

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	1.12	--	1.75	1.12	1	TOP SLAB	3.00	1.28	1	TOP SLAB	5.67		
	HL-93 (OPERATING)	N/A		1.45	--	1.35	1.45	1	TOP SLAB	3.00	1.66	1	TOP SLAB	5.67		
	HS-20 (INVENTORY)	36.000	②	1.02	36.72	1.75	1.02	1	TOP SLAB	3.00	1.18	1	TOP SLAB	5.67		
	HS-20 (OPERATING)	36.000		1.33	47.88	1.35	1.33	1	TOP SLAB	3.00	1.52	1	TOP SLAB	5.67		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.05	27.68	1.40	2.05	1	TOP SLAB	3.00	2.69	1	TOP SLAB	5.67	
		SNGARBS2	20.000		1.92	38.40	1.40	1.92	1	TOP SLAB	3.00	2.46	1	TOP SLAB	5.67	
		SNAGRIS2	22.000		2.05	45.10	1.40	2.05	1	TOP SLAB	3.00	2.69	1	TOP SLAB	5.67	
		SNCOTTS3	27.250		1.62	44.15	1.40	1.62	1	BOTTOM SLAB	6.00	1.63	1	BOTTOM SLAB	6.00	
		SNAGGRS4	34.925		1.53	53.44	1.40	1.59	1	BOTTOM SLAB	6.00	1.53	1	BOTTOM SLAB	6.00	
		SNS5A	35.550		1.53	54.39	1.40	1.59	1	BOTTOM SLAB	6.00	1.53	1	BOTTOM SLAB	6.00	
		SNS6A	39.950		1.52	60.72	1.40	1.55	1	BOTTOM SLAB	6.00	1.52	1	BOTTOM SLAB	6.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.86	61.38	1.40	1.93	1	BOTTOM SLAB	6.00	1.86	1	BOTTOM SLAB	6.00	
		TNT4A	33.075		1.88	62.18	1.40	1.88	1	BOTTOM SLAB	6.00	1.89	1	BOTTOM SLAB	6.00	
		TNT6A	41.600		1.64	68.22	1.40	1.66	1	BOTTOM SLAB	6.00	1.64	1	BOTTOM SLAB	6.00	
		TNT7A	42.000		1.78	74.76	1.40	1.79	1	BOTTOM SLAB	6.00	1.78	1	BOTTOM SLAB	6.00	
		TNT7B	42.000	③	1.52	63.84	1.40	1.56	1	BOTTOM SLAB	6.00	1.52	1	BOTTOM SLAB	6.00	
		TNAGRIT4	43.000		1.81	77.83	1.40	1.84	1	BOTTOM SLAB	6.00	1.81	1	BOTTOM SLAB	6.00	
		TNAGT5A	45.000		1.81	81.45	1.40	1.84	1	BOTTOM SLAB	6.00	1.81	1	BOTTOM SLAB	6.00	
TNAGT5B	45.000		1.84	82.80	1.40	1.84	1	BOTTOM SLAB	6.00	1.85	1	BOTTOM SLAB	6.00			
EMERGENCY VEHICLE (EV)	EV2	28.750		1.45	41.69	1.30	1.45	1	TOP SLAB	3.00	1.67	1	TOP SLAB	5.67		
	EV3	43.000	④	1.41	60.63	1.30	1.41	1	BOTTOM SLAB	6.00	1.42	1	BOTTOM SLAB	6.00		

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

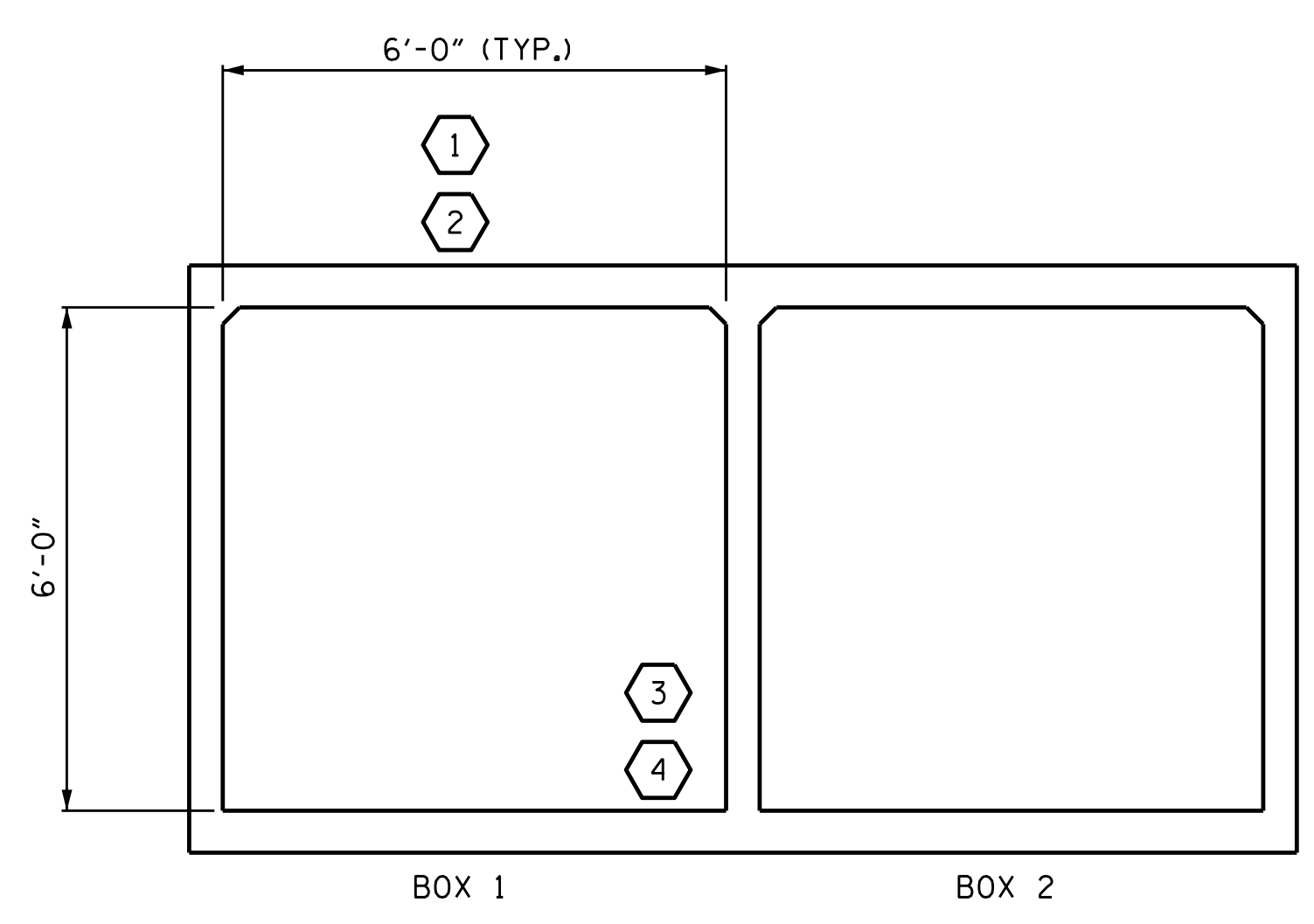
① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

④ EMERGENCY VEHICLE RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. A-0009CD
GRAHAM COUNTY
 STATION: 10+67.00 -Y3A-

SHEET 2 OF 7

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

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:	C2-2
1			3			TOTAL SHEETS
2			4			7

ASSEMBLED BY : STM	DATE : 01/22
CHECKED BY : MGC	DATE : 01/22
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC