# BILL OF REINFORCING FOR ONE HEADWALL 30° SKEW CULVERT SPAN X CULVERT HEIGHT

| LOCATION | SHAPE | BAR | 12' X 12' NO. | 12' X 12' LENGTH | 12' X 12' WT. | 12' X 10' NO. | 12' X 10' LENGTH | 12' X 10' WT. | 12' X 8' NO. | 12' X 8' LENGTH | 12' X 8' WT. | 12' X 6' NO. | 12' X 6' LENGTH | 12' X 6' WT. | 10' X 12' NO. | 10' X 12' LENGTH | 10' X 12' WT. | 10' X 10' NO. | 10' X 10' LENGTH | 10' X 10' WT. | 10' X 8' NO. | 10' X 8' LENGTH | 10' X 8' WT. | 10' X 6' NO. | 10' X 6' LENGTH | 10' X 6' WT. | 10' X 5' NO. | 10' X 5' LENGTH | 10' X 5' WT. | 10' X 4' NO. | 10' X 4' LENGTH | 10' X 4' WT. | BAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FENCE ANCHOR | | 5fa | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 2 | 3'-1 | 7 | 5fa |
| WINGWALL, B.F.H. L | | 4b1 | 1 | 54'-3 | 37 | 1 | 45'-11 | 32 | 1 | 37'-7 | 25 | 1 | 29'-3 | 20 | 1 | 54'-3 | 37 | 1 | 45'-11 | 32 | 1 | 37'-7 | 25 | 1 | 29'-3 | 20 | 1 | 25'-1 | 17 | 1 | 20'-11 | 14 | 4b1 |
| WINGWALL, B.F.H. S | | 4b2 | 1 | 41'-3 | 29 | 1 | 35'-1 | 23 | 1 | 28'-10 | 19 | 1 | 22'-7 | 15 | 1 | 41'-3 | 29 | 1 | 35'-1 | 23 | 1 | 28'-10 | 19 | 1 | 22'-7 | 15 | 1 | 19'-6 | 13 | 1 | 16'-4 | 11 | 4b2 |
| WINGWALL, B.F.H. L | | 4b3 | 10 VAR | 14'-9 TO 52'-4 | 228 | 8 VAR | 14'-9 TO 44'-0 | 158 | 6 VAR | 14'-9 TO 35'-7 | 101 | 4 VAR | 14'-9 TO 27'-4 | 56 | 10 VAR | 14'-9 TO 52'-4 | 228 | 8 VAR | 14'-9 TO 44'-0 | 158 | 6 VAR | 14'-9 TO 35'-7 | 101 | 4 VAR | 14'-9 TO 27'-4 | 56 | 3 VAR | 14'-9 TO 23'-1 | 38 | 2 VAR | 14'-9 TO 18'-11 | 22 | 4b3 |
| WINGWALL, B.F.H. S | | 4b4 | 10 VAR | 11'-11 TO 39'-10 | 173 | 8 VAR | 11'-11 TO 33'-8 | 122 | 6 VAR | 11'-11 TO 27'-5 | 79 | 4 VAR | 11'-11 TO 21'-2 | 44 | 10 VAR | 11'-11 TO 39'-10 | 173 | 8 VAR | 11'-11 TO 33'-8 | 122 | 6 VAR | 11'-11 TO 27'-5 | 79 | 4 VAR | 11'-11 TO 21'-2 | 44 | 3 VAR | 11'-11 TO 18'-1 | 30 | 2 VAR | 11'-10 TO 14'-11 | 18 | 4b4 |
| WINGWALL, F.F.H. L | | 5b5 | 1 | 54'-3 | 59 | 1 | 45'-11 | 50 | 1 | 37'-7 | 39 | 1 | 29'-3 | 31 | 1 | 54'-3 | 59 | 1 | 45'-11 | 50 | 1 | 37'-7 | 39 | 1 | 29'-3 | 31 | 1 | 25'-1 | 26 | 1 | 20'-11 | 22 | 5b5 |
| WINGWALL, F.F.H. S | | 5b6 | 1 | 41'-3 | 45 | 1 | 35'-1 | 37 | 1 | 28'-10 | 30 | 1 | 22'-7 | 24 | 1 | 41'-3 | 45 | 1 | 35'-1 | 37 | 1 | 28'-10 | 30 | 1 | 22'-7 | 24 | 1 | 19'-6 | 20 | 1 | 16'-4 | 17 | 5b6 |
