

Report Date: September 8, 2021

Client: Everest Infrastructure Partners
Two Allegheny Center
Pittsburgh, PA 15212
Attn: Thomas Rigg
(603) 498-7462
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Structure: Existing 150-ft Self Support Tower
Site Name: Norwich CDT / Norwich
Site Reference #: 702499 / CT11254B
Site Address: 2 Hinkley Hill Rd
City, County, State: Preston, New London County, CT
Latitude, Longitude: 41.514847°, -72.061689°

PJF Project: A13321-0008.002.8700 R1

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the tower stress level.

Analysis Criteria:

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph (converted to an equivalent 105 mph nominal 3-second gust wind speed per Section 1609.3.1 for use with TIA-222 G) as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Proposed Appurtenance Loads:

The structure was analyzed with the proposed loading configuration shown in Table 1 combined with the other considered equipment shown in Table 2 of this report.

Summary of Analysis Results:

Existing Structure: Pass – 93.9%
Existing Foundation: Pass – 74.5%

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Everest Infrastructure Partners. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully Submitted by:
Paul J. Ford and Company



Anna Trudo, E.I.
Structural Designer
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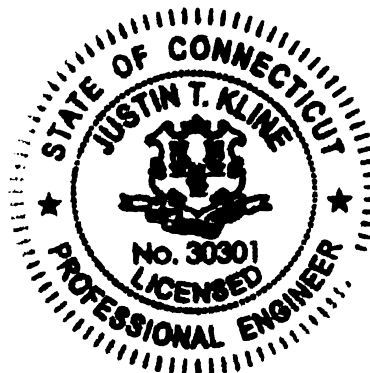


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1) INTRODUCTION

This tower is a 150 ft Self Support tower designed by Fred A Nudd Corporation in July of 1999. All tower geometry and foundation information were taken from a previous structural analysis by Fred Nudd Corp dated 6/11/2018.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-G
Risk Category:	II
Wind Speed:	105 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	0.75 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)
150.0	150.0	3	ericsson	AIR 32 B66A B2A_T-MOBILE w/ Mount Pipe	5	1-1/4
		3	ericsson	RADIO 4449 B71 + B85_T-MOBILE		
		3	ericsson	AIR 6449 B41 w/ Mount Pipe		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		3	tower mounts	Site Pro 1 VFA12-HD		

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)
140.0	140.0	6	alcatel lucent	1900 MHz 4x45W RRH	4	1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		3	commscope	DT465B-2XR w/ Mount Pipe		
		3	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 802-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
126.0	127.5	3	commscope	CBC78T-DS-43-2X	12 2	1-5/8 Hybrid
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		1	raycap	DB-B1-6C-12AB-0Z		
		1	raycap	RRFDC-3315-PF-48		
		2	rfs celwave	APL866513 w/ Mount Pipe		
		4	rfs celwave	APL868013 w/ Mount Pipe		
		3	samsung telecommunications	64T64R w/ Mount Pipe		
		3	samsung telecommunications	B2/B66A RRH-BR049		
		3	samsung telecommunications	B5/B13 RRH-BR04C		
	126.0	3	commscope	BSAMNT-SBS-2-2 (Mount Bracket)		
		3	tower mounts	12-ft Nudd Sector Mount with modifications		
115.0	115.0	2	cci antennas	DMP65R-BU6D w/ Mount Pipe	6 8 2	1-1/4 DC cable Fiber
		1	cci antennas	DMP65R-BU8D w/ Mount Pipe		
		2	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		1	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 32 B66A		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS E2 B29		
		2	kmw communications	EPBQ-654L8H6-L2 w/ Mount Pipe		
		1	kmw communications	EPBQ-654L8H8-L2 w/ Mount Pipe		
		3	powerwave technologies	7770_TIA w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		4	raycap	DC6-48-60-18-8F		
		3	tower mounts	Site Pro 1 VFA12-HD		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Source
Tower Structural Analysis	Nudd Corp #118-23067 dated 6/11/2018	on file

