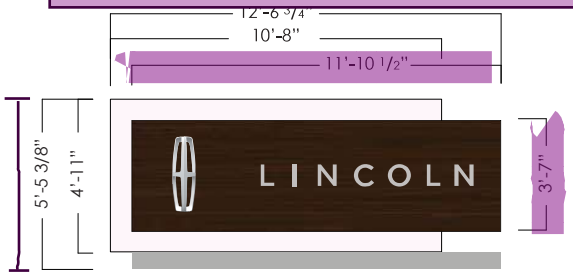
(a) The square footage of a sign made up of le
itself.The square footage of the proposed mon
documents, pg. 1]

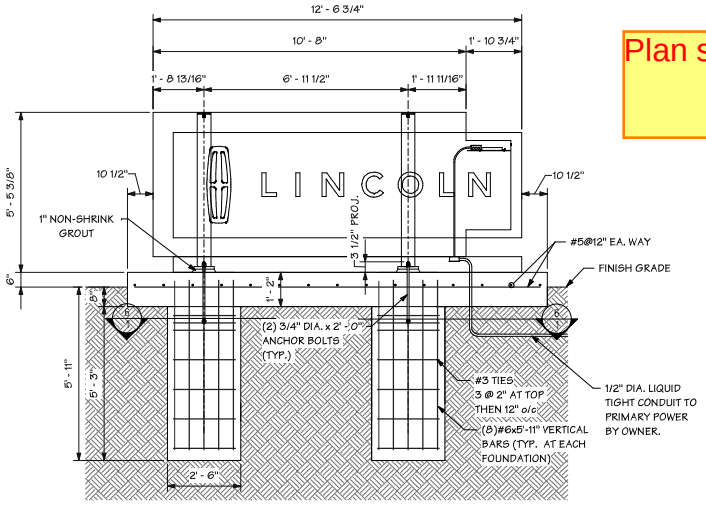


Horizontal Monument
Scale: 1/4"=1'

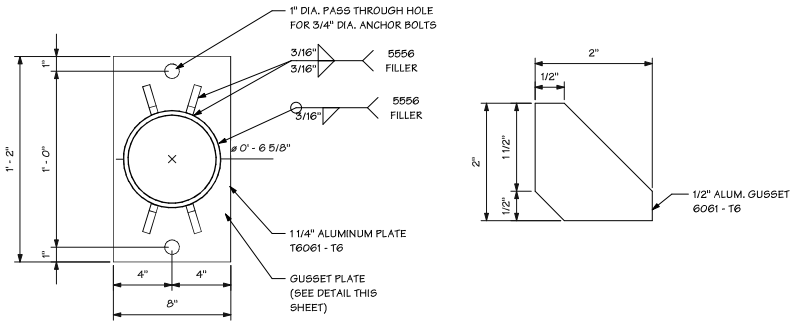
(a) The height of a monument sign shall be measured
earthen berm, retaining wall or otherwise artificially cre
monument signs set forth herein.

LINCOLN SIGN FAMILY

Plan size needs to be a minimum of 11" X 17"

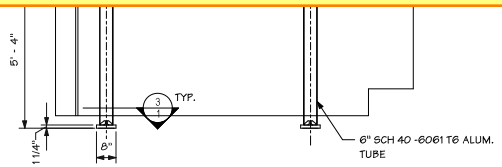


INSTALLATION PROCESS #1
(INSTALL FOUNDATION)
1/2" = 1'-0"

