**Dynamic Message Sign**

**General Plan and Elevation**

*Maximum design post height. Project specific post height shall be determined by elevations provided in the traffic plans.*

**Notes:**

See Traffic Plans for the sign structure location.

See Traffic Plans to determine if catwalk is continuous. If catwalk is permitted, the WG X 20 mounting posts length shall be reduced by 1'-2" See Section I on sheet 4 of 11.

**Pay Item Notes:**

Pay item for butterfly sign structure foundation includes the drilled shaft and the anchor bolt assembly.

Pay item for butterfly sign structure foundation in the median with concrete barrier is the drilled shaft. The formed pedestal on drilled shafts, and the anchor bolt assembly.

For optional field splice details not shown here, see 50 9.10 (5 of 5).

**Welding Notes:**

Welding of structural tubing shall conform to the requirements of the American Welding Society (AWS), Structural Welding Code D1.1, latest edition. All other welding shall conform to the requirements of the American Welding Society (AWS), Structural Welding Code D1.5, latest edition. All other welding shall be of the same grade, and shall be furnished as Grade 60.

All connection bolts shall be high strength bolts conforming to ASTM F3125 Grade A325 Specification. All high strength bolts, nuts and washers shall be galvanized in accordance with the requirements of the American Welding Society (AWS), Grade 12.

All Tubular Structural Pipes shall be welded or seamless steel pipes, and shall conform to the ASTM specifications listed below:

- **A53** Grade B Type E or S Fy = 35 ksi
- **A500** Grade B Type E or S Fy = 35 ksi
- **A106** Grade B Type E or S Fy = 35 ksi
- **API SL** Grade B 42 Fy = 42 ksi
- **API SLX** Grade B 42 Fy = 42 ksi
- **A500** Grade B Fy = 46 ksi

Prior to erecting any portion of the Sign Structure, the Contractor shall provide the Engineer an erection plan for review and approval.

Dimensions shall not be scaled from drawings.

**Butterfly Sign Structure (BUTTERFLY DMS)**

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Description</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>6060035</td>
<td>Sign Structure (BUTTERFLY DMS)</td>
<td>Each</td>
</tr>
<tr>
<td>6060080</td>
<td>Foundation for Bridge Sign Structure (BUTTERFLY DMS)</td>
<td>Each</td>
</tr>
</tbody>
</table>

**Roadside Installation Plan**

**Elevation**

**Butterfly Sign Structure**

**Post Pipe Data**

**Sign Structure**

**Max Post Height**

**Wind Loading:** 90 MPH Velocity.

**Concrete Base:** Class C (f'c = 3,500 psi).

**Foundation:** shall conform to ASTM A63 specification, unless noted otherwise.

**Drilled shafts location and top of drilled shaft elevation shall be field verified by the Contractor prior to fabrication of post.**

Shop drawings for sign structure fabrication shall not be submitted until the drilled shaft is constructed, and the top of the drilled shaft elevation has been verified.

**BUTTERFLY SIGN STRUCTURE**

**POST PIPE DATA**

<table>
<thead>
<tr>
<th>Max DMS Dimensions</th>
<th>Max DMS Weight</th>
<th>Pipe Nominal Dia (In.)</th>
<th>Pipe Wall Thickness (In.)</th>
<th>Max Post Height</th>
<th>Pipe Nominal Dia (In.)</th>
<th>Pipe Wall Thickness (In.)</th>
<th>Max Post Height</th>
<th>Mast Arm Length (FT)</th>
<th>Mast Arm Spacing (In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27'-6&quot; x 7'-10&quot; x 11&quot;</td>
<td>2290 Lbs</td>
<td>24</td>
<td>0.50</td>
<td>28</td>
<td>16.0</td>
<td>0.50</td>
<td>27'-6&quot;</td>
<td>3'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
</tbody>
</table>
Butterfly sign structure foundation in the median includes a formed pedestal. See SD 9.10 (5 of 5) for median formed pedestal. Butterfly sign structure foundation in the median includes a formed pedestal. See SD 9.10 (5 of 5) for median formed pedestal.

**FOUNDATION NOTES:**

All anchor bolts shall conform to ASTM F1554 Grade 55 Specifications. The upper 1/2 and lower 1/2 shall be threaded. The upper 1/2 shall be galvanized in accordance with the requirements of ASTM A53.

