

Audi

**Audi Naperville
1527 Aurora Avenue, Naperville, IL 60540
Pylon Package**

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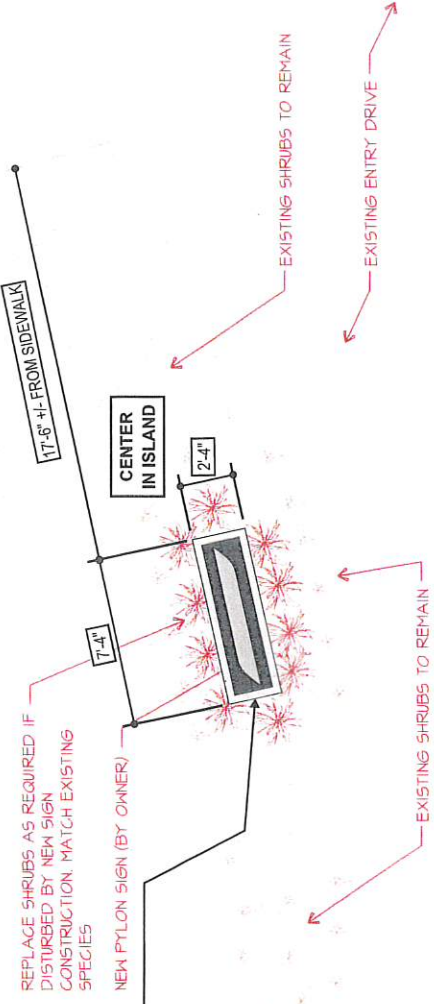
EXISTING SIDEWALK

EXISTING LIGHT POLE



Pylon Key Plan
Scale: N.T.S. @ 11x17

Sign #1
AP-6000
126.67 SqFt
Sheet 401



REPLACE SHRUBS AS REQUIRED IF DISTURBED BY NEW SIGN CONSTRUCTION. MATCH EXISTING SPECIES

NEW PYLON SIGN (BY OWNER)

