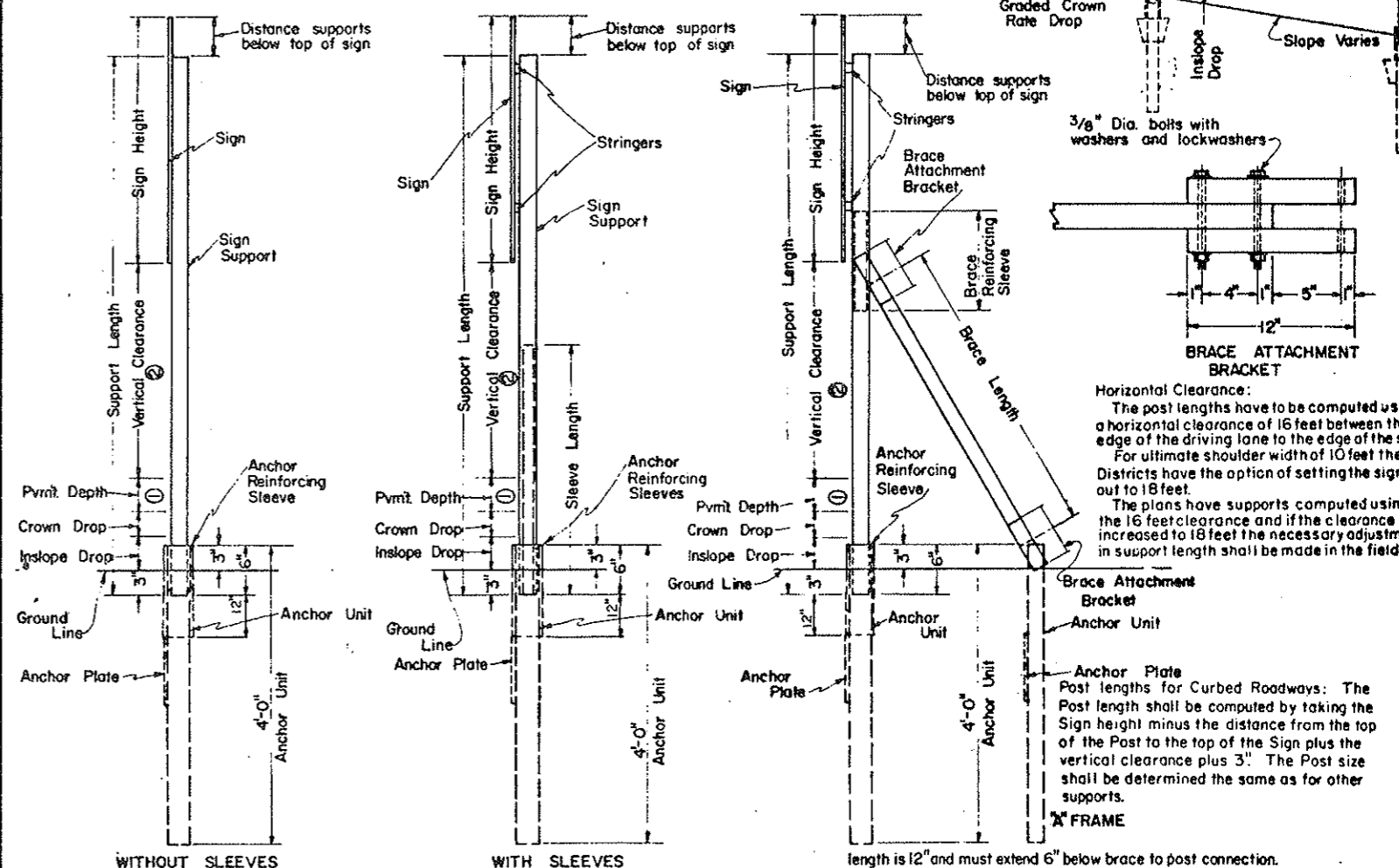
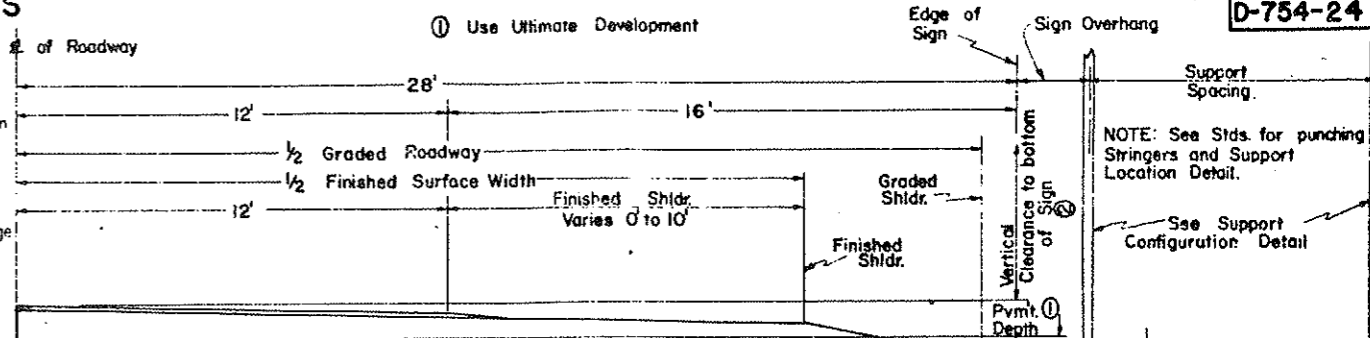


