

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:

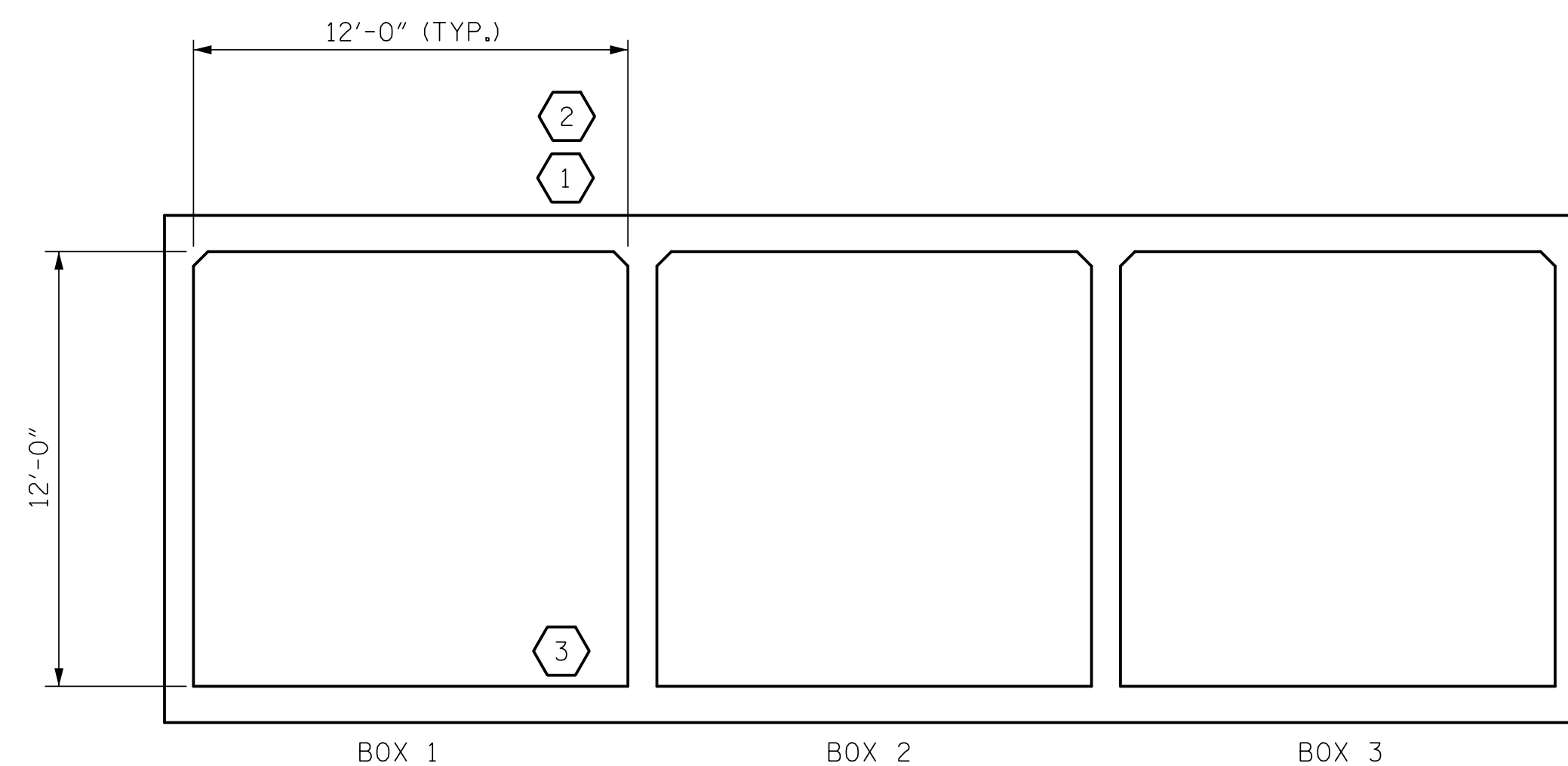
RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

