

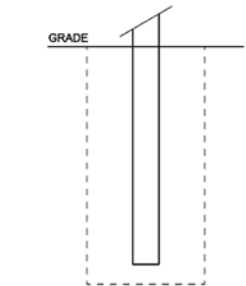
6" Sch 40, 6.625" Dia, 0.28" wall, A53 35 ksi Steel Column, S=7.82 M=13.7
5" Sch 80, 5.563" Dia, 0.375" wall, A53 35 ksi Steel Column, S=6.84 M=12
5" Dia, 0.375" wall, A500 42 ksi HSS Steel Column, S=5.55 M=11.7

NOT TO SCALE

Acceptable Sign Support Columns

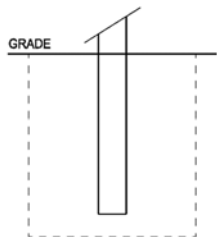
direct_embed type foundation

Grade offset (ft)



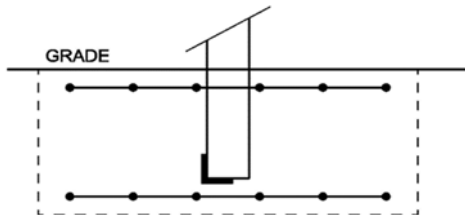
Drilled Shaft Foundation

3' dia x 5.3' deep
or 2.5' dia x 5.6' deep
or 2' dia x 6.2' deep



Cube Foundation

4.1' cube, L=W=D



Spread Foundation (Long is perpendicular to face)

6' long x 6' wide x 1.7' deep

#5, 12" OC each way, 2 mats, 3" from top and bottom, gentle bend around column

Weld 2' long 2" x 2" x 3/8" angle to bottom and side of column with 3/8" fillet weld all around

UNO, in 2500 psi or higher concrete, embed support columns, anchor bolts, and/or vertical rebar to 6" from bottom in drilled shaft and cube foundations, and to 3" from bottom in spread foundations.

North_Carolina, 2018 NORTH CAROLINA BUILDING CODE

2015 IBC with NC Amendments, Appendix H, ASCE 7-10

115 Wind Speed, Vult, mph, from ASCE 7-10, Figure 26.5

II Risk Category; I, Low; II, Normal; III, Substantial Hazard; IV, Essential/Critical

C Wind Exposure; C, House size obstructions for > 600 ft; D, no obstructions > 5000 ft

Sand, silty sand, clayey sand, silty gravel, clayey gravel

← Presumptive soil type

WIND LOAD CALC: ASCE 7-10 Section 29.4.1, Solid Freestanding Signs

Terrain $K_{zt}=1$, no hill, ridge, or escarpment >15' high; Directionality $K_d=0.85$; Gust $G=0.85$ rigid structure;

$K_z=2.01*(H/900)^{(2/9.5)}ExpC$, (700&11.5)ExpD; $q_{h,ult}=0.00256*K_z*K_{zt}*K_d*V_{ult}^2$

A	B	C	D	E	F	Sign Segment ID	OAH
12.0	6.0					Segment Top Above Grade, Top, ft	12.0
6.0	8.3					Segment Width, W, ft	6.7
6.0	6.0					Segment Height, H, ft	12.0
30.60	49.50					Segment Area, ft², adjusted for grade offset	
0.85	0.85					Velocity Pressure Exposure Coeff; K_z	
24.4	24.4					Velocity Pressure, $q_{h,ult}$, psf (per segment)	
1.75	1.45					Force Coefficient, C_f (per segment)	1.60
36.3	30.1					Wind Pressure, P_{ult} , psf = $q_{h,ult}*G*C_{f,seg}$	
21.8	18.1					Wind Pressure, P_{asd} , psf = $P_{ult}*0.6$	
0.7	0.9					Wind Force, F_{seg} , kips = $P_{asd}*Area_{seg}$	
6.2	3.0					Wind Moment M_{seg} kip*ft = $F_{seg}*(Top_{seg}*0.45*H_{seg})$	

