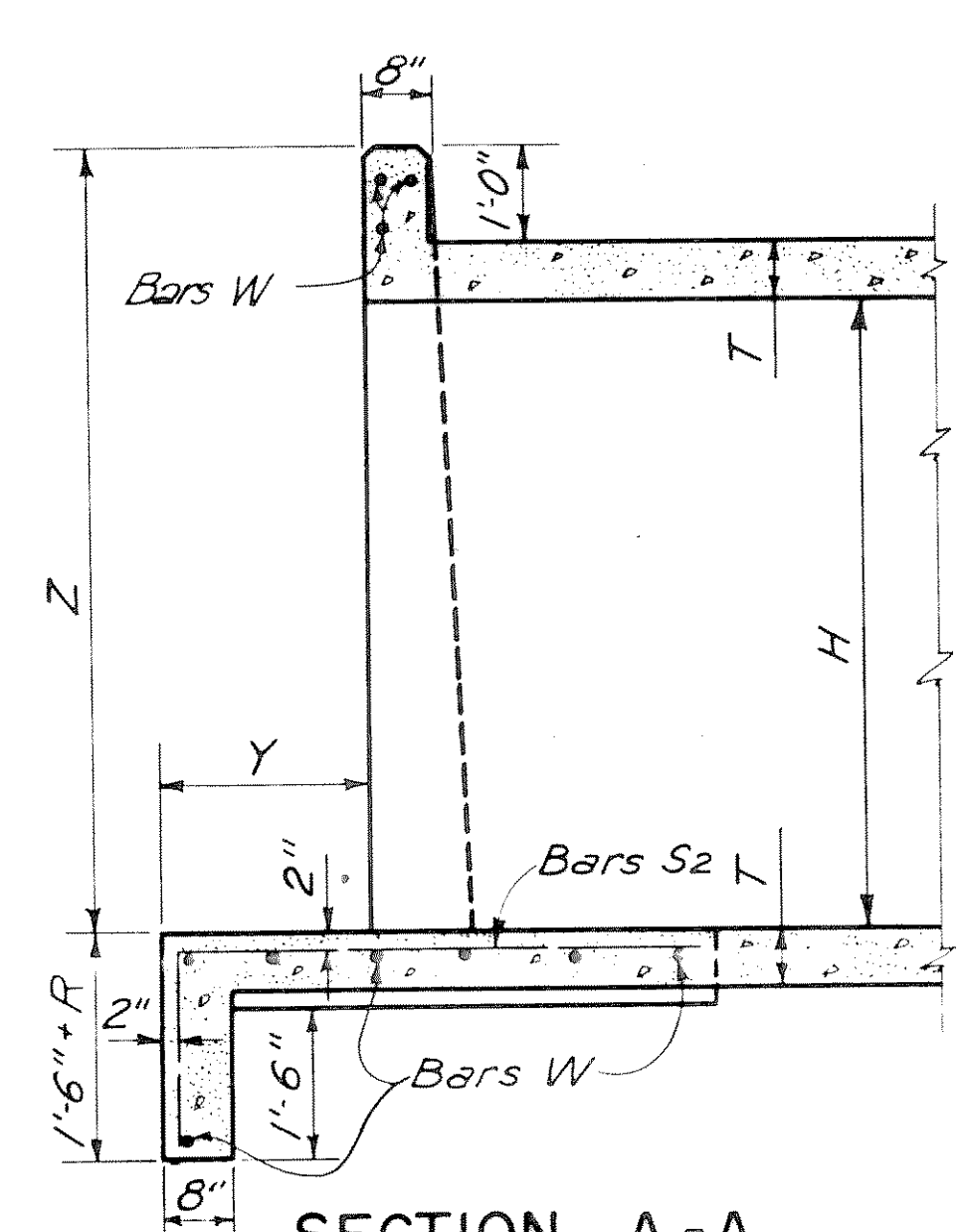


TABLE OF REINFORCING STEEL FOR 4 WINGWALLS

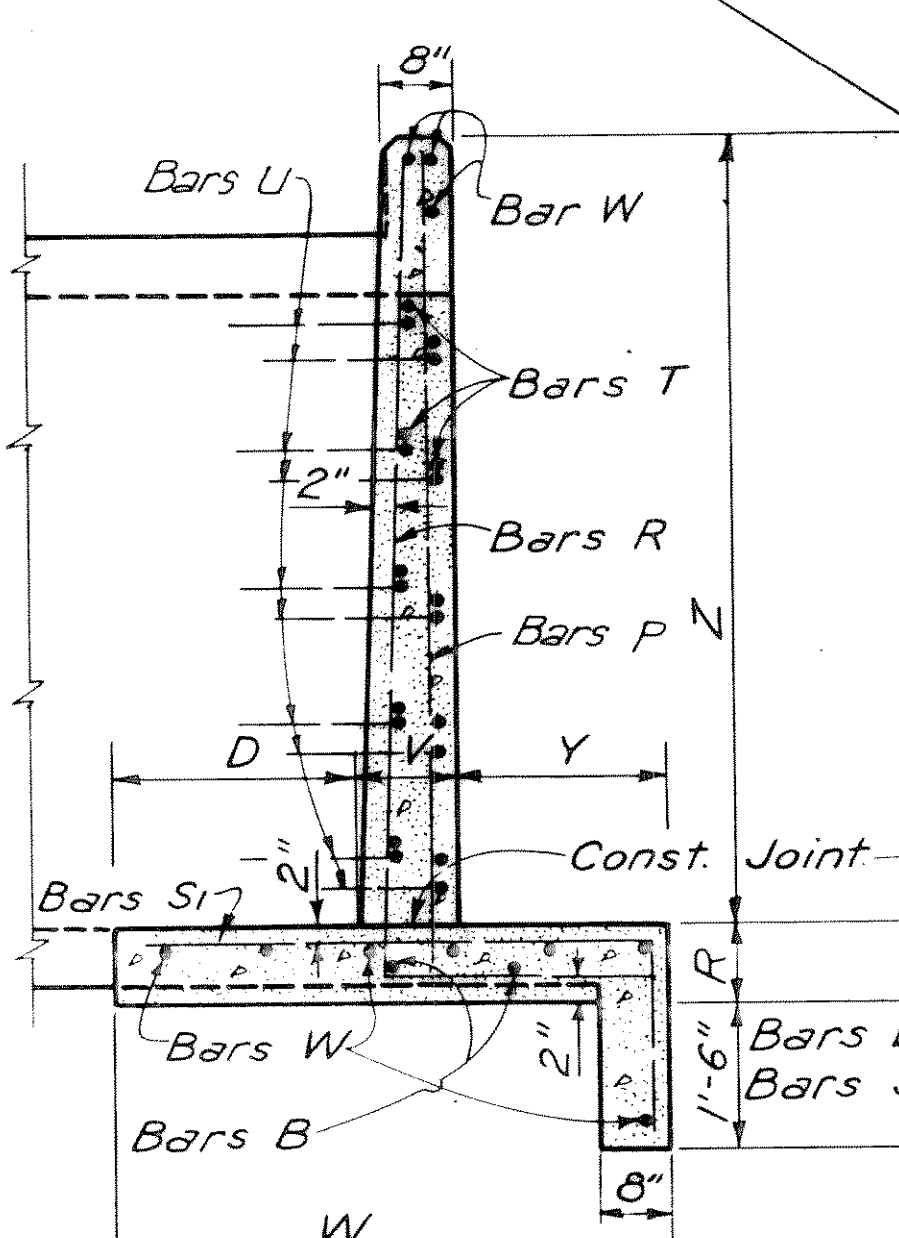
| CULVERT MAX SIZE | TABLE OF DIMENSIONS |   |      |       |        |       |        |    |       |       | * TOTAL QUANT. |             | WING WALL REINFORCING |         |               |         |        |     |                     |        |               |      |                             |      |                          |        |                          |     |               |     |               |         |       |       |     |       | TOTAL WEIGHT |       |     |       |       |     |        |     |    |         |     |      |
|------------------|---------------------|---|------|-------|--------|-------|--------|----|-------|-------|----------------|-------------|-----------------------|---------|---------------|---------|--------|-----|---------------------|--------|---------------|------|-----------------------------|------|--------------------------|--------|--------------------------|-----|---------------|-----|---------------|---------|-------|-------|-----|-------|--------------|-------|-----|-------|-------|-----|--------|-----|----|---------|-----|------|
|                  | FILL SLAB           |   | WING |       |        |       |        |    |       |       | CONC. CY       | REINF. LBS. | WING SIZE             |         | *4 BARS B@12" |         | BARS R |     | BARS S <sub>1</sub> |        | *4 BARS T@18" |      | *4 BARS T <sub>2</sub> @18" |      | BARS U <sub>1</sub> @18" |        | BARS U <sub>2</sub> @18" |     | *4 BARS W@12" |     | *4 Bars P@18" |         |       |       |     |       |              |       |     |       |       |     |        |     |    |         |     |      |
|                  | S                   | H | T    | Z     | -L     | R     | W      | V  | D     | Y     |                |             | H                     | L       | NO.           | LGTH.   | WT.    | NO. | SIZE                | SPAC.  | LGTH.         | WT.  | NO.                         | SIZE | SPAC.                    | LGTH.  | WT.                      | NO. | LGTH.         | WT. | NO.           | SIZE    | SPAC. | LGTH. | WT. | NO.   |              | LGTH. | WT. | NO.   | LGTH. | WT. |        |     |    |         |     |      |
