

Date: **March 25, 2024**



Brittnee Zimmerman
Smartlink
(312) 869-1109

SMW Engineering Group, Inc.
158 Business Center Drive
Birmingham, AL 35244
(205) 252-6985

Subject: **Structural Analysis Report**

Carrier Designation: **T-Mobile**
Carrier Site Number: 9JK1918A
Carrier Site Name: White Springs

Engineering Firm Designation: **SMW Engineering Group, Inc. Project Number:** 17-5641.3

Site Data: **26972 North US Hwy 441, White Springs, FL 32096 (Columbia County)**
Latitude 30.569°, Longitude -82.681°
250 Foot - Self Support Tower

Dear Brittnee Zimmerman,

SMW Engineering Group, Inc. 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:

Proposed Equipment Configuration

Sufficient Capacity

The analysis utilizes an ultimate 3-second gust wind speed of 117 mph as required by the 2023 Florida Building Code, 8th Edition. Applicable standard references and design criteria are listed in Section 2 – Analysis Criteria.

Respectfully submitted by:

Jeremy D. Sharit, P.E.
Project Engineer
FL CA #33693

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1) INTRODUCTION

This tower is a 250 ft Self Support tower designed by World Tower.

2) ANALYSIS CRITERIA

Building Code:	2023 Florida Building Code, 8th Edition
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	117 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	0.25 in
Wind Speed with Ice:	30 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)
245.0	245.0	3	Ericsson	AIR 6419 B41 Antennas	-	-
		3	Ericsson	RADIO 4460 B25+B66		

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)
250.0	252.0	1	-	Lightning Rod	-	-
	251.0	1	-	Flash Beacon Lighting		
245.0	245.0	3	-	C10857001C Mounts	3	1.996 Hybrid
		3	-	Pipe Mounts		
		3	Commscope	FFVV-65C-R3-V1 w/ Mount Pipe		
		3	Ericsson	RADIO 4480 B71+B85		
230.0	230.0	2	Ceragon	IP20D ODU	1 1	1/2 Coax 55mm Fiber
		1	-	Pipe Mount		
		1	RFS	SB6-W60C Dish		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Manufacturer Drawings	World Tower	Dated 11/18/16	T-Mobile
RFDS	T-Mobile	Dated 9/13/23	NexTower Development
Geotechnical Report	Trileaf	Dated 01/18/16	T-Mobile
Structural Analysis	SMW Engineering Group, Inc.	Dated 01/12/24	SMW Engineering Group, Inc.

3.1) Analysis Method

tnxTower (version 8.1.1.0), 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.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) 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. SMW Engineering Group, Inc. 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
T1	250 - 240	Leg	1 1/2	2	-5.02	39.03	12.9	Pass
T2	240 - 220	Leg	2	28	-32.24	91.64	35.2	Pass
T3	220 - 200	Leg	P5x.258	78	-54.06	179.55	30.1	Pass
T4	200 - 180	Leg	P6x.28	108	-73.71	238.36	30.9	Pass
T5	180 - 160	Leg	P8x0.25	135	-93.07	287.23	32.4	Pass
T6	160 - 140	Leg	P8x.322	162	-113.31	366.59	30.9	Pass
T7	140 - 120	Leg	P10x.365	189	-131.29	495.59	26.5	Pass
T8	120 - 100	Leg	P10x.365	204	-152.59	495.59	30.8	Pass
T9	100 - 80	Leg	P10x.365	219	-174.51	495.59	35.2	Pass
T10	80 - 60	Leg	P12x.375	234	-197.01	620.91	31.7	Pass
T11	60 - 40	Leg	P12x.375	249	-216.10	620.86	34.8	Pass
T12	40 - 20	Leg	P12x.375	264	-233.81	620.86	37.7	Pass
T13	20 - 0	Leg	P12x.375	279	-251.14	620.86	40.5	Pass
T1	250 - 240	Diagonal	1	12	-3.57	6.57	54.4	Pass
T2	240 - 220	Diagonal	1 1/4	39	-6.15	15.87	38.8	Pass
T3	220 - 200	Diagonal	L2x2x3/16	104	-2.90	17.55	16.5	Pass
T4	200 - 180	Diagonal	L2x2x3/16	113	-2.48	13.81	17.9	Pass
T5	180 - 160	Diagonal	L2x2x1/4	140	-2.87	14.78	19.4	Pass
T6	160 - 140	Diagonal	L2x2x1/4	167	-3.05	11.87	25.7	Pass
T7	140 - 120	Diagonal	L3x3x3/16	194	-4.47	16.38	27.3	Pass
T8	120 - 100	Diagonal	L3x3x3/16	210	-4.82	14.43	33.4	Pass
T9	100 - 80	Diagonal	L3x3x1/4	225	-5.24	16.65	31.4	Pass
T10	80 - 60	Diagonal	L3x3x3/8	240	-6.07	21.72	27.9	Pass
T11	60 - 40	Diagonal	L3x3x1/4	255	-4.69	12.82	36.6	Pass
T12	40 - 20	Diagonal	L3x3x3/8	270	-5.30	15.98	33.1	Pass
T13	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	285	-6.40	14.81	43.2	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	250 - 240	Horizontal	1	16	-0.93	10.42	9.0	Pass
T2	240 - 220	Horizontal	1	49	-0.72	10.63	6.8	Pass
T1	250 - 240	Secondary Horizontal	1	13	-0.00	17.56	0.0	Pass
T2	240 - 220	Secondary Horizontal	1	40	-0.00	17.59	0.0	Pass
T1	250 - 240	Top Girt	1 1/8	4	-0.03	15.91	0.2	Pass
T2	240 - 220	Top Girt	1 1/8	33	-1.60	16.15	9.9	Pass
T3	220 - 200	Top Girt	L2x2x1/8	80	-0.94	10.27	9.1	Pass
T1	250 - 240	Bottom Girt	1	9	-1.49	10.42	14.3	Pass
T2	240 - 220	Bottom Girt	1	36	-1.71	10.63	16.1	Pass
							Summary	
						Leg (T13)	40.5	Pass
						Diagonal (T1)	54.4	Pass
						Horizontal (T1)	9.0	Pass
						Secondary Horizontal (T1)	0.0	Pass
						Top Girt (T2)	9.9	Pass
						Bottom Girt (T2)	16.1	Pass
						Rating =	54.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	25.6	Pass
1	Base Foundation (Structure)	0	25.4	Pass
1	Base Foundation (Soil Interaction)	0	40.4	Pass

Structure Rating (max from all components) =	54.4%
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Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

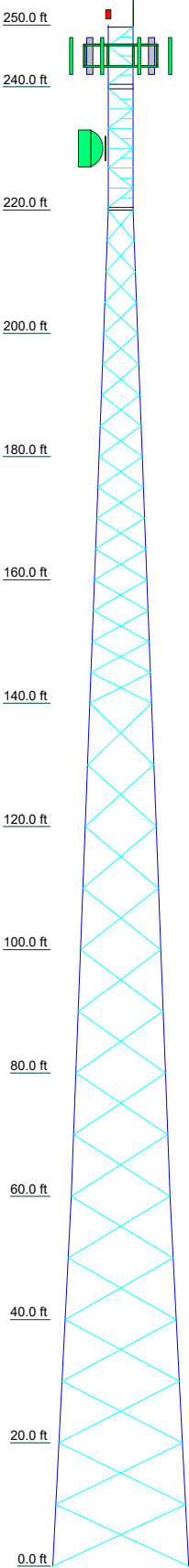
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

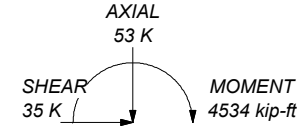
Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		P12x.375				P8x.322		P10x.365	P8x0.25	P6x.28	P5x.258	SR 2	SR 1 1/2
Leg Grade								A500-50				A572-50	
Diagonals	L3 1/2x3 1/2x1/4	L3x3x3/8	L3x3x1/4	L3x3x3/8	L3x3x1/4			L3x3x3/16	L2x2x1/4		L2x2x3/16	SR 1 1/4	SR 1
Diagonal Grade													
Top Girts												SR 1 1/8	
Bottom Girts												SR 1	
Horizontals												SR 1	
Sec. Horizontals												SR 1	
Face Width (ft)	20	18	16	14 @ 10	14.5	13	11.5	10	8.5	7	5.5	6 @ 3.20833	3 @ 3.08333
# Panels @ (ft)	4.8	4.1	4.6	4.6	3.4	3.1	3.1	3.1	2.1	1.6	1.3	1.3	0.5
Weight (K)	37.0												



ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 256 K
SHEAR: 23 K

UPLIFT: -212 K
SHEAR: 20 K



TORQUE 25 kip-ft
REACTIONS - 117 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	250	C10857001C Mount [3]	245
Flash Beacon Lighting	250	AIR 6419 B41	245
FFVV-65C-R3-V1 w/ Mount Pipe	245	AIR 6419 B41	245
FFVV-65C-R3-V1 w/ Mount Pipe	245	AIR 6419 B41	245
FFVV-65C-R3-V1 w/ Mount Pipe	245	RADIO 4460 B2/B25 B66 _TMO	245
RADIO 4480 B71 _TMO	245	RADIO 4460 B2/B25 B66 _TMO	245
RADIO 4480 B71 _TMO	245	RADIO 4460 B2/B25 B66 _TMO	245
RADIO 4480 B71 _TMO	245	(2) IP20D ODU	230
Pipe Mount	245	Pipe Mount	230
Pipe Mount	245	SB6-W60C	230
Pipe Mount	245		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A500-50	50 ksi	62 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in Columbia County, Florida.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 117 mph basic wind in accordance with the TIA-222-H Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 54.4%



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Phone: (205) 252-6985

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Job: **9JK1918A**

Project: **17-5641.3**

Client: NexTower Development

Code: TIA-222-H

Path:

Drawn by: Joe McAllister

Date: 03/21/24

Scale: NTS

App'd:

Dwg No. E-1

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Tower Input Data

The main tower is a 3x free standing tower with an overall height of 250.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 4.00 ft at the top and 22.00 ft at the base.

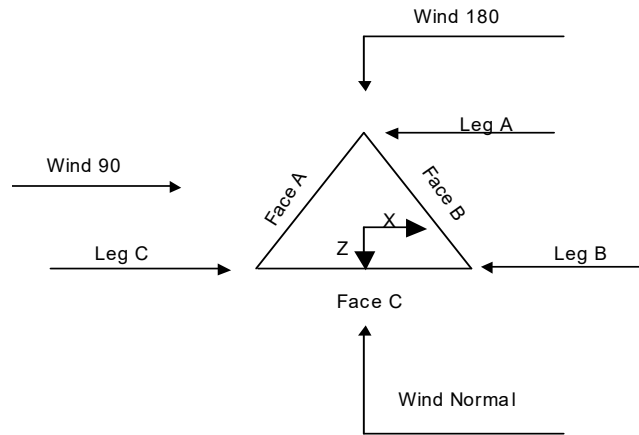
This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Columbia County, Florida.
- Tower base elevation above sea level: 125.00 ft.
- Basic wind speed of 117 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.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$.
- Maximum demand-capacity ratio is: 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist.
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-H Tension Splice
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Poles
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Include Shear-Torsion Interaction
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	250.00-240.00			4.00	1	10.00
T2	240.00-220.00			4.00	1	20.00
T3	220.00-200.00			4.00	1	20.00
T4	200.00-180.00			5.50	1	20.00
T5	180.00-160.00			7.00	1	20.00
T6	160.00-140.00			8.50	1	20.00
T7	140.00-120.00			10.00	1	20.00
T8	120.00-100.00			11.50	1	20.00
T9	100.00-80.00			13.00	1	20.00
T10	80.00-60.00			14.50	1	20.00
T11	60.00-40.00			16.00	1	20.00
T12	40.00-20.00			18.00	1	20.00
T13	20.00-0.00			20.00	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	250.00-240.00	3.08	K Brace Left	No	Yes+Steps	4.5000	4.5000
T2	240.00-220.00	3.21	K Brace Left	No	Yes+Steps	4.5000	4.5000
T3	220.00-200.00	5.00	X Brace	No	No	0.0000	0.0000
T4	200.00-180.00	5.00	X Brace	No	No	0.0000	0.0000
T5	180.00-160.00	5.00	X Brace	No	No	0.0000	0.0000
T6	160.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T7	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T8	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T9	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T10	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T11	60.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T12	40.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T13	20.00-0.00	10.00	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 250.00-240.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)
T2 240.00-220.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T3 220.00-200.00	Pipe	P5x.258	A500-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 200.00-180.00	Pipe	P6x.28	A500-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T5 180.00-160.00	Pipe	P8x0.25	A500-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 160.00-140.00	Pipe	P8x.322	A500-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T7 140.00-120.00	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 120.00-100.00	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T9 100.00-80.00	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T10 80.00-60.00	Pipe	P12x.375	A500-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T11 60.00-40.00	Pipe	P12x.375	A500-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T12 40.00-20.00	Pipe	P12x.375	A500-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T13 20.00-0.00	Pipe	P12x.375	A500-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 250.00-240.00	Solid Round	1 1/8	A36 (36 ksi)	Solid Round	1	A36 (36 ksi)
T2 240.00-220.00	Solid Round	1 1/8	A36 (36 ksi)	Solid Round	1	A36 (36 ksi)
T3 220.00-200.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 250.00-240.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	1	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 240.00-220.00	None	Equal Angle		A36 (36 ksi)	Solid Round	1	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 250.00-240.00	Solid Round	1	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 240.00-220.00	Solid Round	1	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
T1 250.00-240.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 240.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 200.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T12 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T13 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry (cont'd)

K Factors¹

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
ft										
T1 250.00-240.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 240.00-220.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 220.00-200.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 200.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T9 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T10 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T11 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T12 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T13 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 250.00-240.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75	0.0000	1
T2 240.00-220.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 220.00-200.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 200.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T13 20.00- 0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub- Diagonal		Redundant Sub- Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 250.00- 240.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 240.00- 220.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 220.00- 200.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 200.00- 180.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 180.00- 160.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 160.00- 140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 140.00- 120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 120.00- 100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 100.00- 80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 80.00- 60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 60.00- 40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 40.00- 20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 20.00- 0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacin g in	Width or Diameter in	Perimete r in	Weight plf
Step Bolts	A	No	No	Ar (CaAa)	250.00 - 0.00	2.0000	0.5	1	1	0.2500	0.1500		0.31
Safety Line	B	No	No	Ar (CaAa)	250.00 - 0.00	3.0000	-0.5	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	245.00 - 0.00	0.0000	0.35	1	1	3.0000	2.0000		8.40
1.996 Hybrid (T-Mobile) ***	A	No	No	Ar (CaAa)	245.00 - 0.00	0.0000	0.38	3	3	1.5500	1.5500		1.71
LDF4RN-50A (1/2 FOAM) (T-Mobile)	A	No	No	Ar (CaAa)	230.00 - 0.00	0.0000	0.33	1	1	0.6300	0.6300		0.15
55mm MW Fiber (T-Mobile)	A	No	No	Ar (CaAa)	230.00 - 0.00	0.0000	0.3	1	1	2.3500	2.3500		1.22

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	250.00-240.00	A	0.000	0.000	4.142	0.000	0.07
		B	0.000	0.000	0.375	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	240.00-220.00	A	0.000	0.000	19.247	0.000	0.29
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	220.00-200.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T4	200.00-180.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T5	180.00-160.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T6	160.00-140.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T7	140.00-120.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T8	120.00-100.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T9	100.00-80.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T10	80.00-60.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T11	60.00-40.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T12	40.00-20.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T13	20.00-0.00	A	0.000	0.000	22.227	0.000	0.30
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	250.00-240.00	-0.7928	-5.4235	-0.7928	-5.4235
T2	240.00-220.00	-1.4923	-8.3589	-1.4923	-8.3589
T3	220.00-200.00	-1.1357	-6.5680	-1.0757	-6.2059
T4	200.00-180.00	-1.3008	-7.8572	-1.1826	-7.1113
T5	180.00-160.00	-1.3299	-8.2432	-1.1972	-7.3845
T6	160.00-140.00	-1.4483	-9.2088	-1.2973	-8.1997
T7	140.00-120.00	-1.4818	-9.5097	-1.3135	-8.3788
T8	120.00-100.00	-1.5971	-10.4010	-1.4088	-9.1128
T9	100.00-80.00	-1.7011	-11.2152	-1.4966	-9.7931
T10	80.00-60.00	-1.6939	-11.2155	-1.4818	-9.7380
T11	60.00-40.00	-1.7918	-11.9885	-1.5652	-10.3872
T12	40.00-20.00	-1.8925	-12.7933	-1.6529	-11.0760
T13	20.00-0.00	-1.8424	-12.6437	-1.6315	-11.0937

