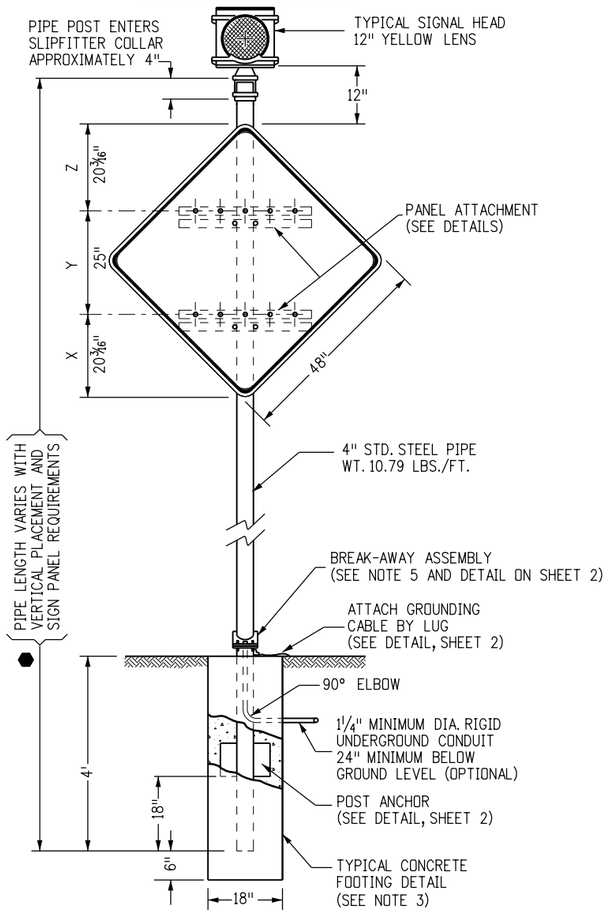
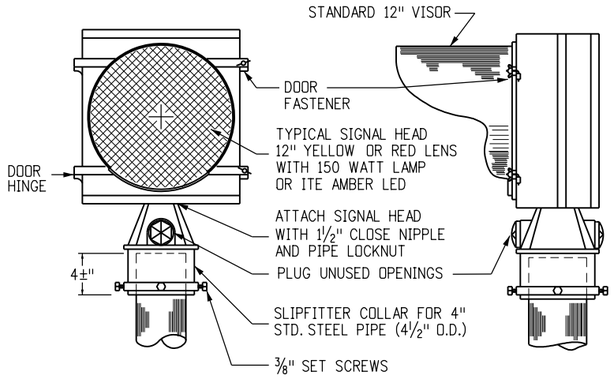
## Complete Installation With Diamond Panel

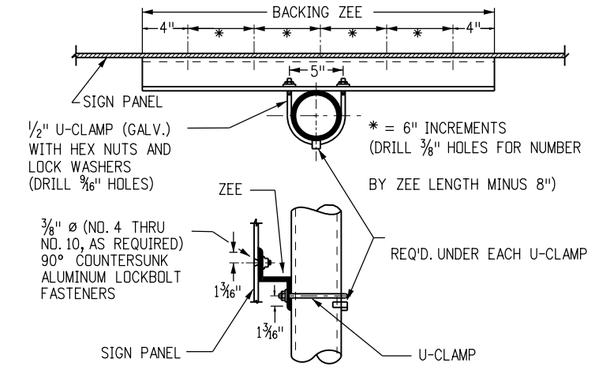



| TABLE OF DIMENSIONS FOR PANELS NOT ILLUSTRATED | | | | | |
|---|---|---|---|---|---|
| DESCRIPTION | DIMENSIONS (IN.) | | | LENS TYPE | BACKING ZEES |
| | X | Y | Z | | |
| 36" DIAMETER CIRCLE PANEL ( ● ) | 8 | 20 | 8 | 12" YELLOW | 20" |
| 48" DIAMETER CIRCLE PANEL ( ● ) | 10½ | 27 | 10½ | 12" YELLOW | 20" |
| 36" PENTAGON PANEL ( ⬟ ) | 9 | 20 | 9 | 12" YELLOW | 20" |
| 48" PENTAGON PANEL ( ⬟ ) | 12 | 25¾ | 9 | 12" YELLOW | 20" |
| 48" OCTAGON PANEL ( ● ) | 12 | 24 | 12 | 12" RED | 20" |
| 24" X 48" RECTANGLE PANEL ( ▬ ) | 12 | 24 | 12 | 12" YELLOW | 20" |