| WINGWALL, F.F.H. L | | 5b7 | 11 VAR | 10'-7 TO 52'-4 | 367 | 9 VAR | 10'-7 TO 44'-0 | 258 | 7 VAR | 10'-7 TO 35'-7 | 169 | 5 VAR | 10'-7 TO 27'-4 | 99 | 11 VAR | 10'-7 TO 52'-4 | 367 | 9 VAR | 10'-7 TO 44'-0 | 258 | 7 VAR | 10'-7 TO 35'-7 | 169 | 5 VAR | 10'-7 TO 27'-4 | 99 | 4 VAR | 10'-7 TO 23'-1 | 70 | 3 VAR | 10'-7 TO 18'-11 | 46 | 5b7 |
| WINGWALL, F.F.H. S | | 5b8 | 11 VAR | 8'-10 TO 39'-10 | 279 | 9 VAR | 8'-10 TO 33'-8 | 199 | 7 VAR | 8'-10 TO 27'-5 | 132 | 5 VAR | 8'-10 TO 21'-2 | 78 | 11 VAR | 8'-10 TO 39'-10 | 279 | 9 VAR | 8'-10 TO 33'-8 | 199 | 7 VAR | 8'-10 TO 27'-5 | 132 | 5 VAR | 8'-10 TO 21'-2 | 78 | 4 VAR | 8'-10 TO 18'-1 | 56 | 3 VAR | 8'-10 TO 14'-11 | 37 | 5b8 |
| WINGWALL, F.F.V. L | | 4c1 | 51 VAR | 2'-10 TO 14'-9 | 299 | 43 VAR | 2'-10 TO 12'-10 | 225 | 35 VAR | 2'-10 TO 10'-11 | 161 | 26 VAR | 2'-10 TO 21'-2 | 101 | 51 VAR | 2'-9 TO 14'-8 | 297 | 43 VAR | 2'-9 TO 12'-9 | 223 | 35 VAR | 2'-9 TO 10'-10 | 159 | 26 VAR | 2'-9 TO 8'-8 | 99 | 22 VAR | 2'-9 TO 7'-9 | 77 | 18 VAR | 2'-9 TO 6'-9 | 57 | 4c1 |
| WINGWALL, F.F.V. S | | 4c2 | 38 VAR | 2'-11 TO 14'-10 | 225 | 32 VAR | 2'-11 TO 12'-11 | 169 | 26 VAR | 2'-11 TO 10'-11 | 120 | 20 VAR | 2'-11 TO 9'-0 | 80 | 38 VAR | 2'-10 TO 14'-9 | 223 | 32 VAR | 2'-10 TO 12'-10 | 167 | 26 VAR | 2'-10 TO 10'-10 | 119 | 20 VAR | 2'-10 TO 8'-11 | 78 | 17 VAR | 2'-10 TO 8'-0 | 62 | 14 VAR | 2'-10 TO 7'-0 | 46 | 4c2 |
| WINGWALL, F.F.V. L | | 4c3 | 2 | 13'-9 | 18 | 2 | 11'-9 | 16 | 1 | 9'-9 | 7 | 2 | 7'-9 | 10 | 2 | 13'-8 | 18 | 2 | 11'-8 | 16 | 1 | 9'-8 | 6 | 2 | 7'-8 | 10 | 2 | 6'-8 | 9 | 2 | 5'-8 | 8 | 4c3 |
| WINGWALL, F.F.V. S | | 4c3 | 2 | 13'-9 | 18 | 2 | 11'-9 | 16 | 1 | 9'-9 | 7 | 1 | 7'-9 | 5 | 2 | 13'-8 | 18 | 2 | 11'-8 | 16 | 1 | 9'-8 | 6 | 1 | 7'-8 | 5 | 1 | 6'-8 | 4 | 1 | 5'-8 | 4 | 4c3 |
| WINGWALL, B.F.V. L | | 5c4 | 11 VAR | 2'-10 TO 5'-2 | 46 | 11 VAR | 2'-10 TO 5'-2 | 46 | 11 VAR | 2'-10 TO 5'-2 | 46 | 11 VAR | 2'-10 TO 5'-2 | 46 | 11 VAR | 2'-9 TO 5'-1 | 45 | 11 VAR | 2'-9 TO 5'-1 | 45 | 11 VAR | 2'-9 TO 5'-1 | 45 | 11 VAR | 2'-9 TO 5'-1 | 45 | 11 VAR | 2'-9 TO 5'-1 | 45 | 11 VAR | 2'-9 TO 5'-1 | 45 | 5c4 |
| WINGWALL, B.F.V. S | | 5c5 | 5 VAR | 2'-11 TO 4'-2 | 18 | 5 VAR | 2'-11 TO 4'-2 | 18 | 5 VAR | 2'-11 TO 4'-2 | 18 | 5 VAR | 2'-11 TO 4'-2 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5 VAR | 2'-10 TO 4'-1 | 18 | 5c5 |
