LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERT

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	1.09	--	1.75	**1.09**	1	TOP SLAB	**4.33**	1.22	1	BOTTOM SLAB	**0.84**	
		HL-93 (OPERATING)	N/A		1.41	--	1.35	1.41	1	TOP SLAB	4.33	1.58	1	BOTTOM SLAB	0.84	
		HS-20 (INVENTORY)	36.000	2	1.65	59.45	1.75	**1.65**	1	TOP SLAB	**4.33**	1.70	1	BOTTOM SLAB	**0.84**	
		HS-20 (OPERATING)	36.000		2.14	77.07	1.35	2.14	1	TOP SLAB	4.33	2.21	1	BOTTOM SLAB	0.84	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.00	40.51	1.40	3.00	1	TOP SLAB	4.33	3.10	1	BOTTOM SLAB	0.84	
		SNGARBS2	20.000		2.80	56.09	1.40	2.80	1	TOP SLAB	4.33	2.86	1	BOTTOM SLAB	0.84	
		SNAGRIS2	22.000		3.00	66.01	1.40	3.00	1	TOP SLAB	4.33	3.10	1	BOTTOM SLAB	0.84	
		SNCOTTS3	27.250	3	1.36	37.01	1.40	**1.36**	1	TOP SLAB	**4.33**	1.52	1	BOTTOM SLAB	**0.84**	
		SNAGGRS4	34.925		1.43	49.79	1.40	1.43	1	TOP SLAB	4.33	1.60	1	BOTTOM SLAB	0.84	
		SNS5A	35.550		1.49	53.02	1.40	1.49	1	TOP SLAB	4.33	1.65	1	BOTTOM SLAB	0.84	
		SNS6A	39.950		1.48	59.24	1.40	1.48	1	TOP SLAB	4.33	1.65	1	BOTTOM SLAB	0.84	
		SNS7B	42.000		1.48	62.28	1.40	1.48	1	TOP SLAB	4.33	1.65	1	BOTTOM SLAB	0.84	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.00	99.01	1.40	3.00	1	TOP SLAB	4.33	3.10	1	BOTTOM SLAB	0.84	
		TNT4A	33.075		1.62	53.68	1.40	1.62	1	TOP SLAB	4.33	1.79	1	BOTTOM SLAB	0.84	
		TNT6A	41.600		1.44	59.97	1.40	1.44	1	TOP SLAB	4.33	1.60	1	BOTTOM SLAB	7.82	
		TNT7A	42.000		1.60	67.31	1.40	1.60	1	TOP SLAB	4.33	1.77	1	BOTTOM SLAB	7.82	
		TNT7B	42.000		1.49	62.64	1.40	1.49	1	TOP SLAB	4.33	1.65	1	BOTTOM SLAB	0.84	
		TNAGRIT4	43.000		1.55	66.44	1.40	1.55	1	TOP SLAB	4.33	1.71	1	BOTTOM SLAB	0.84	
		TNAGT5A	45.000		1.58	71.24	1.40	1.58	1	TOP SLAB	4.33	1.75	1	BOTTOM SLAB	0.84	
		TNAGT5B	45.000		1.62	73.03	1.40	1.62	1	TOP SLAB	4.33	1.79	1	BOTTOM SLAB	0.84	

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.

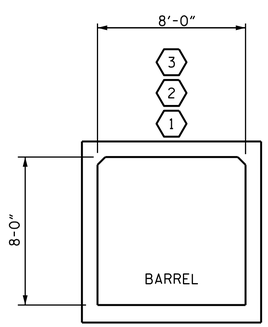
(#) CONTROLLING LOAD RATING

(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. U-3615B

GUILFORD COUNTY

STATION: 266+36.00 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERT

(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG

DocuSigned by: Ting H. Fang E72068400077435...

12/3/2014

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			7

ASSEMBLED BY : T. KIRSCHBAUM DATE : 5/31/13
CHECKED BY : T.H. FANG DATE : 1/3/14
DESIGN ENGINEER OF RECORD : P. K. NEWTON DATE : 1/7/14

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

REV. 10/1/11 MAA/GM

03-DEC-2014 10:48
K:\TIPProjects-U\U3615b\Structures\Plans\cul\FinalPlans\u3615b_sd_cu.dgn
ttfang