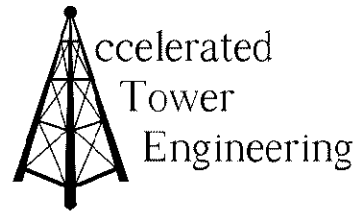




CONSTRUCTION SERVICES, LLC

Date: March 25, 2025

Ryan Guerrero
UCI2 Construction Services LLC
4751 Fox St
Denver, CO 80216
Ryang@uci2.net



Shawn D. Cook, P.E.
Accelerated Tower Engineering LLC
4710 Portofino Drive
Longmont, CO 80503
(479) 530-8627
shawn.cook@atowereng.com

Subject: Structural Modification Report
Carrier Designation: T-Mobile
Carrier Site Number: A1P0967C
Carrier Site Name: BLOOMINGTONDREDSMITH REPL
Engineering Firm Designation: ATE Project Number: 038920250008
Site Data: 10801 Bloomington Ferry Rd, Bloomington, MN 55438, Hennepin County
Latitude 44°48'23.5", Longitude -93°23'17.9"
74.208 Foot Monopole Tower

Dear Ryan Guerrero,

Accelerated Tower Engineering, LLC is pleased to submit this "**Structural Modification Report**" for the structural integrity of the existing tower structure. The purpose of the analysis is to determine the adequacy of the existing tower structure with the addition of proposed equipment as specified in the construction drawings Rev.0 prepared by UCI2, issued on 8/8/2024.

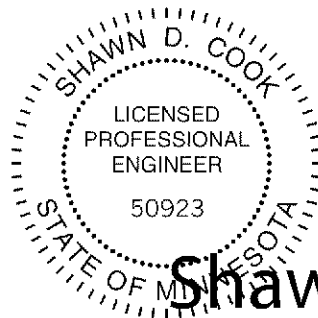
Analysis Results:

Modified Tower Stress Level with Existing + Proposed Equipment: 95.8% PASS
Existing Foundation Stress Level with Existing + Proposed Equipment: 58.0% PASS

We at Accelerated Tower Engineering, LLC appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully submitted,

Shawn D. Cook, P.E.
Structural Engineer
MN PE#: 50923



**Shawn D.
Cook, PE**

DN: cn=Shawn D. Cook, PE,
o=Accelerated Tower
Engineering, ou,
email=Shawn.Cook@atoweren
g.com, c=US
Date: 2025.03.25 14:39:06
-06'00'
Adobe Acrobat version: 11.0.23

1) ANALYSIS CRITERIA

This is a 74.2ft tower, mapped by Delta Oaks Group in November of 2024. The tower was originally designed for an unknown design code and wind speed.

Table 1 – Analysis Parameters

Parameter	Remarks
International Building Code	2018
TIA-222 Revision	TIA-222-H
Risk Category	II
Basic Wind Speed	109 mph
Exposure Category	C
Topographic Factor at Base	1.00
Ground Elevation Factor	0.97
Wind Speed with Ice	50 mph
Ice Thickness	1.50 in
Seismic S_s	0.048
Seismic S_1	0.030

Table 2 – Final Configuration Loading

Mount Elevation (ft)	Antenna Centerline (ft)	Quantity	Manufacture	Model	Feedlines	Notes
72.0	72.0	3	Commscope	FFVV-65B-R3-V1 w/ Mount Pipe		Proposed
		3	Nokia	AEHC w/ Mount Pipe		
		1	Tower Mounts	T-Arm Mount [TA 702-3]		
55.0	57.0	3	Nokia	AHFII	(2) Hybrid	Proposed
	55.0	1	Tower Mounts	Side Arm Mount [SO 104-3]		
	53.0	3	Nokia	AHLOB		

Table 3 – Removed Loading

Mount Elevation (ft)	Antenna Centerline (ft)	Quantity	Manufacture	Model	Feedlines	Notes
72.0	72.0	3	Generic	Panel Antenna (51"x12"x6.5")	(12) 7/8"	Existing - To Be Removed
	68.5	8	Generic	TME (10"x8.5"x2.4")		

2) ANALYSIS PROCEDURE

Table 4 – Documents Provided

Document	Remarks	Source
Tower Mapping	Delta Oaks Group (AGI24-22812-03), dated 11/8/2024	UCI2
Foundation Mapping	Delta Oaks Group (BGI24-22812-01), dated 10/10/2024	UCI2
Geotechnical Report	Delta Oaks Group (GEO24-22812-01), dated 11/11/2024	UCI2
Mount Analysis	UCI2 (A1P0967C), dated 8/14/2024	UCI2
Previous Analysis	Accelerated Tower Engineering (038920250007), dated 3/13/2025	On-File
Construction Drawings	UCI2 Rev.0, dated 8/8/2024	UCI2

2.1) Analysis Method

TNX Tower, a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in the appendices.

2.2) Assumptions

- 1) The tower was built, installed, and maintained in accordance with the manufactures' specifications and recommendations.
- 2) We have not performed a site visit to verify the tower member sizes or the antenna and coax loading. If the existing conditions are not represented accurately in this analysis we should be contacted immediately to evaluate the significance of the deviation(s).
- 3) No allowance was made for any damaged, missing, or corroded members. This analysis assumes that the tower and foundation have been maintained in accordance with the manufacturer's specifications.
- 4) This analysis verifies the adequacy of the main structural members of the tower, and provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.
- 5) Miscellaneous items such as mounts to support proposed equipment have not been designed or detailed as part of our scope of work.
- 6) The following material grades were assumed based on previous experience: Tower Shaft: A36, Flange Plates: A36, Flange Bolts: A325, Anchor Rods: F1554-55, Concrete: 3ksi compressive strength, Rebar: 60ksi yield strength

This analysis may be affected if any assumptions are not valid or have been made in error. Accelerated Tower Engineering, LLC should be notified immediately to determine the effect on the structural integrity of the structure.

3) RECOMMENDATIONS

The tower will have sufficient capacity to carry the existing and proposed loads once the proposed modifications in Appendix C are installed.

Appendix A

TNX Output

Feed Line Plan 29'

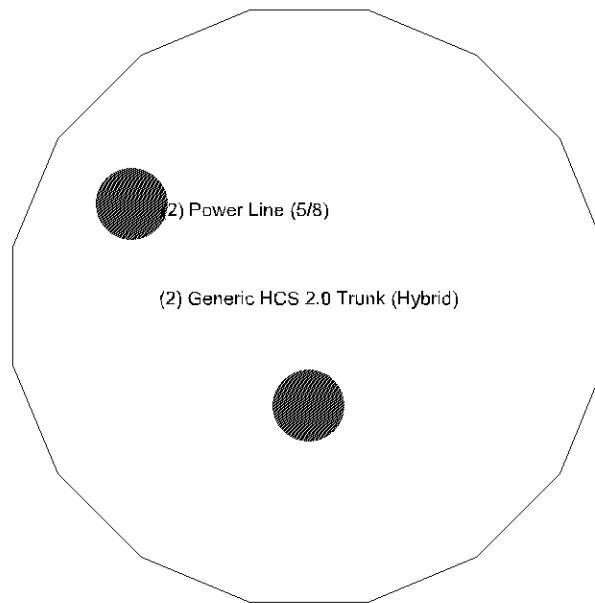
Round

Flat

App In Face

App Out Face

Section @ 29'



Accelerated Tower Engineering

4710 Portofino Drive
Longmont, CO 80503

Phone:

FAX:

Job: **A1P0967C**

Project: **Bloomingtonredscott Repl**

Client: T-Mobile

Drawn by: Ben Ude

App'd:

Code: TIA-222-H

Date: 03/17/25

Scale: NTS

Path:

Dwg No. E-7

C:\Users\ben\Documents\Projects\A1P0967C\Drawings\250317\A1P0967C.dwg

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Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Hennepin County, Minnesota.
- Tower base elevation above sea level: 840.000 ft.
- Basic wind speed of 109.000 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50.000 mph is used in combination with ice.
- Temperature drop of 5.000 °F.
- Deflections calculated using a wind speed of 60.000 mph.
- Non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Kz In Exposure D Hurricane Region Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric Distribute Leg Loads As Uniform Use Special Wind Profile | <ul style="list-style-type: none"> Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurtenances Alternative Appurt. EPA Calculation Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs Use ASCE 10 X-Brace Ly Rules | <ul style="list-style-type: none"> Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="padding-left: 20px;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
I.1	74.208-67.167	7.041	0.000	Round	12.750	12.750	0.375		A53-B-35 (35 ksi)

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	67.167-51.667	15.500	1.719	16	12.200	14.130	0.188	0.750	A36 (36 ksi)
L3	51.667-49.000	4.386	0.000	16	13.541	14.087	0.188	0.750	A36 (36 ksi)
L4	49.000-29.000	20.000	0.000	16	14.087	16.577	0.368	1.473	A36 [27.182] (27 ksi)
L5	29.000-0.000	29.000		16	16.577	20.188	0.490	1.960	A36 [26.763257] (27 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	J in ⁴	r in	C in	I/C in ³	J in ⁴	I _t Q in ²	w in	w/t
L1	12.750	14.579	279.335	4.377	6.375	43.817	558.670	7.285	0.000	0
	12.750	14.579	279.335	4.377	6.375	43.817	558.670	7.285	0.000	0
L2	12.402	7.185	130.980	4.276	6.222	21.051	263.944	3.553	2.055	10.958
	14.370	8.339	204.799	4.964	7.206	28.419	412.699	4.123	2.439	13.007
L3	13.988	7.987	179.923	4.754	6.906	26.054	362.571	3.949	2.322	12.381
	14.326	8.314	202.913	4.948	7.184	28.244	408.897	4.111	2.430	12.961
L4	14.291	16.116	383.176	4.884	7.184	53.335	772.155	7.968	2.071	5.623
	16.830	19.041	632.001	5.770	8.454	74.754	1273.571	9.415	2.566	6.968
L5	16.806	25.144	822.084	5.727	8.454	97.238	1656.616	12.432	2.324	4.743
	20.488	30.788	1509.169	7.013	10.296	146.580	3041.190	15.223	3.042	6.209

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _s	Weight Multi.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 74.208-67.167				1	1	1			
L2 67.167-51.667				1	1	1			
L3 51.667-49.000				1	1	1			
L4 49.000-29.000				1	1	0.985626			
L5 29.000-0.000				1	1	0.971883			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
** Safety Line 3/8	A	No	Surface Ar (CaAa)	67.000 - 10.000	1	1	0.500 0.500	0.375		0.220
Climbing Pegs	A	No	Surface Ar (CaAa)	67.000 - 10.000	1	1	0.500 0.500	0.350		0.220

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Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
**										
MOD PL1.00x6.00	A	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.500 0.500	6.000	14.000	0.000
MOD PL1.00x6.00	B	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.450 0.450	6.000	14.000	0.000
MOD PL1.00x6.00	A	No	Surface Af (CaAa)	30.500 - 0.000	1	1	-0.450 -0.450	6.000	14.000	0.000
MOD PL0.75x4.00	A	No	Surface Af (CaAa)	50.500 - 30.500	1	1	0.500 0.500	4.000	9.500	0.000
MOD PL0.75x4.00	B	No	Surface Af (CaAa)	50.500 - 30.500	1	1	0.450 0.450	4.000	9.500	0.000
MOD PL0.75x4.00	A	No	Surface Af (CaAa)	50.500 - 30.050	1	1	-0.450 -0.450	4.000	9.500	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A ₁ ft ² /ft	Weight plf
**									
Power Line (5/8)	A	No	No	Inside Pole	64.500 - 1.500	2	No Ice	0.000	0.220
							1/2" Ice	0.000	0.220
							1" Ice	0.000	0.220
							2" Ice	0.000	0.220
**									
Generic HCS 2.0 Trunk (Hybrid)	C	No	No	Inside Pole	55.000 - 1.500	2	No Ice	0.000	2.480
							1/2" Ice	0.000	2.480
							1" Ice	0.000	2.480
							2" Ice	0.000	2.480

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _B ft ²	A _F ft ²	C _A A ₁ In Face ft ²	C _A A ₁ Out Face ft ²	Weight K
L1	74.208-67.167	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	67.167-51.667	A	0.000	0.000	1.112	0.000	0.012
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.017
L3	51.667-49.000	A	0.000	0.000	2.193	0.000	0.002
		B	0.000	0.000	1.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.013
L4	49.000-29.000	A	0.000	0.000	29.417	0.000	0.018
		B	0.000	0.000	13.833	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.099
L5	29.000-0.000	A	0.000	0.000	59.378	0.000	0.020
		B	0.000	0.000	29.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.136

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Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_d A_d$ In Face ft ²	$C_d A_d$ Out Face ft ²	Weight K
L1	74.208-67.167	A	1.619	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	67.167-51.667	A	1.590	0.000	0.000	10.866	0.000	0.129
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.017
L3	51.667-49.000	A	1.565	0.000	0.000	4.844	0.000	0.051
		B		0.000	0.000	1.477	0.000	0.014
		C		0.000	0.000	0.000	0.000	0.013
L4	49.000-29.000	A	1.524	0.000	0.000	53.941	0.000	0.532
		B		0.000	0.000	19.930	0.000	0.185
		C		0.000	0.000	0.000	0.000	0.099
L5	29.000-0.000	A	1.377	0.000	0.000	85.816	0.000	0.728
		B		0.000	0.000	36.987	0.000	0.298
		C		0.000	0.000	0.000	0.000	0.136

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	74.208-67.167	0.000	0.000	0.000	0.000
L2	67.167-51.667	0.000	-0.534	0.000	-2.013
L3	51.667-49.000	1.260	1.576	0.945	0.134
L4	49.000-29.000	1.673	2.324	1.359	1.072
L5	29.000-0.000	2.182	3.056	1.839	2.082