CENTER IN ISLAND

EXISTING SHRUBS TO REMAIN

EXISTING ENTRY DRIVE

EXISTING SHRUBS TO REMAIN

Pylon Location Plan

Scale: 3/16"=1'-0" @ 11x17

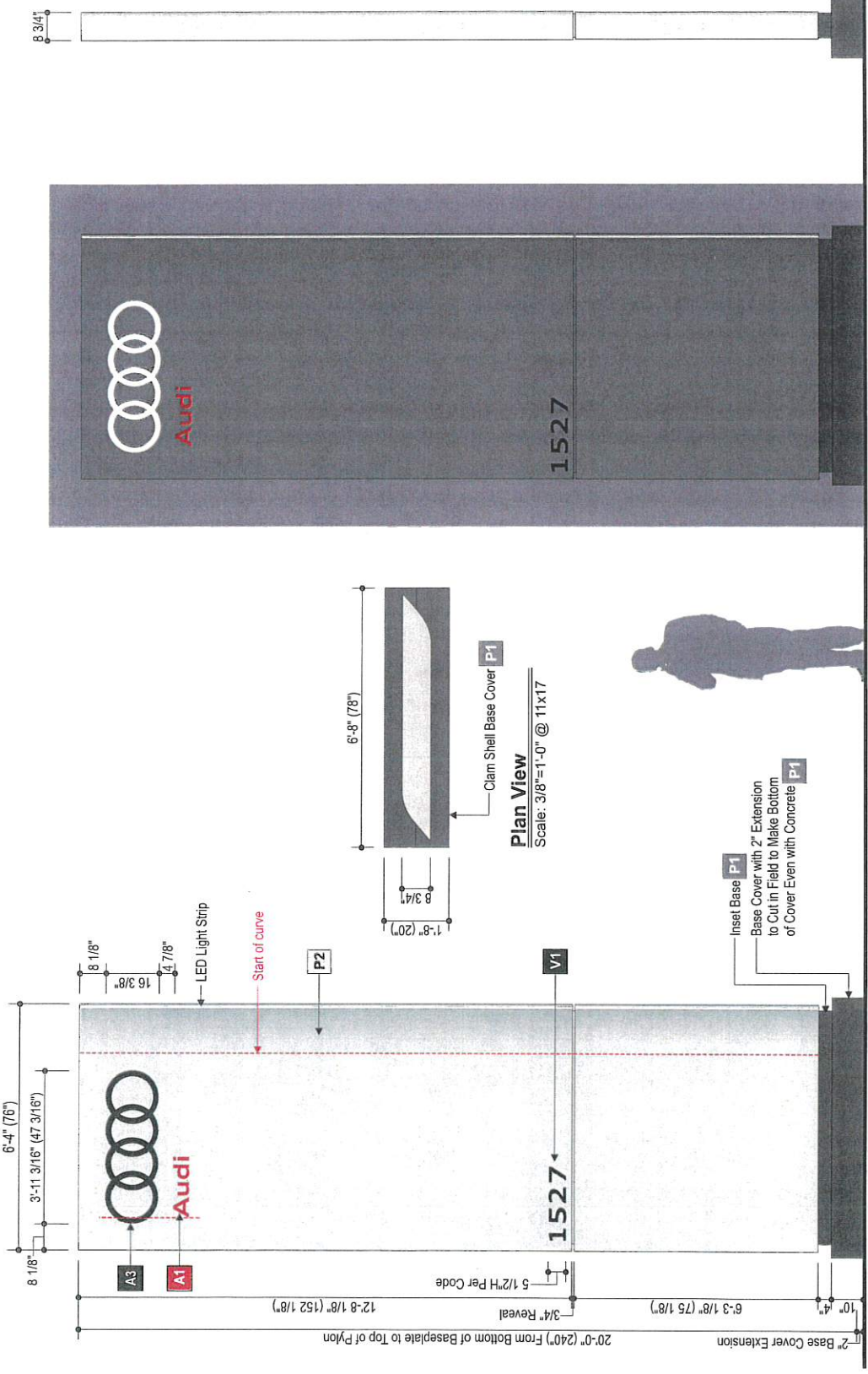
ALL NOTES IN RED ARE BY OTHERS
ONLY SIGN IS PROVIDED BY BIE

NEW FOOTING SUPPLIED BY BIE

NOTE: LANDSCAPE CONTRACTOR TO ENSURE ONE SQUARE FOOT OF LANDSCAPED AREA PER ONE SQUARE FOOT OF SIGN IS PROVIDED

		blair IMAGE ELEMENTS	
CLIENT: Audi Naperville (Pylon) LOCATION: 1527 Aurora Avenue, Naperville, IL 60540 BLAIR PROJECT #: 100201 BLAIR SALES ORDER #: 70848 DATE: 03.22.23		Blair Image Elements 5107 Kessel Avenue Altona, PA 16601 P: (814) 949.8287 blairimage.com	
SHEET CALLOUT 102		CUSTOMER APPROVAL <input type="checkbox"/> Approved <input type="checkbox"/> Approved as Noted <input type="checkbox"/> No Approval/Change	
PAGE NUMBER: 3 DRAWN BY: DJG		THESE DRAWINGS ARE NOT FOR CONSTRUCTION PURPOSES. THE INFORMATION CONTAINED HEREIN IS INTENDED TO EXPRESS DESIGN INTENT AND IS NOT TO BE USED FOR CONSTRUCTION. BLAIR IMAGE ELEMENTS, INC. CANNOT BE HELD RESPONSIBLE FOR ANY REPRODUCTION, COPIED OR OTHERWISE, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING WRITTEN CONSENT FROM BLAIR IMAGE ELEMENTS.	
REV DESCRIPTION DATE BY		DATE BY	
A ADDED PYLON DETAILS 03.20.23 DJG		DATE BY	
B ADDED SITE PLAN WISE BACK 03.20.23 DJG		DATE BY	
C REVISED SITE MAP/ADDED PLAT PLAN 09.20.23 DJG		DATE BY	

