Date: **July 28, 2025**

Telamon Tower Engineering, PLLC
319 Chapanoke Road, Suite 118
Raleigh, NC 27603
(405) 348-5460

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	A1Q0428C
	Site Name:	AT&T Wireless
Crown Castle Designation:	**BU Number:**	844362
	Site Name:	LYNDALE
	JDE Job Number:	2155964
	Work Order Number:	2408557
	Order Number:	712975 Rev. 0
Engineering Firm Designation:	**Telamon Project Number:**	42285-844362-2408557-01-STR
Site Data:	**8801 Lyndale Avenue South, Bloomington, Hennepin County, MN** **Latitude *44° 50' 39.43"*, Longitude *-93° 17' 13.71"*** **100 Foot - Monopole Tower**	

Telamon is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis has been performed in accordance with the 2020 Minnesota State Building Code based upon an ultimate 3-second gust wind speed of 109 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Yogesh Choure

Respectfully submitted by:

Nick Schauer, P.E.
Engineering Manager

Nick Schauer

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Nicholas J. Schauer
Signature: Digitally signed by Nick Schauer
Date: Date: 2025.07.28 09:36:02-04'00' License # 58027

Nick Schauer, PE | Lic. No. 58027 | Exp. 06/30/2026
Telamon Technologies Corp.

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1) INTRODUCTION

This tower is a 95 ft Monopole tower designed by Tower Technology, Inc.

A 5 ft tower extension is considered designed by Allfasteners and post modification inspection completed by Sinnott, Gering and Schmitt Towers, INC bringing the total tower height to 100 ft.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	109 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
87.0	91.0	3	nokia	AHFIB_T-MOBILE	1 1	1-1/2 1-5/8
	89.0	1	commscope	FFHH-65C-R3_T-MOBILE w/ Mount Pipe		
		3	nokia	AVHA 476268A_2024_TMO w/ Mount Pipe		
	88.0	2	commscope	FFHH-65C-R3_T-MOBILE w/ Mount Pipe		
		3	nokia	AHLOA_T-MOBILE		
	87.0	1	commscope	HCS 2.0 Part 1		
		1	tower mounts	Platform Mount [LP 303-1_KCKR-HR-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
99.0	102.0	6	commscope	NNH4-65C-R6 w/ Mount Pipe	3 6	3/8 7/8
		3	ericsson	4471 B30		
		3	ericsson	4890 B25/B66		
		3	ericsson	AIR 6472 B77G B77M w/ Mount Pipe		
		3	ericsson	RADIO 4494 44B14 20B29		
		3	ericsson	Radio 4490 B5/B12A		
		1	raycap	DC6-48-60-0-8C		
		1	raycap	DC6-48-60-18-8C		
		1	raycap	DC6-48-60-18-8F		
		1	raycap	DC9-48-60-24-8C-EV		
	99.0	1	site pro 1	F3P-12-WLL Platform Mount		
		1	tower mounts	Miscellaneous [NA 507-1]		
64.0	66.0	1	ericsson	UKY 210 73/SC15	2	3/8
	64.0	1	tower mounts	Pipe Mount [PM 601-1]		
		1	tower mounts	Side Arm Mount [SO 104-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4536573	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5163802	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	7632221	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	9847023	CCISITES
4-POST-MODIFICATION INSPECTION	10044902	CCISITES

3.1) Analysis Method

tnxTower (version 8.3.0.5), 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 Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Telamon should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	100 - 95	Pole	TP20x20x0.375	1	-7	1005	6.9	Pass
L2	95 - 71.5	Pole	TP28.538x24.5x0.4125	2	-13	2246	13.1	Pass
L3	71.5 - 31.5	Pole	TP34.587x26.4414x0.5	3	-22	3292	24.6	Pass
L4	31.5 - 0	Pole	TP39x32.7912x0.5	4	-32	3807	32.9	Pass
							Summary	
						Pole (L4)	32.9	Pass
						Rating =	32.9	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	95	6.3	Pass
1	Flange Plate	95	9.8	Pass
1	Anchor Rods	0	53.1	Pass
1	Base Plate	0	27.8	Pass
1	Base Foundation (Structure)	0	41.4	Pass
1	Base Foundation (Soil Interaction)	0	36.7	Pass

Structure Rating (max from all components) =	**53.1%**

Notes:
1) See additional documentation in “Appendix C - Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

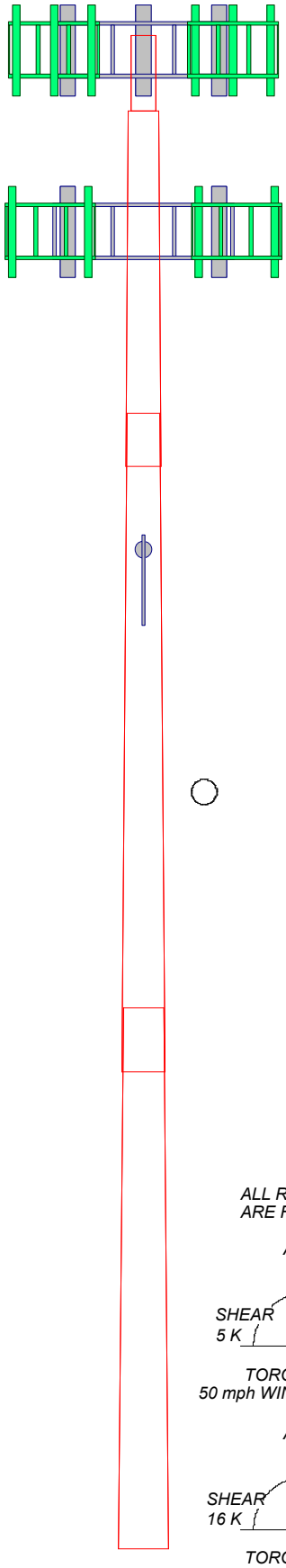
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4				
Length (ft)	5.00	23.50	43.50	35.75				
Number of Sides	1	12	12	12	12			
Thickness (in)	0.3750	0.4125	0.5000	0.5000				
Socket Length (ft)		3.50	4.25					
Top Dia (in)	20.0000	24.5000	26.4414	32.7912				
Bot Dia (in)	20.0000	28.5380	34.5870	39.0000				
Grade	A500-46		A572-65					
Weight (K)	0.4	2.8	7.2	6.9	17.3			

100.0 ft
95.0 ft
71.5 ft
31.5 ft
0.0 ft



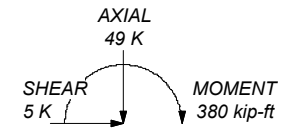
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-46	46 ksi	62 ksi	A572-65	65 ksi	80 ksi

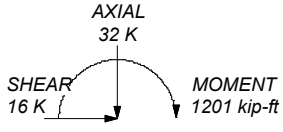
TOWER DESIGN NOTES

1. Tower is located in Hennepin County, Minnesota.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 109 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 32.9%

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE



TORQUE 1 kip-ft
REACTIONS - 109 mph WIND

telamon

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Job:	***BU# 844362 - LYNDALE***		
Project:	***42285-844362-2408557-01-STR***		
Client: Crown Castle	Drawn by: Y.C	App'd:	
Code: TIA-222-H	Date: 07/24/25	Scale: NTS	
Path:		Dwg No. E-1	

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: 823.48 ft.
- Basic wind speed of 109 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Horizontals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Consider Moments - Diagonals	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Moment Magnification		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Stress Ratios		Retension Guys To Initial Tension		Offset Girt At Foundation
√	Use Code Safety Factors - Guys	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Escalate Ice	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Always Use Max Kz	√	Project Wind Area of Appurtenances		Use TIA-222-H Bracing Resist. Exemption
	Kz In Exposure D Hurricane Region	√	Alternative Appurt. EPA Calculation		Use TIA-222-H Tension Splice Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Pole Without Linear Attachments
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole With Shroud Or No Appurtenances
	Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules		Outside and Inside Corner Radii Are Known
	Use Special Wind Profile				