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 | |

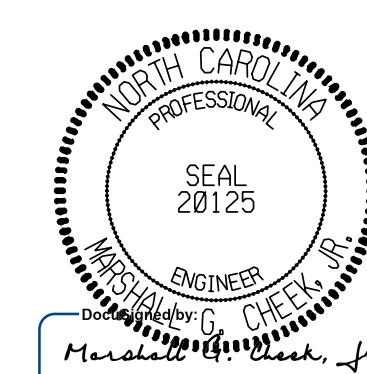
| LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS | | | | | | | | | | | | | | | | |
|--|-----------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|--|---------------|---------|--------------|--|---------------|---------|--------------|----------------|--|--|
| LEVEL | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING LOAD RATING # | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
| | | | | | | LIVE-LOAD FACTORS (γ _L) | 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 | 1.16 | -- | 1.75 | 1.29 | 1 | TOP SLAB | 6.83 | 1.16 | 1 | TOP SLAB | 12.5 | | |
| | HL-93 (OPERATING) | N/A | | 1.50 | -- | 1.35 | 1.67 | 1 | TOP SLAB | 6.83 | 1.50 | 1 | TOP SLAB | 12.5 | | |
| | HS-20 (INVENTORY) | 36,000 | 2 | 1.21 | 43.56 | 1.75 | 1.26 | 1 | EXT. WALL | 0.42 | 1.21 | 1 | TOP SLAB | 12.5 | | |
| | HS-20 (OPERATING) | 36,000 | | 1.57 | 56.52 | 1.35 | 1.63 | 1 | EXT. WALL | 0.42 | 1.57 | 1 | TOP SLAB | 12.5 | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SH | | 2.09 | 26.13 | 1.40 | 2.43 | 1 | BOTT SLAB | 1.25 | 2.09 | 1 | EXT. WALL | 0.42 | | |
| | | S3C | 21,500 | | 1.88 | 40.42 | 1.40 | 2.12 | 1 | TOP SLAB | 6.83 | 1.88 | 1 | TOP SLAB | 12.5 | |
| | | S3A | 22,750 | | 1.85 | 42.09 | 1.40 | 2.12 | 1 | BOTT SLAB | 1.25 | 1.85 | 1 | TOP SLAB | 12.5 | |
| | | S4A | 26,750 | | 1.84 | 49.22 | 1.40 | 2.09 | 1 | BOTT SLAB | 1.25 | 1.84 | 1 | TOP SLAB | 12.5 | |
| | | S5A | 30,500 | | 1.98 | 60.39 | 1.40 | 2.04 | 1 | BOTT SLAB | 1.25 | 1.98 | 1 | EXT. WALL | 0.42 | |
| | | S6A | 34,500 | | 1.80 | 62.10 | 1.40 | 1.89 | 2 | BOTT SLAB | 14.0 | 1.80 | 1 | TOP SLAB | 12.5 | |
| | | S7B | 38,500 | | 1.72 | 66.22 | 1.40 | 1.72 | 1 | BOTT SLAB | 12.5 | 1.74 | 1 | TOP SLAB | 12.5 | |
| | | S7A | 40,000 | 3 | 1.70 | 68.00 | 1.40 | 1.70 | 1 | BOTT SLAB | 12.5 | 1.76 | 1 | TOP SLAB | 12.5 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | T4A | 28,250 | | 1.86 | 52.55 | 1.40 | 2.09 | 1 | BOTT SLAB | 1.25 | 1.86 | 1 | TOP SLAB | 12.5 | |
| | | T5B | 32,000 | | 1.80 | 57.60 | 1.40 | 1.90 | 1 | TOP SLAB | 12.5 | 1.80 | 1 | TOP SLAB | 12.5 | |
| | | T6A | 36,000 | | 1.82 | 65.52 | 1.40 | 1.82 | 1 | BOTT SLAB | 12.5 | 1.84 | 1 | TOP SLAB | 12.5 | |
| | | T7A | 40,000 | | 1.71 | 68.40 | 1.40 | 1.71 | 1 | BOTT SLAB | 12.5 | 1.84 | 1 | TOP SLAB | 12.5 | |
| | T7B | 40,000 | | 1.73 | 69.20 | 1.40 | 1.73 | 2 | BOTT SLAB | 14.0 | 1.84 | 1 | TOP SLAB | 12.5 | | |



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. I-5987A
ROBESON COUNTY
 STATION: 310+73.00 -L-

SHEET 2 OF 14



5/10/2022 | 10:02 AM EDT

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

| | |
|--------------------|-------------|
| ASSEMBLED BY : ZCS | DATE : 1/22 |
| CHECKED BY : MGC | DATE : 1/22 |
| DRAWN BY : WMC | 7/II |
| CHECKED BY : GM | 7/II |
| REV. 10/1/II | MAA/GM |
| REV. 12/17 | MAA/THC |

| | | | | | |
|---|-----|-------|-----|-----|-------|
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | | | | | |
| TGS ENGINEERS | | | | | |
| 706 HILLSBOROUGH STREET | | | | | |
| SUITE 200 | | | | | |
| RALEIGH, NC 27603 | | | | | |
| PH (919) 773-8887 | | | | | |
| CORP. LICENSE NO.: C-0275 | | | | | |
| REVISIONS | | | | | |
| NO. | BY: | DATE: | NO. | BY: | DATE: |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| SHEET NO. | | | | | C11-2 |
| TOTAL SHEETS | | | | | 14 |