NALLE WOODS

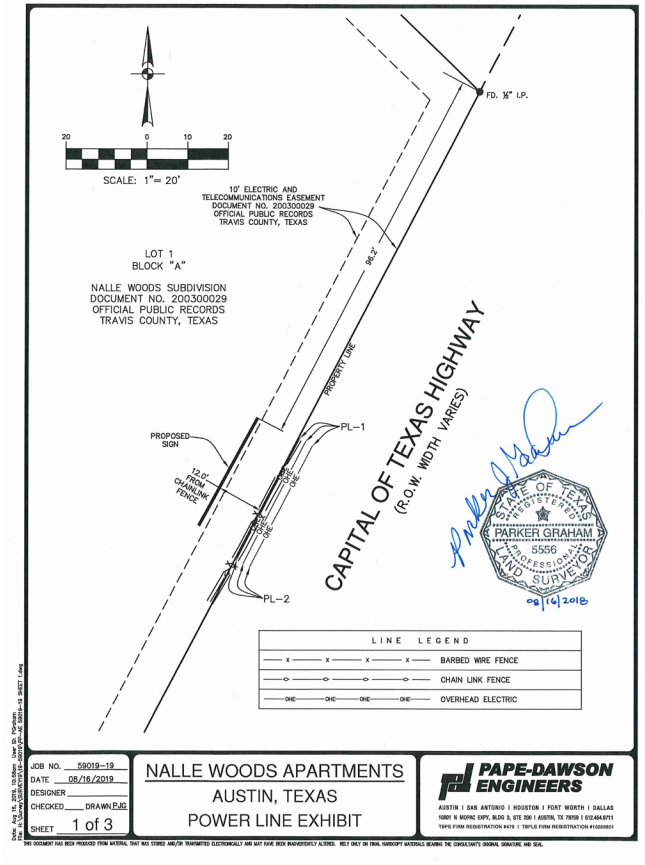
4700 N Capital of Texas Hwy.,
Loop 360
Austin, TX 78746

SIGN VARIANCE REQUEST

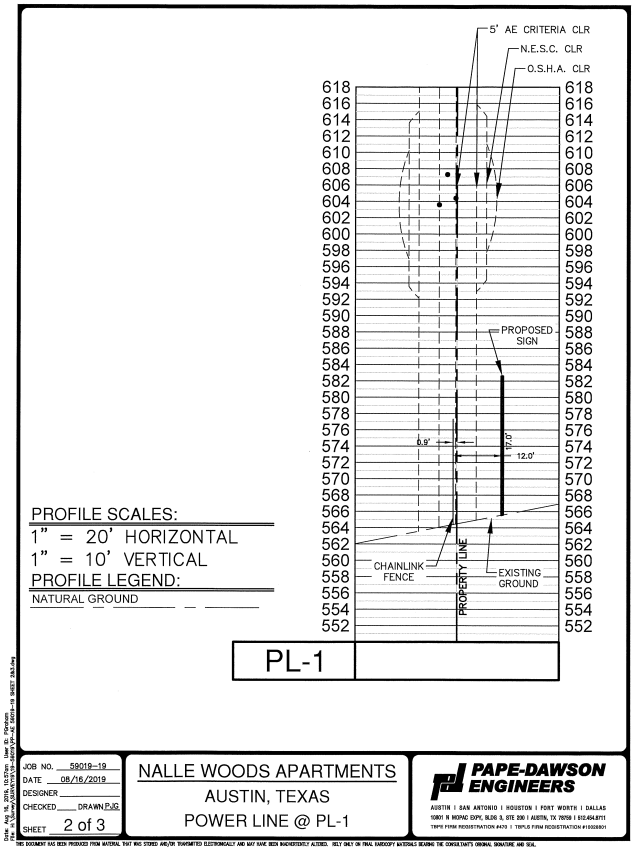
EXHIBIT 14 - TOPOGRAPHY OF LAND AND TREES