| WINGWALL, B.F.V. L | | 5c6 | 40 VAR | 9'-4 TO 18'-8 | 584 | 32 VAR | 9'-4 TO 16'-9 | 435 | 24 VAR | 9'-4 TO 14'-10 | 302 | 15 VAR | 9'-4 TO 12'-8 | 172 | 40 VAR | 9'-3 TO 18'-7 | 581 | 32 VAR | 9'-3 TO 16'-8 | 433 | 24 VAR | 9'-3 TO 14'-9 | 300 | 15 VAR | 9'-3 TO 12'-7 | 171 | 11 VAR | 9'-3 TO 11'-7 | 120 | 7 VAR | 9'-3 TO 10'-8 | 73 | 5c6 |
| WINGWALL, B.F.V. S | | 5c7 | 33 VAR | 8'-6 TO 18'-10 | 470 | 27 VAR | 8'-6 TO 16'-10 | 357 | 21 VAR | 8'-6 TO 14'-11 | 256 | 15 VAR | 8'-6 TO 13'-0 | 168 | 33 VAR | 8'-5 TO 18'-9 | 467 | 27 VAR | 8'-5 TO 16'-8 | 353 | 21 VAR | 8'-5 TO 14'-9 | 254 | 15 VAR | 8'-5 TO 12'-10 | 166 | 12 VAR | 8'-5 TO 12'-0 | 128 | 9 VAR | 8'-5 TO 11'-0 | 91 | 5c7 |
| WINGWALL, B.F.V. L | | 5c8 | 29 | 10'-6 | 318 | 21 | 10'-6 | 230 | 13 | 10'-6 | 142 | - | - | - | 29 | 10'-6 | 318 | 21 | 10'-6 | 230 | 13 | 10'-6 | 142 | - | - | - | - | - | - | - | - | - | 5c8 |
| WINGWALL, B.F.V. S | | 5c8 | 20 | 10'-6 | 219 | 14 | 10'-6 | 153 | 8 | 10'-6 | 88 | - | - | - | 20 | 10'-6 | 219 | 14 | 10'-6 | 153 | 8 | 10'-6 | 88 | - | - | - | - | - | - | - | - | - | 5c8 |
| WINGWALL, B.F.V. L | | 5c9 | 2 | 17'-9 | 37 | 2 | 15'-9 | 33 | 1 | 13'-9 | 14 | 2 | 11'-9 | 25 | 2 | 17'-8 | 37 | 2 | 15'-8 | 33 | 1 | 13'-8 | 14 | 2 | 11'-8 | 24 | 2 | 10'-8 | 22 | 2 | 9'-8 | 20 | 5c9 |
| WINGWALL, B.F.V. S | | 5c9 | 2 | 17'-9 | 37 | 2 | 15'-9 | 33 | 1 | 13'-9 | 14 | 1 | 11'-9 | 12 | 2 | 17'-8 | 37 | 2 | 15'-8 | 33 | 1 | 13'-8 | 14 | 1 | 11'-8 | 12 | 1 | 10'-8 | 11 | 1 | 9'-8 | 10 | 5c9 |
| APRON, LONGIT.,BOTT. | | 4d1 | 9 | 31'-3 | 188 | 9 | 26'-7 | 160 | 9 | 22'-0 | 132 | 9 | 17'-4 | 104 | 7 | 31'-3 | 146 | 7 | 26'-7 | 124 | 7 | 22'-0 | 103 | 7 | 17'-4 | 81 | 7 | 15'-1 | 71 | 7 | 12'-9 | 60 | 4d1 |
| APRON, LONGIT.,BOTT. L | | 4d2 | 3 | 48'-0 | 100 | 3 | 39'-7 | 79 | 3 | 31'-4 | 63 | 3 | 23'-1 | 47 | 3 | 48'-0 | 100 | 3 | 39'-7 | 79 | 3 | 31'-4 | 63 | 3 | 23'-1 | 47 | 3 | 19'-0 | 38 | 3 | 14'-11 | 30 | 4d2 |
| APRON, LONGIT.,BOTT. S | | 4d3 | 3 | 36'-9 | 74 | 3 | 30'-8 | 61 | 3 | 24'-5 | 49 | 3 | 18'-4 | 37 | 3 | 36'-9 | 74 | 3 | 30'-8 | 61 | 3 | 24'-5 | 49 | 3 | 18'-4 | 37 | 3 | 15'-3 | 31 | 3 | 12'-3 | 25 | 4d3 |
| APRON, LONGIT.,TOP | | 6f1 | 12 | 31'-3 | 563 | 12 | 26'-7 | 479 | 12 | 22'-0 | 397 | 12 | 17'-4 | 312 | 10 | 31'-3 | 469 | 10 | 26'-7 | 399 | 10 | 22'-0 | 330 | 10 | 17'-4 | 260 | 10 | 15'-1 | 227 | 10 | 12'-9 | 192 | 6f1 |