| 3x2              | 14                  | 6 | 6    | 3'-6" | 6'-1"  | 6 1/2 | 2'-6"  | 8" | 10"   | 1'-0" | 4.75           | 618         | 2'-0"                 | 6'-1"   | 8             | 5'-6"   | 29     | 28  | #4                  | 12"    | 5'-1"         | 95   | 28                          | #4   | 12"                      | 3'-11" | 73                       | 8   | 5'-6"         | 29  | 8             | 6'-0"   | 32    | 8     | #5  | 6'-0" | 50           | 8     | #5  | 6'-0" | 50    | 28  | 9'-10" | 184 | 20 | 3'-9"   | 50  | 592  |
| 3x3              | 14                  | 6 | 6    | 4'-6" | 7'-10" | 7"    | 2'-10" | 8" | 1'-2" | 1'-0" | 7.09           | 912         | 3'-0"                 | 7'-10"  | 8             | 7'-3"   | 39     | 36  | #4                  | 11"    | 6'-1"         | 146  | 36                          | #4   | 11"                      | 4'-3"  | 102                      | 12  | 7'-3"         | 58  | 12            | 7'-9"   | 62    | 12    | #5  | 6'-0" | 75           | 12    | #5  | 6'-0" | 75    | 28  | 12'-9" | 238 | 28 | 4'-9"   | 89  | 884  |
| 4x2              | 12                  | 6 | 6    | 3'-6" | 6'-1"  | 6 1/2 | 2'-6"  | 8" | 10"   | 1'-0" | 4.88           | 623         | 4'-0"                 | 9'-6"   | 8             | 8'-11"  | 48     | 68  | #4                  | 7"     | 7'-3"         | 329  | 68                          | #4   | 7"                       | 4'-10" | 219                      | 16  | 8'-11"        | 95  | 16            | 9'-5"   | 101   | 16    | #5  | 6'-0" | 100          | 16    | #5  | 6'-0" | 100   | 32  | 15'-3" | 326 | 32 | 5'-9"   | 123 | 1441 |
| 4x3              | 12                  | 6 | 6    | 4'-6" | 7'-10" | 7"    | 2'-10" | 8" | 1'-2" | 1'-0" | 7.23           | 918         | 5'-0"                 | 11'-3"  | 12            | 10'-8"  | 86     | 68  | #5                  | 8"     | 8'-5"         | 597  | 68                          | #5   | 8"                       | 5'-5"  | 384                      | 16  | 10'-8"        | 114 | 16            | 11'-2"  | 119   | 16    | #5  | 6'-0" | 100          | 16    | #5  | 6'-0" | 100   | 36  | 18'-4" | 441 | 36 | 6'-9"   | 162 | 2103 |
| 4x4              | 12                  | 6 | 6    | 5'-6" | 9'-6"  | 7"    | 3'-5"  | 8" | 1'-7" | 1'-2" | 10.08          | 1480        | 6'-0"                 | 13'-0"  | 12            | 12'-5"  | 100    | 92  | #5                  | 7"     | 9'-10"        | 943  | 92                          | #5   | 7"                       | 6'-1"  | 583                      | 20  | 12'-5"        | 166 | 20            | 12'-11" | 173   | 20    | #5  | 6'-0" | 125          | 20    | #5  | 6'-0" | 125   | 36  | 20'-1" | 483 | 40 | 7'-9"   | 207 | 2905 |