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	2	Safety Line 3/8	51.67 - 67.00	1.0000	1.0000
L2	3	Climbing Pegs	51.67 - 67.00	1.0000	1.0000
L3	2	Safety Line 3/8	49.00 - 51.67	1.0000	1.0000
L3	3	Climbing Pegs	49.00 - 51.67	1.0000	1.0000
L3	13	MOD PL0.75x4.00	49.00 - 50.50	1.0000	1.0000
L3	14	MOD PL0.75x4.00	49.00 - 50.50	1.0000	1.0000
L3	15	MOD PL0.75x4.00	49.00 - 50.50	1.0000	1.0000
L4	2	Safety Line 3/8	29.00 - 49.00	1.0000	1.0000
L4	3	Climbing Pegs	29.00 - 49.00	1.0000	1.0000
L4	10	MOD PL1.00x6.00	29.00 - 30.50	1.0000	1.0000
L4	11	MOD PL1.00x6.00	29.00 - 30.50	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _o No Ice	K _o Ice
L4	12	MOD PL1.00x6.00	29.00 - 30.50	1.0000	1.0000
L4	13	MOD PL0.75x4.00	30.50 - 49.00	1.0000	1.0000
L4	14	MOD PL0.75x4.00	30.50 - 49.00	1.0000	1.0000
L4	15	MOD PL0.75x4.00	30.05 - 49.00	1.0000	1.0000
L5	2	Safety Line 3/8	10.00 - 29.00	1.0000	1.0000
L5	3	Climbing Pegs	10.00 - 29.00	1.0000	1.0000
L5	10	MOD PL1.00x6.00	0.00 - 29.00	1.0000	1.0000
L5	11	MOD PL1.00x6.00	0.00 - 29.00	1.0000	1.0000
L5	12	MOD PL1.00x6.00	0.00 - 29.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L3	13	MOD PL0.75x4.00	49.00 - 50.50	Manual	0.2500
L3	14	MOD PL0.75x4.00	49.00 - 50.50	Manual	0.2500
L3	15	MOD PL0.75x4.00	49.00 - 50.50	Manual	0.2500
L4	10	MOD PL1.00x6.00	29.00 - 30.50	Manual	0.4000
L4	11	MOD PL1.00x6.00	29.00 - 30.50	Manual	0.4000
L4	12	MOD PL1.00x6.00	29.00 - 30.50	Manual	0.4000
L4	13	MOD PL0.75x4.00	30.50 - 49.00	Manual	0.2500
L4	14	MOD PL0.75x4.00	30.50 - 49.00	Manual	0.2500
L4	15	MOD PL0.75x4.00	30.05 - 49.00	Manual	0.2500
L5	10	MOD PL1.00x6.00	0.00 - 29.00	Manual	0.4000
L5	11	MOD PL1.00x6.00	0.00 - 29.00	Manual	0.4000
L5	12	MOD PL1.00x6.00	0.00 - 29.00	Manual	0.4000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horiz Vert ft ft	Azimuth Adjustment	Placement ft	C _{dA_f} Front ft ²	C _{dA_s} Side ft ²	Weight K
**								
Lighting Rod [1/2" x 4']	C	From Leg	0.000 0.000 2.000	0.000	74.208	No Ice 0.200 1/2" Ice 0.613 1" Ice 0.945 2" Ice 1.465	0.200 0.613 0.945 1.465	0.003 0.006 0.011 0.029
**								
Horizontal Pipe [2 SCH40 x 2']	C	From Leg	1.000 -1.000 -5.000	0.000	64.500	No Ice 0.344 1/2" Ice 0.474 1" Ice 0.613 2" Ice 0.920	0.344 0.474 0.613 0.920	0.007 0.011 0.017 0.033

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	Client	T-Mobile	Designed by	Ben Ude

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C/A		Weight K
			Horz Lateral ft	Vert ft			Front ft ²	Side ft ²	
Horizontal Pipe [2 SCH40 x 2']	C	From Leg	1.000	0.000	64.500	No Ice	0.344	0.344	0.007
			1.000			1/2" Ice	0.474	0.474	0.011
			-5.000			1" Ice	0.613	0.613	0.017
						2" Ice	0.920	0.920	0.033
Horizontal Pipe [2 SCH40 x 5']	C	From Leg	1.000	0.000	64.500	No Ice	1.188	1.188	0.018
			-2.000			1/2" Ice	1.496	1.496	0.027
			-1.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
Horizontal Pipe [2 SCH40 x 5']	C	From Leg	1.000	0.000	64.500	No Ice	1.188	1.188	0.018
			2.000			1/2" Ice	1.496	1.496	0.027
			-1.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
Horizontal Pipe [2 SCH40 x 5']	C	From Leg	1.000	0.000	64.500	No Ice	1.188	1.188	0.018
			-2.000			1/2" Ice	1.496	1.496	0.027
			2.500			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
Horizontal Pipe [2 SCH40 x 5']	C	From Leg	1.000	0.000	64.500	No Ice	1.188	1.188	0.018
			2.000			1/2" Ice	1.496	1.496	0.027
			2.500			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
**									
FFVV-65B-R3-V1 w/ Mount Pipe	A	From Leg	2.000	0.000	72.000	No Ice	15.795	8.525	0.129
			2.000			1/2" Ice	16.525	9.818	0.243
			0.000			1" Ice	17.223	10.957	0.364
						2" Ice	18.554	12.873	0.639
FFVV-65B-R3-V1 w/ Mount Pipe	B	From Leg	2.000	0.000	72.000	No Ice	15.795	8.525	0.129
			2.000			1/2" Ice	16.525	9.818	0.243
			0.000			1" Ice	17.223	10.957	0.364
						2" Ice	18.554	12.873	0.639
FFVV-65R-R3-V1 w/ Mount Pipe	C	From Leg	2.000	0.000	72.000	No Ice	15.795	8.525	0.129
			2.000			1/2" Ice	16.525	9.818	0.243
			0.000			1" Ice	17.223	10.957	0.364
						2" Ice	18.554	12.873	0.639
AEHC w/ Mount Pipe	A	From Leg	2.000	0.000	72.000	No Ice	7.988	4.055	0.137
			-2.000			1/2" Ice	8.822	5.124	0.199
			0.000			1" Ice	9.570	6.046	0.266
						2" Ice	10.877	7.559	0.426
AEHC w/ Mount Pipe	B	From Leg	2.000	0.000	72.000	No Ice	7.988	4.055	0.137
			-2.000			1/2" Ice	8.822	5.124	0.199
			0.000			1" Ice	9.570	6.046	0.266
						2" Ice	10.877	7.559	0.426
AEHC w/ Mount Pipe	C	From Leg	2.000	0.000	72.000	No Ice	7.988	4.055	0.137
			-2.000			1/2" Ice	8.822	5.124	0.199
			0.000			1" Ice	9.570	6.046	0.266
						2" Ice	10.877	7.559	0.426
T-Arm Mount [TA 702-3]	C	None		0.000	72.000	No Ice	5.640	5.640	0.339
						1/2" Ice	6.550	6.550	0.429
						1" Ice	7.460	7.460	0.519
						2" Ice	9.280	9.280	0.699
**									
AHFII	A	From Leg	1.000	0.000	55.000	No Ice	3.222	1.367	0.071
			0.000			1/2" Ice	3.454	1.545	0.092
			2.000			1" Ice	3.694	1.729	0.117
						2" Ice	4.196	2.119	0.178
AHFII	B	From Leg	1.000	0.000	55.000	No Ice	3.222	1.367	0.071
			0.000			1/2" Ice	3.454	1.545	0.092
			2.000			1" Ice	3.694	1.729	0.117
						2" Ice	4.196	2.119	0.178

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C/A, Front ft²	C/A, Side ft²	Weight K	
AHFII	C	From Leg	1.000	0.000	55.000	2" Ice	4.196	2.119	0.178
			0.000			No Ice	3.222	1.367	0.071
			2.000			1/2" Ice	3.454	1.545	0.092
						1" Ice	3.694	1.729	0.117
AHL0B	A	From Leg	1.000	0.000	55.000	2" Ice	4.196	2.119	0.178
			0.000			No Ice	3.220	1.470	0.071
			-2.000			1/2" Ice	3.452	1.650	0.093
						1" Ice	3.692	1.837	0.119
AHL0R	B	From Leg	1.000	0.000	55.000	2" Ice	4.193	2.232	0.180
			0.000			No Ice	3.220	1.470	0.071
			-2.000			1/2" Ice	3.452	1.650	0.093
						1" Ice	3.692	1.837	0.119
AHL0R	C	From Leg	1.000	0.000	55.000	2" Ice	4.193	2.232	0.180
			0.000			No Ice	3.220	1.470	0.071
			-2.000			1/2" Ice	3.452	1.650	0.093
						1" Ice	3.692	1.837	0.119
Side Arm Mount [SO 104-3]	C	None		0.000	55.000	2" Ice	4.193	2.232	0.180
						No Ice	3.300	3.300	0.287
						1/2" Ice	4.130	4.130	0.317
						1" Ice	4.960	4.960	0.347
Mount Pipe [2 SCH40 x 6']	A	From Leg	0.500	0.000	55.000	2" Ice	6.620	6.620	0.407
			0.000			No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
Mount Pipe [2 SCH40 x 6']	B	From Leg	0.500	0.000	55.000	2" Ice	3.060	3.060	0.090
			0.000			No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
Mount Pipe [2 SCH40 x 6']	C	From Leg	0.500	0.000	55.000	2" Ice	3.060	3.060	0.090
			0.000			No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
						1" Ice	2.294	2.294	0.048
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft²	Weight K	
**											
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				2.000					1/2" Ice	2.875	0.035
				-4.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				-2.000					1/2" Ice	2.875	0.035
				-4.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				4.000					1/2" Ice	2.875	0.035
				0.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				2.000					1/2" Ice	2.875	0.035
				0.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				-2.000					1/2" Ice	2.875	0.035
				0.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				-4.000					1/2" Ice	2.875	0.035
				0.000					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				4.000					1/2" Ice	2.875	0.035
				3.500					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				2.000					1/2" Ice	2.875	0.035
				3.500					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				-2.000					1/2" Ice	2.875	0.035
				3.500					1" Ice	3.120	0.050
									2" Ice	3.610	0.079
Stadium Light (22")	C	Paraboloid w/o Radome	From Leg	2.000	0.000		64.500	1.830	No Ice	2.630	0.020
				-4.000					1/2" Ice	2.875	0.035
				3.500					1" Ice	3.120	0.050
									2" Ice	3.610	0.079

**

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead-1.0 Wind 0 deg - No Ice
3	0.9 Dead-1.0 Wind 0 deg - No Ice
4	1.2 Dead-1.0 Wind 90 deg - No Ice
5	0.9 Dead-1.0 Wind 90 deg - No Ice
6	1.2 Dead-1.0 Wind 180 deg - No Ice
7	0.9 Dead-1.0 Wind 180 deg - No Ice
8	1.2 Dead-1.0 Wind 270 deg - No Ice
9	0.9 Dead-1.0 Wind 270 deg - No Ice
10	1.2 Dead+1.0 Ice+1.0 Temp
11	1.2 Dead-1.0 Wind 0 deg+1.0 Ice+1.0 Temp
12	1.2 Dead-1.0 Wind 90 deg+1.0 Ice+1.0 Temp
13	1.2 Dead-1.0 Wind 180 deg+1.0 Ice+1.0 Temp
14	1.2 Dead-1.0 Wind 270 deg+1.0 Ice+1.0 Temp
15	Dead+Wind 0 deg - Service
16	Dead+Wind 90 deg - Service
17	Dead+Wind 180 deg - Service

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Comb. No.	Description
18	Dead+Wind 270 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	74.208 - 67.167	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	10	-4.488	0.675	-0.387
			Max. Mx	8	-1.713	10.362	-0.087
			Max. My	6	-1.728	0.274	-10.169
			Max. Vy	4	2.607	-10.121	0.257
			Max. Vx	2	-2.488	-0.343	10.092
			Max. Torque	8			1.070
L2	67.167 - 51.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	10	-7.875	2.192	-1.190
			Max. Mx	4	-3.225	-59.065	8.928
			Max. My	2	-3.246	-14.429	55.939
			Max. Vy	4	4.641	-59.065	8.928
			Max. Vx	2	-4.351	-14.429	55.939
			Max. Torque	9			1.987
L3	51.667 - 49	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	10	-8.359	2.246	-1.187
			Max. Mx	4	-3.471	-79.698	12.376
			Max. My	2	-3.491	-20.033	75.303
			Max. Vy	4	4.768	-79.698	12.376
			Max. Vx	2	-4.479	-20.033	75.303
			Max. Torque	9			1.987
L4	49 - 29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	10	-11.252	2.492	-1.078
			Max. Mx	4	-5.130	-180.795	28.055
			Max. My	2	-5.142	-45.501	170.631
			Max. Vy	4	5.350	-180.795	28.055
			Max. Vx	2	-5.062	-45.501	170.631
			Max. Torque	9			1.986
L5	29 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	10	-16.644	2.716	-0.847
			Max. Mx	4	-8.713	-346.309	50.379
			Max. My	2	-8.713	-81.748	327.924
			Max. Vy	4	6.067	-346.309	50.379
			Max. Vx	2	-5.789	-81.748	327.924
			Max. Torque	9			1.983

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	12	16.644	-2.026	0.206
	Max. H _x	9	6.538	5.623	-0.045
	Max. H _z	2	8.718	-1.225	5.782
	Max. M _x	2	327.924	-1.225	5.782
	Max. M _z	4	346.309	-6.060	0.754

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. Torsion	9	1.981	5.623	-0.045
	Min. Vert	7	6.538	0.157	-5.398
	Min. H ₁	4	8.718	-6.060	0.754
	Min. H ₂	6	8.718	0.157	-5.398
	Min. M ₁	6	-302.918	0.157	-5.398
	Min. M ₂	8	-318.420	5.623	-0.045
	Min. Torsion	7	-1.426	0.157	-5.398

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _y K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	7.265	0.000	0.000	0.325	0.592	0.000
1.2 Dead-1.0 Wind 0 deg - No Ice	8.718	1.225	-5.782	-327.924	-81.748	-0.524
0.9 Dead-1.0 Wind 0 deg - No Ice	6.538	1.225	-5.782	-325.298	-81.220	-0.527
1.2 Dead-1.0 Wind 90 deg - No Ice	8.718	6.060	-0.754	-50.379	-346.309	0.728
0.9 Dead-1.0 Wind 90 deg - No Ice	6.538	6.060	-0.754	-50.041	-343.607	0.730
1.2 Dead-1.0 Wind 180 deg - No Ice	8.718	-0.157	5.398	302.918	11.276	1.423
0.9 Dead-1.0 Wind 180 deg - No Ice	6.538	-0.157	5.398	300.307	10.997	1.426
1.2 Dead-1.0 Wind 270 deg - No Ice	8.718	-5.623	0.045	3.442	318.420	-1.979
0.9 Dead-1.0 Wind 270 deg - No Ice	6.538	-5.623	0.045	3.315	315.594	-1.981
1.2 Dead+1.0 Ice+1.0 Temp	16.644	-0.000	0.000	0.847	2.716	0.000
1.2 Dead-1.0 Wind 0 deg+1.0 Ice+1.0 Temp	16.644	0.335	-1.950	-110.359	-20.850	-0.190
1.2 Dead-1.0 Wind 90 deg+1.0 Ice+1.0 Temp	16.644	2.026	-0.206	-13.665	-113.840	0.152
1.2 Dead-1.0 Wind 180 deg+1.0 Ice+1.0 Temp	16.644	-0.043	1.845	104.673	5.739	0.436
1.2 Dead-1.0 Wind 270 deg+1.0 Ice+1.0 Temp	16.644	-1.907	0.012	1.720	110.890	-0.494
Dead+Wind 0 deg - Service	7.265	0.332	-1.584	-89.347	-21.651	-0.143
Dead+Wind 90 deg - Service	7.265	1.660	-0.204	-13.370	-94.132	0.199
Dead+Wind 180 deg - Service	7.265	-0.043	1.480	83.028	3.446	0.388
Dead+Wind 270 deg - Service	7.265	-1.541	0.012	1.152	87.398	-0.540