| APRON, LONGIT.,TOP L | | 6f2 | 10 VAR | 6'-7 TO 27'-5 | 255 | 8 VAR | 6'-9 TO 23'-0 | 178 | 6 VAR | 6'-8 TO 18'-4 | 112 | 4 VAR | 6'-7 TO 13'-8 | 61 | 10 VAR | 6'-7 TO 27'-5 | 255 | 8 VAR | 6'-9 TO 23'-0 | 178 | 6 VAR | 6'-8 TO 18'-4 | 112 | 4 VAR | 6'-7 TO 13'-8 | 61 | 3 VAR | 6'-7 TO 11'-4 | 40 | 2 VAR | 6'-7 TO 9'-0 | 23 | 6f2 |
| APRON, LONGIT.,TOP S | | 6f3 | 8 VAR | 5'-8 TO 27'-5 | 198 | 6 VAR | 7'-2 TO 22'-9 | 135 | 5 VAR | 5'-7 TO 18'-1 | 89 | 3 VAR | 7'-2 TO 13'-6 | 47 | 8 VAR | 5'-8 TO 27'-5 | 198 | 6 VAR | 7'-2 TO 22'-9 | 135 | 5 VAR | 5'-7 TO 18'-1 | 89 | 3 VAR | 7'-2 TO 13'-6 | 47 | 3 VAR | 4'-10 TO 11'-2 | 36 | 2 VAR | 5'-7 TO 8'-10 | 22 | 6f3 |
| APRON, LONGIT.,TOP L | | 6f4 | 1 | 54'-3 | 84 | 1 | 45'-11 | 72 | 1 | 37'-7 | 56 | 1 | 29'-3 | 44 | 1 | 54'-3 | 84 | 1 | 45'-11 | 72 | 1 | 37'-7 | 56 | 1 | 29'-3 | 44 | 1 | 25'-1 | 38 | 1 | 20'-11 | 31 | 6f4 |
| APRON, LONGIT.,TOP S | | 6f5 | 1 | 41'-3 | 65 | 1 | 35'-1 | 53 | 1 | 28'-10 | 43 | 1 | 22'-7 | 34 | 1 | 41'-3 | 65 | 1 | 35'-1 | 53 | 1 | 28'-10 | 43 | 1 | 22'-7 | 34 | 1 | 19'-6 | 29 | 1 | 16'-4 | 25 | 6f5 |
| PARAPET, VERTICAL | | 4f1 | 25 | 6'-4 | 106 | 25 | 6'-4 | 106 | 25 | 6'-4 | 106 | 25 | 6'-4 | 106 | 21 | 6'-4 | 89 | 21 | 6'-4 | 89 | 21 | 6'-4 | 89 | 21 | 6'-4 | 89 | 21 | 6'-4 | 89 | 21 | 6'-4 | 89 | 4f1 |
| PARAPET, HORIZONTAL | | 7j1 | 4 | 14'-2 | 116 | 4 | 14'-2 | 116 | 4 | 14'-2 | 116 | 4 | 14'-2 | 116 | 4 | 11'-10 | 97 | 4 | 11'-10 | 97 | 4 | 11'-10 | 97 | 4 | 11'-10 | 97 | 4 | 11'-10 | 97 | 4 | 11'-10 | 97 | 7j1 |
| APRON, TRANS., TOP | | 6m1 | 6 VAR | 14'-11 TO 15'-11 | 139 | 6 VAR | 14'-7 TO 15'-6 | 136 | 6 VAR | 14'-7 TO 15'-7 | 136 | 6 VAR | 14'-5 TO 15'-7 | 134 | 5 VAR | 12'-10 TO 13'-7 | 99 | 5 VAR | 12'-6 TO 13'-3 | 97 | 5 VAR | 12'-6 TO 13'-3 | 97 | 5 VAR | 12'-4 TO 13'-1 | 95 | 5 VAR | 12'-4 TO 13'-1 | 95 | 5 VAR | 12'-4 TO 13'-1 | 95 | 6m1 |
| APRON, TRANS., TOP | | 6m2 | 29 VAR | 16'-0 TO 26'-6 | 926 | 23 VAR | 15'-8 TO 23'-11 | 684 | 17 VAR | 15'-8 TO 21'-8 | 477 | 11 VAR | 15'-6 TO 19'-3 | 287 | 31 VAR | 13'-8 TO 24'-11 | 898 | 25 VAR | 13'-4 TO 22'-4 | 670 | 19 VAR | 13'-4 TO 20'-1 | 477 | 12 VAR | 13'-2 TO 17'-3 | 274 | 9 VAR | 13'-2 TO 16'-2 | 198 | 6 VAR | 13'-2 TO 15'-0 | 127 | 6m2 |
| APRON, TRANS., TOP | | 6m3 | 6 | 18'-2 | 164 | 6 | 16'-10 | 152 | 6 | 15'-9 | 142 | 6 | 14'-5 | 130 | 5 | 16'-6 | 124 | 5 | 15'-2 | 114 | 5 | 13'-11 | 105 | 5 | 12'-7 | 94 | 5 | 12'-0 | 90 | 5 | 11'-5 | 86 | 6m3 |