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Step Bolts	240.00 - 250.00	0.6000	0.6000
T1	2	Safety Line	240.00 - 250.00	0.6000	0.6000
T1	3	Feedline Ladder (Af)	240.00 - 245.00	0.6000	0.6000
T1	5	1.996 Hybrid	240.00 - 245.00	0.6000	0.6000
T2	1	Step Bolts	220.00 - 240.00	0.6000	0.6000
T2	2	Safety Line	220.00 - 240.00	0.6000	0.6000
T2	3	Feedline Ladder (Af)	220.00 - 240.00	0.6000	0.6000
T2	5	1.996 Hybrid	220.00 - 240.00	0.6000	0.6000
T2	7	LDF4RN-50A (1/2 FOAM)	220.00 - 230.00	0.6000	0.6000
T2	8	55mm MW Fiber	220.00 - 230.00	0.6000	0.6000
T3	1	Step Bolts	200.00 - 220.00	0.6000	0.6000
T3	2	Safety Line	200.00 - 220.00	0.6000	0.6000
T3	3	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T3	5	1.996 Hybrid	200.00 - 220.00	0.6000	0.6000
T3	7	LDF4RN-50A (1/2 FOAM)	200.00 - 220.00	0.6000	0.6000
T3	8	55mm MW Fiber	200.00 - 220.00	0.6000	0.6000
T4	1	Step Bolts	180.00 - 200.00	0.6000	0.6000
T4	2	Safety Line	180.00 - 200.00	0.6000	0.6000
T4	3	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T4	5	1.996 Hybrid	180.00 - 200.00	0.6000	0.6000
T4	7	LDF4RN-50A (1/2 FOAM)	180.00 - 200.00	0.6000	0.6000
T4	8	55mm MW Fiber	180.00 - 200.00	0.6000	0.6000
T5	1	Step Bolts	160.00 - 180.00	0.6000	0.6000
T5	2	Safety Line	160.00 - 180.00	0.6000	0.6000
T5	3	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T5	5	1.996 Hybrid	160.00 - 180.00	0.6000	0.6000
T5	7	LDF4RN-50A (1/2 FOAM)	160.00 - 180.00	0.6000	0.6000
T5	8	55mm MW Fiber	160.00 - 180.00	0.6000	0.6000
T6	1	Step Bolts	140.00 - 160.00	0.6000	0.6000
T6	2	Safety Line	140.00 - 160.00	0.6000	0.6000
T6	3	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T6	5	1.996 Hybrid	140.00 - 160.00	0.6000	0.6000
T6	7	LDF4RN-50A (1/2 FOAM)	140.00 - 160.00	0.6000	0.6000
T6	8	55mm MW Fiber	140.00 - 160.00	0.6000	0.6000
T7	1	Step Bolts	120.00 - 140.00	0.6000	0.6000
T7	2	Safety Line	120.00 - 140.00	0.6000	0.6000
T7	3	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T7	5	1.996 Hybrid	120.00 - 140.00	0.6000	0.6000
T7	7	LDF4RN-50A (1/2 FOAM)	120.00 - 140.00	0.6000	0.6000
T7	8	55mm MW Fiber	120.00 - 140.00	0.6000	0.6000
T8	1	Step Bolts	100.00 - 120.00	0.6000	0.6000
T8	2	Safety Line	100.00 - 120.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T8	5	1.996 Hybrid	100.00 - 120.00	0.6000	0.6000
T8	7	LDF4RN-50A (1/2 FOAM)	100.00 - 120.00	0.6000	0.6000
T8	8	55mm MW Fiber	100.00 - 120.00	0.6000	0.6000
T9	1	Step Bolts	80.00 - 100.00	0.6000	0.6000
T9	2	Safety Line	80.00 - 100.00	0.6000	0.6000
T9	3	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T9	5	1.996 Hybrid	80.00 - 100.00	0.6000	0.6000
T9	7	LDF4RN-50A (1/2 FOAM)	80.00 - 100.00	0.6000	0.6000
T9	8	55mm MW Fiber	80.00 - 100.00	0.6000	0.6000
T10	1	Step Bolts	60.00 - 80.00	0.6000	0.6000
T10	2	Safety Line	60.00 - 80.00	0.6000	0.6000
T10	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T10	5	1.996 Hybrid	60.00 - 80.00	0.6000	0.6000
T10	7	LDF4RN-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T10	8	55mm MW Fiber	60.00 - 80.00	0.6000	0.6000
T11	1	Step Bolts	40.00 - 60.00	0.6000	0.6000
T11	2	Safety Line	40.00 - 60.00	0.6000	0.6000
T11	3	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T11	5	1.996 Hybrid	40.00 - 60.00	0.6000	0.6000
T11	7	LDF4RN-50A (1/2 FOAM)	40.00 - 60.00	0.6000	0.6000
T11	8	55mm MW Fiber	40.00 - 60.00	0.6000	0.6000
T12	1	Step Bolts	20.00 - 40.00	0.6000	0.6000
T12	2	Safety Line	20.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T12	3	Feedline Ladder (Af)	40.00 20.00 - 40.00	0.6000	0.6000
T12	5	1.996 Hybrid	40.00 20.00 - 40.00	0.6000	0.6000
T12	7	LDF4RN-50A (1/2 FOAM)	40.00 20.00 - 40.00	0.6000	0.6000
T12	8	55mm MW Fiber	40.00 20.00 - 40.00	0.6000	0.6000
T13	1	Step Bolts	0.00 - 20.00	0.6000	0.6000
T13	2	Safety Line	0.00 - 20.00	0.6000	0.6000
T13	3	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	5	1.996 Hybrid	0.00 - 20.00	0.6000	0.6000
T13	7	LDF4RN-50A (1/2 FOAM)	0.00 - 20.00	0.6000	0.6000
T13	8	55mm MW Fiber	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horiz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Lightning Rod	B	From Leg	0.00 0.00 2.00	0.0000	250.00	No Ice	0.75	0.75	0.04
Flash Beacon Lighting	C	From Leg	0.00 0.00 1.00	0.0000	250.00	No Ice	2.70	2.70	0.05

FFVV-65C-R3-V1 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	12.97	6.20	0.18
FFVV-65C-R3-V1 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	12.97	6.20	0.18
FFVV-65C-R3-V1 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	12.97	6.20	0.18
RADIO 4480 B71_TMO	A	From Leg	3.75 0.00 0.00	0.0000	245.00	No Ice	2.85	1.38	0.09
RADIO 4480 B71_TMO	B	From Leg	3.75 0.00 0.00	0.0000	245.00	No Ice	2.85	1.38	0.09
RADIO 4480 B71_TMO	C	From Leg	3.75 0.00 0.00	0.0000	245.00	No Ice	2.85	1.38	0.09
Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	1.43	1.43	0.02
Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	1.43	1.43	0.02
Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	245.00	No Ice	1.43	1.43	0.02
C10857001C Mount [3] ***	C	None		0.0000	245.00	No Ice	29.82	29.82	1.67
AIR 6419 B41	A	From Leg	4.00	0.0000	245.00	No Ice	6.32	2.88	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
AIR 6419 B41	B	From Leg	0.00 0.00 4.00 0.00 0.00	0.0000	245.00	No Ice	6.32	2.88	0.08
AIR 6419 B41	C	From Leg	0.00 0.00 4.00 0.00 0.00	0.0000	245.00	No Ice	6.32	2.88	0.08
RADIO 4460 B2/B25 B66_TMO	A	From Leg	0.00 0.00 3.75 0.00 0.00	0.0000	245.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	B	From Leg	0.00 0.00 3.75 0.00 0.00	0.0000	245.00	No Ice	2.14	1.69	0.11
RADIO 4460 B2/B25 B66_TMO	C	From Leg	0.00 0.00 3.75 0.00 0.00	0.0000	245.00	No Ice	2.14	1.69	0.11
*** (2) IP20D ODU	C	From Leg	0.00 0.00 0.50 0.00 0.00	0.0000	230.00	No Ice	0.68	0.29	0.01
Pipe Mount	C	From Leg	0.00 0.00 0.50 0.00 0.00	0.0000	230.00	No Ice	1.11	1.11	0.04

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 ft ²	Weight K
SB6-W60C	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	-25.0000		230.00	6.00	No Ice 28.27	0.25