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*	*Sides*	*in*	*in*	*in*	*in*	
L1	100.00-95.00	5.00	0.00	Round	20.0000	20.0000	0.3750		A500-46 (46 ksi)
L2	95.00-71.50	23.50	3.50	12	24.5000	28.5380	0.4125	1.6500	A572-65 (65 ksi)
L3	71.50-31.50	43.50	4.25	12	26.4414	34.5870	0.5000	2.0000	A572-65

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
L4	31.50-0.00	35.75		12	32.7912	39.0000	0.5000	2.0000	(65 ksi) A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	20.0000	23.1202	1113.4704	6.9398	10.0000	111.3470	2226.9409	11.5532	0.0000	0
	20.0000	23.1202	1113.4704	6.9398	10.0000	111.3470	2226.9409	11.5532	0.0000	0
L2	25.2188	31.9942	2369.4140	8.6233	12.6910	186.7003	4801.0752	15.7466	5.4605	13.238
	29.3992	37.3577	3771.9552	10.0689	14.7827	255.1604	7643.0039	18.3863	6.5427	15.861
L3	27.8763	41.7656	3587.4942	9.2870	13.6966	261.9252	7269.2358	20.5558	5.7463	11.493
	35.6307	54.8801	8139.1334	12.2031	17.9161	454.2924	16492.0910	27.0103	7.9293	15.859
L4	34.5357	51.9888	6919.3122	11.5602	16.9858	407.3581	14020.4025	25.5873	7.4480	14.896
	40.1994	61.9850	11727.1914	13.7830	20.2020	580.4966	23762.4693	30.5071	9.1120	18.224

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 100.00-95.00				1	1	1			
L2 95.00-71.50				1	1	1			
L3 71.50-31.50				1	1	1			
L4 31.50-0.00				1	1	1			

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	C	No	Surface Ar (CaAa)	95.00 - 0.00	1	1	0.000 0.000	0.3750		0.22
*** 87 ***										
HCS 2.0 Part 3(1-1/2)	B	No	Surface Ar (CaAa)	87.00 - 77.00	1	1	0.255 0.255	1.5500		1.71
LDF2-50(3/8)	B	No	Surface Ar (CaAa)	86.00 - 64.00	2	2	0.245 0.255	0.4400		0.08
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*** 99 ***									
PWRT-606-S(7/8)	A	No	No	Inside Pole	99.00 - 0.00	4	No Ice 1/2" Ice	0.00 0.00	0.89 0.89

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1" Ice	0.00	0.89
							2" Ice	0.00	0.89
RFFT-36SM-001-XXM(3/8)	A	No	No	Inside Pole	99.00 - 0.00	2	No Ice	0.00	0.09
							1/2" Ice	0.00	0.09
							1" Ice	0.00	0.09
							2" Ice	0.00	0.09
RFFT-48SM-001-100M(3/8)	A	No	No	Inside Pole	99.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
PWRT-606-S(7/8)	A	No	No	Inside Pole	99.00 - 0.00	2	No Ice	0.00	0.89
							1/2" Ice	0.00	0.89
							1" Ice	0.00	0.89
							2" Ice	0.00	0.89
HCS 2.0 Part 3(1-1/2)	B	No	No	Inside Pole	77.00 - 0.00	1	No Ice	0.00	1.71
							1/2" Ice	0.00	1.71
							1" Ice	0.00	1.71
							2" Ice	0.00	1.71
HB158-21U6S24-xxM_TMO(1-5/8)	B	No	No	Inside Pole	87.00 - 0.00	1	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
**							2" Ice	0.00	2.50
LDF2-50(3/8)	B	No	No	Inside Pole	86.00 - 0.00	2	No Ice	0.00	0.08
							1/2" Ice	0.00	0.08
							1" Ice	0.00	0.08
							2" Ice	0.00	0.08
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	100.00-95.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L2	95.00-71.50	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	2.826	0.000	0
		C	0.000	0.000	0.881	0.000	0
L3	71.50-31.50	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.660	0.000	0
		C	0.000	0.000	1.500	0.000	0
L4	31.50-0.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	1.181	0.000	0

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	100.00-95.00	A	1.421	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L2	95.00-71.50	A	1.398	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	11.009	0.000	0
		C		0.000	0.000	7.452	0.000	0
L3	71.50-31.50	A	1.332	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	3.446	0.000	0

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		C		0.000	0.000	12.685	0.000	0
L4	31.50-0.00	A	1.184	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	9.573	0.000	0

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	100.00-95.00	0.0000	0.0000	0.0000	0.0000
L2	95.00-71.50	0.7266	0.2216	1.6182	1.0608
L3	71.50-31.50	0.0907	0.2279	0.3103	1.2624
L4	31.50-0.00	0.0000	0.2293	0.0000	1.3016