Provide bolt template during installation of anchor bolts. The bolt template shall be fabricated of 3/8" thick (min.) steel plate, similar to anchor plate details, and shall be part of each base plate.

Drilled shaft concrete shall be Class S, and shall be placed within undisturbed material or compacted embankment.

Top of drilled shaft shall be formed to 1/0 below ground surface. Compacted backfill shall be in place prior to erecting post.

Butterfly sign structure foundation in the median includes a formed pedestal. See SD 3.16 (5 of 5) for median formed pedestal details.

**SPIRAL NOTES:**

The 3/8" diameter spiral shall be cold drawn steel wire conforming to AASHTO M32 except minimum yield strength = 60,000 psi. Lap 1/2 turns at top and bottom of spiral.

**TABLE A**

<table>
<thead>
<tr>
<th>Max. Slope</th>
<th>x</th>
<th>8l</th>
<th>1</th>
<th>0'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>1/0</td>
<td>8l</td>
<td>1</td>
<td>1'</td>
</tr>
<tr>
<td>2</td>
<td>2'</td>
<td>8l</td>
<td>2</td>
<td>4'</td>
</tr>
<tr>
<td>3</td>
<td>5'</td>
<td>8l</td>
<td>3</td>
<td>8'</td>
</tr>
</tbody>
</table>

Drilled shaft depth shall be adjusted for ground slope. Add a value of x in TABLE A to the minimum Drilled Shaft Depth to obtain the total length of shaft.
COVER & END PLATE DETAIL

- ½" STIFFENER PLATE
  - Total of 4 Stiffeners per bracket assembly

Z-Brackets provided by manufacturer (Typ).  See Z-Bracket Note

Barrier tape shall be used at any point of contact between aluminum Z-Mounting Brackets (provided by manufacturer) and steel sign supports. The contractor shall supply the tape based on manufacturer's recommendations. The contractor shall submit the type of tape to be used to the Engineer for approval.

IF cutout is omitted, the W6 x 20 mounting posts length will be reduced by 1½ from the bottom.
**PREHEAT** per AWS requirements

Post wall

1/4" Gusset Plate

1/4" Max
Short tag

1" x 1/4" Backing ring

Base R

**POST TO BASE PLATE WELDING**

Post wall

1/4" Gusset Plate

1/4" Max
Short tag

1" x 1/4" Backing ring

Base R

**POST TO BASE PLATE WELDING**

3" 1/2" Gusset Plate

**HAND HOLE & COVER DETAILS**

Front

Drill and tap for 1/4" x 20 RH
Brass Machine
Screws 1/2" long.

3" 1/2" Gusset Plate, provide
10 ga. Cover

Stop Fillet Weld 1/2" from ends (Typ)

**GUSSET PLATE DETAIL**

For location of Gusset Plates,
See SD 9.60 1 2 of 5.

**HANDRAIL WELD DETAILS**

**POST CAP PLATE SECTION DETAIL**

Post NPS couplings not shown for clarity

**CAP PLATE DETAIL**

1/4" Gusset Plate for 24" Post
(Typ 96-225)

24" Post

4-1/2" NPS couplings for wiring (Typ)

4-1/2" NPS couplings for wiring (Typ)

Cover Plate - 8" x 16" x 1/4" with
1/4" x 20 RH Cap Screw Total 4 Placed
as shown. Provide Neoprene Gasket
Cemented to 1/4" Plate

**POST TO BASE PLATE WELDING**

1/4" Gusset Plate

**HAND HOLE & COVER DETAILS**

Front

Drill and tap for 1/4" x 20 RH
Brass Machine
Screws 1/2" long.

3" 1/2" Gusset Plate, provide
10 ga. Cover

Stop Fillet Weld 1/2" from ends (Typ)

**GUSSET PLATE DETAIL**

For location of Gusset Plates,
See SD 9.60 1 2 of 5.

**HANDRAIL WELD DETAILS**

**POST CAP PLATE SECTION DETAIL**

Post NPS couplings not shown for clarity

**CAP PLATE DETAIL**

1/4" Gusset Plate for 24" Post
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1/4" x 20 RH Cap Screw Total 4 Placed
as shown. Provide Neoprene Gasket
Cemented to 1/4" Plate

**POST TO BASE PLATE WELDING**

1/4" Gusset Plate

**HAND HOLE & COVER DETAILS**

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Drill and tap for 1/4" x 20 RH
Brass Machine
Screws 1/2" long.