| 5x2              | 8                   | 6 | 6    | 3'-6" | 6'-1"  | 7"    | 2'-6"  | 8" | 10"   | 1'-0" | 5.12           | 629         | 7'-0"                 | 14'-10" | 12            | 14'-3"  | 114    | 132 | #5                  | 5 1/2" | 11'-4"        | 1560 | 132                         | #5   | 5 1/2"                   | 6'-7"  | 906                      | 24  | 14'-3"        | 228 | 24            | 14'-9"  | 236   | 24    | #5  | 6'-0" | 150          | 24    | #5  | 6'-0" | 150   | 44  | 23'-8" | 696 | 44 | 8'-9"   | 257 | 4184 |
| 5x3              | 8                   | 6 | 6    | 4'-6" | 7'-10" | 7"    | 2'-10" | 8" | 1'-2" | 1'-0" | 7.36           | 924         | 8'-0"                 | 16'-6"  | 16            | 15'-11" | 170    | 132 | #6                  | 6"     | 7'-4"         | 1453 | 24                          | #5   | 6"                       | 7'-4"  | 1453                     | 24  | 15'-11"       | 255 | 24            | 16'-5"  | 263   | 24    | #5  | 6'-0" | 150          | 24    | #5  | 6'-0" | 150   | 44  | 23'-8" | 696 | 48 | 9'-9"   | 313 | 5978 |
| 5x4              | 8                   | 6 | 6    | 5'-6" | 9'-6"  | 7"    | 3'-5"  | 8" | 1'-7" | 1'-2" | 10.22          | 1486        | 9'-0"                 | 18'-4"  | 16            | 17'-9"  | 190    | 160 | #6                  | 5 1/2" | 14'-4"        | 3444 | 160                         | #6   | 5 1/2"                   | 7'-11" | 1903                     | 28  | 17'-9"        | 332 | 28            | 18'-3"  | 341   | 28    | #5  | 6'-0" | 175          | 28    | #5  | 6'-0" | 175   | 44  | 25'-5" | 747 | 56 | 10'-10" | 405 | 7712 |
| 5x5              | 8                   | 6 | 6    | 6'-6" | 11'-3" | 7"    | 4'-0"  | 8" | 2'-0" | 1'-4" | 13.69          | 2154        | 10'-0"                | 20'-1"  | 16            | 19'-6"  | 208    | 192 | #6                  | 5"     | 15'-9"        | 4542 | 192                         | #6   | 5"                       | 8'-7"  | 2474                     | 32  | 19'-6"        | 417 | 32            | 20'-0"  | 428   | 32    | #5  | 6'-0" | 200          | 32    | #5  | 6'-0" | 200   | 48  | 27'-1" | 868 | 60 | 11'-10" | 474 | 9811 |

