### STEP 1: Calculation of area and centroid for individual sign or sign cluster.

**Note:** The centroid and areas have been calculated for frequently used sign clusters. They are shown on Sheets 7, 8, and 9.

| Size x x in. | Local | Global | Global Σ
|-------------|-------|--------|--------
| X | Y | X | Y | X | Y | X | Y |
| (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) | (in.) |
| 20 x 12 | 7.5 | -12.5 | -13.5 | 13.5 | 7.5 | 315 | -4,252.5 | 2,362.5 |
| 21 x 15 | 7.5 | 10.5 | 15.75 | 13.5 | 7.5 | 315 | 4,252.5 | 2,362.5 |
| 24 x 24 | 12 | -12.5 | -13.5 | 13.5 | 15 | 28 | 436 | 5,886 | 12,208 |
| 24 x 24 | 12 | 12 | -13.5 | 13.5 | 15 | 28 | 436 | 5,886 | 12,208 |

- **ΣX** = 2.26 ft.
- **ΣY** = 60,133 in.² = 34.8 ft.²

### STEP 2: Determine the height 'H' from groundline to centroid of the individual sign or sign cluster.

Assumption: \( \dot{X} = 1 \text{ ft.}, \dot{Y} = 1 \text{ ft.} \)

Calculated: \( \dot{X} = -0.1 \text{ ft.}, \dot{Y} = 1.26 \text{ ft.} \)

\[ H = \dot{X} + \dot{Y} = 0.26 \text{ ft.} \]

### STEP 3: Refer to Aluminum Column (Post) Selection Tables and find the intersection point. See Sheet 3.

**ALUMINUM COLUMN (POST) SELECTION TABLE**

<table>
<thead>
<tr>
<th>Size (in. x in.)</th>
<th>Area (sq ft)</th>
<th>Total (sq in.)</th>
<th>( X )</th>
<th>( Y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 4</td>
<td>16</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 x 6</td>
<td>9.6</td>
<td>14.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 x 8</td>
<td>7.6</td>
<td>19.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 x 8</td>
<td>12.8</td>
<td>25.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 x 10</td>
<td>17.4</td>
<td>34.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 x 12</td>
<td>22</td>
<td>44.8</td>
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<td>0</td>
</tr>
<tr>
<td>8 x 8</td>
<td>11.5</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 x 10</td>
<td>17.6</td>
<td>25.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 x 12</td>
<td>23.7</td>
<td>38.8</td>
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<td>0</td>
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<tr>
<td>10 x 10</td>
<td>18.8</td>
<td>37.6</td>
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<td>10 x 12</td>
<td>25</td>
<td>50.2</td>
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</tr>
<tr>
<td>12 x 12</td>
<td>22.5</td>
<td>36</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

For \( H = 11 \text{ ft.} \)

Area = 16 sq ft

- Refer to the Aluminum Column (Post) Selection Table, Sheet 3, and found here for reference.
- To determine the required post size, refer to the intersection of the row labeled "11 sq ft" and the column labeled "4 ft. H" for the example. The intersection value is "4 ft H" (30).
- In the Column (Post) and Foundation Table, the value "47 ft" shows the design requires a 47 ft diameter and 3.5 ft deep Concrete Foundation and 3.0 ft Sub.

### STEP 4: For sign assemblies with signs oriented in two directions, only the sign with the largest area should be analyzed to determine the Column (Post) requirements.

**GUIDE TO USE THIS INDEX**

**GENERAL NOTES: **

1. Shop Drawings:
   - This Index is considered fully detailed. Submit Shop Drawings only for minor modifications not detailed in the Plans.
2. Aluminum Sign, Wind Beans, and Column (Post) Materials:
   - A. Aluminum Plates: ASTM B209, Alloy 6061-T6
   - B. Aluminum Bars and Extruded Shapes: ASTM B221, Alloy 6061-T6
   - C. Aluminum Structural Shapes: ASTM B830, Alloy 6061-T6
   - D. Cast Aluminum: ASTM B26, Alloy A356-T6
   - E. Aluminum Weigh Material: ER 5556 or 3556
3. Sign Mounting Bolts, Nuts, and Washers:
   - A. Stainless Steel Bolts: ASTM F593 Alloy 3, Condition C, CWI or SMI
   - B. Stainless Steel Bolts: ASTM F594
   - C. Stainless Steel Nuts: ASTM F595
4. Sign Mounting Bolts, Nuts, and Washers may be used in lieu of the aluminum button head and flat head bolts as follows:
   - A. Stainless Steel Bolts: ASTM F593
   - B. Stainless Steel Nuts: ASTM F595
   - C. Stainless Steel Washers: ASTM F596
5. Sign Column (Post) Bolts, Nuts, and Washers:
   - A. Galvanized U-Bolt (Column) ASTM A449 or ASTM A193 B7 according to ASTM D1229 with double nuts
   - B. Aluminum Nuts (Sleeves): ASTM F486, Alloy 6061-T6 or 6062-T19 and Washers B221, A31424-T6
   - C. Galvanized High Strength Hex Head Bolts (Bolts/Washers): ASTM F3123, Grade 525, Type 1
   - D. Galvanized Hex Nuts: ASTM A656 Grade OH
   - E. Galvanized Washers: ASTM F537
   - F. Galvanized Bolts: ASTM A307 with Galvanized Hex Nuts and Washers
6. Coatings:
   - A. Aluminum Fasteners: Anodic coating (0.0003 inches min.) and chromate sealed
   - B. High-Strength Steel Bolts Nuts and Washers: ASTM F2329
   - C. All other steel items (excluding stainless steel): Hot-dip Galvanize - ASTM A123
   - D. Repair damaged galvanizing in accordance with Specification 363
7. BREAKAWAY SUPPORT REQUIREMENTS:
   - Install non-frangible aluminum column (post) larger than 32 ft with breakaway supports as shown on Sheet 4. Signs shielded by barrier wall or guardrail do not require breakaway support.
\[
\begin{align*}
X_C &= \frac{\sum (X_i \times Y_i)}{\sum Y_i} \\
C' &= \frac{\sum (Y_i \times Y_i)}{\sum Y_i}
\end{align*}
\]

- \(X_i\) = Area of individual sign
- \(Y_i\) = Height of the edge of pavement from the mounting elevation
- \(C'\) = Height of the centroid of the sign or cluster from the edge of pavement elevation
- \(Y'\) = Height of the centroid of the sign or cluster from the bottom of the sign or cluster
- \(h\) = Individual sign height
- \(H'\) = Height of sign or cluster centroid from groundline
- \(a\) = Individual sign width
- \(A'\) = Individual Sign centroid height from bottom of sign cluster
- \(X'\) = Individual sign horizontal location from \(\alpha\) Aluminum Column (Post)
- \(X'\) = Individual sign horizontal location from \(\alpha\) Aluminum Column (Post)

**NOTES:**
1. For 'B & 'C' see Index 700-101 and Roadway Plans.
2. Do not exceed an area of 30 SF or a width of 60 inches for a sign or a sign cluster, including rotated sign panels.
3. Vertical sign spacing (1" shown on Sign Cluster detail) also applies to rotated signs.

**CALCULATION OF SIGN CLUSTER CENTROID**

**TYPICAL SECTION**

**CENTROID**

**SIGN CLUSTER**

\(X'\) Aluminum Column (Post)

\(Y'\) Aluminum Column (Post)

\(X'\) Aluminum Column (Post)

\(Y'\) Aluminum Column (Post)

**NORTH EAST**

**COUNTY**

\(X'\) Aluminum Column (Post)

\(Y'\) Aluminum Column (Post)

\(X'\) Aluminum Column (Post)

\(Y'\) Aluminum Column (Post)

**RAILROAD**

**SCHOOL**

**SHIELD**

**COUNTY**

**DESIGN EXAMPLE - CENTROID**

**SINGLE COLUMN GROUND SIGNS**

INDEX 700-010 SHEET 2 of 10

**FY 2020-21 STANDARD PLANS**
### ALUMINUM COLUMN (POST) SELECTION TABLE (O.D. in.)

<table>
<thead>
<tr>
<th>Diameter (in)</th>
<th>Outside Diameter (in)</th>
<th>Wall Thk. (in)</th>
<th>Embedment Depth (ft)</th>
<th>Concrete (Class I)</th>
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<tbody>
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<td>3 ft</td>
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<td>0.5</td>
<td>45</td>
<td>9</td>
</tr>
<tr>
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<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>11</td>
</tr>
<tr>
<td>5 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>13</td>
</tr>
<tr>
<td>6 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>15</td>
</tr>
<tr>
<td>7 ft</td>
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<td>0.5</td>
<td>45</td>
<td>17</td>
</tr>
<tr>
<td>8 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>9 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>21</td>
</tr>
<tr>
<td>10 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>23</td>
</tr>
<tr>
<td>11 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>12 ft</td>
<td>3.5</td>
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<td>45</td>
<td>27</td>
</tr>
<tr>
<td>13 ft</td>
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<td>29</td>
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<td>31</td>
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<td>33</td>
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<td>16 ft</td>
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<td>35</td>
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<tr>
<td>17 ft</td>
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<td>0.5</td>
<td>45</td>
<td>37</td>
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<td>45</td>
<td>39</td>
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<tr>
<td>19 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>41</td>
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<td>20 ft</td>
<td>3.5</td>
<td>0.5</td>
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<td>45</td>
<td>45</td>
</tr>
<tr>
<td>22 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>47</td>
</tr>
<tr>
<td>23 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>24 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>25 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>53</td>
</tr>
<tr>
<td>26 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>27 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>57</td>
</tr>
<tr>
<td>28 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>59</td>
</tr>
<tr>
<td>29 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>61</td>
</tr>
<tr>
<td>30 ft</td>
<td>3.5</td>
<td>0.5</td>
<td>45</td>
<td>63</td>
</tr>
</tbody>
</table>

### STANDARD PLANS

**OFFSET SIGN**

- **OFFSET SIGN**
  - For offset sign placement see Index 700-101.
  - For signs with widths greater than 4' see Index 700-011.
  - Offset signs with driven posts require a soil plate.

### COLUMN AND FOUNDATION TABLES

**COLUMN AND FOUNDATION TABLES**

**INDEX**

700-010

**SHEET**

3 of 10

**DESCRIPTION:**

FY 2020-21

STANDARD PLANS
SLIP BASE AND FOUNDATION DETAILS

NOTES:
1. Foundation Notes for Slip Base:
   a. Place Stub into concrete foundation given in the FOUNDATION TABLE using Class I Concrete.
   b. Slip Base Fabrication Notes:
      1. The difference between the O.D. of the post and I.D. of the Sleeve must be 3/4” or less.
      2. Either a Welded Stub Base or Bolted Stub/Sleeve Base may be used in Slip Base.
      3. For cast base plates bolted to foundation stubs, use a foundation stub the same size as the sign column (Post).

3. Slip Base Assembly Instructions:
   a. Assemble the Slip Base as follows:
      1. Place Post into Sleeve and connect using 2 – 1/2” diameter Sleeve Bolts.
      2. Assemble top base plate to bottom Base Plate using Base Bolts (high strength) with 3 washers per bolt. (See Detail ‘A’):
         a. Place one washer on each Base Bolt between the bottom Base Plate and the Bolt Keeper Plate.
         b. Place the next washer between the Bottom Base Plate and the Base Bolt head.
         c. Use brass or galvanized steel shims to plumb the Post.
         d. Add the top base plate section.
         e. Place the third washer between the Top Base Plate and the Nut.
   b. Orient the Bolt Keeper Plates in the Direction of Traffic.
   c. Tighten Base Bolts as follows:
      1. Tighten Base Bolts to the maximum possible with a 12” x 15” wrench (this will bed the washers and shims and close the bolt threads).
      2. Loosen each Base Bolt one turn.
      3. Under the supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the SLIP BASE DETAILS Table. Over-tightened Base Bolts are not permitted.
      4. Tighten bolt threads at the junction with nuts to prevent loosening. Repair damaged galvanizing.
      D. Obtain a tight sleeve connection by placing 4 galvanized steel shims between the column (post) and sleeve. Space the shims evenly around the perimeter of the column (I) between each bolt hole, 4 total. Use shims that are 1” shorter than the height of the sleeve.

SLIP BASE AND FOUNDATION DETAILS

(Non-Frangible Column, Typ.)

SLIP BASE AND FOUNDATION DETAIL IN CONCRETE
(Non-Frangible Column In Crossovers, Medians & Sidewalks)
ALUMINUM SOIL PLATE DETAIL

- Optional Slotted Holes

- Thickness = 1/8"

- Ø Hole

PLAN

Concrete Sidewalk, Median, Etc.

DRIVEN POST DETAIL

(Frangible Post In Crossovers, Medians & Sidewalks)

- 2" Grout Seal

- Ø Bolt Holes
  (Hole Spacing to match U-Bolts)
  (Washers as required)

- 5/32" Ø Bolt Holes

- 3/8" O.D. Max. Aluminum Column (Post)
  (Driven to Full Embedment)

- 1" Min., 1'-6" Max.

- Embedded Depth

- 1/3 Of Embedment Depth
WIND BEAM CONNECTIONS DETAILS

SINGLE SIGN DETAIL

VIEW A-A

BACK-TO-BACK SIGN DETAIL

NOTES:
1. 3/4" Ø stainless steel hex head bolts with nylon washer under head and washer under nut may be used in lieu of 1/2" Ø aluminum button or flat head bolts.
2. Use nylon washers (provided by the sheeting supplier) under the bolt heads to protect sign sheeting.
3. Slots up to 2" long are allowed in wind beams to accommodate U-Bolts for varying Column (Post) diameters.
4. Wind beams may be oriented in either direction.
5. For signs greater than 66" in height, install a third wind beam evenly spaced between the top and bottom wind beams. For signs up to 12" in height, use only one wind beam at A Sign. Install two wind beams on signs with heights greater than 12" and less than or equal to 66".
NOTES:

1. Install sign in the undeployed (down) position.

2. Provide a continuous stainless steel hinge with minimum 0.060" leaf thickness, 2" open width and 0.120" pin diameter. Stake the hinge at both ends to prevent pin movement.

3. Stowed 1 or 2 pcs of U-Bolt sized specifically for column (post) diameter with double nuts. Stowed on Wind Beam and displaced while deploying the sign.

4. Bolts, Wingnuts, and washers at the bottom corners of the sign hold the sign panels closed when in the undeployed (down) position. Store bolts, wingnuts, and washers in the bottom corner of the sign when in the deployed (up) position.

