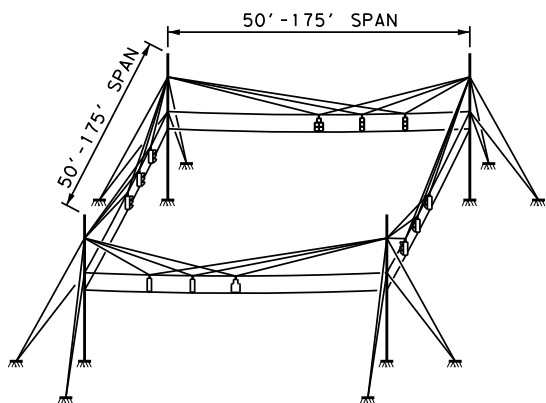


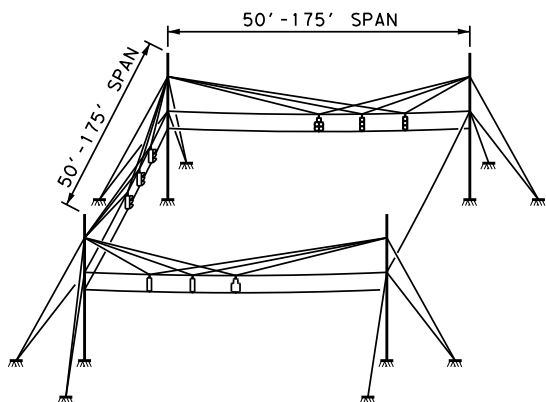
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LEVELS DISPLAYED

1 2



RECTANGULAR BOX CONFIGURATION



C-BOX CONFIGURATION

SIGNAL HEAD TYPE	'Y'
HORIZONTAL	1'-8" ±
VERTICAL	4'-0" ±

- ② LOCATE THE EMBEDDED TIP OF GUY ANCHOR A DISTANCE FROM PILE BUTT NO GREATER THAN THE VERTICAL DISTANCE MEASURED ALONG THE POLE BETWEEN THE GROUND LINE AND THE ATTACHMENT OF LOWEST GUY AND NEVER ANY LESS THAN 1/3 OF THAT DISTANCE.

DESIGN CRITERIA:

1. SIGNAL HEAD DESIGN DEAD LOADS AND WIND AREAS SHOWN IN TABLE BELOW. VALUES INCLUDE BACKPLATES.
2. DESIGN IS BASED ON ONE 5 OR 4-SECTION HEAD AND ONE OR MORE ADDITIONAL 3-SECTION HEAD(S).
3. WEIGHT OF INDIVIDUAL $\frac{3}{8}$ " CABLE IS 0.273 LB/FT AND $\frac{3}{16}$ " CABLE IS 0.080 LB/FT.
4. WEIGHT OF SWAY CABLE IS ASSUMED TO BE 0.65 LB/FT, WHICH INCLUDES AN ALLOWANCE FOR CONDUCTOR CABLE AND MISCELLANEOUS HARDWARE.
5. DESIGN WIND SPEED EQUALS 80 MPH PLUS A 1.3 GUST FACTOR (CURRENT AASHTO SPECIFICATIONS FOR SIGNS, LUMINAIRES AND TRAFFIC SIGNALS USE EQUIVALENT 90 MPH WITH A 1.14 GUST FACTOR).
6. IMPORTANCE FACTOR = 0.71 (10-YEAR DESIGN LIFE)
7. DESIGN WIND PRESSURE ON CABLES ARE ASSUMED AS 1.0 LB/FT.
8. DESIGN CONTAINS ALLOWANCE FOR A MAXIMUM 30 SQ. FT. OF 0.100 IN. THICK ALUMINUM SIGNS PER SPAN.
9. DESIGN CONTAINS ALLOWANCE FOR A 60 LB. LUMINAIRE HAVING AN EFFECTIVE PROJECTED AREA (ACTUAL AREA TIMES DRAG COEFFICIENT) OF 1.6 SQ. FT.
10. DESIGN ICE LOAD OF 3 PSF IS CONSIDERED AROUND SURFACES OF SUPPORTS, WIRES, SIGNALS AND ONE FACE OF SIGN PANELS ONLY.