3.1) Analysis Method

tnxTower (version 8.0.9.0), 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 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.
 - 3) All tower geometry and foundation information were taken from a previous structural analysis by Fred Nudd Corp dated 6/11/2018.
 - 4) The antenna feedlines are assumed to be placed as indicated in Appendix B.
- This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company 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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	150 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-11467	82352	13.9	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	21	-50357	62849	80.1	Pass
T3	120 - 100	Leg	Pipe 4.5" x 0.237" (4 STD)	46	-104337	138323	75.4	Pass
T4	100 - 80	Leg	Pipe 5.563" x 0.258" (5 STD)	73	-147335	184369	79.9	Pass
T5	80 - 60	Leg	Pipe 6.625" x 0.280" (6 STD)	94	-186761	248502	75.2	Pass
T6	60 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	115	-223308	387837	57.6	Pass
T7	40 - 20	Leg	Pipe 8.625" x 0.50" (8 XS)	136	-255394	550137	46.4	Pass
T8	20 - 0	Leg	Pipe 8.625" x 0.50" (8 XS)	151	-287588	550137	52.3	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 3/16	9	-2579	6096	42.3 45.0 (b)	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 3/16	24	-6991	12216	57.2 93.9 (b)	Pass
T3	120 - 100	Diagonal	L 2 x 2 x 3/16	54	-6966	9453	73.7 93.8 (b)	Pass
T4	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	81	-7238	11448	63.2 78.4 (b)	Pass
T5	80 - 60	Diagonal	L 3 x 3 x 3/16	102	-7349	14985	49.0 75.9 (b)	Pass
T6	60 - 40	Diagonal	L 3 x 3 x 3/16	123	-7879	11963	65.9 79.2 (b)	Pass
T7	40 - 20	Diagonal	L 3.5 x 3.5 x 1/4	144	-8570	16716	51.3 58.8 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T8	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	158	-9129	13815	66.1	Pass
T1	150 - 140	Top Girt	L 3 x 3 x 1/4	5	-731	23047	3.2 9.2 (b)	Pass
							Summary	
						Leg (T2)	80.1	Pass
						Diagonal (T2)	93.9	Pass
						Top Girt (T1)	9.2	Pass
						Bolt Checks	93.9	Pass
						Rating =	93.9	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	74.3	Pass
1	Base Foundation (Soil Interaction)	0	74.5	Pass

Structure Rating (max from all components) =	93.9%
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Notes:

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

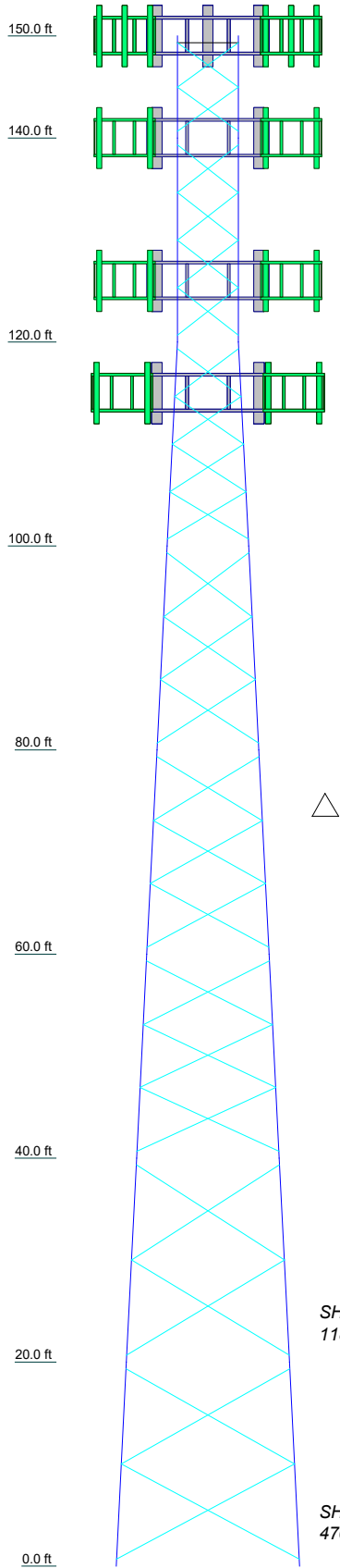
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8
Legs	Pipe 2.875" x 0.203" (2.5 STD)		Pipe 4.5" x 0.237" (4 STD)		Pipe 5.563" x 0.258" (5 STD)		Pipe 6.625" x 0.280" (6 STD)	
Leg Grade	A		L 2 x 2 x 3/16		L 2.5 x 2.5 x 3/16		L 3 x 3 x 3/16	
Diagonals	A36		L 2 x 2 x 3/16		L 2.5 x 2.5 x 3/16		L 3 x 3 x 3/16	
Diagonal Grade	A36		L 2 x 2 x 3/16		L 2.5 x 2.5 x 3/16		L 3 x 3 x 3/16	
Top Girts	L 3 x 3 x 1/4		L 3 x 3 x 1/4		L 3 x 3 x 1/4		L 3 x 3 x 1/4	
Face Width (ft)	6		8		10		12	
# Panels @ (ft)	2 @ 4.33333		8 @ 4.66667		9 @ 6.22222		4 @ 9.33333	
Weight (lb) / 7909.5	483.5		1254.8		2183.8		4212.4	