\*These Total Quantities are for 4 Wing Walls and 2 Aprons.

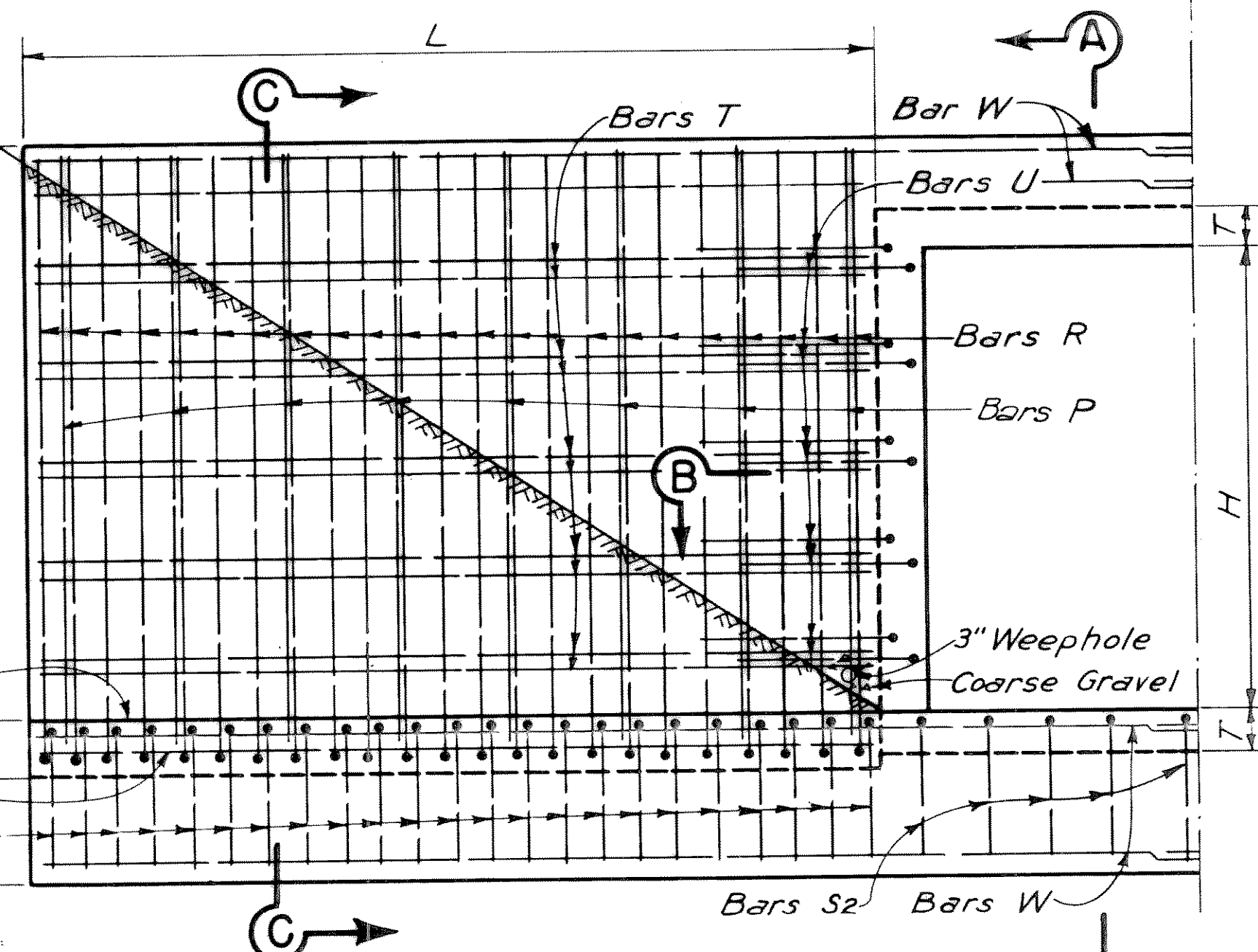
Variable Slope - Max. 1 1/2:1 - See Plan View