# ASSEMBLY DETAILS Regulatory, Warning and Guide Signs

| SIGN TYPE OR SIZE     | ULTIMATE PVTM DEPTH PLUS SIGN HEIGHT MINUS THE SIGN OVERHANG |     |     |     |     |     |     |     |     |     |     |     |     |     |       |       |       |        |     |     |     |     |                     |      |                     |       | SUPPORT SPACING     |         |           |                     | SUPPORT LENGTH & SIZE without Sleeves |  |  |  | SUPPORT LENGTH & SIZE with Sleeve |  |  |  | SUPPORT LENGTH & SIZE Using "A" Frame |                     | AREA<br>Sq. Ft. |
|-----------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|--------|-----|-----|-----|-----|---------------------|------|---------------------|-------|---------------------|---------|-----------|---------------------|---------------------------------------|--|--|--|-----------------------------------|--|--|--|---------------------------------------|---------------------|-----------------|
|                       | DISTANCE SIGN SUPPORT IS BELOW THE SIGN TOP                  |     |     |     |     |     |     |     |     |     |     |     |     |     |       |       |       |        |     |     |     |     |                     |      |                     |       | Inslope             |         |           |                     | Max. Support Length                   |  |  |  | Max. Support Length               |  |  |  | Post Size                             | Max. Support Length |                 |
|                       | Ultimate Pavement Depth                                      |     |     |     |     |     |     |     |     |     |     |     |     |     |       |       |       |        |     |     |     |     |                     |      |                     |       | Vertical Drop       |         |           |                     | Vertical Drop                         |  |  |  | Vertical Drop                     |  |  |  |                                       |                     |                 |
|                       | 8"   | 9"  | 10" | 11" | 12" | 13" | 14" | 15" | 16" | 18" | 20" | 22" | 24" | 26" | 6:1   | 4:1   | 3:1   | 2:1    | 6:1 | 4:1 | 3:1 | 2:1 | Max. Support Length | Size | Max. Support Length | Size  | Max. Support Length | Size    | Post Size | Max. Support Length |                                       |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 36" Cir.              | 44   | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 54  | 56  | 58  | 60  | 62  | 3     | 4     | 6     | 9      | 6   | 8   | 12  | 126 | 2                   | 163  | 2 1/4               | 241   | 2 1/4               | 282 1/4 |           | 7.07                |                                       |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 48" Cir.              | 50   | 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 60  | 62  | 64  | 66  | 68  | 2     | 3     | 4     | 6      | 4   | 6   | 8   | 12  | 126                 | 2    | 163                 | 2 1/4 | 241                 | 2 1/4   | 282 1/4   |                     | 12.57                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 48" Pend.             | 38   | 39  | 40  | 41  | 42  | 44  | 45  | 46  | 47  | 49  | 51  | 53  | 55  | 57  | 5     | 7 1/2 | 9 1/4 | 14 1/4 |     |     |     |     | 127 1/2             | 2    | 166                 | 2 1/4 |                     |         |           |                     | 5.56                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 54" Pend.             | 44   | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 54  | 56  | 58  | 60  | 62  | 4 1/2 | 7     | 9 1/4 | 14     |     |     |     |     | 161                 | 2    | 202                 | 2 1/4 |                     |         |           |                     | 10.25                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 24" x 24" BP          | 32   | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40  | 42  | 44  | 46  | 48  | 50  | 2     | 3     | 4     | 6      |     |     |     |     |                     |      |                     |       |                     |         |           |                     | 5.00                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 24" x 24" BP          | 38   | 39  | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 48  | 50  | 52  | 54  | 56  | 2     | 3     | 4     | 6      |     |     |     |     |                     |      |                     |       |                     |         |           |                     | 6.00                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 30" x 30" BP          | 38   | 39  | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 48  | 50  | 52  | 54  | 56  | 2 1/2 | 3 3/4 | 5     | 7 1/2  |     |     |     |     | 124                 | 2    | 160                 | 2 1/4 |                     |         |           |                     | 7.25                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 30" x 30" BP          | 44   | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 54  | 56  | 58  | 60  | 62  | 2 1/2 | 3 3/4 | 5     | 7 1/2  |     |     |     |     |                     |      |                     |       |                     |         |           |                     | 8.50                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 30" x 30" BP          | 35   | 36  | 37  | 38  | 39  | 40  | 41  | 42  | 43  | 45  | 47  | 49  | 51  | 53  | 2 1/2 | 3 3/4 | 5     | 7 1/2  |     |     |     |     |                     |      |                     |       |                     |         |           |                     | 4.69                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 36" School            | 38   | 39  | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 48  | 50  | 52  | 54  | 56  | 3     | 4 1/2 | 6     | 9      |     |     |     |     | 113 1/2             | 2    | 147                 | 2 1/4 | 245 1/2             | 2 1/4   |           |                     | 6.75                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 48" School            | 41   | 42  | 43  | 44  | 45  | 46  | 47  | 48  | 49  | 51  | 53  | 55  | 57  | 59  | 2     | 3     | 4     | 6      | 4   | 6   | 8   | 12  | 122 1/2             | 2    | 160                 | 2 1/4 | 271 1/2             | 2 1/4   |           |                     | 12.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 24" School Speed Ser. | 56   | 57  | 58  | 59  | 60  | 61  | 62  | 63  | 64  | 66  | 68  | 70  | 72  | 74  | 2     | 3     | 4     | 6      |     |     |     |     |                     |      |                     |       |                     |         |           |                     | 8.00                                  |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 36" School Speed Ser. | 80   | 81  | 82  | 83  | 84  | 85  | 86  | 87  | 88  | 90  | 92  | 94  | 96  | 98  | 1     | 1 1/2 | 2     | 3      | 4   | 6   | 8   | 12  |                     |      |                     |       |                     |         |           |                     | 18.75                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 48" School Speed Ser. | 101  | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 111 | 113 | 115 | 117 | 119 | 2     | 3     | 4     | 6      | 4   | 6   | 8   | 12  | 89 1/2              | 2    | 103 1/2             | 2 1/4 | 145                 | 2 1/4   | 2         |                     | 32.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 24" Speed Series      | 35   | 36  | 37  | 38  | 39  | 40  | 41  | 42  | 43  | 45  | 47  | 49  | 51  | 53  | 2     | 3     | 4     | 6      | 8   | 12  | 16  | 24  | 110 1/2             | 2    | 143                 | 2 1/4 | 238 1/2             | 2 1/4   |           |                     | 13.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 36" Speed Series      | 50   | 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 60  | 62  | 64  | 66  | 68  | 3     | 4 1/2 | 6     | 9      | 12  | 18  | 24  | 36  |                     |      |                     |       |                     |         |           |                     | 30.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 48" Speed Series      | 62   | 63  | 64  | 65  | 66  | 67  | 68  | 69  | 70  | 72  | 74  | 76  | 78  | 80  | 4     | 6     | ③     | ③      | 16  | 24  | 32  | ③   | ③                   |      |                     |       |                     |         |           |                     | 52.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |
| 36" D&S               | 68   | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  | 81  | 2 1/4 | 3 1/4 | 4 1/2 | 6 1/2  | 4   | 6   | 8   | 12  | 131 1/2             | 2    | 166                 | 2 1/4 | 269 1/2             | 2 1/4   |           |                     | 13.00                                 |  |  |  |                                   |  |  |  |                                       |                     |                 |

