SHOWN.



TYPICAL BOLT LAYOUT

LOCATION OF BOLTS SHALL BE COORDINATED WITH STRUCTURAL STEEL SHOP DRAWINGS TO AVOID INTERFERENCE WITH CONNECTION PLATES.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

OPEN GRID DECK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			21

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9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
96975AE68AD44DB...

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DESIGNED BY:	M. NIFONG	DATE : SEP 2023
DRAWN BY:	M. NIFONG	DATE : SEP 2023
CHECKED BY:	B. LOFLIN	DATE : SEP 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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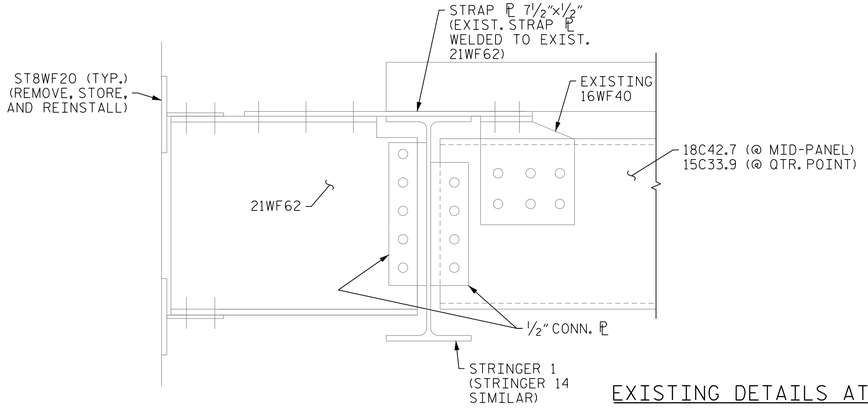
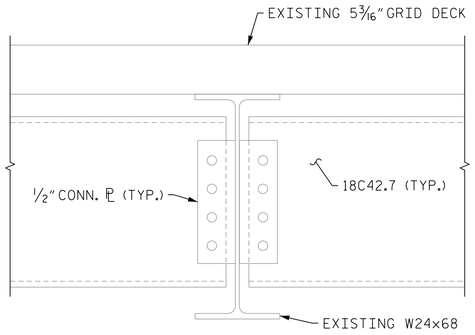
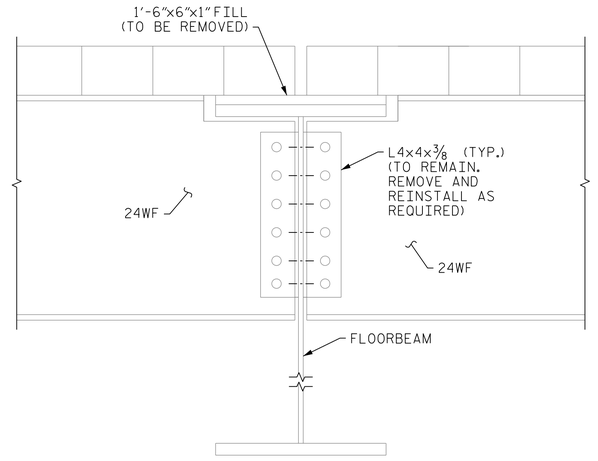
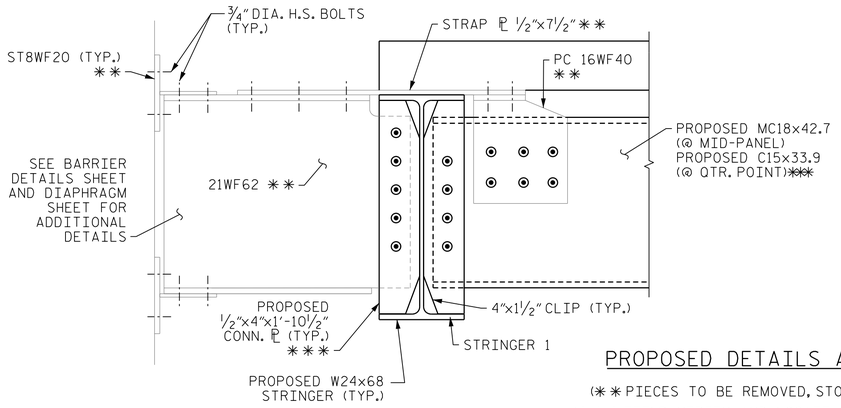


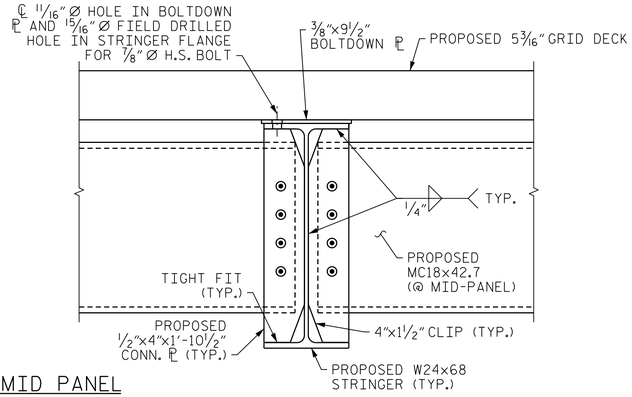


EXISTING DETAILS AT MID PANEL



EXISTING SECTION AT INTERIOR FLOORBEAM

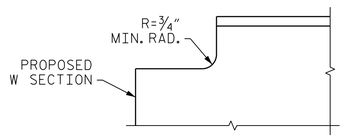




PROPOSED DETAILS AT MID PANEL

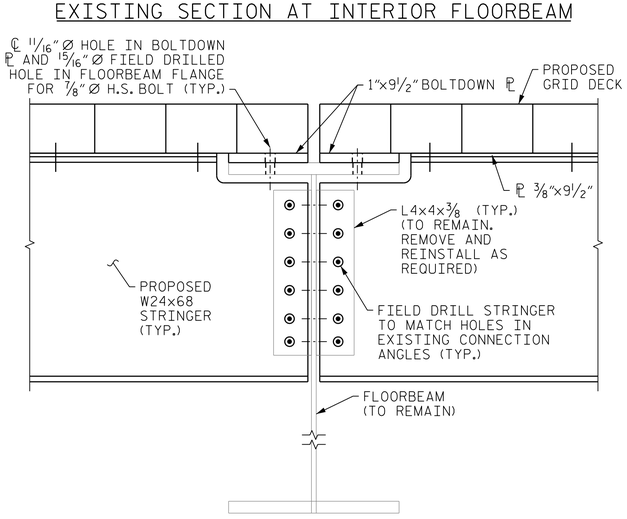
(** PIECES TO BE REMOVED, STORED, AND REINSTALLED)

(*** FIELD VERIFY AND LOCATE STIFFENERS CONNECTING TO EXISTING CURB ATTACHMENTS.)



RE-ENTRANT CORNER DETAIL (TYP.)

(COPE AT TOP FLANGE SHOWN)



PROPOSED SECTION AT INTERIOR FLOORBEAM

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE ⅞" DIAMETER ASTM F3125 GRADE A325, GALVANIZED HIGH STRENGTH BOLTS, EXCEPT AS NOTED.

* FIELD VERIFY LOCATION OF EXISTING STRINGERS BEFORE SUBMITTING SHOP DRAWINGS.

ANY BOLTS LOOSENED FROM ANY CONNECTION DURING CONSTRUCTION SHALL BE REPLACED WITH NEW BOLTS TIGHTENED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK AND FLOORBEAM TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL TYPICAL STRINGERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			21

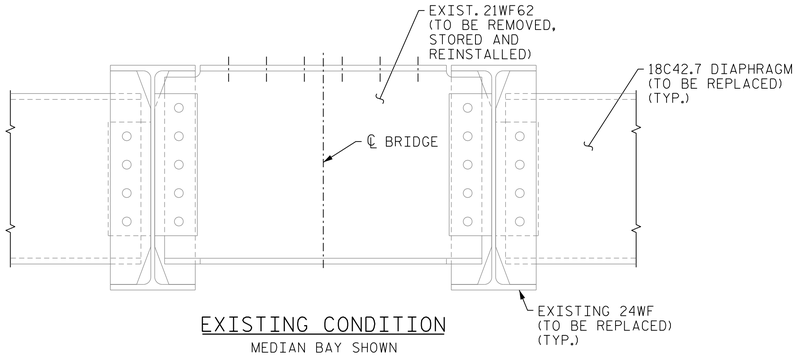
DESIGNED BY: C. CORMAN DATE : AUG 2023
DRAWN BY: R. JOHNSON DATE : AUG 2023
CHECKED BY: M. NIFONG DATE : AUG 2023
DESIGN ENGINEER OF RECORD: B. LOFLIN DATE : SEP 2023