Image from www.austintexas.gov/GIS/Property Profile

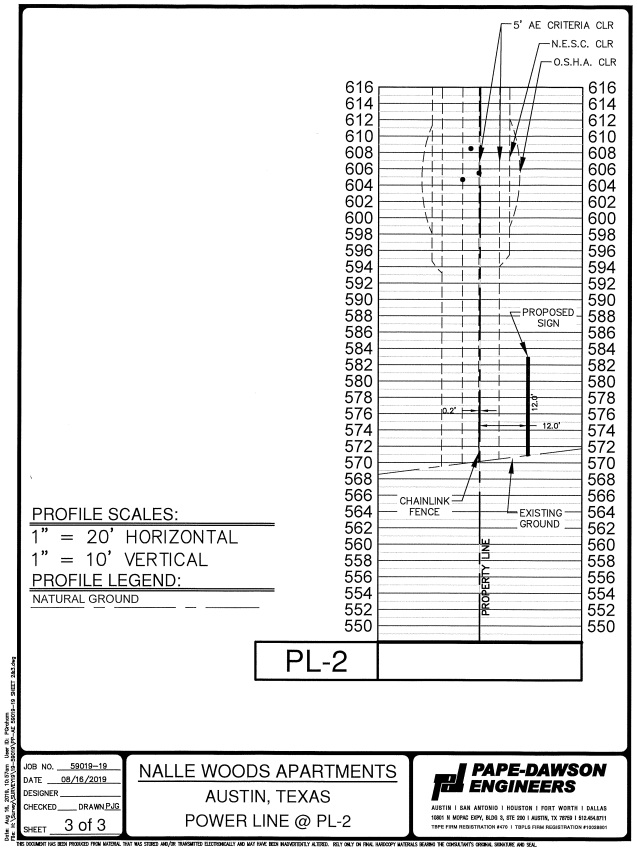
EXHIBIT 15 - SURVEY OF POWERLINES - *SURVEYORS PAPE-DAWSON*



Overhead View



Northside of Sign

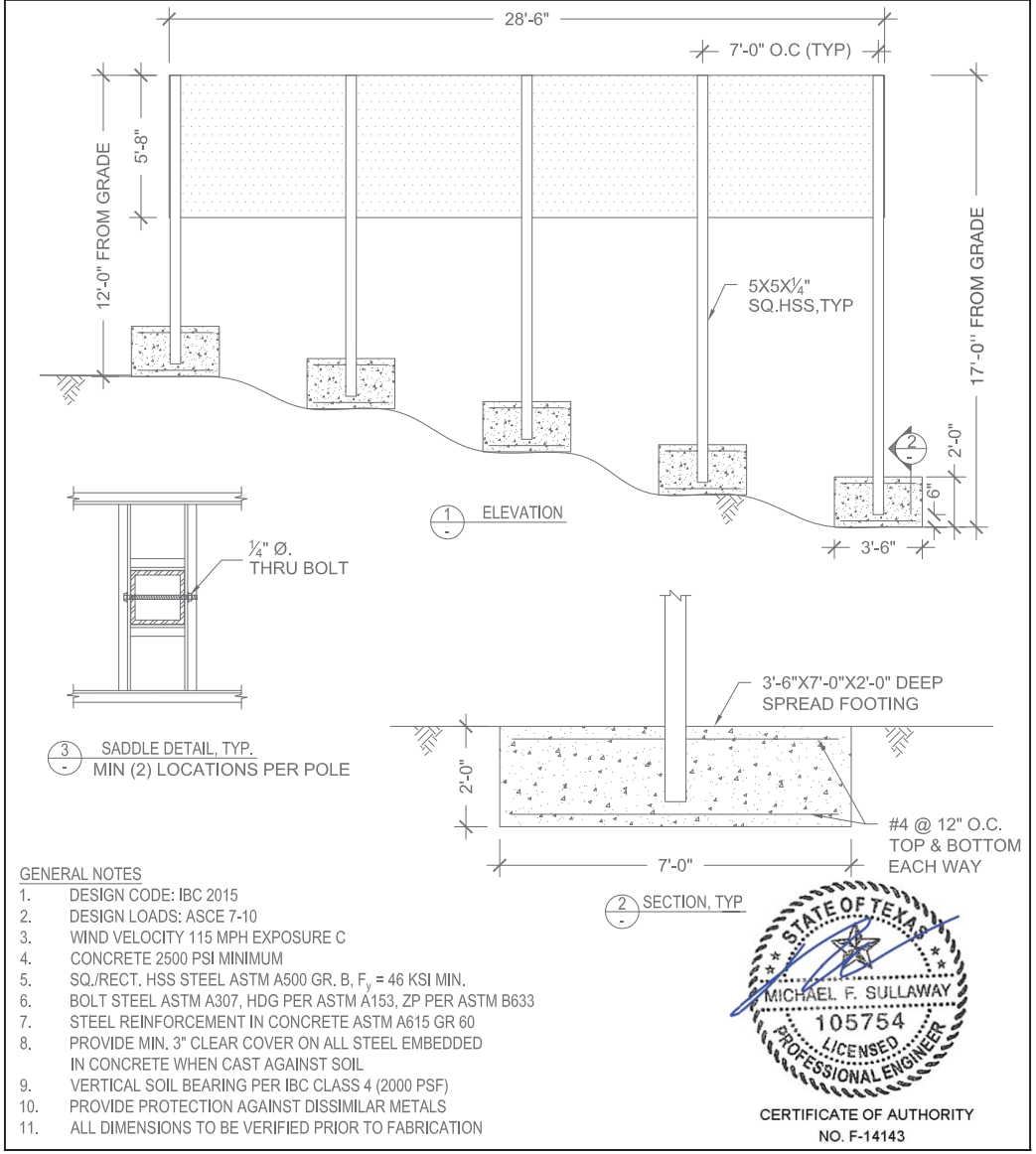


Southside of Sign

EXHIBIT 16 - ENGINEER DRAWING OF SIGN STRUCTURE - *SULLAWAY ENGINEERING*

SULLAWAY ENGINEERING
10815 RANCHO BERNARDO RD., SUITE 260
SAN DIEGO, CA 92198
[redacted]
PHONE: 1-858-312-5150 FAX: 1-858-777-3534

PROJECT: NALLE WOODS, 4700 N CAPITAL OF TEXAS HWY, AUSTIN, TX
PROJECT #: 22688
CLIENT: MELLO SIGNS
DATE: 08-09-2019
ENGINEER: PS
LAST REVISED:



GENERAL NOTES

1. DESIGN CODE: IBC 2015
2. DESIGN LOADS: ASCE 7-10
3. WIND VELOCITY 115 MPH EXPOSURE C
4. CONCRETE 2500 PSI MINIMUM
5. SQ./RECT. HSS STEEL ASTM A500 GR. B, F_y = 46 KSI MIN.
6. BOLT STEEL ASTM A307, HDG PER ASTM A153, ZP PER ASTM B633
7. STEEL REINFORCEMENT IN CONCRETE ASTM A615 GR 60
8. PROVIDE MIN. 3" CLEAR COVER ON ALL STEEL EMBEDDED IN CONCRETE WHEN CAST AGAINST SOIL
9. VERTICAL SOIL BEARING PER IBC CLASS 4 (2000 PSF)
10. PROVIDE PROTECTION AGAINST DISSIMILAR METALS
11. ALL DIMENSIONS TO BE VERIFIED PRIOR TO FABRICATION

CERTIFICATE OF AUTHORITY
NO. F-14143

SULLAWAY ENGINEERING

10815 [redacted]

PROJECT: NALLE WOODS
PROJ. NO.: 22688
CLIENT: MELLO SIGNS

DATE: 8/9/19
ENGINEER: PS

V5.0

units; pounds, feet unless noted otherwise

Applied Wind Loads; from ASCE 7-10

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

C_f= 1.793 (Fig. 29.4-1) max. height= 18.0

K_{zt}= 1.0 (26.8.2) (=1.0 unless unusual landscape)

K_z= from table 28.3-1 Exposure= c

K_d= 0.85 for signs (table 26.6-1)