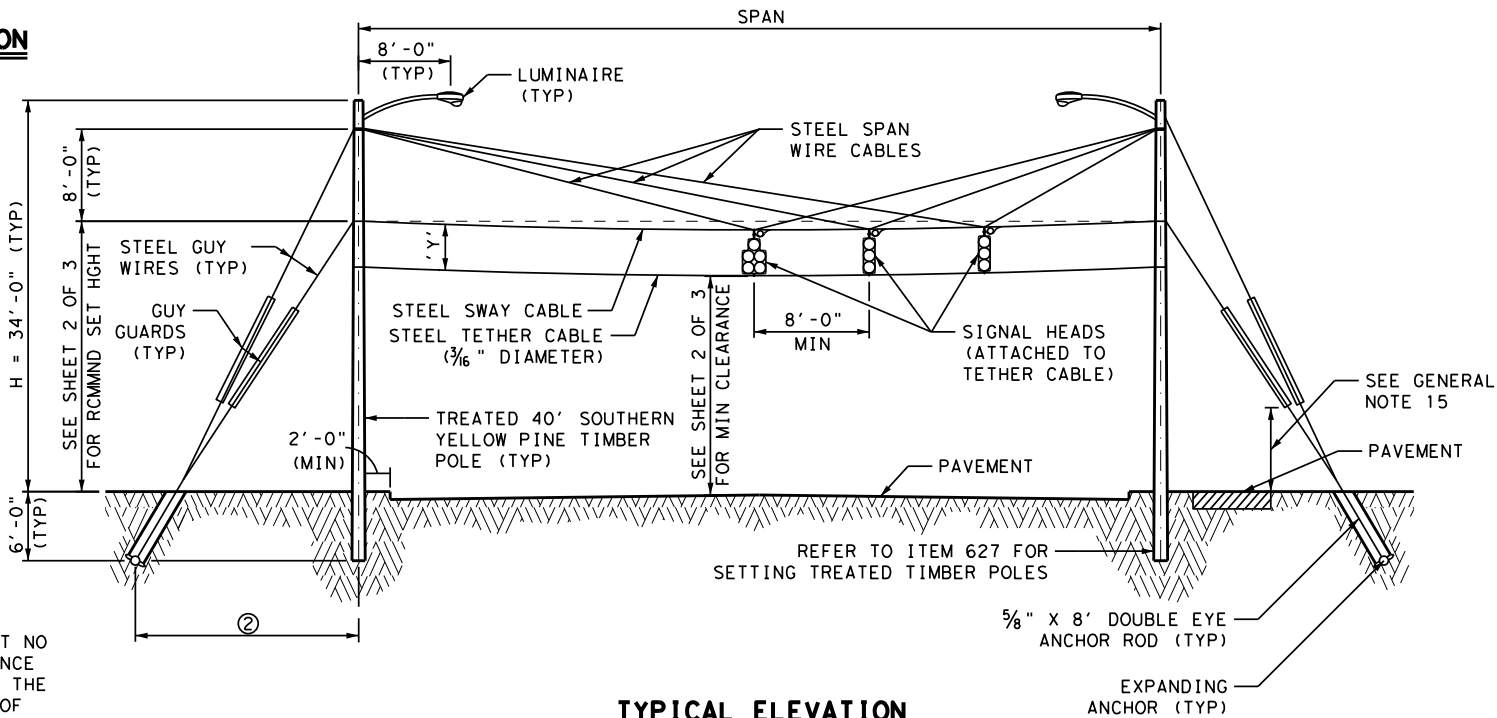
SIGNAL HEAD DESIGN VALUES		
SIGNAL HEAD TYPE	WT. PER HEAD	WIND AREA ♦
5-SECTION, 12" LENS	125 LBS	9.6 SQ. FT.
4-SECTION, 12" LENS	100 LBS	7.6 SQ. FT.
3-SECTION, 12" LENS	75 LBS	5.6 SQ. FT.

♦ EFFECTIVE PROJECTED DESIGN WIND AREA (ACTUAL AREA TIMES DRAG COEFFICIENT)

MATERIALS	
TIMBER POLE	ANSI CLASS 2 TREATED TIMBER POLE
STEEL CABLE	ASTM A475, 7 WIRE, UTILITIES GRADE, GALVANIZED, $\frac{3}{8}$ " DIAMETER EXCEPT AS NOTED
SIGNAL HEADS	POLYCARBONATE HOUSING & LENS, LED LAMP WITH 12" LENS

SHIPPING PARTS LIST		
DESCRIPTION	QUANTITY	UNIT
40' TIMBER POLE ①		EA
$\frac{3}{8}$ " STEEL CABLE		FT
$\frac{3}{16}$ " STEEL CABLE		FT
8' LUMINAIRE ARM		EA