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

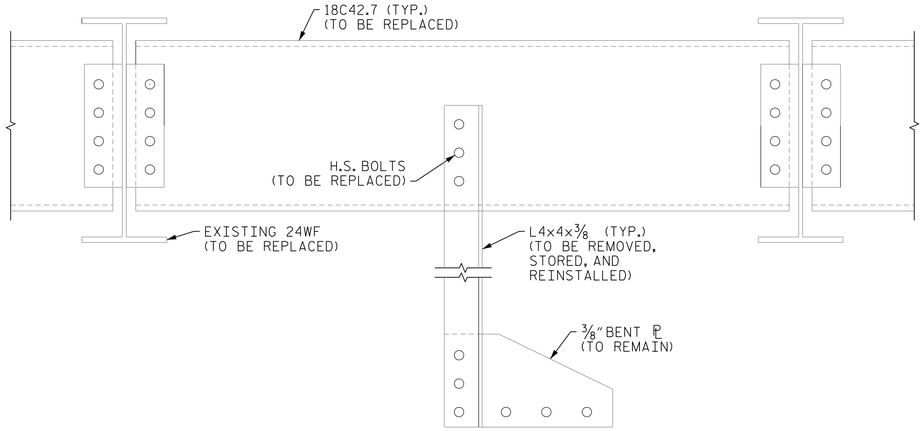
9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

9/11/2023
401.023.15BPR.102.SMU.SS01.12.dgn

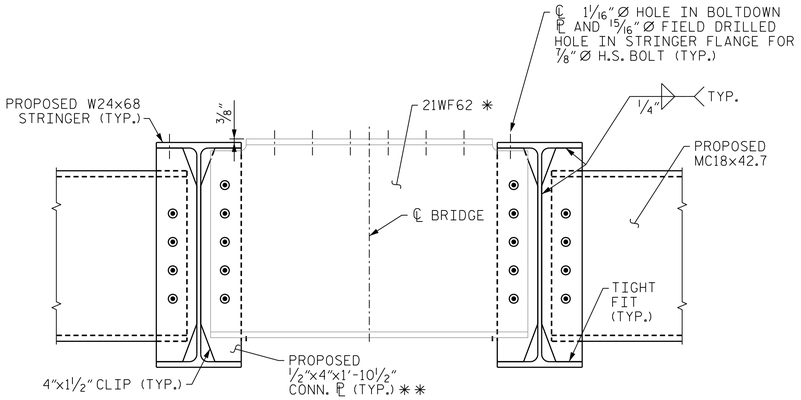


EXISTING CONDITION

MEDIAN BAY SHOWN

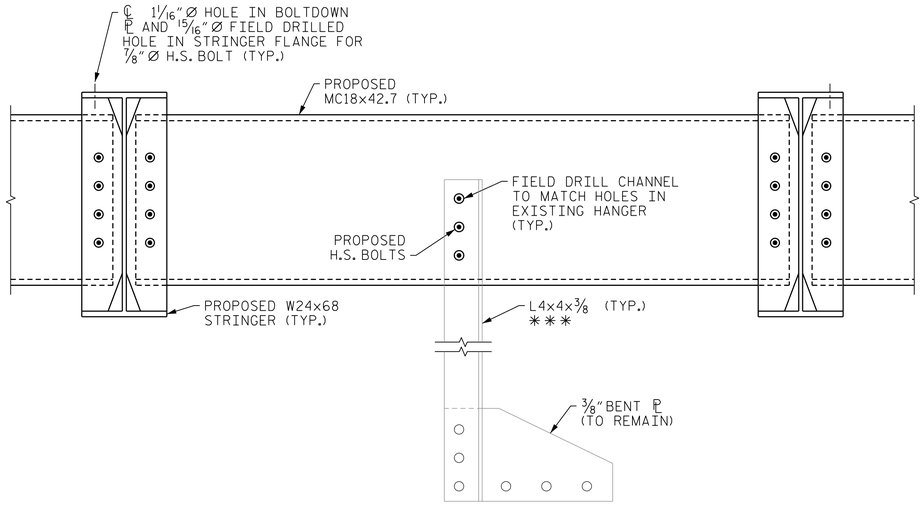


EXISTING TYPICAL BOTTOM LATERAL HANGER



FINAL CONDITION

MEDIAN BAY SHOWN,
(MEDIAN BARRIER NOT SHOWN FOR CLARITY)
(* PIECES TO BE REMOVED, STORED, AND REINSTALLED.)
(** FIELD VERIFY AND LOCATE STIFFENERS CONNECTING
TO EXISTING MEDIAN BARRIER ATTACHMENTS.)



PROPOSED TYPICAL BOTTOM LATERAL HANGER

(*** HANGER ANGLE TO BE REMOVED, STORED, AND REINSTALLED
TO FACILITATE ERECTION AND REMOVAL OF STRUCTURAL STEEL.
LOCATION OF LATERAL BRACING SHALL BE MEASURED PRIOR TO
REMOVAL OF HANGER. HANGER SHALL BE REINSTALLED SO THAT
LATERAL BRACING IS RETURNED TO ITS ORIGINAL POSITION.)

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE 7/8" DIAMETER ASTM F3125 GRADE A325, GALVANIZED HIGH STRENGTH BOLTS, EXCEPT AS NOTED.

FOR BARRIER INFORMATION, SEE BARRIER DETAIL SHEET.

FIELD VERIFY DIAPHRAGM LOCATIONS TO MATCH EXISTING RAILING CONNECTIONS BEFORE SUBMITTING SHOP DRAWINGS. BECAUSE THERE IS LITTLE ADJUSTMENT WITHIN THE BARRIER RAILS, EXTREME CARE SHOULD BE TAKEN WHEN LOCATING THE CONNECTION PLATES FOR THE BARRIER RAILS TO ENSURE BARRIER RAILS CAN BE REINSTALLED.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL DIAPHRAGM DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY:	C. CORMAN	DATE : AUG 2023
DRAWN BY:	R. JOHNSON	DATE : AUG 2023
CHECKED BY:	M. NIFONG	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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RALEIGH, NC 27601
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9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
96975AE68AD44DB...

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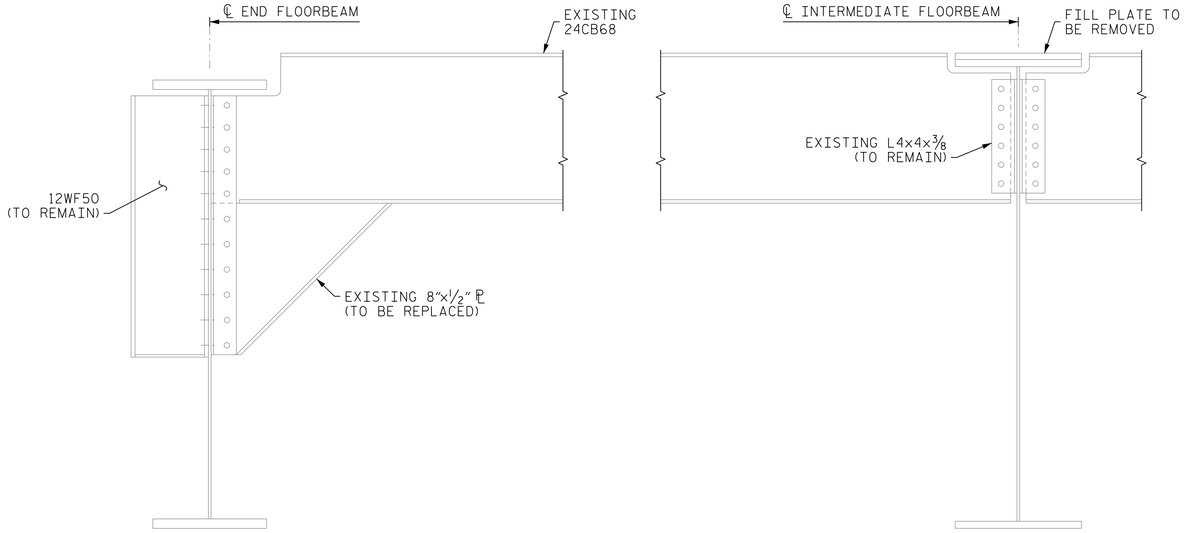
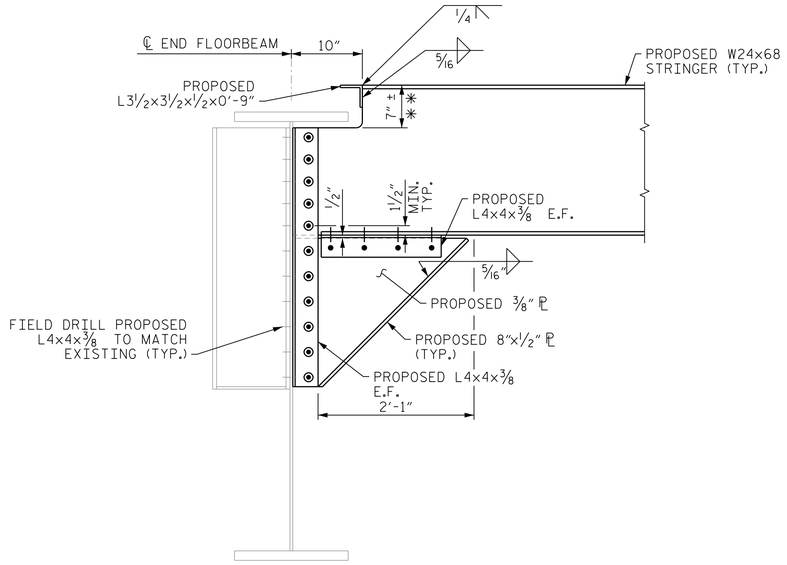
401.025.15BPR.102_SWU.SS02.13.dgn