"grade" = 0 ft

1.56 kip

Total Shear at Grade, $V = \text{Sum}(F_{seg})$

5.863734

9.2 kip.ft

Total Moment at Grade, $M = \text{Sum}(M_{seg})$

- Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
- Materials of construction: (Unless noted otherwise)
 - Structural steel (angles, shapes, plates, gussets): ASTM A-36, $F_y=36$ ksi.
 - HSS steel tubing: A-500, Grade B, Round $F_y=42$ ksi; Rectangular $F_y=46$ ksi.
 - Structural aluminum tubing: 6061-T6, or equivalent, $F_y = 18$ ksi at weld.
 - Structural pipe: A-53, Grade B, Type E or S, $F_y=35$ ksi.
 - Anchor bolts: ASTM F1554 Grade 36 with heavy hex at bottom, not "L or J" bolts.
 - Connection bolts: A-325, snug tight.
 - Rebar: ASTM 615, #6 or larger - Grade 60, #5 or smaller - Grade 40, 3" cover.
 - Concrete: 2500 psi, 28 days.
 - Provide coatings to prevent any possibility of corrosion.
- Welding design and fabrication according to AWS D1.1 (steel) or AWS D1.2 (aluminum).
- AWS certification required for all structural welders.
- Use D1.1 (steel) or D1.2 (aluminum) certified weld with same bending strength as column UNO.
- Embedded column acts as vertical reinforcement for drilled and cube foundations.
- Soil bearing capacity is Section 1806.2 Presumptive Load Bearing Value. Lateral bearing is doubled for sign poles per 1806.3.4. Soil choice types per Table 1806.2. Soil type must be applicable for entire foundation. Flat level grade and unsaturated soil matching presumptive soil type must be verified by sign installer.

Cube

L=W=D

Drilled Shaft Foundation,

Code Section 1807.3.2

laterally unconstrained at grade

4.1	3.0	2.5	2.0	Diameter, b, ft	(or length and width of cube)
4.1	5.2	5.6	6.1	Depth, D, ft	$D = 0.5*A\{1+[1+(4.36*H_{cent}/A)]^{.5}\}$
1.6	2.3	2.6	3.0	A term	$A = 2.34*F/(S1*b)$
405	520	559	611	S1 or S3	$S1 = 2*S_{soil}*D/3$

150

Soil Bearing Capacity, $S_{soil}=150$ psf/ft for Sand, silty sand, clayey sand, silty gravel, clayey gravel

Spread Foundation

Soil Bearing Capacity, $Q=2000$ psf for Sand, silty sand, clayey sand, silty gravel, clayey gravel

6.0 Length, L, ft

6.0 Width, W, ft

1.7 Depth, D, ft

2646 $Q_{bot} = 1.3*(Q+100pcf*(D-1))$

9.2 Total Weight, Wt , kips, $Wt = L * W * D * .15$ kips/ft3

1.2 Toe Length, Toe , ft, $Toe = Wt / (W * Q_{bot})$

2.6 Bearing Eccentricity, e , ft, $e = L / 2 - Toe / 3$

16.0 Overturning Capacity Calc, OT , kip.ft, $OT = Wt / e / 1.5$ safety

9.2



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This pdf file has been digitally signed. Printed copies are not considered signed and sealed. IdenTrust verifies my signature certificate when you click the date. Valid for one sign at this location, UNO.

This seal for structural engineering
(Support Column & Foundation ONLY)

SCOPE OF WORK: Design sign support column and foundation to meet structural requirements of building code based on stated (not verified) site factors and size & shape based on sign installer's drawing, attached.

By using this engineering the sign owner, manufacturer, and installer accept responsibility to: Design, build, and install sign cabinet, face, attachment, electrical, etc according to building, appendix h, sign, fire, UL, zoning codes. Verify site conditions match stated wind speed, risk, exposure, topo, and soil factors or request engineering revision.

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JOB # 250802

MONUMENT SIGN: 1 Column, Centered &
Embedded in Foundation

Advance Signs & Service, Inc.

42 Store All
94 Lunker Lane
Holly Springs, NC 27540

Job250802,Sign1,Sht1of1,Rev0,Day250825