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	1	Safety Line 3/8	71.50 - 95.00	1.0000	1.0000
L2	8	HCS 2.0 Part 3(1-1/2)	77.00 - 87.00	1.0000	1.0000
L2	13	LDF2-50(3/8)	71.50 - 86.00	1.0000	1.0000
L3	1	Safety Line 3/8	31.50 - 71.50	1.0000	1.0000
L3	13	LDF2-50(3/8)	64.00 - 71.50	1.0000	1.0000
L4	1	Safety Line 3/8	0.00 - 31.50	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
*** 99 ***									
AIR 6472 B77G B77M w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.12 5.47 5.84 6.60	3.35 3.83 4.34 5.39	0 0 0 0
AIR 6472 B77G B77M w/ Mount Pipe	B	From Leg	4.00 0.00	0.0000	99.00	No Ice 1/2"	5.12 5.47	3.35 3.83	0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	5.84	4.34	0
						1" Ice	6.60	5.39	0
						2" Ice			
AIR 6472 B77G B77M w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.12 5.47 5.84 6.60	3.35 3.83 4.34 5.39	0 0 0 0
(2) NNH4-65C-R6 w/ Mount Pipe	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.68 10.27 10.87 12.10	5.17 5.71 6.26 7.40	0 0 0 1
(2) NNH4-65C-R6 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.68 10.27 10.87 12.10	5.17 5.71 6.26 7.40	0 0 0 1
(2) NNH4-65C-R6 w/ Mount Pipe	C	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.68 10.27 10.87 12.10	5.17 5.71 6.26 7.40	0 0 0 1
4471 B30	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.22 1.36 1.50 1.82	0.61 0.71 0.83 1.09	0 0 0 0
4471 B30	B	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.22 1.36 1.50 1.82	0.61 0.71 0.83 1.09	0 0 0 0
4471 B30	C	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.22 1.36 1.50 1.82	0.61 0.71 0.83 1.09	0 0 0 0
Radio 4490 B5/B12A	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.68 2.88 3.10 3.54	1.22 1.37 1.53 1.87	0 0 0 0
Radio 4490 B5/B12A	B	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.68 2.88 3.10 3.54	1.22 1.37 1.53 1.87	0 0 0 0
Radio 4490 B5/B12A	C	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.68 2.88 3.10 3.54	1.22 1.37 1.53 1.87	0 0 0 0
DC9-48-60-24-8C-EV	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	4.78 5.06 5.35 5.95	0 0 0 0
DC6-48-60-18-8F	A	From Leg	4.00 0.00 3.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0 0 0 0
RADIO 4494 44B14 20B29	A	From Leg	4.00 0.00	0.0000	99.00	No Ice 1/2"	2.20 2.39	0.84 0.97	0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	2.58	1.10	0
						1" Ice	2.99	1.39	0
						2" Ice			
RADIO 4494 44B14 20B29	B	From Leg	4.00	0.0000	99.00	No Ice	2.20	0.84	0
			0.00			1/2"	2.39	0.97	0
			3.00			Ice	2.58	1.10	0
						1" Ice	2.99	1.39	0
						2" Ice			
RADIO 4494 44B14 20B29	C	From Leg	4.00	0.0000	99.00	No Ice	2.20	0.84	0
			0.00			1/2"	2.39	0.97	0
			3.00			Ice	2.58	1.10	0
						1" Ice	2.99	1.39	0
						2" Ice			
4890 B25/B66	A	From Leg	4.00	0.0000	99.00	No Ice	2.70	1.22	0
			0.00			1/2"	2.90	1.37	0
			3.00			Ice	3.11	1.53	0
						1" Ice	3.56	1.87	0
						2" Ice			
4890 B25/B66	B	From Leg	4.00	0.0000	99.00	No Ice	2.70	1.22	0
			0.00			1/2"	2.90	1.37	0
			3.00			Ice	3.11	1.53	0
						1" Ice	3.56	1.87	0
						2" Ice			
4890 B25/B66	C	From Leg	4.00	0.0000	99.00	No Ice	2.70	1.22	0
			0.00			1/2"	2.90	1.37	0
			3.00			Ice	3.11	1.53	0
						1" Ice	3.56	1.87	0
						2" Ice			
DC6-48-60-0-8C	B	From Leg	4.00	0.0000	99.00	No Ice	2.74	2.74	0
			0.00			1/2"	2.96	2.96	0
			3.00			Ice	3.20	3.20	0
						1" Ice	3.68	3.68	0
						2" Ice			
DC6-48-60-18-8C	C	From Leg	4.00	0.0000	99.00	No Ice	2.74	2.74	0
			0.00			1/2"	2.96	2.96	0
			3.00			Ice	3.20	3.20	0
						1" Ice	3.68	3.68	0
						2" Ice			
(2) 10'6"x2-3/8" Pipe Mount	A	From Leg	4.00	0.0000	99.00	No Ice	2.49	2.49	0
			0.00			1/2"	3.57	3.57	0
			0.00			Ice	4.67	4.67	0
						1" Ice	6.32	6.32	0
						2" Ice			
(2) 10'6"x2-3/8" Pipe Mount	B	From Leg	4.00	0.0000	99.00	No Ice	2.49	2.49	0
			0.00			1/2"	3.57	3.57	0
			0.00			Ice	4.67	4.67	0
						1" Ice	6.32	6.32	0
						2" Ice			
(2) 10'6"x2-3/8" Pipe Mount	C	From Leg	4.00	0.0000	99.00	No Ice	2.49	2.49	0
			0.00			1/2"	3.57	3.57	0
			0.00			Ice	4.67	4.67	0
						1" Ice	6.32	6.32	0
						2" Ice			
5' x 2" Pipe Mount	A	From Leg	1.00	0.0000	99.00	No Ice	1.19	1.19	0
			0.00			1/2"	1.50	1.50	0
			0.00			Ice	1.81	1.81	0
						1" Ice	2.46	2.46	0
						2" Ice			
5' x 2" Pipe Mount	B	From Leg	1.00	0.0000	99.00	No Ice	1.19	1.19	0
			0.00			1/2"	1.50	1.50	0
			0.00			Ice	1.81	1.81	0
						1" Ice	2.46	2.46	0
						2" Ice			
5' x 2" Pipe Mount	C	From Leg	1.00	0.0000	99.00	No Ice	1.19	1.19	0
			0.00			1/2"	1.50	1.50	0

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
			0.00			Ice	1.81	1.81	0
						1" Ice	2.46	2.46	0
						2" Ice			
F3P-12-WLL Platform Mount	C	None		0.0000	99.00	No Ice	26.20	25.00	3
						1/2"	32.70	31.90	3
						Ice	41.30	39.20	4
						1" Ice	58.50	53.80	5
						2" Ice			
Miscellaneous [NA 507-1]	C	None		0.0000	99.00	No Ice	4.56	4.56	0
						1/2"	6.39	6.39	0
						Ice	8.18	8.18	0
						1" Ice	11.66	11.66	1
						2" Ice			
*** 87 ***									
FFHH-65C-R3_T-MOBILE w/ Mount Pipe	A	From Leg	4.00	0.0000	87.00	No Ice	12.97	6.20	0
			0.00			1/2"	13.62	6.77	0
			1.00			Ice	14.27	7.36	0
						1" Ice	15.62	8.57	1
						2" Ice			
FFHH-65C-R3_T-MOBILE w/ Mount Pipe	B	From Leg	4.00	0.0000	87.00	No Ice	12.97	6.20	0
			0.00			1/2"	13.62	6.77	0
			1.00			Ice	14.27	7.36	0
						1" Ice	15.62	8.57	1
						2" Ice			
FFHH-65C-R3_T-MOBILE w/ Mount Pipe	C	From Leg	4.00	0.0000	87.00	No Ice	12.97	6.20	0
			0.00			1/2"	13.62	6.77	0
			2.00			Ice	14.27	7.36	0
						1" Ice	15.62	8.57	1
						2" Ice			
AVHA 476268A_2024_TMO w/ Mount Pipe	A	From Leg	4.00	0.0000	87.00	No Ice	7.00	3.48	0
			0.00			1/2"	7.40	3.99	0
			2.00			Ice	7.81	4.52	0
						1" Ice	8.65	5.63	0
						2" Ice			
AVHA 476268A_2024_TMO w/ Mount Pipe	B	From Leg	4.00	0.0000	87.00	No Ice	7.00	3.48	0
			0.00			1/2"	7.40	3.99	0
			2.00			Ice	7.81	4.52	0
						1" Ice	8.65	5.63	0
						2" Ice			
AVHA 476268A_2024_TMO w/ Mount Pipe	C	From Leg	4.00	0.0000	87.00	No Ice	7.00	3.48	0
			0.00			1/2"	7.40	3.99	0
			2.00			Ice	7.81	4.52	0
						1" Ice	8.65	5.63	0
						2" Ice			
HCS 2.0 Part 1	A	From Leg	4.00	0.0000	87.00	No Ice	1.87	0.93	0
			0.00			1/2"	2.04	1.06	0
			0.00			Ice	2.21	1.19	0
						1" Ice	2.59	1.48	0
						2" Ice			
AHLOA_T-MOBILE	A	From Leg	4.00	0.0000	87.00	No Ice	2.86	1.85	0
			0.00			1/2"	3.08	2.04	0
			1.00			Ice	3.31	2.23	0
						1" Ice	3.80	2.65	0
						2" Ice			
AHLOA_T-MOBILE	B	From Leg	4.00	0.0000	87.00	No Ice	2.86	1.85	0
			0.00			1/2"	3.08	2.04	0
			1.00			Ice	3.31	2.23	0
						1" Ice	3.80	2.65	0
						2" Ice			
AHLOA_T-MOBILE	C	From Leg	4.00	0.0000	87.00	No Ice	2.86	1.85	0
			0.00			1/2"	3.08	2.04	0
			1.00			Ice	3.31	2.23	0
						1" Ice	3.80	2.65	0
						2" Ice			
AHFIB_T-MOBILE	A	From Leg	4.00	0.0000	87.00	No Ice	2.85	1.52	0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 4.00			1/2" Ice 1" Ice 2" Ice	3.07 3.30 3.79	1.70 1.89 2.29	0 0 0
AHFIB_T-MOBILE	B	From Leg	4.00 0.00 4.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.85 3.07 3.30 3.79	1.52 1.70 1.89 2.29	0 0 0 0
AHFIB_T-MOBILE	C	From Leg	4.00 0.00 4.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.85 3.07 3.30 3.79	1.52 1.70 1.89 2.29	0 0 0 0
(2) 8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0 0 0 0
(2) 8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0 0 0 0
(2) 8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0 0 0 0
Platform Mount [LP 303-1_KCKR-HR-1] *	C	None		0.0000	87.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.31 35.69 43.11 58.21	28.31 35.69 43.11 58.21	2 2 3 5
Side Arm Mount [SO 102-3] *	C	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.18 4.75 5.90	3.60 4.18 4.75 5.90	0 0 0 0
Pipe Mount [PM 601-1]	A	From Leg	2.00 0.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.32 1.58 1.84 2.40	1.32 1.58 1.84 2.40	0 0 0 0
Side Arm Mount [SO 104-3] ****** ***	C	None		0.0000	64.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	2.62 3.30 3.98 5.35	2.62 3.30 3.98 5.35	0 0 1 1