**SINGLE COLUMN GROUND SIGNS**

**WIND BEAM CONNECTION FOR FLIP UP SIGN**

**SIGN PANEL FRONT VIEW**

**SIGN PANEL SIDE VIEW**

**DEPLOYED SIGN DETAIL**

**UNDEPLOYED SIGN DETAIL**

**DETAIL "A"**

**DETAIL "B"**
### Single Column Ground Signs

<table>
<thead>
<tr>
<th>Size</th>
<th>Area</th>
<th>Total Area</th>
<th>Centroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>24x12</td>
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<td>5.00 SF</td>
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<td>30x24</td>
<td>5.00 SF</td>
<td>11.25 SF</td>
<td>2.78 SF</td>
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<tr>
<td>21x15</td>
<td>2.19 SF</td>
<td>3.90 SF</td>
<td>1.57 SF</td>
</tr>
<tr>
<td>30x30</td>
<td>4.76 SF</td>
<td>14.24 SF</td>
<td>2.84 SF</td>
</tr>
<tr>
<td>21x15</td>
<td>2.19 SF</td>
<td>3.90 SF</td>
<td>1.57 SF</td>
</tr>
<tr>
<td>30x30</td>
<td>4.76 SF</td>
<td>14.24 SF</td>
<td>2.84 SF</td>
</tr>
<tr>
<td>21x15</td>
<td>2.19 SF</td>
<td>3.90 SF</td>
<td>1.57 SF</td>
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<td>30x30</td>
<td>4.76 SF</td>
<td>14.24 SF</td>
<td>2.84 SF</td>
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<td>2.19 SF</td>
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<td>14.24 SF</td>
<td>2.84 SF</td>
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<td>2.19 SF</td>
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<td>1.57 SF</td>
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<td>2.19 SF</td>
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<td>1.57 SF</td>
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<tr>
<td>30x30</td>
<td>4.76 SF</td>
<td>14.24 SF</td>
<td>2.84 SF</td>
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### Single Column Ground Signs

<table>
<thead>
<tr>
<th>Size</th>
<th>Area</th>
<th>Total Area</th>
<th>Centroid</th>
</tr>
</thead>
<tbody>
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<td>2.18 Ft.</td>
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</tr>
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<td>8.99 SF</td>
<td>2.18 Ft.</td>
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<td>1.73 SF</td>
<td>2.30 Ft.</td>
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<td>3.20 SF</td>
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<td>2.19 SF</td>
<td>2.30 Ft.</td>
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</tr>
<tr>
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<td>2.33 Ft.</td>
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<td>3.13 SF</td>
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<td></td>
</tr>
<tr>
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<td>2.35 Ft.</td>
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<tr>
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<td>2.19 SF</td>
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<td></td>
</tr>
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<td>4.69 SF</td>
<td>1.63 Ft.</td>
<td></td>
</tr>
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<td>24x12</td>
<td>2.00 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30x30</td>
<td>4.69 SF</td>
<td>1.27 Ft.</td>
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<td>36x26</td>
<td>6.75 SF</td>
<td>2.00 Ft.</td>
<td></td>
</tr>
<tr>
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<td>3.75 SF</td>
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### Single Column Ground Signs

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<th>Area</th>
<th>Total Area</th>
<th>Centroid</th>
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<td>30x30</td>
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<td></td>
</tr>
<tr>
<td>30x30</td>
<td>4.69 SF</td>
<td>1.27 Ft.</td>
<td></td>
</tr>
<tr>
<td>30x18</td>
<td>3.75 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36x26</td>
<td>6.75 SF</td>
<td>2.00 Ft.</td>
<td></td>
</tr>
<tr>
<td>30x18</td>
<td>3.75 SF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Single Column Ground Signs

<table>
<thead>
<tr>
<th>Size</th>
<th>Area</th>
<th>Total Area</th>
<th>Centroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>30x30</td>
<td>4.69 SF</td>
<td>1.63 Ft.</td>
<td></td>
</tr>
<tr>
<td>24x12</td>
<td>2.00 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30x30</td>
<td>4.69 SF</td>
<td>1.27 Ft.</td>
<td></td>
</tr>
<tr>
<td>30x18</td>
<td>3.75 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36x26</td>
<td>6.75 SF</td>
<td>2.00 Ft.</td>
<td></td>
</tr>
<tr>
<td>30x18</td>
<td>3.75 SF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. Refer to Index 700-010 for additional notes, assembly of base connection and material specifications not given in this Index.
3. Place galvanized steel shims between the Sleeve and Post to obtain a tight fit between the Post and Sleeve.
4. Wind Beam and Vertical Brace: Aluminum Z3 x 2 1/8 x 3.38. Install Vertical Brace on 7'-0" to 8'-0" signs only.
5. Provide 2 - 0.0149" Thick (28 gauge) and 2 - 0.0329" Thick (21 gauge) Brass Shims Per Post. Used brass shims to plumb the post.
6. Use nylon washers under the button bolt heads to protect sign sheeting. Use aluminum washers under nut.

<table>
<thead>
<tr>
<th>SIGN DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>View A-A</strong></td>
</tr>
<tr>
<td><strong>Section B-B</strong></td>
</tr>
<tr>
<td><strong>Section C-C</strong></td>
</tr>
</tbody>
</table>

**COLUMN SELECTION AND FOOTING SIZE TABLE**

<table>
<thead>
<tr>
<th>Sign Size</th>
<th>Column Size Diameter x Thickness</th>
<th>Sleeve Size Diameter x Thickness</th>
<th>U-bolt Diameter</th>
<th>Base Bolt Diameter x Length</th>
<th>Torque Lbs/In</th>
<th>Base Plate Thickness</th>
<th>Footing Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot; x 5'-0&quot;</td>
<td>4 NPS Schedule 80 (4.5&quot; x 0.337&quot;)</td>
<td>3 NPS Schedule 120 (2.650&quot; x 0.321&quot;)</td>
<td>1&quot;</td>
<td>5/8&quot; x 3&quot;</td>
<td>270 +/- 45</td>
<td>1&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>4'-0&quot; x 6'-0&quot;</td>
<td>4 NPS Schedule 80 (4.5&quot; x 0.250&quot;)</td>
<td>3 NPS Schedule 120 (2.650&quot; x 0.222&quot;)</td>
<td>1&quot;</td>
<td>5/8&quot; x 3&quot;</td>
<td>270 +/- 45</td>
<td>1&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>4'-0&quot; x 7'-0&quot;</td>
<td>5 NPS Schedule 80 (5.562&quot; x 0.375&quot;)</td>
<td>4 NPS Schedule 80 (6.625&quot; x 0.432&quot;)</td>
<td>1 1/8&quot;</td>
<td>5/8&quot; x 4&quot;</td>
<td>445 +/- 75</td>
<td>1 1/4&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>4'-0&quot; x 8'-0&quot;</td>
<td>5 NPS Schedule 80 (5.562&quot; x 0.375&quot;)</td>
<td>4 NPS Schedule 80 (6.625&quot; x 0.432&quot;)</td>
<td>1 1/8&quot;</td>
<td>5/8&quot; x 4&quot;</td>
<td>445 +/- 75</td>
<td>1 1/4&quot;</td>
<td>6'-0&quot;</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION**

- 4'-0" Min. to 8'-0" Max.
- 2 Equal Spaces
- 1'-0" Min.
- 1 3/4" (Typ.)
- Wind Beam (See Note 4)
- 1/2" Dia. Bolts (Typ.)
- Vertical Brace (See Note 4)
- U-bolt (See Table)
- Wind Beam
- Column
- Vertical Brace (See Note 4)
- 8" x 3" x 1/4" Neoprene Pad Required Between Column And Wind Beam (Typ.)

**DESCRIPTION:**
FY 2020-21 STANDARD PLANS
GROUND MOUNTED SIGN

**INDEX:** 700-011

**SHEET:** 1 of 2
NOTES:
1. Work with index 700-010.
2. Shop Drawings: Not required.
3. Materials:
   - A. Steel Pipe: ASTM A36 or ASTM A500 Grade 36
   - B. Steel Pipe (Support Post): ASTM A501 Schedule 40
   - C. Aluminum Pipe: ASTM B429 Alloy 6063-T6
   - D. Galvanized U-Bolts, Nuts and Plate Washer
     a. U-Bolt: ASTM A449
     b. Hex Nuts: ASTM A 563 Lock Nuts
   - E. Galvanized Anchor Bolts, Nuts and Washers:
     a. Anchor Rod: ASTM F1554 Grade 55 fully threaded (for Adhesive Anchors)
     b. Anchor Bolts: ASTM F1554 Grade 55 Grade A Hex
   - F. Nuts: ASTM A563 Heavy Hex Locking
   - G. Washers: ASTM F436
   - I. Weld Material: E70XX
   - J. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap
4. Coating:
   - A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM F2132
   - B. Other Steel: ASTM A123
5. Fabrication:
   - A. Weld: Specification 460-6.4
   - B. Not dip galvanize after fabrication
6. Construction:
   - A. Locate Sign Support a minimum of 5 feet from an open joint or transition (sign stationing may be adjusted to accommodate this requirement).
   - B. Base plate must be flush with back of Traffic Railing
   - C. Anchors in Traffic Railings:
     a. Install Adhesive Anchors in accordance with Specification 416 except perform field test on one anchor per sign support location.
     b. Use templates and tie anchors as necessary to maintain correct placement of C-1-P Embedded Anchors
   - D. Do not drill into existing conduit
   - E. Temporary Signs on Permanent Traffic Railings: Same as Permanent except Field testing of anchors is not required.
7. Removal of Temporary Signs on Permanent Traffic Railings:
   - A. Cut anchor rods flush with the top of the traffic railing
   - B. Coat anchors with Type F-1 epoxy to prevent corrosion
     a. Extend coating 2 inches beyond edge of cut anchor rods
     b. Epoxy coating 1/16" thick minimum
8. Payment:
   - A. None.
   - B. Include the cost of all materials and labor in the cost of the single post sign assembly.

SIGN LIMITATIONS TABLE

<table>
<thead>
<tr>
<th>MAX. SIGN AREA</th>
<th>MAX. SIGN CENTROID HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SF)</td>
<td>(DIM. A + DIM. C)</td>
</tr>
<tr>
<td>25</td>
<td>9-7</td>
</tr>
</tbody>
</table>

Dimension A = Distance from centerline of the Support Post to the bottom of the sign or sign cluster.
Dimension C = Vertical distance from the bottom of the sign or sign cluster to the centroid of the sign or sign cluster.
NOTES:

1. Existing Traffic Railings:
   A. Locate existing conduit prior to drilling and adjust placement of base plate as necessary to avoid damaging existing conduit. Base plate must be flush with back of traffic railing. Maintain a minimum cover of 2" from face of traffic railing to tip of Adhesive Anchor.
   B. For concrete parapets less than 10" thick, through bolt 3/8" Heavy Hex Head Bolts with Nuts and Washers shall protrude more than 1/2" beyond traffic face of railing.
   C. For through bolting, countersink the nut and washer so that the bolt and nut does not extend beyond the face of the traffic railing. Do not exceed a countersinking depth and diameter of 29/64".

2. New Traffic Railings:
   A. Optional Couplers are shown for slipforming; keep Anchor Bolt coupler threads free of concrete.
   B. For concrete parapets less than 10" thick, through bolt 3/8" Heavy Hex Head Bolts with Nuts and Washers in lieu of Adhesive Bonded Anchors. Bolt heads shall not protrude more than 1/2" beyond traffic face of railing.
   C. For through bolting, countersink the nut and washer so that the bolt and nut does not extend beyond the face of the traffic railing. Do not exceed a countersinking depth and diameter of 29/64".
   D. Bridge Deck shown, Approach Slab and Retaining Wall are similar.
   E. Bridge Deck shown, Approach Slab and Retaining Wall are similar.
   F. Bridge Deck shown, Approach Slab and Retaining Wall are similar.

3. 36" Single-Slope Traffic Railing shown, other Traffic Railings and Parapets are similar.
4. Bridge Deck shown, Approach Slab and Retaining Wall are similar.

**DESCRIPTION:**

**TYPICAL SECTION - NEW CONSTRUCTION**

**TYPICAL SECTION - EXISTING RAILING**

**ELEVATION**

**PLAN**

**SIGN SUPPORT BRACKET**

**ADHESIVE BOND**

**THROUGH BOLTING**

**INDEX**

**SHEET**

**FY 2020-21 STANDARD PLANS**

**SINGLE POST BRIDGE MOUNTED SIGN SUPPORT**
NOTES:
1. Work with Index 700-010.
2. Shop Drawings: Not required.

3. Materials:
   A. Steel Plate: ASTM A36 or ASTM A520 Grade 36
   B. Steel Pipe (Support Post): ASTM A53 Grade B Schedule 40
   C. Galvanized U-Bolts, Nuts and Plate Washer
      a. U-Bolts, ASTM A449
      b. Hex Nuts, ASTM A 563 Grade A
      c. Plate Washer: ASTM A 53 Grade A or ASTM A520 Grade 36 or 50
   D. Galvanized Anchor Bolts, Nuts and Washers:
      a. Anchor Rod: ASTM F1554 Grade 55 Fully Threaded (for Adhesive Anchors)
      b. Anchor: ASTM A193 Grade 56 Grade A Hex
      c. Nuts: ASTM A193 Heavy Hex Locking
      d. Washers: ASTM F436
   E. Adhesive Anchor Bonding Material: Specification 937 Type IV Adhesive
   F. Weld Material: E70XX
   G. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap

4. Coating:
   A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM F2329
   B. Other Steel: ASTM A513

5. Fabrication:
   A. Weas, Specification 460-6.4
   B. Hot dip galvanize after fabrication

6. Construction:
   A. Locate Sign Support a minimum of 5 feet from an open joint or transition
      (sign stationing may be adjusted to accommodate this requirement)
   B. Embed anchor rods flush with the top of railing
   C. Anchors in Traffic Railings:
      a. Install Adhesive Anchors in accordance with Specification 416 except perform field
         test on one anchor per sign support location
      b. Use templates and (or) anchors as necessary to maintain correct placement of C-1-P
         Embedded Anchors
      c. Do not drill into existing reinforcing
   D. Temporary Signs on Permanent Traffic Railings, Same as Permanent except:
      testing of anchors is not required
   E. Temporary Signs on Temporary Railings/Barriers:
      a. Install Sign Supports at the midpoint along the length of a single segment
      b. Avoid drilling through existing reinforcement; use of metal detector not required.
   F. Concrete Barriers:
      a. Install Adhesive Anchors in accordance with Specification 416 except perform field
         testing of anchors is not required
      b. Use templates and (or) anchors as necessary to maintain correct placement of C-1-P
         Embedded Anchors
      c. Do not drill into existing reinforcing
   G. Poster anchoring:
      a. Install Poster Anchors in accordance with Specification 416 except perform field
         testing of anchors is not required
      b. Use templates and (or) anchors as necessary to maintain correct placement of C-1-P
         Embedded Anchors
      c. Do not drill into existing reinforcing
   H. Removal of Temporary Signs on Permanent Traffic Railings:
      a. Cut anchor rods flush with the top of the railing
      b. Coat anchors with Type F-1 epoxy to prevent corrosion
      c. Epoxy coating 1/16"thick minimum
      d. Washers: ASTM F436
      e. Nuts: ASTM A563 Heavy Hex Locking
      f. U-Bolts: ASTM A449
      g. Hex Nuts: ASTM A563 Grade A

7. Removal of Temporary Signs on Permanent Traffic Railings:
   A. Cut anchor rods flush with the top of the railing
   B. Coat anchors with Type F-1 epoxy to prevent corrosion
   C. Epoxy coating 1/16"thick minimum
   D. Use of metal detector not required

8. Payment:
   Include the cost of all materials and labor in the cost of the single post sign assembly.

### TABLE 1 - SIGN PANEL AND POST SIZING

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. Sign Area (SF)</th>
<th>Post (NPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary</td>
<td>≤ 135</td>
<td>30</td>
</tr>
<tr>
<td>Permanent</td>
<td>&gt; 135 ≤ Sign ≤ 20</td>
<td>35</td>
</tr>
</tbody>
</table>

 tongues may be adjusted to accommodate this requirement

### ELEVATION

- SINGLE POST MEDIAN BARRIER
- MOUNTED SIGN SUPPORT

(Index 521-001 Median Barrier shown; others similar)
NOTES:
1. Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing.
2. Use a staggered pattern for all temporary barriers.

<table>
<thead>
<tr>
<th>Table 2: Base Plate Type and Anchor Rod Sizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>521-001</td>
</tr>
<tr>
<td>521-001</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

All listed above Plus 102-110 & 102-100 Temporary Signs

Notes:
1. Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing.
2. Use a staggered pattern for all temporary barriers.

Base Plate (See Table 2)

Elevation

Base Plate Type C

(Slanted Anchor Rod Pattern shown)

Elevation

Plan

Sign Support Weldment Detail

(Slanted Anchor Rod Pattern shown)
GENERAL NOTES:

1. Verify Column lengths in the field prior to fabrication.

2. Shop drawings:
   A. Sign Support Shop drawings are not required when fabricated in accordance with this Index and support columns do not exceed the length shown in the plans by more than 2'-0".
   B. Sign Panels: Horizontal panel splices are allowed at interior wind beams for sign panels with a depth ("D") greater than 10 feet. Shop drawings required for horizontal panel splice details.
   C. When shop drawings are required, obtain approval prior to fabrication.

3. Materials:
   A. Sign Panel Mounting Materials:
      a. Aluminum Bars, and Extruded Shapes: ASTM B221, Alloy 6061-T6 or Alloy 6351-T5
      b. Aluminum Structural Shapes: ASTM B368, Alloy 6061-T6
   B. Sign Support Structure Materials:
      a. Steel Plates and Structural Shapes: ASTM A572 or ASTM A393, Grade 50
      b. Steel Weld Metal: E70XX
      c. Shims: Brass ASTM B221 or Galvanized Steel
   C. Aluminum Bolts, Nuts, and Washers:
      a. Flat Head and Button Head Bolts: ASTM F 468, Alloy 2024-T4
      b. Hex Nuts: ASTM F594, 2024-T4
      c. Washers: ASTM F222, Alloy 2024-T4
   D. Stainless Steel Bolts, Nuts and Washers:
      a. Stainless Steel Bolts, Nuts and Washers: ASTM 6V5, Grade 1
      b. Nuts: ASTM F594, Grade 1
      c. Washers: ASTM B221, Alloy 6061-T6
   E. High Strength Steel Bolts, Nuts and Washers:
      a. High Strength Steel Bolts: ASTM F593, CW1 or SH1
      b. Nuts: ASTM F594, Grade 5
      c. Washers: ASTM B221, Alloy 6061-T6
   F. Concrete:
      a. Concrete: Class I.
      b. Reinforcing Bars or Welded Wire Reinforcement (WWR): Specification 415
   G. Reinforcing Bars or Welded Wire Reinforcement (WWR): Specification 415

4. Coatings:
   A. Aluminum Fasteners: Anodic coating (0.0002 inches min.) and chromate sealed
   B. Galvanize High Strength Steel Bolts Nuts and Washers: ASTM F3319
   C. Galvanize all other steel items (excluding stainless steel): Hot-dip ASTM A123
   D. Treat damaged galvanizing in accordance with Specification 562

5. Fabrication:
   A. All Base Connections and Stub Column materials are steel unless otherwise specified.
   B. Drill or sub-punch and ream holes in Fuse Plates and Hinge Plates
   C. Weld Base Plate to Post & Stub or if using the Alternate Connection Detail weld Base Plate and Stiffeners to Post and Stub (See Sheet 2)
   D. Hot dip galvanize after fabrication. Remove all drips, runs or beads on base plate within washer contact areas (Including saw cuts)

6. Construction:
   A. Install the Sign Structure foundation in accordance with Specification 455. Orient Stub Post according to direction of traffic (Sheet 2)
   B. Install all high strength bolts except Base bolts in accordance with Specification 700.
   C. Assemble Post to Stub with Base Bolts and three flat washers per bolt (See Base Connection Details, Sheet 2) Tighten Base Bolts in accordance with Instructions Notes on Sheet 2.

