

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	1.14	--	1.75	1.14	1	EXTERIOR WALL	0.42	1.79	1	BOTTOM SLAB	0.33		
	HL-93 (OPERATING)	N/A		1.48	--	1.35	1.48	1	EXTERIOR WALL	0.42	2.32	1	BOTTOM SLAB	0.33		
	HS-20 (INVENTORY)	36.000	②	1.18	42.48	1.75	1.18	1	EXTERIOR WALL	0.42	1.86	1	BOTTOM SLAB	0.33		
	HS-20 (OPERATING)	36.000		1.53	55.08	1.35	1.53	1	EXTERIOR WALL	0.42	2.41	1	BOTTOM SLAB	0.33		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.63	35.51	1.40	2.63	1	EXTERIOR WALL	0.42	4.73	1	TOP SLAB	0.33	
		SNGARBS2	20.000		2.38	47.60	1.40	2.38	1	EXTERIOR WALL	0.42	4.02	1	BOTTOM SLAB	0.33	
		SNAGRIS2	22.000		2.43	53.46	1.40	2.43	1	EXTERIOR WALL	0.42	4.05	1	BOTTOM SLAB	0.33	
		SNCOTTS3	27.250		1.42	38.70	1.40	1.42	1	EXTERIOR WALL	0.42	2.20	1	BOTTOM SLAB	0.33	
		SNAGGRS4	34.925		1.42	49.59	1.40	1.42	1	EXTERIOR WALL	0.42	2.10	1	BOTTOM SLAB	15.67	
		SNS5A	35.550		1.48	52.61	1.40	1.48	1	EXTERIOR WALL	0.42	2.27	1	BOTTOM SLAB	0.33	
		SNS6A	39.950		1.30	51.94	1.40	1.30	1	EXTERIOR WALL	0.42	1.94	1	BOTTOM SLAB	0.33	
		SNS7B	42.000	③	1.25	52.50	1.40	1.25	1	EXTERIOR WALL	0.42	1.86	1	BOTTOM SLAB	0.33	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.74	57.42	1.40	1.74	1	EXTERIOR WALL	0.42	2.72	1	BOTTOM SLAB	15.67	
		TNT4A	33.075		1.56	51.60	1.40	1.56	1	EXTERIOR WALL	0.42	2.40	1	BOTTOM SLAB	0.33	
		TNT6A	41.600		1.38	57.41	1.40	1.38	1	EXTERIOR WALL	0.42	2.05	1	BOTTOM SLAB	15.67	
		TNT7A	42.000		1.50	63.00	1.40	1.50	1	EXTERIOR WALL	0.42	2.29	1	BOTTOM SLAB	15.67	
		TNT7B	42.000		1.40	58.80	1.40	1.40	1	EXTERIOR WALL	0.42	2.16	1	BOTTOM SLAB	0.33	
		TNAGRIT4	43.000		1.47	63.21	1.40	1.47	1	EXTERIOR WALL	0.42	2.22	1	BOTTOM SLAB	0.33	
TNAGT5A	45.000		1.43	64.35	1.40	1.43	1	EXTERIOR WALL	0.42	2.09	1	BOTTOM SLAB	0.33			
TNAGT5B	45.000		1.39	62.55	1.40	1.39	1	EXTERIOR WALL	0.42	2.07	1	BOTTOM 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:

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

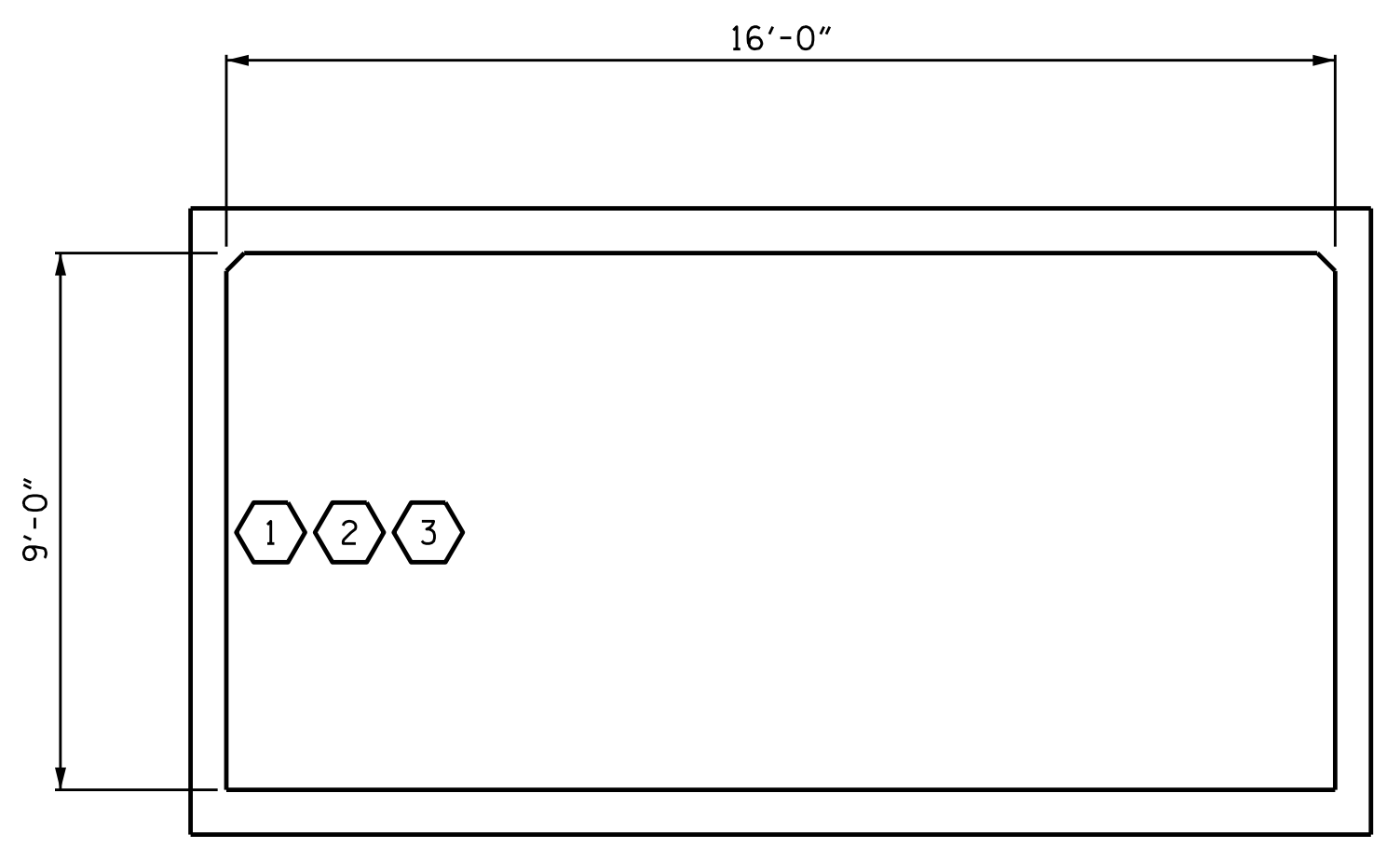
CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

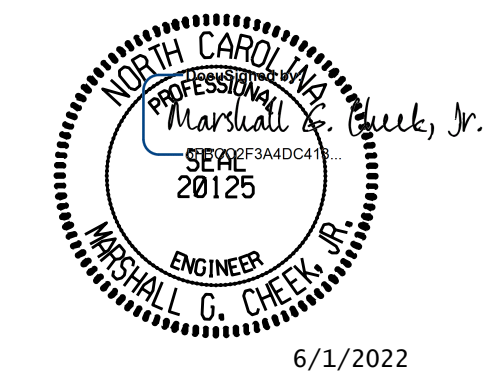
** SEE CHART FOR VEHICLE TYPE



BOX 1
LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. A-0009CA
GRAHAM COUNTY
 STATION: 10+59.00 -DR1A-

SHEET 2 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERT**

ASSEMBLED BY : STM	DATE : 02/22
CHECKED BY : MGC	DATE : 03/22
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC

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						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C7-2
2			4			TOTAL SHEETS 8