Dishes

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
UKY 210 73/SC15	A	Paraboloid w/o Radome	From Leg	2.00 0.00 2.00	20.0000		64.00	1.25	No Ice 1/2" Ice 1" Ice 2" Ice	1.23 1.40 1.57 1.90	0 0 0 0
****** ***											

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 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 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	100 - 95	Pole	Max Tension	2	0	0.00	-0.00
			Max. Compression	26	-13	-0.00	0.64
			Max. Mx	20	-7	31.24	0.13
			Max. My	2	-7	-0.00	30.85
			Max. Vy	20	-5	31.24	0.13
			Max. Vx	2	-5	-0.00	30.85
			Max. Torque	20			-0.58
L2	95 - 71.5	Pole	Max Tension	1	0	0.00	0.00
			Max. Compression	26	-25	-0.11	1.05
			Max. Mx	8	-13	-196.81	0.39
			Max. My	2	-13	-0.11	195.21
			Max. Vy	20	-10	196.77	0.20
			Max. Vx	2	-10	-0.11	195.21
			Max. Torque	20			-0.71
L3	71.5 - 31.5	Pole	Max Tension	1	0	0.00	0.00
			Max. Compression	26	-37	-0.15	1.43
			Max. Mx	20	-22	668.96	-0.95
			Max. My	2	-22	-0.15	665.72
			Max. Vy	20	-14	668.96	-0.95
			Max. Vx	14	14	0.83	-665.13
			Max. Torque	20			-0.97
L4	31.5 - 0	Pole	Max Tension	1	0	0.00	0.00
			Max. Compression	26	-49	-0.16	1.27
			Max. Mx	20	-32	1200.76	-2.67
			Max. My	14	-32	1.71	-1195.93
			Max. Vy	20	-16	1200.76	-2.67
			Max. Vx	14	16	1.71	-1195.93
			Max. Torque	20			-0.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	29	49	-4	2
	Max. H_x	20	32	16	0
	Max. H_z	2	32	0	16
	Max. M_x	2	1195.72	0	16
	Max. M_z	8	1199.82	-16	0
	Max. Torsion	8	0.93	-16	0
	Min. Vert	25	24	8	14
	Min. H_x	8	32	-16	0
	Min. H_z	14	32	0	-16
	Min. M_x	14	-1195.93	0	-16
	Min. M_z	20	-1200.76	16	0
	Min. Torsion	20	-0.97	16	0

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	27	0	0	-0.50	-0.02	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	32	0	-16	-1195.72	-0.19	-0.00
0.9 Dead+1.0 Wind 0 deg - No Ice	24	0	-16	-1186.97	-0.19	-0.00
1.2 Dead+1.0 Wind 30 deg -	32	8	-14	-1035.79	-600.54	-0.49

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
No Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	24	8	-14	-1028.19	-596.22	-0.49
1.2 Dead+1.0 Wind 60 deg - No Ice	32	14	-8	-598.06	-1039.53	-0.83
0.9 Dead+1.0 Wind 60 deg - No Ice	24	14	-8	-593.61	-1032.05	-0.83
1.2 Dead+1.0 Wind 90 deg - No Ice	32	16	0	-1.56	-1199.82	-0.93
0.9 Dead+1.0 Wind 90 deg - No Ice	24	16	0	-1.39	-1191.19	-0.93
1.2 Dead+1.0 Wind 120 deg - No Ice	32	14	8	597.92	-1037.96	-0.76
0.9 Dead+1.0 Wind 120 deg - No Ice	24	14	8	593.79	-1030.49	-0.76
1.2 Dead+1.0 Wind 150 deg - No Ice	32	8	14	1036.56	-597.69	-0.36
0.9 Dead+1.0 Wind 150 deg - No Ice	24	8	14	1029.28	-593.38	-0.36
1.2 Dead+1.0 Wind 180 deg - No Ice	32	0	16	1195.93	1.71	0.08
0.9 Dead+1.0 Wind 180 deg - No Ice	24	0	16	1187.50	1.71	0.08
1.2 Dead+1.0 Wind 210 deg - No Ice	32	-8	14	1036.30	600.55	0.49
0.9 Dead+1.0 Wind 210 deg - No Ice	24	-8	14	1029.01	596.24	0.49
1.2 Dead+1.0 Wind 240 deg - No Ice	32	-14	8	599.94	1039.30	0.81
0.9 Dead+1.0 Wind 240 deg - No Ice	24	-14	8	595.79	1031.84	0.81
1.2 Dead+1.0 Wind 270 deg - No Ice	32	-16	0	2.67	1200.76	0.97
0.9 Dead+1.0 Wind 270 deg - No Ice	24	-16	0	2.81	1192.13	0.97
1.2 Dead+1.0 Wind 300 deg - No Ice	32	-14	-8	-598.22	1038.26	0.77
0.9 Dead+1.0 Wind 300 deg - No Ice	24	-14	-8	-593.77	1030.80	0.77
1.2 Dead+1.0 Wind 330 deg - No Ice	32	-8	-14	-1035.01	599.80	0.47
0.9 Dead+1.0 Wind 330 deg - No Ice	24	-8	-14	-1027.42	595.49	0.47
1.2 Dead+1.0 Ice+1.0 Temp	49	0	0	-1.27	-0.16	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	49	0	-5	-379.47	-0.21	-0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	49	2	-4	-328.87	-189.89	-0.15
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	49	4	-2	-190.39	-328.60	-0.25
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	49	5	0	-1.65	-379.25	-0.28
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	49	4	2	187.96	-328.14	-0.23
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	49	2	4	326.70	-189.06	-0.11
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	49	0	5	377.14	0.34	0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	49	-2	4	326.62	189.57	0.15
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	49	-4	2	188.54	328.21	0.24
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	49	-5	0	-0.42	379.21	0.29
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	49	-4	-2	-190.45	327.91	0.23
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	49	-2	-4	-328.65	189.36	0.14
Dead+Wind 0 deg - Service	27	0	-5	-340.21	-0.07	-0.00

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 30 deg - Service	27	2	-4	-294.76	-170.71	-0.15
Dead+Wind 60 deg - Service	27	4	-2	-170.34	-295.49	-0.24
Dead+Wind 90 deg - Service	27	5	0	-0.78	-341.05	-0.28
Dead+Wind 120 deg - Service	27	4	2	169.61	-295.04	-0.22
Dead+Wind 150 deg - Service	27	2	4	294.29	-169.90	-0.11
Dead+Wind 180 deg - Service	27	0	5	339.59	0.47	0.02
Dead+Wind 210 deg - Service	27	-2	4	294.22	170.69	0.15
Dead+Wind 240 deg - Service	27	-4	2	170.19	295.40	0.24
Dead+Wind 270 deg - Service	27	-5	0	0.42	341.29	0.29
Dead+Wind 300 deg - Service	27	-4	-2	-170.38	295.10	0.23
Dead+Wind 330 deg - Service	27	-2	-4	-294.53	170.47	0.14