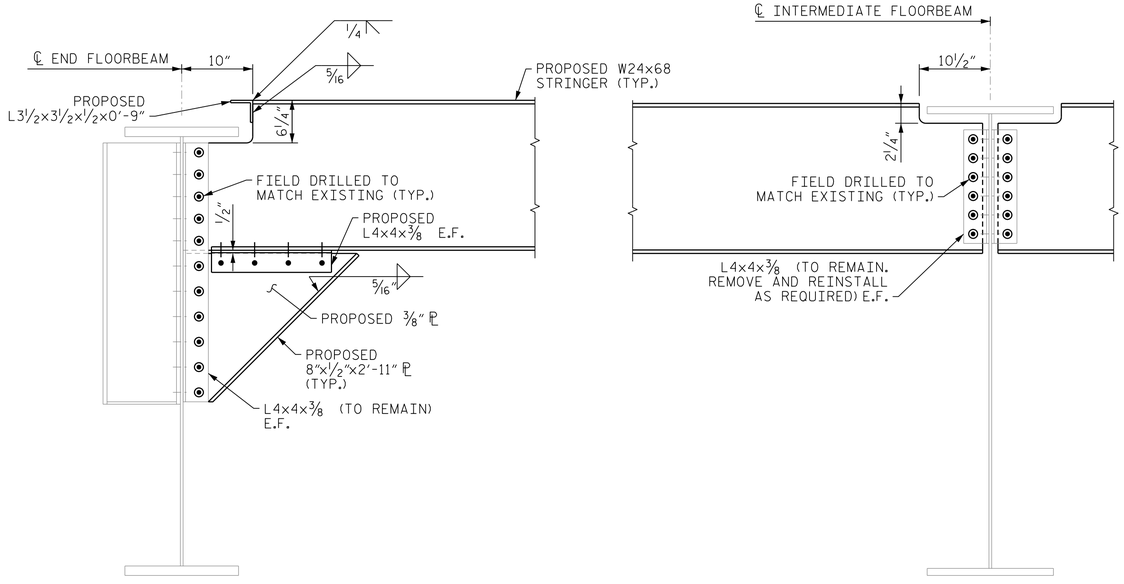


EXISTING STRINGER S1 AND S14 END DETAILS



PROPOSED STRINGER S14 AT FBO

**FIELD VERIFY THIS DIMENSION AS THIS DIMENSION IS APPROXIMATED ASSUMING THAT THE LIFT SPAN FINGER JOINT WILL NEED TO BE RAISED ¾" ± AT EACH SOUTHWEST END STRINGER LOCATION (S8-S14). (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)



PROPOSED STRINGER S1 AND S14 END DETAILS

(TYPICAL UNLESS NOTED OTHERWISE.) (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE ⅞" DIAMETER ASTM F3125 GRADE A325 GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE SHOWN.

* FIELD VERIFY LOCATION OF EXISTING STRINGERS BEFORE SUBMITTING SHOP DRAWINGS.

ANY BOLTS LOOSENED FROM ANY CONNECTION DURING CONSTRUCTION SHALL BE REPLACED WITH NEW BOLTS TIGHTENED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT A FEW OF THE EXISTING STRINGER CONNECTIONS AT THE END FLOORBEAMS CONTAIN RIVETS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL END STRINGERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY:	C. CORMAN	DATE : AUG 2023
DRAWN BY:	R. JOHNSON	DATE : AUG 2023
CHECKED BY:	M. NIFONG	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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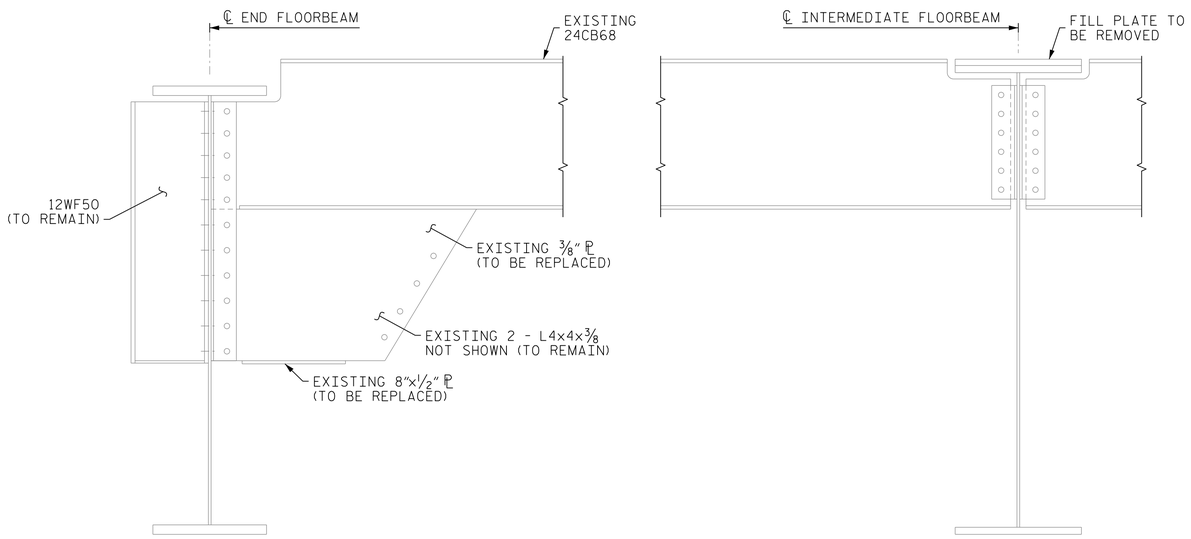
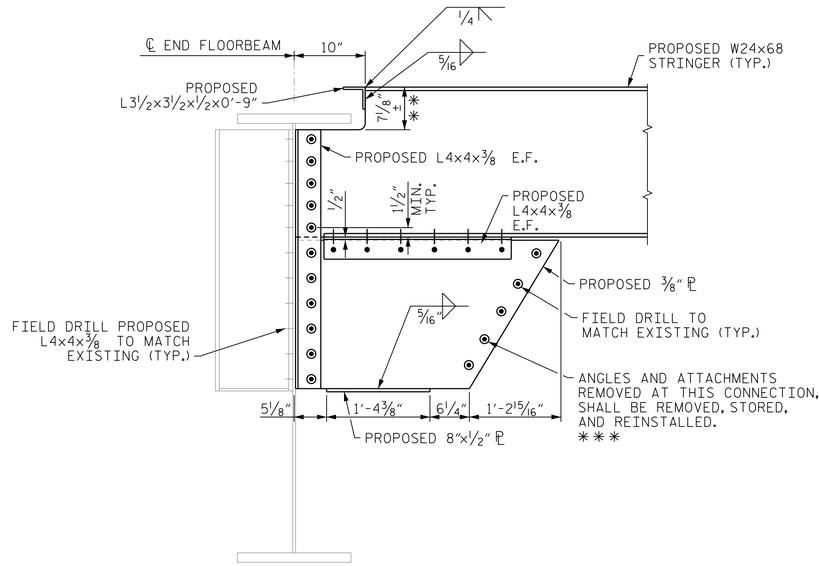
9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 9697SAE68AD44DB...