STATE OF FLORIDA
WELCOME CENTER
MULTI-COLUMN SIGN ASSEMBLY

MULTI-COLUMN GROUND SIGN
INDEX 700-020
STANDARD PLANS
FY 2020-21

REV. 3
11/01/18
Sheet 1 of 3
MULTI-COLUMN GROUND SIGN

FOUNDATION NOTES:

The Contractor may use Welded Wire Reinforcement (WWR) for foundation reinforcement.

At the Contractor's option, the #4 tie bars at 12" o.c. may be replaced by D10 Spiral Wire @ 6" pitch, with three flat turns at the top and one flat turn at the bottom in accordance with Specification 415.

INSTRUCTIONS NOTES:

1. Assembly of Base Instructions:
   A. Place one washer on each Base Bolt between the Bottom Base Plate and the head of high strength Base Bolt; and place the third washer between the Top Base Plate and the Nut.
   B. Shim as required to plumb column. Provide 2-0.0329" thick (21 gauge) and 2-0.0329" thick (28 gauge) shims per column.

2. H.S. Base Bolt L, Torque Instructions:
   A. Tighten Base Bolts to the maximum possible with a 12" to 15" wrench this will bed the washers and shims and clear the bolt threads.
   B. Loosen each Base Bolt one turn.
   C. Under the supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the Table. Over tightened Base Bolt's will not be permitted.
   D. Burr threads at junction with nut to prevent nut loosening. Treat damaged galvanizing.

3. BASE CONNECTION DATA:

   | Base Bolt Dia | washer | Nut Torque (lbf*in) | H.S. Bolt Keeper Plate
   |---------------|--------|---------------------|------------------------
   | 3/4"          | 1/2"   | 30-45               | 1/2"                   |
   | 1-1/4"        | 1"     | 45-60               | 1"                     |

   Base Bolt Dia):
   3/4":
   Washer (Typ.)
   Nut (Typ.)
   Torque:
   H.S. Bolt Keeper Plate:

ALTERNATIVE BASE CONNECTION DATA:

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Thickness</th>
<th>No.</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>0.0149&quot;</td>
<td>2</td>
<td>1-1/8&quot;</td>
</tr>
</tbody>
</table>

Designations (Nominal Depth in inches x weight in pounds per linear foot).

ELEVATION

STATE OF FLORIDA
WELCOME CENTER

MULTI-COLUMN SIGN ASSEMBLY

FOUNDATION AND BASE CONNECTION DETAILS
**Back Elevation**

- **Multi-Column Sign Assembly**
  - See Sign Panel Splice Details
  - Wind Beam (Typ.) See Tables For No. Of Beams
  - Same Size For All Wind Beams

- **Plan View**
  - 1/8" Aluminum Flat Head Bolts With Washers and Nuts (Typ.)
  - Column (Typ.)
  - Panel Splice (See DETAIL "A")
  - Sign Face (See DETAIL "A")

**Side Elevation**

- **Sign Panel Splice**
  - Adjoining Sign Panels
  - Column (Typ.)
  - Panel Splice (Typ.)

**Number of Wind Beams Based On Sign Depth (D)**

- 2 Beams
- 3 Beams
- 5 Beams

**Wind Beam Size Based On Sign Length (L)**

- 2 Columns
- 3 Columns

**Fuse Plate & Hinge Plate Details**

- Column
- Column Flange
- Bolt Cut
- Saw Cut Column Flange and Web (See Sheet 1, Note 5D)

**Wind Beam, Backing Strip & Fuse/Hinge Plate Details**

- Wind Beam
- Column
- Sign Face
- Column Flange
- H.S. Bolt Diameter +1/2" Bolt Cut

**FUSE PLATE, HINGE PLATE**

- Column
- Column Flange
- Bolt Cut
- Saw Cut Column Flange and Web (See Sheet 1, Note 5D)

**Electrical Panel (120V 12A)**

- Column
- Column Flange
- Bolt Cut
- Saw Cut Column Flange and Web (See Sheet 1, Note 5D)

**WIND BEAM, BACKING STRIP & FUSE/HINGE PLATE DETAILS**

- Column
- Column Flange
- Bolt Cut
- Saw Cut Column Flange and Web (See Sheet 1, Note 5D)
STATE OF FLORIDA
WELCOME CENTER

FRONT ELEVATION

ELEVATION

SIGN PANEL SPLICE

DETAIL "A"

PLAN VIEW

WIND AND HANGER BEAMS FOR OVERHEAD SIGNS

GENERAL NOTES
1. Work this Index with Index 700-040 and 700-041.
2. The number and location of the Panel Splices are determined by the Sign Face supplier.
3. Spacing of Vertical Hangers:
   A. Two Vertical Hangers = 21.0% L
   B. Three Vertical Hangers = 33.0% L
   C. Four Vertical Hangers = 45.0% L
   D. Five Vertical Hangers = 57.0% L
   E. Six Vertical Hangers = 69.0% L
   F. Spacing of vertical hangers may be varied slightly as necessary to clear the wind beam struts and diagonals at panel points
4. Spacing of Wind Beams:
   A. Two Wind Beams = 21.0% D
   B. Three Wind Beams = 29.0% D
   C. Four Wind Beams = 37.0% D
   D. Five Wind Beams = 45.0% D
   E. Six Wind Beams = 53.0% D
5. Shop Drawings:
   A. Required for Sign Panels deeper than 10'-0" with a horizontal panel splice.
6. Materials:
   A. Aluminum:
      a. Bars, and Extruded Shapes: ASTM B 221, Alloy 6061-T6 or Alloy 6351-T5
      b. Structural Shapes: ASTM B520, Alloy 6061-T6
      c. Flat Head and Hex Head Machine Bolts: ASTM F436, (Flat Washers)
      d. Hex Nuts:  ASTM F467, Alloy 6061-T6 or Alloy 6262-T9
      e. Washers: ASTM B221, Alclad 2024-T4
   B. Steel:
      a. U-Bolts: ASTM A449 or ASTM A193 B7
      b. Nuts: ASTM A563, (Flat Washers)
      c. Washers: ASTM F468, Alloy 2024-T4
   C. Galvanized Steel Bolts, Nuts and Washers: ASTM F2329
7. Coatings:
   A. Aluminum Bolts, Nuts and Washers: Anodic (0.0002 inches nickel and chrome sealed)
8. Wind Speed by county: see Index 715-010.

WIND BEAM TABLE (Z 3 x 2½g x 2.33)

<table>
<thead>
<tr>
<th>Number of Horizontal Wind Beams Based on Sign Depth (D)</th>
<th>2 Beams</th>
<th>3 Beams</th>
<th>4 Beams</th>
<th>5 Beams</th>
<th>6 Beams</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 &lt;= D &lt;= 8</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>8 &lt; D &lt;= 10</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>10 &lt; D &lt;= 12</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>12 &lt; D &lt;= 15</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

HANGER TABLE (1 6 x 4.69 or Z 5 x 3½ x 6.19)

<table>
<thead>
<tr>
<th>Number of Vertical Hanger Beams Based on Wind Speed and Sign Length (L)</th>
<th>2 Hangers</th>
<th>3 Hangers</th>
<th>4 Hangers</th>
<th>6 Hangers</th>
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<td>1 x 20</td>
<td>1 x 18</td>
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<td>1 x 20</td>
<td>1 x 18</td>
<td>1 x 17</td>
<td>1 x 16</td>
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NOTE: For Monroe County designs, use 170 mph values but with Z 5 x 3½ x 6.19 vertical hanger beams only.

STATE OF FLORIDA
WELCOME CENTER

FRONT ELEVATION

ELEVATION

SIGN PANEL SPLICE

DETAIL "A"

PLAN VIEW

WIND AND HANGER BEAMS FOR OVERHEAD SIGNS

GENERAL NOTES
1. Work this Index with Index 700-040 and 700-041.
2. The number and location of the Panel Splices are determined by the Sign Face supplier.
3. Spacing of Vertical Hangers:
   A. Two Vertical Hangers = 21.0% L
   B. Three Vertical Hangers = 33.0% L
   C. Four Vertical Hangers = 45.0% L
   D. Five Vertical Hangers = 57.0% L
   E. Six Vertical Hangers = 69.0% L
   F. Spacing of vertical hangers may be varied slightly as necessary to clear the wind beam struts and diagonals at panel points
4. Spacing of Wind Beams:
   A. Two Wind Beams = 21.0% D
   B. Three Wind Beams = 29.0% D
   C. Four Wind Beams = 37.0% D
   D. Five Wind Beams = 45.0% D
   E. Six Wind Beams = 53.0% D
5. Shop Drawings:
   A. Required for Sign Panels deeper than 10'-0" with a horizontal panel splice.
6. Materials:
   A. Aluminum:
      a. Bars, and Extruded Shapes: ASTM B 221, Alloy 6061-T6 or Alloy 6351-T5
      b. Structural Shapes: ASTM B520, Alloy 6061-T6
      c. Flat Head and Hex Head Machine Bolts: ASTM F436, (Flat Washers)
      d. Hex Nuts:  ASTM F467, Alloy 6061-T6 or Alloy 6262-T9
      e. Washers: ASTM B221, Alclad 2024-T4
   B. Steel:
      a. U-Bolts: ASTM A449 or ASTM A193 B7
      b. Nuts: ASTM A563, (Flat Washers)
      c. Washers: ASTM F468, Alloy 2024-T4
   C. Galvanized Steel Bolts, Nuts and Washers: ASTM F2329
7. Coatings:
   A. Aluminum Bolts, Nuts and Washers: Anodic (0.0002 inches nickel and chrome sealed)
8. Wind Speed by county: see Index 715-010.
PLACEMENT OF SIGN LIGHTS

1. This Index details a bottom luminaire support structure. For signs requiring top luminaire support structures, the detail can be reversed.

2. Luminaire spacing and arm length is shown on Guide Sign Worksheet.

3. The Guide Sign Worksheet indicates the sign luminaire used for basis of design.

The contractor may propose a different luminaire by submitting photometric calculations for each lighted sign for review by the Engineer.

SIGN LIGHTING INSTALLATION

Roadway Lighting included in contract:

1. Power for the sign lighting provided from the roadway lighting circuit.

2. Indicate sign location and a pull box location for connection to the sign lights in the lighting plans.

3. Lighting contractor installs pull box and loop 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

4. Signing contractor furnishes and installs the luminaires, NEMA 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

Roadway Lighting not included in contract:

1. Signing plans include the pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment.

2. Signing plans indicate the location of the service point equipment and circuit runs.

3. Signing contractor provides all electrical equipment necessary for connection of the sign lights.
NOTES
1. Install hanger pipe to each vertical beam crossed with a 3/8" U-bolt, lock washers and hex nuts. Cap both ends of the horizontal pipe.

2. Materials:
   A. Steel Pipe: ASTM A53 (Grade A or B)
   B. Steel Plate: ASTM A36
   C. Bolts: ASTM A325
   D. Hex Nuts: ASTM A563
   E. Washers: ASTM F436


4. All pipe dimensions are NPS.

5. Chord O.D. = 5' (Min.)

LUMINAIRE SUPPORT STRUCTURE

2/12/19
8:23:25 AM
REV 1

DESCRIPTION:

REVISION

LAST REV 10/01/17

INDEX

STANDARD PLANS

FY 2020-21

EXTERNAL LIGHTING FOR SIGNS

700-201

SHEET 2 of 2
NOTES:

1. Work this Index in conjunction with CANTILEVER SIGN STRUCTURE.
2. Handholes are required at pole base for DNS Structures. Refer to Index 700-060. For Handhole Details.
3. Shop Drawings are required.
4. Materials:
   - A. Sign Structure: Upright and Chords (Steel Pipe): API 5L X42 PSL2, 42 ksi yield strength.
   - B. Bolts, Nuts and Washers: ASTM F3125, Grade 3125 Type 1.
   - C. Anchor Bolts: ASTM F1554 Grade 55.
   - D. Nuts: ASTM A563 Grade DH Heavy-Hex.
   - E. Washers: ASTM A36 Grade A.

5. Fabrication:
   - B. Chord Splices: "SD" Panel from upright in the closest panel in which a chord splice may be used. See Plans for CANTILEVER SIGN STRUCTURE.

6. Coatings:
   - A. Structural bolts: ASTM A325 Type 1.
   - B. Nuts: ASTM A563 Grade DH.
   - C. Washers: ASTM F416 Type 1.

7. Construction:
   - A. Construct foundation in accordance with Specification 455, except payment is included in the cost of the structure.
   - B. Prior to erection, record the as-buil anchor locations and submit to the Engineer.
   - C. Place backfill above spread footings prior to installation of the sign panels. Do not remove or reduce backfill without prior approval of the Engineer.
   - D. Tighten nuts and bolts in accordance with Specification 700.

8. Back Rake Top of Pipe 'F' before Truss installation by using leveling bolt at Base Plate.

9. ISOMETRIC VIEW

CANTILEVER SIGN ASSEMBLY
NOTES:
1. Construction joint allowed, roughen surface to 1/4" minimum amplitude prior to pour.
2. See Traffic Plans for elevation at top of Foundation.
3. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drilled shaft to the finished grade, unless specified otherwise in the plans.
4. The shaft length is based on 2'-0" height above finished grade.
5. The Structural Grout Pad dimension may be modified to be less than 3" where the footprint of the Structural Grout Pad does not provide adequate clearance for accessibility considerations.
6. Wrap fillet weld around the stiffener termination on the tube wall.
NOTE:

1. Wrap fillet weld around the stiffener termination on the tube wall.

2. Truss Chord Bolts:
   A. Top and Bottom: Install 'TC' hex head bolts.
   B. Back: Install 'TB' hex head bolts.

[Diagram of Upright-Truss Connection Detail]

CANTILEVER ASSEMBLY

SECTION A-A
(With Gusset Plates and Web Angles Omitted For Clarity)

DETAIL 'C'

FRONT ELEVATION

SIDE ELEVATION
(Up Members From Back Truss Chord Omitted For Clarity)
TRUSS NOTES:
1. Out-of-plane members are not shown for clarity.
2. Wrap fillet weld around plate termination on the tube wall.
3. Chord Splices not shown.
CANTILEVER ASSEMBLY

SPlice CONNECTION NOTES:
1. Only 6 bolts are shown in detail for clarity. (One Half Each Side Of Splice)
2. Splices are not permitted for trusses less than or equal to 40’, Splice optional for trusses greater than 40’.

TRUSS PLUG DETAIL

SPlice CONNECTION DETAIL

UPRIGHT CAP DETAIL
NOTES:

1. Work this Index in conjunction with SPAN SIGN STRUCTURE DATA TABLES in the Plane and Index 700-020.

2. Handholes at the pole base are required for DMS Structures. Refer to Index 700-090 for Handhole Details.

3. Shop Drawings are required.

   Obtain Shop Drawing approval prior to fabrication. Include the following:
   A. Upright Pipe height ("C" & "B") and foundation elevations: Verify minimum vertical clearances of the sign panel over the roadway.
   B. Height of the foundation above adjacent ground.
   C. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
   D. Method to be used to provide the required parabolic camber (see Camber Diagram).

4. Materials:

   A. Sign Structure:
      a. Upright and Chords (Steel Pipe): API 5L X42 PS52, 42 ksi yield or ASTM A500, Grade B (MIN).
      b. Steel Angles and Plates: ASTM A369 grade 36.
      c. Bolt Material: E70XX
      d. Bolts, Nuts, and Washers:
         i. High Strength Bolts: ASTM F3122, Grade A25, Type 1
         ii. Nuts: ASTM A563 Grade A Heavy-Hex
         iii. Washers: ASTM F436, Type 1, one under turned element
   B. Anchor bolts, nuts, and washers:
      a. Anchor bolts: ASTM A490, Grade 55
      b. Nuts: ASTM A563, Grade DH Heavy-Hex
      c. Washers: ASTM A36, Grade B for bolts up to 1/2".
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 40').