| APRON, TRANS., BOTT. | | 6m4 | 24 VAR | 8'-10 TO 24'-6 | 601 | 20 VAR | 8'-10 TO 21'-9 | 459 | 16 VAR | 8'-10 TO 19'-1 | 335 | 12 VAR | 8'-10 TO 16'-4 | 226 | 24 VAR | 6'-6 TO 22'-2 | 517 | 20 VAR | 6'-6 TO 19'-6 | 391 | 16 VAR | 6'-6 TO 16'-9 | 279 | 12 VAR | 6'-6 TO 14'-0 | 185 | 10 VAR | 6'-6 TO 12'-8 | 144 | 8 VAR | 6'-6 TO 11'-4 | 107 | 6m4 |
| CURTAIN, HORIZONTAL | | 6p1 | 4 | 14'-3 | 86 | 4 | 14'-3 | 86 | 4 | 14'-3 | 86 | 4 | 14'-3 | 86 | 4 | 12'-0 | 72 | 4 | 12'-0 | 72 | 4 | 12'-0 | 72 | 4 | 12'-0 | 72 | 4 | 12'-0 | 72 | 4 | 11'-11 | 72 | 6p1 |
| CURTAIN, HORIZONTAL L | | 6p2 | 4 | 28'-0 | 168 | 4 | 24'-0 | 144 | 4 | 20'-0 | 120 | 4 | 16'-0 | 96 | 4 | 28'-0 | 168 | 4 | 24'-0 | 144 | 4 | 20'-0 | 120 | 4 | 16'-0 | 96 | 4 | 14'-0 | 84 | 4 | 12'-0 | 72 | 6p2 |
| CURTAIN, HORIZONTAL S | | 6p3 | 4 | 16'-0 | 96 | 4 | 13'-11 | 84 | 4 | 11'-10 | 71 | 4 | 9'-8 | 58 | 4 | 16'-0 | 96 | 4 | 13'-11 | 84 | 4 | 11'-10 | 71 | 4 | 9'-8 | 58 | 4 | 8'-8 | 52 | 4 | 7'-8 | 46 | 6p3 |
| WING SLOPE, BOTH F. L | | 6s1 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 2 | 8'-0 | 24 | 6s1 |
| WING SLOPE, BOTH F. S | | 6s2 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 2 | 6'-11 | 21 | 6s2 |
| WING SLOPE, BOTH F. L | | 6s3 | 2 | 49'-4 | 154 | 2 | 40'-9 | 128 | 2 | 32'-2 | 97 | 2 | 23'-7 | 71 | 2 | 49'-4 | 154 | 2 | 40'-9 | 128 | 2 | 32'-2 | 97 | 2 | 23'-7 | 71 | 2 | 19'-4 | 58 | 2 | 15'-0 | 45 | 6s3 |
| WING SLOPE, BOTH F. S | | 6s4 | 2 | 38'-6 | 116 | 2 | 31'-11 | 96 | 2 | 25'-4 | 76 | 2 | 18'-10 | 57 | 2 | 38'-6 | 116 | 2 | 31'-11 | 96 | 2 | 25'-4 | 76 | 2 | 18'-10 | 57 | 2 | 15'-7 | 47 | 2 | 12'-3 | 37 | 6s4 |
| WING SLOPE, F.F L | | 6s5 | 1 | 54'-7 | 85 | 1 | 46'-0 | 72 | 1 | 37'-5 | 56 | 1 | 28'-10 | 43 | 1 | 54'-7 | 85 | 1 | 46'-0 | 72 | 1 | 37'-5 | 56 | 1 | 28'-10 | 43 | 1 | 24'-9 | 37 | 1 | 20'-3 | 30 | 6s5 |
| WING SLOPE, F.F S | | 6s6 | 1 | 42'-8 | 67 | 1 | 36'-1 | 54 | 1 | 29'-6 | 44 | 1 | 23'-0 | 35 | 1 | 42'-8 | 67 | 1 | 36'-1 | 54 | 1 | 29'-6 | 44 | 1 | 23'-0 | 35 | 1 | 19'-9 | 30 | 1 | 16'-5 | 25 | 6s6 |
| CURTAIN, VERT. | | 5t1 | 37 | 7'-11 | 306 | 31 | 7'-5 | 240 | 26 | 6'-11 | 188 | 22 | 6'-5 | 147 | 34 | 7'-11 | 281 | 29 | 7'-5 | 224 | 24 | 6'-11 | 173 | 20 | 6'-5 | 134 | 17 | 6'-5 | 113 | 15 | 6'-5 | 100 | 5t1 |