9/11/2023
401.027.15BPR.102.SMU.SS03.14.dgn



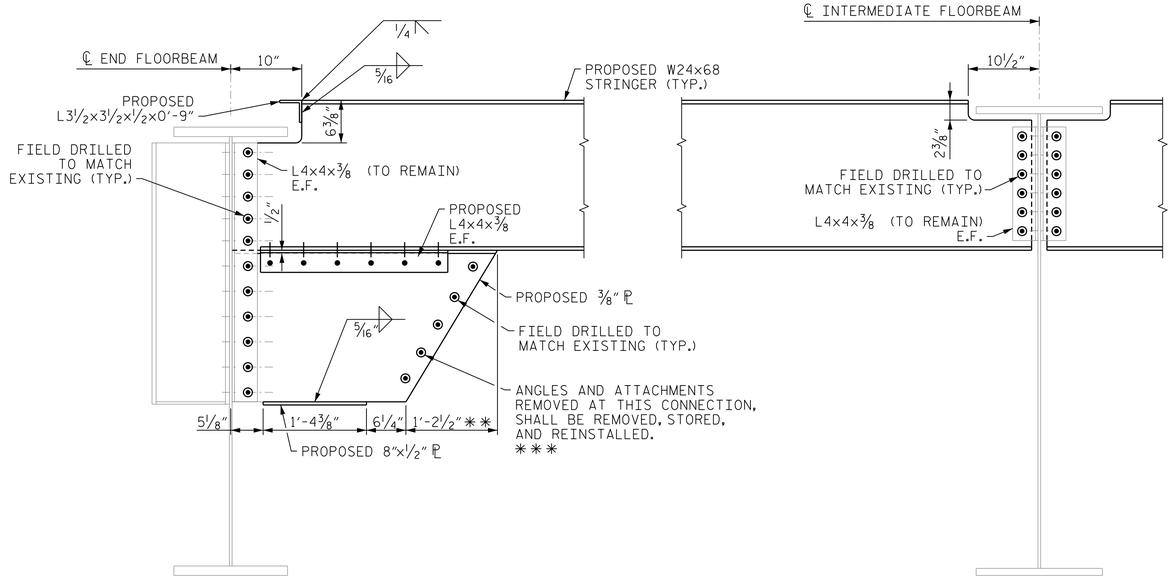
EXISTING STRINGER S2 AND S13 END DETAILS



PROPOSED STRINGER S13 AT FBO

** FIELD VERIFY THIS DIMENSION AS THIS DIMENSION IS APPROXIMATED ASSUMING THAT THE LIFT SPAN FINGER JOINT WILL NEED TO BE RAISED 3/4" ± AT EACH SOUTHWEST END STRINGER LOCATION (S8-S14). (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)

*** TO FACILITATE OPERATION OF THE LIFT SPAN, TEMPORARY BRACING SHALL BE INSTALLED IMMEDIATELY AFTER THE REMOVAL OF THE EXISTING LOCK BAR BRACING. CONTRACTOR SHALL SUBMIT TEMPORARY BRACING FOR APPROVAL. COST OF TEMPORARY BRACING SHALL BE INCLUDED IN THE COST OF THE STRUCTURAL STEEL.



PROPOSED STRINGER S2 AND S13 END DETAILS

(TYPICAL UNLESS NOTED OTHERWISE.) (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE 7/8" DIAMETER ASTM F3125 GRADE A325 GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE SHOWN.

* FIELD VERIFY LOCATION OF EXISTING STRINGERS BEFORE SUBMITTING SHOP DRAWINGS.

ANY BOLTS LOOSENED FROM ANY CONNECTION DURING CONSTRUCTION SHALL BE REPLACED WITH NEW BOLTS TIGHTENED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT A FEW OF THE EXISTING STRINGER CONNECTIONS AT THE END FLOORBEAMS CONTAIN RIVETS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 2 OF 4

DESIGNED BY:	C. CORMAN	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	M. NIFONG	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

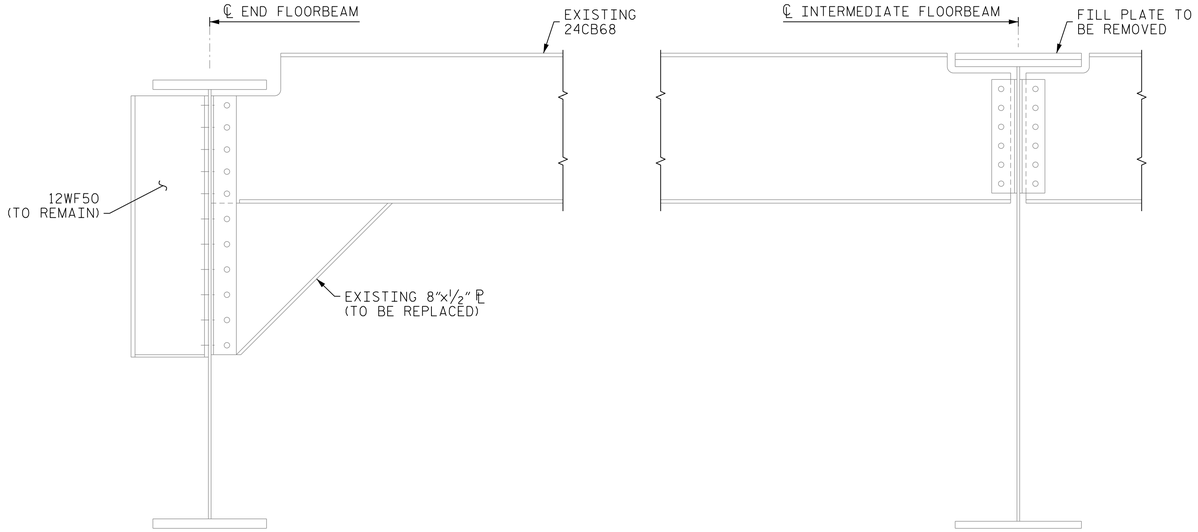
11/7/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

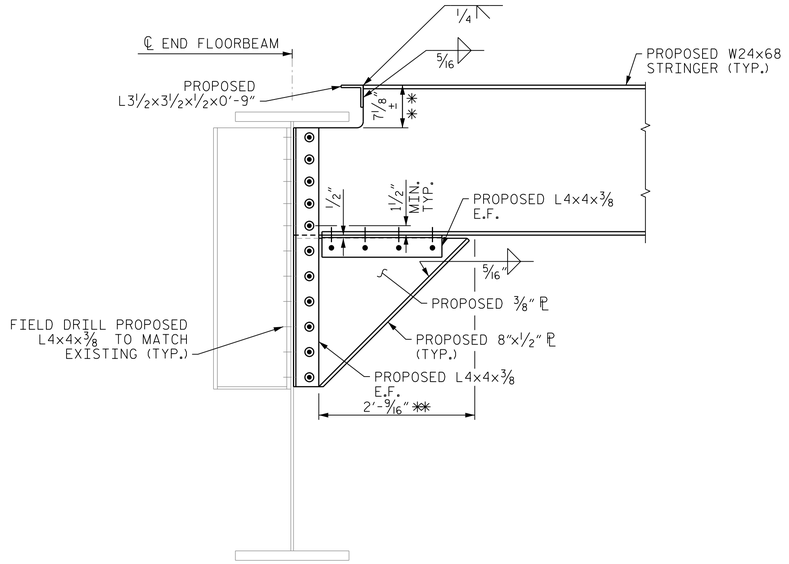
STRUCTURAL STEEL END STRINGERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			21