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-7.265	0.000	0.000	7.265	0.000	0.000%
2	1.225	-8.718	-5.782	-1.225	8.718	5.782	0.000%
3	1.225	-6.538	-5.782	-1.225	6.538	5.782	0.000%
4	6.060	-8.718	-0.754	-6.060	8.718	0.754	0.000%
5	6.060	-6.538	-0.754	-6.060	6.538	0.754	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PY K	PY K	PZ K	PX K	PY K	PZ K	
6	-0.157	-8.718	5.398	0.157	8.718	-5.398	0.000%
7	-0.157	-6.538	5.398	0.157	6.538	-5.398	0.000%
8	-5.623	-8.718	0.045	5.623	8.718	-0.045	0.000%
9	-5.623	-6.538	0.045	5.623	6.538	-0.045	0.000%
10	0.000	-16.644	0.000	0.000	16.644	-0.000	0.000%
11	0.335	-16.644	-1.950	-0.335	16.644	1.950	0.000%
12	2.026	-16.644	-0.206	-2.026	16.644	0.206	0.000%
13	-0.043	-16.644	1.845	0.043	16.644	-1.845	0.000%
14	-1.907	-16.644	0.012	1.907	16.644	-0.012	0.000%
15	0.332	-7.265	-1.584	-0.332	7.265	1.584	0.000%
16	1.660	-7.265	-0.204	-1.660	7.265	0.204	0.000%
17	-0.043	-7.265	1.480	0.043	7.265	-1.480	0.000%
18	-1.541	-7.265	0.012	1.541	7.265	-0.012	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00021668
3	Yes	5	0.00000001	0.00009641
4	Yes	5	0.00000001	0.00007236
5	Yes	5	0.00000001	0.00003171
6	Yes	5	0.00000001	0.00031850
7	Yes	5	0.00000001	0.00015082
8	Yes	5	0.00000001	0.00042046
9	Yes	5	0.00000001	0.00019728
10	Yes	4	0.00000001	0.00002070
11	Yes	4	0.00000001	0.00083737
12	Yes	4	0.00000001	0.00080062
13	Yes	5	0.00000001	0.00024762
14	Yes	5	0.00000001	0.00028494
15	Yes	4	0.00000001	0.00011334
16	Yes	4	0.00000001	0.00024862
17	Yes	4	0.00000001	0.00060793
18	Yes	4	0.00000001	0.00088918

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _n	Kl/r	A	P _u	φP _s	Ratio
	j _i		j _i	j _i		in ²	K	K	$\frac{P_u}{\phi P_s}$
L1	74.208 - 67.167 (1)	TP12.75x12.75x0.375	7.041	0.000	0.0	14.579	-1.713	459.237	0.004
L2	67.167 - 51.667 (2)	TP14.13x12.2x0.188	15.500	0.000	0.0	8.211	-3.225	266.047	0.012
L3	51.667 - 49 (3)	TP14.087x13.541x0.188	4.386	0.000	0.0	8.314	-3.471	269.363	0.013

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Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _s K	Ratio P _u / φP _s
L4	49 - 29 (4)	TP16.577x14.087x0.368	20.000	0.000	0.0	19.041	-5.130	465.817	0.011
L5	29 - 0 (5)	TP20.188x16.577x0.49	29.000	0.000	0.0	30.788	-8.713	741.582	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio M _{ux} / φM _{ux}	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio M _{uy} / φM _{uy}
L1	74.208 - 67.167 (1)	TP12.75x12.75x0.375	10.363	150.794	0.069	0.000	150.794	0.000
L2	67.167 - 51.667 (2)	TP14.13x12.2x0.188	59.736	94.462	0.632	0.000	94.462	0.000
L3	51.667 - 49 (3)	TP14.087x13.541x0.188	80.653	96.847	0.833	0.000	96.847	0.000
L4	49 - 29 (4)	TP16.577x14.087x0.368	182.958	193.545	0.945	0.000	193.545	0.000
L5	29 - 0 (5)	TP20.188x16.577x0.49	349.955	373.662	0.937	0.000	373.662	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u K	φV _s K	Ratio V _u / φV _s	Actual T _v kip-ft	φT _v kip-ft	Ratio T _v / φT _v
L1	74.208 - 67.167 (1)	TP12.75x12.75x0.375	2.422	137.771	0.018	1.070	149.893	0.007
L2	67.167 - 51.667 (2)	TP14.13x12.2x0.188	4.707	79.814	0.059	0.731	96.081	0.008
L3	51.667 - 49 (3)	TP14.087x13.541x0.188	4.832	80.809	0.060	0.731	98.491	0.007
L4	49 - 29 (4)	TP16.577x14.087x0.368	5.407	139.745	0.039	0.729	198.623	0.004
L5	29 - 0 (5)	TP20.188x16.577x0.49	6.114	222.475	0.027	0.728	384.272	0.002

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P _u / φP _s	Ratio M _{ux} / φM _{ux}	Ratio M _{uy} / φM _{uy}	Ratio V _u / φV _s	Ratio T _v / φT _v	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	74.208 - 67.167 (1)	0.004	0.069	0.000	0.018	0.007	0.073	1.000	✓
L2	67.167 - 51.667 (2)	0.012	0.632	0.000	0.059	0.008	0.649	1.000	✓
L3	51.667 - 49 (3)	0.013	0.833	0.000	0.060	0.007	0.850	1.000	✓
L4	49 - 29 (4)	0.011	0.945	0.000	0.039	0.004	0.958	1.000	✓
L5	29 - 0 (5)	0.012	0.937	0.000	0.027	0.002	0.949	1.000	✓

tnxTower <i>Accelerated Tower Engineering</i> 4710 Portofino Drive Longmont, CO 80503 Phone: FAX:	Job A1P0967C	Page 13 of 13
	Project Bloomingtonredscott Repl	Date 11:41:01 03/17/25
	Client T-Mobile	Designed by Ben Ude

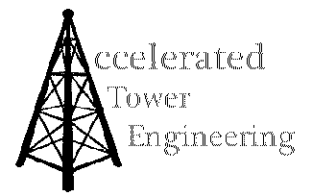
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ρP_{allow} K	% Capacity	Pass Fail
L1	74.208 - 67.167	Pole	TP12.75x12.75x0.375	1	-1.713	459.237	7.3	Pass
L2	67.167 - 51.667	Pole	TP14.13x12.2x0.188	2	-3.225	266.047	64.9	Pass
L3	51.667 - 49	Pole	TP14.087x13.541x0.188	3	-3.471	269.363	85.0	Pass
L4	49 - 29	Pole	TP16.577x14.087x0.368	4	-5.130	465.817	95.8	Pass
L5	29 - 0	Pole	TP20.188x16.577x0.49	5	-8.713	741.582	94.9	Pass
						Summary		
						Pole (L4)	95.8	Pass
						RATING =	95.8	Pass

Appendix B

Additional Calculations

Monopole



Shaft

Top Elevation (Ft)	Base Elevation (Ft)	Sides	Top Diameter (in)	Base Diameter (in)	Thickness (in)	Bend Radius (in)	Material
74.21	67.17	1	12.750	12.750	0.3750	1.500	A53-B-35
67.17	51.67	16	12.200	14.130	0.1875	0.750	A36
53.39	0.00	16	13.541	20.188	0.1875	0.750	A36

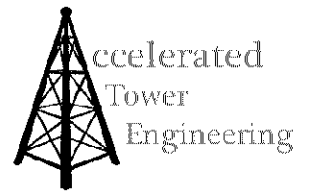
Reinforcement

Top Elevation (Ft)	Base Elevation (Ft)	Quantity	Reinforcement	Material
49.00	29.00	3	PL075040016GR65AJAX	A572-65
29.00	0.00	3	PL100060017GR65AJAX	A572-65

Overview:

Top Elevation (Ft)	Base Elevation (Ft)	Sides	Top Diameter (in)	Base Diameter (in)	TNX Thickness (in)	TNX Weight Mlt.	TNX Yield Strength (ksi)	Pole Ratio	Reinf. Ratio
74.21	67.17	1	12.750	12.750	0.3750	1.000	35.0	7.3%	0.0%
67.17	51.67	16	12.200	14.130	0.1875	1.000	36.0	64.1%	0.0%
53.39	49.00	16	13.541	14.087	0.1875	1.000	36.0	84.2%	0.0%
49.00	29.00	16	14.087	16.577	0.3683	0.986	27.2	95.5%	67.8%
29.00	0.00	16	16.577	20.188	0.4900	0.972	26.7	94.7%	58.5%

Flange Connection



Elevation (ft)

Connection Moment (kip-ft)

Connection Axial (kip)

Connection Shear (kip)

Flange Bolts

Quantity	Diameter (in)	Bolt Circle (in)	Material	eta	Unbraced Length (in)	Embedment (ft)	Embedment Material	Stress Ratio
<input type="text" value="8"/>	<input type="text" value="0.625"/>	<input type="text" value="24.75"/>	<input)"="" type="text" value="A325 (up to 1"/>	<input type="text" value="0.5"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text"/>	<input type="text" value="10.4%"/>

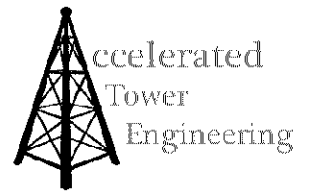
Upper Flange Plate

Plate Type	Outside Diameter (in)	Inside Diameter (in)	Thickness (in)	Corner Clip (in)	Material	Plate Stress Ratio
<input type="text" value="Ext FP"/>	<input type="text" value="30.00"/>	<input type="text" value="9.00"/>	<input type="text" value="0.7500"/>	<input type="text" value="0.0"/>	<input type="text" value="A36"/>	<input type="text" value="33.2%"/>

Lower Flange Plate

Plate Type	Outside Diameter (in)	Inside Diameter (in)	Thickness (in)	Corner Clip (in)	Material	Plate Stress Ratio
<input type="text" value="Ext FP"/>	<input type="text" value="30.00"/>	<input type="text" value="10.00"/>	<input type="text" value="0.5000"/>	<input type="text" value="0.0"/>	<input type="text" value="A36"/>	<input type="text" value="92.3%"/>

Flange Connection



Elevation (ft)

Connection Moment (kip-ft)	350.0
Connection Axial (kip)	8.7
Connection Shear (kip)	6.1

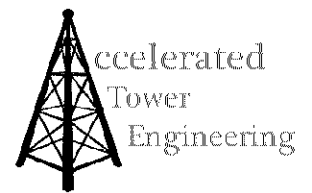
Flange Bolts

Quantity	Diameter (in)	Bolt Circle (in)	Material	eta	Unbraced Length (in)	Embedment (ft)	Embedment Material	Stress Ratio
12	1	23	F1554 GR 55	0.5	1	6		64.8%
4	1.75	31.25	A193 B7	0.5	1	5		31.4%

Upper Flange Plate

Plate Type	Outside Diameter (in)	Inside Diameter (in)	Thickness (in)	Corner Clip (in)	Material	Plate Stress Ratio
Rnd BP	27.00	20.19	1.2500	0.0	A36	21.7%

Pier Foundation



Pier Properties

Width (ft)	3.5
Shape	Round
Height Above Grade (ft)	0.5
Depth Below Grade (ft)	17

Collar Properties

Width (ft)	0
Length (ft)	0
Shape	Round
Depth Below Grade (ft)	0

Base Reactions

Moment (kip-ft)	350.0
Axial (kip)	8.7
Shear (kip)	6.1

Other Properties

Material	Concrete (3000psi)
Neglected Soil Depth (ft)	6.67
Water Depth (ft)	99

Soil Profile

Top Depth (Ft)	Base Depth (Ft)	Moist Density (pcf)	Internal Angle (deg.)	Cohesion (psf)
0.00	4.00	110	30.0	0
4.00	9.00	105	29.0	0
9.00	14.00	110	30.0	0
14.00	19.00	105	29.0	0
19.00	24.00	115	30.0	0
24.00	29.00	110	30.0	0
29.00	39.00	115	31.0	0
39.00	44.00	120	33.0	0
44.00	51.00	115	32.0	0

Rebar

Quantity	Type	Size	Rebar Length (ft)	Clear Cover (in)	Rebar Material	Embedment Material
18	Vertical Pier	7	17	3.5	A615-60	

Soil Results

Center of Rotation Depth (ft)	13.0
Pier Maximum Moment (kip-ft)	396
Soil Capacity Ratio	58.0%

Structure Capacity Ratio

Depth Below Grade (Ft)	Structure Capacity Ratio
7.29	50.0%

Appendix C

Modification Drawings

MONOPOLE REINFORCEMENT DRAWINGS

SITE INFORMATION

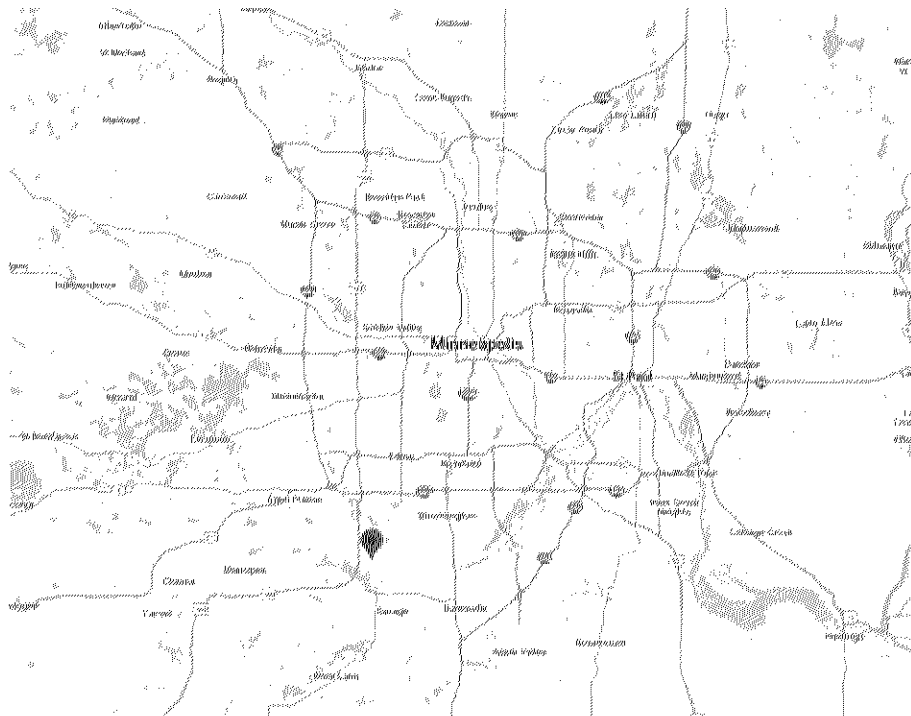
SITE NAME: Bloomingtonredscott Repl

SITE NUMBER: A1P0967C

SITE ADDRESS:

10801 Bloomington Ferry Rd

Bloomington, MN 55438, Hennepin County



PROJECT CONTACTS

1) TOWER OWNER

City of Bloomington
1800 W. Old Shakopee Rd
Bloomington, MN 55431

2) CONSTRUCTION MANAGER

Unknown

3) ENGINEER OF RECORD (EOR)

Shawn D. Cook, P.E.
4795308627
Shawn.Cook@atowereng.com
4710 Portofino Dr.
Longmont, CO 80503

TOWER INFORMATION

TOWER MANUFACTURER: Unknown
TOWER HEIGHT/TYPE: 74 FT
TOWER LOCATION: LAT: 44.8065
TOWER LOCATION: LONG: -93.3883
ATE ID: #: 038920250008

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING:

TIA CODE: TIA-222-H

BASIC WIND SPEED: 109

ICE THICKNESS: 1.50

WIND SPEED WITH ICE: 50

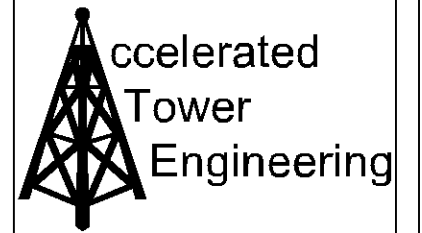
SERVICE LOAD WIND SPEED: 60

EXPOSURE CATEGORY: C

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	NOTES
S-4	NG2 BOLT NOTES AND DETAILS
S-5	FORGBOLT NOTES AND DETAILS
S-6	AJAX BOLT SPECIFICATIONS
S-7	BASE PLATE WELD DETAIL
S-8	ELEVATION
S-9	REINFORCEMENT LAYOUT
S-10	REINFORCEMENT DETAILS
S-11	EXTENSION DETAILS
S-12	DETAILS

General Notes



4710 Portofino Drive
Longmont, CO 80503
(479) 530-8627
www.atowereng.com

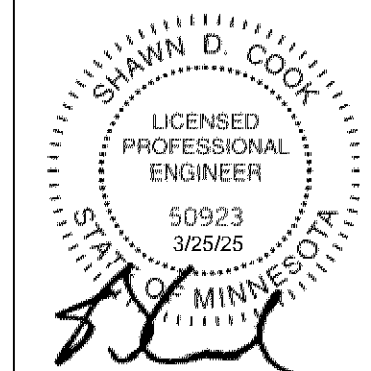
Report Prepared For:



CONSTRUCTION SERVICES, LLC

4751 Fox St
Denver, CO 80216

ENGINEER of RECORD SEAL



No.	Revision/Issue	Date
0	Construction	03/25/25

Project Name and Address

A1P0967C
Bloomingtonredscott Repl
10801 Bloomington Ferry Rd
Bloomington, MN 55438
Hennepin County

Sheet Title

TITLE
PAGE

Project 038920250008	Sheet S-1
Date 03/25/2025	
Drawn By: BU	Checked By: SC

MODIFICATION INSPECTION NOTES

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT THE EOR OR CONSTRUCTION MANAGER.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO THE EOR.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW THE FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, THE EOR SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF THE EOR CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH THE EOR TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

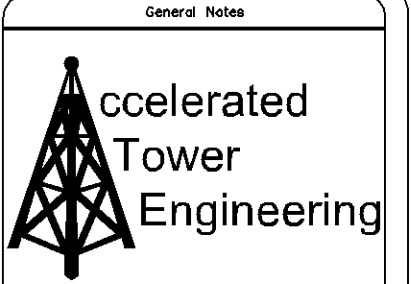
- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - WELD PREPARATION
 - BOLT INSTALLATION
 - FINAL INSTALLED CONDITION
 - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
 - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR APPROVAL
NA	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
None	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTORS CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
None	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING (S)
X	POST INSTALLED ANCHOR ROD PULL OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	
None	

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT



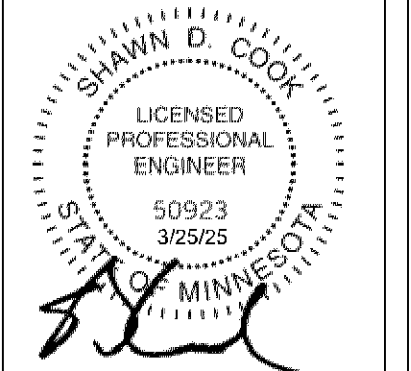
4710 Portofino Drive
Longmont, CO 80503
(479) 530-8627
www.atowereng.com

Report Prepared For:



4751 Fox St
Denver, CO 80216

ENGINEER of RECORD SEAL



No.	Revision/Issue	Date
0	Construction	03/25/25

Project Name and Address
A1P0967C
Bloomingtonredscott Repl
10801 Bloomington Ferry Rd
Bloomington, MN 55438
Hennepin County

**MODIFICATION
INSPECTION
CHECKLIST**

Project 038920250008	Sheet S-2
Date 03/25/2025	
Drawn By: BU	Checked By: SC

GENERAL NOTES

- ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
- THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
- THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE ENGINEER OF RECORD (EOR) AND FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
- USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS. UNO.
- ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, AISC, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
- STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
- STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
- DO NOT SCALE DRAWINGS.
- FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
- MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
- THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD.

STRUCTURAL STEEL NOTES

- DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO).
 - TIA-222: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
 - TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
 - AISC: MANUAL OF STEEL CONSTRUCTION
- ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO.
 - STRUCTURAL STEEL, ASTM A572 GRADE 65 (FY = 65KSI).
 - ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS.
 - ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
 - ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
- HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
- ALL FASTENERS SHALL NOT BE REUSED.
- A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.
- ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
- HOT-DIP GALVANIZE ALL ITEMS, UNO.
GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.

- AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES, AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND (2) COATS OF ZRC-BRAND (OR APPROVED EQUAL BY EOR) ZINC-RICH COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

WELDING NOTES

- ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL".
- ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
- ALL ARC WELDING SHALL BE DONE IN ACCORDANCE WITH A, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THE CONTRACTOR IS RESPONSIBLE FOR THE "CUTTING AND WELDING PLAN". THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.
- FOR ALL WELDING, USE E80XX ELECTRODES FOR SMAW PROCESS AND E8XT-XX ELECTRODES FOR FCAW PROCESS, UNO.
- SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.
- DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.
- DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
- FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
- PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.

FOUNDATION NOTES

- CONCRETE AND REINFORCEMENT INSTALLATION SHALL CONFORM TO THE MOST RECENT EDITION OF ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
- INSTALLATION OF CONCRETE DURING COLD WEATHER CONDITIONS SHALL BE PERFORMED IN ACCORDANCE WITH ACI 360.1-90 "STANDARD SPECIFICATION FOR COLD WEATHER CONCRETE."
- REINFORCEMENT SHALL BE DEFORMED AND CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60 UNLESS OTHERWISE NOTED. SPLICES IN REINFORCEMENT SHALL NOT BE ALLOWED UNLESS EXPLICITLY APPROVED IN WRITING BY THE ENGINEER OF RECORD.
- WELDING IS PROHIBITED ON REINFORCING STEEL AND ANCHORAGE.
- CONCRETE SHALL DEVELOPE A MINIMUM COMPRESSIVE STRENGTH OF AT LEAST 4000 PSI AT 28 DAYS.
- CONCRETE COVER FROM EXPOSED SURFACE OF CONCRETE TO SURFACE OF REINFORCEMENT SHALL NOT BE LESS THAN 3 INCHES. ALL REINFORCING SHALL BE EQUALLY SPACED UNLESS NOTED OTHERWISE.
- LOOSE MATERIAL SHALL BE REMOVED FROM BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT.
- CARE SHALL BE TAKEN DURING INSTALLATION OF DOWELS SO THAT EXISTING REINFORCING STEEL AND ANCHOR RODS ARE NOT DAMAGED. CONTRACTOR SHALL USE X-RAY OR OTHER ENGINEER APPROVED NON-DESTRUCTIVE MEANS TO LOCATE EXISTING REINFORCING STEEL AND ANCHOR RODS. CONTACT ENGINEER IMMEDIATELY IF EXISTING STEEL IS ENCOUNTERED.
- ALL EXISTING CONCRETE TO WHICH NEW CONCRETE WILL BE ATTACHED SHALL BE CLEANED OF ALL DIRT WITH A STIFF WIRE BRUSH AND COATED WITH A CONCRETE BONDING AGENT, WHERE THE NEW CONCRETE WILL BE PLACED.
- DOWEL HOLES MUST BE CLEANED BEFORE INSERTING EPOXY AND DOWELS. INSTALL DOWELS IN ACCORDANCE WITH THE EPOXY BEING USED.
- REINFORCING BARS SHALL BE TIED WITH TIE WIRE AT ALL INTERSECTIONS. REINFORCING MATS SHALL BE SUPPORTED BY CHAIRS AND STANDEES PLACED NO MORE THAN 48 INCHES ON CENTER.
- CONCRETE SHALL BE PLACED AS SOON AS PRACTICAL AFTER EXCAVATING TO AVOID DISTURBANCE OF BEARING AND SIDE WALL SURFACES.
- CONCRETE SHALL BE CONSOLIDATED BY VIBRATION.
- EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 INCH BY 3/4 INCH.
- STRUCTURAL BACKFILL MUST BE COMPACTED IN 6 INCH TO 12 INCH LOOSE LIFTS TO A 95% OF MAXIMUM DRY DENSITY AT WITHIN -2% TO +2% OF OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D1557. BACKFILL MUST BE CLEAN AND FREE OF ORGANIC AND FROZEN SOILS AND FOREIGN MATERIALS.
- WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS. THE FOUNDATION CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE LOCAL BUILDING OFFICIALS FOR ANY INSPECTIONS THAT MAY BE REQUIRED.
- SUMP PUMPS OR OTHER DE-WATERING EQUIPMENT MAY BE REQUIRED TO KEEP THE EXCAVATION DRY WHILE INSTALLING.
- EXCAVATING MAY BE DIFFICULT DUE TO SITE OBSTRUCTIONS. THE CONTRACTOR SHALL EMPLOY ALL NECESSARY MEASURES TO PROTECT EXISTING STRUCTURES, FOUNDATIONS AND UTILITIES DURING EXCAVATION AND CONSTRUCTION OF THE FOUNDATION.

**DETAIL DRAWINGS SHALL GOVERN
OVER ANY VARIANCE FROM THIS SHEET**

General Notes



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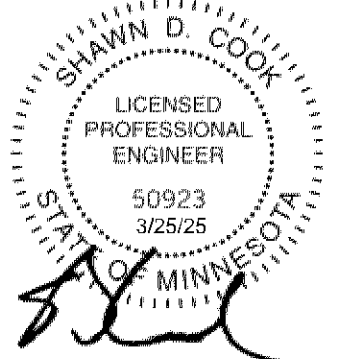
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UCI²
CONSTRUCTION SERVICES, LLC

