

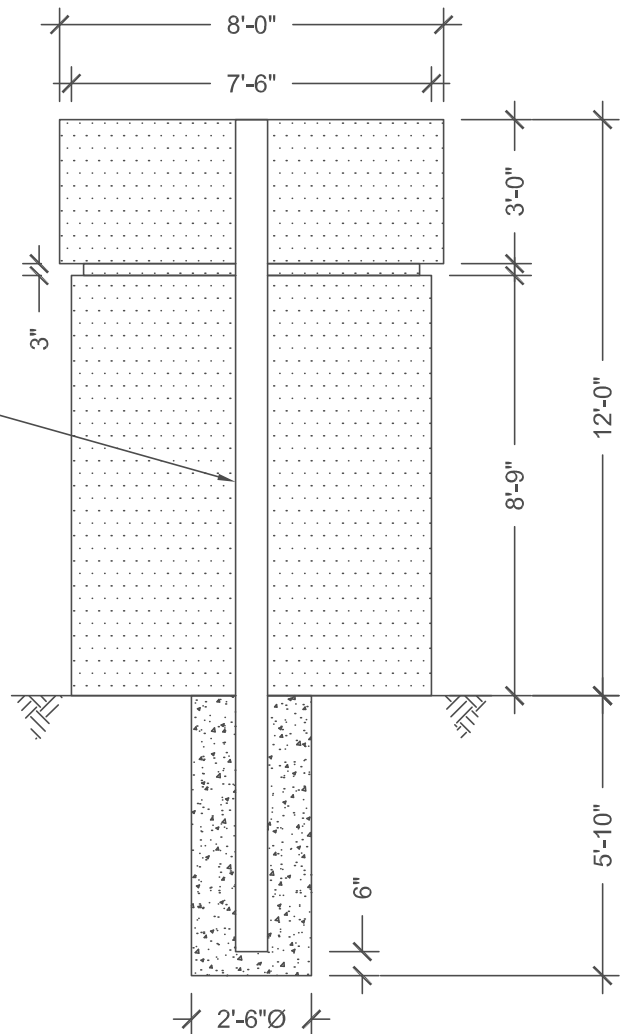


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PROJECT: DUTCH BROS, CHIPMAN & WARD LEE'S SUMMIT, MO
 PROJECT #: 32261D
 CLIENT: ES&A SIGN & AWNING CO.

DATE: 10-29-2021
 ENGINEER: MAC
 LAST REVISED:

8 STD. PIPE
 OD: 8.625"
 WALL: 0.322"



GENERAL NOTES

1. DESIGN CODE: IBC 2018
2. DESIGN LOADS: ASCE 7-16
3. WIND VELOCITY 110 MPH EXPOSURE C
4. CONCRETE 2500 PSI MINIMUM
5. PIPE STEEL ASTM A53 GR. B, $F_y = 35$ KSI MIN.
6. LATERAL SOIL BEARING PER IBC CLASS 4 (150 PSF/FT)
7. PROVIDE PROTECTION AGAINST DISSIMILAR METALS
8. ALL DIMENSIONS TO BE VERIFIED PRIOR TO FABRICATION



FRONT ELEVATION



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V5.5

units; pounds, feet unless noted otherwise

Applied Wind Loads; from ASCE 7-16

$$F = q_z * G * C_f * A_f \quad \text{with } q_z = 0.00256 K_z K_{zt} K_d V^2 \quad (29.3.2 \text{ \& } 29.4)$$

$$C_f = 1.684 \quad (\text{Fig. 29.3-1})$$

$$1.00 \quad 0 \quad \text{max. height} = 12.00$$

$$K_{zt} = 1.0 \quad (26.8.2) (=1.0 \text{ unless unusual landscape})$$

$$s = 7.50$$

$$K_z = \text{from table 28.3-1}$$

$$\text{Exposure} = c$$

$$K_d = 0.85 \quad \text{for signs (table 26.6-1)}$$

$$V = 110 \quad \text{mph}$$

$$G = 0.85 \quad (26.9)$$

$$\text{weight} = 0.914 \quad \text{kips}$$

$$s/h = 0.625$$

$$M_{DL} = 0.00 \quad \text{k-ft}$$

$$B/s = 1.07$$

Pole Loads	structure component	height at section c.g.	K _z	q _z	pressure q _z *G*C _f	A _f	shear	Wind Moment M _w
	1	4.4	0.850	22.4	32.04	65.6	2103	9198
	2	8.875	0.850	22.4	32.04	1.8	56	498
	3	10.5	0.850	22.4	32.04	24.0	769	8074
					sums:	91.4	2927	17.77 (M _w)
								k-ft arm= 6.1
								M = 17.77 k-ft
								M = sqrt(M _{DL} ² + M _w ²)
								M _u = sqrt(1.2M _{DL} ² + 1.0M _w ²) = 17.77 k-ft

Pole Design**section; pipe**

M _u ≤ φM _n with M _n = f _y Z	f _y = 35 ksi	φ = 0.9					
H	M _u (k-ft)	Z req'd. (in)	Size(in)	t (in)	Z	USE	
at grade	17.8	6.77	5	0.258	6.8	8 STD. PIPE, φM _n = 54.6 k-ft	

Footing Design**footprint: round**

$$\omega = 1.3 \quad \text{IBC 1605.3.2} \quad \text{IBC Table 1806.2, sections 1806.3.4, 1807.3.2} \quad S = (1.3x2x)$$

$$P = 2.28 \quad \text{kip}$$

$$S1 = S \times d / 3$$

$$A = 2.34 \times P / (S1 \times b)$$

$$S = 400$$

$$S1 = 779$$

$$d = 0.5xA (1 + (1 + 4.36x h/A)^{.5})$$

$$\text{IBC 1807.3.2.1}$$

$$A = 2.74$$

footing: 2' - 6" dia.

5' - 10" deep