| ESTIMATED QUANTITIES ONE HEADWALL | | 12' X 12' | 12' X 10' | 12' X 8' | 12' X 6' | 10' X 12' | 10' X 10' | 10' X 8' | 10' X 6' | 10' X 5' | 10' X 4' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| REINF. STEEL | | 8215 lbs. | 6436 lbs. | 4812 lbs. | 3334 lbs. | 7801 lbs. | 6084 lbs. | 4509 lbs. | 3058 lbs. | 2534 lbs. | 2047 lbs. |
| CONCRETE | PARAPET △ | 2.0 / 77.5 | 1.9 / 55.5 | 1.9 / 40.7 | 1.9 / 27.4 | 1.9 / 72.4 | 1.8 / 51.3 | 1.8 / 37.5 | 1.7 / 24.8 | 1.7 / 20.3 | 1.7 / 16.1 |
| | WINGWALLS | 26.4 cu. yd. | 16.0 cu. yd. | 10.8 cu. yd. | 6.0 cu. yd. | 26.4 cu. yd. | 16.0 cu. yd. | 10.8 cu. yd. | 6.0 cu. yd. | 4.4 cu. yd. | 3.0 cu. yd. |
| | FOOTINGS | 49.1 | 37.6 | 28.0 | 19.5 | 44.1 | 33.5 | 24.9 | 17.1 | 14.2 | 11.4 |