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L 1.5 x 1.5 x 3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500M-54	54 ksi	70 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

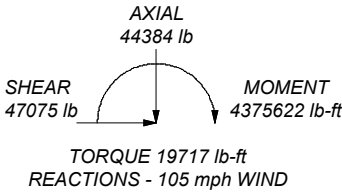
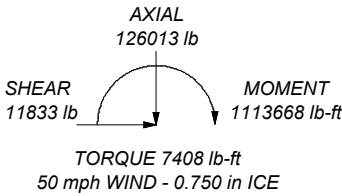
1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 93.9%

ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 295490 lb
SHEAR: 28892 lb

UPLIFT: -260942 lb
SHEAR: 26375 lb





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250 East Broad St., Suite 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: 150-ft Norwich, CT S/S Tower

Project: **PJF 13321-0008**

Client: Everest Infrastructure Partners

Code: TIA-222-G

Path:

Drawn by: Anna Trudo

Date: 09/08/21

Scale: NTS

Dwg No. E-1

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 150.00 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 6.00 ft at the top and 18.00 ft at the base.

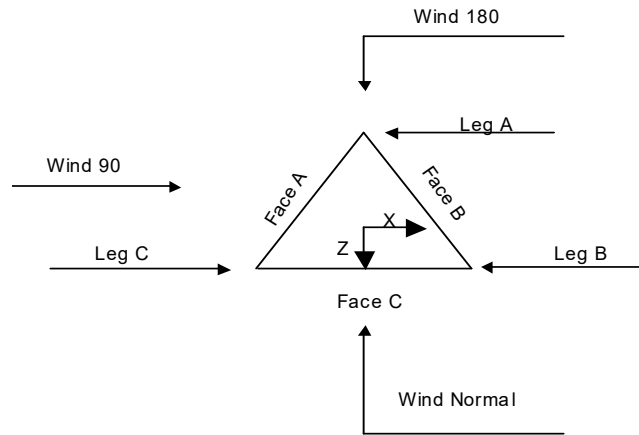
This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- Tower is located in New London County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 105 mph.
- Structure Class II.
- Exposure Category B.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 0.750 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.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in tower member design 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	Retention 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-G Bracing Resist.
		Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice
		Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	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	150.00-140.00			6.00	1	10.00
T2	140.00-120.00			6.00	1	20.00
T3	120.00-100.00			6.00	1	20.00
T4	100.00-80.00			8.00	1	20.00
T5	80.00-60.00			10.00	1	20.00
T6	60.00-40.00			12.00	1	20.00
T7	40.00-20.00			14.00	1	20.00
T8	20.00-0.00			16.00	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	150.00-140.00	4.33	X Brace	No	No	8.000	8.000
T2	140.00-120.00	4.67	X Brace	No	No	8.000	8.000
T3	120.00-100.00	4.67	X Brace	No	No	8.000	8.000
T4	100.00-80.00	6.22	X Brace	No	No	8.000	8.000
T5	80.00-60.00	6.22	X Brace	No	No	8.000	8.000
T6	60.00-40.00	6.22	X Brace	No	No	8.000	8.000
T7	40.00-20.00	9.33	X Brace	No	No	8.000	8.000
T8	20.00-0.00	9.33	X Brace	No	No	8.000	8.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A500M-54 (54 ksi)	Single Angle	L 1.5 x 1.5 x 3/16	A36 (36 ksi)
T2 140.00-120.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A500M-54 (54 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T3 120.00-100.00	Pipe	Pipe 4.5" x 0.237" (4 STD)	A500M-54 (54 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T4 100.00-80.00	Pipe	Pipe 5.563" x 0.258" (5 STD)	A500M-54 (54 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T5 80.00-60.00	Pipe	Pipe 6.625" x 0.280" (6 STD)	A500M-54 (54 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T6 60.00-40.00	Pipe	Pipe 8.625" x 0.322" (8 STD)	A500M-54 (54 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T7 40.00-20.00	Pipe	Pipe 8.625" x 0.50" (8 XS)	A500M-54 (54 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)
T8 20.00-0.00	Pipe	Pipe 8.625" x 0.50" (8 XS)	A500M-54 (54 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	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 150.00-140.00	Single Angle	L 3 x 3 x 1/4	A36 (36 ksi)	Single Angle		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 150.00-140.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T2 140.00-120.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T3 120.00-100.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T4 100.00-80.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T5 80.00-60.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T6 60.00-40.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T7 40.00-20.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000
T8 20.00-0.00	0.00	0.000	A36 (36 ksi)	1.03	1	1.1	0.000	0.000	36.000