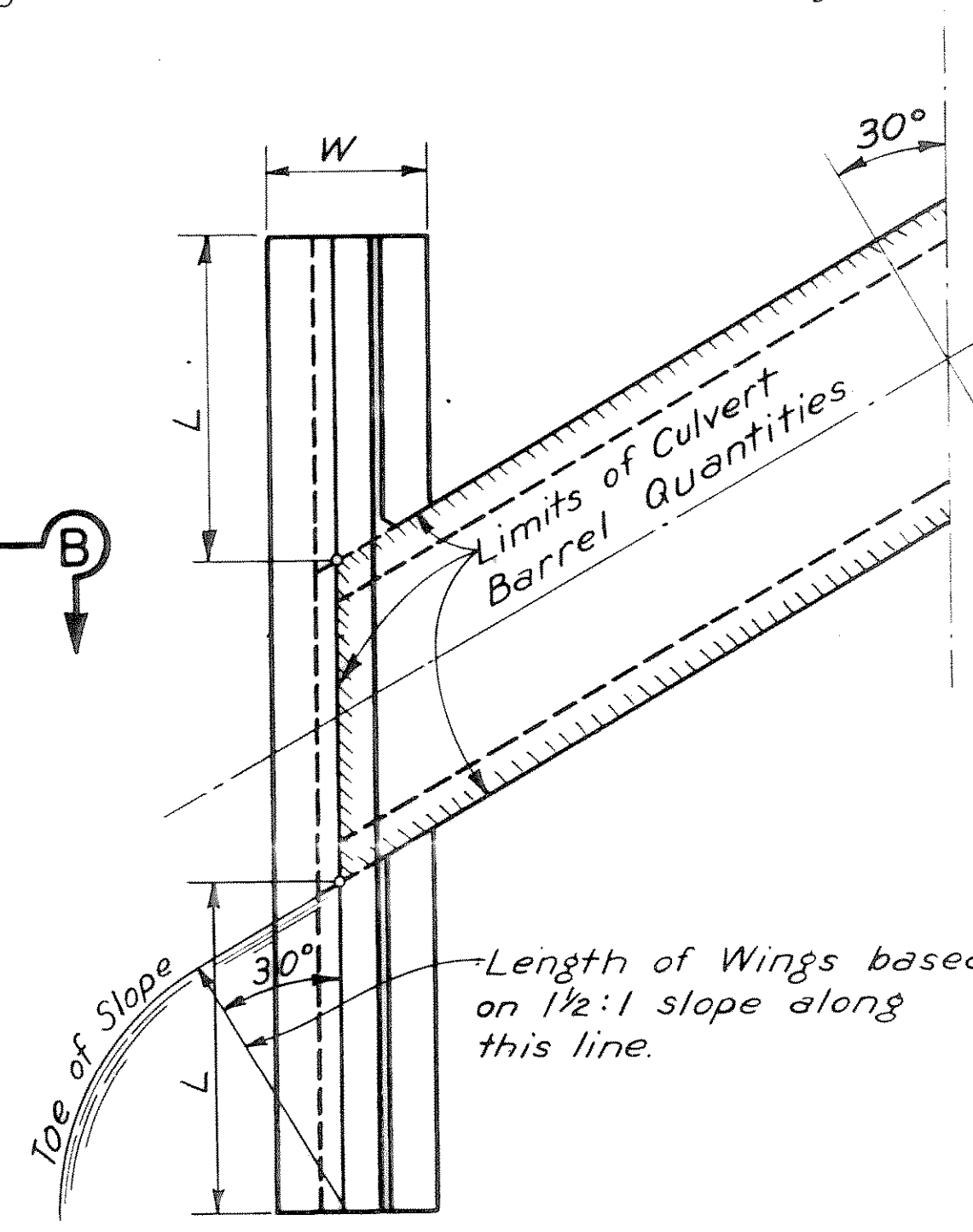
SECTION A-A  
APRON DETAIL



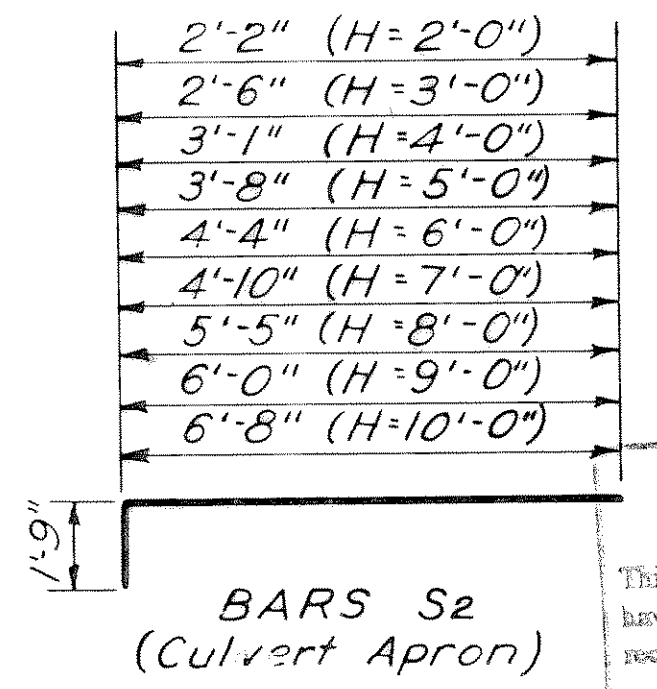