AP-6000 PYLON SIGN	
AP-6000/ADIDK00010A	
Sign #1	
Approx Weight: 2000 Lbs	
Finish Specifications	
P1	Dark Grey Mica D5 703
P2	RAL 9006 Silver (30% Matt)
Plexiglas Specifications	
A1	Plexiglas G5 Red 3H67
A3	Plexiglas LED Black & White 9H00T GT
Vinyl Specifications	
V1	4500-03 Black Vinyl
Electrical	
RED LEDs "Audi"	
7500k White Led's (Rings)	
Max. Amps Req'd: 4.8 (TB V1)	
Voltage Req'd: 120V-277V	
PRIMARY CIRCUIT AND FINAL CONNECTION BY OTHERS	



Front/Rear Elevation
Scale: 3/8"=1'-0" @ 11x17

Side Elevation
Scale: 3/8"=1'-0" @ 11x17

Front/Rear Night View
Scale: 3/8"=1'-0" @ 11x17

		CLIENT: Audi Naperville (Pilot) LOCATION: 1527 Aurora Avenue, Naperville, IL 60540 BLAIR PROJECT #: 100201 BLAIR SALES ORDER #: 70848 DATE: 03.22.23	
		SHEET CALLOUT 401 PAGE NUMBER: 5 DRAWN BY: DJG	
REVISIONS		DESCRIPTION	
REV	DATE	BY	
A	03.28.23	DJG	ADDED PYLON DETAILS
B	03.30.23	DJG	ADDED SITE PLAN W/SETBACK
C	03.28.23	DJG	REVISED SITE IMPADDED PLAT PLAN

CUSTOMER APPROVAL

Approved
 Approved as Noted
 Noted with Changes

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File : Blair1078b.mcd

Site : Audi Naperville
 1527 Aurora Avenue
 Naperville, Illinois 60540

Sign Type : 20'-2" overall height, including bottom trim, x 6'-4" wide monolith ID sign with twin poles on caisson footings.
 Drawing No. 2310051 rev. A

Design wind load is based on the 2018 International Building Code (ASCE 7-16) using Exposure C and 115 mph wind speed.

Design Wind Speed : (mph.) $V := 115.0$ Based on Risk Category II

Velocity Pressure Coefficient at a Height of Less Than 20', Exposure C : $Kz := 0.94$ Based on Table 29.3-1

Topographic Factor : $Kzt := 1.00$ Based on Table 26.8-1

Wind Directionality Factor : $Kd := 0.95$ Based on Table 26.6-1

Velocity Pressure : (PSF) $qz := 0.00256 \cdot Kz \cdot Kzt \cdot Kd \cdot V^2$ $qz = 30.233$ Based on 29.3-1

For Figure 29.4-1

Overall Height : (ft.) $h := 20.17$ Overall Width : (ft.) $B := 6.33$

Where 's' equals 'h' $s := 20.17$

$$\frac{s}{h} = 1 \quad \frac{B}{s} = 0.314$$

Force Coefficient : $Cf := 1.61$ Based on Figure 29.4-1

Gust Effect Factor : $G := 0.85$ Based on 26.9.4 for Other Structures

ASD Conversion Factor : $LCF := 0.60$

Design Pressure : (PSF) $F := qz \cdot Cf \cdot G \cdot LCF$ $F = 24.825$ Use : $WL := 24.9$

Reference : Manual of Steel Construction, AISC 13th Edition.

Tube : ASTM A-500 Gr. B $Fy = 46.0$ ksi. ; $Fb = 30.36$ ksi. ; $Fv = 18.40$ ksi.

Plate : ASTM A-36 $Fy = 36.0$ ksi. ; $Fb = 27.00$ ksi. ; $Fv = 14.40$ ksi.

Anchor Bolts : ASTM F-1554 Gr. 36 $Fu = 58.0$ ksi. ; $Ft = 19.14$ ksi. ; $Fv = 14.40$ ksi.