5. Fabrication:

   A. Welding: Specification 460-6.4
   B. Chord Splices: Minimum splice spacing is three truss panel lengths apart and three truss panel lengths from the uprights when panel lengths are 10'-0" or less.
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 49').
   D. Structural bolt hole diameters: Bolt diameter plus 1/16".
   E. Anchor bolt hole diameters: Bolt diameter plus 1/16".
   F. Hot Dip Galvanize after fabrication.
   G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   H. Disassemble as necessary and secure components for shipment.

6. Coatings:

   A. Bolts, Nuts and Washers: ASTM F2329
   B. All other steel, including Plate Washers, hot dip galvanize: ASTM A123

7. Construction:

   A. Construct foundation in accordance with Specification 455 Drilled Shaft, except payment is included in the cost of the structure.
   B. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   C. Provide a parabolic camber with the required upward deflection as shown on the Camber Diagram.
   D. Tighten nuts and bolts in accordance with Specification 700.
   E. Install Aluminum Sign Panels as shown in the Plans.
   F. After installation, place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649-6.

TABLES in the Plans and Index 700-030.

Refer to Index 700-090 for Handhole Details.

2. Handholes at the pole base are required for DMS Structures.

3. Work this Index in conjunction with SPAN SIGN STRUCTURE DATA TABLES in the Plane and Index 700-020.

4. Materials:

   A. Sign Structure:
      a. Upright and Chords (Steel Pipe): API 5L X42 PS52, 42 ksi yield or ASTM A500, Grade B (MIN).
      b. Steel Angles and Plates: ASTM A369 grade 36.
      c. Bolt Material: E70XX
      d. Bolts, Nuts, and Washers:
         i. High Strength Bolts: ASTM F3122, Grade A25, Type 1
         ii. Nuts: ASTM A563 Grade A Heavy-Hex
         iii. Washers: ASTM F436, Type 1, one under turned element
   B. Anchor bolts, nuts, and washers:
      a. Anchor bolts: ASTM A490, Grade 55
      b. Nuts: ASTM A563, Grade DH Heavy-Hex
      c. Washers: ASTM A36, Grade B for bolts up to 1/2".
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 40').

5. Fabrication:

   A. Welding: Specification 460-6.4
   B. Chord Splices: Minimum splice spacing is three truss panel lengths apart and three truss panel lengths from the uprights when panel lengths are 10'-0" or less.
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 49').
   D. Structural bolt hole diameters: Bolt diameter plus 1/16".
   E. Anchor bolt hole diameters: Bolt diameter plus 1/16".
   F. Hot Dip Galvanize after fabrication.
   G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   H. Disassemble as necessary and secure components for shipment.

6. Coatings:

   A. Bolts, Nuts and Washers: ASTM F2329
   B. All other steel, including Plate Washers, hot dip galvanize: ASTM A123

7. Construction:

   A. Construct foundation in accordance with Specification 455 Drilled Shaft, except payment is included in the cost of the structure.
   B. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   C. Provide a parabolic camber with the required upward deflection as shown on the Camber Diagram.
   D. Tighten nuts and bolts in accordance with Specification 700.
   E. Install Aluminum Sign Panels as shown in the Plans.
   F. After installation, place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649-6.

TABLES in the Plans and Index 700-030.

Refer to Index 700-090 for Handhole Details.

2. Handholes at the pole base are required for DMS Structures.

3. Work this Index in conjunction with SPAN SIGN STRUCTURE DATA TABLES in the Plane and Index 700-020.

4. Materials:

   A. Sign Structure:
      a. Upright and Chords (Steel Pipe): API 5L X42 PS52, 42 ksi yield or ASTM A500, Grade B (MIN).
      b. Steel Angles and Plates: ASTM A369 grade 36.
      c. Bolt Material: E70XX
      d. Bolts, Nuts, and Washers:
         i. High Strength Bolts: ASTM F3122, Grade A25, Type 1
         ii. Nuts: ASTM A563 Grade A Heavy-Hex
         iii. Washers: ASTM F436, Type 1, one under turned element
   B. Anchor bolts, nuts, and washers:
      a. Anchor bolts: ASTM A490, Grade 55
      b. Nuts: ASTM A563, Grade DH Heavy-Hex
      c. Washers: ASTM A36, Grade B for bolts up to 1/2".
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 40').

5. Fabrication:

   A. Welding: Specification 460-6.4
   B. Chord Splices: Minimum splice spacing is three truss panel lengths apart and three truss panel lengths from the uprights when panel lengths are 10'-0" or less.
   C. Upright splice: Not allowed unless the upright exceeds available mill lengths (35' - 49').
   D. Structural bolt hole diameters: Bolt diameter plus 1/16".
   E. Anchor bolt hole diameters: Bolt diameter plus 1/16".
   F. Hot Dip Galvanize after fabrication.
   G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
   H. Disassemble as necessary and secure components for shipment.

6. Coatings:

   A. Bolts, Nuts and Washers: ASTM F2329
   B. All other steel, including Plate Washers, hot dip galvanize: ASTM A123

7. Construction:

   A. Construct foundation in accordance with Specification 455 Drilled Shaft, except payment is included in the cost of the structure.
   B. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   C. Provide a parabolic camber with the required upward deflection as shown on the Camber Diagram.
   D. Tighten nuts and bolts in accordance with Specification 700.
   E. Install Aluminum Sign Panels as shown in the Plans.
   F. After installation, place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649-6.
**NOTES:**

1. See Traffic Plans for elevation at top of Foundation.
2. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.
3. The shaft length is based on 2'-0" height above finished grade.
4. Wrap fillet weld around the stiffener termination on the tube wall (Typ).

---

**DESCRIPTION:**

**SPAN SIGN ASSEMBLY**

**BASE PLATE CONNECTION**

**PLAN**

**ELEVATION**

**DRILLED SHAFT**

**FOUNDATION**

**BASE PLATE CONNECTION**

**DETAIL "A"**

**DETAIL "B"**
SPAN SIGN ASSEMBLY

SPAN SIGN STRUCTURE

NOTES:
1. Wrap fillet weld around the stiffener termination on the tube wall.
2. Truss Chord Bolts: "LB" or "RB" Hex Head Bolts "LA" or "RA" Ø.
3. Right Upright Truss connection shown, Left Upright Truss connection similar.

Upright-Truss Connection Detail
(Web Members From Back Truss Chord Omitted For Clarity, See Note 3)

SECTION A-A
(With Gusset Plates And Web Angles Omitted For Clarity)

LEFT ELEVATION

TOP ELEVATION

FRONT ELEVATION

SIDE ELEVATION

UPRIGHT-TRUSS CONNECTION DETAIL

DETAIL "C"

SECTION "C"

FLAT POUR

UPRIGHT-TRUSS CONNECTION

SPAN SIGN ASSEMBLY

10" OD Left Upright Pipe
2" OD Right Upright Pipe

1.5" x "F" OD

Gusset Plates (Typ.)

45°

Chord

Truss Web Angles

See DETAIL "C" (Typ.)

Bolts

Rows Of 2 Equal

For An Even Number Of Bolts Per Row

For An Odd Number Of Bolts Per Row

£ Top Truss Chord

£ Bottom Truss Chord

£ Gussset Plates (Typ.)

£ Gusset Plates (Typ.)

£ Left Upright Pipe

£ Right Upright Pipe

(DIA.)

£ Bar (Right)

£ Bar (Right)

£ Gusset Plate (Typ.)

£ Gusset Plate (Typ.)

£ Bottom Of Plate And £ Chord

£ Gusset Plate And £ Gusset £

£ Gusset Plate And £ Gusset £

£ Gusset Plate And £ Gusset £
SPAN SIGN ASSEMBLY

NOTES:
1. Out-of-plane members are not shown for clarity.
2. Back truss chord and attached angles are not shown for clarity.
3. Wrap fillet weld around plate termination on the tube wall.

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<th>Bolt Diameter (in.)</th>
<th>Distance (in.)</th>
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DETAIL 'D'

DETAIL 'E'

DETAIL 'F'

DETAIL 'G'

DETAIL 'H'

DETAIL 'I'

DETAIL 'J'

DETAIL 'K'

DETAIL 'L'

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STANDARD PLANS

SPAN SIGN STRUCTURE

INDEX
700-041

4 of 5
DESCRIPTION:

1. Free-swinging, internally-illuminated street signs shall only be installed on the signal pole.

2. Free-swinging, internally-illuminated street signs meet the requirements of Specification 700.

3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor.

4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Specification 700 for "Acceptance by Certification." require the submission of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.
GENERAL NOTES:

1. Mark this Index with Specification 700.
2. Furnish and install the Dynamic Message Sign (DMS), sign structure in accordance with Index 700-040 or 700-041. Locate foundations at locations shown in the Plans.
3. Shop Drawings are required:
   A. Include the DMS connection.
   B. Do not start fabrication until the shop drawings are approved.
4. If required, install guardrail at location shown in the Plans and in accordance with Index 536-001.
5. Materials:
   A. Sign Mounting Components:
      a. Aluminum Structural Shapes: ASTM B308, Alloy 6061-T6
      b. Vertical Angles: ASTM A572, Grade 36
      c. D-Bolts: ASTM A490 or A139 B7
      d. Steel Bolts, Nuts, and Washers:
         1. High Strength Bolts: ASTM F1385, Grade 8.8
         2. Nuts: ASTM F563
         3. Washers: ASTM F463 (Flat Washer)
   B. Coatings:
      a. All nuts, bolts and washers ASTM F2299
      b. All other steel items ASTM A4123
      c. Bolt hole Diameters: Bolt plus 1/8" before galvanizing
6. Installation:
   A. See project requirements for location of DMS Cabinet.
   B. Field Adjust pole-mounted DMS cabinet height to achieve best access for maintenance personnel given site condition as directed by the Engineer. Avoid conflicts with stiffeners, handhole and maintenance of anchor bolts.
   C. Locate the sign horizontal on the structure as shown in the Plans. Vertically center the sign enclosure with the centerline of the truss.
   D. Before erection, field drill the bolt holes in the vertical hangers and horizontal mounting member attached to the sign enclosure. Field locate holes to allow vertical hanger placement as shown on the Plans with no conflicts with gusset or splice plates.
   E. Locate threaded couplings on sign side of upright above the sign truss.
   F. Connect grounding conductors to the steel framework that has been cleaned to base metal by use of bonding plates having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure in accordance with Index 500-003 is also an acceptable method.
   G. If steel framework is to be drilled and tapped to accept a threaded connector, the threaded connector shall be galvanized and have at least 3 threads fully engaged and secured with a jam nut to the steel framework.
   H. Bends in the conduit must be greater than the minimum bending radius for the cable contained in the conduit.
   I. Completely encase all data, fiber optic and power cables for the DMS within the sign structure or in conduit.
   J. Permanently stamp/mark foundation to indicate conduit locations.
   K. Transition conduit in foundation to indicate underground conduit with appropriate reducer outside the limits of the foundation.

CANTILEVER ISOMETRIC VIEW

DYNAMIC MESSAGE SIGN ASSEMBLY
NOTE: Actual number and direction of travel lanes varies.

DYNAMIC MESSAGE SIGN WALK-IN
Primary Ground Rod

Exothermic Weld (Typ.)

#2 AWG Tin-Plated Bare Solid Copper Wire to Ground Mounted Cabinet

#2 AWG Tin-Plated Bare Solid Copper Wire Continuous to the Bases of the DMS Structure

#2 AWG Tin-Plated Bare Solid Copper Wire to Ground Rods B, C, and D as Required (Connections may be Combined)

Grounding Conduit

Finished Grade

Parking Box

Ground Rod

TYPICAL
(20' Rods, 40' Spacing)

GROUND ROD ARRAY DETAIL

DETAIL "B"

DETAIL "C"

20' Radius Each "Sphere of Influence"

Ground Rod C

Primary Ground Rod A

Primary Ground Rod B

90' (Typical)

Sign Structure Foundation

DETAIL "D"

GROUND ROD ARRAY DETAIL

SECTION A-A

DETAIL "E"

DYNAMIC MESSAGE SIGN WALK-IN

STANDARD PLANS

FY 2020-21

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700-090

4 of 5
(Cantilever Sign Structure Shown, Span Sign Structure Similar)

**HANGER LOCATION DETAIL**

**SECTION C-C**

**SECTION D-D**

Zee Beam Aluminum Zee 4½x3½x3.7 (Typ.)

Vertical Hanger Galvanized W6x9 (Typ.)

Hanger @ 5' (Max.) Spacing

Provide 2 ~ ½° U-Bolts

Double Nuts and Washers

Field Drill Holes And

See Truss Data Sheet

Zee Beam

Vertical Hanger

2-½° U-Bolts

2½° U-Bolts

Top Truss Chord

Bottom Truss Chord

Extended Zee Beam Assembly

Back Face of DMS

Sign Enclosure

Hanger Location Detail

Quantities and Spacing of Members will be dictated by

Locations of Truss Connection Plates, Splices and 2-½° (Max.) Spacing

(Visitor Sign Structure Shown, Span Sign Structure Similar)
GENERAL NOTES:

1. Work this Index with Specification 700.

2. Shop Drawings are required:
   A. Provide length as shown in the Plans
   B. Design in accordance with AISC, AASHTO, and OSHA requirements
   C. Do not start fabrication until the shop drawings are approved

3. Catwalk hangers must be positioned to avoid conflicts with the sign structure truss and
   gusset plates. Place walkway close to the sign with a maximum open distance from
   walkway grate to DNS sign of 12".

4. Maximum spacing of Catwalk hanger supports is 3'-0". Cantilever ends of grating is 8'.

5. Galvanized steel catwalk grating meeting the requirements of Specification 504-23. Must
   Support a 90 psf load and have a 3/4" minimum toe kick. Attach grating in accordance
   with the manufacturer's instructions using stainless steel or galvanized fasteners.


7. Chain link fabric options (2" mesh with knuckled selvage top and bottom for all options):
   A. AASHTO M181 Type I - Zinc Coated Steel, No. 9 gage (coated wire diameter), coated
      at the rate of 1.8 oz./ft² (M181 Class D 2.0 oz./ft², modified to 1.8 oz./ft²).
   B. AASHTO M181 Type II - Aluminum Coated Steel, No. 9 gage (coated wire diameter),
      coated at the rate of 0.40 oz./ft².

8. Install 2" NPS (Sch. 40) guiderail and posts: ASTM A53 Grade B for standard weight pipe.

9. Welding:
   E70XX

10. Materials:
    A. Steel Plates ASTM A 36 or A709 Grade 36.
    B. W-Sections: ASTM A572 Grade 36 or 50.
    C. Steel Pipe Railings or Structural Tubing: Specification 962
    D. High Strength Bolts, Nuts and Washers: Specification 962
    E. U-Bolts, nuts and washers: Specification 962

11. Coatings/Galvanizing:
    Hot dip galvanize support frame after fabrication and galvanize non-stainless steel fasteners in accordance with Specification 962.

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<td>General Assembly and Fixed Base Details</td>
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<tr>
<td>3</td>
<td>Walkway Support Details</td>
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</tbody>
</table>

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CATWALK ASSEMBLY
(Cantilever Shown, Span Similar)
NOTES:
1. See manufacturer details for walkway planks and bolting criteria.
2. Fasten securely. See grating manufacturers details.
**DESCRIPTION:**

**REVISION LAST OF STANDARD PLANS** FY 2020-21

---

**Fall Protection Requirements**

- W6x15 Hanger Meeting OSHA Horizontal Life Line Attached to W6x15 Hanger Meeting OSHA Fall Protection Requirements

- Minimum of 2 Required at 5'-0" Max. Spacing

- W6x15 Hanger (Typ.)

---

**Fixed Base**

- W6x15 Support Beam (Typ.)

---

**Guiderail**

- W6x15 Hanger (Cap Open End) with Nuts and Washer

- Ø Galv. Steel U-Bolt (Typ.)

---

**Infill Panel**

- 2" Max. Chain Link Infill Panel

- Infill Panel to Lap Inside Toe Kick

---

**Walkway Grating**

- 3'-11" (Typ.)

- W8x15 Support Beam

---

**Truss Chord**

- See DETAIL "C"

---

**Bolting Plate**

- Ø Holes (4) 16

---

**Guiderail**

- See DETAIL "D"

---

**Stiffener Plate**

- Stiffener Plate (4 Typ.)