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0	-27	0	0	27	0	0.000%
2	0	-32	-16	0	32	16	0.000%
3	0	-24	-16	0	24	16	0.000%
4	8	-32	-14	-8	32	14	0.000%
5	8	-24	-14	-8	24	14	0.000%
6	14	-32	-8	-14	32	8	0.000%
7	14	-24	-8	-14	24	8	0.000%
8	16	-32	0	-16	32	0	0.000%
9	16	-24	0	-16	24	0	0.000%
10	14	-32	8	-14	32	-8	0.000%
11	14	-24	8	-14	24	-8	0.000%
12	8	-32	14	-8	32	-14	0.000%
13	8	-24	14	-8	24	-14	0.000%
14	0	-32	16	0	32	-16	0.000%
15	0	-24	16	0	24	-16	0.000%
16	-8	-32	14	8	32	-14	0.000%
17	-8	-24	14	8	24	-14	0.000%
18	-14	-32	8	14	32	-8	0.000%
19	-14	-24	8	14	24	-8	0.000%
20	-16	-32	0	16	32	0	0.000%
21	-16	-24	0	16	24	0	0.000%
22	-14	-32	-8	14	32	8	0.000%
23	-14	-24	-8	14	24	8	0.000%
24	-8	-32	-14	8	32	14	0.000%
25	-8	-24	-14	8	24	14	0.000%
26	0	-49	0	0	49	0	0.000%
27	0	-49	-5	0	49	5	0.000%
28	2	-49	-4	-2	49	4	0.000%
29	4	-49	-2	-4	49	2	0.000%
30	5	-49	0	-5	49	0	0.000%
31	4	-49	2	-4	49	-2	0.000%
32	2	-49	4	-2	49	-4	0.000%
33	0	-49	5	0	49	-5	0.000%
34	-2	-49	4	2	49	-4	0.000%
35	-4	-49	2	4	49	-2	0.000%
36	-5	-49	0	5	49	0	0.000%
37	-4	-49	-2	4	49	2	0.000%
38	-2	-49	-4	2	49	4	0.000%
39	0	-27	-5	0	27	5	0.000%
40	2	-27	-4	-2	27	4	0.000%
41	4	-27	-2	-4	27	2	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
42	5	-27	0	-5	27	0	0.000%
43	4	-27	2	-4	27	-2	0.000%
44	2	-27	4	-2	27	-4	0.000%
45	0	-27	5	0	27	-5	0.000%
46	-2	-27	4	2	27	-4	0.000%
47	-4	-27	2	4	27	-2	0.000%
48	-5	-27	0	5	27	0	0.000%
49	-4	-27	-2	4	27	2	0.000%
50	-2	-27	-4	2	27	4	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	4	0.00000001	0.00006247
3	Yes	4	0.00000001	0.00003138
4	Yes	5	0.00000001	0.00009771
5	Yes	5	0.00000001	0.00004854
6	Yes	5	0.00000001	0.00010981
7	Yes	5	0.00000001	0.00005481
8	Yes	4	0.00000001	0.00048463
9	Yes	4	0.00000001	0.00033085
10	Yes	5	0.00000001	0.00009529
11	Yes	5	0.00000001	0.00004736
12	Yes	5	0.00000001	0.00010447
13	Yes	5	0.00000001	0.00005211
14	Yes	4	0.00000001	0.00007258
15	Yes	4	0.00000001	0.00004039
16	Yes	5	0.00000001	0.00010582
17	Yes	5	0.00000001	0.00005280
18	Yes	5	0.00000001	0.00009550
19	Yes	5	0.00000001	0.00004745
20	Yes	4	0.00000001	0.00047881
21	Yes	4	0.00000001	0.00032705
22	Yes	5	0.00000001	0.00010923
23	Yes	5	0.00000001	0.00005452
24	Yes	5	0.00000001	0.00009759
25	Yes	5	0.00000001	0.00004849
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00009873
28	Yes	5	0.00000001	0.00010996
29	Yes	5	0.00000001	0.00011060
30	Yes	5	0.00000001	0.00009865
31	Yes	5	0.00000001	0.00010860
32	Yes	5	0.00000001	0.00010873
33	Yes	5	0.00000001	0.00009741
34	Yes	5	0.00000001	0.00010879
35	Yes	5	0.00000001	0.00010865
36	Yes	5	0.00000001	0.00009857
37	Yes	5	0.00000001	0.00011033
38	Yes	5	0.00000001	0.00010973
39	Yes	4	0.00000001	0.00001429
40	Yes	4	0.00000001	0.00007152
41	Yes	4	0.00000001	0.00009728
42	Yes	4	0.00000001	0.00004163
43	Yes	4	0.00000001	0.00006936
44	Yes	4	0.00000001	0.00008461
45	Yes	4	0.00000001	0.00001444
46	Yes	4	0.00000001	0.00008711
47	Yes	4	0.00000001	0.00006970
48	Yes	4	0.00000001	0.00004226
49	Yes	4	0.00000001	0.00009603
50	Yes	4	0.00000001	0.00007142

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95	7.250	48	0.5673	0.0018
L2	95 - 71.5	6.659	48	0.5613	0.0016
L3	75 - 31.5	4.398	48	0.5062	0.0011
L4	35.75 - 0	1.093	48	0.2736	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
99.00	AIR 6472 B77G B77M w/ Mount Pipe	48	7.132	0.5662	0.0017	39773
87.00	FFHH-65C-R3_T-MOBILE w/ Mount Pipe	48	5.729	0.5456	0.0013	23656
75.00	Side Arm Mount [SO 102-3]	48	4.398	0.5062	0.0011	15701
66.00	UKY 210 73/SC15	48	3.471	0.4649	0.0009	11655
64.00	Pipe Mount [PM 601-1]	48	3.275	0.4546	0.0009	11006

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 95	25.533	20	1.9978	0.0060
L2	95 - 71.5	23.449	20	1.9769	0.0052
L3	75 - 31.5	15.488	20	1.7830	0.0036
L4	35.75 - 0	3.846	20	0.9635	0.0013

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
99.00	AIR 6472 B77G B77M w/ Mount Pipe	20	25.115	1.9940	0.0058	11366
87.00	FFHH-65C-R3_T-MOBILE w/ Mount Pipe	20	20.174	1.9216	0.0044	6744
75.00	Side Arm Mount [SO 102-3]	20	15.488	1.7830	0.0036	4467
66.00	UKY 210 73/SC15	20	12.222	1.6377	0.0031	3315
64.00	Pipe Mount [PM 601-1]	20	11.533	1.6011	0.0029	3130