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Denver, CO 80216

ENGINEER of RECORD SEAL



No.	Revision/Issue	Date
0	Construction	03/25/25

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NOTES

Project 038920250008	Sheet S-3
Date 03/25/2025	
Drawn By: BU	Checked By: SC

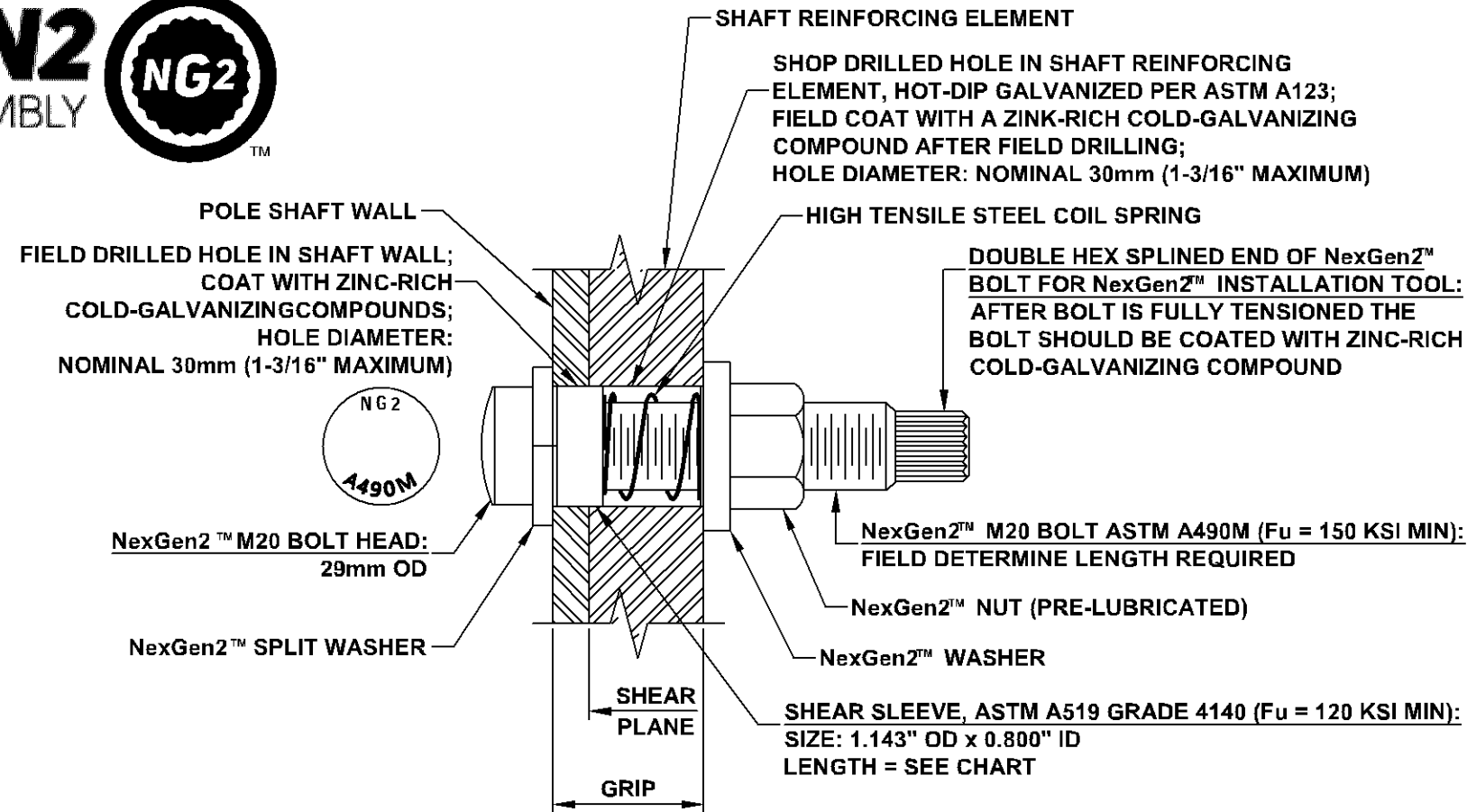
NEXGEN2

BLIND BOLT ASSEMBLY

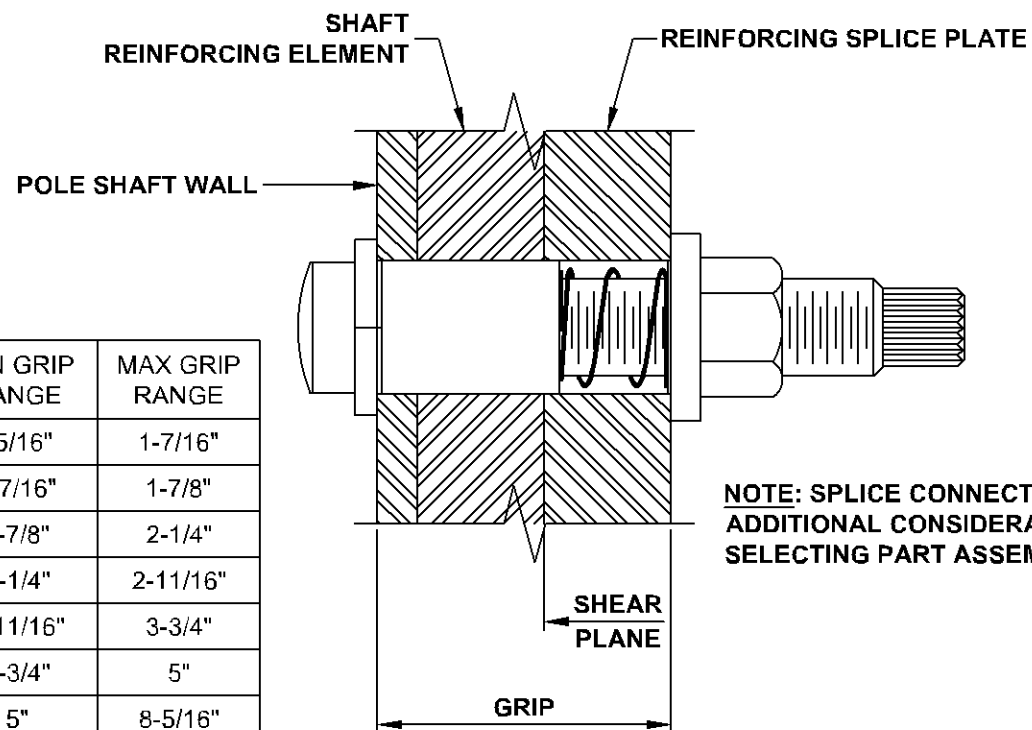
- PATENT PENDING -



INTERIOR OF POLE SHAFT EXTERIOR OF POLE SHAFT



TYPICAL **NG2** BOLT DETAIL



PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

NOTES:

- ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
- NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.
- INSTALL PER MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER:

ALLFASTENERS
959 LAKE ROAD
MEDINA, OHIO, USA 44256
PHONE: 440-232-6060
WEBSITES: WWW.ALLFASTENERS.COM WWW.AFTOWER.COM

General Notes



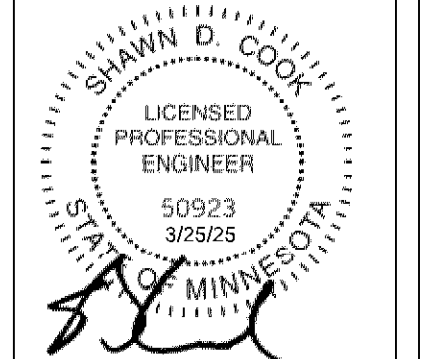
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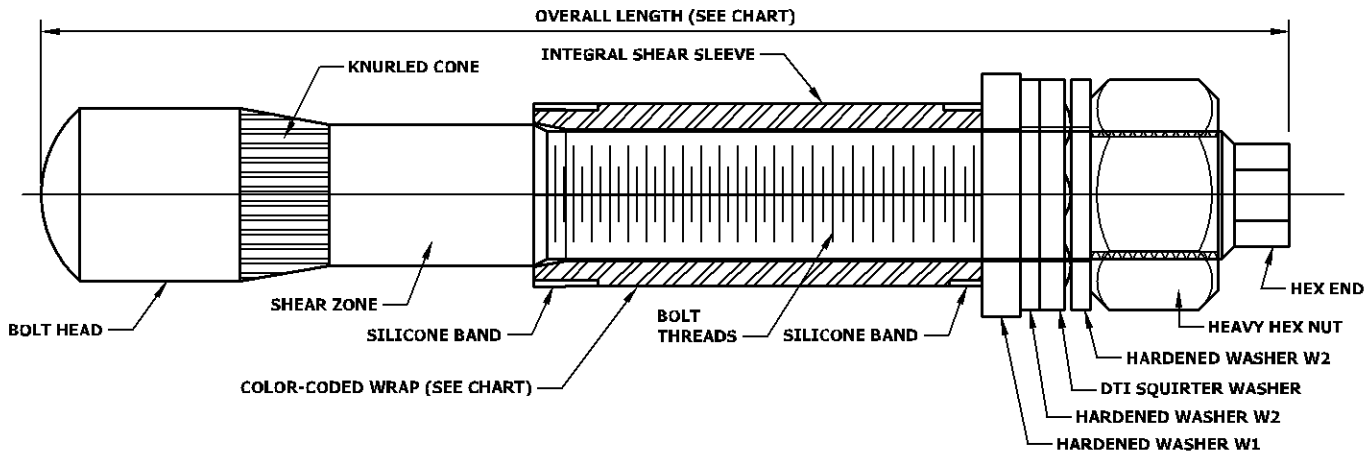
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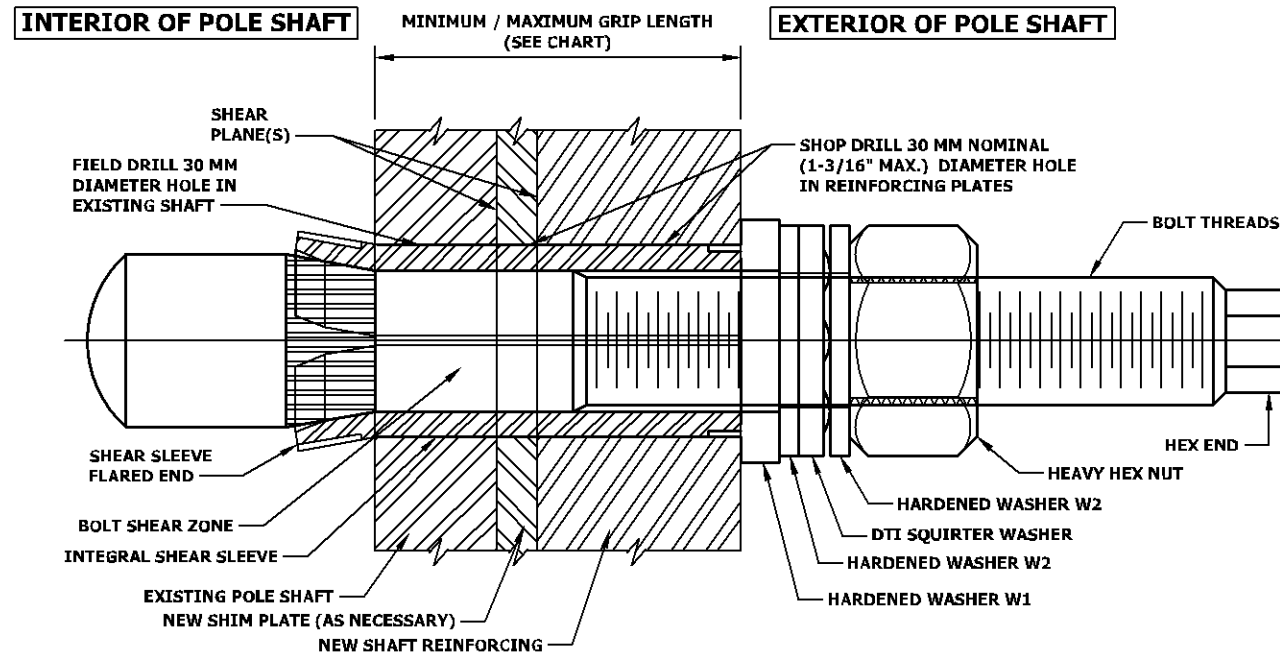
NG2 BOLT NOTES AND DETAILS

Project 038920250008	Sheet S-4
Date 03/25/2025	
Drawn By: BU	Checked By: SC

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2

BOLT HOLE NOTES:

1. ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".
2. ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.

DISTRIBUTOR CONTACT:

Sky Climber Telecom
 PHONE: 720-987-4051
 EMAIL: towerbids@skyclimber.com
 WEB: www.skyclimbertelecom.com

**CONTAINS
 PROPRIETARY INFORMATION
 PATENT PENDING**

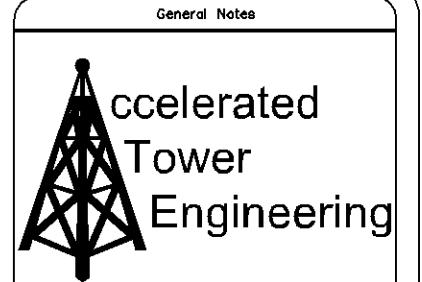
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FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8	1 135	5.31	1.3	3/8" to 1"	--	RED
	2 160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
	3 195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
	4 260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
	5 365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
	6 440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORGBolt™ Installation

**Follow all Manufacturer/Distributor
 Recommendations for Installation,
 Tightening, and Inspection.**

1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.



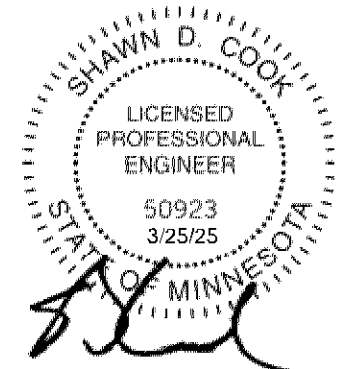
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 Denver, CO 80216

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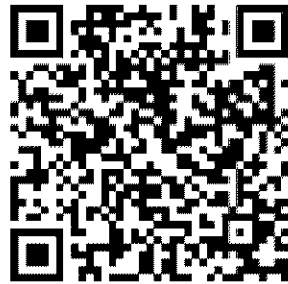
0	Construction	03/25/25
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Sheet Title
 FORGBOLT
 NOTES
 AND DETAILS

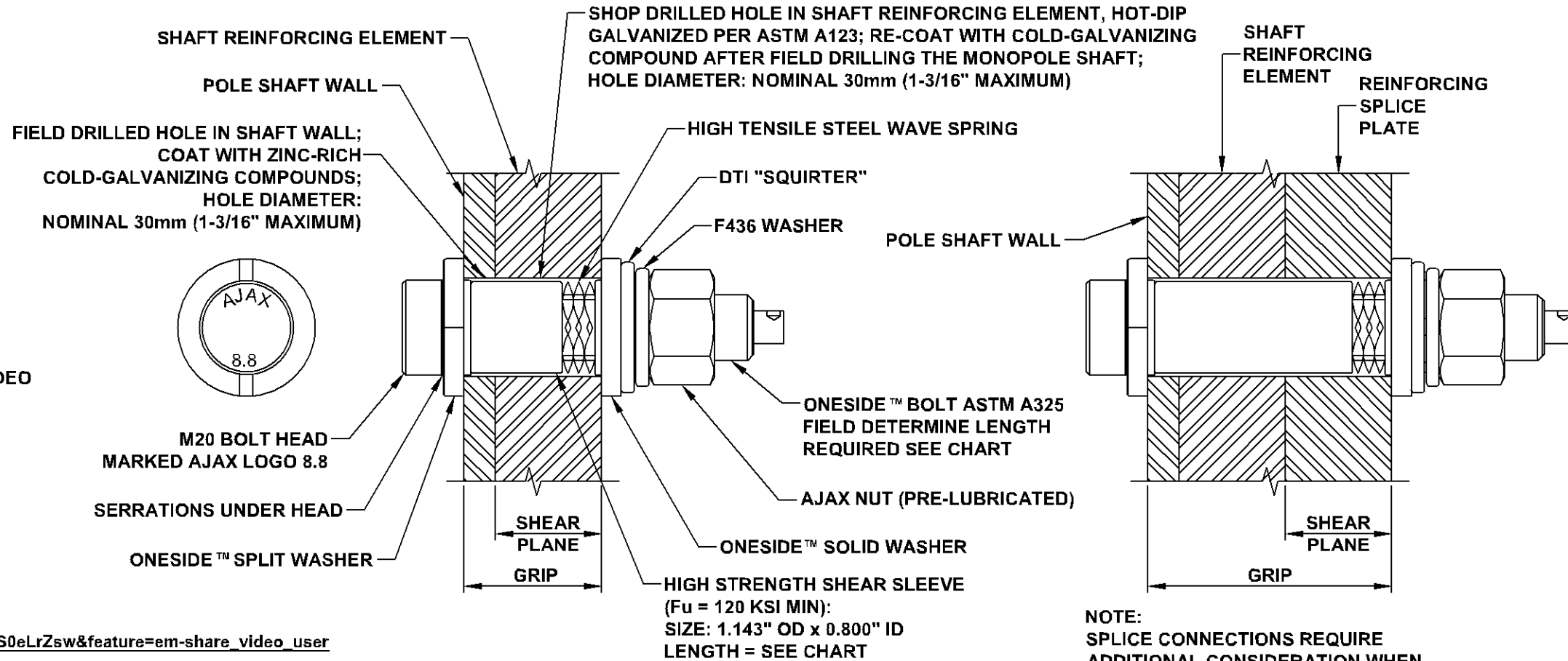
Project 038920250008	Sheet S-5
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MANUFACTURER INSTALLATION VIDEO



https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user

INTERIOR OF POLE SHAFT EXTERIOR OF POLE SHAFT



AJAX ONESIDE BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

MANUFACTURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

DISTRIBUTOR
IRA SVENSGAARD AND ASSOCIATES
PETER SVENSGAARD - PETERS@IRASVENS.COM
JOHN KILLAM - JOHN@IRASVENS.COM
PHONE (530) 647-8225
FAX (530) 647-8229

- BOLT ASSEMBLY AND INSTALLATION:**
- BOLT MUST BE PURCHASED PRE-ASSEMBLED.
 - FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.
- INSPECTION:**
- A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
 - INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS.