3" 1/2" Gusset Plate, provide
10 ga. Cover

Stop Fillet Weld 1/2" from ends (Typ)

**GUSSET PLATE DETAIL**

For location of Gusset Plates,
See SD 9.60 1 2 of 5.

**HANDRAIL WELD DETAILS**

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1/4" x 20 RH Cap Screw Total 4 Placed
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Cemented to 1/4" Plate
**CATWALK PLAN VIEW**

1. **1½" x 1½" x ¾" square tubing (Typ)**
2. **1" x ½" x 2½" bar**
3. **1½" x 1½" x 1½" wall square tubing (Typ)**
4. **1½" x 9" galv. chain tack weld to bolt**
5. **5¼" x ⅜" x ⅜" plate**
6. **2" x ⅜" x ⅜" bar**
7. **¼" oil hole**
8. **2" x ⅜" x 2½" bar**
9. **⅝" x 3½" hex bolt, nut and washer**
10. **⅝" x 3" cap screw w/nut and washer**
11. **⅝" Plate w/ ⅝" hole**
12. **⅝" x 3½" hex bolt and nut (1½" bolt thread)**
13. **Drill for ⅝" hole for cotter pin**

**NOTE:**

Provide ⅝" holes for ½" pivot bolts and ⅝" holes for ¾" lock bolts.

---

**SECTION 1 (Single Post)**

- 1" x 1½" x 2½" bar
- 2" x 1½" x 2½" bar
- 3" x ⅜" x ⅜" plate
- ⅝" oil hole
- 2" x ⅜" x 5½" bar
- ⅝" x 3½" hex bolt, nut and washer
- ⅝" bolt thread
- Drill for ½" hole for cotter pin

**SECTION 2 (Single Post)**

- ⅝" Plate w/ ⅝" hole
- ⅝" x 3½" hex bolt and nut (1½" bolt thread)
- ⅝" x 3" cap screw w/nut and washer

---

**SECTION 3 (Dual Post)**

- 1½" x 1½" x 1½" wall square tubing (Typ)
- 1½" x 9" galv. chain tack weld to bolt
- 5¼" x ⅜" x ⅜" plate
- 2" x ⅜" x ⅜" bar
- ¼" oil hole
- 2" x ⅜" x 2½" bar
- ⅝" x 3½" hex bolt, nut and washer (1½" bolt thread)
- Drill for ½" cotter pin

**SECTION 4 (Dual Post)**

- ⅝" x 3½" hex bolt and nut (1½" bolt thread)

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**SECTION 5 (Dual Post)**

- ⅝" Plate w/ ⅝" hole
- ⅝" x 3½" hex bolt and nut (1½" bolt thread)

---

**DETAIL 5**

- ⅝" x 3½" hex bolt and nut (1½" bolt thread)
- ⅝" Plate w/ ⅝" hole
- ⅝" x 3" cap screw w/nut and washer
Grating Details:

1. The Field splice surface shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1 3/8" radius around each bolt.

2. 3/16" galvanized safety chain with 1-1/4" snap hook at end of catwalks.

3. Omit horizontal W 6x20, backing bars and stiffeners when Catwalk is specifically omitted on Traffic Plans.

Welded grating shall meet the standard requirements of ANSI/NAAMM MGB 531-00. Grating shall be 2" x 3/4" bearing bars at 1 3/8" centers and cross bars at 4" centers.

All grating shall have 2" x 3/4" banding bars at both ends.

Weld bearing bars to banding bars with 3/8" fillet weld, one side every second bar and as shown in Detail 3.

All grating to be straight and true after fabrication. Grating shall be galvanized.

**NOTES:**

1. The Field splice surface shall be in full contact without gaps prior to the bolts being snug tightened and fully tensioned. The contact surface is the area defined by a 1 3/8" radius around each bolt.

2. 3/16" galvanized safety chain with 1-1/4" snap hook at end of catwalks.

3. Omit horizontal W 6x20, backing bars and stiffeners when Catwalk is specifically omitted on Traffic Plans.