

## 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 <sub>LL</sub> )	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	3.74	--	1.75	4.50	1	TOP SLAB	3.67	3.74	1	EXTERIOR WALL	0.33		
	HL-93 (OPERATING)	N/A		4.85	--	1.35	5.83	1	TOP SLAB	3.67	4.85	1	EXTERIOR WALL	0.33		
	HS-20 (INVENTORY)	36.000	②	3.78	136.08	1.75	6.27	1	TOP SLAB	3.67	3.78	1	EXTERIOR WALL	0.33		
	HS-20 (OPERATING)	36.000		4.90	176.40	1.35	8.12	1	TOP SLAB	3.67	4.90	1	EXTERIOR WALL	0.33		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13,500		4.83	65.21	1.40	10.78	1	EXTERIOR WALL	0.33	4.83	1	EXTERIOR WALL	0.33	
		SNGARBS2	20,000		4.79	95.80	1.40	9.68	1	EXTERIOR WALL	0.33	4.79	1	EXTERIOR WALL	0.33	
		SNAGRIS2	22,000		4.78	105.16	1.40	9.39	1	EXTERIOR WALL	0.33	4.78	1	EXTERIOR WALL	0.33	
		SNCOTTS3	27,250		4.70	128.08	1.40	6.81	1	TOP SLAB	3.67	4.70	1	EXTERIOR WALL	0.33	
		SNAGGRS4	34,925		4.66	162.75	1.40	4.97	1	TOP SLAB	3.67	4.66	1	EXTERIOR WALL	0.33	
		SNS5A	35,550		4.66	165.66	1.40	5.14	1	TOP SLAB	3.67	4.66	1	EXTERIOR WALL	0.33	
		SNS6A	39,950		4.65	185.77	1.40	4.90	1	TOP SLAB	3.67	4.65	1	EXTERIOR WALL	0.33	
	SNS7B	42,000		4.66	195.72	1.40	4.92	1	TOP SLAB	3.67	4.66	1	EXTERIOR WALL	0.33		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		4.69	154.77	1.40	5.97	1	TOP SLAB	3.67	4.69	1	EXTERIOR WALL	0.33	
		TNT4A	33,075		4.69	155.12	1.40	6.01	1	TOP SLAB	3.67	4.69	1	EXTERIOR WALL	0.33	
		TNT6A	41,600		4.63	192.61	1.40	4.69	1	TOP SLAB	3.67	4.63	1	BOTTOM SLAB	0.33	
		TNT7A	42,000		4.57	191.94	1.40	4.59	1	TOP SLAB	3.67	4.57	1	BOTTOM SLAB	0.33	
		TNT7B	42,000		4.63	194.46	1.40	4.71	1	TOP SLAB	3.67	4.63	1	EXTERIOR WALL	0.67	
		TNAGRIT4	43,000		4.64	199.52	1.40	4.74	1	TOP SLAB	3.67	4.64	1	EXTERIOR WALL	0.67	
TNAGT5A		45,000		4.55	204.75	1.40	4.55	1	TOP SLAB	3.67	4.63	1	EXTERIOR WALL	0.33		
TNAGT5B	45,000		③	4.29	193.05	1.40	4.39	1	TOP SLAB	3.67	4.29	1	BOTTOM SLAB	0.67		

**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	--

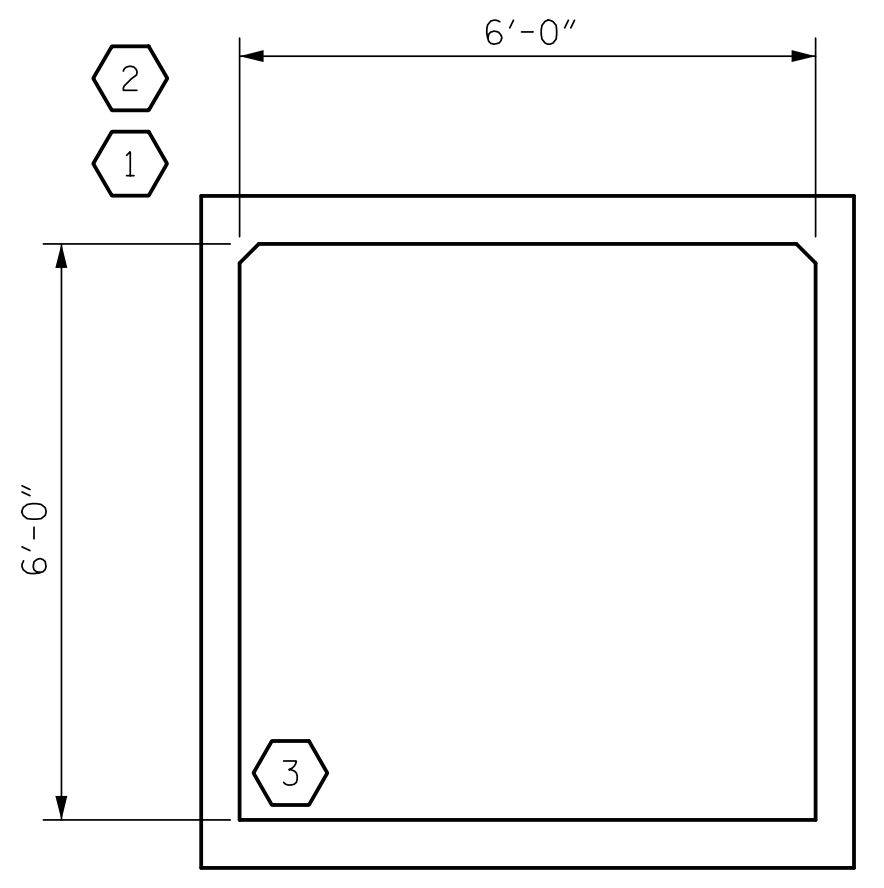
**NOTE:**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS:**

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

#	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)

PROJECT NO. A-0009CC  
GRAHAM COUNTY  
 STATION: 66+85.00 -Y2-

SHEET 2 OF 7

	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH																			
	STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)																			
	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED																			
TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275		REVISIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table>	NO.	BY:	DATE:	NO.	BY:	DATE:	1			3			2			4		
NO.	BY:	DATE:	NO.	BY:	DATE:															
1			3																	
2			4																	
ASSEMBLED BY : ZCS DATE : 05/21 CHECKED BY : MGC DATE : 09/21 DRAWN BY : WMC 7/11 REV. 10/1/11 MAA/GM CHECKED BY : GM 7/11 REV. 12/17 MAA/THC		SHEET NO. C1-2 TOTAL SHEETS 7																		