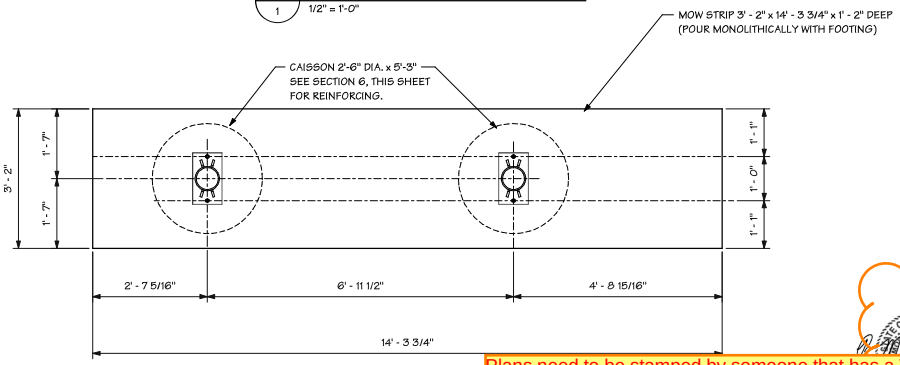


BASE PLATE DETAIL
3" = 1'-0"

GUSSET DETAIL
12" = 1'-0"



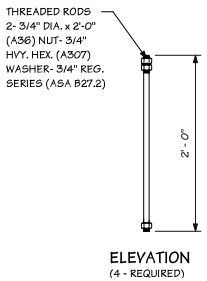
INSTALLATION PROCESS #2
(PROVIDE SIGNBOX UNIT)
1/2" = 1'-0"



PLAN

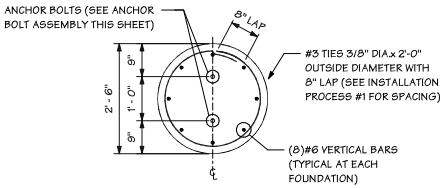
Plans need to be stamped by someone that has a WA. ST. seal. Page L

FOUNDATION PLAN
3/4" = 1'-0"



ELEVATION
(4 - REQUIRED)

ANCHOR BOLT ASSEMBLY
1 1/2" = 1'-0"



SECTION AT CAISSON
3/4" = 1'-0"

INSTALLATION SEQUENCE

1. OWNER TO PROVIDE UNDERGROUND POWER FEED TO THE SIGN IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS AND LOCAL CODES.
2. INSTALL FOUNDATION TO DETAILS SHOWN ON THIS DRAWING IN INSTALLATION PROCESS # 1, ANCHOR BOLTS SHALL BE SET TO CORRECT ELEVATION AND POSITION.
3. INSTALL SIGN BOX UNIT SHOWN IN INSTALLATION PROCESS # 2 BY LIFTING UNIT AND LOWERING UNIT TO ALIGN HOLES IN COLUMN BASE PLATES WITH ANCHOR BOLTS SHOWN IN INSTALLATION PROCESS # 1. GROUT UNDER BASE PLATE WITH NON-SHRINK GROUT.
4. COAT TOP OF ANCHOR BOLTS AND NUTS WITH ONE COAT OF RUSTPROOF PRIMER PAINT.
5. CONNECT UNDERGROUND POWER FEED TO SIGNBOX ELECTRICAL LEADS.
6. INSTALL ALUMINUM BASE COVER PER FABRICATORS DRAWINGS.
7. TAKE COMPLETION PHOTOGRAPHS OF SIGN, DEALERSHIP, AND RESTORED SITE AT FOUNDATION. OBTAIN SIGNATURE AND ANSWER TO QUESTIONNAIRE FROM DEALERSHIP REPRESENTATIVE.

FOUNDATION NOTES:

1. FOUNDATIONS ARE DESIGNED FOR A MAXIMUM SOIL BEARING PRESSURE OF 2000 PSF AND A MAXIMUM LATERAL PRESSURE OF 150 PSF/FT OF DEPTH WITH A FACTOR OF SAFETY AGAINST OVERTURNING OF 1.5. IF SOIL CONDITIONS APPEAR UNSUITABLE, THE BEARING CAPACITY SHALL BE VERIFIED BY EXPLORATION.
2. ALL CONCRETE SHALL BE A MINIMUM OF 5 1/2 BAGS OF CEMENT PER CUBIC YARD. (EQUIVALENT TO 3000 PSI COMPRESSIVE STRENGTH AT 28 DAYS)

"SEALED FOR STRUCTURAL COMPONENTS ONLY"

DATE	ISSUED FOR	APPROVED

FORD MOTOR COMPANY
DEALERSHIP REAL ESTATE OFFICE
DEARBORN MICHIGAN
FORD PROJ. NO.