11/7/2023
401.029.15BPR.102.SMU.SS04.15.dgn

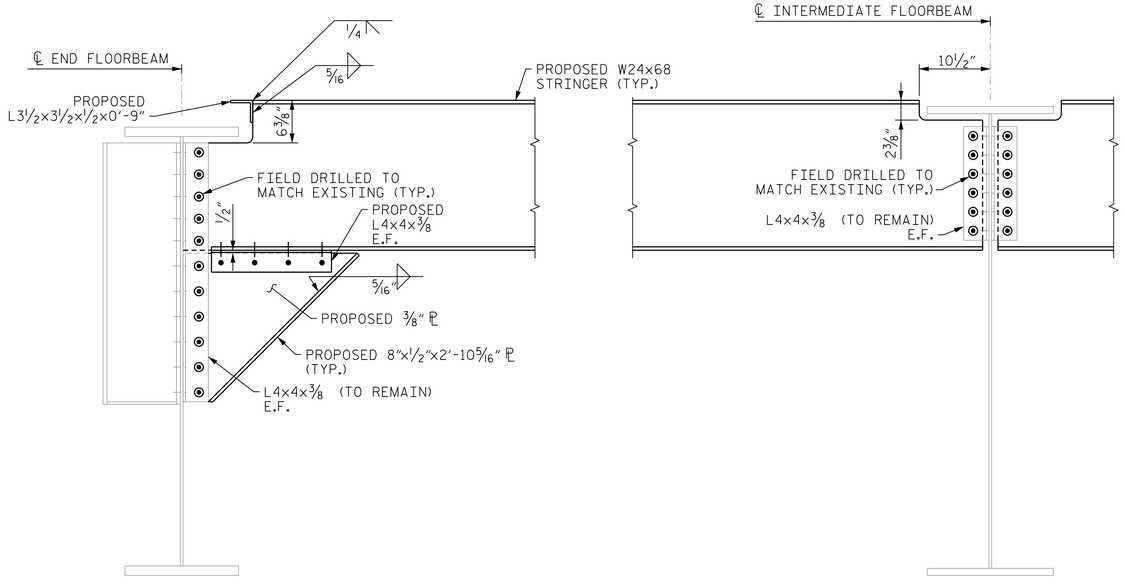


EXISTING STRINGER S3-6 AND S9-12 END DETAILS



PROPOSED STRINGER S9-12 AT FBO

**FIELD VERIFY THIS DIMENSION AS THIS DIMENSION IS APPROXIMATED ASSUMING THAT THE LIFT SPAN FINGER JOINT WILL NEED TO BE RAISED 3/4" ± AT EACH SOUTHWEST END STRINGER LOCATION (S8-S14). (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)



PROPOSED STRINGER S3-6 AND S9-12 END DETAILS

(TYPICAL UNLESS NOTED OTHERWISE.) (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE 7/8" DIAMETER ASTM F3125 GRADE A325 GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE SHOWN.

* FIELD VERIFY LOCATION OF EXISTING STRINGERS BEFORE SUBMITTING SHOP DRAWINGS.

ANY BOLTS LOOSENED FROM ANY CONNECTION DURING CONSTRUCTION SHALL BE REPLACED WITH NEW BOLTS TIGHTENED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT A FEW OF THE EXISTING STRINGER CONNECTIONS AT THE END FLOORBEAMS CONTAIN RIVETS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 3 OF 4

DESIGNED BY:	C. CORMAN	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	M. NIFONG	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

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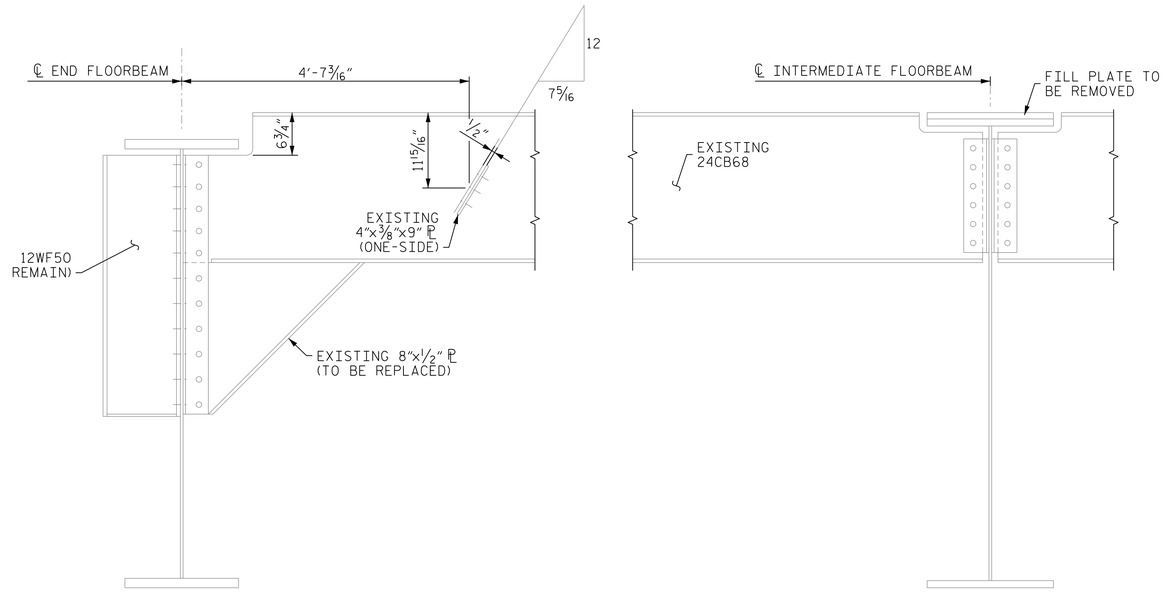
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 96975AE68AD44DB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL END STRINGERS

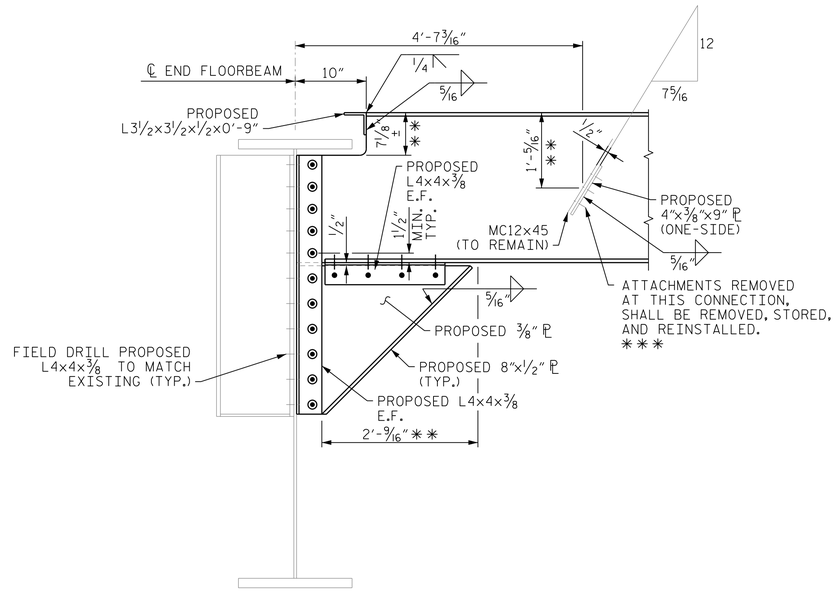
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			21

9/11/2023
401.031.15BPR.102.SMU.SS05.16.dgn



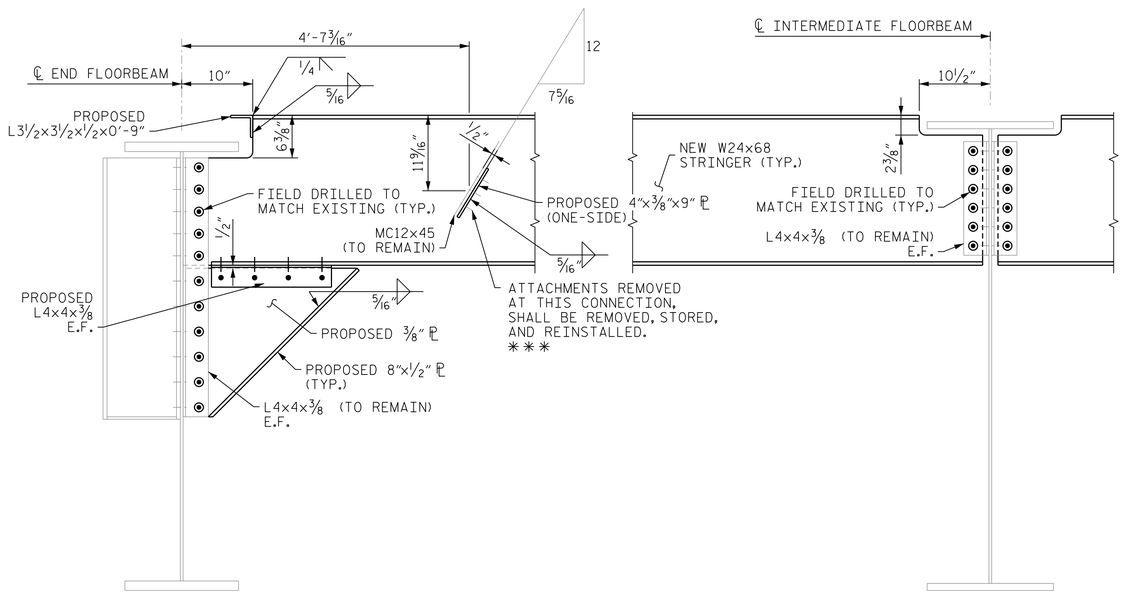
EXISTING STRINGER S7 AND S8 END DETAILS

✱✱✱TO FACILITATE OPERATION OF THE LIFT SPAN, TEMPORARY BRACING SHALL BE INSTALLED IMMEDIATELY AFTER THE REMOVAL OF THE EXISTING CENTERING DEVICE BRACING. CONTRACTOR SHALL SUBMIT TEMPORARY BRACING FOR APPROVAL. COST OF TEMPORARY BRACING SHALL BE INCLUDED IN THE COST OF THE STRUCTURAL STEEL.