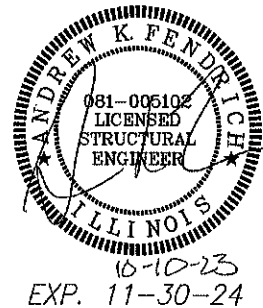
Reference : American Concrete Institute, Code 318.14

Rebar : ASTM A-615 Grade 60 $Fy = 60.0$ ksi.

Concrete : 3,000 psi. compressive strength at 28 days.

Design Loads at Grade :

Shear : (lbs.) $ShrGrd := (20.17 \cdot 6.33 \cdot WL)$ $ShrGrd = 3179.135$



$$\text{Moment : (ft.lbs.) } MtGrd := ShrGrd \cdot \left(\left(\frac{20.17}{2} \right) + (0.05 \cdot 20.17) \right) \quad MtGrd = 35267.733$$

Design of Pole Structures at Grade :

$$\text{Section Modulus of Tube : (in.}^3\text{) } HSS 5-1/2" \times 5-1/2" \times 5/16" \text{ wall - } TubeSM := 9.43$$

$$\text{Moment per Pole : (ft.lbs.) } MtPoleGrd := \frac{MtGrd}{2} \quad MtPoleGrd = 17633.866$$

$$\text{Bending Stress : (psi.) } f_b := \frac{MtPoleGrd \cdot 12}{TubeSM} \quad f_b = 22439.703$$

$$\text{Area of Tube : (in.}^2\text{) } HSS 5-1/2" \times 5-1/2" \times 5/16" \text{ wall - } TubeArea := 5.85$$

$$\text{Shear per Pole : (lbs.) } ShrPoleGrd := \frac{ShrGrd}{2} \quad ShrPoleGrd = 1589.567$$

$$\text{Shear Stress : (psi.) } f_v := \frac{ShrPoleGrd}{TubeArea} \quad f_v = 271.721$$

$$\text{Unity Check - Poles : } UCPoles := \frac{f_b}{30360} + \frac{f_v}{18400} \quad UCPoles = 0.754 < 1.00 \quad \text{OK}$$

Design of Anchor Bolts at Grade :

$$\text{Anchor Bolt Diameter : (in.) } AncBlDia := 1.00$$

$$\text{Stress Area : (in.}^2\text{) } AncBltArea := \frac{\pi \cdot AncBlDia^2}{4} \quad AncBltArea = 0.785$$

(Based on nominal diameter per AISC 4-3)

$$\text{Allowable Tension : (lbs.) } AllwTen := 19140 \cdot AncBltArea \quad AllwTen = 15033$$

$$\text{Allowable Shear : (lbs.) } AllwShr := 14400 \cdot AncBltArea \quad AllwShr = 11310$$

$$\text{Number of Anchor Bolts in Tension per Pole : } NoTen := 2$$

$$\text{Front to Back Distance Between Anchor Bolts : (in.) } LvrArm := 15.75$$

$$\text{Tension Load per Anchor Bolt : (lbs.) } TenAncBlt := \frac{MtPoleGrd \cdot 12}{NoTen \cdot LvrArm} \quad TenAncBlt = 6717.66$$

$$\text{Number of Anchor Bolts in Shear per Pole : } NoShr := 4$$

$$\text{Shear Load per Anchor Bolt : (lbs.) } ShrAncBlt := \frac{ShrPoleGrd}{NoShr} \quad ShrAncBlt = 397.39$$

$$\text{Unity Check : } UCAncBlts := \frac{TenAncBlt}{AllwTen} + \frac{ShrAncBlt}{AllwShr} \quad UCAncBlts = 0.482 < 1.00 \quad \text{OK}$$

Anchor Bolts

$$\text{Allowable Bond Stress : (lbs./ in.2)} \quad U := \left(\frac{1}{2} \right) \cdot \left(\frac{4.8 \cdot \sqrt{3000}}{\text{AncBltDia}} \right) \quad U = 131.453$$

$$\text{Development Length : (in.)} \quad Ld := \frac{\text{TenAncBlt}}{U \cdot \pi \cdot \text{AncBltDia}} \quad Ld = 16.267$$

$$\text{Embedment Length : (in.)} \quad \text{AncBltEmb} := 36 - 6.0 \quad \text{AncBltEmb} = 30$$

