

LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (γ _{LL})	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.22	--	1.75	2.46	1	TOP SLAB	7.33	1.22	1	TOP SLAB	7.33		
	HL-93 (OPERATING)	N/A		1.58	--	1.35	3.19	1	TOP SLAB	7.33	1.58	1	TOP SLAB	7.33		
	HS-20 (INVENTORY)	36.000	②	1.22	43.92	1.75	2.46	1	TOP SLAB	7.33	1.22	1	TOP SLAB	7.33		
	HS-20 (OPERATING)	36.000		1.58	56.88	1.35	3.19	1	TOP SLAB	7.33	1.58	1	TOP SLAB	7.33		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.02	27.27	1.40	6.27	1	EXT. WALL	8.54'	2.02	1	EXT. WALL	0.54'	
		SNGARBS2	20,000		2.09	41.80	1.40	4.73	1	TOP SLAB	7.33	2.09	1	EXT. WALL	0.54'	
		SNAGRIS2	22,000		2.11	46.42	1.40	4.48	1	TOP SLAB	7.33	2.11	1	EXT. WALL	0.54'	
		SNCOTTS3	27,250		1.93	52.59	1.40	3.43	1	TOP SLAB	7.33	1.93	1	TOP SLAB	7.33	
		SNAGGRS4	34,925		1.56	54.48	1.40	2.92	1	TOP SLAB	7.33	1.56	1	TOP SLAB	7.33	
		SNS5A	35,550		1.62	57.59	1.40	2.96	1	TOP SLAB	7.33	1.62	1	TOP SLAB	7.33	
		SNS6A	39,950		1.50	59.93	1.40	2.72	1	TOP SLAB	7.33	1.50	1	TOP SLAB	7.33	
	SNS7B	42,000		1.46	61.32	1.40	2.64	1	TOP SLAB	7.33	1.46	1	TOP SLAB	7.33		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.79	59.07	1.40	3.23	1	TOP SLAB	7.33	1.79	1	TOP SLAB	7.33	
		TNT4A	33,075		1.80	59.54	1.40	3.23	1	TOP SLAB	7.33	1.80	1	TOP SLAB	7.33	
		TNT6A	41,600		1.47	61.15	1.40	2.75	1	TOP SLAB	7.33	1.47	1	TOP SLAB	7.33	
		TNT7A	42,000		1.46	61.32	1.40	2.75	1	TOP SLAB	7.33	1.46	1	TOP SLAB	7.33	
		TNT7B	42,000		1.53	64.26	1.40	2.86	1	TOP SLAB	7.33	1.53	1	TOP SLAB	7.33	
		TNAGRIT4	43,000		1.43	61.49	1.40	2.58	1	TOP SLAB	7.33	1.43	1	TOP SLAB	7.33	
TNAGT5A		45,000		1.60	72.00	1.40	2.76	1	TOP SLAB	7.33	1.60	1	TOP SLAB	7.33		
TNAGT5B	45,000		③	1.34	60.30	1.40	2.42	1	TOP SLAB	7.33	1.34	1	TOP SLAB	7.33		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

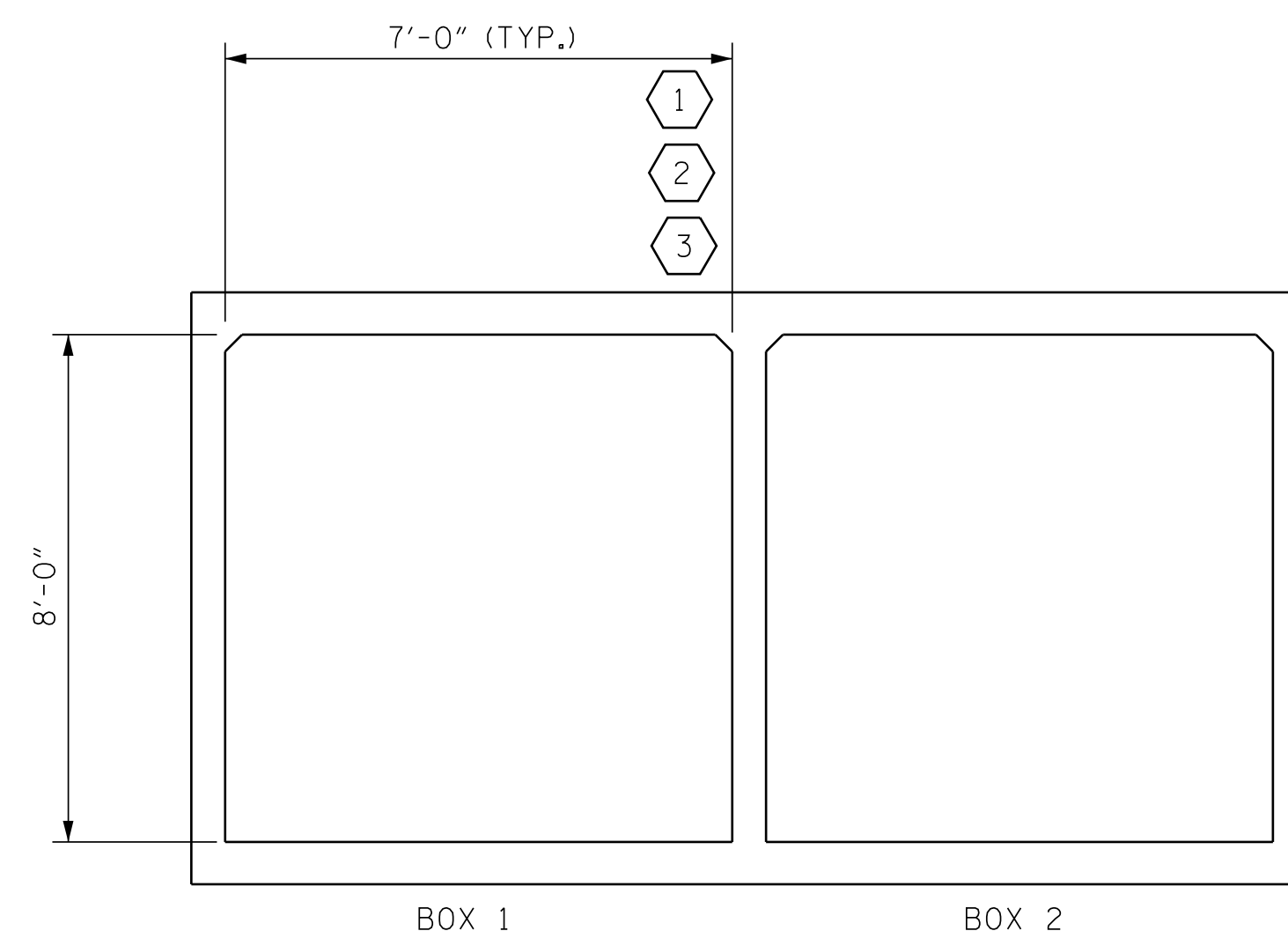
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

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



LRFR SUMMARY
(LOOKING DOWNSTREAM)



DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 41+20.00 -L-

SHEET 9 OF 9

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

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

STD. NO. LRFR5

ASSEMBLED BY : WDC	DATE : 10-2017
CHECKED BY : RTS	DATE : 11-2017
DRAWN BY : WMC 7/11	REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11	REV. 12/17 MAA/THC