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

Comb. No.	Description
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	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	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
T1	250 - 240	Leg	Max Tension	7	4.26	0.30	-0.15
			Max. Compression	2	-6.86	-0.01	0.15
			Max. Mx	8	-1.87	0.54	-0.01
			Max. My	14	-1.39	0.00	0.54
			Max. Vy	8	1.32	-0.15	0.00
			Max. Vx	2	-1.28	-0.01	0.15
		Diagonal	Max Tension	16	3.55	0.00	0.00
			Max. Compression	4	-3.57	0.00	0.00
			Max. Mx	4	1.53	0.01	0.00
			Max. My	6	-0.02	0.00	0.00
			Max. Vy	4	0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Horizontal	Max Tension	6	0.95	0.00	0.00
			Max. Compression	18	-0.93	0.00	0.00
			Max. Mx	10	0.46	0.01	0.00
			Max. My	6	-0.35	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	8	0.00	-0.00	-0.00
			Max. Compression	20	-0.00	-0.00	-0.00
			Max. Mx	2	0.00	-0.00	0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	2	0.00	-0.00	0.00
			Max. Vx	2	-0.00	-0.00	0.00
		Top Girt	Max Tension	24	0.04	0.00	0.00
			Max. Compression	12	-0.03	0.00	0.00
			Max. Mx	10	-0.03	0.01	0.00
			Max. My	6	0.00	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	2	1.52	0.00	0.00
			Max. Compression	14	-1.49	0.00	0.00
			Max. Mx	10	-0.75	0.01	0.00
			Max. My	6	-1.46	0.00	-0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T2	240 - 220	Leg	Max Tension	7	31.11	0.13	-0.01
			Max. Compression	2	-35.08	-0.26	1.00
			Max. Mx	20	-30.51	0.86	-0.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T3	220 - 200	Diagonal	Max. My	2	-35.08	-0.26	1.00
			Max. Vy	20	-2.68	0.86	-0.24
			Max. Vx	2	-3.03	-0.26	1.00
			Max Tension	4	5.82	0.00	0.00
			Max. Compression	4	-6.15	0.00	0.00
			Max. Mx	4	3.84	0.01	0.00
			Max. My	6	-0.12	0.00	0.00
			Max. Vy	4	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	4	0.81	0.00	0.00
		Horizontal	Max. Compression	15	-0.71	0.00	0.00
			Max. Mx	10	0.03	0.01	0.00
			Max. My	6	-0.26	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	8	0.00	-0.00	-0.00
		Secondary Horizontal	Max. Compression	20	-0.00	-0.00	-0.00
			Max. Mx	4	0.00	-0.00	0.00
			Max. My	2	0.00	-0.00	0.00
			Max. Vy	4	0.00	-0.00	0.00
			Max. Vx	2	-0.00	-0.00	0.00
			Max Tension	14	1.57	0.00	0.00
			Max. Compression	2	-1.60	0.00	0.00
			Max. Mx	10	0.78	0.01	0.00
			Max. My	6	-0.83	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
		Bottom Girt	Max. Vx	6	-0.00	0.00	0.00
			Max Tension	4	1.75	0.00	0.00
			Max. Compression	14	-1.71	0.00	0.00
			Max. Mx	10	-0.44	0.01	0.00
			Max. My	6	1.47	0.00	0.00
			Max. Vy	10	-0.01	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Leg	Max Tension	7	49.07	-0.38	0.01
			Max. Compression	2	-54.06	0.51	0.02
			Max. Mx	2	-37.37	1.00	0.26
			Max. My	4	-2.09	-0.02	-0.69
			Max. Vy	2	0.22	1.00	0.26
			Max. Vx	20	-0.14	-0.02	-0.66
		Diagonal	Max Tension	7	2.82	0.00	0.00
			Max. Compression	2	-2.90	0.00	0.00
			Max. Mx	2	1.32	0.02	0.00
			Max. My	14	-2.31	-0.01	-0.01
			Max. Vy	2	-0.01	0.02	0.00
			Max. Vx	14	0.00	0.00	0.00
		Top Girt	Max Tension	6	0.58	0.00	0.00
			Max. Compression	16	-0.54	0.00	0.00
			Max. Mx	10	0.09	-0.00	0.00
			Max. My	6	-0.27	0.00	0.00
			Max. Vy	10	0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T4	200 - 180	Leg	Max Tension	7	66.83	-0.56	0.03
			Max. Compression	2	-73.71	0.93	0.08
			Max. Mx	2	-73.71	0.93	0.08
			Max. My	8	-9.44	0.07	0.89
			Max. Vy	3	-0.12	0.92	0.08
			Max. Vx	8	-0.12	0.07	0.89
		Diagonal	Max Tension	4	2.48	0.00	0.00
			Max. Compression	4	-2.52	0.00	0.00
			Max. Mx	2	1.45	0.02	0.00
			Max. My	6	-2.26	-0.00	0.00
			Max. Vy	2	-0.01	0.02	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Leg	Max Tension	7	83.70	-1.09	0.05
			Max. Compression	2	-93.07	1.10	0.05
			Max. Mx	2	-78.46	1.16	0.05
			Max. My	4	-4.46	-0.01	-1.17
T5	180 - 160	Leg	Max. Vy	6	0.11	-1.15	0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	160 - 140	Diagonal	Max. Vx	20	0.10	-0.06	-1.01
			Max Tension	4	2.81	0.00	0.00
			Max. Compression	4	-2.87	0.00	0.00
			Max. Mx	2	1.87	0.02	0.00
			Max. My	6	-2.48	0.00	0.00
			Max. Vy	2	-0.01	0.02	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	100.84	-1.10	0.02
			Max. Compression	2	-113.31	1.65	0.09
			Max. Mx	2	-113.31	1.65	0.09
			Max. My	8	-13.29	0.09	1.54
			Max. Vy	6	0.17	-1.63	0.10
			Max. Vx	8	-0.24	0.09	1.54
			Max Tension	4	3.10	0.00	0.00
T7	140 - 120	Diagonal	Max. Compression	4	-3.17	0.00	0.00
			Max. Mx	6	1.73	0.02	0.00
			Max. My	6	-2.95	0.01	0.00
			Max. Vy	6	0.01	0.02	0.00
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	115.70	-1.79	0.10
			Max. Compression	2	-131.30	2.08	0.07
			Max. Mx	2	-131.30	2.08	0.07
			Max. My	4	-6.43	-0.06	-2.37
			Max. Vy	19	-0.17	2.03	-0.05
			Max. Vx	8	-0.25	0.04	2.37
			Max Tension	4	4.39	0.00	0.00
			Max. Compression	4	-4.47	0.00	0.00
			Max. Mx	2	3.35	0.05	0.00
T8	120 - 100		Max. My	6	-3.68	0.01	0.01
			Max. Vy	6	0.02	0.05	0.01
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	133.24	-1.80	0.06
			Max. Compression	2	-152.59	2.53	0.11
			Max. Mx	2	-152.59	2.53	0.11
			Max. My	8	-16.91	0.13	2.22
			Max. Vy	19	-0.21	2.48	-0.14
			Max. Vx	8	-0.20	0.13	2.22
			Max Tension	4	4.68	0.00	0.00
			Max. Compression	18	-4.82	0.00	0.00
			Max. Mx	2	3.59	0.05	0.00
			Max. My	6	-4.25	0.01	0.01
			Max. Vy	6	0.02	0.05	0.01
T9	100 - 80		Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	151.11	-1.63	0.04
			Max. Compression	2	-174.51	3.08	0.12
			Max. Mx	2	-174.51	3.08	0.12
			Max. My	8	-18.74	0.18	2.57
			Max. Vy	18	-0.29	3.03	-0.17
			Max. Vx	8	-0.22	0.18	2.57
			Max Tension	4	5.02	0.00	0.00
			Max. Compression	18	-5.24	0.00	0.00
			Max. Mx	2	3.93	0.07	0.01
			Max. My	6	-4.72	0.03	0.01
			Max. Vy	6	0.03	0.07	0.01
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	168.80	-2.62	0.10
T10	80 - 60		Max. Compression	2	-197.01	3.26	0.03
			Max. Mx	2	-197.01	3.26	0.03
			Max. My	8	-19.86	0.01	3.22
			Max. Vy	2	-0.22	3.26	0.03
			Max. Vx	8	0.31	0.01	3.22
			Max Tension	16	5.66	0.00	0.00
			Max. Compression	18	-6.07	0.00	0.00
			Max. Mx	2	4.32	0.11	0.01
			Max. My	8	-3.34	0.07	0.01
			Max. Vy	6	0.05	0.11	-0.01
			Max. Vx	8	-0.00	0.00	0.00
			Max Tension	7	183.14	-2.38	0.07
			Max. Compression	2	-216.10	3.52	0.13
T11	60 - 40	Leg					