- ① SHIP EACH POLE WITH THE FOLLOWING: A BARE #6 AWG (AMERICAN WIRE GAUGE) COPPER ELECTRICAL CONDUCTOR FROM THE TOP OF THE POLE TO THE BUTT WRAP OR COPPER BUTT PLATE, PROTECTIVE ELECTRICAL CONDUCTOR TO A HEIGHT OF 8 FT. ABOVE FINISHED GRADE, BRANDING OF SUPPLIER, PLANT, SPECIES, PRESERVATIVE CODE & CLASS LENGTH 2 CLAMP-ON SIMPLEX. FOR A PROJECT REQUIRING 10 POLES OR LESS, THE CONTRACTOR MAY PURCHASE POLES LOCALLY IF SOURCE AND TREATMENT ARE DOCUMENTED.



TYPICAL ELEVATION
(VERTICAL SIGNALS SHOWN, HORIZONTAL SIGNALS SIMILAR)

GENERAL NOTES:

1. DESIGN CONFORMS TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 5TH EDITION.
2. THIS STANDARD IS ONLY APPLICABLE FOR RECTANGULAR OR C-BOX CONFIGURATIONS (AS SHOWN) WITH SPAN LENGTHS RANGING FROM 50' TO 175' IN EITHER DIRECTION.
3. FOR CONSTRUCTION REQUIREMENTS AND SEQUENCING, SEE SHEET 2 OF 3.
4. FOR ELECTRICAL AND MISCELLANEOUS DETAILS, SEE SHEET 3 OF 3.
5. SEE LAYOUT FOR LOCATIONS OF SIGNALS, SIGNS AND LUMINAIRES.
6. MINIMUM ALLOWABLE SOIL STRENGTH IS 20 BLOWS/12" PER THE TEXAS CONE PENETRATION TEST (TCP).
7. SEE SHEET 3 OF 3 FOR LUMINAIRE ARM AND CONNECTION DETAILS.
8. TEMPORARY TRAFFIC SIGNALS SHALL BE PAID FOR AND IN ACCORDANCE WITH ITEM 681.
9. ZINC-COATED STEEL WIRE STRAND SHALL BE IN ACCORDANCE ITEM 625.
10. TREATED TIMBER POLES SHALL BE IN ACCORDANCE WITH ITEM 627. FOR A PROJECT REQUIRING 10 POLES OR LESS, CONTRACTOR MAY PURCHASE LOCAL POLES IF SOURCE AND TREATMENT ARE DOCUMENTED.
11. VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE IN ACCORDANCE WITH ITEM 682.
12. TRAFFIC SIGNAL CABLES SHALL BE IN ACCORDANCE WITH ITEM 684.
13. CONTRACTOR SHALL NOT INSTALL ANY SPAN WIRE, SWAY, OR GUY WIRE CABLES AROUND EXISTING AERIAL UTILITIES. CLEARANCE SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF THE NATIONAL ELECTRIC CODE (NEC).
14. IF PEDESTRIAN ACCOMMODATIONS ARE TO BE INSTALLED, PEDESTRIAN SIGNAL HEADS AND PUSH BUTTONS SHOULD BE INSTALLED ON SEPARATE PEDESTAL POLES.
15. A MINIMUM 8' VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN SIDEWALK AND GUY WIRE. THE CLOSEST GUY WIRE TO THE SIDEWALK SHALL HAVE YELLOW PLASTIC TUBING.
16. DRILLED HOLE DIAMETER SHALL BE 18" MINIMUM OR A MINIMUM HOLE SIZE EQUAL TO THE POLE BUTT DIAMETER PLUS 8".
17. FILL MATERIAL SHALL BE TAMPED IN 6" LIFTS. A GRADE 7 OR 8 CONCRETE AGGREGATE OR DRILL CUTTINGS (IF GRANULAR AND NOT LARGER THAN $\frac{3}{4}$ ") MAY BE USED AS FILL.