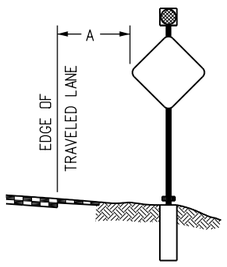
## Typical Elevation Facing Traffic




## Typical Signal Head - 12 Inch Lens




## Typical Panel Attachment Details




### Lateral Placement ("A")

Normal lateral placement "A" for warning signs is 12 feet plus curb or shoulder width.

Normal lateral placement "A" for regulatory signs is 6 feet plus curb or shoulder width, or if none 12 feet from edge of pavement.

2 feet shall be considered minimum except that in urban areas 1 foot from the curb face is permissible where sidewalk width is limited or where existing poles are close to the curb.

Refer to CDOT Standard Plan S-614-1 for vertical placement requirements.

## Typical Sign Placement

## General Notes

1. All sign panels used on flashing beacons are Class II and shall be fabricated in accordance with:
   a. Panels shall be single sheet aluminum 0.100 minimum thickness.
   b. Backing zees are 3 in. x 2 11/16 in. and 2.33 lbs. per ft. aluminum.
   c. All signs shall be fabricated using retroreflective sheeting conforming to ASTM D4956. The type shall be described in the standard specifications and/or as shown on the plans.
   d. Bolts, u-clamps, nuts and metal washers shall be galvanized or cadmium plated.
2. Installation design conforms with AASHTO "Standard Specifications for Structure Supports for Highway Signs, Luminaires and Traffic Signals" and shall be fabricated in accordance with:
   a. Steel pipe, post anchor plates and break-away plates shall conform to AASHTO M270 (ASTM A709) Grade 36.
   b. High strength bolts, nuts and washers shall conform to ASTM-A325 and shall be galvanized or cadmium plated.
   c. Holes shall be drilled and cuts shall preferably be saw cuts; However, flame cutting will be permitted provided all edges are ground. Metal shall not project beyond the plane of the plate face on break-away plates.
   d. All welding is to be continuous and in accordance with current AWS specifications.
   e. A "Keeper Plate" of thin (28 gage) galvanized sheet metal, fabricated to match break-away plate dimensions but with holes rather than slots, shall be used to restrain bolt loosening due to wind vibration.
   ⬣ f. Pipe length varies with vertical placement, minimum ground clearance (7 ft.) and the sign panel required. It will be as shown on the plans, or as determined by cross-section, or as directed by the Engineer for each location (maximum length is approximately 20 ft.-10 in. and minimum length is approximately 15 ft.-4 in., if length is not specified supply maximum - may require field cut to conform to typical sign placement details).
3. Concrete footings for flashing beacon installations shall conform to "Drilled Caissons" and "Structural Concrete" (Class "BZ"). Integrity testing per 503 is not required.
4. All electrical materials and workmanship shall conform to the latest requirements of the NEC, NEMA, UL or EIA wherever applicable; the Colorado PUC and any local codes or ordinances which may apply; and the following:
   a. The contractor is to provide all necessary wiring within the beacon and from there to the power source provided by the utility company. The utility company will make the connection with the contractor's wiring.
   b. The electrical service between the power source and the flashing beacon shall be underground unless an aerial drop is authorized by the Engineer. All wiring excluding the aerial drop wire shall be in conduit.
   c. The "Flasher" shall be housed in a suitable enclosure on the utility pole at the power source unless the Engineer directs that the enclosure be mounted on the beacon pipe or that the device may be contained within the signal head itself.
   d. A suitable enclosure for the flasher shall be in accordance with "a rain tight junction box or can, approximately 8 in. x 8 in. x 4 in., surface mount, with a flanged screw attached cover, and fabricated from not less than 16 gage galvanized steel".
   e. A built-in radio interference suppression device and a photocell sensor type signal lamp dimmer shall be provided for each flashing beacon.
   f. Beacons shall flash at a rate of not less than 50 and not more than 60 times per minute.
5. Breakaway base installation shall be used for uni-directional configuration only. Pedestal foundation (as shown on Sheet 3) may be used for both uni-directional and bi-directional configurations.
6. When specified in the plans, solar powered system may be used in place of the AC power system shown on this sheet.
7. For advance placement of warning signs see MUTCD Section 2C.04 and Table 2C-3.

