

**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 x RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
|--------------------------|--------------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|---|------------------|------------------|------------------|--|------------------|---------------|-----------------|----------------|--|--|
| | | | | | | MOMENT | | | | SHEAR | | | | | | |
| | | | | | | LIVE-LOAD FACTORS (γ _{LL}) | 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 | 4.34 | -- | 1.75 | 4.34 | 1 | BOT. CORNER WALL | 7.63 | 6.52 | 1 | EXTERIOR WALL | 7.06 | | |
| | HL-93 (OPERATING) | N/A | | 5.62 | -- | 1.35 | 5.62 | 1 | BOT. CORNER WALL | 7.63 | 8.45 | 1 | EXTERIOR WALL | 7.06 | | |
| | HS-20 (INVENTORY) | 36.000 | ② | 4.34 | 156.08 | 1.75 | 4.34 | 1 | BOT. CORNER WALL | 7.63 | 6.52 | 1 | EXTERIOR WALL | 7.06 | | |
| | HS-20 (OPERATING) | 36.000 | | 5.62 | 202.32 | 1.35 | 5.62 | 1 | BOT. CORNER WALL | 7.63 | 8.45 | 1 | EXTERIOR WALL | 7.06 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13.500 | ③ | 5.42 | 73.16 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNGARBS2 | 20.000 | | 5.42 | 108.39 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNAGRIS2 | 22.000 | | 5.42 | 119.22 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNCOTTS3 | 27.250 | | 5.42 | 147.68 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNAGGRS4 | 34.925 | | 5.42 | 189.27 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNS5A | 35.550 | | 5.42 | 192.66 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | SNS6A | 39.950 | | 5.42 | 216.50 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | SNS7B | 42.000 | | 5.42 | 227.61 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | | 5.42 | 178.84 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | TNT4A | 33.075 | | 5.42 | 179.24 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | TNT6A | 41.600 | | 5.42 | 225.44 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | TNT7A | 42.000 | | 5.42 | 227.61 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | TNT7B | 42.000 | | 5.42 | 227.61 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| | | TNAGRIT4 | 43.000 | | 5.42 | 233.03 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | |
| TNAGT5A | | 45.000 | | 5.42 | 243.87 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | | |
| TNAGT5B | 45.000 | | 5.42 | 243.87 | 1.40 | 5.42 | 1 | BOT. CORNER WALL | 7.63 | 8.15 | 1 | EXTERIOR WALL | 7.06 | | | |

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 | -- |
| WA | 1.00 | -- |

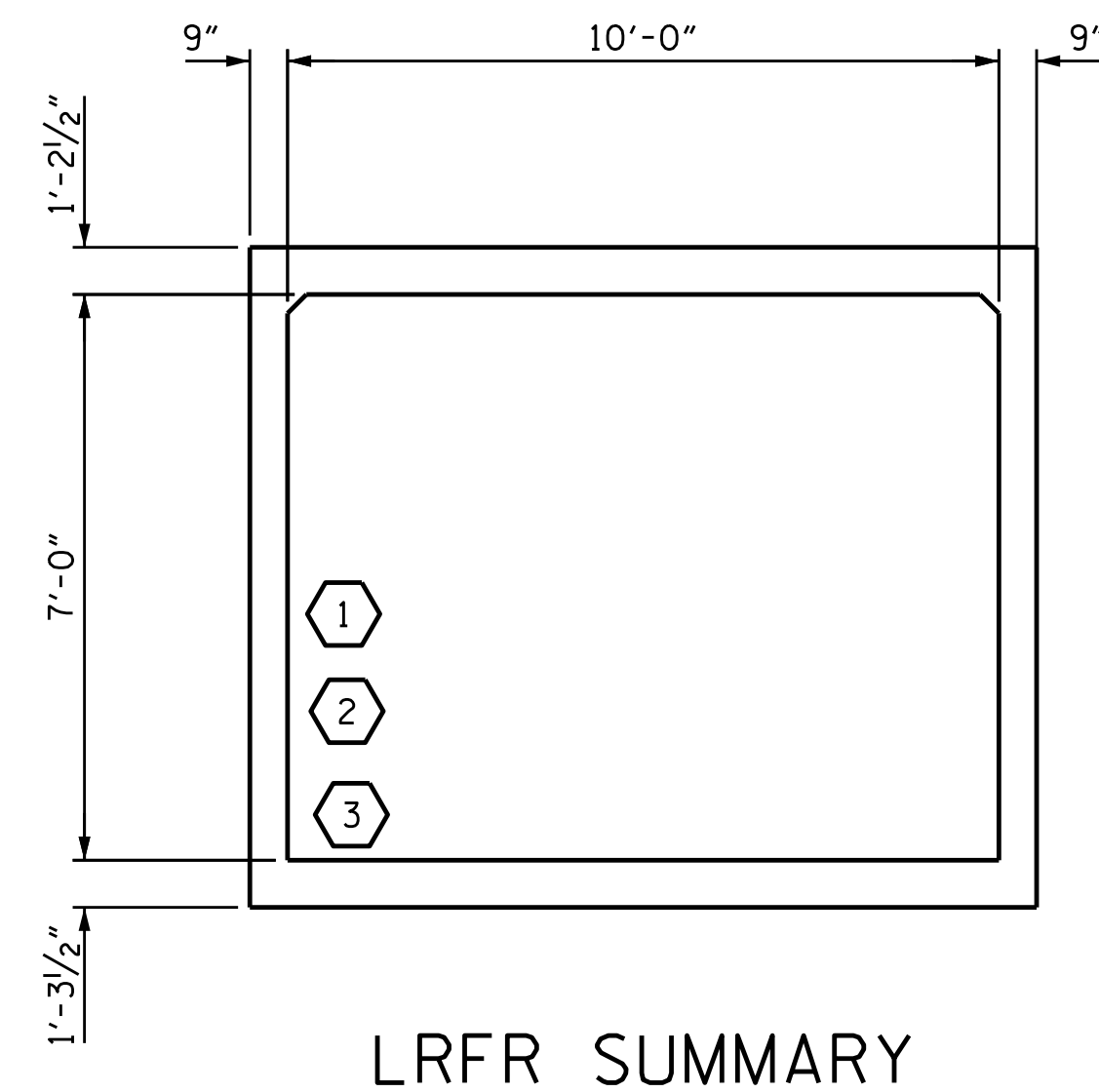
NOTE:

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 | |



PROJECT NO. U-3109A
ALAMANCE COUNTY
 STATION: 179+55.00 -L-

SHEET 5 OF 5



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

| | |
|------------------------------|---------------|
| ASSEMBLED BY : A. SORSENCINH | DATE : 4/2014 |
| CHECKED BY : K.W. ALFORD | DATE : 2/2017 |
| DRAWN BY : WMC | 7/11 |
| CHECKED BY : GM | 7/11 |

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DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C2-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 5 |

STD. NO. LRFR5