EXPANDING ANCHOR NOTES:

1. HOLE SHALL BE DRILLED AT AN ANGLE INLINE WITH THE GUY (45° TO 60° TYPICAL).
2. OTHER ANCHOR TYPES (DISC OR SCREW TYPE) MAY BE USED WITH ENGINEER'S APPROVAL.
3. HOLE SIZE SHALL BE SLIGHTLY LARGER THAN THE UNEXPANDED ANCHOR, PER MANUFACTURER'S SPECIFICATIONS.
4. ALL ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL BLADES SHALL BE WEDGED INTO UNDISTURBED SOIL.
5. FOLLOWING INSTALLATION OF THE ANCHOR AND ANCHOR ROD, BACKFILL HOLE AND THOROUGHLY TAMP.

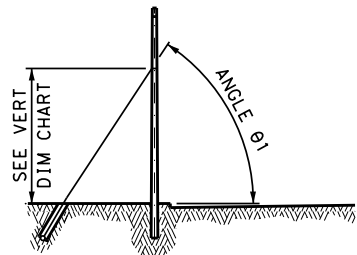
SHEET 1 OF 3

Texas Department of Transportation
Fort Worth District

TRAFFIC SIGNAL
SUPPORT STRUCTURES
TIMBER POLE ASSEMBLIES
(80 MPH WIND ZONE)
TP-80(12) (FTW)

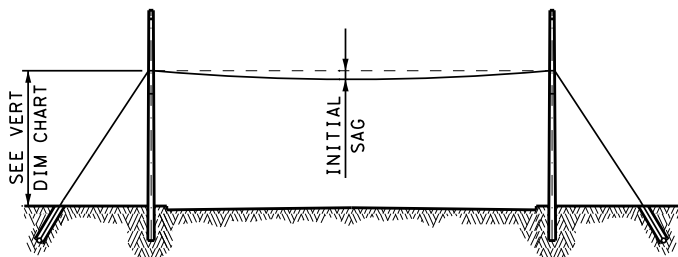
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CONSTRUCTION REQUIREMENTS AND SEQUENCING



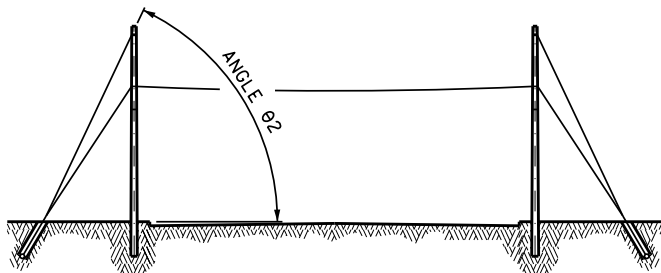
STEP 1 - SET POLE & STRESS LOWER GUY WIRE

- STEP 1 NOTES:
1. CONSTRUCTION MAY PROCEED IN ONLY ONE DIRECTION AT A TIME.
 2. SET THE POLES PLUMB AND THE EXPANDING ANCHORS PER MANUFACTURER'S RECOMMENDATIONS.
 3. BACKFILL HOLES FOR ANCHOR, ANCHOR ROD & POLES PER ITEM 627.
 4. STRESS LOWER GUY WIRE TO:
INITIAL TENSION = $500 \text{ LB} / \cos \theta_1$ ②



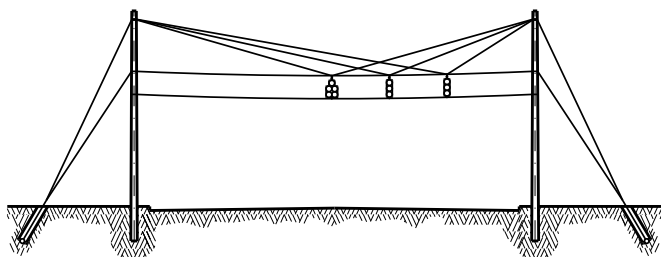
STEP 2 - STRESS SWAY CABLE

- STEP 2 NOTES:
1. INSTALL AND STRESS THE STEEL SWAY CABLE PER THE INITIAL SWAY CABLE PROFILE CHART.
 2. INITIAL SAG IS THE MAXIMUM DISTANCE BETWEEN THE SWAY CABLE AND A STRAIGHT LINE BETWEEN THE SUPPORT POINTS ON THE TIMBER POLES.
 3. INITIAL SAG REQUIREMENTS DO NOT ACCOUNT FOR WEIGHT OF CONDUCTOR CABLE. CONDUCTOR CABLE IS TO BE ATTACHED IN STEP 4.
 4. THIS IS THE FINAL STEP FOR THE OPEN END (SPAN WITHOUT SIGNALS) IN THE C-BOX CONFIGURATION.



