

STRAIN POLE DESIGN CRITERIA:

THE DESIGN OF THE STRAIN POLE STRUCTURES SHOWN ON SIG-021-A IS BASED ON THE AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION (2015), WITH 2017 TO 2022 INTERIM REVISIONS.

THE DESIGN IS BASED ON THE MAXIMUM WIND AREAS AND WEIGHTS SHOWN BELOW IN THE SPAN WIRE LOADING TABLE. THE SUM OF THE WEIGHTS AND AREAS (VIEWED PERPENDICULAR TO THE SPAN) OF ALL SIGNALS, SIGNS, DEVICES AND OTHER EQUIPMENT SUPPORTED ON EACH SPAN MUST BE LESS THAN THE MAXIMUM VALUES SHOWN. THE SPAN LENGTH IS DEFINED AS THE STRAIGHT HORIZONTAL DISTANCE BETWEEN POLES. FOR TIE-OFF CONFIGURATIONS, THE SPAN LENGTH IS DEFINED AS THE LONGEST HORIZONTAL DISTANCE BETWEEN ANY TWO ADJACENT POLES MEASURED ALONG THE LENGTHS OF EACH WIRE.

LOAD PARAMETERS:

WIND LOAD (EXTREME EVENT LIMIT STATE): 1700-YEAR MRI BASIC WIND SPEED MAP, 120 MPH DESIGN WIND SPEED

WIND LOAD (SERVICE I EVENT LIMIT STATE): 10-YEAR MRI BASIC WIND SPEED MAP, 76 MPH DESIGN WIND SPEED

HEIGHT AND EXPOSURE FACTOR (K_z): K_z IS CALCULATED USING A HEIGHT (Z) MEASURED FROM TOP OF THE DRILLED SHAFT (IT IS ASSUMED THAT THE POLE IS GROUND-MOUNTED).

DIRECTIONALITY FACTOR (K_d): 0.85

GUST EFFECT FACTOR (G): 1.14

WIND DRAG COEFFICIENT FOR WIND AREA (C_d): 1.2

WIND LOAD REDUCTION FACTOR FOR FREE-SWINGING DEVICES SUPPORTED BY THE SPAN WIRE (UNTETHERED CONFIGURATIONS): 0.65

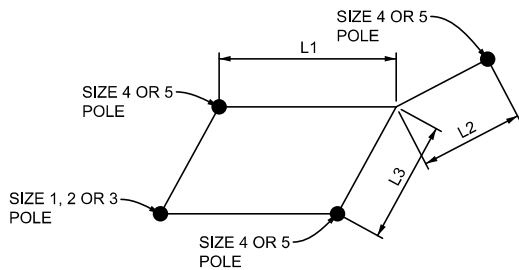
WIRE SAG: 5% (TYPICAL), 6.5% FOR SPANS WITH TIE-OFFS

STRAIN POLE LOADING: SEE SPAN WIRE LOADING TABLE BELOW. IN ADDITION, A DISAPPEARING LEGEND SIGN IS APPLIED MIDWAY ALONG ALL TIE-OFF SPANS (WHERE APPLICABLE). NO OTHER LOAD IS ALLOWED ON TIE-OFF SPANS.

SPAN WIRE + ELECTRIC CABLES WEIGHT: 1.155 LB/FT FOR 5/16" SPAN WIRE AND 1.467 LB/FT FOR 1/2" SPAN WIRE

SERVICABILITY PARAMETERS:

LIMIT FOR HORIZONTAL DEFLECTION AT TOP OF POLE UNDER DEAD LOAD ONLY: 2.5% OF POLE HEIGHT



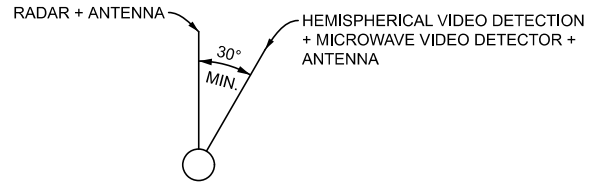
NOTES:

1. L1, L2 AND L3 ARE TIE-OFF SPANS.
2. SEE SIG-021 FOR POLE SIZES.
3. USE A SPAN LENGTH OF MAX(L1+L2, L2+L3) FOR DRILLED SHAFT LENGTH SELECTION FOR POLES CONNECTED TO TIE-OFF SPANS.

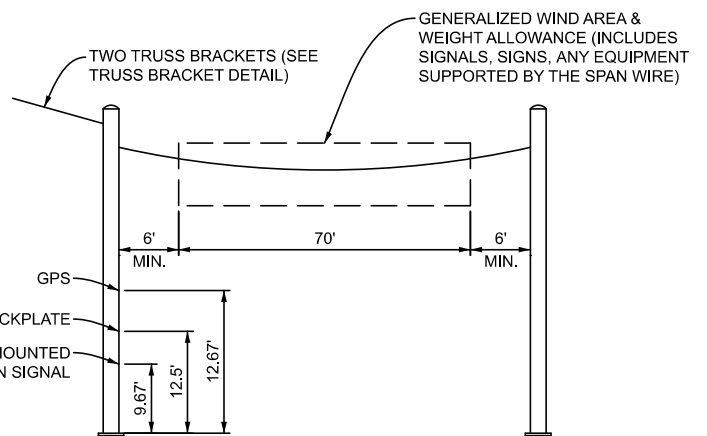
3 DETAIL - STRAIN POLE CONFIGURATION

SPAN LENGTH	WEIGHT OF GENERALIZED LOAD (LBS)**	MAX PERP. WIND AREA (TETHERED SPANS, SIGNALS WITH BACKPLATES) (SFT)**	MAX PERP. WIND AREA (UNTETHERED SPANS, SIGNALS WITHOUT BACKPLATES) (SFT)**
UP TO 100 FT	328	58.0	31.0
101 FT TO 120 FT	328	58.0	31.0
121 FT TO 150 FT	328	58.0	31.0
151 FT TO 175 FT	370	58.0	37.0
176 FT TO 200 FT	370	58.0	37.0

**WEIGHTS AND AREAS INCLUDE ALLOWANCE FOR SIGNALS, SIGNS, AND ANYTHING ELSE CARRIED BY THE CABLES.



1 DETAIL - TRUSS BRACKET



2 DETAIL - STRAIN POLE LOADING ELEVATION VIEW

EQUIPMENT	WEIGHT LBS	AREA SFT
ANTENNA	20	0.09
GPS MODULE	30	0.75
POLE MOUNTED PEDESTRIAN SIGNAL	25	1.78
1W-3C SIGNAL (WITH BACKPLATE)	43	8.67
18' STEEL TRUSS BRACKET	106	7.29
HEMISPHERICAL VIDEO DETECTION	22	2.11
MICROWAVE VEHICLE DETECTOR	4	0.97
RADAR VEHICLE DETECTOR	4	0.97
DISAPPEARING LEGEND SIGN	45	9

SEE ELEVATION VIEW FOR EQUIPMENT MOUNTING LOCATIONS.

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL STRAIN POLE LOADING
TABLE AND DESIGN CRITERIA

(SPECIAL DETAIL) 07/27/23
FHWA APPROVAL PLAN DATE

SIG-020-A

SHEET
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