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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: LIVE-LOAD FACTORS $\gamma_{(LL)}$	MOMENT: RATING FACTOR	MOMENT: BOX NO.	MOMENT: ELEMENT TYPE	MOMENT: DISTANCE FROM LEFT END OF ELEMENT (ft)	SHEAR: RATING FACTOR	SHEAR: BOX NO.	SHEAR: ELEMENT TYPE	SHEAR: DISTANCE FROM LEFT END OF ELEMENT (ft)	COMMENT NUMBER
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.04	- -	1.75	1.26	1	BOT SLAB - RIGHT	8.2	1.04	1	TOP SLAB - RT END	9.6	
		HL-93 (OPERATING)	N/A		1.35	- -	1.35	1.63	1	BOT SLAB - RIGHT	8.2	1.35	1	TOP SLAB - RT END	9.6	
		HS-20 (INVENTORY)	36.000	2	1.07	38.5	1.75	1.13	2	BOT SLAB - RIGHT	8.2	1.07	1	TOP SLAB - RT END	9.6	
		HS-20 (OPERATING)	36.000		1.39	49.9	1.35	1.46	1	BOT SLAB - RIGHT	8.2	1.39	1	TOP SLAB - RT END	9.6	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.10	28.4	1.40	2.10	1	TOP SLAB - MID	8.2	2.39	1	TOP SLAB - RT END	9.6	
		SNGARBS2	20.000		1.97	39.4	1.40	1.97	1	TOP SLAB - MID	8.2	2.21	1	BOT SLAB - RT END	9.6	
		SNAGRIS2	22.000		2.04	44.9	1.40	2.04	1	BOT SLAB - RIGHT	8.2	2.13	1	TOP SLAB - RT END	9.6	
		SNCOTTS3	27.250		1.44	39.2	1.40	1.45	1	TOP SLAB - MID	8.2	1.44	1	BOT SLAB - RT END	9.6	
		SNAGGRS4	34.925		1.56	54.5	1.40	1.56	1	BOT SLAB - RIGHT	8.2	1.65	1	TOP SLAB - RT END	9.6	
		SNS5A	35.550		1.53	54.4	1.40	1.53	1	BOT SLAB - RIGHT	8.2	1.62	1	TOP SLAB - RT END	9.6	
		SNS6A	39.950		1.54	61.5	1.40	1.54	1	BOT SLAB - RIGHT	8.2	1.57	1	TOP SLAB - RT END	9.6	
		SNS7B	42.000		1.49	62.6	1.40	1.49	1	BOT SLAB - RIGHT	8.2	1.52	1	BOT SLAB - RT END	9.6	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.45	47.9	1.40	1.45	1	BOT SLAB - RIGHT	8.2	1.50	1	BOT SLAB - RT END	9.6	
		TNT4A	33.075		1.65	54.6	1.40	1.74	1	TOP SLAB - MID	8.2	1.65	1	TOP SLAB - RT END	9.6	
		TNT6A	41.600		1.53	63.6	1.40	1.53	1	BOT SLAB - RIGHT	8.2	1.60	1	TOP SLAB - RT END	9.6	
		TNT7A	42.000		1.49	62.6	1.40	1.49	1	BOT SLAB - RIGHT	8.2	1.53	1	BOT SLAB - RT END	9.6	
		TNT7B	42.000		1.58	66.4	1.40	1.58	1	BOT SLAB - RIGHT	8.2	1.63	1	TOP SLAB - RT END	9.6	
		TNAGRIT4	43.000		1.60	68.8	1.40	1.71	1	BOT SLAB - RIGHT	8.2	1.60	1	TOP SLAB - RT END	9.6	
		TNAGT5A	45.000		1.60	72.0	1.40	1.60	1	BOT SLAB - RIGHT	8.2	1.60	1	TOP SLAB - RT END	9.6	
		TNAGT5B	45.000	3	1.32	59.4	1.40	1.32	1	BOT SLAB - RIGHT	8.2	1.37	1	BOT SLAB - RT END	9.6	

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	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

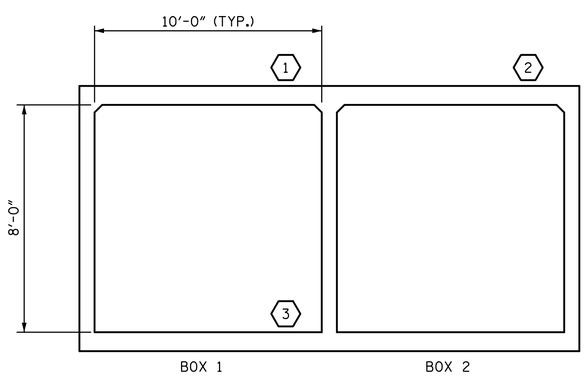
(#) CONTROLLING LOAD RATING

(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. 17BP.5.R.51

WAKE COUNTY

STATION: 15+68.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

PLANS PREPARED BY:

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LICENSURE NO. C-2521

NORTH CAROLINA PROFESSIONAL SEAL 18056 ENGINEER JOHN A. BATTS

2/5/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY: T. BANKOVICH DATE: 2-18
CHECKED BY: B.S. COX DATE: 2-18
DESIGN ENGINEER OF RECORD: J.A. BATTS DATE: 2-18

2/5/2018 12:26:31 PM G:\Projects\2014\17BP5R51 (Wake 27)\Structures\Drawings\Final\Wake 27_smu_culvert.dgn