

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 (γ _{LL})	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	2.03	--	1.75	2.03	1	BOTTOM SLAB	3.92	5.95	1	EXTERIOR WALL	0.42		
	HL-93 (OPERATING)	N/A		2.63	--	1.35	2.63	1	BOTTOM SLAB	3.92	7.71	1	EXTERIOR WALL	0.42		
	HS-20 (INVENTORY)	36.000	②	2.11	387.61	1.75	2.11	1	BOTTOM SLAB	3.92	5.98	1	EXTERIOR WALL	0.42		
	HS-20 (OPERATING)	36.000		2.74	502.46	1.35	2.74	1	BOTTOM SLAB	3.92	7.75	1	EXTERIOR WALL	0.42		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.29	181.69	1.40	3.29	1	BOTTOM SLAB	3.92	7.50	1	EXTERIOR WALL	0.42	
		SNGARBS2	20.000		3.13	269.18	1.40	3.13	1	BOTTOM SLAB	3.92	7.47	1	EXTERIOR WALL	0.42	
		SNAGRIS2	22.000		3.29	296.09	1.40	3.29	1	BOTTOM SLAB	3.92	7.47	1	EXTERIOR WALL	0.42	
		SNCOTTS3	27.250		2.13	366.75	1.40	2.13	1	BOTTOM SLAB	3.92	7.41	1	BOTTOM SLAB	0.33	
		SNAGGRS4	34.925		1.78	470.05	1.40	1.78	1	BOTTOM SLAB	3.92	6.34	1	BOTTOM SLAB	7.00	
		SNS5A	35.550		1.86	478.46	1.40	1.86	1	BOTTOM SLAB	3.92	6.63	1	BOTTOM SLAB	0.33	
		SNS6A	39.950		1.86	537.68	1.40	1.86	1	BOTTOM SLAB	3.92	6.52	1	BOTTOM SLAB	0.33	
		SNS7B	42.000		1.86	565.27	1.40	1.86	1	BOTTOM SLAB	3.92	6.52	1	BOTTOM SLAB	0.33	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.33	444.14	1.40	2.33	1	BOTTOM SLAB	3.92	7.49	1	EXTERIOR WALL	0.42	
		TNT4A	33.075		2.17	445.15	1.40	2.17	1	BOTTOM SLAB	3.92	7.45	1	EXTERIOR WALL	0.42	
		TNT6A	41.600		1.91	559.89	1.40	1.91	1	BOTTOM SLAB	3.92	6.69	1	EXTERIOR WALL	0.33	
		TNT7A	42.000		2.04	565.27	1.40	2.04	1	BOTTOM SLAB	3.92	7.12	1	EXTERIOR WALL	0.33	
		TNT7B	42.000		1.87	565.27	1.40	1.87	1	BOTTOM SLAB	3.92	6.55	1	EXTERIOR WALL	0.33	
		TNAGRIT4	43.000		1.96	578.73	1.40	1.96	1	BOTTOM SLAB	3.92	7.33	1	BOTTOM SLAB	0.33	
TNAGT5A	45.000		2.01	605.64	1.40	2.01	1	BOTTOM SLAB	3.92	7.45	1	EXTERIOR WALL	0.42			
TNAGT5B	45.000		③	1.83	605.64	1.40	1.83	1	BOTTOM SLAB	3.92	6.95	1	BOTTOM SLAB	0.33		

LOAD FACTORS:

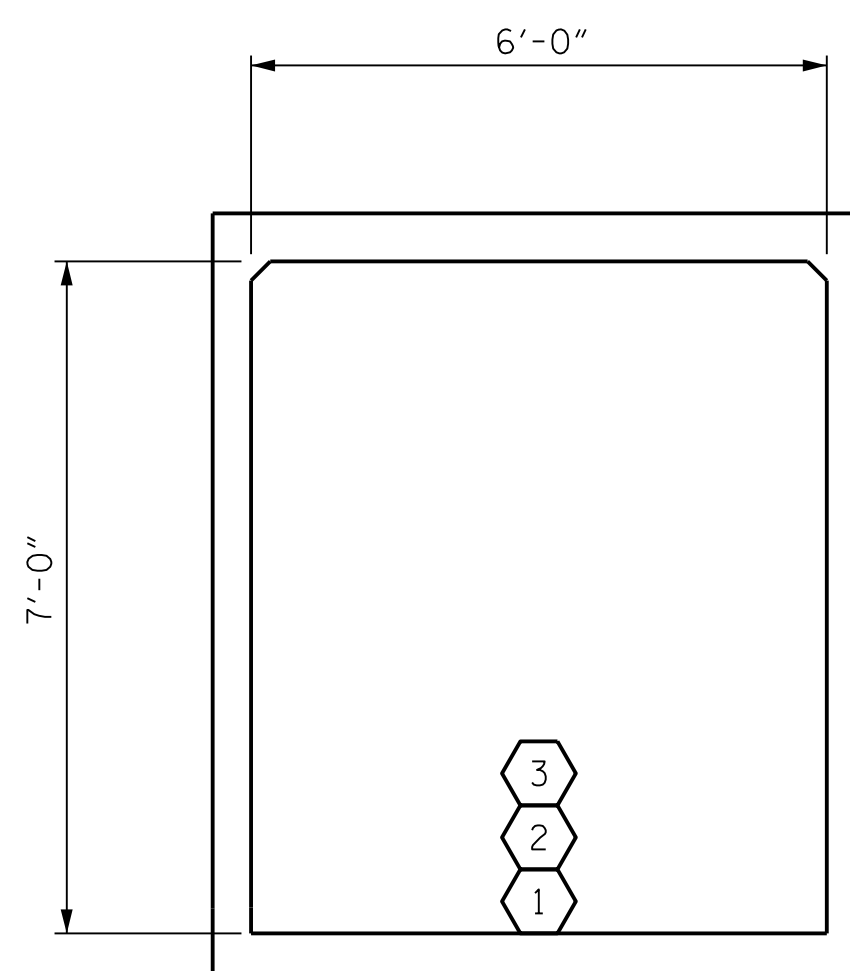
DESIGN LOAD RATING FACTORS

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.

#	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. I-5987B
ROBESON COUNTY
 STATION: 23+47.75-Y6-POC

SHEET 5 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS**
 (NON-INTERSTATE TRAFFIC)

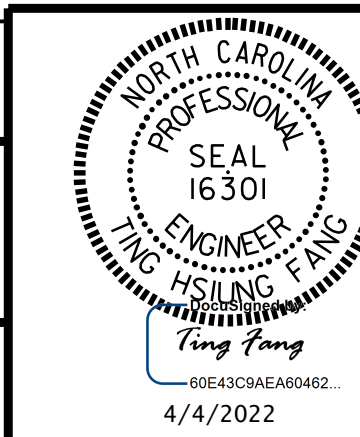
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CDM Smith

CDM SMITH
 5400 Glenwood Ave, Suite 400
 Raleigh, NC 27612-3228
 NC COA No. F-1255

DRAWN BY : JJR DATE : 4/21
 CHECKED BY : THF DATE : 5/21
 DESIGN ENGINEER : VDK DATE : 6/21

DWG. No. _____



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C17-5
1			3			TOTAL SHEETS
2			4			5