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T12	40 - 20	Diagonal	Max. Mx	2	-216.10	3.52	0.13
			Max. My	8	-22.89	0.15	3.26
			Max. Vy	10	-0.26	3.41	0.10
			Max. Vx	8	-0.28	-0.01	2.97
			Max Tension	18	4.49	0.00	0.00
			Max. Compression	18	-4.70	0.00	0.00
			Max. Mx	6	2.77	0.09	0.01
			Max. My	6	-3.93	0.05	0.01
			Max. Vy	6	0.03	0.09	0.01
			Max. Vx	6	-0.00	0.00	0.00
		Leg	Max Tension	7	195.92	-2.57	0.06
			Max. Compression	2	-233.81	2.41	0.02
			Max. Mx	2	-224.06	3.52	0.13
			Max. My	8	-23.14	0.15	3.26
			Max. Vy	11	0.22	3.40	0.11
			Max. Vx	8	0.25	0.02	2.56
			Max Tension	16	5.08	0.00	0.00
			Max. Compression	18	-5.30	0.00	0.00
			Max. Mx	6	3.16	0.14	0.02
			Max. My	6	-4.70	0.11	0.02
T13	20 - 0	Diagonal	Max. Vy	6	0.06	0.14	0.02
			Max. Vx	6	-0.00	0.00	0.00
			Max Tension	7	208.42	-2.62	0.10
			Max. Compression	2	-251.14	-0.00	-0.00
			Max. Mx	6	204.62	-2.68	0.11
			Max. My	8	-25.97	-0.13	4.15
			Max. Vy	6	-0.40	-2.68	0.11
			Max. Vx	8	0.55	-0.13	4.15
			Max Tension	16	5.62	0.00	0.00
			Max. Compression	18	-6.40	0.00	0.00
		Leg	Max. Mx	2	4.17	0.14	0.02
			Max. My	6	-1.87	0.11	0.02
			Max. Vy	8	0.05	0.14	0.02
			Max. Vx	6	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	251.23	19.69	-12.06
	Max. H _x	18	251.23	19.69	-12.06
	Max. H _z	7	-211.62	-16.65	10.31
	Min. Vert	7	-211.62	-16.65	10.31
	Min. H _x	7	-211.62	-16.65	10.31
	Min. H _z	18	251.23	19.69	-12.06
Leg B	Max. Vert	10	246.16	-19.53	-11.77
	Max. H _x	23	-203.59	16.31	9.90
	Max. H _z	23	-203.59	16.31	9.90
	Min. Vert	23	-203.59	16.31	9.90
	Min. H _x	10	246.16	-19.53	-11.77
	Min. H _z	10	246.16	-19.53	-11.77
Leg A	Max. Vert	2	255.62	-0.14	23.28
	Max. H _x	21	8.76	2.08	0.70
	Max. H _z	2	255.62	-0.14	23.28
	Min. Vert	15	-205.43	0.15	-19.26
	Min. H _x	9	22.29	-2.11	1.51
	Min. H _z	15	-205.43	0.15	-19.26

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	44.28	0.00	0.00	-19.58	4.26	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	53.14	0.49	-35.26	-4532.76	-108.33	-6.55
0.9 Dead+1.0 Wind 0 deg - No Ice	39.85	0.49	-35.26	-4520.52	-109.41	-6.54
1.2 Dead+1.0 Wind 30 deg - No Ice	53.14	16.40	-28.26	-3690.25	-2131.78	-14.56
0.9 Dead+1.0 Wind 30 deg - No Ice	39.85	16.40	-28.26	-3679.12	-2130.03	-14.55
1.2 Dead+1.0 Wind 60 deg - No Ice	53.14	28.29	-16.73	-2234.92	-3666.67	-23.82
0.9 Dead+1.0 Wind 60 deg - No Ice	39.85	28.29	-16.73	-2225.81	-3662.76	-23.80
1.2 Dead+1.0 Wind 90 deg - No Ice	53.14	33.39	-0.66	-177.80	-4293.43	-25.21
0.9 Dead+1.0 Wind 90 deg - No Ice	39.85	33.39	-0.66	-171.57	-4288.68	-25.18
1.2 Dead+1.0 Wind 120 deg - No Ice	53.14	30.02	17.29	2152.32	-3783.22	-15.79
0.9 Dead+1.0 Wind 120 deg - No Ice	39.85	30.02	17.29	2155.25	-3779.27	-15.78
1.2 Dead+1.0 Wind 150 deg - No Ice	53.14	16.25	28.88	3691.71	-2041.04	-5.35
0.9 Dead+1.0 Wind 150 deg - No Ice	39.85	16.25	28.88	3692.41	-2039.51	-5.35
1.2 Dead+1.0 Wind 180 deg - No Ice	53.14	-0.40	32.46	4167.00	96.97	6.77
0.9 Dead+1.0 Wind 180 deg - No Ice	39.85	-0.40	32.46	4167.01	95.49	6.77
1.2 Dead+1.0 Wind 210 deg - No Ice	53.14	-16.22	27.99	3579.18	2099.24	14.35
0.9 Dead+1.0 Wind 210 deg - No Ice	39.85	-16.22	27.99	3580.03	2094.98	14.34
1.2 Dead+1.0 Wind 240 deg - No Ice	53.14	-30.21	17.75	2257.98	3833.69	22.95
0.9 Dead+1.0 Wind 240 deg - No Ice	39.85	-30.21	17.75	2260.70	3827.07	22.93
1.2 Dead+1.0 Wind 270 deg - No Ice	53.14	-33.21	0.45	80.46	4263.64	24.03
0.9 Dead+1.0 Wind 270 deg - No Ice	39.85	-33.21	0.45	86.19	4256.37	24.01
1.2 Dead+1.0 Wind 300 deg - No Ice	53.14	-27.95	-15.92	-2048.65	3599.79	15.83
0.9 Dead+1.0 Wind 300 deg - No Ice	39.85	-27.95	-15.92	-2039.91	3593.43	15.82
1.2 Dead+1.0 Wind 330 deg - No Ice	53.14	-16.09	-29.00	-3766.03	2014.34	5.91
0.9 Dead+1.0 Wind 330 deg - No Ice	39.85	-16.09	-29.00	-3754.83	2010.28	5.90
Dead+Wind 0 deg - Service	44.28	0.14	-10.26	-1323.18	-27.09	-1.81
Dead+Wind 30 deg - Service	44.28	4.79	-8.25	-1082.58	-614.92	-4.03
Dead+Wind 60 deg - Service	44.28	8.26	-4.88	-659.43	-1060.08	-6.59
Dead+Wind 90 deg - Service	44.28	9.74	-0.18	-62.28	-1240.98	-6.98
Dead+Wind 120 deg - Service	44.28	8.74	5.03	610.36	-1092.33	-4.37
Dead+Wind 150 deg - Service	44.28	4.75	8.42	1056.74	-589.84	-1.48
Dead+Wind 180 deg - Service	44.28	-0.11	9.48	1195.75	29.67	1.87
Dead+Wind 210 deg - Service	44.28	-4.74	8.18	1025.61	611.64	3.97
Dead+Wind 240 deg - Service	44.28	-8.79	5.16	639.58	1112.01	6.35
Dead+Wind 270 deg - Service	44.28	-9.69	0.12	9.12	1238.48	6.65
Dead+Wind 300 deg - Service	44.28	-8.17	-4.65	-607.93	1047.32	4.38
Dead+Wind 330 deg - Service	44.28	-4.70	-8.46	-1103.56	588.19	1.63

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	0.00	-44.28	0.00	0.00	44.28	0.00	0.000%
2	0.49	-53.14	-35.26	-0.49	53.14	35.26	0.001%
3	0.49	-39.85	-35.26	-0.49	39.85	35.26	0.000%
4	16.40	-53.14	-28.26	-16.40	53.14	28.26	0.000%
5	16.40	-39.85	-28.26	-16.40	39.85	28.26	0.000%
6	28.29	-53.14	-16.73	-28.29	53.14	16.73	0.000%
7	28.29	-39.85	-16.73	-28.29	39.85	16.73	0.000%
8	33.39	-53.14	-0.66	-33.39	53.14	0.66	0.000%
9	33.39	-39.85	-0.66	-33.39	39.85	0.66	0.000%
10	30.02	-53.14	17.29	-30.02	53.14	-17.29	0.000%
11	30.02	-39.85	17.29	-30.02	39.85	-17.29	0.000%
12	16.25	-53.14	28.88	-16.25	53.14	-28.88	0.000%
13	16.25	-39.85	28.88	-16.25	39.85	-28.88	0.000%
14	-0.40	-53.14	32.46	0.40	53.14	-32.46	0.000%
15	-0.40	-39.85	32.46	0.40	39.85	-32.46	0.000%
16	-16.22	-53.14	27.99	16.22	53.14	-27.99	0.000%
17	-16.22	-39.85	27.99	16.22	39.85	-27.99	0.000%
18	-30.21	-53.14	17.75	30.21	53.14	-17.75	0.000%
19	-30.21	-39.85	17.75	30.21	39.85	-17.75	0.000%
20	-33.21	-53.14	0.45	33.21	53.14	-0.45	0.000%
21	-33.21	-39.85	0.45	33.21	39.85	-0.45	0.000%
22	-27.95	-53.14	-15.92	27.95	53.14	15.92	0.000%
23	-27.95	-39.85	-15.92	27.95	39.85	15.92	0.000%
24	-16.09	-53.14	-29.00	16.09	53.14	29.00	0.000%
25	-16.09	-39.85	-29.00	16.09	39.85	29.00	0.000%
26	0.14	-44.28	-10.26	-0.14	44.28	10.26	0.000%
27	4.79	-44.28	-8.25	-4.79	44.28	8.25	0.000%
28	8.26	-44.28	-4.88	-8.26	44.28	4.88	0.000%
29	9.74	-44.28	-0.18	-9.74	44.28	0.18	0.000%
30	8.74	-44.28	5.03	-8.74	44.28	-5.03	0.000%
31	4.75	-44.28	8.42	-4.75	44.28	-8.42	0.000%
32	-0.11	-44.28	9.48	0.11	44.28	-9.48	0.000%
33	-4.74	-44.28	8.18	4.74	44.28	-8.18	0.000%
34	-8.79	-44.28	5.16	8.79	44.28	-5.16	0.000%
35	-9.69	-44.28	0.12	9.69	44.28	-0.12	0.000%
36	-8.17	-44.28	-4.65	8.17	44.28	4.65	0.000%
37	-4.70	-44.28	-8.46	4.70	44.28	8.46	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	0.00000089
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000088
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000095
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000102
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000086
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000094
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000095
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000089
17	Yes	4	0.00000001	0.00000001