General Notes

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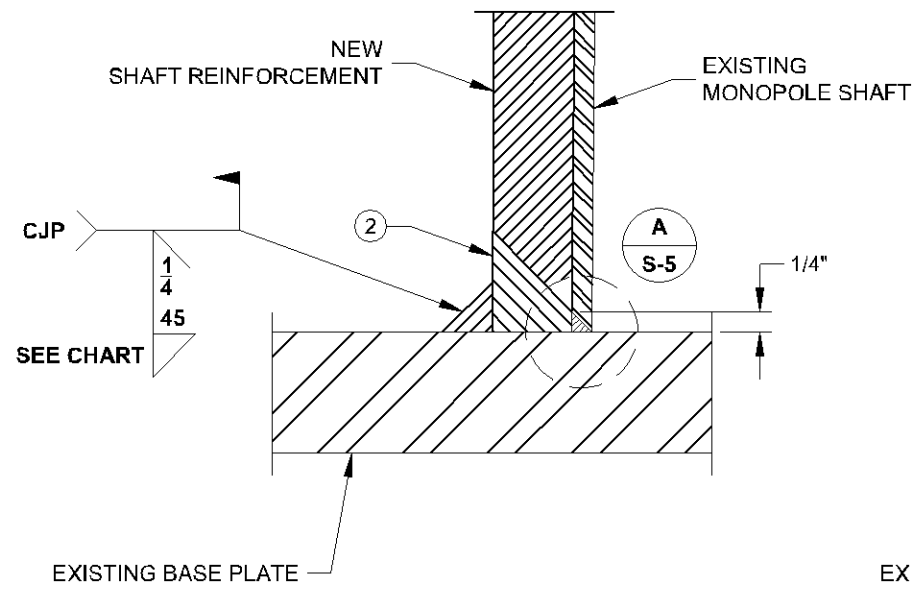
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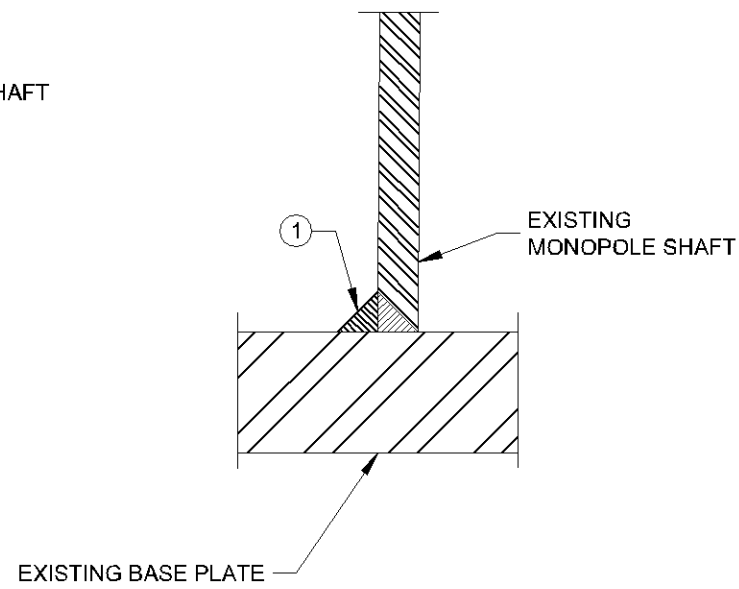
Sheet Title
AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

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OPTION 1



WELD DETAIL



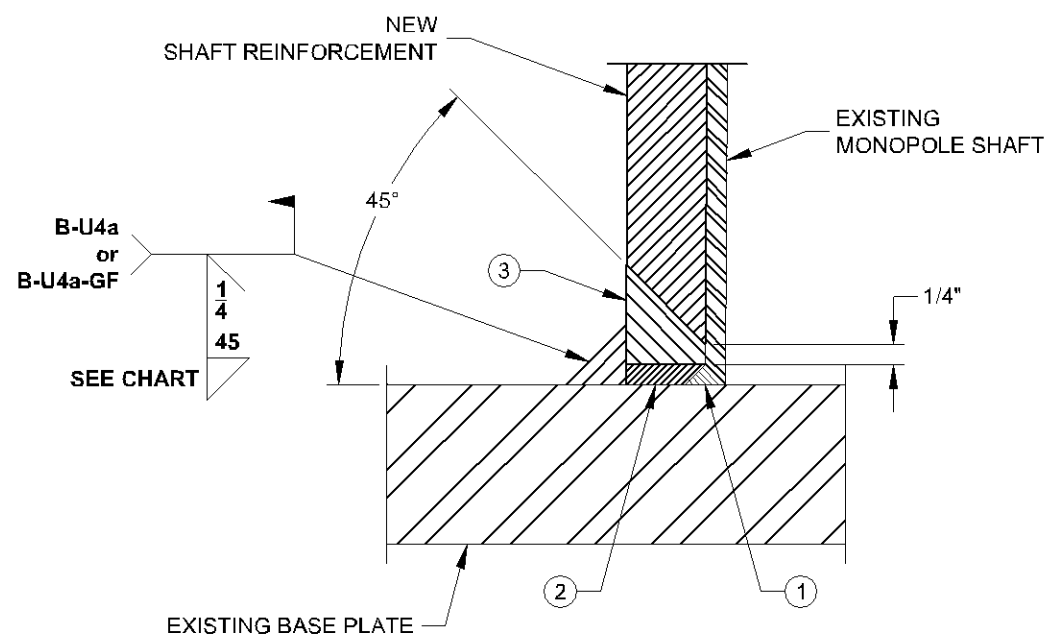
EXISTING WELD

NOTES:

- 1) GRIND EXISTING FILLET WELD FLUSH TO BASE PLATE & POLE FOR THE WIDTH OF THE REINFORCEMENT PLATE PLUS 1/4" ON EACH SIDE (DO NOT OVER GRIND)
- 2) PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

REINFORCING PLATE SIZE	MINIMUM REINFORCING FILLET WELD
3/4" x 4"	1/4"
1" x 4 1/2"	1/4"
1" x 6"	3/8"
1 1/4" x 6 1/2"	1/2"
1 1/4" x 8 1/2"	5/8"

OPTION 2

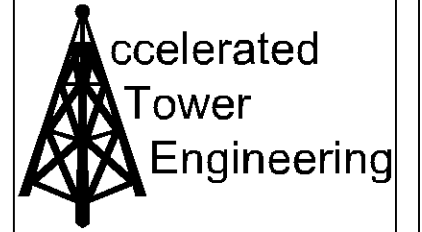


WELD DETAIL

NOTES:

- 1) CLEAN EXISTING WELD FROM GALVANIZING
- 2) BUILD A PLATFORM WITH WELD AT THE SAME HEIGHT OF THE EXISTING FILLET WELD (TO REDUCE THE AMOUNT OF WELD TO BUILD THE PLATFORM, IT IS ALLOWABLE TO PARTIALLY GRIND THE HEIGHT OF THE EXISTING FILLET WELD TO A 1/4" MINIMUM)
- 3) PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

General Notes



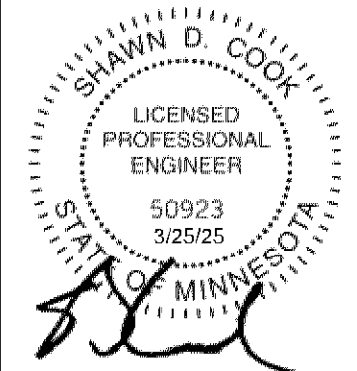
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Sheet Title
BASE PLATE WELD DETAIL

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Date 03/25/2025	
Drawn By: BU	Checked By: SC

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	16-Sided POLYGON
TAPER:	0.1245 IN/FT
SHAFT STEEL:	ASTM A36
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	F1554-55

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (FT)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	7.04	0.3750	0.00	12.750	12.750
2	15.50	0.1875	1.72	12.200	14.130
3	53.39	0.1875	0.00	13.541	20.188

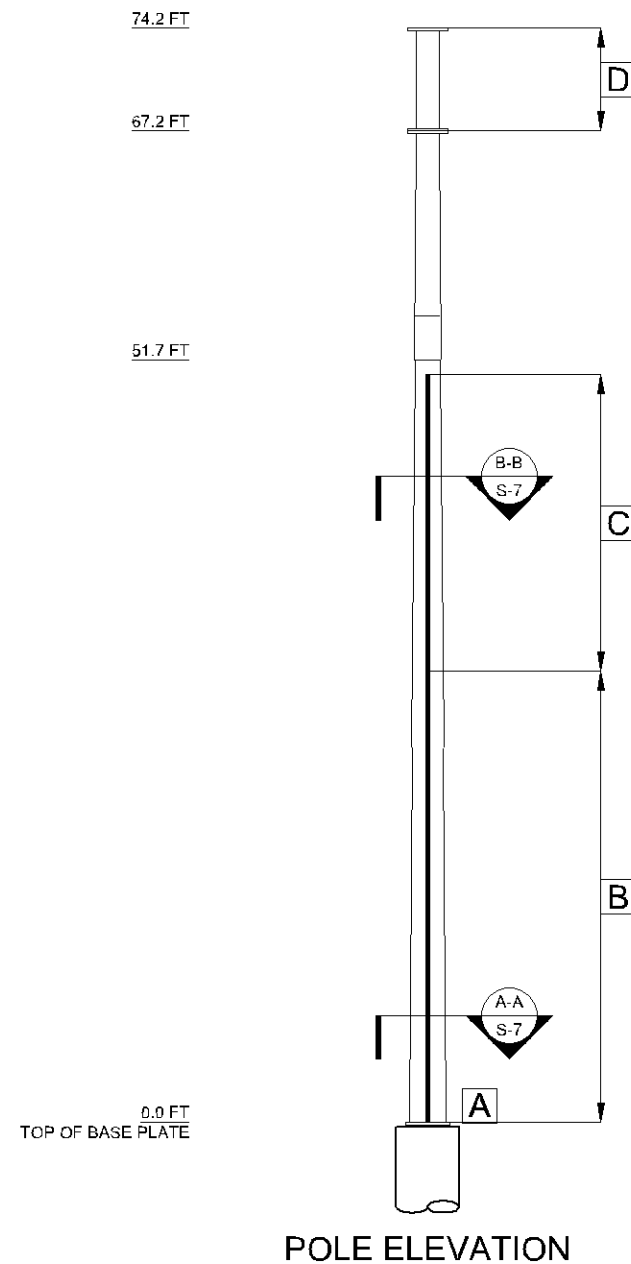
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

POLE MODIFICATION SCHEDULE			
	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0	Added Anchor Rods	S-9
B	0.5-30.5	Shaft Reinforcement	S-9
C	30.5-50.5	Shaft Reinforcement	S-9
D	67.2-74.2	Replace Extension	S-12

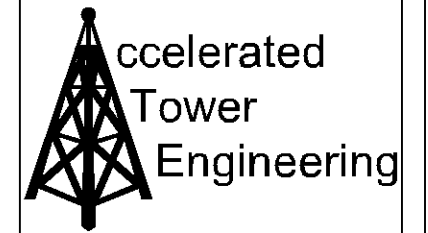
REINFORCING SCHEDULE											
BOTTOM ELEVATION (FT)	TOP ELEVATION (FT)	Ref QTY	PART NUMBER	FLAT/DEGREE	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAX INTERMEDIATE BOLT SPACING	AJAX BOLT QUANTITY PER PLATE	STEEL WEIGHT PER PLATE (BLACK) (LB)	TOTAL AJAX BOLT QUANTITY	TOTAL STEEL WEIGHT (BLACK) (LB)
30.50	50.50	3	PL0750400STD	1,6,12	6	6	1'-4"	24	204.0	72	612.0
0.50	30.50	3	PL1000600STD	1,6,12	10	10	1'-4"	38	612.0	114	1836.0
TOTAL STEEL WEIGHT:											2448.0

NOTES FOR (65 KSI) MATERIAL:

- DO NOT WELD WITHOUT APPROVAL FROM THE EOR.
- ALL SHIMS TO BE MADE OF ASTM A36 STEEL
- ALL FLAT PLATE REINFORCEMENT IS TO BE INSTALLED CENTERED ON ITS DESIGNATED FLAT, UNO.
- AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER THE AISC TURN-OF-NUT METHOD.



