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 $\gamma_{(LL)}$	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	1.07	--	1.75	**1.07**	1	BOTTOM SLAB	**10.40**	2.96	1	BOTTOM SLAB	9.31	
		HL-93 (OPERATING)	N/A		1.39	--	1.35	1.39	1	BOTTOM SLAB	10.40	3.84	1	BOTTOM SLAB	9.31	
		HS-20 (INVENTORY)	36.000	2	1.15	41.39	1.75	**1.15**	1	BOTTOM SLAB	**10.40**	3.19	1	BOTTOM SLAB	9.31	
		HS-20 (OPERATING)	36.000		1.49	53.65	1.35	1.49	1	BOTTOM SLAB	10.40	4.14	1	BOTTOM SLAB	9.31	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.92	39.45	1.40	2.92	1	BOTTOM SLAB	10.40	4.78	1	EXTERIOR WALL	7.23	
		SNGARBS2	20.000		2.22	44.39	1.40	2.22	1	BOTTOM SLAB	10.40	4.78	1	EXTERIOR WALL	7.23	
		SNAGRIS2	22.000		2.09	45.92	1.40	2.09	1	BOTTOM SLAB	10.40	4.78	1	EXTERIOR WALL	7.23	
		SNCOTTS3	27.250		1.34	36.47	1.40	1.34	1	BOTTOM SLAB	10.40	3.70	1	BOTTOM SLAB	9.31	
		SNAGGRS4	34.925		1.17	40.82	1.40	1.17	1	BOTTOM SLAB	10.40	3.24	1	BOTTOM SLAB	9.31	
		SNS5A	35.550		1.12	39.95	1.40	1.12	1	BOTTOM SLAB	10.40	3.14	1	BOTTOM SLAB	9.31	
		SNS6A	39.950		1.12	44.61	1.40	1.12	1	BOTTOM SLAB	10.40	3.09	1	BOTTOM SLAB	9.31	
		SNS7B	42.000	3	1.03	43.32	1.40	**1.03**	1	BOTTOM SLAB	**10.40**	2.88	1	BOTTOM SLAB	9.31	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.35	44.51	1.40	1.35	1	BOTTOM SLAB	10.40	3.77	1	BOTTOM SLAB	9.31	
		TNT4A	33.075		1.39	46.02	1.40	1.39	1	BOTTOM SLAB	10.40	3.84	1	BOTTOM SLAB	9.31	
		TNT6A	41.600		1.24	51.73	1.40	1.24	1	BOTTOM SLAB	10.40	3.40	1	BOTTOM SLAB	9.31	
		TNT7A	42.000		1.28	53.75	1.40	1.28	1	BOTTOM SLAB	10.40	3.51	1	BOTTOM SLAB	9.31	
		TNT7B	42.000		1.25	52.60	1.40	1.25	1	BOTTOM SLAB	10.40	3.46	1	BOTTOM SLAB	9.31	
		TNAGRIT4	43.000		1.22	52.35	1.40	1.22	1	BOTTOM SLAB	10.40	3.34	1	BOTTOM SLAB	9.31	
		TNAGT5A	45.000		1.13	50.90	1.40	1.13	1	BOTTOM SLAB	10.40	3.14	1	BOTTOM SLAB	9.31	
		TNAGT5B	45.000		1.06	47.82	1.40	1.06	1	BOTTOM SLAB	10.40	2.96	1	BOTTOM SLAB	9.31	

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.

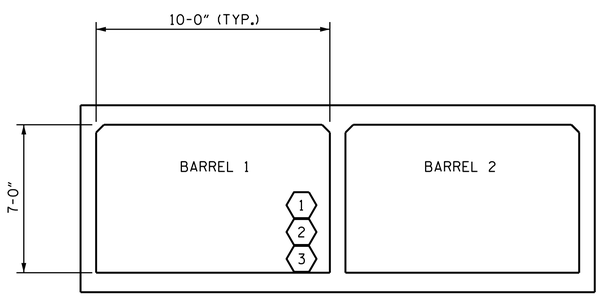
(#) CONTROLLING LOAD RATING

(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. R-0623

MONTGOMERY COUNTY

STATION: 77+04.00 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 25461 ENGINEER EMMANUEL L. OMILE

9/29/2014

DocuSigned by: 658110228E1B425...

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14
1			3			TOTAL SHEETS
2			4			29

ASSEMBLED BY : E. I. OMILE DATE : 3-19-13
CHECKED BY : S. WANCE DATE : 3-19-13

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

REV. 10/1/11 MAA/GM

29-SEP-2014 11:36
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tfang

CULVERT #2

STD. NO. LRFR5