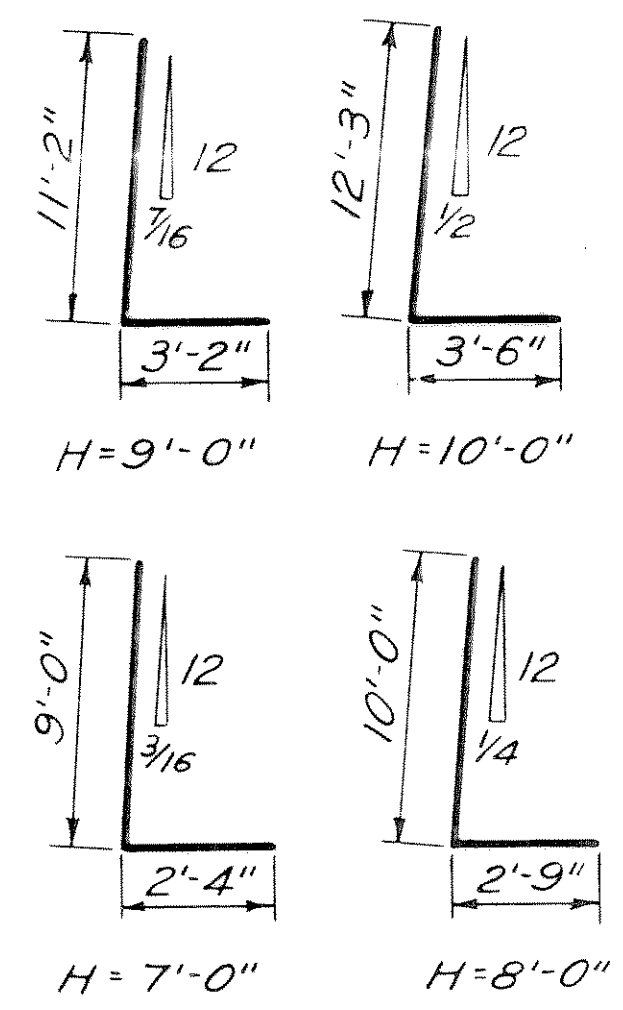
SECTION C-C  
DETAIL OF WINGWALL



