

**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	1.05	--	1.75	1.06	1	TOP SLAB	6.67	1.05	1	TOP SLAB	0.33		
	HL-93 (OPERATING)	N/A		1.36	--	1.35	1.37	1	TOP SLAB	6.67	1.36	1	TOP SLAB	0.33		
	HS-20 (INVENTORY)	36.000	②	1.09	39.24	1.75	1.10	1	TOP SLAB	6.67	1.09	1	TOP SLAB	0.33		
	HS-20 (OPERATING)	36.000		1.42	51.12	1.35	1.43	1	TOP SLAB	6.67	1.42	1	TOP SLAB	0.33		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		2.29	30.92	1.40	2.29	1	TOP SLAB	6.67	2.84	1	TOP SLAB	0.33		
		SNGARBS2	20.000		2.14	42.80	1.40	2.14	1	TOP SLAB	6.67	2.59	1	TOP SLAB	0.33	
		SNAGRIS2	22.000		2.29	50.38	1.40	2.29	1	TOP SLAB	6.67	2.84	1	TOP SLAB	0.33	
		SNCOTTS3	27.250		1.31	35.70	1.40	1.32	1	TOP SLAB	6.67	1.31	1	TOP SLAB	0.33	
		SNAGGRS4	34.925	③	1.27	44.35	1.40	1.27	1	BOTT. SLAB	6.67	1.39	1	BOTT. SLAB	0.33	
		SNS5A	35.550		1.31	46.57	1.40	1.31	1	BOTT. SLAB	6.67	1.45	1	BOTT. SLAB	0.33	
		SNS6A	39.950		1.30	51.94	1.40	1.30	1	BOTT. SLAB	6.67	1.42	1	BOTT. SLAB	0.33	
	SNS7B	42.000		1.30	54.60	1.40	1.30	1	BOTT. SLAB	6.67	1.42	1	BOTT. SLAB	0.33		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.62	53.46	1.40	1.62	1	BOTT. SLAB	6.67	1.80	1	BOTT. SLAB	0.33	
		TNT4A	33.075		1.57	51.93	1.40	1.57	1	TOP SLAB	6.67	1.58	1	TOP SLAB	0.33	
		TNT6A	41.600		1.36	56.58	1.40	1.36	1	BOTT. SLAB	6.67	1.47	1	TOP SLAB	0.33	
		TNT7A	42.000		1.47	61.74	1.40	1.47	1	BOTT. SLAB	6.67	1.52	1	TOP SLAB	0.33	
		TNT7B	42.000		1.32	55.44	1.40	1.32	1	BOTT. SLAB	6.67	1.43	1	BOTT. SLAB	0.33	
		TNAGRIT4	43.000		1.57	67.51	1.40	1.57	1	TOP SLAB	6.67	1.58	1	TOP SLAB	0.33	
TNAGT5A		45.000		1.57	70.65	1.40	1.57	1	TOP SLAB	6.67	1.58	1	TOP SLAB	0.33		
TNAGT5B	45.000		1.57	70.65	1.40	1.57	1	TOP SLAB	6.67	1.58	1	TOP SLAB	0.33			
EMERGENCY VEHICLE (EV)	EV2	28.750		1.61	46.29	1.30	1.61	1	TOP SLAB	6.67	1.75	1	TOP SLAB	0.33		
	EV3	43.000	④	1.14	49.45	1.30	1.15	1	TOP SLAB	6.67	1.14	1	TOP SLAB	0.33		

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	--

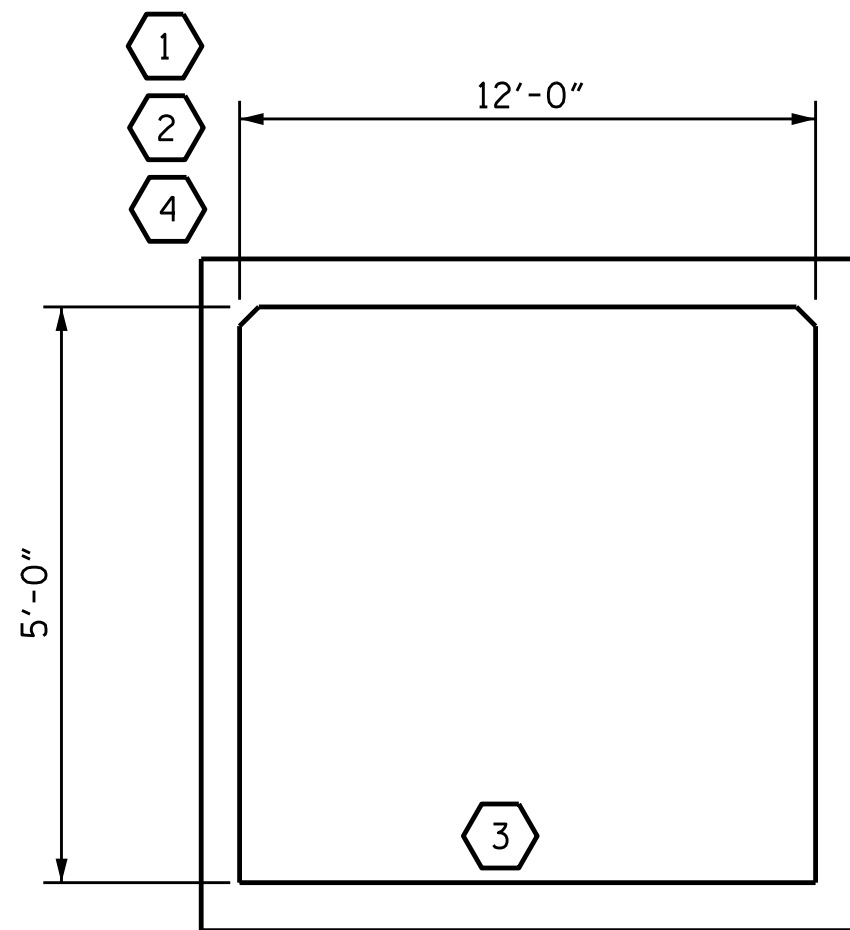
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

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#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
④	EMERGENCY VEHICLE RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. A-0009CD
GRAHAM COUNTY
 STATION: 99+82.00 -Y2-

SHEET 2 OF 6

	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 201 W. MARION ST STE 200 SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	REVISIONS <table border="1"> <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			SHEET NO. C1-2 TOTAL SHEETS 6
NO.	BY:	DATE:	NO.	BY:	DATE:															
1			3																	
2			4																	

ASSEMBLED BY : ZCS	DATE : 06/21
CHECKED BY : MGC	DATE : 10/21
DRAWN BY : WMC 7/11	REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11	REV. 12/17 MAA/THC