18	Yes	4	0.00000001	0.00000084
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000103
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000097
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000092
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	6.435	26	0.2741	0.0541
T2	240 - 220	5.848	26	0.2721	0.0555
T3	220 - 200	4.728	26	0.2450	0.0477
T4	200 - 180	3.768	26	0.2055	0.0365
T5	180 - 160	2.964	26	0.1715	0.0287
T6	160 - 140	2.296	26	0.1410	0.0233
T7	140 - 120	1.739	26	0.1163	0.0185
T8	120 - 100	1.271	26	0.0985	0.0145
T9	100 - 80	0.877	26	0.0801	0.0108
T10	80 - 60	0.563	26	0.0612	0.0081
T11	60 - 40	0.327	26	0.0453	0.0062
T12	40 - 20	0.154	26	0.0298	0.0037
T13	20 - 0	0.048	26	0.0146	0.0020

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Lightning Rod	26	6.435	0.2741	0.0541	204670
245.00	FFVV-65C-R3-V1 w/ Mount Pipe	26	6.141	0.2737	0.0551	204670
230.00	SB6-W60C	26	5.273	0.2619	0.0529	40291

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	22.362	2	0.9635	0.2006
T2	240 - 220	20.297	2	0.9562	0.2018
T3	220 - 200	16.361	2	0.8583	0.1725
T4	200 - 180	13.007	2	0.7160	0.1322
T5	180 - 160	10.210	2	0.5948	0.1036
T6	160 - 140	7.897	2	0.4871	0.0844

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T7	140 - 120	5.977	2	0.4007	0.0670
T8	120 - 100	4.365	2	0.3388	0.0525
T9	100 - 80	3.009	2	0.2753	0.0391
T10	80 - 60	1.934	2	0.2100	0.0292
T11	60 - 40	1.124	2	0.1555	0.0225
T12	40 - 20	0.529	2	0.1020	0.0134
T13	20 - 0	0.166	2	0.0500	0.0072

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Lightning Rod	2	22.362	0.9635	0.2006	55922
245.00	FFVV-65C-R3-V1 w/ Mount Pipe	2	21.327	0.9622	0.2021	55922
230.00	SB6-W60C	2	18.276	0.9193	0.1913	11252

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
T1	250 - 240	1 1/2	10.00	3.08	98.7 K=1.00	1.7672	-5.02	39.03	0.129 ¹
T2	240 - 220	2	20.00	3.21	77.0 K=1.00	3.1416	-32.24	91.64	0.352 ¹
T3	220 - 200	P5x.258	20.02	5.00	32.0 K=1.00	4.2999	-54.06	179.55	0.301 ¹
T4	200 - 180	P6x.28	20.02	5.00	26.7 K=1.00	5.5813	-73.71	238.36	0.309 ¹
T5	180 - 160	P8x0.25	20.02	5.00	20.3 K=1.00	6.5777	-93.07	287.23	0.324 ¹
T6	160 - 140	P8x.322	20.02	5.00	20.4 K=1.00	8.3993	-113.31	366.59	0.309 ¹
T7	140 - 120	P10x.365	20.02	10.01	32.7 K=1.00	11.908 3	-131.29	495.59	0.265 ¹
T8	120 - 100	P10x.365	20.02	10.01	32.7 K=1.00	11.908 3	-152.59	495.59	0.308 ¹
T9	100 - 80	P10x.365	20.02	10.01	32.7 K=1.00	11.908 3	-174.51	495.59	0.352 ¹
T10	80 - 60	P12x.375	20.02	10.01	27.4 K=1.00	14.579 0	-197.01	620.91	0.317 ¹
T11	60 - 40	P12x.375	20.03	10.02	27.5 K=1.00	14.579 0	-216.10	620.86	0.348 ¹
T12	40 - 20	P12x.375	20.03	10.02	27.5 K=1.00	14.579 0	-233.81	620.86	0.377 ¹
T13	20 - 0	P12x.375	20.03	10.02	27.5 K=1.00	14.579 0	-251.14	620.86	0.405 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	5.05	4.89	164.4 K=0.70	0.7854	-3.57	6.57	0.544 ¹ ✓
T2	240 - 220	1 1/4	5.13	4.91	132.1 K=0.70	1.2272	-6.15	15.87	0.388 ¹ ✓
T3	220 - 200	L2x2x3/16	6.52	3.09	100.6 K=1.07	0.7150	-2.90	17.55	0.165 ¹ ✓
T4	200 - 180	L2x2x3/16	8.45	4.00	121.4 K=1.00	0.7150	-2.48	13.81	0.179 ¹ ✓
T5	180 - 160	L2x2x1/4	9.70	4.54	134.8 K=0.97	0.9380	-2.87	14.78	0.194 ¹ ✓
T6	160 - 140	L2x2x1/4	11.01	5.21	150.4 K=0.94	0.9380	-3.05	11.87	0.257 ¹ ✓
T7	140 - 120	L3x3x3/16	14.96	7.13	138.0 K=0.96	1.0900	-4.47	16.38	0.273 ¹ ✓
T8	120 - 100	L3x3x3/16	16.11	7.72	147.1 K=0.95	1.0900	-4.82	14.43	0.334 ¹ ✓
T9	100 - 80	L3x3x1/4	17.31	8.33	157.3 K=0.93	1.4400	-5.24	16.65	0.314 ¹ ✓
T10	80 - 60	L3x3x3/8	18.55	8.87	166.7 K=0.92	2.1100	-6.07	21.72	0.279 ¹ ✓
T11	60 - 40	L3x3x1/4	20.16	9.75	179.3 K=0.91	1.4400	-4.69	12.82	0.366 ¹ ✓
T12	40 - 20	L3x3x3/8	21.92	10.64	194.4 K=0.89	2.1100	-5.30	15.98	0.331 ¹ ✓
T13	20 - 0	L3 1/2x3 1/2x1/4	23.71	11.55	180.7 K=0.91	1.6900	-6.40	14.81	0.432 ¹ ✓

¹ P_u / φP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	4.00	3.88	130.2 K=0.70	0.7854	-0.93	10.42	0.090 ¹ ✓
T2	240 - 220	1	4.00	3.83	128.8 K=0.70	0.7854	-0.72	10.63	0.068 ¹ ✓

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	2.00	1.94	83.9 K=0.90	0.7854	-0.00	17.56	0.000 ¹ ✓
T2	240 - 220	1	2.00	1.92	83.7	0.7854	-0.00	17.59	0.000 ¹

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
K=0.91									✓

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1 1/8	4.00	3.88	115.7 K=0.70	0.9940	-0.03	15.91	0.002 ¹ ✓
T2	240 - 220	1 1/8	4.00	3.83	114.5 K=0.70	0.9940	-1.60	16.15	0.099 ¹ ✓
T3	220 - 200	L2x2x1/8	4.00	3.54	113.4 K=1.06	0.4844	-0.94	10.27	0.091 ¹ ✓

¹ P_u / φP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	4.00	3.88	130.2 K=0.70	0.7854	-1.49	10.42	0.143 ¹ ✓
T2	240 - 220	1	4.00	3.83	128.8 K=0.70	0.7854	-1.71	10.63	0.161 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1 1/2	10.00	0.38	12.0	1.7672	4.26	79.52	0.054 ¹ ✓
T2	240 - 220	2	20.00	0.38	9.0	3.1416	31.11	141.37	0.220 ¹ ✓
T3	220 - 200	P5x.258	20.02	5.00	32.0	4.2999	49.07	193.49	0.254 ¹ ✓
T4	200 - 180	P6x.28	20.02	5.00	26.7	5.5813	66.83	251.16	0.266 ¹ ✓
T5	180 - 160	P8x0.25	20.02	5.00	20.3	6.5777	83.70	296.00	0.283 ¹ ✓
T6	160 - 140	P8x.322	20.02	5.00	20.4	8.3993	100.84	377.97	0.267 ¹ ✓

