

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	
						LIVE-LOAD FACTORS (%L)	MOMENT				SHEAR				
							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	2.38	--	1.75	2.38	1	EXTERIOR WALL	0.37	9.53	1	TOP SLAB	0.99	
	HL-93 (OPERATING)	N/A		3.09	--	1.35	3.09	1	EXTERIOR WALL	0.37	12.36	1	TOP SLAB	0.99	
	HS-20 (INVENTORY)	36,000	②	2.38	85.7	1.75	2.38	1	EXTERIOR WALL	0.37	9.53	1	TOP SLAB	0.99	
	HS-20 (OPERATING)	36,000		3.09	111.2	1.35	3.09	1	EXTERIOR WALL	0.37	12.36	1	TOP SLAB	0.99	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		4.49	60.6	1.40	4.49	1	EXTERIOR WALL	0.37	18.03	1	BOT. SLAB	0.75
		SNGARBS2	20,000		4.20	84.0	1.40	4.20	1	EXTERIOR WALL	0.37	16.88	1	BOT. SLAB	0.75
		SNAGRIS2	22,000		4.49	98.8	1.40	4.49	1	EXTERIOR WALL	0.37	18.03	1	BOT. SLAB	0.75
		SNCOTTS3	27,250		1.98	54.0	1.40	1.98	1	EXTERIOR WALL	0.37	7.97	1	TOP SLAB	0.99
		SNAGGRS4	34,925		2.03	70.9	1.40	2.03	1	EXTERIOR WALL	0.37	7.82	1	TOP SLAB	0.99
		SNS5A	35,550	③	1.96	69.7	1.40	1.96	1	EXTERIOR WALL	0.37	7.83	1	TOP SLAB	0.99
		SNS6A	39,950		1.96	78.3	1.40	1.96	1	EXTERIOR WALL	0.37	7.83	1	TOP SLAB	0.99
		SNS7B	42,000		1.96	82.3	1.40	1.96	1	EXTERIOR WALL	0.37	7.83	1	TOP SLAB	0.99
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.91	96.0	1.40	2.91	1	EXTERIOR WALL	0.37	10.78	1	TOP SLAB	0.99
		TNT4A	33,075		2.36	78.1	1.40	2.36	1	EXTERIOR WALL	0.37	9.50	1	TOP SLAB	0.99
		TNT6A	41,600		2.10	87.4	1.40	2.10	1	EXTERIOR WALL	0.37	8.25	1	TOP SLAB	0.99
		TNT7A	42,000		2.23	93.7	1.40	2.23	1	EXTERIOR WALL	0.37	8.82	1	TOP SLAB	0.99
		TNT7B	42,000		2.08	87.4	1.40	2.08	1	EXTERIOR WALL	0.37	8.15	1	TOP SLAB	0.99
		TNAGRIT4	43,000		2.36	101.5	1.40	2.36	1	EXTERIOR WALL	0.37	9.50	1	TOP SLAB	0.99
TNAGR5A	45,000		2.35	105.8	1.40	2.35	1	EXTERIOR WALL	0.37	9.46	1	TOP SLAB	0.99		
TNAGR5B	45,000		2.35	105.8	1.40	2.35	1	EXTERIOR WALL	0.37	9.46	1	TOP SLAB	0.99		

LOAD FACTORS:

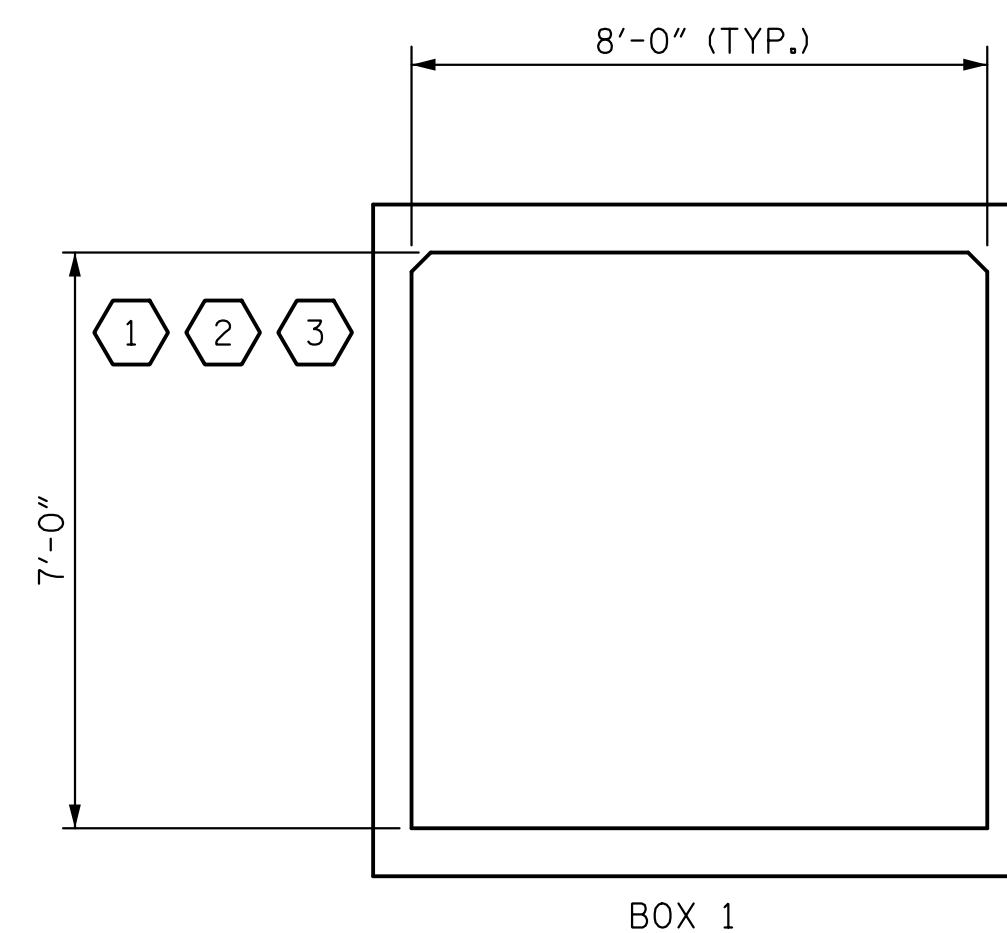
DESIGN LOAD RATING FACTORS

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.

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



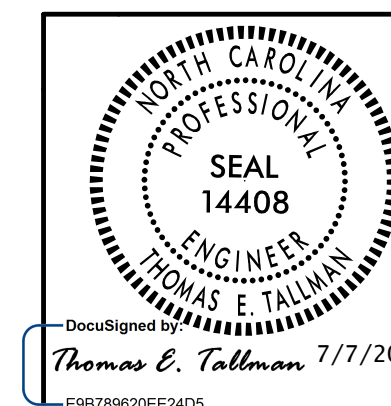
PROJECT NO. W-5516

ROWAN COUNTY

STATION: 108+21.00 -L-

SHEET 8 OF 8

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-13
1			3			TOTAL SHEETS 13
2			4			

STD. NO. LRFR5

5/28/2015 R:\Structures\Plans\UT\_Cold\_Water\_Creek\C8\_w5516\_sd.lrfd.dgn ICA Engineering

ASSEMBLED BY : D. H. CARTER DATE : MAY 2015  
CHECKED BY : T. E. TALLMAN DATE : MAY 2015  
DRAWN BY : WMC 7/11  
CHECKED BY : GM 7/11

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