Tower Section Geometry (cont'd)

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors ¹							
			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
T1 150.00-140.00	Yes	No	1	1	1	1	1	1	1	1
T2 140.00-120.00	Yes	No	1	1	1	1	1	1	1	1
T3 120.00-100.00	Yes	No	1	1	1	1	1	1	1	1
T4 100.00-80.00	Yes	No	1	1	1	1	1	1	1	1
T5 80.00-60.00	Yes	No	1	1	1	1	1	1	1	1
T6 60.00-40.00	Yes	No	1	1	1	1	1	1	1	1
T7 40.00-20.00	Yes	No	1	1	1	1	1	1	1	1
T8 20.00-0.00	Yes	No	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 150.00-140.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 140.00-120.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 120.00-100.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 100.00-80.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 80.00-60.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 60.00-40.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 40.00-20.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 20.00-0.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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 150.00-140.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 140.00-120.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 120.00-100.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 100.00-80.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	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
T5 80.00- 60.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 60.00- 40.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 40.00- 20.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 20.00-0.00	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 150.00- 140.00	Flange	0.750 A325N	4	0.500 A325N	1	0.500 A325N	1	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T2 140.00- 120.00	Flange	1.000 A325N	4	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T3 120.00- 100.00	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T4 100.00- 80.00	Flange	1.000 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T5 80.00- 60.00	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T6 60.00- 40.00	Flange	1.250 A325N	8	0.625 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T7 40.00- 20.00	Flange	1.250 A325N	8	0.750 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T8 20.00-0.00	Flange	1.500 A325N	0	0.750 A325N	1	0.000 A325N	0	0.625 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component 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
Safety Line 3/8	C	No	No	Ar (CaAa)	150.00 - 0.00	0.000	-0.5	1	1	0.375	0.375		0.22
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	150.00 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80
AVA6-50(1- 1/4") **	C	No	No	Ar (CaAa)	150.00 - 0.00	0.000	-0.25	5	5	1.560	1.560		0.45
1.5" flat Cable Ladder Rail	A	No	No	Af (CaAa)	140.00 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80
AVA6-50(1- 1/4") **	A	No	No	Ar (CaAa)	140.00 - 0.00	0.000	-0.25	4	4	1.560	1.560		0.45
1.5" flat Cable Ladder Rail	B	No	No	Af (CaAa)	127.50 - 0.00	0.000	-0.25	2	2	30.000 1.500	1.500		1.80
LDF7-50A(1- 5/8")	B	No	No	Ar (CaAa)	127.50 - 0.00	0.000	-0.25	14	14	1.000 1.980	1.980		0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**													
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	115.00 - 0.00	0.000	0.25	2	2	30.000 1.500	1.500		1.80
AVA6-50(1- 1/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	6	6	1.560	1.560		0.45
DC (3/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	2	2	1.090	0.750		0.33
DC (3/4")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	6	6	1.090	0.001		0.33
Fiber (3/8")	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	2	1	1.090	0.001		0.33
3" (Nominal) Conduit	C	No	No	Ar (CaAa)	115.00 - 0.00	0.000	0.25	1	1	3.500	3.500		1.49