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T7	140 - 120	P10x.365	20.02	10.01	32.7	11.908 3	115.71	535.87	0.216 ¹ ✓
T8	120 - 100	P10x.365	20.02	10.01	32.7	11.908 3	133.24	535.87	0.249 ¹ ✓
T9	100 - 80	P10x.365	20.02	10.01	32.7	11.908 3	151.11	535.87	0.282 ¹ ✓
T10	80 - 60	P12x.375	20.02	10.01	27.4	14.579 0	168.80	656.05	0.257 ¹ ✓
T11	60 - 40	P12x.375	20.03	10.02	27.5	14.579 0	183.14	656.05	0.279 ¹ ✓
T12	40 - 20	P12x.375	20.03	10.02	27.5	14.579 0	195.92	656.05	0.299 ¹ ✓
T13	20 - 0	P12x.375	20.03	10.02	27.5	14.579 0	208.42	656.05	0.318 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	5.05	4.89	234.8	0.7854	3.55	25.45	0.139 ¹ ✓
T2	240 - 220	1 1/4	5.13	4.91	188.7	1.2272	5.82	39.76	0.146 ¹ ✓
T3	220 - 200	L2x2x3/16	6.52	3.09	60.1	0.7150	2.82	23.17	0.122 ¹ ✓
T4	200 - 180	L2x2x3/16	8.15	3.85	74.9	0.7150	2.48	23.17	0.107 ¹ ✓
T5	180 - 160	L2x2x1/4	9.70	4.54	89.5	0.9380	2.81	30.39	0.092 ¹ ✓
T6	160 - 140	L2x2x1/4	10.68	5.04	99.4	0.9380	3.10	30.39	0.102 ¹ ✓
T7	140 - 120	L3x3x3/16	14.96	7.13	91.1	1.0900	4.39	35.32	0.124 ¹ ✓
T8	120 - 100	L3x3x3/16	16.11	7.72	98.7	1.0900	4.68	35.32	0.133 ¹ ✓
T9	100 - 80	L3x3x1/4	17.31	8.33	107.5	1.4400	5.02	46.66	0.108 ¹ ✓
T10	80 - 60	L3x3x3/8	18.55	8.87	116.6	2.1100	5.66	68.36	0.083 ¹ ✓
T11	60 - 40	L3x3x1/4	20.16	9.75	125.9	1.4400	4.49	46.66	0.096 ¹ ✓
T12	40 - 20	L3x3x3/8	21.92	10.64	139.9	2.1100	5.08	68.36	0.074 ¹ ✓
T13	20 - 0	L3 1/2x3 1/2x1/4	23.71	11.55	127.1	1.6900	5.62	54.76	0.103 ¹ ✓

¹ P_u / φP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	4.00	3.88	186.0	0.7854	0.95	25.45	0.037 ¹
T2	240 - 220	1	4.00	3.83	184.0	0.7854	0.81	25.45	0.032 ¹

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	2.00	1.94	93.0	0.7854	0.00	25.45	0.000 ¹
T2	240 - 220	1	2.00	1.92	92.0	0.7854	0.00	25.45	0.000 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1 1/8	4.00	3.88	165.3	0.9940	0.04	32.21	0.001 ¹
T2	240 - 220	1 1/8	4.00	3.83	163.6	0.9940	1.57	32.21	0.049 ¹
T3	220 - 200	L2x2x1/8	4.00	3.54	67.8	0.4844	0.94	15.69	0.060 ¹

¹ P_u / φP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	250 - 240	1	4.00	3.88	186.0	0.7854	1.52	25.45	0.060 ¹
T2	240 - 220	1	4.00	3.83	184.0	0.7854	1.75	25.45	0.069 ¹

¹ P_u / φP_n controls

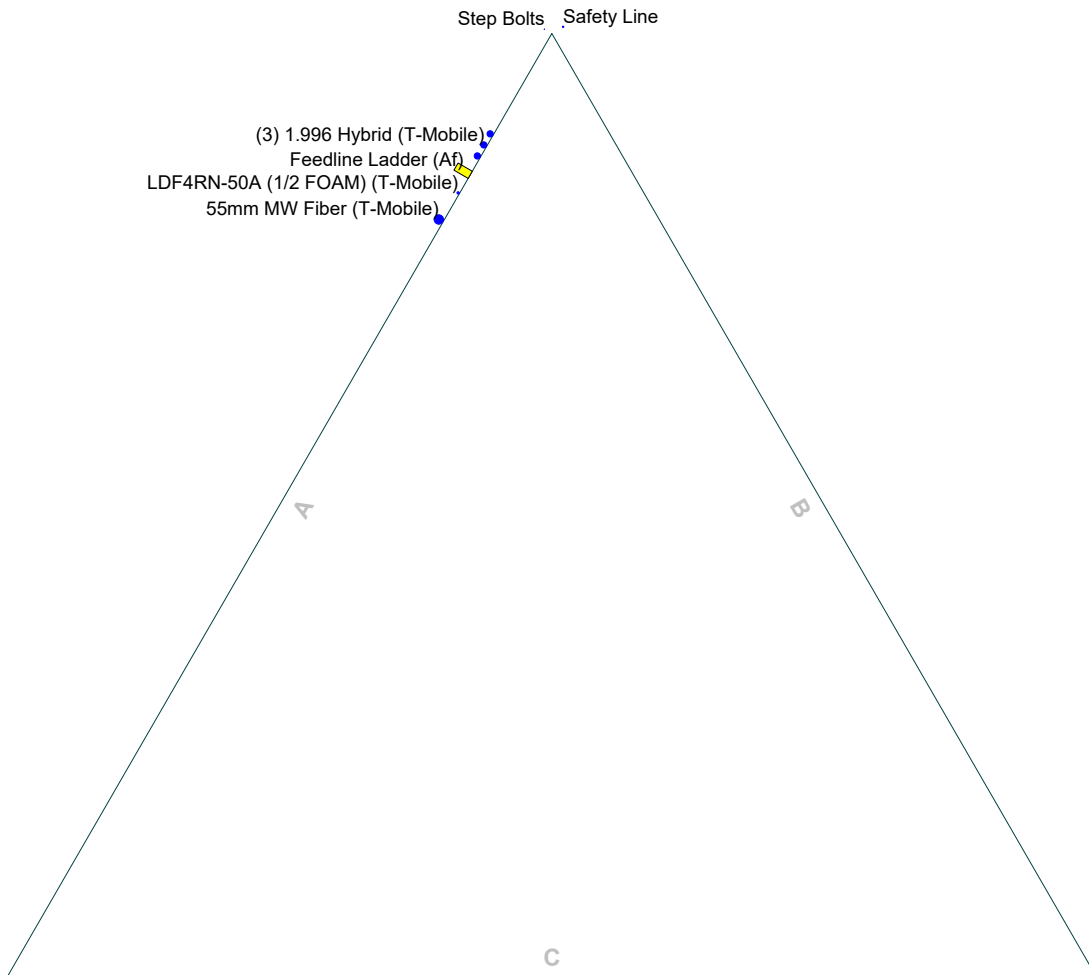
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	250 - 240	Leg	1 1/2	2	-5.02	39.03	12.9	Pass
T2	240 - 220	Leg	2	28	-32.24	91.64	35.2	Pass
T3	220 - 200	Leg	P5x.258	78	-54.06	179.55	30.1	Pass
T4	200 - 180	Leg	P6x.28	108	-73.71	238.36	30.9	Pass
T5	180 - 160	Leg	P8x0.25	135	-93.07	287.23	32.4	Pass
T6	160 - 140	Leg	P8x.322	162	-113.31	366.59	30.9	Pass
T7	140 - 120	Leg	P10x.365	189	-131.29	495.59	26.5	Pass
T8	120 - 100	Leg	P10x.365	204	-152.59	495.59	30.8	Pass
T9	100 - 80	Leg	P10x.365	219	-174.51	495.59	35.2	Pass
T10	80 - 60	Leg	P12x.375	234	-197.01	620.91	31.7	Pass
T11	60 - 40	Leg	P12x.375	249	-216.10	620.86	34.8	Pass
T12	40 - 20	Leg	P12x.375	264	-233.81	620.86	37.7	Pass
T13	20 - 0	Leg	P12x.375	279	-251.14	620.86	40.5	Pass
T1	250 - 240	Diagonal	1	12	-3.57	6.57	54.4	Pass
T2	240 - 220	Diagonal	1 1/4	39	-6.15	15.87	38.8	Pass
T3	220 - 200	Diagonal	L2x2x3/16	104	-2.90	17.55	16.5	Pass
T4	200 - 180	Diagonal	L2x2x3/16	113	-2.48	13.81	17.9	Pass
T5	180 - 160	Diagonal	L2x2x1/4	140	-2.87	14.78	19.4	Pass
T6	160 - 140	Diagonal	L2x2x1/4	167	-3.05	11.87	25.7	Pass
T7	140 - 120	Diagonal	L3x3x3/16	194	-4.47	16.38	27.3	Pass
T8	120 - 100	Diagonal	L3x3x3/16	210	-4.82	14.43	33.4	Pass
T9	100 - 80	Diagonal	L3x3x1/4	225	-5.24	16.65	31.4	Pass
T10	80 - 60	Diagonal	L3x3x3/8	240	-6.07	21.72	27.9	Pass
T11	60 - 40	Diagonal	L3x3x1/4	255	-4.69	12.82	36.6	Pass
T12	40 - 20	Diagonal	L3x3x3/8	270	-5.30	15.98	33.1	Pass
T13	20 - 0	Diagonal	L3 1/2x3 1/2x1/4	285	-6.40	14.81	43.2	Pass
T1	250 - 240	Horizontal	1	16	-0.93	10.42	9.0	Pass
T2	240 - 220	Horizontal	1	49	-0.72	10.63	6.8	Pass
T1	250 - 240	Secondary Horizontal	1	13	-0.00	17.56	0.0	Pass
T2	240 - 220	Secondary Horizontal	1	40	-0.00	17.59	0.0	Pass
T1	250 - 240	Top Girt	1 1/8	4	-0.03	15.91	0.2	Pass
T2	240 - 220	Top Girt	1 1/8	33	-1.60	16.15	9.9	Pass
T3	220 - 200	Top Girt	L2x2x1/8	80	-0.94	10.27	9.1	Pass
T1	250 - 240	Bottom Girt	1	9	-1.49	10.42	14.3	Pass
T2	240 - 220	Bottom Girt	1	36	-1.71	10.63	16.1	Pass
Summary								
Leg (T13)							40.5	Pass
Diagonal (T1)							54.4	Pass
Horizontal (T1)							9.0	Pass
Secondary Horizontal (T1)							0.0	Pass
Top Girt (T2)							9.9	Pass
Bottom Girt (T2)							16.1	Pass
RATING =							54.4	Pass