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	100 - 95 (1)	TP20x20x0.375	5.00	0.00	0.0	23.1202	-7	957	0.007
L2	95 - 71.5 (2)	TP28.538x24.5x0.4125	23.50	0.00	0.0	36.5589	-13	2139	0.006
L3	71.5 - 31.5 (3)	TP34.587x26.4414x0.5	43.50	0.00	0.0	53.5988	-22	3136	0.007
L4	31.5 - 0 (4)	TP39x32.7912x0.5	35.75	0.00	0.0	61.9850	-32	3626	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	100 - 95 (1)	TP20x20x0.375	31.24	478.14	0.065	0.00	478.14	0.000
L2	95 - 71.5 (2)	TP28.538x24.5x0.4125	196.81	1500.53	0.131	0.00	1500.53	0.000
L3	71.5 - 31.5 (3)	TP34.587x26.4414x0.5	668.96	2660.79	0.251	0.00	2660.79	0.000
L4	31.5 - 0 (4)	TP39x32.7912x0.5	1200.76	3565.70	0.337	0.00	3565.70	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	100 - 95 (1)	TP20x20x0.375	5	287	0.019	0.58	495.45	0.001
L2	95 - 71.5 (2)	TP28.538x24.5x0.4125	10	642	0.016	0.71	1553.40	0.000
L3	71.5 - 31.5 (3)	TP34.587x26.4414x0.5	14	941	0.014	0.97	2754.62	0.000
L4	31.5 - 0 (4)	TP39x32.7912x0.5	16	1088	0.015	0.97	3684.04	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	100 - 95 (1)	0.007	0.065	0.000	0.019	0.001	0.073	1.050	
L2	95 - 71.5 (2)	0.006	0.131	0.000	0.016	0.000	0.138	1.050	
L3	71.5 - 31.5 (3)	0.007	0.251	0.000	0.014	0.000	0.259	1.050	
L4	31.5 - 0 (4)	0.009	0.337	0.000	0.015	0.000	0.346	1.050	

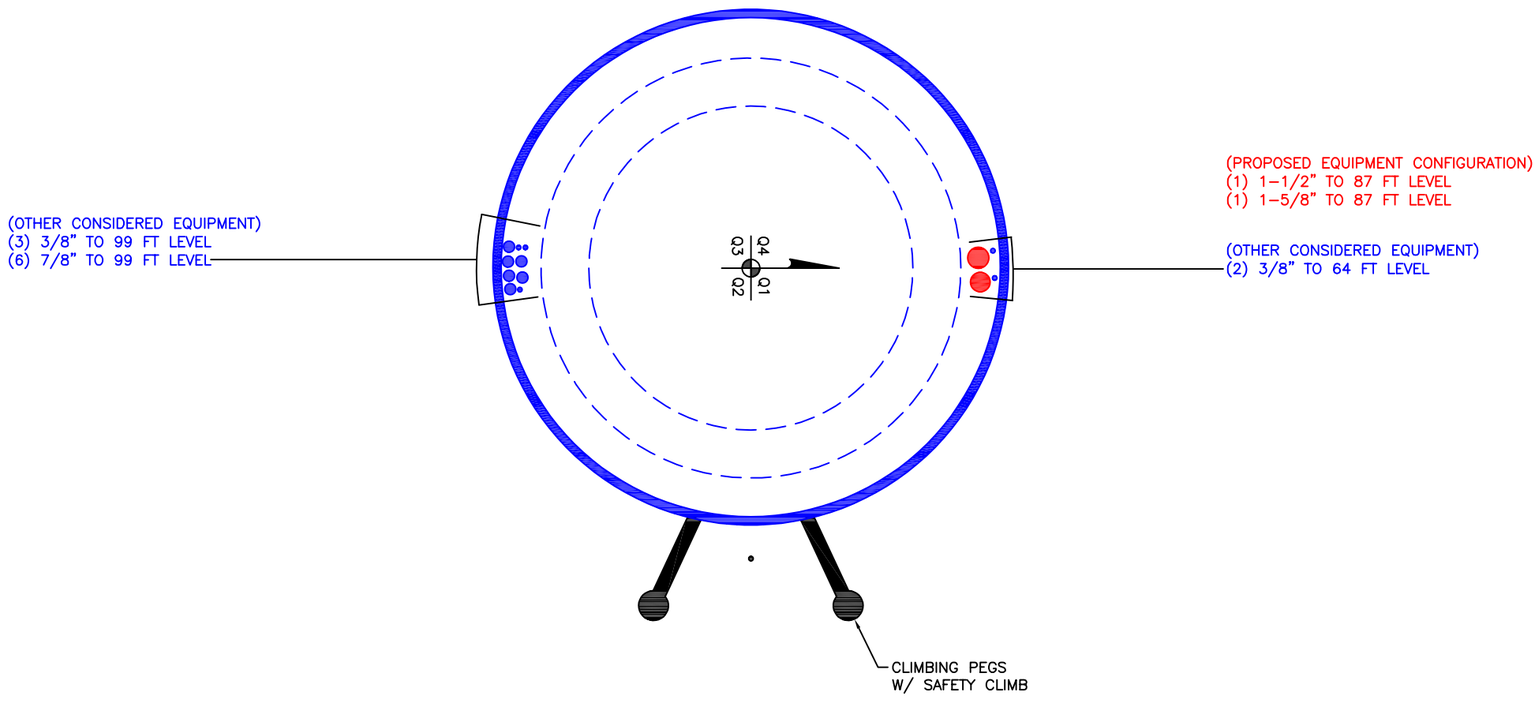
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	100 - 95	Pole	TP20x20x0.375	1	-7	1005	6.9	Pass
L2	95 - 71.5	Pole	TP28.538x24.5x0.4125	2	-13	2246	13.1	Pass
L3	71.5 - 31.5	Pole	TP34.587x26.4414x0.5	3	-22	3292	24.6	Pass
L4	31.5 - 0	Pole	TP39x32.7912x0.5	4	-32	3807	32.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
							Summary	
						Pole (L4)	32.9	Pass
						RATING =	**32.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(3) 3/8" TO 99 FT LEVEL
(6) 7/8" TO 99 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 87 FT LEVEL
(1) 1-5/8" TO 87 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 3/8" TO 64 FT LEVEL
Q4
Q3
Q2
Q1
CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

Elevation = 95 ft.

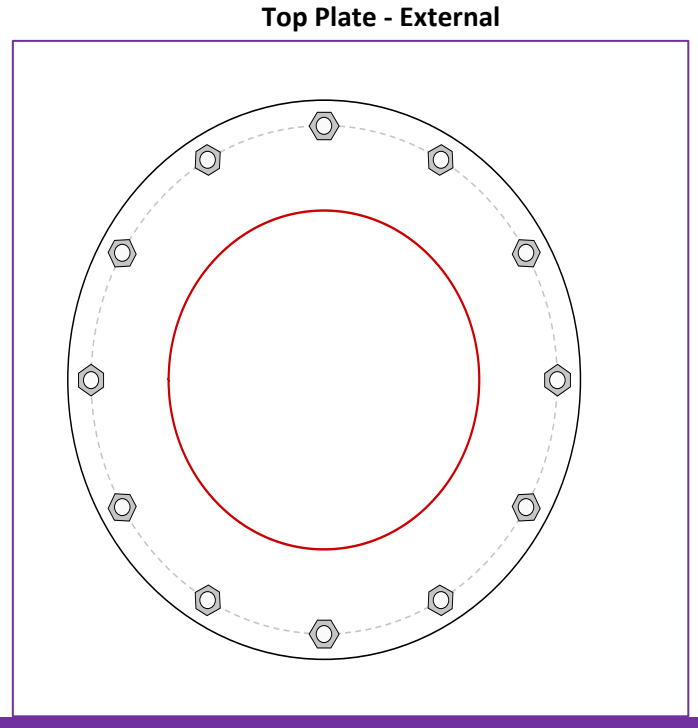
BU #	844362
Site Name	LYNDALE
Order #	712975 Rev.0