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**Colorado Department of Transportation**
**Traffic Safety & Engineering Services**
2829 West Howard Place
Denver, CO 80204
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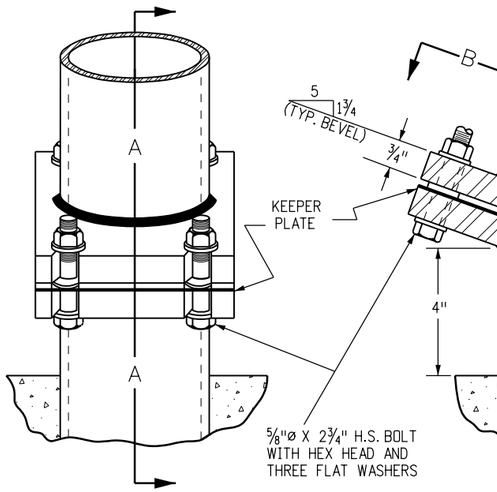
# Flashing Beacon and Sign Installations

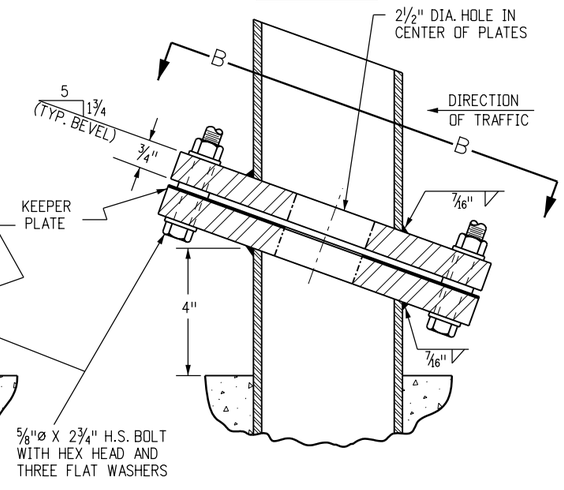
Issued by the Traffic Safety & Engineering Services: July 01, 2026

**Standard Plan No.**
**S-614-14**
Standard Sheet No. 1 of 4
Project Sheet Number:

## Front View



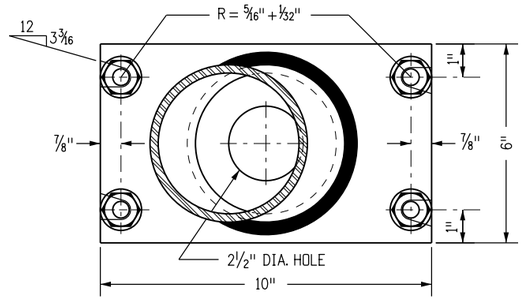

## Section A-A



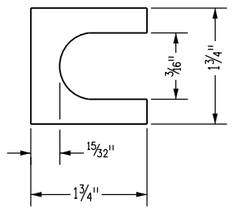

## Break-away Assembly Bolting Procedure

1. Assemble post to footing with bolts; one flat washer on each bolt top and bottom, and one flat washer and the keeper plate between the break-away plates. Use brass shims to plumb the post.
2. Tighten all bolts to maximum hand-strength with a 12 to 15 inch pipe wrench to bed washers and shims to clean bolt threads, then loosen each bolt in turn and retighten in a systematic order to 450 inch-pounds torque.
3. Burr threads at junction with nut using a center punch to prevent nut loosening.

## Section B-B (Plate Detail)



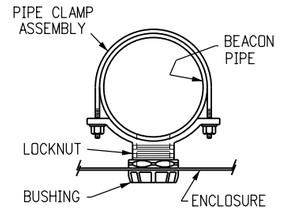

## Shim Detail



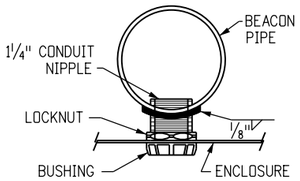

Furnish two (2) .012 inch ± thick and two (2) .032 inch ± thick shims.