V= 115 mph

G= 0.85 (26.9) weight= 0.448 kips

s/h= 0.315 M_{DL}= 0.00 k-ft

B/s= 5.03

Pole Loads	structure component	height at section c.g.	K_z	q_z	q_z*G*C_f	A_f	shear	Wind Moment M_W
	1	6.16666667	0.85	24.5	37.3	5.1	192	1181
	2	13.6666667	0.85	24.5	37.3	18.7	696	9508
	3	16.5	0.87	24.9	38.0	21.0	797	13158
					sums:	44.8	1685	23.85 (M_w) k-ft arm= 14.2

P_u= 0.54 kip M= 23.85 k-ft $M=sqrt(M_{DL}^2+M_w^2)$

$M_u=sqrt(1.2M_{DL}^2+1.0M_w^2)$ = 23.85 k-ft

Pole Design section; tube

$M_u \le \phi M_n$ with $M_n = f_yZ$ f_y= 46 ksi ϕ= 0.9

H	M_u(k-ft)	Z req'd. (in)	Size(in)	t (in)	Z	Use
at grade	23.85	6.91	5	0.233	7.6	5x5x1/4" SQ. HSS, ϕMn =26.2 k-ft

SULLAWAY ENGINEERING

P.O. [redacted] 150 Fax: 858-777-3534

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V5.0

Longitude Direction units; pounds, feet unless noted otherwise

applied shear at grade v= **1.053** kip unfactored load 1.685 k

applied moment at grade m= **14.904** kip-ft unfactored Moment 23.85 k-ft

depth of soil above footing h_s= **0.0** ft

allowable soil bearing p= **2.600** ksf (i.e., 2000 x 1.33 = 2660 psf)

(use a factor of 1.33 for wind or seismic)

Spread Footing Design

moment m= 17.0 k-ft

Footing size (ft) b= **3.50** L= **7.00** h= **2.00** S= 28.6

Footing Weight= 7.4 k signage weight= **0.448** k soil 0.00 total= 7.80

Overturning; M_c= 27 M_c>1.5M 1.605 ok

soil pressure; max= 1.126 ksf ok

forces on concrete pad; V= 8 k V_r= 12 k (=1.6V)

M= 13 k-ft M_r= 21.1 k-ft

Check Slab;

ϕ= 0.9 f_y= 60 ksi f_c= 2.5 ksi 150 lbs/ft3

Flexure A_s= **0.25** d= 20.0 in

$\phi M_n=\phi A_s f_y(d-a/2)$= 269 k-in = 22 k-ft $M_r<\phi M_n$ ok

$a=A_s f_y/0.85f_c b$= 0.168 in

Check minimum $A_{smin}=3sqrt(f_c)bd/f_y$ = 2.1 200bd/fy= 2.80 or $1.333A_s$= 0.33 in^2

ACI 10.3.1

Use A_s= 0.33 in^2

short direction $\gamma_s=2/(\beta+1)$ = 0.8 with β= 1.5 short direction; γA_s= 0.27 in^2

use #4@12" each direction

Shear; $\phi V_n=\phi 2sqrt(f_c)bd$ ϕV_c= 63.0 ϕ= 0.75 $V_r<\phi V_n$ ok

Top Slab

Assume half of footing is in uplift

weight= 4 kip arm= 1.8 ft

M= 6 k-ft M_r= 7.7 k-ft

Flexure A_s= **0.150**

$\phi M_n=\phi A_s f_y(d-a/2)$= 162 k-in = 13.5 k-ft $M_r<\phi M_n$ ok

$a=A_s f_y/0.85f_c b$= 0.050 in

Check minimum $A_{smin}=2sqrt(f_c)bd/f_y$ = 4.2 200bd/fy= 5.60 or $1.333A_s$= 0.2 in^2

Use A_s= 0.20 in^2

short direction $\gamma_s=2/(\beta+1)$ = 0.8 with β= 1.5 short direction; γA_s= 0.16 in^2

use #4@12" each direction