(36" overall length minus 6" of thread projection.)

$$\text{Unity Check :} \quad \text{UCABEmb} := \frac{Ld}{\text{AncBltEmb}} \quad \text{UCABEmb} = 0.542 < 1.00 \quad \text{OK}$$

Anchor Bolt Embedment

Use : Four (4) 1" Diameter x 36" long with 6" of top thread and 3" of bottom thread per pole.

Design of Base Plates at Grade :

$$\text{Plate Thickness : (in.)} \quad \text{PltThk} := 0.875 \quad \text{Plate Width : (in.)} \quad \text{PltWdth} := 18.875$$

$$\text{Transfer Distance : (in.)} \quad \text{PLS} := 4.71 \quad (\text{Measured in AutoCAD to gussets.})$$

$$\text{Minimum Thickness Required : (in.)} \quad \text{ReqdThk} := \sqrt{\left(\frac{\text{TenAncBlt} \cdot \text{NoTen} \cdot \text{PLS} \cdot 6}{(\text{PltWdth} \cdot 27000)} \right)}$$

$$\text{ReqdThk} = 0.863$$

$$\text{Unity Check - Base Plate :} \quad \text{UCBasePlt} := \frac{\text{ReqdThk}}{\text{PltThk}} \quad \text{UCBasePlt} = 0.986 < 1.00 \quad \text{OK}$$

Use : 3/4" thick x 18-7/8" x 18-7/8" base plates with four (4) 1-3/16" diameter holes on a 15-3/4" square bolt pattern with gussets.

Design of Caisson Footings :

$$\text{Overturning Moment per Footing : (ft.lbs.)} \quad \text{Ma} := \text{MtPoleGrd} \quad \text{Ma} = 17633.866$$

$$\text{Shear per Footing : (lbs.)} \quad \text{Va} := \text{ShrPoleGrd} \quad \text{Va} = 1589.567$$

$$\text{Applied Lateral Force : (lbs.)} \quad \text{P} := \text{Va} \quad \text{P} = 1589.567$$

$$\text{Allowable Lateral Soil Pressure : (lbs./ft.2 per ft.)} \quad \text{LP} := 250$$

$$\text{Diameter of Round Footing : (ft.)} \quad \text{bl} := 2.5$$

$$\text{Distance in Feet From Ground Surface} \quad \text{h} := \frac{\text{Ma}}{\text{Va}} \quad \text{h} = 11.094$$

to Point of Application of "P"

$$\text{Depth of Footing Below Grade : (ft.)} \quad \text{dl} := 6.5$$

$$\text{Allowable Lateral Soil Bearing Pressure Pursuant} \quad \text{Sl} := \text{dl} \cdot \frac{(\text{LP} \cdot 1.33)}{3} \quad \text{Sl} = 720.417$$

to the 2018 International Building Code Section 1807.3.2.1 and Table 1806.2.

$$A := 2.34 \cdot \frac{P}{S1 \cdot b1}$$

$$A = 2.065$$

$$d2 := \left(\frac{A}{2} \right) \cdot \left(1 + \left(\sqrt{1 + 4.36 \cdot \frac{h}{A}} \right) \right) \quad d2 = 6.135 \leq d1 = 6.5 \quad \text{OK}$$

Check Tensile Stress in Footing :

Overturning Moment About Heel Point : (ft.lbs.) $Mh := Ma + (Va \cdot d1)$ $Mh = 27966.055$
Treat as a cantilever at bottom.