APPENDIX B
BASE LEVEL DRAWING

Feed Line Plan

Round Flat App In Face App Out Face



Consulting Engineers

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Job: **9JK1918A**

Project: **17-5641.3**

Client: NexTower Development

Drawn by: Joe McAllister

App'd:

Code: TIA-222-H

Date: 03/21/24

Scale: NTS

Path: C:\Work from Home\17-5641.3 9JK1918A\TDX Files\17-5641.3 9JK1918A White Springs SA.en

Dwg No. E-7

APPENDIX C

ADDITIONAL CALCULATIONS

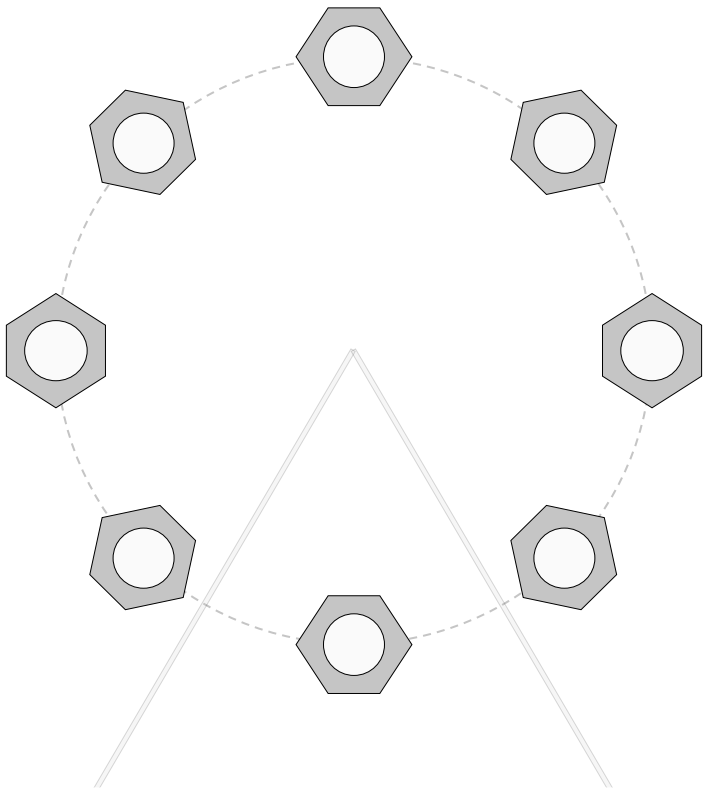
Monopole Base Plate Connection

Site Info	
BU #	9JK1918A
Site Name	White Springs
Order #	17-5641.2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	0.00
Axial Force (kips)	255.62
Shear Force (kips)	23.28

*TIA-222-H Section 15.5 Applied



Connection Properties		Analysis Results	
Anchor Rod Data		Anchor Rod Summary (units of kips, kip-in)	
(8) 1-1/4" ϕ bolts (A354-BC N; Fy=109 ksi, Fu=125 ksi) on 12" BC		P_{u_c} = 31.95	ϕP_{n_c} = 120.39
pos. (deg): 45, 135, 225, 315		V_u = 2.91	ϕV_n = 54.17
#N/A			Stress Rating
			25.6%

SST Unit Base Foundation

Site Name:

9JK1918A

TIA-222 Revision:

H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☐
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions			
Global Moment, M:	4534	ft-kips	
Global Axial, P:	53	kips	
Global Shear, V:	35	kips	
Leg Compression, P_{comp}:	256	kips	
Leg Comp. Shear, V_{u_comp}:	23	kips	
Leg Uplift, P_{uplift}:	212	kips	
Leg Uplift. Shear, V_{u_uplift}:	20	kips	
Tower Height, H:	250	ft	
Base Face Width, BW:	22	ft	
BP Dist. Above Fdn, bp_{dist}:	6	in	

Pier Properties			
Pier Shape:	Circular		
Pier Diameter, dpier:	5.0	ft	
Ext. Above Grade, E:	0.50	ft	
Pier Rebar Size, Sc:	8		
Pier Rebar Quantity, mc:	22		
Pier Tie/Spiral Size, St:	4		
Pier Tie/Spiral Quantity, mt:	5		
Pier Reinforcement Type:	Tie		
Pier Clear Cover, cc_{pier}:	3	in	

Pad Properties			
Depth, D:	6.00	ft	
Pad Width, W₁:	44.00	ft	
Pad Thickness, T:	2.00	ft	
Pad Rebar Size (Bottom dir. 2), Sp₂:	11		
Pad Rebar Quantity (Bottom dir. 2), mp₂:	52		
Pad Clear Cover, cc_{pad}:	3	in	

Material Properties			
Rebar Grade, Fy:	60	ksi	
Concrete Compressive Strength, F'c:	4	ksi	
Dry Concrete Density, δc:	150	pcf	

Soil Properties			
Total Soil Unit Weight, γ:	55	pcf	
Ultimate Gross Bearing, Qult:	7.800	ksf	
Cohesion, Cu:	0.000	ksf	
Friction Angle, φ:	33	degrees	
SPT Blow Count, N_{blows}:			
Base Friction, μ:			
Neglected Depth, N:	0.0	ft	
Foundation Bearing on Rock?	No		
Groundwater Depth, gw:	2	ft	

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	193.81	35.00	17.2%	Pass
Bearing Pressure (ksf)	5.85	0.60	9.8%	Pass
Overturning (kip*ft)	11824.41	4779.00	40.4%	Pass
Pier Flexure (Comp.) (kip*ft)	2361.65	103.50	4.2%	Pass
Pier Flexure (Tension) (kip*ft)	1589.55	90.00	5.4%	Pass
Pier Compression (kip)	12497.26	268.96	2.0%	Pass
Pad Flexure (kip*ft)	6398.93	1203.37	17.9%	Pass
Pad Shear - 1-way (kips)	945.96	150.48	15.2%	Pass
Pad Shear - Comp 2-way (ksi)	0.190	0.051	25.4%	Pass
Flexural 2-way (Comp) (kip*ft)	3183.90	62.10	1.9%	Pass
Pad Shear - Tension 2-way (ksi)	0.190	0.043	21.6%	Pass
Flexural 2-way (Tension) (kip*ft)	3183.90	54.00	1.6%	Pass

*Rating per TIA-222-H Section 15.5

Structural Rating*:	25.4%
Soil Rating*:	40.4%

<-- Toggle between Gross and Net