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	1.17	--	1.75	1.17	1	BOTT. CORNER WALL	10.77	1.46	1	TOP SLAB	11.61	
		HL-93 (OPERATING)	N/A		1.52	--	1.35	1.52	1	BOTT. CORNER WALL	10.77	1.90	1	TOP SLAB	11.61	
		HS-20 (INVENTORY)	36.000	2	1.17	42.11	1.75	1.17	1	BOTT. CORNER WALL	10.77	1.80	1	TOP SLAB	11.61	
		HS-20 (OPERATING)	36.000		1.52	54.59	1.35	1.52	1	BOTT. CORNER WALL	10.77	2.33	1	TOP SLAB	11.61	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.81	24.49	1.40	1.81	1	BOTT. CORNER WALL	10.77	3.56	1	TOP SLAB	11.61	
		SNGARBS2	20.000		1.69	33.87	1.40	1.69	1	BOTT. CORNER WALL	10.77	3.16	1	TOP SLAB	11.61	
		SNAGRIS2	22.000		1.65	36.22	1.40	1.65	1	BOTT. CORNER WALL	10.77	3.27	1	TOP SLAB	11.61	
		SNCOTTS3	27.250		1.56	42.50	1.40	1.56	1	BOTT. CORNER WALL	10.77	1.81	1	TOP SLAB	11.61	
		SNAGGRS4	34.925		1.46	50.90	1.40	1.46	1	BOTT. CORNER WALL	10.77	1.95	1	TOP SLAB	11.61	
		SNS5A	35.550		1.47	52.24	1.40	1.47	1	BOTT. CORNER WALL	10.77	1.79	1	TOP SLAB	11.61	
		SNS6A	39.950		1.42	56.82	1.40	1.42	1	BOTT. CORNER WALL	10.77	1.79	1	TOP SLAB	11.61	
		SNS7B	42.000		1.41	59.27	1.40	1.41	1	BOTT. CORNER WALL	10.77	1.71	1	TOP SLAB	11.61	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.49	49.30	1.40	1.49	1	BOTT. CORNER WALL	10.77	2.70	1	TOP SLAB	11.61	
		TNT4A	33.075		1.49	49.42	1.40	1.49	1	BOTT. CORNER WALL	10.77	2.15	1	TOP SLAB	11.61	
		TNT6A	41.600		1.43	59.65	1.40	1.43	1	BOTT. CORNER WALL	10.77	1.82	1	TOP SLAB	11.61	
		TNT7A	42.000		1.41	59.27	1.40	1.41	1	BOTT. CORNER WALL	10.77	1.93	1	TOP SLAB	11.61	
		TNT7B	42.000		1.45	60.71	1.40	1.45	1	BOTT. CORNER WALL	10.77	1.95	1	TOP SLAB	11.61	
		TNAGRIT4	43.000		1.38	59.27	1.40	1.38	1	BOTT. CORNER WALL	10.77	2.05	1	TOP SLAB	11.61	
		TNAGT5A	45.000		1.37	61.54	1.40	1.37	1	BOTT. CORNER WALL	10.77	1.99	1	TOP SLAB	11.61	
		TNAGT5B	45.000	3	1.36	61.08	1.40	1.36	1	BOTT. CORNER WALL	10.77	1.91	1	TOP SLAB	11.61	

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	0.50 OR 0.90
ES	1.35	0.50 OR 0.90
LS	1.75	0.00
WA	1.00	0.00

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. THIS LRFR RATING APPLIES TO THE RIGHT EXTENSION ONLY.
2.
3.
4.

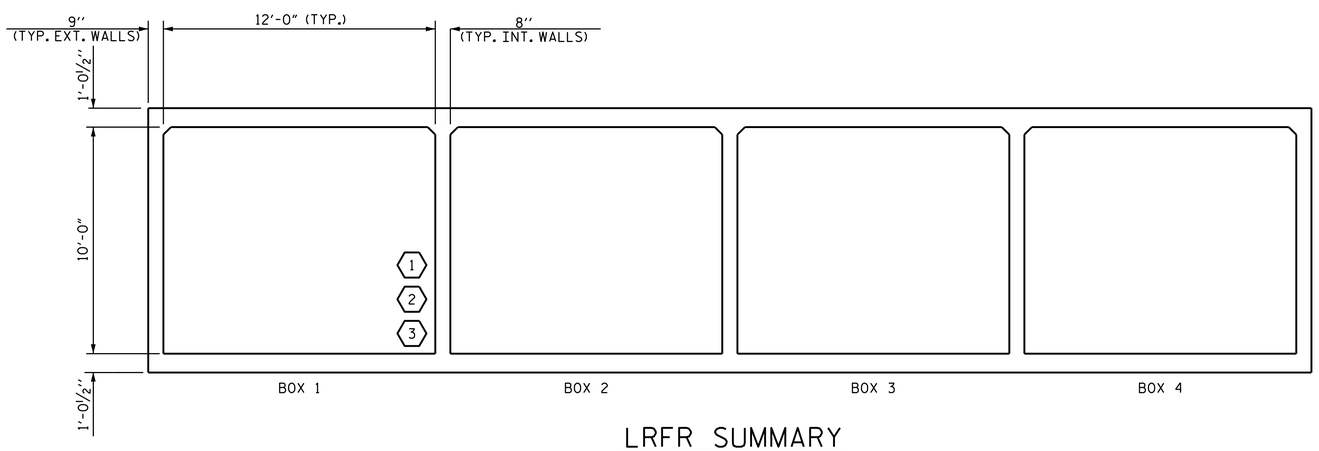
(#) CONTROLLING LOAD RATING

(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. R-2519B

YANCEY COUNTY

STATION: 44+11.92 -L-

SHEET 17 OF 17

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)
(RIGHT EXTENSION)

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL A. CHEEK, JR.

8/27/2014 Marshall A. Cheek, Jr.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-17
1			3			TOTAL SHEETS
2			4			87

ASSEMBLED BY : D. HODGE DATE : 9/13
CHECKED BY : D. A. GLADDEN DATE : 10/13
DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11
REV. 10/1/11 MAA/GM

STR. #7 STD. NO. LRFR5

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$