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	1.57	--	1.75	1.81	1	EXTERIOR WALL	8.33	1.57	1	BOTTOM SLAB	7.82	
		HL-93 (OPERATING)	N/A		2.04	--	1.35	2.35	1	EXTERIOR WALL	8.33	2.04	1	BOTTOM SLAB	7.82	·
		HS-20 (INVENTORY)	36.000	2	1.57	56.52	1.75	1.85	1	BOTTOM SLAB	8.42	1.57	1	BOTTOM SLAB	7.82	·
		HS-20 (OPERATING)	36.000	·	2.04	73.44	1.35	2.40	1	BOTTOM SLAB	8.42	2.04	1	TOP SLAB	7.82	·
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	·	2.97	40.10	1.40	2.97	1	EXTERIOR WALL	8.33	2.97	1	TOP SLAB	7.82	·
		SNGARBS2	20.000	·	2.76	55.20	1.40	2.84	1	EXTERIOR WALL	8.33	2.76	1	TOP SLAB	7.82	·
		SNAGRIS2	22.000	·	2.87	63.14	1.40	2.97	1	EXTERIOR WALL	8.33	2.87	1	BOTTOM SLAB	7.82	·
		SNCOTTS3	27.250	·	2.23	60.77	1.40	2.74	1	BOTTOM SLAB	8.42	2.23	1	BOTTOM SLAB	7.82	·
		SNAGGRS4	34.925	·	1.90	66.36	1.40	2.35	1	BOTTOM SLAB	8.42	1.90	1	BOTTOM SLAB	7.82	·
		SNS5A	35.550	·	2.21	78.57	1.40	2.73	1	BOTTOM SLAB	8.42	2.21	1	BOTTOM SLAB	7.82	·
		SNS6A	39.950	·	2.26	90.29	1.40	2.79	1	BOTTOM SLAB	8.42	2.26	1	BOTTOM SLAB	7.82	·
		SNS7B	42.000	·	2.43	102.06	1.40	2.99	1	BOTTOM SLAB	8.42	2.43	1	BOTTOM SLAB	7.82	·
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	·	2.30	75.90	1.40	2.82	1	BOTTOM SLAB	8.42	2.30	1	BOTTOM SLAB	7.82	·
		TNT4A	33.075	·	2.47	81.70	1.40	3.04	1	BOTTOM SLAB	8.42	2.47	1	BOTTOM SLAB	7.82	·
		TNT6A	41.600	·	2.52	104.83	1.40	3.10	1	BOTTOM SLAB	8.42	2.52	1	BOTTOM SLAB	7.82	·
		TNT7A	42.000	·	2.77	116.34	1.40	3.41	1	BOTTOM SLAB	8.42	2.77	1	BOTTOM SLAB	7.82	·
		TNT7B	42.000	·	2.77	116.34	1.40	3.41	1	BOTTOM SLAB	8.42	2.77	1	BOTTOM SLAB	7.82	·
		TNAGRIT4	43.000	3	1.90	81.70	1.40	2.34	1	BOTTOM SLAB	8.42	1.90	1	BOTTOM SLAB	7.82	·
		TNAGT5A	45.000	·	2.07	93.15	1.40	2.55	1	BOTTOM SLAB	8.42	2.07	1	BOTTOM SLAB	7.82	·
		TNAGT5B	45.000	·	2.07	93.15	1.40	2.55	1	BOTTOM SLAB	8.42	2.07	1	BOTTOM SLAB	7.82	·

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.

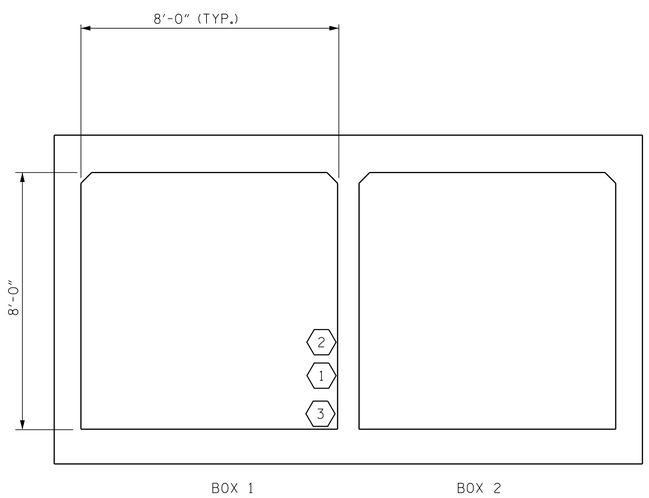
(#) CONTROLLING LOAD RATING

(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. 17BP.14.R.142

POLK COUNTY

STATION: 13+47.70 -L-

SHEET 10 OF 10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 20777 ENGINEER HARDY L. WILLIS

DocuSigned by: Hardy Willis CC287FCF0223461... 4/28/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY : RWW		DATE : 3/2015	
CHECKED BY : HLW		DATE : 3/2015	
DRAWN BY : WMC	7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM	7/11		

STD. NO. LRFR5