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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 × 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	**1.24**	--	1.75	1.54	1	TOP SLAB	8.00	**1.24**	1	TOP SLAB	8.00	
		HL-93 (OPERATING)	N/A		1.60	--	1.35	1.99	1	TOP SLAB	8.00	1.60	1	TOP SLAB	8.00	
		HS-20 (INVENTORY)	36.000	2	**1.65**	59.4	1.75	2.05	1	TOP SLAB	8.00	**1.65**	1	TOP SLAB	8.00	
		HS-20 (OPERATING)	36.000		2.14	77.04	1.35	2.65	1	TOP SLAB	8.00	2.14	1	TOP SLAB	8.00	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500	3	**2.22**	27.75	1.40	2.72	1	TOP SLAB	8.00	**2.22**	1	TOP SLAB	8.00	
		S3C	21.500		2.33	50.01	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S3A	22.750		2.33	53.01	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S4A	26.750		2.33	62.33	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S5A	30.500		2.33	71.07	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S6A	34.500		2.33	80.39	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S7B	38.500		2.33	89.71	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		S7A	40.000		2.33	93.20	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		2.33	65.82	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		T5B	32.000		2.33	74.56	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		T6A	36.000		2.33	83.88	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		T7A	40.000		2.33	93.20	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	
		T7B	40.000		2.33	93.20	1.40	2.85	1	TOP SLAB	8.00	2.33	1	TOP SLAB	8.00	

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.

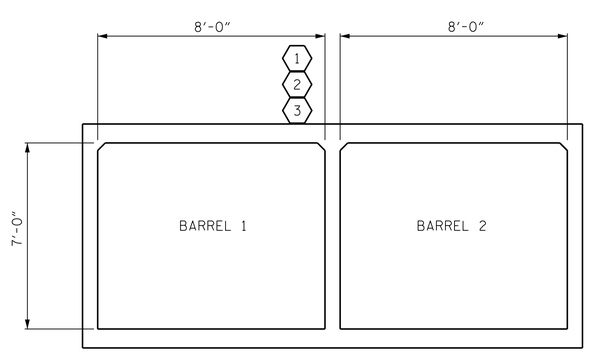
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. I-5987A

ROBESON COUNTY

STATION: 454+90.00 -L-

SHEET 8 OF 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CDM Smith

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

DRAWN BY : JJR DATE : 10/21
CHECKED BY : THF DATE : 11/21
DESIGN ENGINEER : VDK DATE : 12/21

DWG. No.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSILING FANG

Ting Fang
80E43C8AEA60462...
3/17/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C13-8
1			3			TOTAL SHEETS
2			4			8

STD. NO. LRFR5 SITE 13