PROPOSED STRINGER S8 AT FBO

✱✱FIELD VERIFY THIS DIMENSION AS THIS DIMENSION IS APPROXIMATED ASSUMING THAT THE LIFT SPAN FINGER JOINT WILL NEED TO BE RAISED 3/4″ ± AT EACH SOUTHWEST END STRINGER LOCATION (S8-S14). (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)



PROPOSED STRINGER S7 AND S8 END DETAILS

(TYPICAL UNLESS NOTED OTHERWISE.) (FIELD DRILLED BOLTS THROUGH STRINGER TOP FLANGE NOT SHOWN IN THIS VIEW.)

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

ALL BOLTS ARE 7/8″ DIAMETER ASTM F3125 GRADE A325 GALVANIZED HIGH STRENGTH BOLTS UNLESS OTHERWISE SHOWN.

✱ FIELD VERIFY LOCATION OF EXISTING STRINGERS BEFORE SUBMITTING SHOP DRAWINGS.

ANY BOLTS LOOSENED FROM ANY CONNECTION DURING CONSTRUCTION SHALL BE REPLACED WITH NEW BOLTS TIGHTENED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT A FEW OF THE EXISTING STRINGER CONNECTIONS AT THE END FLOORBEAMS CONTAIN RIVETS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

SHEET 4 OF 4

DESIGNED BY:	C. CORMAN	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	M. NIFONG	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

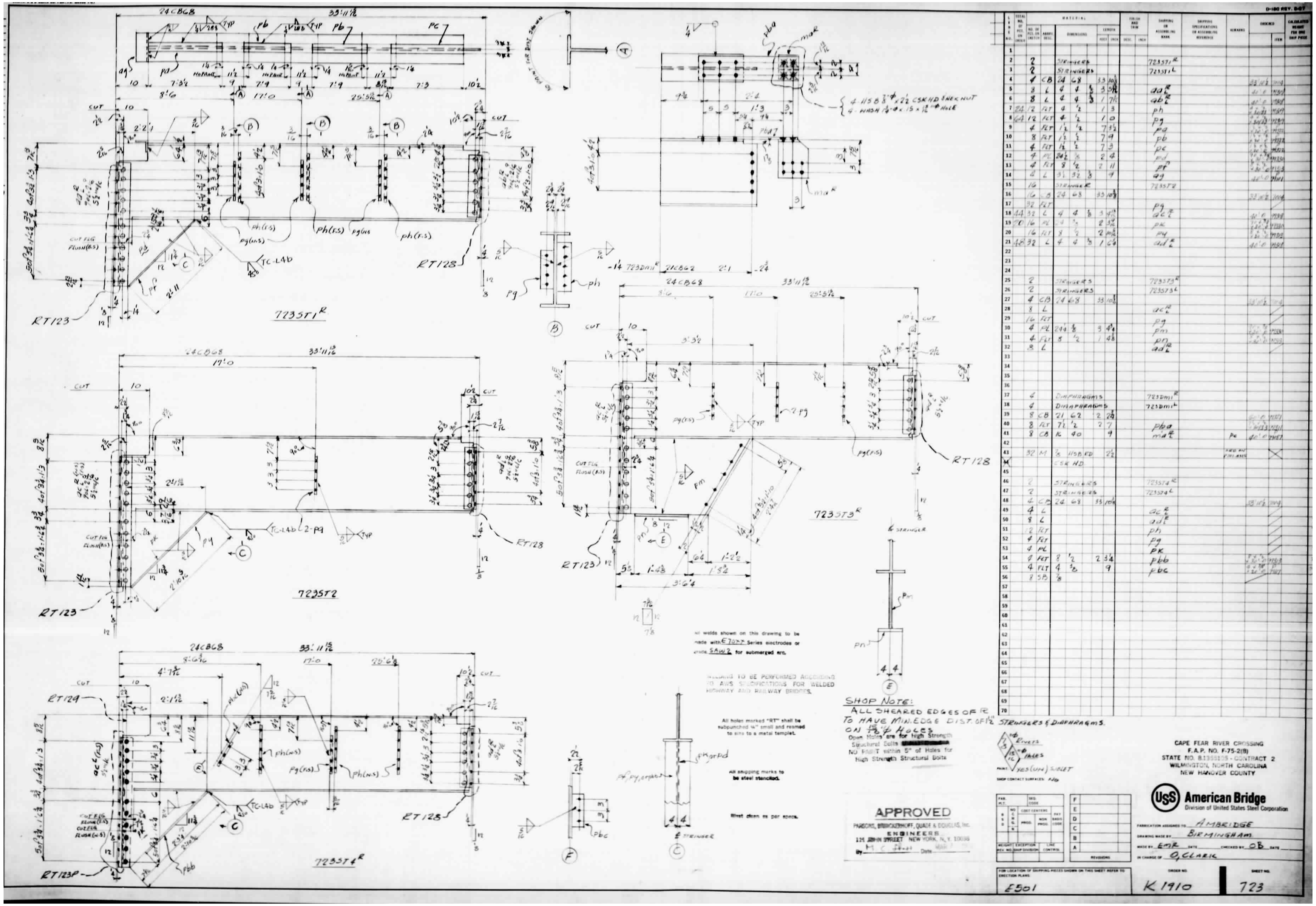
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
11/7/2023
DocuSigned by: 9697SAE68AD44DB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL END STRINGERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			21

11/7/2023
401.033.15BPR.102.SMU.SS06.1T.dgn



NOTES:

THE INFORMATION SHOWN IS FOR REFERENCE ONLY. DIMENSIONS SHALL BE FIELD VERIFIED PRIOR TO FABRICATION.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL END STRINGERS SHOP DRAWINGS

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NC LICENSE NO. C-2979

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038654 BRYAN J. LOFLIN
9/11/2023
DocuSigned by:
96975AE68AD44DB...

