

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.09	--	1.75	0.87	1.25	A	EL	58.48	1.11	1.27	A	I	33.25	0.80	0.87	1.09	A	EL	58.48		
	HL-93 (OPERATING)	N/A		1.62	--	1.35	0.87	1.62	A	EL	58.48	1.11	1.68	A	I	33.25	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.57	56.520	1.75	0.87	1.79	A	EL	58.48	1.11	1.68	A	I	33.25	0.80	0.87	1.57	A	EL	58.48		
	HS-20 (OPERATING)	36.000		2.22	79.920	1.35	0.87	2.31	A	EL	58.48	1.11	2.22	A	I	33.25	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.78	51.030	1.40	0.87	5.4	A	EL	58.48	1.11	5.41	A	I	33.25	0.80	0.87	3.78	A	EL	58.48	
		SNGARBS2	20.000		2.71	54.200	1.40	0.87	3.87	A	EL	58.48	1.11	3.77	A	I	33.25	0.80	0.87	2.71	A	EL	58.48	
		SNAGRIS2	22.000		2.52	55.440	1.40	0.87	3.6	A	EL	58.48	1.11	3.47	A	I	33.25	0.80	0.87	2.52	A	EL	58.48	
		SNCOTTS3	27.250		1.87	50.958	1.40	0.87	2.67	A	EL	58.48	1.11	2.62	A	I	33.25	0.80	0.87	1.87	A	EL	58.48	
		SNAGGRS4	34.925		1.52	53.086	1.40	0.87	2.18	A	EL	58.48	1.11	2.13	A	I	33.25	0.80	0.87	1.52	A	EL	58.48	
		SNS5A	35.550		1.49	52.970	1.40	0.87	2.13	A	EL	58.48	1.11	2.14	A	I	33.25	0.80	0.87	1.49	A	EL	58.48	
		SNS6A	39.950		1.35	53.933	1.40	0.87	1.94	A	EL	58.48	1.11	1.93	A	I	33.25	0.80	0.87	1.35	A	EL	58.48	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.65	54.450	1.40	0.87	2.36	A	EL	58.48	1.11	2.34	A	I	33.25	0.80	0.87	1.65	A	EL	58.48	
		TNT4A	33.075		1.65	54.574	1.40	0.87	2.36	A	EL	58.48	1.11	2.28	A	I	33.25	0.80	0.87	1.65	A	EL	58.48	
		TNT6A	41.600		1.33	55.328	1.40	0.87	1.91	A	EL	58.48	1.11	1.99	A	I	33.25	0.80	0.87	1.33	A	EL	58.48	
		TNT7A	42.000		1.33	55.860	1.40	0.87	1.91	A	EL	58.48	1.11	1.96	A	I	33.25	0.80	0.87	1.33	A	EL	58.48	
		TNT7B	42.000		1.36	57.120	1.40	0.87	1.94	A	EL	58.48	1.11	1.85	A	I	33.25	0.80	0.87	1.36	A	EL	58.48	
		TNAGRIT4	43.000		1.31	56.330	1.40	0.87	1.87	A	EL	58.48	1.11	1.78	A	I	33.25	0.80	0.87	1.31	A	EL	58.48	
		TNAGT5A	45.000		1.24	55.800	1.40	0.87	1.77	A	EL	58.48	1.11	1.76	A	I	33.25	0.80	0.87	1.24	A	EL	58.48	
TNAGT5B	45.000	③	1.23	55.350	1.40	0.87	1.76	A	EL	58.48	1.11	1.69	A	I	33.25	0.80	0.87	1.23	A	EL	58.48			

NOTES:
 MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
 ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:
 1. TRANSFORMING ALL PRESTRESSING TENDONS.
 2. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE.
 3. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
 4. GIRDERS LOAD RATED AS SIMPLE SPAN.
 5. FACTORED SHEAR AND MOMENT CAPACITIES PROVIDED FOR STRENGTH I LIMIT STATE. SECTION PROPERTIES PROVIDED FOR SERVICE III LIMIT STATE.