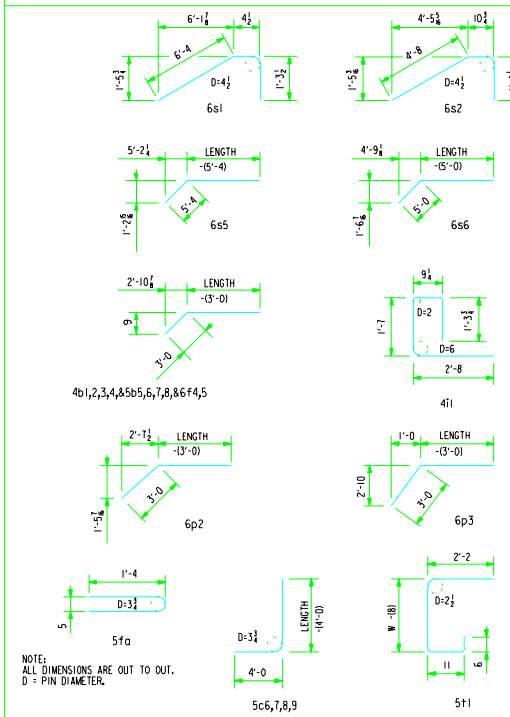
△ NOTE: INCLUDES TOP OF WINGWALL QUANTITIES. WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE OF 2'-0 FOR LAP.

SUBSCRIPT L DENOTES LONG WING.
SUBSCRIPT S DENOTES SHORT WING.

NOTES:

1. SEE DRAWING RCB-G1-87 FOR GENERAL INFORMATION, SPECIFICATIONS, AND DESIGN STRESSES.

# BENT BAR DETAILS




NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

## HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.

THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.

CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.

HORIZONTAL TAILS OF BARS "b" & "s" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "d", "6f1", "6f4" AND "6f5" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET.

THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

LATEST REVISION DATE : 1-1-98

APPROVED BY : William A. Kaufman

STANDARD DESIGN

# FLARED WING HEADWALLS

FOR
REINFORCED CONCRETE BOX CULVERTS

HIGHWAY DIVISION
IOWA DEPARTMENT OF TRANSPORTATION

MAY , 1987

FWH 30-1-87

FWH30I.SOI REVISED 1/98; BEND DIMENSIONS OF 4i1 BAR CHANGED.

XXXXXXXXXXSYSTEMTIME XXXXXXXUSERNAME XXXXXXXXXX