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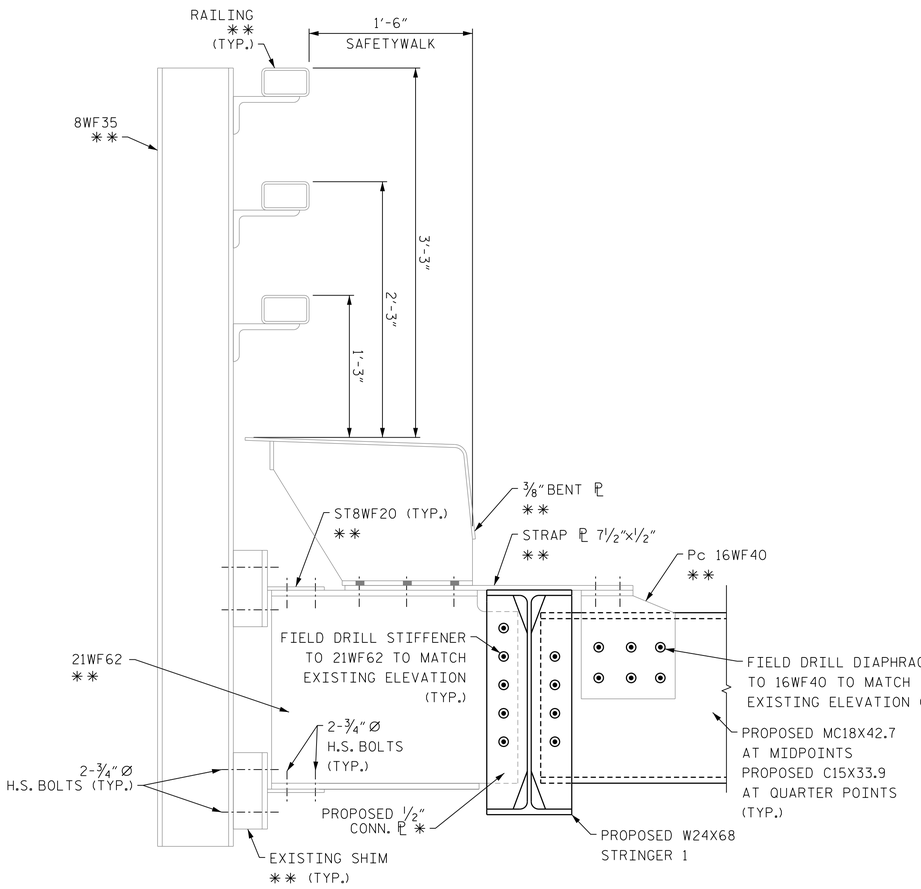
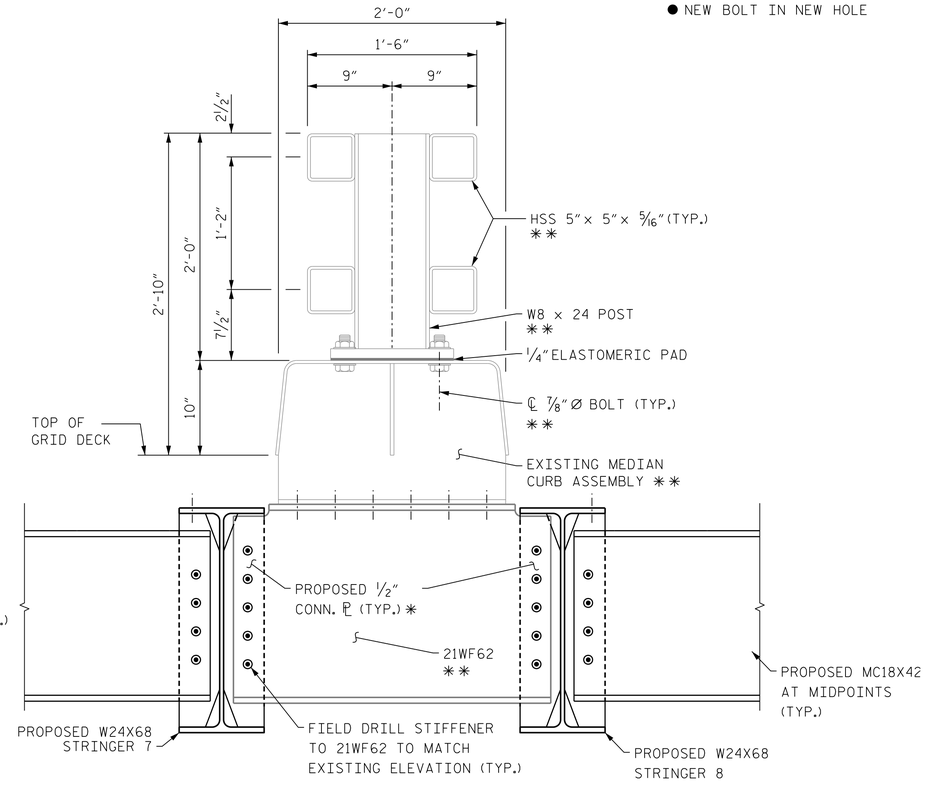
DESIGNED BY:	C. CORMAN	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	M. NIFONG	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			21

9/8/2023
401.035_15BPR.102_SMU_SS07_18.dgn



PROPOSED CURB BARRIER



PROPOSED MEDIAN BARRIER

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE

NOTES:

BARRIER AND CURB ASSEMBLY TO BE REMOVED, STORED DURING STRINGER AND DECK REPLACEMENT, AND REASSEMBLED.

ALL BOLTS ARE 7/8" DIAMETER ASTM F3125 GRADE A325, GALVANIZED HIGH STRENGTH BOLTS, EXCEPT AS NOTED.

* FIELD VERIFY AND LOCATE STIFFENERS CONNECTING TO EXISTING CURB OR EXISTING MEDIAN BARRIER ATTACHMENTS. BECAUSE THERE IS LITTLE ADJUSTMENT WITHIN THE BARRIER RAILS, EXTREME CARE SHOULD BE TAKEN WHEN LOCATING THE CONNECTION PLATES FOR THE BARRIER RAILS TO ENSURE THE BARRIER RAILS CAN BE INSTALLED.

** PIECES TO BE REMOVED, STORED, AND REINSTALLED AS REQUIRED.

SEE DIAPHRAGM DETAILS SHEET FOR ADDITIONAL DETAILS.

IT IS SUGGESTED THAT BARRIER, RAILING, AND CURB COMPONENTS BE MARKED SUCH THAT THEY ARE REINSTALLED IN THEIR EXISTING LOCATIONS UPON COMMENCEMENT OF REINSTALLATION OPERATIONS.

SEE OPEN GRID DECK DRAWINGS FOR STRINGER TO DECK AND FLOORBEAM TO DECK CONNECTION DETAILS.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARRIER DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			21

DESIGNED BY:	C. CORMAN	DATE : AUG 2023
DRAWN BY:	R. JOHNSON	DATE : AUG 2023
CHECKED BY:	M. NIFONG	DATE : AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE : SEP 2023

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

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9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
DocuSigned by:
9697SAE68AD44DB...

9/11/2023
401.037.15BPR.102.SMU.SS10.19.dgn

NOTES:

THE PURPOSE OF THIS REPAIR IS TO VERTICALLY ALIGN THE ADJACENT FINGER PLATES IN THE EASTBOUND LANES AT THE WEST TOWER OF THE LIFT SPAN.

REPAIR WORK SHOWN ON THIS SHEET INVOLVED WITH RESETTING AND SHIMMING THE FINGER PLATE ON THE LIFT SPAN SIDE OF THE JOINT SHALL BE PAID FOR UNDER THE REPLACEMENT OF STRUCTURAL STEEL PAY ITEM.

FINGER PLATE ON THE LIFT SPAN SIDE OF JOINT SHALL BE RAISED TO MATCH THE ELEVATION OF THE FINGER PLATE ON THE TOWER SPAN WHEN IN THE FULLY SEATED POSITION.

IT IS ESTIMATED THAT THE FINGER PLATE ON THE LIFT SPAN SIDE WILL NEED TO BE RAISED APPROX. ¾". THE CONTRACTOR SHALL FIELD VERIFY THE HEIGHT DIFFERENCE BETWEEN THE TOP OF THE FINGER PLATE ON THE TOWER SPAN SIDE TO FURTHER VERIFY THE VARIATIONS IN SHIM THICKNESSES PRIOR TO BEGINNING CONSTRUCTION.

TOTAL NUMBER OF SHIM LOCATIONS: 14 (7 FOR FRONT SHIM AND 7 FOR BACK SHIM)

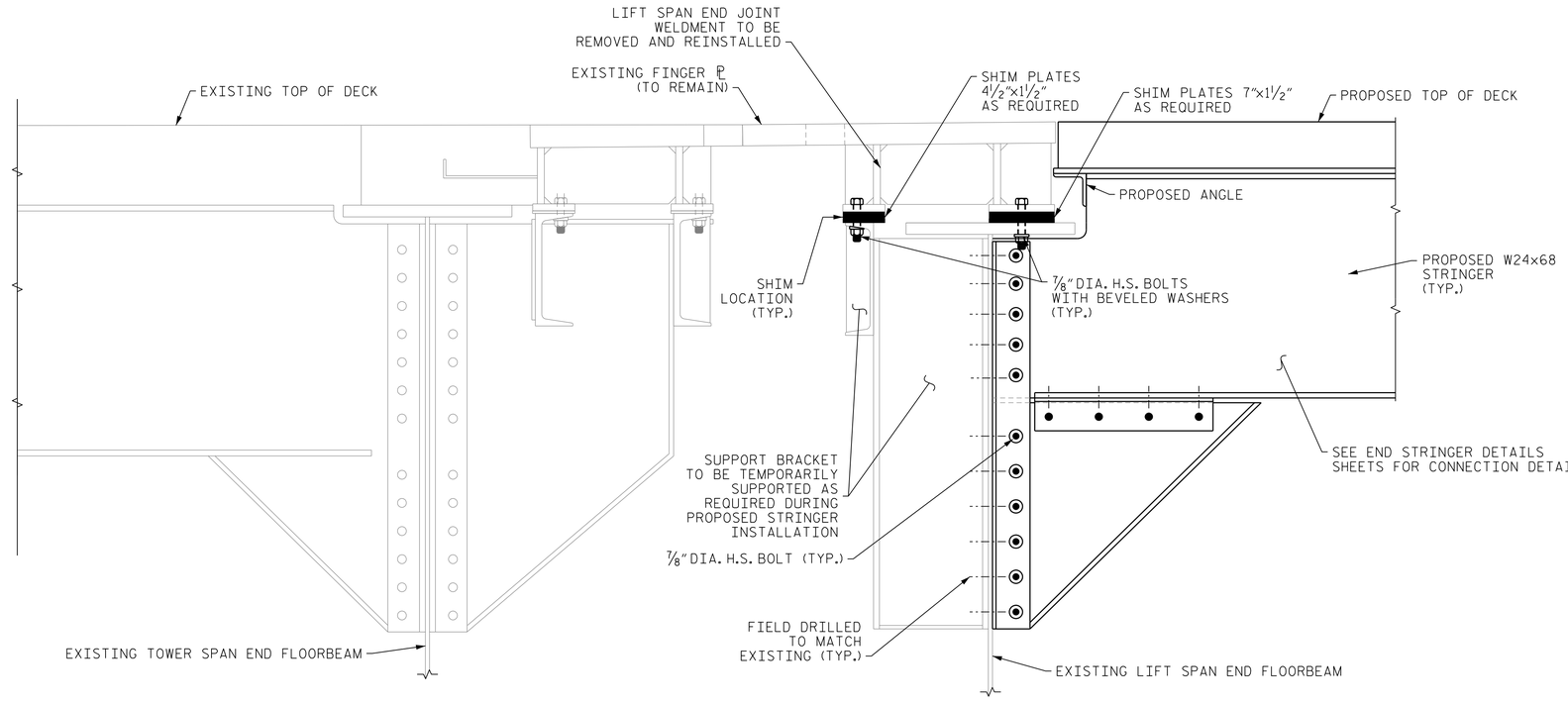
CONTRACTOR SHALL VERIFY SHIM PLATE PLAN DIMENSIONS PRIOR TO FABRICATION.

