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	BARREL NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BARREL NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.58	--	1.75	8.77	3	TOP SLAB	0.00′	1.58	1	BOTTOM SLAB	0.00′	
		HL-93 (OPERATING)	N/A		2.05	--	1.35	11.37	3	TOP SLAB	0.00′	2.05	1	TOP SLAB	10.00′	
		HS-20 (INVENTORY)	36.000	2	2.11	75	1.75	11.42	2	TOP SLAB	0.00′	2.11	3	TOP SLAB	0.00′	
		HS-20 (OPERATING)	36.000		2.73	98	1.35	14.81	2	TOP SLAB	0.00′	2.73	3	TOP SLAB	0.00′	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		8.84	119	1.40	45.33	2	TOP SLAB	0.00′	8.84	3	TOP SLAB	0.00′	
		SNGARBS2	20.000		6.08	121	1.40	33.24	2	TOP SLAB	0.00′	6.08	3	TOP SLAB	0.00′	
		SNAGRIS2	22.000		5.56	122	1.40	30.63	1	TOP SLAB	5.00′	5.56	3	TOP SLAB	0.00′	
		SNCOTTS3	27.250		4.37	162	1.40	21.60	2	TOP SLAB	0.00′	4.37	3	TOP SLAB	0.00′	
		SNAGGRS4	34.925		3.53	123	1.40	18.27	2	TOP SLAB	0.00′	3.53	3	TOP SLAB	0.00′	
		SNS5A	35.550		3.55	126	1.40	17.91	2	TOP SLAB	0.00′	3.55	3	TOP SLAB	0.00′	
		SNS6A	39.950		3.32	132	1.40	17.04	2	TOP SLAB	0.00′	3.32	1	BOTTOM SLAB	0.00′	
		SNS7B	42.000		3.13	131	1.40	16.37	2	TOP SLAB	0.00′	3.13	1	BOTTOM SLAB	0.00′	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.86	127	1.40	20.70	2	TOP SLAB	0.00′	3.86	3	TOP SLAB	0.00′	
		TNT4A	33.075		4.08	134	1.40	20.88	2	TOP SLAB	0.00′	4.08	3	TOP SLAB	0.00′	
		TNT6A	41.600		3.34	138	1.40	17.32	2	TOP SLAB	0.00′	3.34	3	BOTTOM SLAB	0.00′	
		TNT7A	42.000		3.34	140	1.40	17.53	2	TOP SLAB	0.00′	3.34	3	TOP SLAB	0.00′	
		TNT7B	42.000		3.47	146	1.40	18.07	2	TOP SLAB	0.00′	3.47	1	BOTTOM SLAB	0.00′	
		TNAGRIT4	43.000		3.18	136	1.40	16.58	2	TOP SLAB	0.00′	3.18	3	TOP SLAB	0.00′	
		TNAGT5A	45.000		3.11	139	1.40	16.77	2	TOP SLAB	0.00′	3.11	1	BOTTOM SLAB	0.00′	
		TNAGT5B	45.000	3	2.94	132	1.40	15.69	2	TOP SLAB	0.00′	2.94	3	TOP SLAB	0.00′	

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.

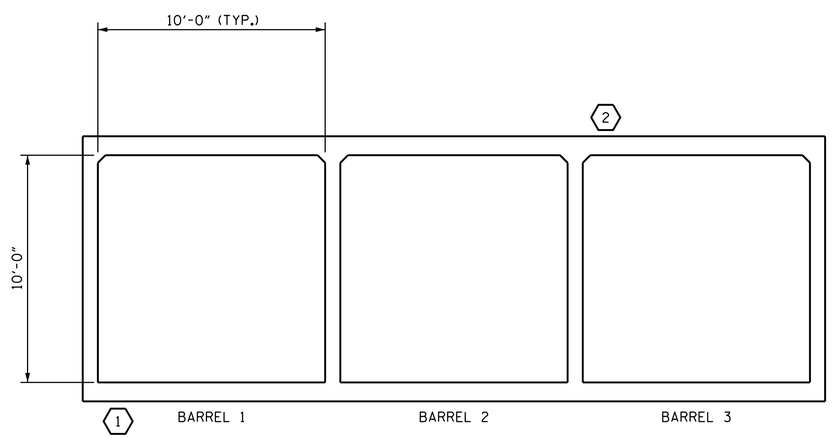
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING UPSTREAM)

PROJECT NO. 17BP.8.R.127

MOORE COUNTY

STATION: 15+92.50 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

DESIGN ENGINEER OF RECORD: DocuSigned by: DB3C8E45806D499... DATE: 3/20/2018

ASSEMBLED BY : K. SU DATE : 12/12/17
CHECKED BY : R. A. PRUETT DATE : 12/14/17

DRAWN BY : WMC 7/11 REV. 10/1/11 MAA/GM
7/11

DocuSigned by: DB3C8E45806D499... 3/20/2018

NORTH CAROLINA PROFESSIONAL SEAL 14114 ENGINEER ROBERT C. LARSSON

KCI Associates of North Carolina, P.A.
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ENGINEERS • PLANNERS • SCIENTISTS
LICENSE NUMBER: C-0782
7005 FALLS OF NEUSE ROAD
SUITE 400
RALEIGH, N.C. 27609-3310
(919) 783-9214

DWG. REF. NO. 2 OF 6

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. LRFR5