General Notes



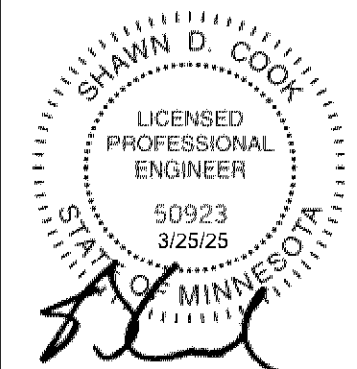
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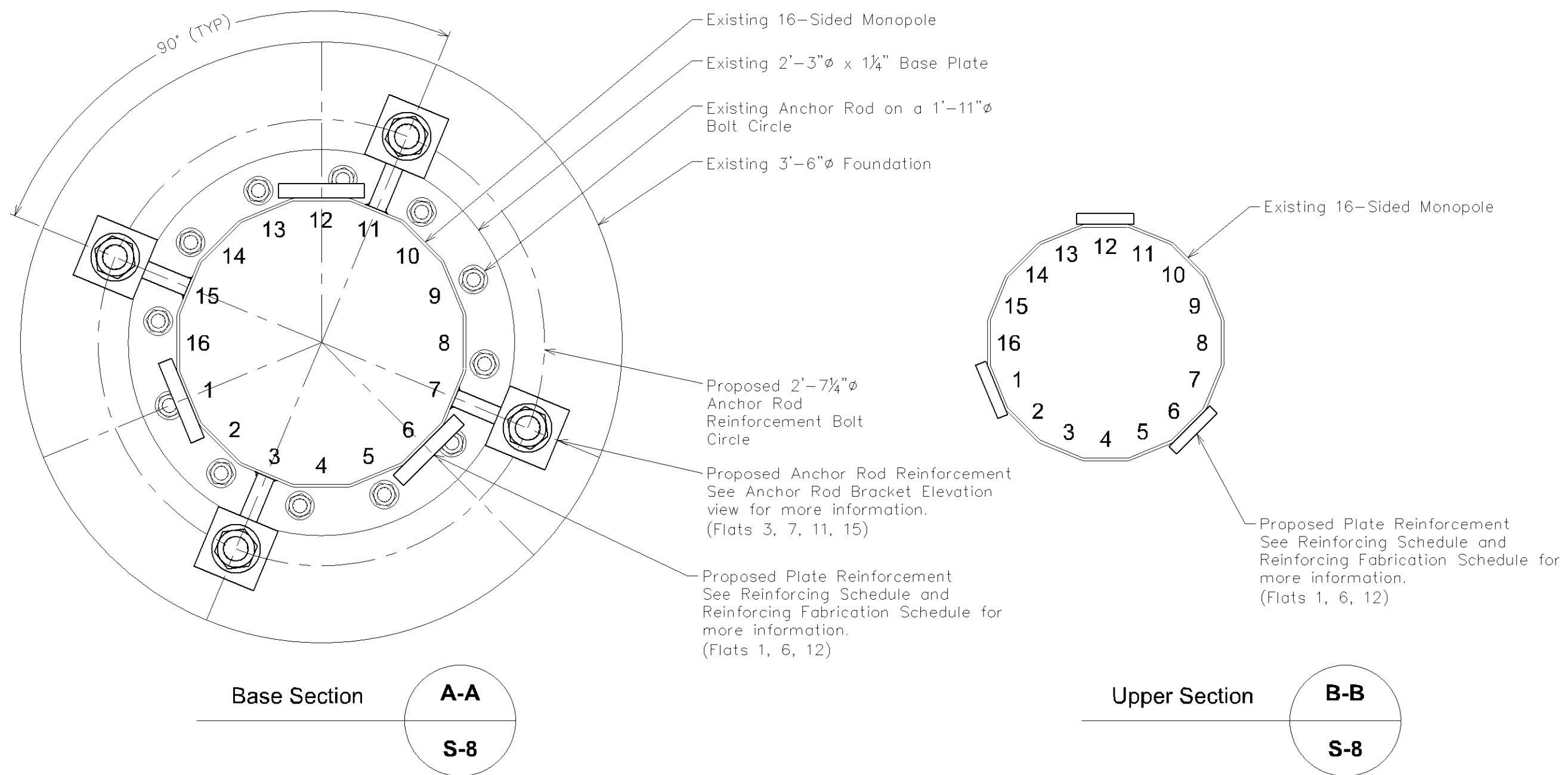


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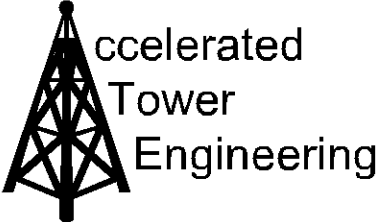
Sheet Title
ELEVATION

Project 038920250008	Sheet S-8
Date 03/25/2025	
Drawn By: BU	Checked By: SC



- Note(s):
- 1) Existing safety line on flat 1. Remove and replace per details on Sheet S-11.
 - 2) Existing climbing on flats 4 and 14.
 - 3) Existing port hole on flats 8 through 10 at the base of the tower.
 - 4) Proposed Plate Reinforcement hardware not shown for clarity.


General Notes



**Accelerated
Tower
Engineering**

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Longmont, CO 80503
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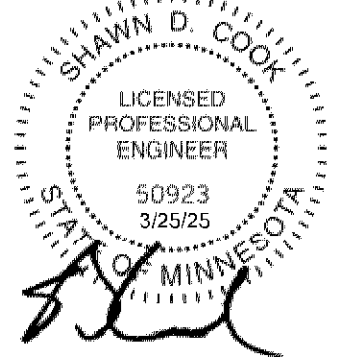
Report Prepared For:



UCI²
CONSTRUCTION SERVICES, LLC

4751 Fox St
Denver, CO 80216

ENGINEER of RECORD SEAL



No.	Revision/Issue	Date
0	Construction	03/25/25

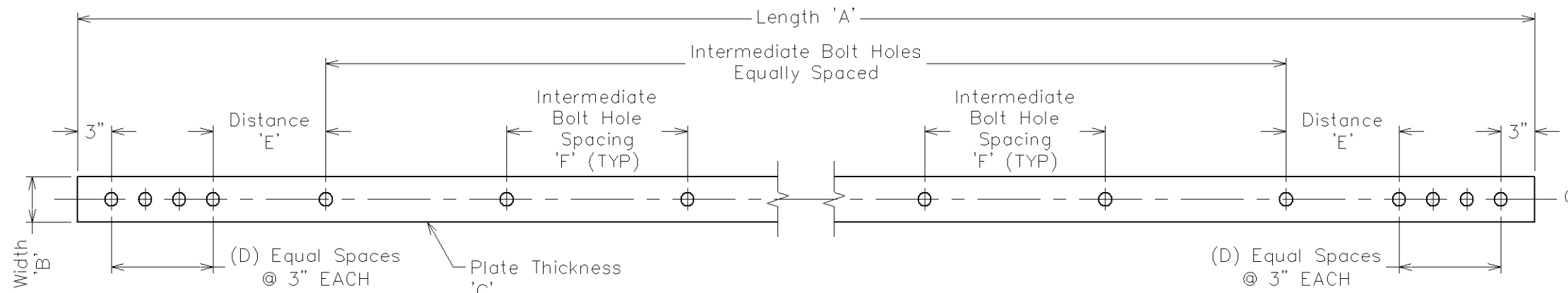
Project Name and Address

A1P0967C
Bloomingtonredscott Repl
10801 Bloomington Ferry Rd
Bloomington, MN 55438
Hennepin County

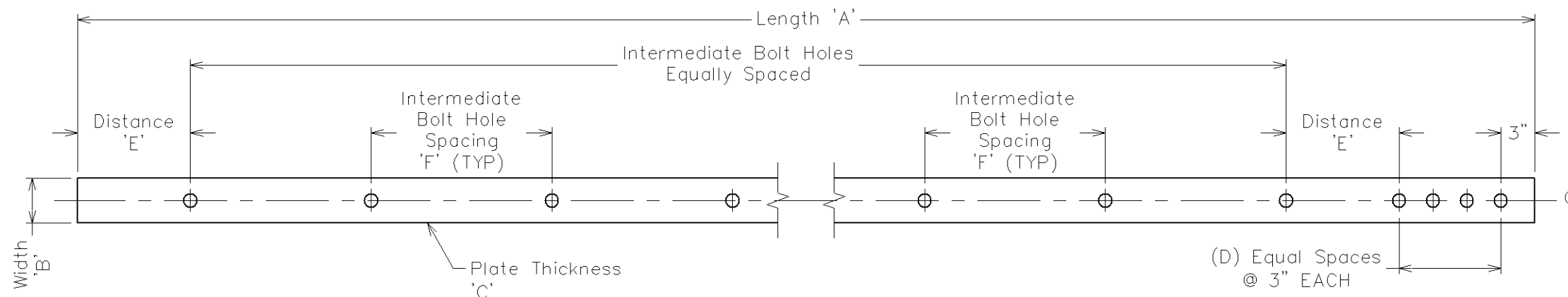
Sheet Title

**REINFORCEMENT
LAYOUT**

Project 038920250008	Sheet
Date 03/25/2025	S-9
Drawn By: BU	



STANDARD REINFORCING DETAIL



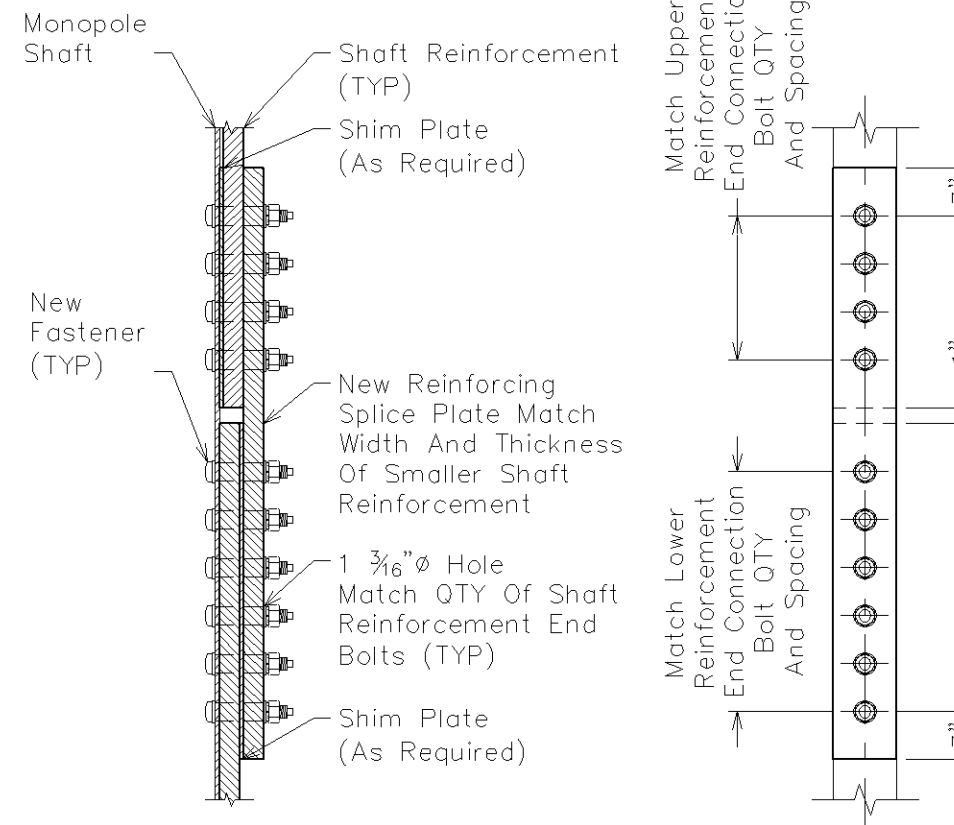
WELDED REINFORCING DETAIL

REINFORCING FABRICATION SCHEDULE

PART NUMBER	TYPE	'A' LENGTH	'B' WIDTH	'C' THICK	'D' BOLT SPACES	'E' DIST.	'F' DIST.
PL0750400STD	Standard	20'-0"	4"	3/4"	5	1'-2"	1'-4"
PL1000600STD	Standard	30'-0"	6"	1"	9	1'-2"	1'-4"

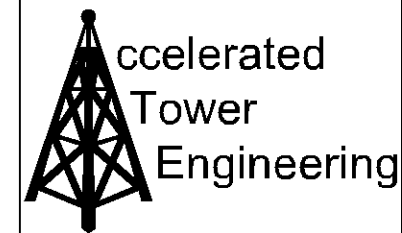
Notes:

- All holes to be drilled, do not burn or punch.
- Tolerances:
Fractions $\pm \frac{1}{16}$ "
Angles $\pm \frac{1}{2}$ "
Decimals ± 0.010 "
- Reinforcement and Splice Plates shall be ASTM A572 -Gr 65
- Shim Plates shall be ASTM A36
- All material shall be hot-dip galvanized per ASTM A123



**REINFORCING SPLICE PLATE DETAIL
(TYP For All Adjoining Reinforcement)**

General Notes



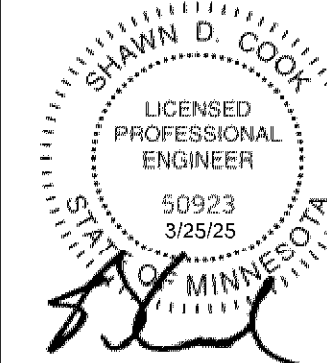
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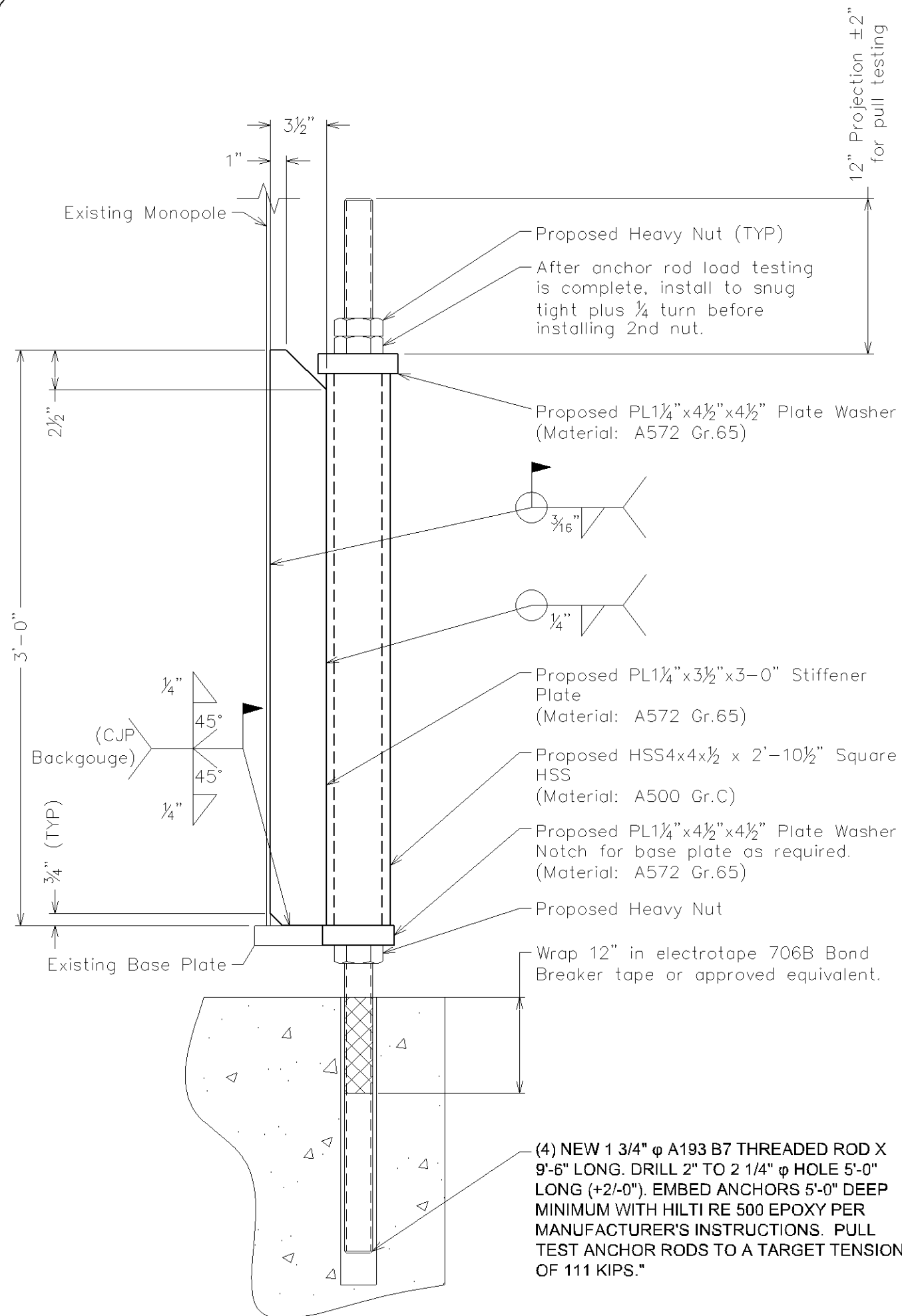