CONTRACTOR SHALL MINIMIZE THE NUMBER OF SHIM PLATES USED AT EACH SHIM LOCATION.

JOINT SHIM PLATES AND BOLTS, NUTS, AND WASHERS FOR SHIM PLATES SHALL BE SUPPLIED BY THE CONTRACTOR.

BOLT LEGEND:

- ○ EXISTING BOLT
- ◉ NEW BOLT IN EXISTING HOLE OR IN HOLE FIELD DRILLED TO MATCH EXISTING HOLE
- ● NEW BOLT IN NEW HOLE



SECTION THROUGH FINGER JOINT AT WEST TOWER

THIS REPAIR WORK SHALL BE PERFORMED ONLY ON THE SOUTHWEST HALF OF THE BRIDGE - EASTBOUND LANES ON THE LIFT SPAN SIDE OF THE JOINT.

PROJECT NO. 15BPR.102.3

NEW HANOVER COUNTY

BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT REPAIR DETAILS

DESIGNED BY:	D. KO	DATE :	JUL 2023		
DRAWN BY:	R. JOHNSON	DATE :	JUL 2023		
CHECKED BY:	M. NIFONG	DATE :	AUG 2023		
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023		

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

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10/6/2023
NORTH CAROLINA PROFESSIONAL SEAL 038854 ENGINEER BRYAN J. LOFLIN
Docusigned by: 9697SAE68AD44DB...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			21

10/6/2023
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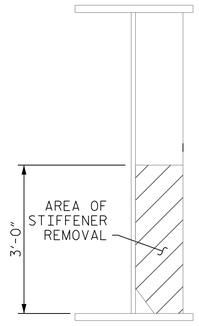
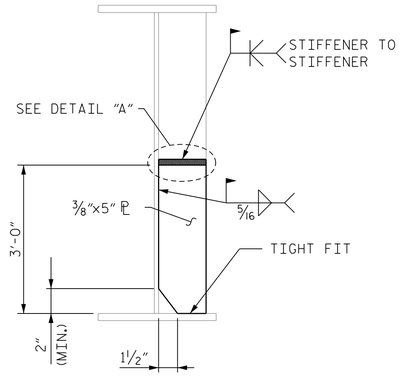
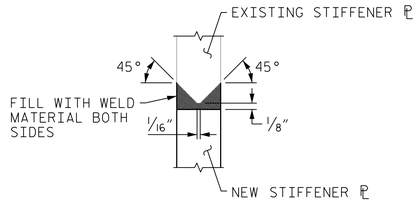


FLOORBEAM STIFFENER ℄ REMOVAL



FLOORBEAM STIFFENER ℄ REPAIR



DETAIL A

STIFFENER REMOVAL PROCEDURE:

1. THERMAL CUT, AIR CARBON ARC GOUGE, ANGLE GRID OR SAW CUT THE STIFFENER TO WITHIN 3/8" OF THE FLANGE OR WEB PLATE, AVOIDING ANY DAMAGE TO THE EXISTING STEEL TO REMAIN. USE MECHANICAL GUIDE WHILE MAKING THE CUT.
2. AIR CARBON ARC GOUGE THE WELD AND REMAINING STIFFENER TO WITHIN 3/16" OF THE WEB PLATE AVOIDING ANY DAMAGE TO THE EXISTING STEEL TO REMAIN.
3. GRIND THE REMAINING WELD AND STIFFENER REMNANTS SMOOTH AND FLUSH WITH THE SURROUNDING BASE METAL. FINAL GRINDING SHALL BE IN THE DIRECTION OF THE FLANGE LENGTH. GROUND SURFACES SHALL HAVE A SURFACE ROUGHNESS OF RA = 1000 MICROINCHES OR LESS.
4. 100 PERCENT MAGNETIC PARTICLE TEST THE WELD REMOVAL AREAS.
5. ALIGN AND ATTACH THE NEW PORTION OF THE STIFFENER AND PLACE WELDS. TEST WELDS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND BRIDGE WELDING CODE.

NOTES:

FLOORBEAM STIFFENER REMOVAL AND REPLACEMENT IS NOT REQUIRED. FLOORBEAM STIFFENER PLATES MAY BE REMOVED AND REPLACED TO FACILITATE STRINGER REPLACEMENT OPERATIONS.

CONTRACTOR SHALL ONLY REMOVE STIFFENERS REQUIRED TO FACILITATE ERECTION OF NEW STRUCTURAL STEEL. A SUGGESTED STIFFENER REMOVAL LAYOUT IS SHOWN ON THIS DRAWING. CONTRACTOR MAY PROPOSE AN ALTERNATE REMOVAL LAYOUT FOR REVIEW AND APPROVAL. THE DEPARTMENT WILL SUPPLY 108 STIFFENER PLATES WITH THE DIMENSIONS SHOWN ON THIS SHEET. CONTRACTOR WILL BE RESPONSIBLE FOR SUPPLYING ANY ADDITIONAL STIFFENER PLATES OR STIFFENER PLATES OF OTHER SIZES REQUIRED BY A DIFFERENT PROPOSED METHOD OF REPLACING THE STRINGERS.

REMOVE ONLY THE STIFFENERS ON THE HALF OF THE BRIDGE WHERE WORK IS OCCURING.

ONLY REMOVE THE STIFFENER PORTIONS SHOWN ON ONE FACE OF THE FLOORBEAM WEB, LEAVING THE STIFFENER ON THE OPPOSING SIDE OF THE WEB.

IT IS SUGGESTED THAT, WITHIN A BAY (BETWEEN FLOORBEAMS) ONLY REMOVE FROM ONE OF THE FLOORBEAM WEB FACES IN THAT BAY TO FACILITATE THE REMOVAL AND INSTALLATION OF STRINGERS.

EXCEPT FOR THE STIFFENER AT CENTERLINE BRIDGE UNDER MEDIAN BARRIER, STIFFENERS REMOVED ON THE EASTBOUND OR WESTBOUND SIDES SHALL BE REPAIRED PRIOR TO ALLOWING TRAFFIC ONTO THAT SIDE.

NO LIVE LOAD SHALL BE PRESENT ON THE LIFT SPAN DURING WELDING.

SUGGESTED FLOORBEAM STIFFENER REMOVAL ELEVATION

PROJECT NO. 15BPR.102.3
NEW HANOVER COUNTY
BRIDGE NO. 640013

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STRUCTURAL STEEL FLOORBEAM DETAILS

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

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RALEIGH, NC 27601
NC LICENSE NO. C-2979

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/11/2023
NORTH CAROLINA PROFESSIONAL SEAL 038654 ENGINEER BRYAN J. LOFLIN
DocuSigned by: 9697SAE68AD44DB...

DESIGNED BY:	M. NIFONG	DATE :	AUG 2023
DRAWN BY:	R. JOHNSON	DATE :	AUG 2023
CHECKED BY:	B. LOFLIN	DATE :	AUG 2023
DESIGN ENGINEER OF RECORD:	B. LOFLIN	DATE :	SEP 2023

9/11/2023
401.041.15BPR.102.SMU.SS14.21.dgn

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.

ENGLISH

JANUARY, 1990

REV. 6-16-95 EEM (c) RGW REV. 5-7-03 RWW (c) JTE REV. 10-1-11 MAA (c) GM
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM REV. 12-17 MAA (c) THC
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