HALF ELEVATION

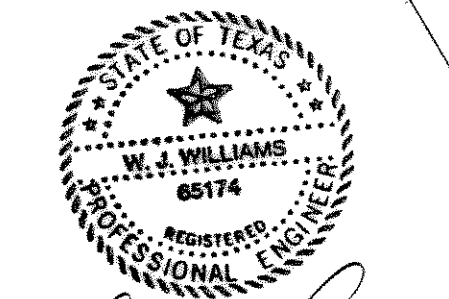


PLAN VIEW OF WINGWALL

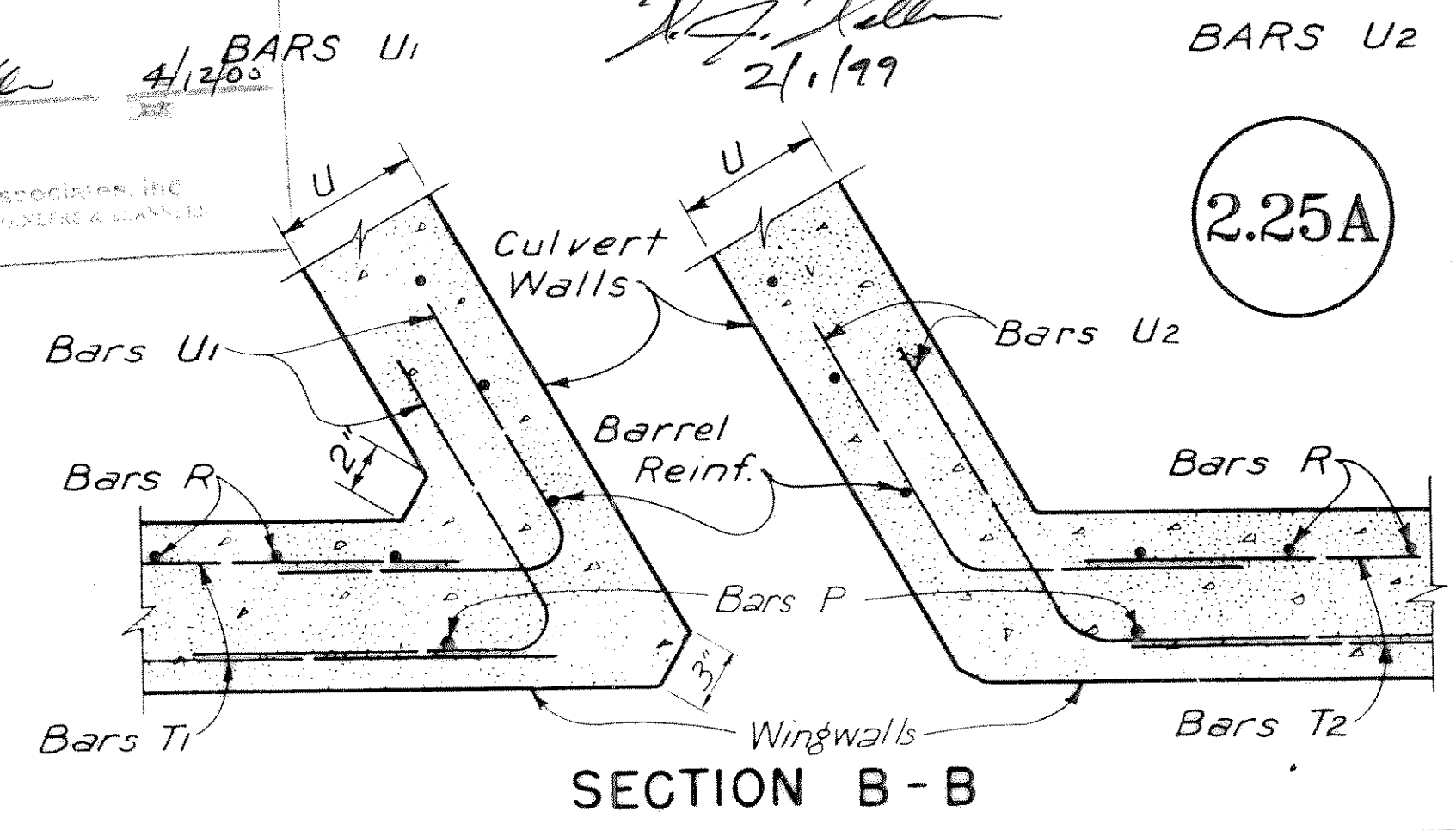


RECORD DRAWING

This is to certify that changes and corrections have been made in accordance with the contractor's request of this project.