Horizontal Clearance: The 16' clearance from edge of driving lane to edge of sign shall be for all roadways without curb. All Curbed roadways shall have 3' horizontal clearance from the face of curb to the edge of sign unless otherwise noted on the plans.



| Graded Roadway | Inslope And Graded Crown Rate Drop |     |     |     |
|----------------|------------------------------------|-----|-----|-----|
|                | 6:1                                | 4:1 | 3:1 | 2:1 |
| 30             | 30                                 | 43  | 56  | 82  |
| 32             | 28                                 | 40  | 52  | 76  |
| 34             | 26                                 | 37  | 48  | 70  |
| 36             | 25                                 | 35  | 45  | 65  |
| 38             | 23                                 | 32  | 41  | 59  |
| 40             | 21                                 | 29  | 37  | 53  |
| 42             | 19                                 | 26  | 33  | 47  |
| 44             | 18                                 | 24  | 30  | 42  |
| 46             | 16                                 | 21  | 26  | 36  |
| 48             | 14                                 | 18  | 22  | 30  |
| 50             | 12                                 | 15  | 18  | 24  |
| 52             | 11                                 | 13  | 15  | 19  |
| 54             | 9                                  | 10  | 11  | 13  |
| 56             | 7                                  | 7   | 7   | 7   |

NOTES:  
 To determine Sign Support Length and Size, the following method shall be used.  
 A. Locate the size or type of sign to be used in the Table.  
 B. From the Typical Section, determine the Ultimate Pavement Depth and choose the appropriate numeral.  
 C. Add the appropriate Sign Overhang Vertical Drop from the column for Design inslope.  
 D. Add the Inslope Drop plus the Graded Crown Rate Drop from the Table for the appropriate Graded Roadway Width and Design inslope.  
 E. Add the Vertical Clearance as determined from Footnote ② plus 3" of post below ground line.  
 F. Total This is the support length or the first support length if two posts are required.  
 G. If two supports are required, add the Support Spacing Vertical Drop under the column for Design Inslope.  
 H. Compare the support length with the Maximum Support Length in each type and size until it is less than the one shown. This is the support size and configuration required for this size.  
 I. If a sleeve is required, the sleeve length is determined by taking the required support length from the Maximum Support Length of the Small Support Size.

Anchorage units: All anchorage units shall have Anchorage Reinforcing Sleeves except the 3"x3" sizes. Anchor Plates may be omitted when support is placed in concrete side walls.  
 Brace Reinforcing Sleeve: The length of the sleeves determined by taking the support length with out sleeves and subtracted it from the sign height minus the distance the support is below the top of the sign plus 6". If the answer is a minus then no sleeve is used. The minimum length is 12" and must extend 6" below brace to post connection.

③ The computed support lengths exceeds design condition and if signs are required on shapes equal to or over are encountered a special design will be required.  
 Notes: All holes shall be punched round for 3/8" diameter bolt. See plans for sign numbers to be used on all assemblies. All brackets on signs shown on the plans to be placed back to back shall be placed upside down. All holes and stringers shall be placed as shown.

| 11-7-75 REVISIONS |                               | NORTH DAKOTA STATE HIGHWAY DEPARTMENT                  |
|-------------------|-------------------------------|--|
| DATE              | CHANGES                       |  |
| 2-6-76            | Table Revisions               | Submitted: <i>Highway Dept</i><br>Design Engineer      |
| 4-28-77           | Table Revisions               |  |
| 7-7-77            | Table Revisions & Added Notes | Recommended: _____<br>Asst. Chief Engineer, Pre-Const. |
| 1-9-78            | Note Added                    |  |
| 1-27-78           | Table Revisions               | Approved: <i>Chief Eng</i><br>Chief Engineer           |
| 3-22-78           | Assembly Added                |  |
| 3-11-78           | MATERIAL NOTE REMOVED         |  |
| 6-29-78           | Anchor Sleeve                 |  |

Sign Structures are designed using a 75 MPH wind velocity.