DEALERSHIP IDENTIFICATION PROGRAM

DRAWING TITLE:
FOUNDATION DETAILS, COLUMN DETAILS AND INSTALLATION DRAWING

RBA STRUCTURAL ENGINEERING, LLC
CONSULTING STRUCTURAL ENGINEERS
227 French Landing Drive, Suite 500
NASHVILLE, TN. 37228 PHONE (615) 329-1300

DATE:	7/2/20	DRAWN BY:	DLP
CHECKED BY:	EOS	APPROVED BY:	EOS
COORD. BY:		JOB NO.	204638

SIGN MODEL
V = 160MPH LN-P6 (NEW INSTALL) 2015 IBC ASCE 7-10

DRAWING NO. 204638-P6 SHEET NO. 1

RBA STRUCTURAL ENGINEERING, LLC
CONSULTING STRUCTURAL ENGINEERS
227 French Landing Dr., Suite 500
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Crest Lincoln of Woodbridge

185 Amity Road
Woodbridge, CT 06525

RBA Job No. 20 4638

CALCULATIONS FOR:
LN-P6

Designed in accordance with:
2015 International Building Code
ASCE 7-10
Wind Velocity: 160 mph

Need to use the 2018 IBC and current ASCE 7-16 standard for all calcs and references. Pages in calc. package.

Plans need to be stamped by someone that has a WA. ST. seal.

FABRICATOR
Architectural Graphics, Inc.
2655 International Parkway
Virginia Beach, Virginia 23452

DESIGN ENGINEER
RBA Structural Engineering, LLC
227 French Landing Drive, Suite 500
Nashville, Tennessee 37228

CODES: 2015 International Building Code - Wind Loads per provisions of ASCE 7-16
2015 Aluminum Design Manual, Specification for Aluminum Structures
ACI 318, Building Code Requirements for Structural Concrete

SIGN DIMENSIONS:

Sign Length, B	Sign Depth, s	Left Column Offset, e	Distance Between Columns, l
12.563 ft.	**5.448** ft.	**1.734** ft.	**6.958** ft.

Overall Height, h	Column Height, c	Total Sign Area, A_{sign}
5.448 ft.	**5.448** ft.	**68.44** ft^2

MAIN COLUMN SECTION PROPERTIES:

Section: **6" Sch 40 Pipe**

A =	5.58	$in.^2$	I_x =	28.10	$in.^4$	J =	56.20	in^3	b =	**0.00**	in.
OD =	6.63	in.	S_x =	8.50	$in.^3$	R_b/t =	11.30		t =	**0.00**	in.
ID =	6.07	in.	r_x =	2.25	in.				$S_{x(eff)}$ =	8.50	in^3
t =	0.28	in.	Z_x =	11.30	$in.^3$				$Z_{x(eff)}$ =	11.30	in^3

Cover Plates: **Not Applicable**

MAIN COLUMN MATERIAL PROPERTIES:

Material: **6061-T6** Column Base Condition: **Welded**

F_{ty} =	15	ksi	E =	10100	ksi
F_{cy} =	15	ksi	k_t =	1	
F_{tu} =	24	ksi			

DEAD LOADS:

Sign Weight =	12	psf	Concrete =	150	pcf
Column Weight =	5.06	lb/ft	Soil =	90	pcf

Project	Lincoln	ROSS BRYAN ASSOCIATES, INC.	Sheet No.	3	of	6
Model	LN-P6 HW	CONSULTING ENGINEERS	Job No.	204628		
By	EOS	NASHVILLE, TN	Date	4/30/20		

CODES:

Wind Loads per provisions of ASCE 7-10, Chapter 29

SIGN DIMENSIONS:

Length, B = 12.563 ft. Height, s = 5.448 ft. OAH Above Grade, h = 5.448 ft.