---

**SIDE ELEVATION**

- W6x15 Hanger

---

**FRONT ELEVATION**

- W6x15 Hanger

---

**ISOMETRIC VIEW**

- W6x15 Walkway Support

---

**SECTION A-A**

- 1½" Ø Holes (4)

---

**SECTION B-B**

- 1½" Ø Holes (4)

---

**DETAIL "C"**

(Guiderail Attachment)

---

**DETAIL "D"**

(Bolting Plate)

---

**DETAIL "E"**

(Stiffener Plate)

---

**WALKWAY SUPPORT DETAILS**
GENERAL NOTES:
1. Single-Column Signs Shown, Multi-Column Signs similar. These typical sections serve as a guide for locating the traffic signs required under various roadside conditions. For size and details of sign construction and footing, refer to the appropriate Index and Plans.
2. Verify the length of sign supports in the field prior to fabrication.
3. Install ground signs at an angle of 1 to 4 degrees away from the traffic flow (see illustration). Island or curbed median mounted signs rotated clockwise and median mounted signs rotated counterclockwise. Install signs on a curve as noted above from the perpendicular to the motorist line of sight.
4. The setback for Stop and Yield signs may be reduced to 3 minimum from the Edge of Traveled Way if required for visibility in business or residential sections with no curb and speeds of 30 MPH or less.
5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the Edge of Traveled Way or from the ground surface at the back of curb. If the standard heights cannot be met, the minimum heights are as follows:
   - Limited Access Roadways - 7'
   - Arterial and Collector Roadways: 5 - Rural
     7 - Urban (including residential with parking and/or pedestrian activity)
   - Limited Access Roadways:
     - if a secondary sign is mounted below the major sign, mount the major sign so that the bottom of the sign is at least 8' above the edge of the traveled way and the secondary sign at least 3' above the edge of the traveled way.
     - Arterial and Collector Roadways:
       - Rural, mount the secondary sign at least 5' above the edge of the traveled way.
       - Urban, mount the secondary sign at least 7' above the edge of the traveled way.
6. Do not install sign supports in the bottom of ditches.
7. Install sign supports so they do not reduce the accessible width of Sidewalks or Shared Use Paths to less than 4' min. clear width.

CASE I
Use on Limited Access Roadways

CASE II
Use on Arterial and Collector Roadways, and Limited Access Ramps

CASE III
Use on Arterial and Collector Roadways

CASE IV
Use on Limited Access Roadways

CASE V
Use in Business or Residential Areas Only

CASE VI
Use on Roadways With Signs Behind Guardrail

CASE VII
REST AREA AND EXIT GORE SIGNS
Use on Limited Access Roadways

CASE VIII
Use on Island or Curbed Median

CASE IX
MILE POST MARKER
Use on Limited Access Roadways

CASE X
WRONG WAY SIGNS
Use on Interstate Exit Ramps

NOTE:
For more information refer to Section 2H of the MUTCD.
FTP-1-06
13'-6" X 5'-6"
9" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

FTP-2-06
7'-0" X 2'-6"
6" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

FTP-3-06
4' X 3'-6"
6" Radii 2" Border
6" Series E Legend
White Background
Black Legend and Border

FTP-4-06
4' X 7'-0"
2" Radii 2" Border
6" Series E Legend
Green Background
White Legend and Border
Note: FTP-4-06 to be used with FTP-3-06

FTP-5-06
14'-6" X 7'-6"
12" Radii 2" Border
12" and 10" Series E Legend
Green Background
White Legend and Border

FTP-6-06
10'-0" X 3'-3"
12" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

FTP-6A-06
10'-0" X 3'-3"
12" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

FTP-6B-06
14'-0" X 7'-6"
12" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

FTP-7A-06
12' X 7'
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

FTP-7B-06
12' X 7'
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

FTP-7B-06-LEFT ARROW
12'-4" X 4'-0"
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border
Note: FTP-7B-06-LEFT ARROW to be used with FTP-7B-06

FTP-8-06
9'-0" X 3'-3"
3" Radii 2" Border
9" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border
Note: FTP-8-06 to be used with FTP-7A-06

FTP-9A-06
14'-0" X 7'-0"
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

FTP-9A-06-LEFT ARROW
14'-0" X 7'-0"
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

FTP-9B-06-LEFT ARROW
14'-0" X 7'-0"
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

FTP-10-06
17'-0" X 6'-0"
10" Radii 2" Border
12" and 15" Series E Legend
Black Background
White Legend and Border
**NOTES:**
1. Florida marker shall have black Legend with white Background.
2. Stroke width of State outline shall be 1" for guide sign.
4. 1/8" border

**GUIDE SIGN USE**

**FTP-17-06 - FLORIDA ROUTE MARKER**

<table>
<thead>
<tr>
<th>DIGITS</th>
<th>NUMERAL SIZE</th>
<th>SERIES LEGEND</th>
<th>PANEL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>15&quot;</td>
<td>C</td>
<td>48&quot; x 36&quot;</td>
</tr>
<tr>
<td>4</td>
<td>12&quot;</td>
<td>C</td>
<td>48&quot; x 36&quot;</td>
</tr>
</tbody>
</table>

**REVISION DESCRIPTION:**

1. Series D Legend.
2. Stroke width of State Outline shall be 1".
4. Stroke width of State Outline shall be 1/8" for guide sign.
5. 1/8" Border

**SPECIAL SIGN DETAILS**

**FTP-18-06 - COUNTY ROUTE MARKER (MI-6)**

**INDEPENDENT USE OTHER THAN FREEWAY**

**INDEPENDENT USE FOR FREEWAY**

**SERIES E**

<table>
<thead>
<tr>
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<th>NUMERAL SIZE</th>
<th>SERIES LEGEND</th>
<th>PANEL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>10&quot;</td>
<td>D</td>
<td>24&quot; x 24&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Stroke width of State Outline shall be 1".
2. 24" x 24" panel shall only be used for a 3 digit route when the panel is to be used on a sign cluster with other 24" x 24" panels.
3. 1/8" Radii

**SERIES F**

<table>
<thead>
<tr>
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<th>NUMERAL SIZE</th>
<th>SERIES LEGEND</th>
<th>PANEL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8&quot;</td>
<td>D</td>
<td>30&quot; x 24&quot;</td>
</tr>
<tr>
<td>4</td>
<td>8&quot;</td>
<td>C</td>
<td>30&quot; x 24&quot;</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

**Rectangular Yellow Background Dimensions (See Note 3)

4 DIGIT POST MOUNTED:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| 25" | 42" | 42" | 42" | 30" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" |

2 DIGIT OVERHEAD:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| 21" | 36" | 36" | 36" | 30" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" |

3 DIGIT OVERHEAD:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| 25" | 42" | 42" | 42" | 30" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" | 12" |

4 DIGIT OVERHEAD:

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| 29" | 48" | 48" | 48" | 36" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" | 15" |
No Obstruction to Text or Symbols From Holes or Bolts. Sign Mounting Holes Can Be Punched or Field Drilled With No Obstruction to Text or Symbols From Holes or Bolts.

**FTP-62-06**
3 x 3
2" Radii 1/8" Border
4" Series C Legend
Yellow Background
Black Legend and Border

**FTP-65-06**
3" x 3.6 "
2" Radii 1/8" Border
4" Series D Legend
White Background
Black Legend and Border

**FTP-66-06**
4" x 3\'
2" Radii 1/8" Border
7" Series D Legend
White Background
White Legend and Border

**FTP-67-06**
3" x 4\'
2" Radii 1/8" Border
5" Series D Legend
Blue Background
White Legend and Border

**FTP-68A-06**
9" x 9.5"
1.5" Radii
Series B Legend
White Background
Black Legend and Border

**FTP-68B-06**
9" x 9.5"
1.5" Radii
Series B Legend

**FTP-69-06**
2" and 3" Series D Legend
White Legend and Border
Blue Background
4" Radii 1/8" Border

**FTP-70-06**
3.6" x 7.6"
225° Radii 1/8" Border
5" Series C and 7" Series C Legend
Yellow Background
Blue Background
Black Legend and Border

**FTP-71-06**
4" x 4"
2" Radii 1/8" Border
5" Series C Legend
Yellow Background
Black Legend and Border

**FTP-72-06**
3" x 3"
2" Radii 1/8" Border
6" Series C Legend
Yellow Background
Black Legend and Border

**FTP-73-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
Blue Background
White Legend and Border

**FTP-74-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
White Legend and Border

**FTP-75-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
White Legend and Border

**FTP-76-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
White Legend and Border

**FTP-77-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
White Legend and Border

**FTP-78-06**
5.6" x 2.6"
4" Radii 1/8" Border
8" Series D Legend
White Legend and Border
DESCRIPTION:

**VENDING FREE COFFEE**
- FTP-74-06
  - 3'-0" x 3'-0"
  - Blue Background
  - 6" Series D Legend
  - White Legend and Border

**SAFETY BREAK**
- FTP-75-06
  - 5'-6" x 1'-3"
  - Blue Background
  - 6" Series D Legend
  - White Legend

**MACHINES**
- FTP-76-06
  - 5'-6" x 1'-3"
  - Blue Background
  - 8" Series D Legend
  - White Legend

**EVACUATION ROUTE**
- FTP-77-06
  - 3" x 3"
  - Blue Circle Background
  - 4" Series C Legend
  - 3" Radii
  - 3' X 3'

**TOLL**
- FTP-78-06
  - 2" x 2"
  - Blue Circle Background
  - 4" Series D Legend
  - 2" Radii
  - 4

- FTP-79-06
  - 4" x 9"
  - Blue Circle Background
  - 6" Series D Legend
  - 3" Radii
  - 3' X 3'

**ALL TRUCKS ONLY**
- FTP-80-06
  - 3" x 3"
  - Blue Circle Background
  - 8" Series D Legend
  - 1.5" Radii
  - 3' X 3'

**DRAW BRIDGE AHEAD**
- FTP-81-06
  - 5" x 5"
  - Blue Circle Background
  - 10" Series E Legend
  - 1.5" Radii
  - 3' X 3'

**INDEX**
- 700-102

**FY 2020-21 STANDARD PLANS**

**SPECIAL SIGN DETAILS**

**REVISED: 01/01/17**

**REV 01/17**
**Note:**
Two assemblies are required: one for each side of the ramp, showing those services in each particular direction from the ramp terminal.
Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100' of another sign.

**GENERAL NOTES**

1. Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol signs for motorist services shall always appear in the following order reading from left to right and top to bottom: Gas, Food, Lodging, Phone *, Hospital, Camping.

2. Symbols shall appear consecutively on the sign with no positions left blank or reserved for intermediate symbols not currently approved for a particular interchange.

3. All motorist service signs to have White Legend and Border with Blue Background.

4. For mounting details see Index 700-010 for Single-column Ground Signs or Index 700-020 for Multi-column Ground Signs.

* The phone symbol shall not be shown whenever any Gas, Food, Lodging or Camping symbol appears.

NOTE
When approved for attachment to the advance guide sign, up to 3 services may be used for an exit. The symbol signs shall be suspended from the guide sign panel or existing wind beams. Symbol signs are not to be connected to existing sign posts.

The mounting height of the advance guide sign shall be increased, where necessary, to provide 8' between the level of the pavement edge and the bottom of the guide sign, prior to mounting the supplementary panel.
DESCRIPTION:

1. Signs and sign structures shall be erected in accordance with the details shown on Index 700-020.
2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the main line roadway as possible (2 signs back to back).
3. Sign FTP-10-06, 11-06, 12-06 shall be located as limited access highways only.
4. All legend to be Series E.
5. See Index 700-102 for sign details.

Note: Roadway not drawn to scale. Distances shown are adequate for driver communication but may be altered slightly if conditions require.

Note: Sign FTP-14-06 shall be used as a supplemental guide sign at interchanges which have a Tourist Information Center approved for such signing (locate half-way between normal guide signs).
1. Signs and sign structures shall be erected in accordance with the details shown on Index 700-020.

2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back).

3. All legend to be Series E.

4. One sign FTP-15A-06 or 15B-06 should be used depending on speed, roadside development & geometric conditions.

Notes:

FTP-15A-06

FTP-12-06

FTP-15B-06

FTP-15C-06

800' Maximum For Rural Conditions

50' Minimum For Rural Conditions

FOR PRIMARY HIGHWAYS
One-Way Traffic

For Paved Shoulders 18" White @ 45° Every 50' For 1570'
White on Right and Yellow on Left.

One-Way Traffic

2-Way Traffic

For Paved Shoulders 18" White @ 45° Every 50' For 1570'

One-Way Traffic

2-Way Traffic
NOTES:

1. Roadways with Two-Way Traffic:
   No passing zone should be extended 1570' in advance of narrow bridge.

2. If the bridge or the approach is on a curve, delineators shall be installed for a distance of 1370' in advance of narrow bridge on the outside portion of the roadway. Spacing shall be 100' between delineators. Delineators are to be placed not less than 2' or not more than 8' outside the outer edge of pavement.

3. Object markers and delineators on both sides of roadway shall face traffic approaching bridge.

4. The OM-3R & OM-3L object markers shall be installed 4' above the roadway edge. The panels may be post mounted at the bridges.

### Shoulder Width | No. of RPM's | Spacing
--- | --- | ---
2 | 2 | 18'
3 | 3 | 13'
4 | 3 | 19'
5 | 4 | 16.67'
SIGN LOCATIONS TYPICAL

2. Location of Sign 3 may require some field adjustment.
3. The Cross Road is the last detour to route around the restricted bridge.
4. Location of Sign 2 should be established from the Cross Road
   the following approximate distances: Interstate-1 Mile Non- Interstate-1/2 Mile.
5. See Index 700-102 for sign details.
DESCRIPTION:

REVISI0N

REV1 - 2

10 /29 /2019
8 :24 :08  A M

REVIEW

STANDARD PLANS
FY 2020-21

WEIGH STATION SIGNING

2 - LANE INSTALLATION

WEIGH STATION 1 MILE
DB-1
ALL TRUCKS ENTER WEIGH STATION
FTP-2-06
WEIGH STATION NEXT LEFT
FTP-3-06
WEIGH STATION
FTP-3-06
W4-1
DIAGRAM

4 - LANE DIVIDED INSTALLATION

WEIGH STATION 1 MILE
DB-1
ALL TRUCKS ENTER WEIGH STATION
FTP-1-06
WEIGH STATION NEXT RIGHT
FTP-3-08
WEIGH STATION
FTP-3-08
DB-3
ALL TRUCKS ENTER WEIGH STATION
FTP-1-06
DB-2
WEIGH STATION 1 MILE
DB-1

MEDIAN INSTALLATION

WEIGH STATION 1 MILE
DB-1
ALL TRUCKS ENTER WEIGH STATION
FTP-1-06
WEIGH STATION NEXT LEFT
FTP-2-06
WEIGH STATION
FTP-2-06
DB-3
ALL TRUCKS ENTER WEIGH STATION
FTP-1-06
DB-2
WEIGH STATION 1 MILE
DB-1

Note:
Signs DB-3 to be placed at or near the theoretical gore.

SHEET INDEX

11/01/17

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

FY 2020-21

INDEX

700-108

1 of 2
DESCRIPTION:

REVISION

LAST

of

STANDARD PLANS

FY 2020-21

SHEET

INDEX

11/01/17

AND INSPECTION STATIONS

TYPICAL SIGNING FOR TRUCK WEIGH

2 - LANE INSTALLATION

1500' Min.

1890'

1890'

1500' Min.

4 - LANE DIVIDED INSTALLATION

Note: Signs FTP-9B-06 to be placed at or near the theoretical gore.

FTP-5-06

ALL TRUCKS - TRAILERS

WEIGH STATION

AGRICULTURAL

INSPECTION

1 MILE

FTP-6A-06

TRUCKS - PICKUPS - VANS

NEXT RIGHT

FTP-7A-06

TRUCKS - PICKUPS - VANS

FTP-9A-06

WEIGH STATION

AGRICULTURAL

INSPECTION

NEXT RIGHT

MINOR

2- LANE DIVIDED INSTALLATION

WEIGH STATION

AGRICULTURAL

INSPECTION

1 MILE

FTP-5-06

FTP-6A-06

FTP-7A-06

FTP-9A-06

W4-1

FTP-5B-06

FTP-6B-06

FTP-7B-06

FTP-9B-06

MEDIAN INSTALLATION

WEIGH STATION

AGRICULTURAL

INSPECTION

1 MILE

FTP-5-06

FTP-6B-06

FTP-7B-06

FTP-9B-06

MEDIAN INSTALLATION

WEIGH STATION

AGRICULTURAL

INSPECTION

1 MILE

FTP-5-06

FTP-6B-06

FTP-7B-06

FTP-9B-06

INSPECTION STATION SIGNING

FY 2020-21

STANDARD PLANS

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

INDEX

700-108

2 of 2
TYPE 1 OBJECT MARKER PLACEMENT

NOTES:
1. Index applicable to residential and minor streets only. Major streets to be evaluated on a case-by-case basis.
2. Install Object Markers in accordance with Index 700-010
3. See Index 711-001 for pavement markings.