Compressive Strength of Concrete : (psi.) $fc := 3000$

Yield Strength of Rebar : (psi.) $fy := 60000$

Section Modulus of Footing : (in.3) $Sw := \frac{\pi \cdot (b1 \cdot 12)^3}{32}$ $Sw = 2650.719$

Tensile Stress in Concrete : (psi.) $ft := \left(\frac{Mh \cdot 12}{Sw} \right)$ $ft = 126.604$

Allowable Concrete Stress : (psi.) $\phi Ft := 0.65 \cdot (5 \cdot \sqrt{fc})$ $\phi Ft = 178.01 > ft = 126.604$

REBAR NOT REQUIRED FOR STRESS

Design of Temperature and Shrinkage Steel in Caisson :

Moment for USD Design : $Mu := 1.7 \cdot Mh$ $Mu = 47542.293$

$$d := ((b1 \cdot 12) \cdot .80) - 3 \quad d = 21$$

To Plot for " ju " : $coeff := \frac{Mu \cdot 12}{fc \cdot b1 \cdot 12 \cdot d^2}$ $coeff = 0.014$ $ju := 0.88$

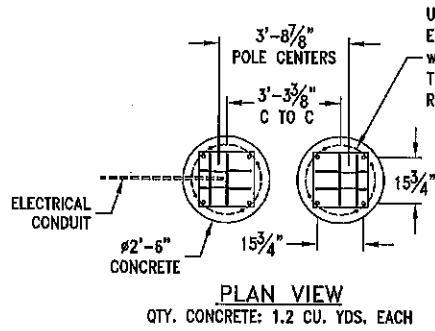
Required Area : (in.2) $As := \frac{Mu \cdot 12}{ju \cdot fy \cdot d \cdot 0.90}$ $As = 0.572$

Rebar Size : $Number := 5$

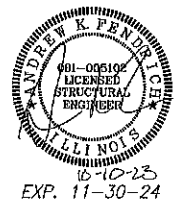
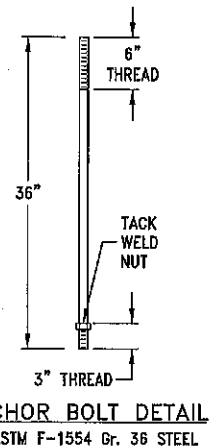
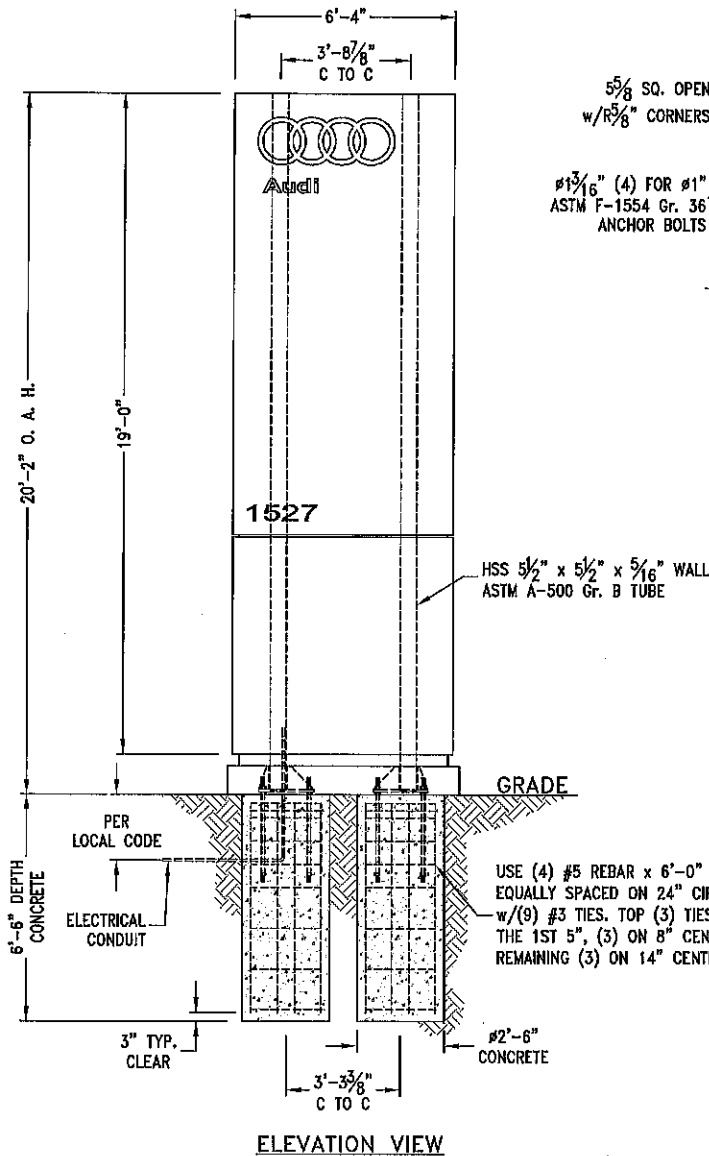
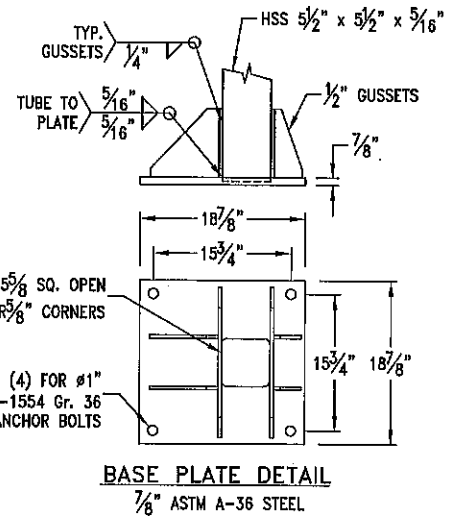
Rebar Area : (in.2) $Area := \frac{\pi \cdot \left(\frac{Number}{8} \right)^2}{4}$ $Area = 0.31$