Depth = 1.411 ft. A_{sign} = 68.4 ft^2

WIND LOADS:

Natural Frequency = 1 **RIGID STRUCTURE**

Exposure Category = C Risk Category = I

$q_h = 0.00256 * K_z * K_{zt} * K_d * V^2$ Velocity Pressure, ASCE 7-10, Section 29.3.2

K_z = 0.85 Velocity Pressure Exposure Coefficient, ASCE 7-10, Table 29.3-1

K_{zt} = 1.0 Topographic Factor, ASCE 7-10, Section 26.8.2

K_d = 0.85 Wind Directionality Factor, ASCE 7-10, Table 26.6-1

V = 160 Basic Wind Speed, mph, ASCE 7-10, Figure 26.5-1C

q_h = 47.35 lb/ft^2

$F/A = q_h * G * C_f$ Design Wind Loads, ASCE 7-10, Section 29.4.1

G = 0.85 Gust Effect Factor, ASCE 7-10, Section 26.9

B/s = 2.31 Length of Sign/Depth of Sign

s/h = 1.00 Depth of Sign/Overall Height

C_f = 1.39 Force Coefficient, ASCE 7-10, Figure 29.4-1

F/A = 56.04 lb/ft^2

CASE A: resultant acts normal to the sign face at a distance above the geometric center equal to 0.27'

CASE B: resultant acts normal to the sign face at a distance of 2.51' toward the windward edge and 0.27' above the geometric center

CASE C loading applies

LRFD Loading:

Use wind pressure = 56.04 lb/ft^2 for 1.0*W from ASCE 7-10, Section 2.3.2

ASD Loading:

Use wind pressure = 33.62 lb/ft^2 for 0.6*W from ASCE 7-10, Section 2.4.1

Project	Lincoln	ROSS BRYAN ASSOCIATES, INC.	Sheet No.	4	of	6
Model	LN-P6 HW	CONSULTING ENGINEERS	Job No.	204628		
By	EOS	NASHVILLE, TN	Date	4/30/20		

CHECK COLUMNS: 6" Sch 40 Pipe 6061-T6

LRFD Load Combinations: 1.2D + 1.0W — ASCE 7-10, Section 2.3

Resistance Factors: $\Phi_{b,T,V}$ = 0.9 — ADM, Sections F.1, G.1, H.2

Φ_b = 0.75 (Tensile Rupture) — ADM, Section F.1

Service Wind Load: Sign, P_w = 2.30 kips

Moment Arm: 3.00 ft.

Load Distribution to One Column (Case B):

Max= 100.00%

Service Moment at Base: Total: M = 6.90 k-ft

Single Col: M = 6.90 k-ft

Factored Moment at Base: Total M_u = 11.49 k-ft

Single Col: M_u = 11.49 k-ft

Flexure — ADM, Section F.6

Compressive Yielding Strength: $M_n = M_p = 1.17 * F_{cy} * S_x$ $\Phi_b M_n$ = 11.19 k-ft

Tensile Yielding Strength: $M_n = M_p = 1.17 * F_{ty} * S_x$ $\Phi_b M_n$ = 11.19 k-ft

Tensile Rupture Strength: $M_n = M_p = 1.24 * F_{tu} * S_x/k_t$ $\Phi_b M_n$ = 15.81 k-ft

Local Buckling - Upper Inelastic Buckling Controls: Mn = Fb Sx $\Phi_b M_n$ = 14.21 k-ft

M_u = 11.49 k-ft > $\Phi_b M_n$ = 11.19 k-ft **O.K. - within 5%**

Compression — ADM, Chapter E

Factored Axial Load: P_u = 1.05 kips

Compressive Strength:

P_u = 1.05 kips <= $\Phi_c P_n$ = 118 kips **O.K.**

Shear — ADM, Section G.3

Factored Shear at Base: V_u = 3.84 kips

Shear Strength: $V_n = F_s * A_g / 2$ V_n = 25.11 kips

V_u = 3.84 kips <= $\Phi_v V_n$ = 22.60 kips **O.K.**

Combined Torsion, Shear, Flexure and Axial Force — ADM, Section H.3.2

$[(P_u/\Phi P_n) + (M_u/\Phi M_n)] + [(V_u/\Phi V_n) + (T_u/\Phi T_n)]^2$ = 1.06 > 1.0 **O.K. -within 8% with 100% load**