TYPE 4 OBJECT MARKER PLACEMENT

OBJECT MARKER DETAIL

TRAFFIC CONTROLS FOR STREET TERMINATIONS

INDEX
700-109

FY 2020-21
STANDARD PLANS

DESCRIPTION: REVISION
REV
LAST 9/01/19
10/29/19 8:24 AM
NOTES:
1. Work with Indexes 700-020 and 700-030.

2 Materials (Aluminum):
A. Sheets and Plates: ASTM B209 Alloy 6061-T6
B. Standard Structural Shapes: ASTM B308 Alloy 6061-T6
C. Extruded Shapes: ASTM B221 Alloy 6061-T6
D. For Bolts, Nuts, and Washers requirements see Index 700-020 or 700-030.

3 Fabrication:
A. See sign layout sheet for dimension "L" and sign face details in the Plans.
B. Round all sign corners.

4. For right exits, install the Exit Number Panel to the top right side of the Highway Sign.
5. For left exits, install the Exit Number Panel to the top left side of the Highway Sign.

DESCRIPTION:

1. Work with Indexes 700-020 and 700-030.

2 Materials (Aluminum):
A. Sheets and Plates: ASTM B209 Alloy 6061-T6
B. Standard Structural Shapes: ASTM B308 Alloy 6061-T6
C. Extruded Shapes: ASTM B221 Alloy 6061-T6
D. For Bolts, Nuts, and Washers requirements see Index 700-020 or 700-030.

3 Fabrication:
A. See sign layout sheet for dimension "L" and sign face details in the Plans.
B. Round all sign corners.

4. For right exits, install the Exit Number Panel to the top right side of the Highway Sign.
5. For left exits, install the Exit Number Panel to the top left side of the Highway Sign.
GENERAL NOTES:
1. Install sign assemblies based on Alpha-Numeric Type designation shown in the Plans (e.g., Type A1). Assembly Type is based on Power Configuration 'Alpha' Identification shown above and Numerical Identification shown on Sheet 3 thru 8.
2. Install sign panel and wind beam in accordance with Index 700-030 and Specification 700.
3. Engage all threads on the transformer base and post unless the aluminum post is fully seated into base.
4. Meet the requirements of Specification 646 for aluminum poles and transformer bases.
5. Install a concrete slab around all roadside assemblies on slopes 6:1 or greater. The minimum slab dimension is 6" by 4'-0" by 5'-0".
6. When wire entry holes are drilled in the sign column, use a bushing or rubber grommet to protect conductors.

POWER CONFIGURATION 'A' NOTES:
1. Install a separate pole for mounting the solar panel, controller and batteries for all roadside assemblies with solar panels, controllers and batteries weighing more than 170 lbs.
2. Install the auxiliary pole as close to the right of way boundary as possible.
3. Install the auxiliary pole so that the height is the same as the column for the roadside assembly.
4. Orient solar panel to face South for optimal exposure to sunlight.
5. The controller and the solar batteries may be located in the same compartment.

POWER CONFIGURATION 'B' NOTES:
1. Install a separate pole for mounting the solar panel, controller and batteries for all roadside assemblies with solar panels, controllers and batteries weighing more than 170 lbs.
2. Install the auxiliary pole as close to the right of way boundary as possible.
3. Install the auxiliary pole so that the height is the same as the column for the roadside assembly.
4. Orient solar panel to face South for optimal exposure to sunlight.
5. The controller and the solar batteries may be located in the same compartment.

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REV 07/01/19
STANDARD PLANS
FY 2020-21
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700-120
1 of 10
**DESCRIPTION:**

**LAST REVISED:** 07/01/19

**CONDUIT, WIRING, AND FOUNDATION DETAILS**

**DETAIL "A"**

- Transformer Base
- #6 Ground Wire
- Grounding Lug
- 3/8" x 18" Anchor Bolts
- Concrete Apron (Typ.)
- Strain Relief Fitting
- Circuit Conductors: 1 or 2 conductors, 4-conductor size as shown in plans (Typical)
- #6 Ground Wire
- Strain Relief Fitting
- Transformer Base
- #6 Ground Wire
- Grounding Lug
- 3/8" x 18" Anchor Bolts
- Cap Conduit
- Conduit for Future Use
- U.L. Approved Ground Rod
- 1/2 Diameter 20' long Copper Clad with Approved Ground Connection (At all Pull Boxes)
- Conduit for Future Use
- 1/2" Bed of Pearock or Crushed Stone For Drainage.

**DETAIL "B"**

- Transformer Base
- #6 Ground Wire
- Grounding Lug
- 3/8" x 18" Anchor Bolts
- Concrete Apron (Typ.)
- Strain Relief Fitting
- Circuit Conductors: 1 or 2 conductors, 4-conductor size as shown in plans (Typical)
- #6 Ground Wire
- Strain Relief Fitting
- Transformer Base
- #6 Ground Wire
- Grounding Lug
- 3/8" x 18" Anchor Bolts
- Cap Conduit
- Conduit for Future Use
- U.L. Approved Ground Rod
- 1/2 Diameter 20' long Copper Clad with Approved Ground Connection (At all Pull Boxes)
- Conduit for Future Use
- 1/2" Bed of Pearock or Crushed Stone For Drainage.
NOTE:
Type A1 Assembly (conventionally-powered) is shown. Type B1 Assemblies (solar-powered) similar.

SIGN
WARNING
12" Yellow Flashing Beacon
Sign Panel (48" x 48")

Beacon Controller
Nominal 4" (Sch. 40) Aluminum

FRONT VIEW
SIDE VIEW
NOTE:
Type A2 Assembly (conventionally-powered) is shown.
Type B2 Assemblies (solar-powered) similar.

DESCRIPTION:
ENHANCED HIGHWAY SIGNING ASSEMBLIES
ROADSIDE SIGN ASSEMBLY-2

SCHOOL SPEED LIMIT
20 OR 15
WHEN FLASHING
SPEEDING FINES DOUBLED

12" Yellow Flashing Beacon
55-1 (24" x 48") Sign
FTP-38-06 (24" x 30") Sign
Nominal 4" (Sch. 40) Aluminum

To Pull Box

FRONT VIEW
SIDE VIEW
1. Type A3 Assembly (conventionally-powered) is shown. Type B3 Assemblies (solar-powered) similar.

2. Use electronic speed feedback sign with 15" high numerals for posted speed of 45 mph or less, and 18" high numerals for posted speeds greater than 45 mph.
Nominal 4" (Sch. 40) Aluminum

NOTE:

20
15

OR

See Index 700-101

Doubled

Fines

Speeding

Limit

SCHOOL

Highlight Sign

55-1 (24" x 48")

FTP-38-06 (24" x 30")

Nominal 4" (Sch. 40) Aluminum

To Pull Box

NOTE:

Type A4 Assembly (conventionally-powered) is shown. Type B4 Assemblies (solar-powered) similar.
NOTES:
1. Type A5 Assembly (conventionally-powered) is shown.
   Type B5 Assemblies (solar-powered) similar.
2. Use electronic speed feedback sign with 15" high numerals for posted speeds of 45 mph or less,
   and 18" high numerals for posted speeds greater than 45 mph.

1. Use Type A5 Assembly, 20 mph speed limit.
2. Use Type A5 Assembly, 15 mph speed limit.
   Highlighted when flashing.

Nominal 4" (Sch. 40) Aluminum

Electronic Speed Feedback Sign

To Pull Box

SCHOOL SPEED LIMIT
20 OR 15
WHEN FLASHING

Highlight Sign Controller

S5-1 (24" x 48") Highlighted Sign

ENHANCED HIGHWAY SIGNING ASSEMBLIES

ROADSIDE SIGN ASSEMBLY-5
NOTES:
1. Type A6 Assembly (conventionally-powered) is shown.
   Type B6 Assemblies (solar-powered) similar.
2. Use electronic speed feedback sign with 15" high numerals for posted speed of 45 mph or less,
   and 18" high numerals for posted speeds greater than 45 mph.
NOTES:
1. Type A7 Assembly (Conventionally-Powered) is shown. Type B7 Assemblies (Solar-Powered) Similar.
2. Install cameras, point to point microwave link, microwave detectors, and antennas in accordance with the manufacturer's instructions.
**NOTES:**

1. Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.

2. Optional flashing beacon will be called for in the Plans. They may be placed within or below the panel, or face to the rear.
**GENERAL NOTES:**

1. Offset all RPMs 1” from solid longitudinal lines unless otherwise noted or shown.
2. Spacing may be reduced for sharp curves if required.
3. For placement of RPMs on ramps, see Index 711-003.
4. Make the traffic face of the RPM the same color as the pavement marking that it is supplementing.

**LEGEND:**

- **B/C** = BACK OF CURB
- **EOP** = EDGE OF PAVEMENT
- **RPM** = RAISED PAVEMENT MARKER
- **W/R** = WHITE/RED RPM
- **Y/Y** = YELLOW/YELLOW RPM
- **MD/Y** = MDN-DIRECTIONAL YELLOW RPM

---

**DESCRIPTION:**

1. Offset all RPMs 1” from solid longitudinal lines unless otherwise noted or shown.
2. Spacing may be reduced for sharp curves if required.
3. For placement of RPMs on ramps, see Index 711-003.
4. Make the traffic face of the RPM the same color as the pavement marking that it is supplementing.
RPM PLACEMENT AT INTERSECTIONS

RPM PLACEMENT AT TRAFFIC CHANNELIZATION AT GORE
(Traffic Flows In Same Direction)

RPM PLACEMENT AT TRAFFIC SEPARATION
(Traffic Flows In Opposite Direction)

LEGEND:
B/C = BACK OF CURB
EDP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/Y = YELLOW/YELLOW RPM
Y/R = YELLOW/RED RPM
MD/Y = MONO-DIRECTIONAL YELLOW RPM

NOTE:
1. Center the Raised Pavement Markers between chevrons and crosshatching.
NOTES:
1. For Type "C" Curb, install RPMs along the pavement edge marking using the same spacing shown.
2. Orient traffic faces of RPMs in curb median radii to be parallel to direction of travel lanes.

LEGEND:
B/C = BACK OF CURB
EOP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/R = YELLOW/RED RPM
Y/Y = YELLOW/YELLOW RPM
W/Y = WHITE/YELLOW RPM
MD/Y = MISC-DIRECTIONAL
YELLOW RPM

POSTED SPEED LIMIT (MPH)
"Y" FEET
30 OR LESS  10
25  20
40  30
45  30
50 OR MORE 40

FLUSH MEDIAN OPENINGS

RPM PLACEMENT AT MEDIAN OPENINGS
(When called for in the Plans)

TYPE "D" OR "F" CURB
RPM PLACEMENT AT ISLANDS
(When called for in the Plans)

NOTES:
1. For Type "E" Curb install RPMs along the pavement edge marking using the same spacing shown.
2. Orient traffic faces of RPMs in median radii to be parallel to direction of travel lanes.

RPM PLACEMENT AT TRAFFIC SEPARATORS
(When called for in the Plans)

LEGEND:
B/C = BACK OF CURB
EOP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/Y = YELLOW/YELLOW RPM
Y/R = YELLOW/RED RPM
MD/Y = MONO-DIRECTIONAL YELLOW RPM
MD/W = MONO-DIRECTIONAL WHITE RPM

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT</th>
<th>11' FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 OR LESS</td>
<td>10</td>
</tr>
<tr>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>50 OR MORE</td>
<td>40</td>
</tr>
</tbody>
</table>
RPM PLACEMENT FOR CROSSES ON LIMITED ACCESS ROADWAYS

3 Yellow RPMs
See DETAIL "L"

2 Yellow RPMs

1 Yellow RPM

Shoulder

6" Yellow Edge Line

Edge of Travelled Way

DETAIL "L"
TWO-LANE ROADWAY

MULTI-LANE ROADWAY

MULTI-LANE ROADWAY WITH TURN LANE

LIMITED ACCESS ROADWAY

TWO-LANE ROADWAY AT INTERSECTION

MULTI-LANE ROADWAY AT INTERSECTION
NOTES FOR PAVEMENT MESSAGES:

1. When an arrow or another pavement message is used with a pavement message, maintain a minimum distance of "S" between items, measured from the base of each item. See the Pavement Message Spacing Table for "S" value.

2. Place all pavement messages 25' back from the stop line. Turn and Through Lane-Use Arrow 27 S.F.

3. Dimensions are within 1" ±.

4. All grids are 4" x 4".

5. All pavement messages must be white except route shields.

6. Increase width of route shield for routes with three digits.

PAVEMENT MESSAGE AND ARROW DETAILS

GENERAL NOTE:

1. See Index 509-076 for pavement markings at railroad crossings.

PAVEMENT MESSAGE SPACING TABLE

<table>
<thead>
<tr>
<th>Posted Speed (mph)</th>
<th>Distance &quot;S&quot; (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 25</td>
<td>40</td>
</tr>
<tr>
<td>25 - 35</td>
<td>56</td>
</tr>
<tr>
<td>&gt; 35</td>
<td>72</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>88</td>
</tr>
</tbody>
</table>

R1=3'-3.375"
R2=2'-3.563"
R1=3'-3.375"
R2=2'-3.563"
PAVEMENT MARKING LINES

10' White Skip (Typ.)
10' Black Contrast (Typ.)

10'-30' SKIP LINE WITH SHADOW MARKINGS

3' White Skip (Typ.)
3' Black Contrast (Typ.)

DOTTED LINE WITH ALTERNATING SHADOW MARKINGS
(3'-9' Dotted Line Shown, Other Dotted Lines Similar)

YIELD LINES

Direction of Traffic

Lane Line

Equally Spaced

Travel Lane

Lane Line

Edge Line

Yield Lines consist of five 18" X 27" white triangles which face traffic. Equally space triangles within traffic lane. When a bike lane is present, add one additional triangle in the center of the bike lane.
Curb and Gutter

Flush Shoulder

Striping for Buffered Bike Lane

Striping with Shoulder or Non-Buffered Bike Lane

Striping with No Shoulder or Bike Lane

Notes:
1. Lane widths (X) may not be same for each lane in the section.
2. For placement of RPMs, see Index 706-001.
NOTES:
1. Lane widths (X) may not be same for each lane in the section.
2. For placement of Express Lane markers and associated RPMs, see the Plans.
3. For placement of RPMs, see Index 706-001.
4. For placement of Express Lane markers and associated RPMs, see the Plans.

INTERSECTION APPROACH STRIPING WITH TURN
LANES AND BUFFERED BIKE LANE KEY HOLE

BUFFERED EXPRESS LANE STRIPING

PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS
FLUSH SHOULDER SHOWN
NOTE:
1. Apply yellow reflective paint to the noses of curbed medians, traffic separators, and raised islands. When applying yellow reflective paint in conjunction with Raised Pavement Markers, see Index 706-001.
2. Use yellow retro-reflective sheeting on both sides of the delineator. Install the post so that the top is 4’ above the grade at the edge of the pavement.
3. Extend double yellow centerlines 100’ back from intersection on all approaches or 50’ for unmarked cross roads.
TWO WAY LEFT TURN LANE
(With Single Lane Left Turn Channelization)

NOTE:
See Sheet 1 for “S” value.

TRAFFIC CHANNELIZATION AT GORE

NOTE:
See Sheet 1 for “S” value.

RIGHT TURN LANE DROP AND ISLAND DETAILS
LEFT TURN LANE DROP IS MIRROR IMAGE

RIGHT TURN LANE AND ISLAND DETAILS
LEFT ROADWAY CENTERED ON EXISTING ROADWAY

RIGHT ROADWAY CENTERED ON EXISTING ROADWAY

SCHEMES FOR TRANSITION - 2 LANE / 4 LANE ROADWAY

NOTE: Make pavement markings yellow for left roadway centered on existing roadway. Right roadway centered on existing roadway is similar with white pavement markings.

NOTE: See Sheet 1 for "S" value.

DETAIL "D"

DETAIL "E"

MARKINGS FOR TRAFFIC SEPARATION
NOTES:
1. For crosswalk width, exceed width of the adjacent sidewalk, but do not make width less than 6' for intersection crosswalks and 10' for midblock crosswalks. Measure width from the inside of the transverse crosswalk markings.

2. When the Special Emphasis Crosswalk is not perpendicular to the lane lines, make the longitudinal markings parallel to the lane lines.

3. Refer to Index 522-002 when Curb Ramps are present.
TURN LANE MARKINGS

**QUEUE LENGTH**

Queue Length is measured from the median nose radial point or when a stop bar is required, from the stop bar.