W. J. Williams  
2/1/99



SECTION B-B

GENERAL NOTES:  
 All Concrete shall be Class C. Chamfer all exposed corners 3/4"  
 All dimensions relating to reinforcing steel are to centers of bars.  
 Provide weepholes for H-5'-0" and greater.  
 The bottom slab of the barrel, wing footings and toe walls shall be placed in one continuous operation.  
 Wings shall be constructed monolithic with the barrel. If construction joints are used near the top of the barrel walls these joints shall continue through the wings.

BILL OF \*4 BARS S<sub>2</sub>@12" FOR 2 CULVERT-APRONS

| H     | SPAN  | NO. | LGTH.  | WT. | H     | SPAN   | NO. | LGTH. | WT. |
|-------|-------|-----|--------|-----|-------|--------|-----|-------|-----|
| 2'-0" | 3'-0" | 10  | 3'-11" | 26  | 5'-0" | 10'-0" | 26  | 5'-5" | 94  |
|       | 4'-0" | 12  | 3'-11" | 31  |       | 6'-0"  | 16  | 6'-1" | 65  |
|       | 5'-0" | 14  | 3'-11" | 37  |       | 7'-0"  | 18  | 6'-1" | 73  |
| 3'-0" | 3'-0" | 10  | 4'-3"  | 28  | 6'-0" | 8'-0"  | 20  | 6'-1" | 81  |
|       | 4'-0" | 12  | 4'-3"  | 34  |       | 9'-0"  | 24  | 6'-1" | 97  |
|       | 5'-0" | 14  | 4'-3"  | 40  |       | 10'-0" | 26  | 6'-1" | 106 |
| 4'-0" | 4'-0" | 12  | 4'-10" | 39  | 7'-0" | 7'-0"  | 18  | 6'-7" | 79  |
|       | 5'-0" | 14  | 4'-10" | 45  |       | 8'-0"  | 20  | 6'-7" | 88  |
|       | 6'-0" | 16  | 4'-10" | 52  |       | 9'-0"  | 24  | 6'-7" | 105 |
| 5'-0" | 4'-0" | 12  | 4'-10" | 39  | 8'-0" | 8'-0"  | 20  | 7'-2" | 96  |
|       | 5'-0" | 14  | 4'-10" | 45  |       | 9'-0"  | 24  | 7'-2" | 115 |
|       | 6'-0" | 16  | 4'-10" | 52  |       | 10'-0" | 26  | 7'-2" | 125 |
| 6'-0" | 5'-0" | 14  | 5'-5"  | 51  | 9'-0" | 9'-0"  | 24  | 7'-9" | 124 |
|       | 6'-0" | 16  | 5'-5"  | 58  |       | 10'-0" | 26  | 7'-9" | 135 |
|       | 7'-0" | 18  | 5'-5"  | 65  |       | 10'-0" | 26  | 8'-5" | 146 |

TEXAS HIGHWAY DEPARTMENT  
**PARALLEL WINGS 30° SKEW**  
 FOR SINGLE BOX CULVERTS  
 SIZES 3' x 2' TO 10' x 10'

PW-30°

|    |        |         |           |           |       |                         |           |
|----|--------|---------|-----------|-----------|-------|-------------------------|-----------|
| DN | CESEWH | DRAWING | DATE      | PER. NO.  | STATE | FEDERAL AID PROJECT NO. | SHEET NO. |
| EX | DN     | WH      | ORIGINAL  | JAN 1950  | 6     | TEXAS                   | 17 OF 27  |
| DW | MDA    | Rev     | Oct 1958  |           |       |                         |           |
| CD | DW     | KM      | Rev       | Jan 1959  |       |                         |           |
| TR | AOB    | Rev     | Nov. 1964 |           |       |                         |           |
| EX | TR     | MDA     | Rev       | Nov. 1967 |       |                         |           |