③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
EXTERIOR GIRDER (EL) SPAN A	ΦV_n (KIPS)	476	438	419	289	244	249	244	289	419	438	476
	ΦM_n (KIP-FT)	----	12118	13139	13687	13852	13852	13852	13687	13139	12118	----
INTERIOR GIRDER (I) SPAN A	ΦV_n (KIPS)	477	712	426	327	274	282	274	327	426	712	477
	ΦM_n (KIP-FT)	----	12303	13308	13949	14223	14240	14223	13949	13308	12303	----

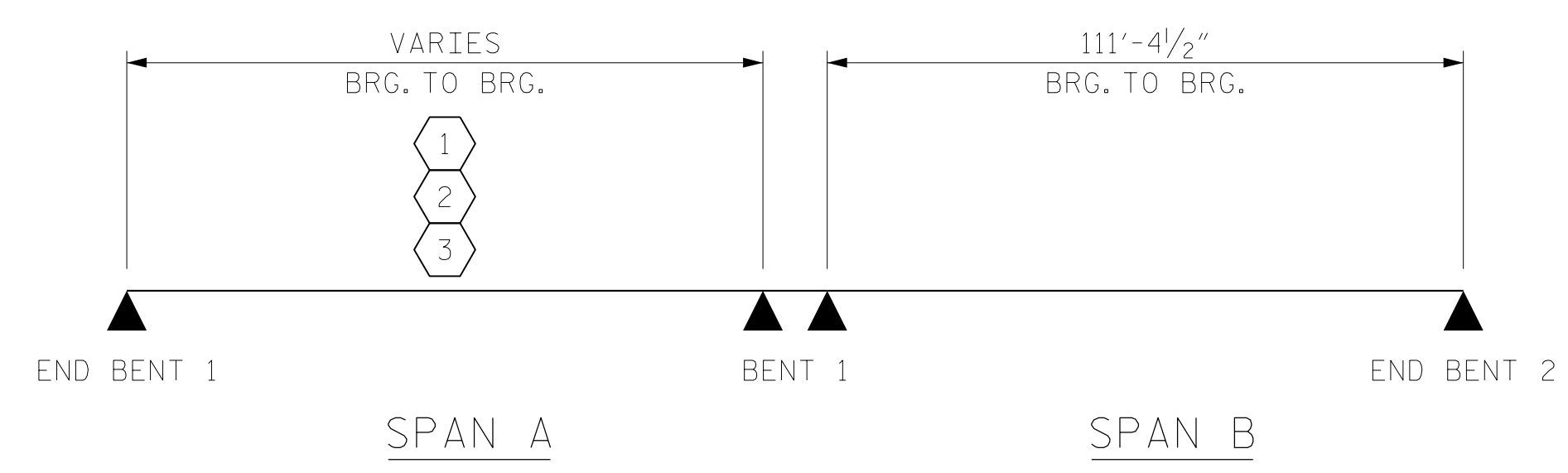
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	54.00	62.50
AREA	IN ²	932.60	1680.70
I _{xx}	IN ⁴	359,929	880,201
Y _{cg}	IN	24.05	37.59
SELF WT.	PLF	971.40	1941.00
EFF. WIDTH	IN	---	109.50

SECTION PROPERTIES PROVIDED AT MIDSPAN

PROJECT NO. U-5798A
CUMBERLAND COUNTY
 STATION: 76+80.00 -L-

	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	54.00	62.50
AREA	IN ²	932.60	1829.20
I _{xx}	IN ⁴	359,929	939,364
Y _{cg}	IN	24.05	39.26
SELF WT.	PLF	971.40	2149.00
EFF. WIDTH	IN	---	133.00

SECTION PROPERTIES PROVIDED AT MIDSPAN



LRFR SUMMARY

DRAWN BY : MRA DATE : 03/2020
 CHECKED BY : MKO DATE : 04/2021
 DESIGN ENGINEER OF RECORD: RLB DATE : 09/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S2-4	
SUPERSTRUCTURE LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC) RIGHT LANE						TOTAL SHEETS 43	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				