**SINGLE LEFT TURNS**

1. This Index also applies to right turn lanes.
2. Make pavement marking yellow for left-turn lanes and white for right-turn lanes.
3. See Sheet 1 for “S” value.
4. Space arrows evenly between the first and last arrow with a minimum spacing of “S” between arrows.
5. For turn lanes greater than 225’ in length, use a minimum of three arrows. Use additional arrows in accordance with the Plans or as directed by the Engineer. Space arrows evenly throughout the available length with a minimum spacing of “S” between arrows.

**TURN LAMES - CURBED AND UNCURBED MEDIANS**

<table>
<thead>
<tr>
<th>POSTED SPEED (mph)</th>
<th>CLEARANCE DISTANCE</th>
<th>BRAKE TO STOP DISTANCE</th>
<th>TOTAL DECEL. DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
<tr>
<td>35</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
<tr>
<td>40</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
<tr>
<td>45</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
<tr>
<td>50</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
<tr>
<td>55</td>
<td>15”</td>
<td>15”</td>
<td>30”</td>
</tr>
</tbody>
</table>

NOTE: When installing lane lines for turn lanes, use the dimensions in the Plans, or use the above values for turn lanes not dimensioned in the Plans.
**FOR ACCESSIBLE MARKINGS - SEE ABOVE**

**DIMENSIONS**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
<th>Depth</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-4&quot;</td>
<td>2'-8&quot;</td>
<td>6&quot;</td>
<td>Std.</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Dimensions are to the centerline of markings.
2. An Access Aisle is required for each accessible space when angle parking is used.
3. Criteria for pavement markings only, not public sidewalk curb ramp locations. For ramp locations refer to plans.
4. Tint blue pavement markings to match color 15180 of Federal Standards SRAs.
5. Mount FTP-22-06 sign below the FTP-21-06 sign.
6. Use of the pavement symbol in accessible parking spaces is optional. When pavement symbol is used, the symbol is either 3'-0" or 5'-0" high and white in color.
NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL PAVEMENT MARKING

SCHOOL

NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL


SCHOOL

NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL

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NOTES:
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2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL

NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL
NOTES:
1. All bicycle markings and pavement messages shall be White.
2. All bicycle markings shall be preformed thermoplastic.
3. All grids are 4" x 4".

---

**STANDARD PAVEMENT MARKING MESSAGE LAYOUTS**
REVISION INDEX SHEET

DESCRIPTION:

REVISION INDEX SHEET

LAST
REV 01-01-17 FY 2020-21
REVISION

INDEX

BICYCLE MARKINGS

10/29/2019

8:24:43

EOP

Line

Dotted

2'-4'

Center of Solid Line and Dotted Line

Radius Curb Return of Stop Line

Shared Lane 150

Lane Width

Sidewalk

SLIDEAWALK

4'-8'

5'-8'

6'

Lane

Width

Travel

Lane

BIKE

LANE

BUFFERED BIKE LANES

6' White Solid Line

BIKE LANE STRIPING

6' White Solid Line

6' Min. From Curb Radius Return

5' Min. From Curb Radius Return

APPROACH TO INTERSECTIONS DETAIL

FAR SIDE OF INTERSECTION DETAIL

11/01/17

711-002

2 of 2

STANDARD PLANS

STANDARD PLANS
GENERAL NOTES:
1. Make the traffic face of the raised pavement marker (RPM) the same color as the pavement marking that it is supplementing.
2. See Index 706-001 for additional information on RPMs.
NOTES:

1. Place the Wrong Way Arrow at the physical gore or 100'-0" from the theoretical gore.

2. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 309'-0". All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.

DESCRIPTION:

Post delineators should not be discontinued in sections with guardrail.

300'-0". All delineators are to be setback 4' from shoulder break.

Direction of Traffic:

Wrong Way Arrow

DETAIL "B"

TYPICAL CURVED EXIT RAMPS
NOTES:

1. Place the Wrong Way Arrow at the end of the physical gore or 100'-30' from the end of theoretical gore.

2. Post delineators spaced at 40' on curves of entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 300'-0'. All delineators are to be setback 4' from shoulder break.

Post delineators should not be discontinued in sections with guardrail.

TYPICAL INTERSECTION
TYPICAL PARTIAL CLOVERLEAF/TRUMPET EXIT RAMP

NOTE:
Do not place wrong way arrows in between consecutive directional arrows.

DESCRIPTION:

REVISIO

INDEX

711-003

6 of 7
NOTES:

1. This Index shows layouts for 1, 2, and 3 lanes, regardless of the number of lanes.

2. The message consists of white letters and numbers with black contrasting material.

3. The "EXIT NUMBER" position remains the same distance from the beginning of taper, regardless of the number of lines of information.

4. All grids are 4" x 4".
**WIRING DIAGRAM**

**WIRING DETAILS**

1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Specification 992.

2. Provide cable length to remove fuseholders from transformer base, pole base or pullbox for maintenance. Remove slack from the luminaire cable to provide tension on the fuseholders if the pole breaks away. Pull excess cable into pull box tighten strain relief fittings or cable clamps at both ends of conduit to prevent cable from slipping.

**NOTES:**

**WIRING DIAGRAM**

- **WIRING DETAILS**

**CONVENTIONAL LIGHTING**

**STANDARD PLANS**

**FY 2020-21**
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class N5 with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Specification 635 may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around pull boxes shall be included in the price of pull box.

SLAB DIMENSIONS

SLAB DETAILS FOR INTERMEDIATE PULLBOX LOCATIONS
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of Fc=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 1' x 24"; others approved under Specification 635 may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited, slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of ½" of closed-cell polyethylene foam expansion material. The top ½" of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Specification 932.

Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.

Concrete shall be Class NS with a minimum strength at 28 days of Fc=2.5 ksi.

Outside edge of slab shall be cast against formwork.

The pull box shown is 1' x 24"; others approved under Specification 635 may be used.

Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited, slab dimensions may be adjusted as shown in the plans.

Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.

The expansion joint shall consist of ½" of closed-cell polyethylene foam expansion material. The top ½" of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Specification 932.
GENERAL NOTES:

1. Poles are designed to support the following:
   A. Luminaire Effective Projected Area (EPA): 1.55 SF
   B. Weight: 75 lb.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not included in the Plans.

3. Materials:
   A. Pole, Pole Connection Extrusions and Arm Extrusions: ASTM B221, Alloy 6063-T6 or Alloy 6061-T6
   B. Bars, Plates, Stiffeners and Backer Ring: ASTM B221, Alloy 6063-T6
   C. Caps and Covers: ASTM B-26, Alloy 319-T
   D. Steel Bearing Plate: ASTM A529 or ASTM A36 Grade 36
   E. Aluminum Weld Material: ER 4043
   G. Bolts, Nuts and Washers:
      a. Shoe Base Bolts: ASTM F3315, Grade A325, Type 1
      b. Nuts: ASTM A563 Grade DH Heavy-Hex
      c. Anchor Bolts, Nuts, and Washers:
         a. Anchor Bolts: ASTM F3315 Grade 55
         b. Nuts: ASTM A563 Grade A Heavy-Hex
         c. Pipe Fitting: ASTM A20
   H. Stainless Steel Fasteners:
      a. Shoe Base: ASTM F3315
      b. Nuts: ASTM F593 Alloy Group 2, Condition A, CW1 or S31
   I. Nut Covers: ASTM B-26, Alloy 319-F
   J. Concrete:
      a. Class: 1
      b. Reinforcing Steel: Specification 415
      c. Concrete: Class 1
      d. Embedded Junction Box (EJB): Install EJBs per Note 4 and in accordance with Specification 635, as shown on the following Sheets.
      e. Anchors:
         a. Shoe Base Bolts: ASTM F3125, Grade A325, Type 1
         b. Nuts: ASTM A563 Grade A Heavy-Hex
         c. Washer: ASTM F436 Type 1
   K. Fasteners:
      a. Anchor Bolts: ASTM F3315
      b. Nuts: ASTM A563 Grade DH Heavy-Hex
      c. Washer: ASTM A36
   L. Reinforcing Steel: Specification 415
   M. Concrete:
      a. Class: 1
      b. Reinforcing Steel: Specification 415
      c. Concrete: Class 1
      d. Embedded Junction Box (EJB): Install EJBs per Note 4 and in accordance with Specification 635, as shown on the following Sheets.
      e. Anchors:
         a. Shoe Base Bolts: ASTM F3125, Grade A325, Type 1
         b. Nuts: ASTM A563 Grade A Heavy-Hex
         c. Washer: ASTM F436 Type 1

4. Fabrication:
   A. Weld Arm and Pole (Alloy 6063) in the 14 temper using 4043 filler. Age the Arm and Pole artificially to the 16 temper after welding.
   B. Transverse welds are only allowed at the base.
   C. Roadway Light Pole Taper: Taper as required to provide a round top O.D. of 6" and a base O.D. of 8" for 20' and 25' mounting heights and 10" O.D. for poles with 30' to 50' mounting heights. Portions of the pole near the base shoe and at the arm connections may be held constant to simplify fabrication.
   D. Median Barrier Mounted Light Pole Taper: Taper as required to provide a 6" O.D. round top with an 11" x 7" O.D. oblong base. Portions of the pole near the base and at the arm connections may be held constant at 11" x 4" oblong and 6" round respectively to simplify fabrication.
   E. Provide 2", 2-1/2", and 3" wall thicknesses for pole and arm connections to simplify fabrication.
   F. Provide 2", 2-1/2", and 3" wall thicknesses for pole and arm connections to simplify fabrication.
   G. Perform all welding in accordance with AWS D1.2.
   H. Embedded Junction Box (EJB)
      a. Weld all seams continuously and grind smooth.
      b. Hot Dip Galvanize after Fabrication.
      c. Provide a watertight cover with neoprene gasket and secure cover with galvanized screws.
      d. Median Barrier Mounted Aluminum Light Poles, the manufacturer must demonstrate the ability to produce a crack free pole. The manufacturer's Department-approved QC Plan must contain the following information prior to fabrication:
         a. Tests demonstrating a pole with a 12" wall thickness achieves and ultimate moment capacity of 36 kip-ft in the strong axis and 30 kip-ft in the weak axis.
         b. Tests demonstrating a pole with a 12M16" wall thickness achieves an ultimate moment capacity of 44 kip-ft in the strong axis and 35 kip-ft in the weak axis.
         c. Test results showing the pole does not buckle at the shape transition area under the ultimate moment capacity loads.
         d. Complete details and calculations for the reinforced 4" x 6" (Min) handhole located 1'-6" above the base plate.
         e. Identification Tag: Submit details for approval.
         a. 2" x 4" (Max) Aluminum identification tag.
         b. Locate on the outside of the transformer base and visible from the door opening.
         c. Secure to transformer base with 1/2" diameter stainless steel rivets or screws.
         d. Include the following information on the ID Tag:
            1. Financial Project ID
            2. Pole Height
            3. Manufacturer's Name

5. Coatings/Finish:
   A. Pole and Arm Finish: 50 grit satin rubs.
   B. Galvanized Steel Bolts, Screws, Nuts and Washers: ASTM F1329
   C. Not Dip Galvanize EJB and other steel items including poles and plate washers: ASTM A123

6. Construction:
   A. Foundation: Specification 635, except payment for the foundation is included in the cost of the pole.
   B. Frangible Base, Base Shoe, and Clamp:
      a. Certify that the Clamp, Frangible Transformer Base, and Base Shoe Design are capable of providing the required capacity.
      b. Certify the Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines (e.g. Akron Foundry TB1-17).
      c. Do not erect pole without Luminaire attached.

7. Embedded Junction Box (EJB): Install EJBs per Note 4 and in accordance with Specification 635, as shown on the following Sheets.

8. Wind Speed by County:
   - 160 MPH: Brinyard, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.
STANDARD ROADWAY ALUMINUM LIGHT POLE W/ARM

STANDARD ROADWAY ALUMINUM LIGHT POLE W/TOP MOUNT

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON CYLINDRICAL FOUNDATION

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON SPREAD FOOTING FOUNDATION

SECTION A-A

ELEVATIONS

STANDARD ALUMINUM LIGHTING

INDEX

715-002

2 of 8
### Fixture Arm Length

- 8', 10', 12', or 15'
- \(3 \times \frac{\text{Fixture Arm Length} - 3'-0"}{4}\)
- 6" (8' and 10' Fixture Arm Lengths)
- 5'-6" (12' and 15' Fixture Arm Lengths)

### Material Specification

- See General Notes on Sheet 1
- Pole Connection Extrusion (Typical)
- 2° Vibration Damper Elevation

### Arm & Damper Details

- ARM & DAMPER DETAILS
- VIBRATION DAMPER ELEVATION
- VIEW B-B
- VIEW C-C

### Arm Tube Extrusions Notes:

- At the pole connections, provide arm tube extrusions with dimensions as shown, uniformly transition elliptical section to a cylindrical section at the arm connection.

- The fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provide minimum wall thickness of \(\frac{1}{8}\) nominal and within the Aluminum Association Tolerances.

- The outside diameter about the minor axis should be held at 2\(\delta\) at the upper and lower arms.
### ARM-POLE TABLE
FOR STANDARD ALUMINUM LIGHT POLES WITH ARM

<table>
<thead>
<tr>
<th>Assembly Height (ft)</th>
<th>Wind Speed and Arm Lengths (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8, 10, 12, 15</td>
<td>120 mph</td>
</tr>
<tr>
<td>10</td>
<td>140 mph</td>
</tr>
<tr>
<td>12, 15</td>
<td>160 mph</td>
</tr>
</tbody>
</table>

- 120 mph: 8, 10, 12, 15
- 140 mph: 8, 10
- 160 mph: 12, 15

### POLE TABLE

<table>
<thead>
<tr>
<th>Pole</th>
<th>Pole Wall Thickness</th>
<th>Top of Base Shoe Weld</th>
<th>Inside of Base Shoe Weld</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>0.156</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>P1</td>
<td>0.250</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>P2</td>
<td>0.313</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>P3</td>
<td>0.375</td>
<td>3/4</td>
<td>3/4</td>
</tr>
</tbody>
</table>

### POLE NOTES:
1. See ARM SECTION detail on Sheet 3 for all A1 and A2 Values.
2. See Pole Table for all P1, P2, and P3 values.
4. For 20' and 25' assembly heights use only 8' or 10' arm A1 with P0.

### FOUNDATION TABLE

<table>
<thead>
<tr>
<th>Pole</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>Bolt Min Embedment</td>
<td>2'-6&quot;</td>
<td>3'-6&quot;</td>
<td>3'-6&quot;</td>
<td>3'-6&quot;</td>
</tr>
</tbody>
</table>

### POLE AND BASE DETAILS FOR ROADWAY ALUMINUM LIGHT POLE

- **Foundation Notes:**
  1. Depths shown are for slopes equal to or flatter than 1:4. For slopes steeper than 1:4 and equal to or flatter than 1:2 add 2'-6" to foundation depths shown.
  2. Foundation Tie Bars: #4 Tie Bars @ 12" centers (max) or Ø10 (or Ø12) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

- **Foundation:**
  - Class 1 Concrete may be cast-in-place or precast with "Flowable Fill" backfill.
  - Anchor Bolt and Washer as required by Approved Breakaway Transformer Base Manufacturer (Typ.)
  - Cast Aluminum Pressure Mounted Nut Cover - Bolted Attachment Optional

- **Bolt Minimum Embedment:**
  - P0: 2'-6"
  - P1: 3'-6"
  - P2: 3'-6"
  - P3: 3'-6"
**NOTE:**

1. For locations of Bearing Plates, Base Plates and Detail 'A' see Sheets 6 & 7.
2. Double Nuts: The bottom hex nut may be substituted by a half-height 'jam' nut.
3. Provide individual nut covers (not shown) for each bolt.
4. Pole wall thicknesses shown are nominal and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used in accordance with the minimum Aluminum Association thicknesses.

**STIFFENER PLATE DETAIL**

**BASE PLATE PLAN**

**BASE PLATE ELEVATION**

**BEARING PLATE ELEVATION**

**BEARING PLATE PLAN**

**BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE**

**STANDARD ALUMINUM LIGHTING**

**STANDARD PLANS**

**FY 2020-21**

**INDEX**

**715-002**

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DESCRIPTION:

REV IS IO N

FINA L

FY 2020-21

STANDARD PLANS

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#5 Bars, 10'-6" long (Typ.)

REVISION

LAST

STANDARD PLANS

FY 2020-21

SHEET

INDEX

11/01/17

STANDARD ALUMINUM LIGHTING

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6 of 8

FRONT VIEW

VIEW AA

EMBEDDED JUNCTION BOX DETAILS

PLAN

ELEVATION

END VIEW

SPREAD FOOTING DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

Median Barrier

(Index 521-001)

20'-0" Min.