TIA-222 Revision	H

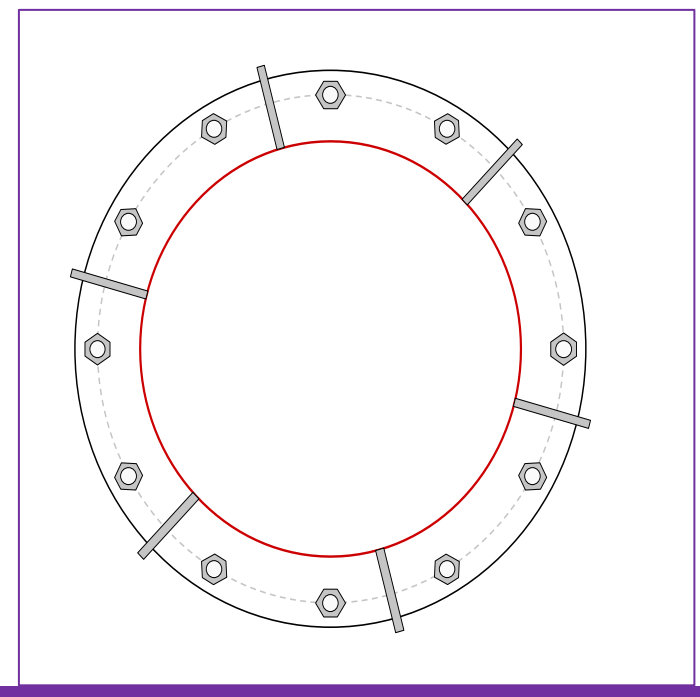
Applied Loads	
Moment (kip-ft)	31.24
Axial Force (kips)	6.53
Shear Force (kips)	5.43

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 30" BC

Top Plate Data

33" OD x 1.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Bottom Plate Data

32.875" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

(6) 7"H x 5"W x 0.5"T, Notch: 0.5"
plate: Fy= 36 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.375" fillet
vert. weld: 0.375" fillet

Top Pole Data

20" x 0.375" round pole (A500-46; Fy=46 ksi, Fu=62 ksi)

Bottom Pole Data

24.5" x 0.4125" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	3.62	
Allowable (kips)	54.54	
Stress Rating:	**6.3%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	3.84	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**8.1%**	**Pass**
Tension Side Stress Rating:	**5.0%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	2.10	(Flexural (b/Le>2))
Allowable Stress (ksi):	32.40	
Stress Rating:	**6.2%**	**Pass**
Tension Side Stress Rating:	**2.2%**	**Pass**

Top Stiffener Capacity

Horizontal Weld:	**N/A**
Vertical Weld:	**N/A**
Plate Flexure+Shear:	**N/A**
Plate Tension+Shear:	**N/A**
Plate Compression:	**N/A**

Bottom Stiffener Capacity

Horizontal Weld:	**5.4%**	**Pass**
Vertical Weld:	**3.7%**	**Pass**
Plate Flexure+Shear:	**2.8%**	**Pass**
Plate Tension+Shear:	**5.1%**	**Pass**
Plate Compression:	**9.8%**	**Pass**

Top Pole Capacity

Punching Shear:	**N/A**

Bottom Pole Capacity

Punching Shear:	**1.3%**	**Pass**

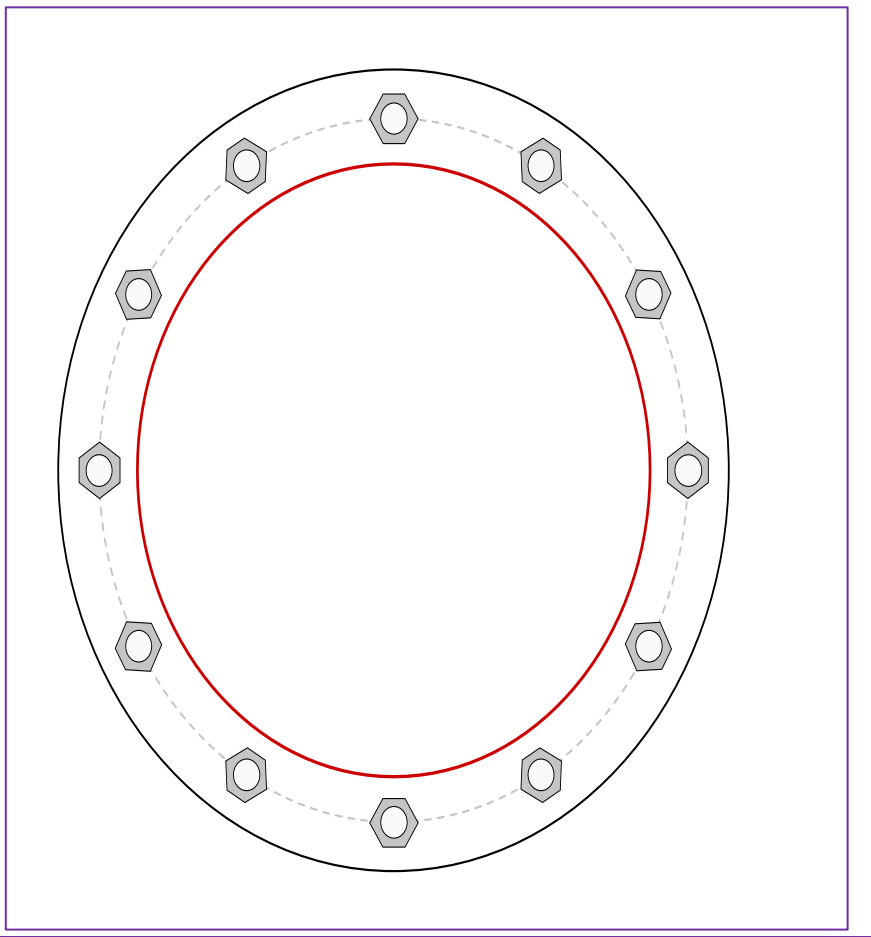
Monopole Base Plate Connection

Site Info	
BU #	844362
Site Name	LYNDALE
Order #	712975 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	1200.76
Axial Force (kips)	32.42
Shear Force (kips)	16.04

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 44.7846" BC

Base Plate Data

51" OD x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

39" x 0.5" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 104.46	ϕPn_t = 187.5	**Stress Rating**
Vu = 1.34	ϕVn = 117.81	**53.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	13.15	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**27.8%**	**Pass**

Drilled Pier Foundation

BU # :	844362
Site Name:	LYNDALE
Order Number:	712975 Rev.0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	1200.76	
Axial Force (kips)	32	
Shear Force (kips)	16	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	26.83	ft
Ext. Above Grade	0.167	ft
Pier Section 1		
From 0.167' above grade to 26.83' below grade		
Pier Diameter	5.5	ft
Rebar Quantity	36	
Rebar Size	9	
Clear Cover to Ties	4.5	in
Tie Size	4	
Tie Spacing		in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	8.59	-
Soil Safety Factor	4.91	-
Max Moment (kip-ft)	1336.75	-
Rating*	*25.8%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	313.98	-
End Bearing (kips)	0.00	-
Weight of Concrete (kips)	89.06	-
Total Capacity (kips)	313.98	-
Axial (kips)	121.06	-
Rating*	*36.7%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	8.68	-
Critical Moment (kip-ft)	1336.70	-
Critical Moment Capacity	4061.06	-
Rating*	*31.3%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	18.06	-
Critical Shear (kip)	140.29	-
Critical Shear Capacity	323.01	-
Rating*	*41.4%*	-

Structural Foundation Rating*	**41.4%**
Soil Interaction Rating*	**36.7%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Design Options	
Input Effective Depths (else Actual):	☐
Consider non-tapered moment capacity:	☐
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