Shims shall be fabricated from brass shims stock or strip conforming to ASTM-B36.

## Pole Clamp




## Welded Nipple

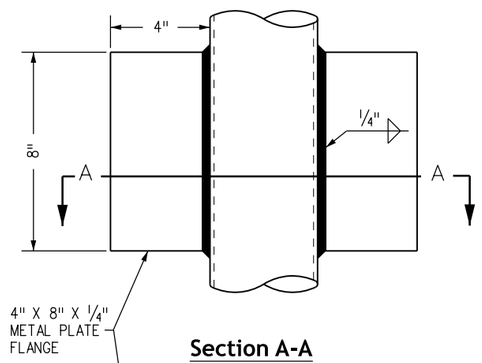



(Note: Weld varies with conduit or nipple wall thickness.)

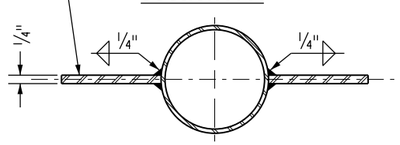
## Typical Pipe Attachments

## Typical Break-away Assembly Details

### Front View

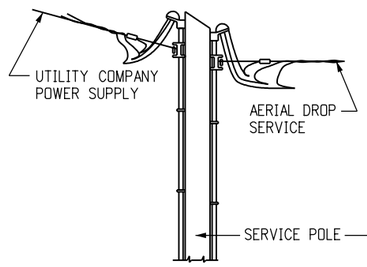



### Section A-A

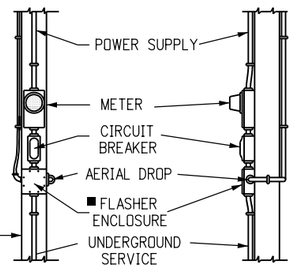



## Post Anchor Details

### View At Power Source




### Views At Enclosures




## Notes

Location and configuration of electrical equipment is diagrammatic only (use any method complying with the general notes).

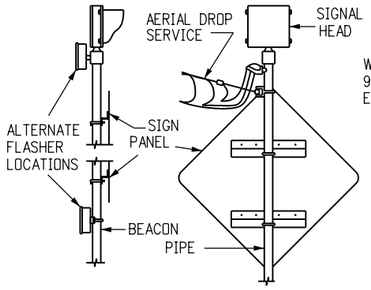
▲ Existing ground at service pole; otherwise pull through conduit or attach to conduit and tap off underground.

● Drill and tap pipe for 1/4" round head brass screw, 3/4" long, for ground lug.

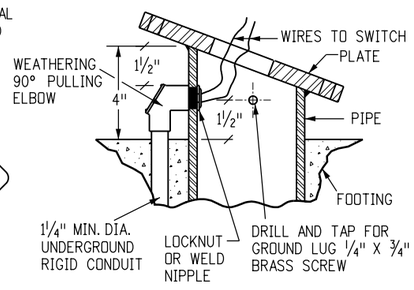
■ Provide a weep hole with aerial drop service.

\# Bedding material for conduit shall be placed in accordance with the National Electrical Code.

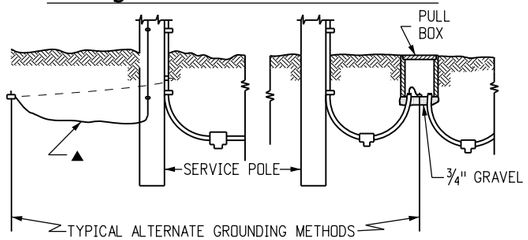
### View At Beacon



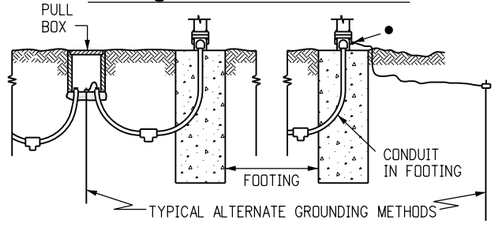

### Underground Connection



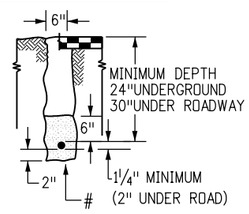

### Underground Views At Power Source




### Underground Views At Beacon




### Trenching Detail




## Typical Electrical Service Detail

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# Flashing Beacon and Sign Installations