2 Sp. @ 16" ±

Spacing Bars 5V & 5W1

7 Sp. @ 8" ±

2 Sp. @ 16" ±

See Detail 'A'.

Sheet 5

Optional Construction Joint (Typ.)

(See Note 2)

Bars 5V (Typ.)

Bars 5W1 (Typ.)

Bearing Plate

4" Cover

(Bottom)

3" Cover (Typ.)

1" Ø Conduit

Anchor Bolts

Base Plate

#5 Bars, 10' 4" long (Typ.)

Construction Joint (Typ.)

See Roadway Plans

See Detail 'A', Sheet 5

Bearing Plate

Material

with Rigid Pavement Only

1" Exp. Jt.

 intertwined 2'-0" with the longitudinal Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal

these alternatives may be substituted;

Alternatively, a continuous concrete pour or a

Barriers may be substituted; these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.

NOTES:

1. For Bearing Plate and Base Plate

Details, see Sheet 5.

2. For connections to adjacent Median

Barrier, use the Doweled Joint detail

per Index 521-001. Alternatively, a

continuous concrete pour or a

construction joint may be substituted,

see Sheet 5.

(See Note 2)

Joint (Typ.)

Construction

Optional

1. For Bearing Plate and Base Plate

Details, see Sheet 5.

2. For connections to adjacent Median

Barrier, use the Doweled Joint detail

per Index 521-001. Alternatively, a

continuous concrete pour or a

construction joint may be substituted,

these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.

NOTES:

1. For Bearing Plate and Base Plate

Details, see Sheet 5.

2. For connections to adjacent Median

Barrier, use the Doweled Joint detail

per Index 521-001. Alternatively, a

continuous concrete pour or a

construction joint may be substituted,

these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.

NOTES:

1. For Bearing Plate and Base Plate

Details, see Sheet 5.

2. For connections to adjacent Median

Barrier, use the Doweled Joint detail

per Index 521-001. Alternatively, a

continuous concrete pour or a

construction joint may be substituted,

these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the longitudinal steel shown herein.
**DESCRIPTION:**

**LAST REVIEW:** 01/01/17  
**INDEX:** 715-002  
**SHEET:** 8 of 8

**STANDARD PLANS**

**STANDARD ALUMINUM LIGHTING**

**FY 2020-21**

---

**PLAN**

(Reinforcing steel and 2" Ø Conduit not shown)

**ELEVATION**

(Longitudinal and transverse deck reinforcing steel not shown)

**SECTION D-D**

(Longitudinal and transverse deck reinforcing steel not shown)

**NOTES:**

1. For Base Plate Details, Bearing Plate Details, and Detail 'A', see Sheet 5.
2. See Index 521-426 for details of adjacent Traffic Railing (Median 36" Single-Slope) and for angles 'A' and 'B'.
3. See Index 630-010 for Conduit, EJB and supplemental reinforcing details.

---

**Bars 5S (Typ.)**

<table>
<thead>
<tr>
<th>1/01/17</th>
<th>8</th>
</tr>
</thead>
</table>

**Bars 5R (Typ.)**

**Bars 5W (Typ.)**

**Bearing Plate**

**Optional Const. Joint**

**Optional Splice (see Note 3)**

---

**4 ~ 1½" Ø Anchor Bolts**

**2" Ø Conduit**

**1" Conduit**

**Supplemental #5 Bars**

**Optional Constr. Joint**

**Embedded Junction Box**

**Symmetrical about ø Light Pole**

**Bridge Deck**

**Traffic Railing (Median 36" Single-Slope)**

**Bars 5R and 5W @ 1'-0"**

**Bars 5R and 5W @ 8"**

**Bars 5R and 5W @ 8"±**

**Bars 5R and 5W @ 1'-0"**

**Min. 5' from ø open joint**

---

**At the Contractor's option, Bars 5W may be fabricated as a two piece bar with a 1'-2" lap splice at the bottom legs.**

---

**Bridge Deck**

**Bars 5S**

**Optional Const. Joint**

---

3. See Index 630-010 for Conduit, EJB and supplemental reinforcing details.

2. See Index 521-426 for details of adjacent Traffic Railing (Median 36" Single-Slope) and for angles 'A' and 'B'.

1. For Base Plate Details, Bearing Plate Details, and Detail 'A', see Sheet 5.
HIGHEST LIGHTING NOTES:

1. Poles are designed to support the following:
   a. One (1) cylindrical head assembly with a maximum effective projected area of 5 ft and 140 lbs (Max.)
   b. Eight (8) cylindrical luminaires with a maximum effective projected area of 1.5 ft and 71 lbs each.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

3. High Mast Structure Materials:
   a. Poles and Backing Rings:
      i. Less than 70°: ASTM A1011 Grade 50, 55, 60 or 65
      ii. Greater than or equal to 70°: ASTM 492 Grade 50, 55, 60 or 65
   b. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   c. Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65 or ASTM B209
   d. Bent Metal: A106X
   e. Stainless Steel Screws: AISI 316
   f. Anchor Bolts, Nuts, and Washers:
      i. Anchor Bolts: ASTM F1554 Grade 55
      ii. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
      iii. Plate Washer: ASTM A36 (4 per anchor bolt)
   g. Nut Covers: ASTM B136 (319-F)
   h. Concrete: Class IV (Drilled Shaft)
   i. Reinforcing Steel: Specification 415

4. Fabrication:
   a. Welding:
      i. Full penetration groove welds on the female end section of telescopic (i.e., slip type) field splices
      ii. Use a full-penetration groove weld within 6 inches of the circumferential tube-to-plate connection and use full-penetration groove welds on the female end section of telescopic (i.e., slip type) field splices for a minimum length of 42 inches.
   b. Identification Tag: (Submit details for approval)
      i. 2” x 4” (Max.) aluminum tag
      ii. Locate on the inside of the pole and visible from the handhole
      iii. Include the following information on the ID Tag:
         a. 2” x 4” (Max.) aluminum tag
         b. Location of the inside of the pole and visible from the handhole
         c. Reinforcing Steel: Specification 415
         d. Pole Type
         e. Anchor Bolt Material
         f. Rod Length
         g. Manufacturer’s Name
   c. Welding:
      i. Fabricate pole longitudinal seam welds (2 maximum) with 60 percent minimum penetration or fusion except as follows:
         a. Use a full penetration groove weld within 6 inches of the circumferential tube-to-plate connection and use full-penetration groove welds on the female end section of telescopic (i.e., slip type) field splices for a minimum length of 42 inches.
   d. Identification Tag: (Submit details for approval)
      i. 2” x 4” (Max.) aluminum tag
      ii. Locate on the inside of the pole and visible from the handhole
      iii. Include the following information on the ID Tag:
         a. 2” x 4” (Max.) aluminum tag
         b. Location of the inside of the pole and visible from the handhole
         c. Reinforcing Steel: Specification 415
         d. Pole Type
         e. Anchor Bolt Material
         f. Rod Length
         g. Manufacturer’s Name

5. Coating:
   a. Galvanize Anchor Bolts, Nuts, and Washers: ASTM F2329
   b. Hot Dip Galvanize all other steel items including plate washers: ASTM A123

6. Construction:
   a. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Structure.
   b. After Installation: Place wire screen between top of foundation and bottom of baseplate in accordance with Specification 369-6

7. Wind Speed by County:
   - 130 MPH
   - 150 MPH
   - 170 MPH
     - Brevard, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.
### POLE DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Base Plate Diameter (in.)</th>
<th>Base Plate Thickness (in.)</th>
<th>Bolt Circle (in.)</th>
<th>No. Bolts</th>
<th>Bolt Diameter (in.)</th>
<th>Bolt Embedment (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION 1 (TOP)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130 mph</td>
<td>80</td>
<td>30.0</td>
<td>3.00</td>
<td>23.0</td>
<td>8</td>
<td>1.75</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>34.0</td>
<td>3.00</td>
<td>27.0</td>
<td>8</td>
<td>1.75</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>38.0</td>
<td>3.00</td>
<td>30.0</td>
<td>8</td>
<td>2.00</td>
<td>48</td>
</tr>
<tr>
<td>150 mph</td>
<td>80</td>
<td>30.0</td>
<td>3.00</td>
<td>23.0</td>
<td>8</td>
<td>1.75</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>36.0</td>
<td>3.00</td>
<td>28.0</td>
<td>8</td>
<td>2.00</td>
<td>47</td>
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<tr>
<td></td>
<td>120</td>
<td>40.0</td>
<td>3.00</td>
<td>32.0</td>
<td>8</td>
<td>2.25</td>
<td>52</td>
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<tr>
<td>170 mph</td>
<td>80</td>
<td>32.0</td>
<td>3.00</td>
<td>25.0</td>
<td>8</td>
<td>1.75</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>37.0</td>
<td>3.00</td>
<td>29.0</td>
<td>8</td>
<td>2.00</td>
<td>54</td>
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<td></td>
<td>120</td>
<td>46.0</td>
<td>3.00</td>
<td>37.0</td>
<td>10</td>
<td>2.25</td>
<td>58</td>
</tr>
</tbody>
</table>

### BASE PLATE AND BOLTS DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Base Plate Diameter (in.)</th>
<th>Base Plate Thickness (in.)</th>
<th>Bolt Circle (in.)</th>
<th>No. Bolts</th>
<th>Bolt Diameter (in.)</th>
<th>Bolt Embedment (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SECTION 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SHAFT DESIGN TABLE

<table>
<thead>
<tr>
<th>Design Wind Speed</th>
<th>Pole Overall Height (ft)</th>
<th>Shaft Diameter</th>
<th>Shaft Length</th>
<th>Longitudinal Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SECTION 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SECTION 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

Shaft Design Table Shaft Length is based on level ground (flatter than 1:5). Increase the shaft depth in accordance with the Additional Shaft Depth Due to Ground Slope table for foundations with slopes 1:5 and steeper, use the higher value for slope or diameter values that fall between those shown on the table.
NOTES:
1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Specification 630.
2. Slabs to be placed around all Poles and Pull Boxes.
3. For Pull Boxes between Poles refer to Index 715-001.

Circuit Breaker Panel Box with Surge Arrester mounted to Top of Circuit Breaker Panel Box for easy access. Service entrance fittings shall be used on all conductors entering Circuit Breaker Panel Box.

Grounding cable shall be a minimum of 10'. Interrod distances must be a minimum of 10

Schedule 40 PVC conduit, Circuit conductors and conduit size as shown in plans (Typical).

Pigtail Cord W/Female Receptacle

Male Inlet

Attach Copper Lugs (Two-Hole Straight Tongue, Two-Barrel) to which support plate to accommodate 2 4/0 and 2 #6 conductors for grounding.

Wire Screen see Spec. 649-6

#6 Bonding Ground

12" bed of pearrock or crushed stone for drainage.

U.L. approved ground rod ¾ diameter 20' long copper clad with approved ground connection.

Schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans (Typical).

#6 ground

4/0 ground

Schedule 80 PVC conduit

#6 Bonding Wire connected to grounding lug inside pole.

4/0 AWG stranded CU bare ground wire connected to grounding lug inside pole.

4/0 Cu bare ground wire connected to grounding lug inside pole.

Minimum of (6) ¾ x 20' approved ground rods.
The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole tops. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to ensure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to allow visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.

Luminaire support ring

See legend for number of luminaires, lamp wattage and light distribution.

Luminaire support ring

2" slip fitter

2" Slip-Fitter Assembly (equally spaced around ring)

Pole Cable Terminators

600 Volt rated Pole Cable, size of conductors to be determined by luminaire load.

Pole Cable

Lift cable sheaves

Lift cable sheaves (2 minimum)

Winch cable sheaves

Lift cables (2 minimum)

Cover

Male Inlet

Power Clutch

Step-down transformer provided with 320% grounded receptacle for electric drill & receptacle for supply cable (see schematic) 25' minimum remote control cable same as pole cable.

Receptacle

Supply cable receptacle

A surge protector shall be located in the pole with the circuit breaker. The surge protector shall be mounted at the front near hand hole for easy access.

Positive drive reversible winch

600 Volt rated Circuit Breaker Cable. Size of conductors to be determined by luminaire load.

Circuit Breaker Cable with Female Plug

Female Plug

Remote control switch

Remote control switch

Positive drive reversible winch

600 Volt rated Circuit Breaker Cable. Size of conductors to be determined by luminaire load.

Circuit Breaker Cable with Female Plug

Female Plug

Remote control switch

Positive drive reversible winch

600 Volt rated Circuit Breaker Cable. Size of conductors to be determined by luminaire load.
NOTES:

1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Specification 635 may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of ½" of closed-cell polyethylene foam expansion material. The top ½" of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Specification 932.

SLAB DIMENSIONS

SHFT LOCATION

½ Expansion Joint (Sealed)

PULL BOX LOCATION

SLAB DETAILS

6" SELECT MATERIAL

SECTION C-C
CROSSING SURFACES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Rubber/Asphalt</td>
</tr>
<tr>
<td>TA</td>
<td>Timber/Asphalt</td>
</tr>
</tbody>
</table>

STOP ZONE FOR RUBBER CROSSING

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Zone Length (Distance From Stop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 or Less</td>
<td>250'</td>
</tr>
<tr>
<td>50 - 55</td>
<td>350'</td>
</tr>
<tr>
<td>60 - 65</td>
<td>500'</td>
</tr>
<tr>
<td>70</td>
<td>600'</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. The Railroad Company will furnish and install all track bed (ballast), crossties, rails, crossing surface panels and accessory components. All pavement materials, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.

2. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

3. The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.

4. The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the list of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.

5. Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.

6. Install pavement in accordance with the Specifications.

7. The Department will participate in crossing work, that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.

Notes:

1. Type R Crossings are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Single track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.

3. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

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7. The Department will participate in crossing work, that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.
CROSSING SHOULDER PAVEMENT

EXCEPT AREA OCCUPIED BY CROSSING SURFACING MATERIAL:

a. To Shoulder Line For Outside Shoulders Less Than 8' Wide.
b. To MAXIMUM Width For Outside Shoulders 8' Or Wider (Regardless Of Approach Shoulder Pavement Width).
c. 4' For Median Shoulders.

Notes:

* Where the existing shoulder is substandard for the facility type, the shoulder width is to be widened to accommodate crossing shoulder pavement.

Railroad Signal, Gate, Or Signal and Gate

Varies (2 Min.)

See 'Crossing Shoulder Pavement' Above

SECTION VIEW

TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

RR CROSSING VARIES

(VARIOUS DEPENDING ON CROSSING TYPE)

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

HALF PLAN

CURBED ROADWAYS

3' CURB TRANSITION

3' DROP CURB

CONCRETE CURB AND GUTTER

UTILITY STRIP

ROCK OR CONCRETE TO MATCH ADJACENT SURFACE

SHOULDER PAVEMENT

WHEN CROSSING MATERIALS DO NOT EXTEND BEYOND CURB OF GUTTER

BEVELED EDGE (1:4 SLOPE)

VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING

To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same grade as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track super-elevation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are super-elevated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.

Note:

For location of railroad signals, gates or signals and gates see Index 509-070

INDEX 509-070

LEVEL

GRADE

CROSSING MATERIALS (WIDTH VARY)

(CROSSING MATERIALS DO NOT EXTEND BEYOND CURB OF GUTTER)

BEVELED EDGE (1:4 SLOPE)

SPA Asphalt (500 LB/SY)

RR Crossing Varies

(CAP OR EXPANSION MATERIAL WHEN REQUIRED BY CROSSING TYPE)

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

RR CROSSING VARIATES (FULL DEPTH ASPHALT/RUBBER SHOWN)

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

CROSSING MATERIALS

(CROSSING MATERIALS DO NOT EXTEND BEYOND CURB OF GUTTER)

BEVELED EDGE (1:4 SLOPE)

HALF PLAN

ROADWAYS WITH FLUSH SHOULDERS

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

RR CROSSING VARIES

(CAP OR EXPANSION MATERIAL WHEN REQUIRED BY CROSSING TYPE)

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

CROSSING MATERIALS

(CROSSING MATERIALS DO NOT EXTEND BEYOND CURB OF GUTTER)

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(CROSSING MATERIALS DO NOT EXTEND BEYOND CURB OF GUTTER)

BEVELED EDGE (1:4 SLOPE)

HALF PLAN

ROADWAYS WITH FLUSH SHOULDERS

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

TYPE SP ASPHALT (500 LB/SY)

FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

RR CROSSING VARIES

(CAP OR EXPANSION MATERIAL WHEN REQUIRED BY CROSSING TYPE)

VARIANCE

(VARIOUS DEPENDING ON CROSSING TYPE)

FRICION COURSE

OVERBUILD

EXIST. RDWY. PAST

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FILTER FABRIC (OPTIONAL WITH RR COMPANY)

BALLAST

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