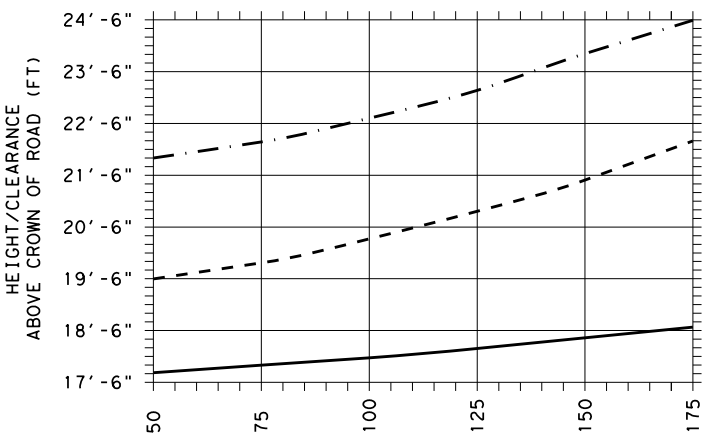
STEP 3 - STRESS UPPER GUY WIRE

- STEP 3 NOTES:
1. INSTALL THE UPPER STEEL GUY WIRE. CONNECT TO ANCHOR ROD FROM STEP 1.
 2. DETERMINE HORIZONTAL COMPONENT OF STRESSING FORCE BASED ON THE SPAN LENGTH AND THE NUMBER OF SIGNAL HEADS FROM UPPER GUY WIRE INITIAL TENSION CHART.
 3. STRESS UPPER GUY WIRE TO:
INITIAL TENSION = $\text{HORIZ COMPONENT} / \cos \theta_2$ ③

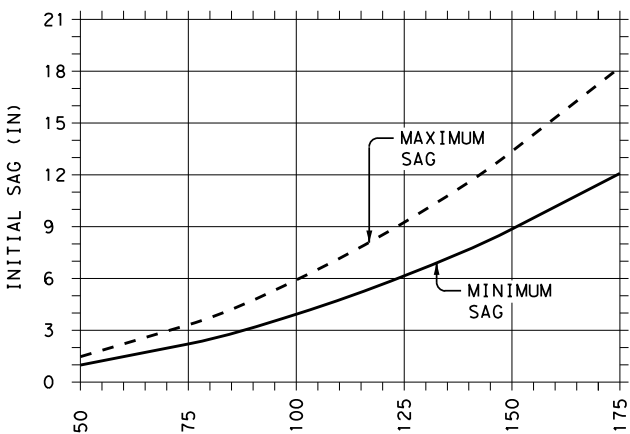


STEP 4 - INSTALL SIGNAL HEADS & ATTACHMENTS

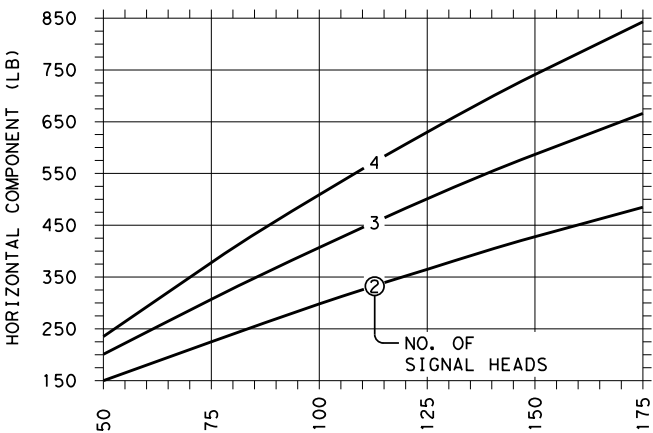
- STEP 4 NOTES:
1. ATTACH SIGNAL HEADS TO STEEL SWAY CABLE.
 2. INSTALL STEEL SPAN WIRE CABLES AND SIGNALS. STRESS SPAN WIRE CABLES UNTIL THE SIGNALS CAN BE ATTACHED TO SWAY CABLE AND NOT CAUSE DEFLECTION IN THE SWAY CABLE FROM THE WEIGHT OF THE SIGNAL HEADS.
 3. FOLLOWING THE STRESSING OF ALL SPAN WIRE CABLES, CONSTRUCTION MAY PROCEED IN THE PERPENDICULAR DIRECTION OR PROCEED WITH THE INSTALLATION OF THE TETHER CABLE, CONDUCTOR CABLE AND ALL OTHER ATTACHMENTS.
 4. VERIFY MINIMUM FINAL CLEARANCE AFTER ALL ATTACHMENTS.



VERTICAL DIMENSIONS



SWAY CABLE PROFILE



UPPER GUY WIRE INITIAL TENSION

- RECOMMENDED HEIGHT OF SWAY CABLE SUPPORT W/ VERTICAL SIGNALS ①
--- RECOMMENDED HEIGHT OF SWAY CABLE SUPPORT W/ HORIZONTAL SIGNALS ①
— MINIMUM FINAL CLEARANCE AFTER ALL ATTACHMENTS ②

① RECOMMENDED HEIGHT DOES NOT ACCOUNT FOR INTERSECTION OR SITE GRADING AND ADJUSTMENTS MAY BE NECESSARY. CONTRACTOR MUST VERIFY THAT THE MINIMUM FINAL CLEARANCE BETWEEN THE PAVEMENT AND SIGNAL HEAD OR TETHER CABLE IS SATISFIED.

② FINAL CLEARANCE ALLOWS DEFLECTION DUE TO ICE LOADING.

- TENSION = 700 LB ③
— TENSION = 1,050 LB

③ TENSIONS SHOWN ARE CABLE FORCES AND DO NOT ACCOUNT FOR FRICTION IN EQUIPMENT DURING STRESSING OPERATIONS.

NOTES:

1. SEE SHEET 1 OF 3 FOR GENERAL NOTES.
2. MINIMUM ALLOWABLE SOIL STRENGTH IS 20 BLOWS/12" PER THE TEXAS CONE PENETRATION TEST (TCP).

SHEET 2 OF 3

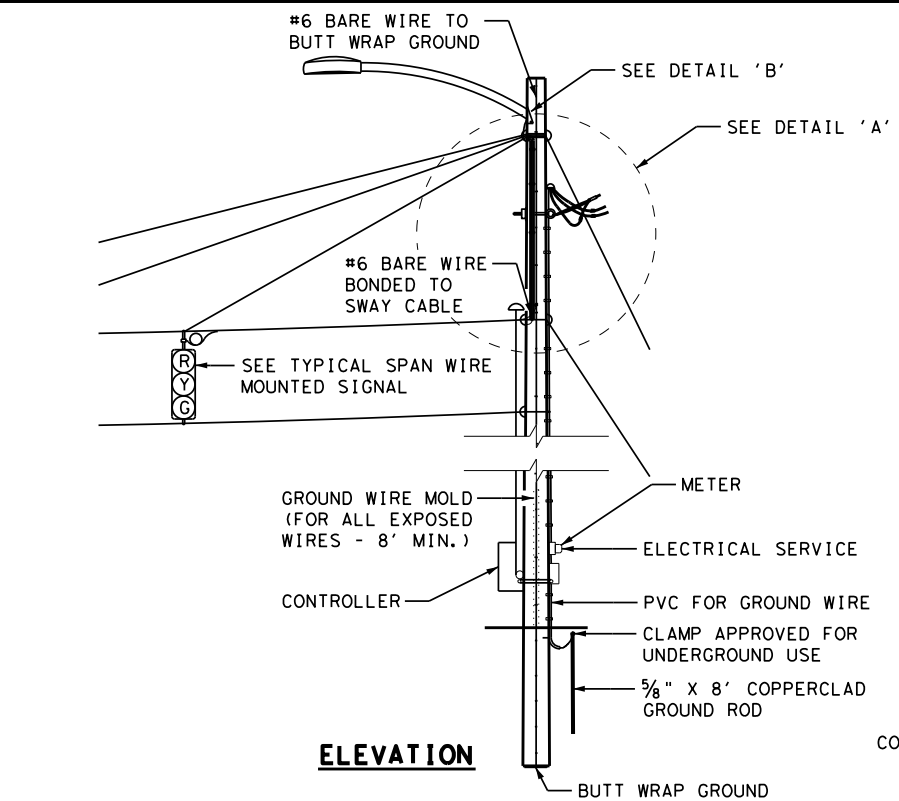
Texas Department of Transportation
Fort Worth District

TRAFFIC SIGNAL
SUPPORT STRUCTURES
TIMBER POLE ASSEMBLIES
(80 MPH WIND ZONE)
TP-80(12) (FTW)

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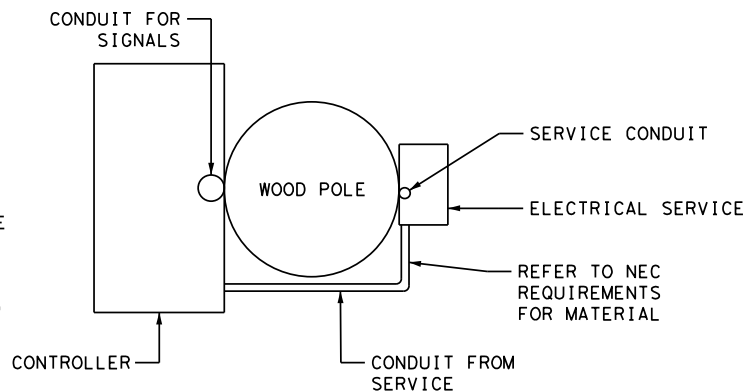
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LEVELS DISPLAYED
1 2

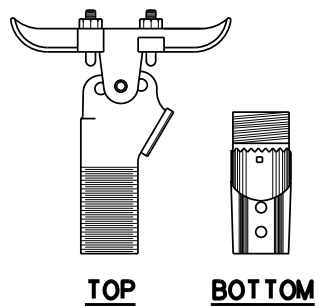
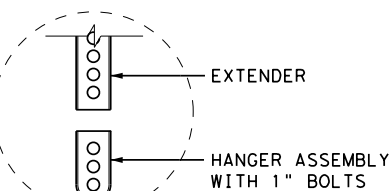
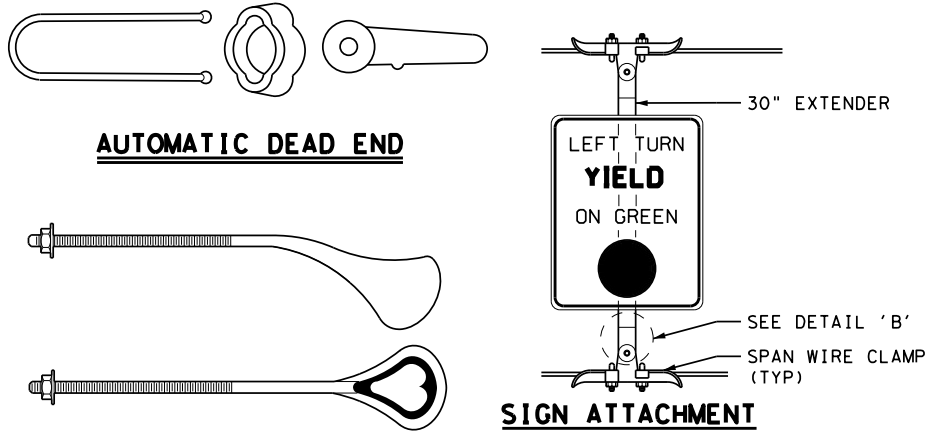


ELECTRICAL NOTES:

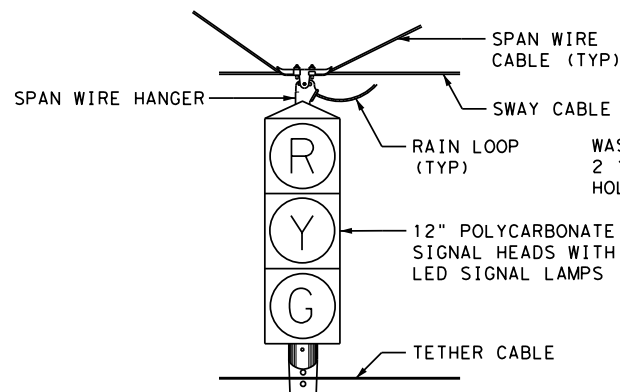
1. ALL CONDUITS SHOWN ARE TYPICAL. CONDUIT SIZES MAY VARY. REFER TO THE LAYOUT FOR ACTUAL SIZES.
2. SEE LAYOUT FOR CONDUCTOR SIZE.
3. ALL UNDERGROUND CONDUIT SHALL BE A MINIMUM OF 2' BELOW GROUND LEVEL.
4. ALL CONDUITS SHALL BE SEALED.
5. SERVICE WIRING SHALL BE XHHW. GROUNDING TYPE INSULATED BUSHINGS SHALL BE INSTALLED ON EVERY CONDUIT ENTERING SERVICE ENCLOSURE.
6. ALL CONDUIT ATTACHED TO THE WOOD POLE SHALL BE RIGID METAL CONDUIT (RMC).
7. CONDUIT SHALL NOT ENTER CABINET FROM THE TOP.



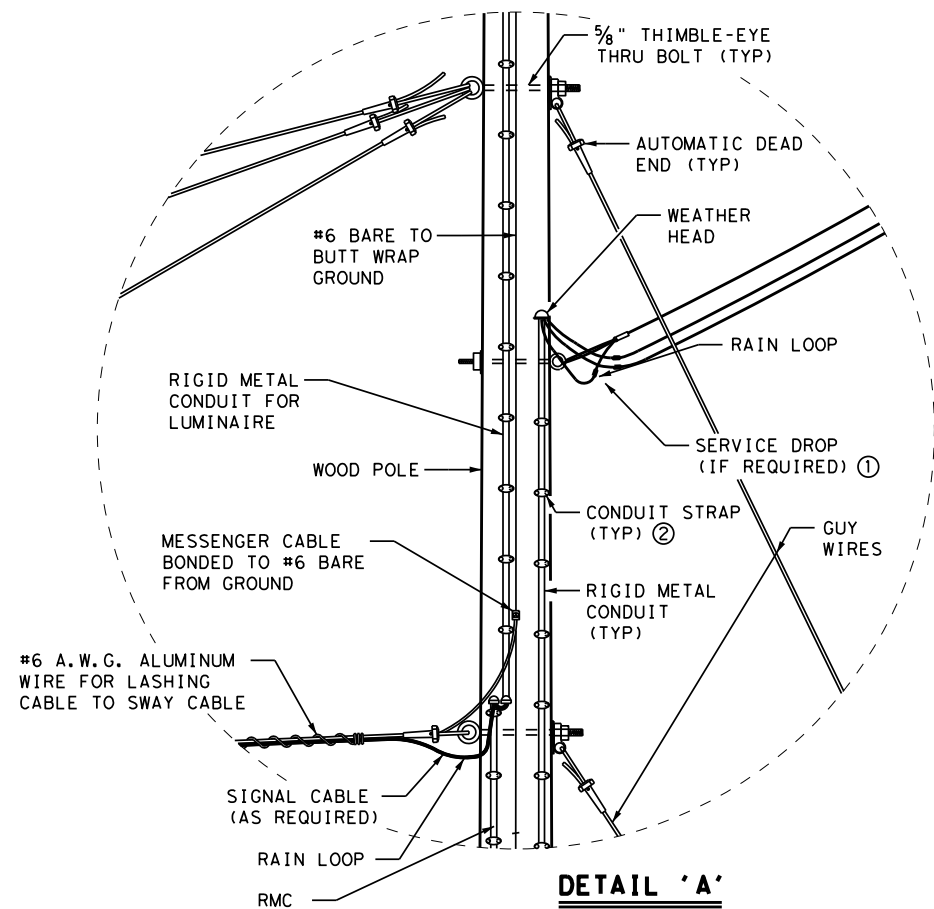
PLAN



SPAN WIRE HANGER DETAIL



TYPICAL SPAN WIRE MOUNTED SIGNAL



- ① SERVICE DROP POINT MIN. 6" BELOW WEATHER HEAD
- ② CONDUIT STRAPS SPACED MAX. 5' ON CENTER
- ③ ALL SPAN WIRE AND SWAY CABLES SHALL BE BONDED TOGETHER AT EACH POLE AND TO THE #6 BARE WIRE (BUTT WRAP) AT EACH POLE

BOLT, MACHINE
5/8 X 10 IN.
GALVANIZED STEEL

WASHER, DOUBLE
COIL 5/8 IN.
GALVANIZED STEEL

WASHER, SQUARE
2 1/4 X 13/16 IN.
HOLE

- ① 4 - 1/2" x 1 1/4" BRACKET MOUNTING BOLTS SUPPLIED WITH POLE (2 BOLTS PER POSITION).
- ② ARM HAS HOLE WITH 1/2" RUBBER GROMMET FOR CONDUCTOR ENTRY WHEN SERVED OVERHEAD.
- ③ ARM WILL ACCOMMODATE OVERHEAD OR UNDERGROUND FEEDS

DETAIL 'B'

NOTES:

1. SEE SHEET 1 OF 3 FOR GENERAL NOTES.
- SHEET 3 OF 3**

Texas Department of Transportation
Fort Worth District

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