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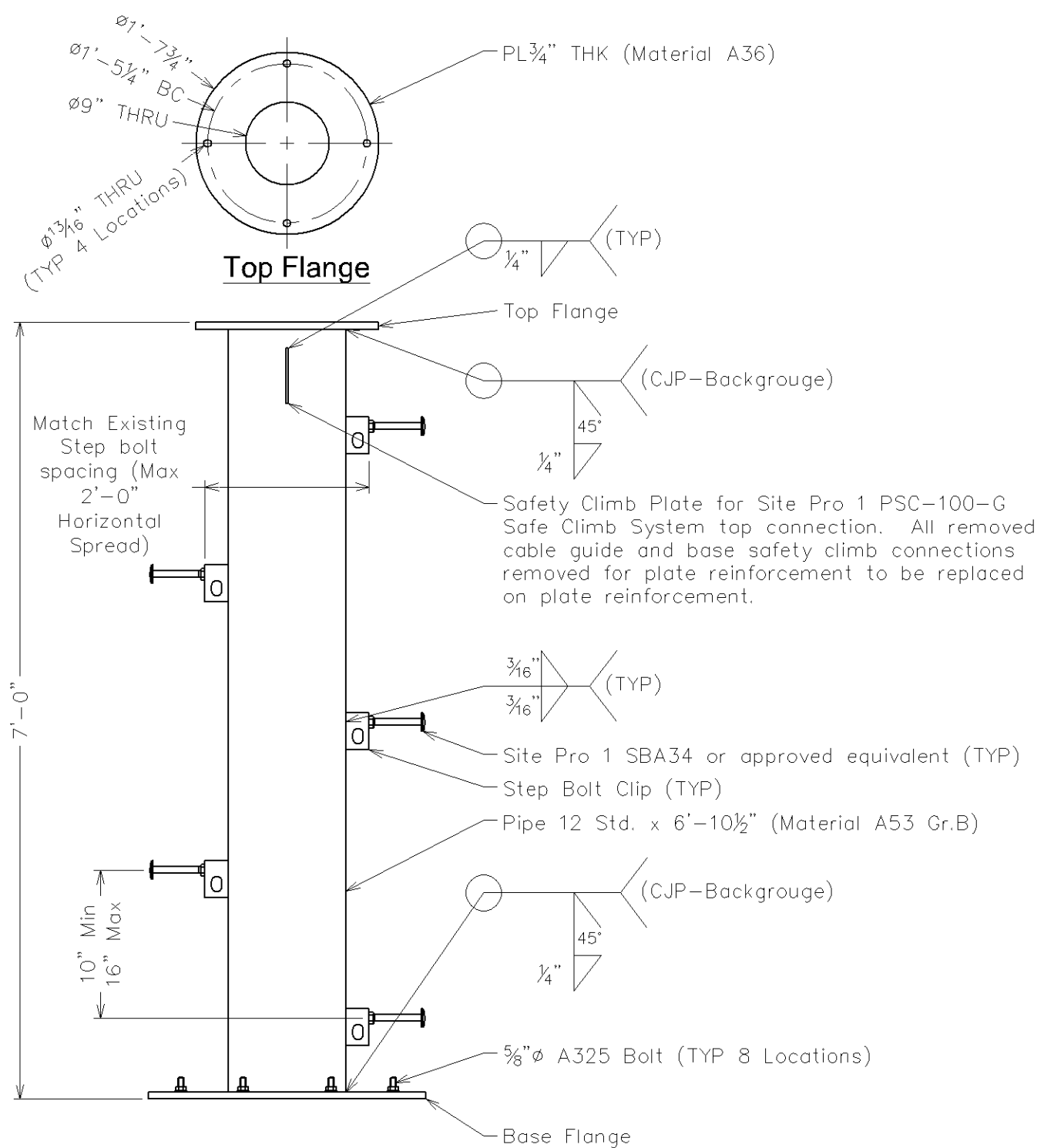
Project Name and Address
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Sheet Title
**REINFORCEMENT
DETAILS**

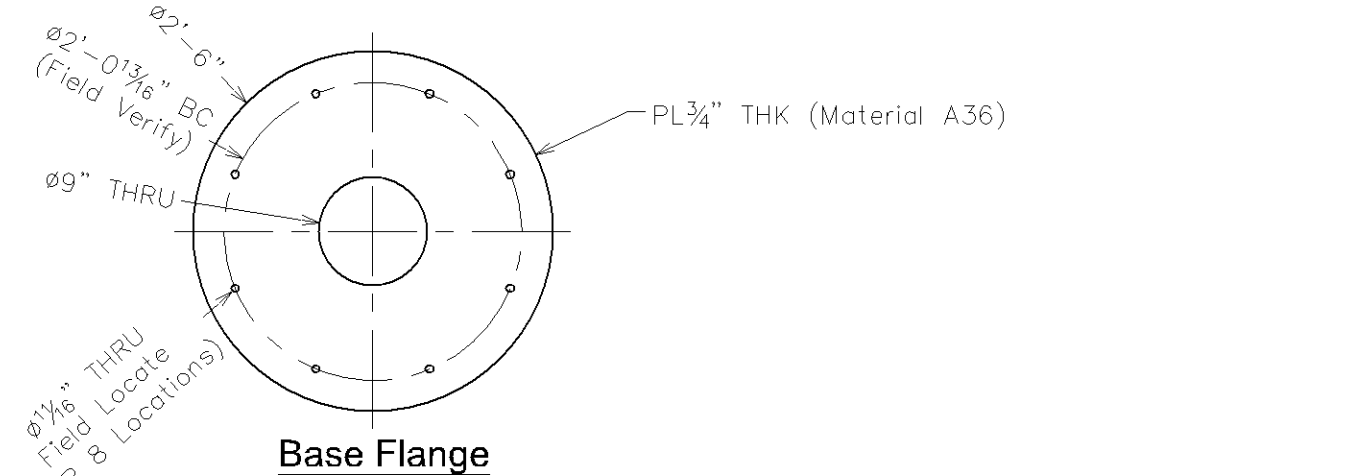
Project 038920250008	Sheet S-10
Date 03/25/2025	
Drawn By: BU	Checked By: SC



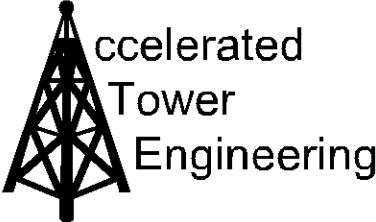
Anchor Rod Bracket Elevation



Extension Elevation




General Notes



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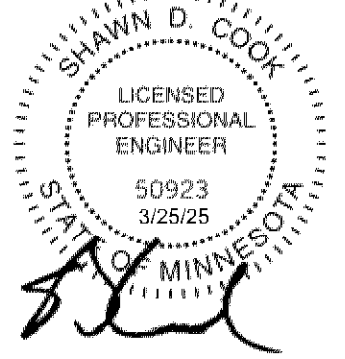
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0	Construction	03/25/25
No.	Revision/Issue	Date

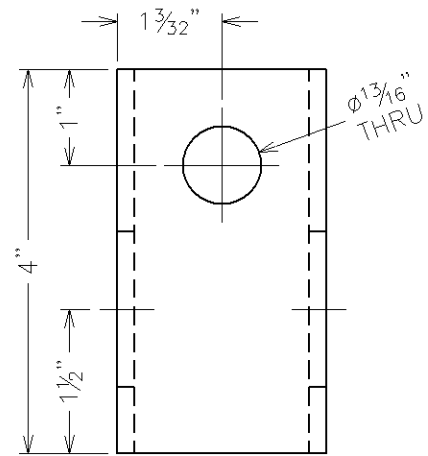
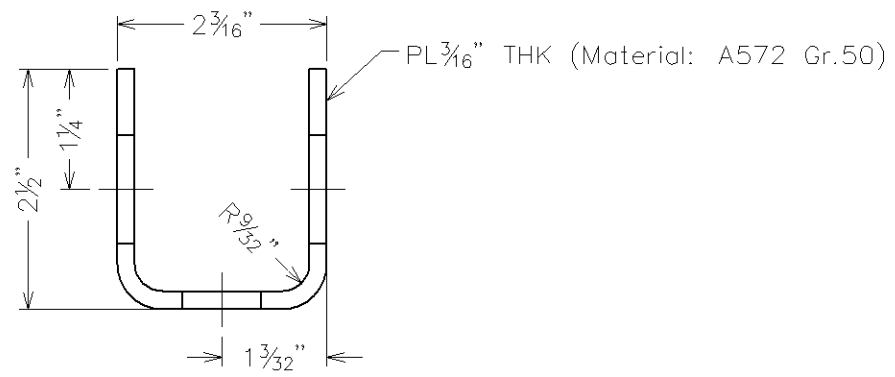
Project Name and Address

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Hennepin County

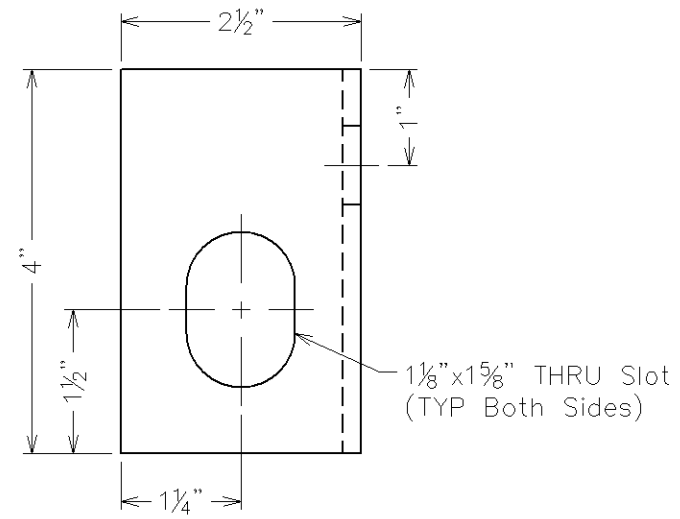
Sheet Title

EXTENSION DETAILS

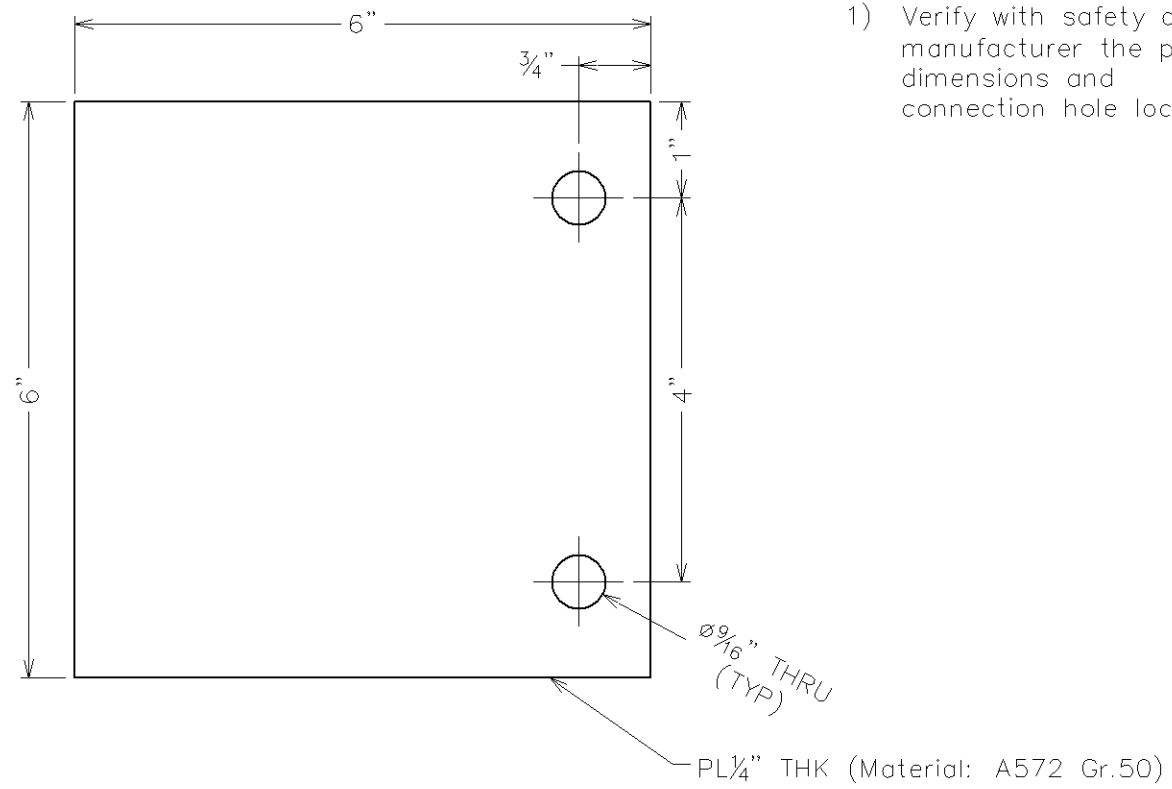
Project	038920250008	Sheet	S-11
Date	03/25/2025		
Drawn By:	BU	Checked By:	SC



Step Bolt Clip

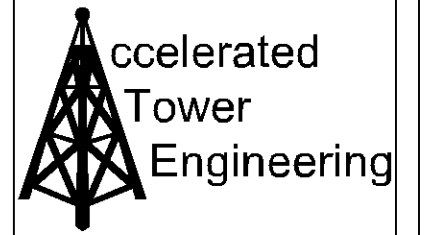


Safety Climb Plate



Note(s):
 1) Verify with safety climb manufacturer the plate dimensions and connection hole locations.

General Notes



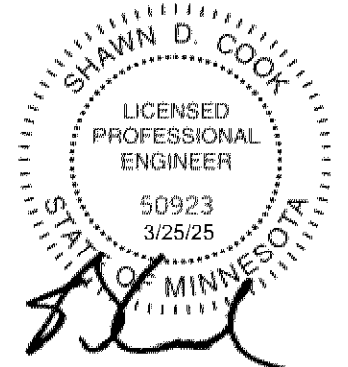
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Sheet Title
 DETAILS

Project 038920250008	Sheet S-12
Date 03/25/2025	
Drawn By: BU	Checked By: SC