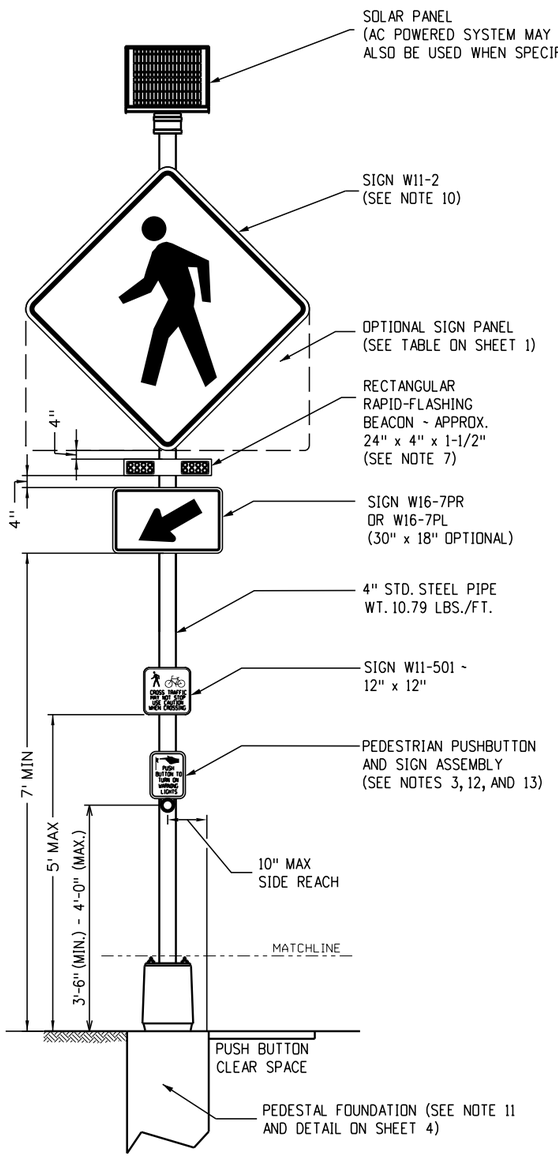
Issued by the Traffic Safety & Engineering Services: July 01, 2026

**Standard Plan No.**

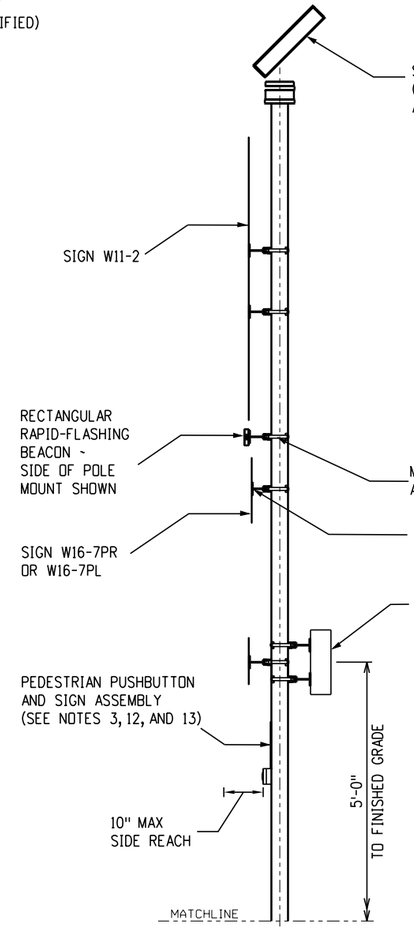
**S-614-14**

Standard Sheet No. 2 of 4

Project Sheet Number:

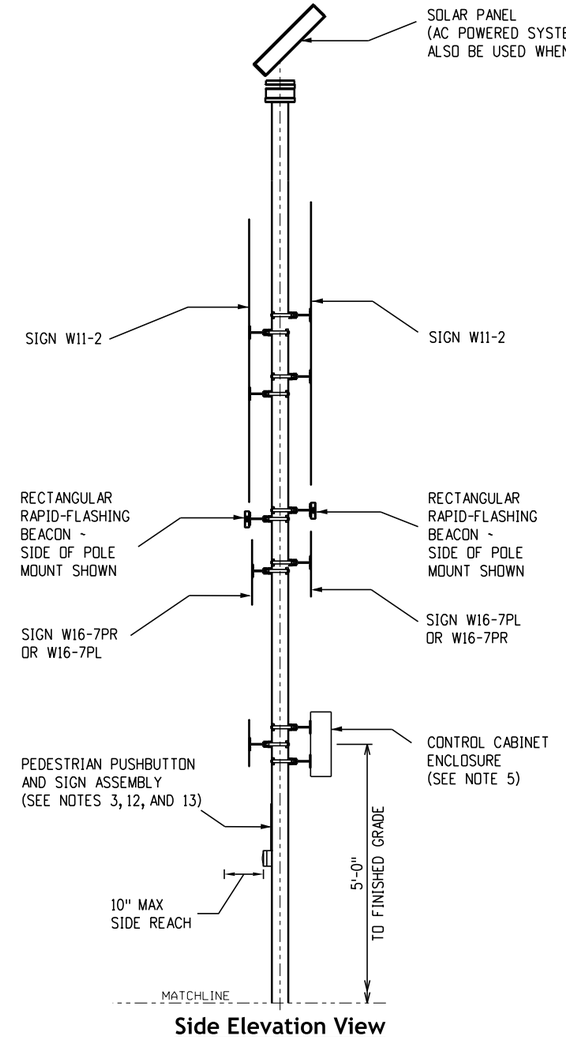



**Front Elevation View**




**Side Elevation View**

**Uni-Directional Configuration Details**




**Side Elevation View**

**Bi-Directional Configuration Details**

## Notes

1. The RRFB system shall adhere to all aspects of MUTCD Chapter 4L.
2. An RRFB shall only be used to supplement a post-mounted W11-2, S1-1, or W11-15 sign with a 16-7p plaque, located immediately adjacent to an uncontrolled marked crosswalk.
3. Pedestrian pushbutton and sign assembly may be separate parts. Use R10-25 (9" x 12") sign in accordance with 2023 MUTCD. Sign may include integrated warning lights.
4. Terminate RRFB connections per manufacturer's recommendation.
5. Control cabinet enclosure shall be sized by the RRFB manufacturer.
6. Beacon assembly may be mounted on the side of the pole as shown or on the top of the pole if specified.
7. RRFB LED displays shall meet the intensity requirements of SAE J595 for Class 1 yellow. An automatic signal dimming device shall be used to reduce the brilliance of the RRFB indications during nighttime operations.
8. See Sheets 1, 2, and 4 for standard base and foundation details.
9. When specified in the plans, AC power system (as shown on Sheet 1) may be used in place of the solar powered system shown on this sheet.
10. For posted speeds of 35 mph or lower, the W11-2 signs shall be 36" x 36". For posted speeds of 40 mph or higher, the W11-2 signs shall be 48" x 48".
11. Pedestal foundation may be used for both uni-directional and bi-directional configurations. Breakaway base installation (as shown on Sheet 1) shall be used for uni-directional configuration only.
12. Pedestrian pushbutton shall be within 10 inch reach distance of adjacent landing area.
13. Pedestrian pushbutton shall be accessible by reaching to the side. If the button is not accessible by reaching to the side, the pushbutton shall be placed on a separate push button post per Standard S-614-45.