Project	Lincoln	ROSS BRYAN ASSOCIATES, INC.	Sheet No.	5	of	6
Model	LN-P6 HW	CONSULTING ENGINEERS	Job No.	204628		
By	EOS	NASHVILLE, TN	Date	4/30/20		

CHECK WELD OF COLUMN TO BASE PLATE:

Resistance Factor for Welds: Φ = 0.75 ADM, Section J.2

Fillet weld size = 3/16 S_{weld} = 4.83 in^3

Wind Load and Moment: M_u = 11.49 k-ft P_{wu} = 3.84 kips

Transverse Load In Weld = (M_u/S_{weld})*(effective throat) = 3.78 kips/in

Longitudinal Load In Weld = $P_u/(L_{weld})$ = 0.18 kips/in

Total Load In Weld = Transverse + Longitudinal = 3.97 kips/in

Weld Design Strength, ΦR_n = 0.75* F_{sw} * L_{we} ADM, Section J.2.2.2

ΦR_n = 4.50 kips/in > 3.97 kips/in **O.K.**

CHECK BASE PLATE AND ANCHOR BOLTS:

LRFD Load Combinations: 1.2D + 1.0W ASCE 7-10, Section 2.3

Resistance Factors: Φ_b = 0.9 ADM, Section F.1

Φ_c = 0.65 ACI 318

Φ_{anchor} = 0.75 ACI 318

Base Plate Size: Length, N = 14 in. Width, B = 8 in. F_y = 36 ksi

Anchor Rods: No. of Bolts = 2 Anchor Spacing, B-dir. = 8 in.

Size of Bolts = 3/4 in. Anchor Spacing, N-dir. = 12 in.

ASTM Designation = A36 Edge Distance = 1 in.

Tensile Stress, F_u = 58 ksi Embedment = 20 in.

Wind Load Moment: M_u = 11.49 k-ft **Dead Load at Base:** P_{du} = 1.05 kips

Anchor Tension: T_u = 10.97 kips **Anchor Shear:** T_u = 1.92 kips

$\Phi_{anchor}*R_n = \Phi*0.75*F_u*A_{ts}$ = 14.41 kips > 10.97 kips **O.K.**

Plate Thickness: $t_{p(req)}$ = 1.12 in. **< 1-1/4" Provided** O.K.

USE 14 in. x 8 in. x 1 1/8 in. min. plate with 2 - 6/8 in. diameter A36 bolts.

Project	**Lincoln**	**ROSS BRYAN ASSOCIATES, INC.**	**Sheet No.**	**6**	of	**6**
Model	**LN-P6 HW**	**CONSULTING ENGINEERS**	**Job No.**	**204628**		
By	**EOS**	**NASHVILLE, TN**	**Date**	**4/30/20**		

CHECK FOUNDATIONS:

LRFD Load Combinations: 1.2D + 1.0W ASCE 7-10, Section 2.3

Resistance Factors: Φ = 0.6 ACI 318
Φ = 0.75 ACI 318
Φ = 0.9 ACI 318

f'_c = 3000 psi
P_a = 150 psf/ft
q_a = 2000 psf Overburden = 0 ft

Total Wind Load: P_w = 2.30 kips

Total Service Moment at base: M = 6.90 k-ft

Circular Caisson Foundation:

Caissons/Column= **2** Diameter = **2.5** ft. Depth* = **5.25** ft.

$M_{(top\ of\ caisson)}$ = 6.90 k-ft * Including mow strip 8" below grade
Height to P_w, h = 3.00 ft.
Required Depth**, d = 5.05 ft. **O.K.** IBC 2015
** From Grade

Moment in Footing, M_u = 11.49 k-ft
Use **8** No. **6** Vertical Bars
Use No. 3 Ties at 12 inches o.c max.
Moment Capacity, ΦM_n = 176.06 k-ft > M_u = 11.49 k-ft **O.K.**