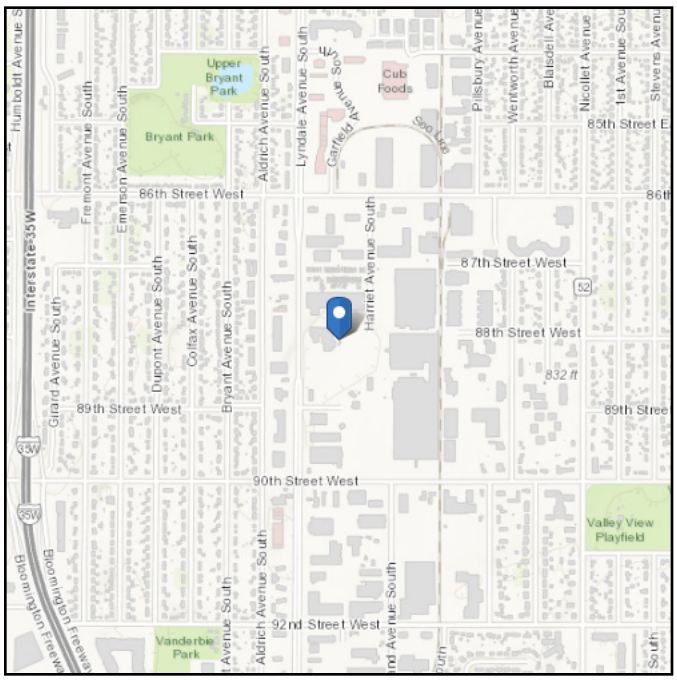
Groundwater Depth	12	# of Layers	5

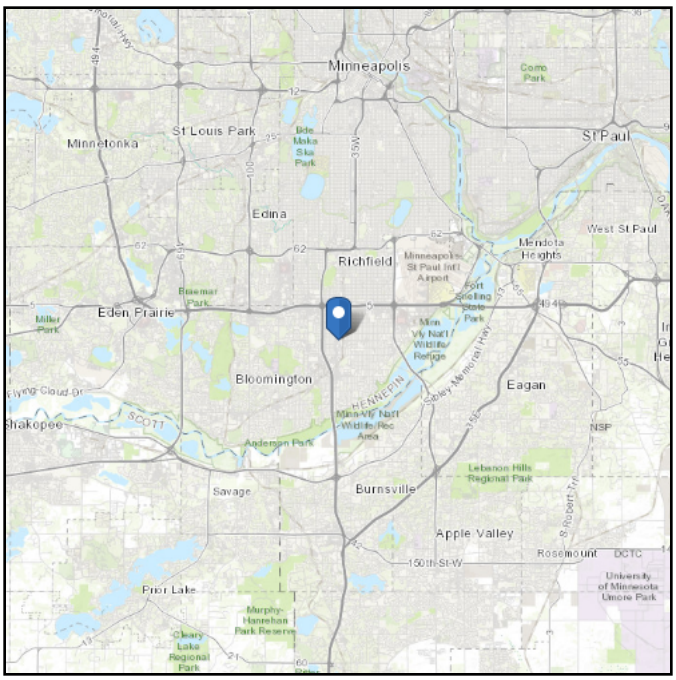
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	6.67	6.67	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	6.67	12	5.33	120	150	0	30	1.056	1.056				13	Cohesionless
3	12	20	8	60	87.6	0	30	1.505	1.505				14	Cohesionless
4	20	24	4	60	87.6	0.6	0	0.330	0.330					Cohesive
5	24	26.83	2.83	70	87.6	0	35	1.851	1.851			0	15	Cohesionless

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	44.844286
Risk Category:	II	**Longitude:**	-93.287142
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	823.4853832806652 ft (NAVD 88)





Wind

Results:

Wind Speed	109 Vmph
10-year MRI	75 Vmph
25-year MRI	82 Vmph
50-year MRI	87 Vmph
100-year MRI	93 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Tue Jul 22 2025

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

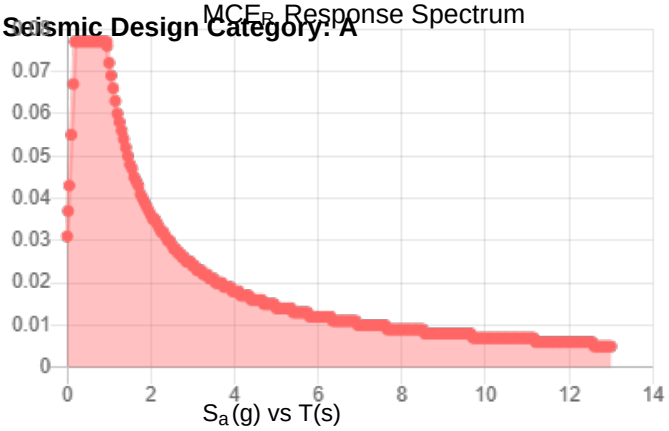
Site Soil Class: D - Default (see Section 11.4.3)

Results:

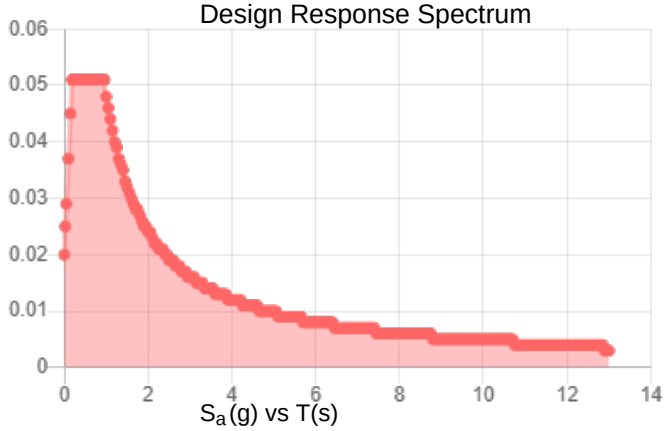
S_S :	0.048	S_{D1} :	0.048
S_1 :	0.03	T_L :	12
F_a :	1.6	PGA :	0.023
F_v :	2.4	PGA_M :	0.036
S_{MS} :	0.077	F_{PGA} :	1.6
S_{M1} :	0.072	I_e :	1
S_{DS} :	0.051	C_v :	0.7

Seismic Design Category: A

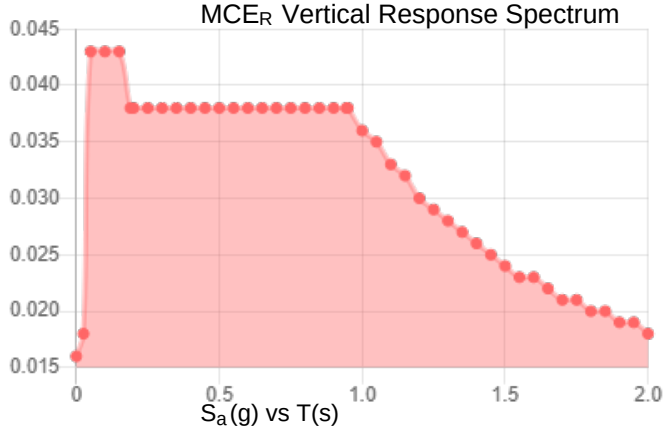
MCE_R Response Spectrum



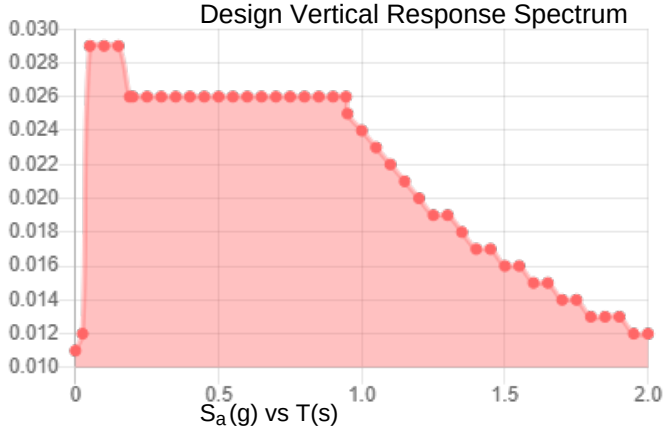
Design Response Spectrum



MCE_R Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: **Tue Jul 22 2025**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	-5 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Jul 22 2025

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.