## Rectangular Rapid-Flashing Beacon (RRFB)

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# Flashing Beacon and Sign Installations

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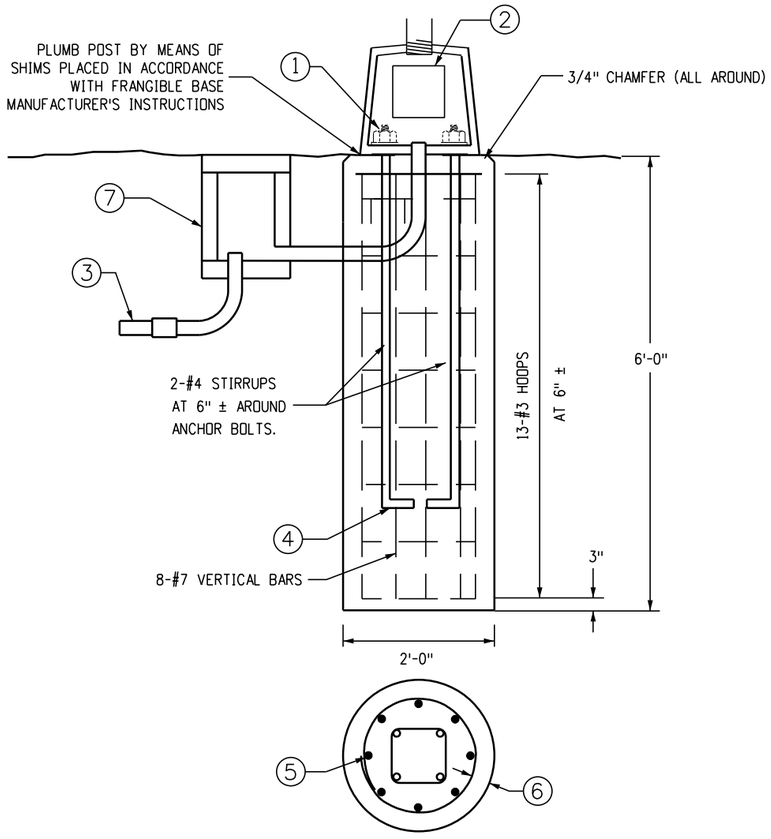
**Standard Plan No.**
**S-614-14**
Standard Sheet No. 3 of 4
Project Sheet Number:




## Alternate Pedestal Base Installation

## General Notes

1. The pole and pedestal must be designed to meet the requirements outlined in the "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", published by AASHTO, for a wind velocity of 100 mph. The Contractor shall submit two sets of working drawings, signed and sealed by a Professional Engineer registered in the State of Colorado, in accordance with Section 105.02 of the Standard Specifications for Road and Bridge Construction.

## Design Data

The designs herein assume that flashing beacons are installed within the roadway prism with the following soil parameters:

Soil Density v = 110 lb./cu. ft.
Soil Cohesion = 750 lb./sq. ft. for Medium Stiff Cohesive Soil
Soil Ø Angle = 30 Degrees for Medium Dense Cohesionless Soil
SF = 3.0 for Flexural Resistance

Contact the Engineer if the flashing beacon will not be installed within the roadway prism or if any of the following soil conditions are encountered during drilling:

a. The soil has a high organic content or consists of saturated silt and clay.
b. The site won't support the weight of the drilling rig.
c. The foundation soils are not homogenous.
d. Firm bedrock is encountered.
e. A high groundwater table is encountered.
f. Large boulders are encountered.

Footing design is based on 100 mph wind load on a 48 inch x 48 inch diamond sign panel mounted 9 feet above the ground, with a 24 inch x 24 inch rectangular plaque underneath and a flashing beacon 12 inches above. If a sign configuration is proposed that exceeds these dimensions, the footing design must be engineered and signed and sealed by a Professional Engineer registered in the State of Colorado.

## Footing Notes

1. Hex Nuts
2. Hand Hole Shall Be Provided.
3. Schedule 80 PVC (24 Inch Min. Depth, 30 Inch Min. Depth Under Roadway) Conduit stub from pull box to pole shall be 2 Inch Min. Diameter.
4. Install Anchor Bolts (Furnished with Pole) per Manufacturer's Template Print (Furnished with Order).
5. Minimum Overlap Of 12 Inch
6. 3 Inch Clearance for Hoops
7. Standard Pull Box

Caisson designs require that the caisson be founded in compact sand, clay, or sandy clay. If, by visual inspection of the hole, other material is present, the caisson design shall be modified as determined by the Engineer.

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**Standard Plan No.**
**S-614-14**
Standard Sheet No. 4 of 4
Project Sheet Number: