SULLAWAY ENGINEERING

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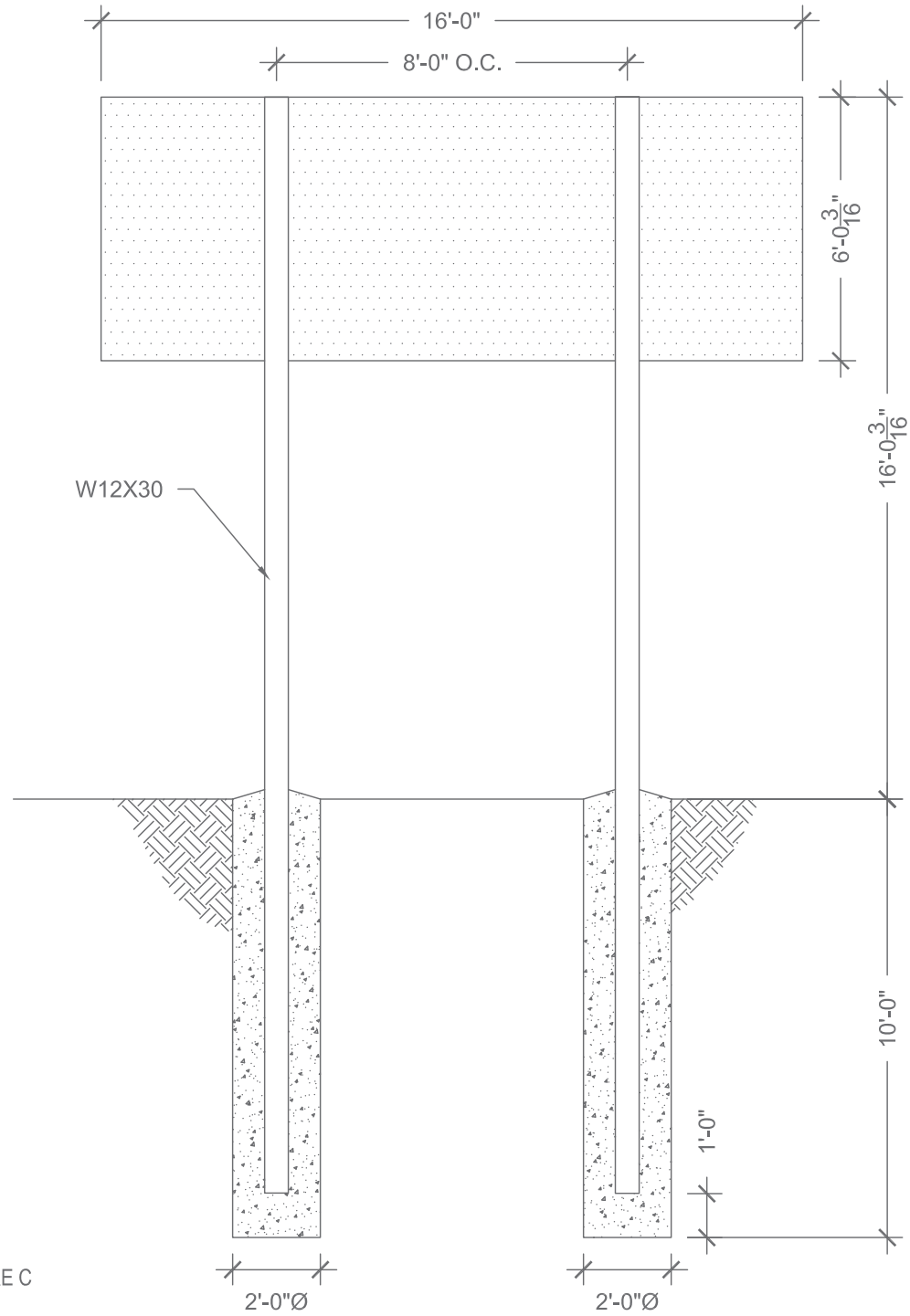
PROJECT:	MEL ROBERTS PARK - DOUBLE POLE SCOREBOARD - 901 NORTH CEDAR ST., FOLEY, AL	DATE:	2-5-2024
PROJECT #:	44185	ENGINEER:	JD
CLIENT:	NEVCO INC.	LAST REVISED:	

2-5-24



1 - FRONT ELEVATION

GENERAL NOTES

1. DESIGN CODE: IBC 2018
2. DESIGN LOADS: ASCE 7-16
3. WIND VELOCITY: 160 MPH EXPOSURE C
4. CONCRETE 2500 PSI MIN.
5. WIDE FLANGE STEEL ASTM A992, F_y = 50KSI MIN.
6. PROVIDE PROTECTION AGAINST DISSIMILAR METALS USING ANTI-CORROSIVE PAINT OR NEOPRENE GASKETS.
7. LATERAL SOIL BEARING PER IBC CLASS 4 (150 PSF/FT)
8. ALL DIMENSIONS TO BE VERIFIED PRIOR TO FABRICATION.

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V5.5 units; pounds, feet unless noted otherwise

Applied Wind Loads; from ASCE 7-16

$F=q_z*G*C_f*A_f$ with $q_z = 0.00256K_zK_{zt}K_dV^2$ (29.3.2 & 29.4)

C_f= 1.684 (Fig. 29.3-1) 2 pole Cf factor= 0.96 max. height= 16.02
K_{zt}= 1.0 (26.8.2) (=1.0 unless unusual landscape) s= 6.02
K_z= from table 28.3-1 Exposure= c
K_d= 0.85 for signs (table 26.6-1)
V= 160 mph
G= 0.85 (26.9) weight= 1.163 kips
s/h= 0.376 M_{DL}= 0.00 k-ft
B/s= 2.66

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	5.0	0.850	47.3	67.79	20.0	1356	6779
	2	12.5	0.850	47.3	67.79	80.0	5423	67787
	3	15.5078125	0.856	47.7	68.27	16.3	1109	17203
					sums:	116.3	7888	91.77
	two pole distribution factor *b*s (asce fig. 29.4-1):				x 0.78		6162	71.68

(M_w) k-ft arm= 11.6

P_u= 1.40 kip M= 71.68 k-ft $M=\sqrt{M_{DL}^2+M_w^2}$

$M_u=\sqrt{1.2M_{DL}^2+1.0M_W^2}$ = 71.68 k-ft

Pole Design section; W flange

$M_u \le \phi M_n$ with $M_n = f_yZ$ f_y= 50 ksi ϕ= 0.9

H	M_u(k-ft)	Z req'd. (in)	Size(in)	t (in)	Z	USE
at grade	71.7	19.12				W12X30, ΦMn= 97.16 k-ft

Unbraced length = 16'-3/16", no lateral bracing provided

Footing Design footprint: round

ω= 1.3 IBC 1605.3.2 IBC Table 1806.2, sections 1806.3.4, 1807.3.2 S=(1.3x2x)
P= 4.81 kip S1 = S x d / 3 A = 2.34 x P / (S1 x b) S= 400
S1= 1310 d =0.5xA (1+ (1+4.36x h/A) ^.5) IBC 1807.3.2.1
A= 4.29

footing: **2' - 0" dia.** **9' - 10" deep**
USE 10' DEEP

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Check W12X30 for flexure (AISC 14 F3)

M_u=(see page #2)= Mu = 860.2 k-in

Yielding:

Mn = Mp = Fy Z = 2155 k-in (eq'n. F2-1)

LTB:

Mn = Fcr Sx = 1296 k-in (eq'n. F2-3)

Fcr = Cb π^2E/(Lb/rts)^2 (1+0.078Jc/Sxho(Lb/rts)^2)$^{1/2}$ = 33.56 ksi (eq'n. F2-4)

FTB:

Mn = Mp-(Mp-0.7FySx)(l-lpf)/(lrf-lpf) = 2249 k-in (eq'n. F3-1)

ϕMn = 1166 k-in OK

(Mu/Mc) = 0.738 (eq'n. H1-1)

Fy =	50	ksi
Zx =	43.1	in^3
Lb =	192.2	in
Lp =	64.43	in
Lr =	187.1	in
E =	29000	ksi
r_y =	1.52	in
S_x =	38.6	in^3
J =	0.457	in^4
h_o =	11.9	in
c =	1	
r_{ts} =	1.769	
λ_{pf} =	9.152	
λ_{rf} =	24.08	
λ =	7.41	
ϕ =	0.9	
kc = 4/(h/tw)$^{1/2}$ =	0.62	
Cb =	1.00	