Number Required : $\left(\frac{As}{Area} \right) \cdot 2 = 3.727$ Use four (4) #5 Rebar x 6'-0" LG. equally spaced on a 24" circle with nine (9) #3 Rebar ties. The top three (3) ties in the first 5", three (3) on 8" centers and the remaining three (3) on 14" centers.

Quantity of Concrete : (yds.3) $CY := \frac{\pi \cdot b1^2 \cdot d1}{4 \cdot 27}$ $CY = 1.182$ Each



USE (4) #5 REBAR x 6'-0" LG. EQUALLY SPACED ON 24" CIRCLE w/(9) #3 TIES. TOP (3) TIES IN THE 1ST 5", (3) ON 8" CENTERS, REMAINING (3) ON 14" CENTERS.



FOUNDATION DESIGN NOTES:

- Concrete shall have a minimum compressive strength of 3000 PSI at 28 days.
- Reinforcing steel shall be ASTM A-615 Gr. 60.
- Caisson footings designed using a soil bearing force of 250 PSF per foot Lateral. If these soil conditions do not exist, it is the Erector's responsibility to have a new base designed for the existing soil conditions by a Licensed Structural Engineer.
- Anchor bolts shall be ASTM F-1554 Gr. 36 steel.

DESIGN WIND LOAD:

Based on the 2018 International Building Code (ASCE 7-16) using Risk Category II, Exposure C and 115 mph wind speed.

SITE:
 Audi Naperville
 1527 Aurora Avenue
 Naperville, Illinois 60540

REV	DATE	DESCRIPTION	APPROVED
A	10 Oct 23	RELEASED FOR PERMITTING	J. HOGAN
Fendrich Engineering, Inc. 305 East Monroe Street, Springfield Illinois 62701 Robert-James & Associates, Inc. phone: 708-479-8385 fax: 708-479-8395 email: rja37@comcast.net			
TITLE 20'-2" OAH TWIN POLES FOR 19'-0" x 6'-4" MONOLITH ID SIGN			
DRAWN BY	A. HOGAN	DATE	10 Oct 23
CHECKED BY	J. HOGAN	DATE	10 Oct 23
SCALE	NONE	DRAWING NUMBER	2310051
SHEET	1 OF 1	REV.	A