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 lb
T1	150.00-140.00	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	13.175	0.000	61
T2	140.00-120.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	24.540	0.000	113
		C	0.000	0.000	26.350	0.000	121
T3	120.00-100.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	55.402	0.000	288
T4	100.00-80.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	65.086	0.000	343
T5	80.00-60.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	65.086	0.000	343
T6	60.00-40.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	65.086	0.000	343
T7	40.00-20.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	65.086	0.000	343
T8	20.00-0.00	A	0.000	0.000	22.480	0.000	108
		B	0.000	0.000	65.440	0.000	302
		C	0.000	0.000	65.086	0.000	343

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	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 lb
T1	150.00-140.00	A	1.739	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	38.597	0.000	561
T2	140.00-120.00	A	1.720	0.000	0.000	61.780	0.000	900
		B		0.000	0.000	50.623	0.000	793
		C		0.000	0.000	76.850	0.000	1108
T3	120.00-100.00	A	1.692	0.000	0.000	61.371	0.000	884
		B		0.000	0.000	134.607	0.000	2085
		C		0.000	0.000	185.820	0.000	2538
T4	100.00-80.00	A	1.658	0.000	0.000	60.888	0.000	866
		B		0.000	0.000	134.151	0.000	2050

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	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 lb
T5	80.00-60.00	C	1.617	0.000	0.000	220.413	0.000	2955
		A		0.000	0.000	60.298	0.000	843
		B		0.000	0.000	133.593	0.000	2008
T6	60.00-40.00	C	1.564	0.000	0.000	218.085	0.000	2875
		A		0.000	0.000	59.531	0.000	814
		B		0.000	0.000	132.868	0.000	1954
T7	40.00-20.00	C	1.486	0.000	0.000	215.061	0.000	2772
		A		0.000	0.000	58.416	0.000	773
		B		0.000	0.000	131.814	0.000	1877
T8	20.00-0.00	C	1.331	0.000	0.000	210.666	0.000	2625
		A		0.000	0.000	56.208	0.000	693
		B		0.000	0.000	129.725	0.000	1725
		C		0.000	0.000	201.963	0.000	2346

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
T1	150.00-140.00	4.970	2.469	7.445	4.585
T2	140.00-120.00	0.650	-3.021	2.118	-0.563
T3	120.00-100.00	-1.281	-7.258	-2.687	-2.499
T4	100.00-80.00	-2.507	-7.831	-4.776	-1.836
T5	80.00-60.00	-2.750	-8.561	-5.422	-2.211
T6	60.00-40.00	-3.032	-9.380	-6.003	-2.633
T7	40.00-20.00	-3.508	-10.808	-6.905	-3.375
T8	20.00-0.00	-3.826	-11.781	-7.465	-4.442

Shielding Factor K_a

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line 3/8	140.00 - 150.00	0.6000	0.6000
T1	2	1.5" flat Cable Ladder Rail	140.00 - 150.00	0.6000	0.6000
T1	4	AVA6-50(1-1/4")	140.00 - 150.00	0.6000	0.6000
T2	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T2	2	1.5" flat Cable Ladder Rail	120.00 - 140.00	0.6000	0.6000
T2	4	AVA6-50(1-1/4")	120.00 - 140.00	0.6000	0.6000
T2	6	1.5" flat Cable Ladder Rail	120.00 - 140.00	0.6000	0.6000
T2	7	AVA6-50(1-1/4")	120.00 - 140.00	0.6000	0.6000
T2	9	1.5" flat Cable Ladder Rail	120.00 - 127.50	0.6000	0.6000
T2	10	LDF7-50A(1-5/8")	120.00 - 127.50	0.6000	0.6000
T3	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T3	2	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	4	AVA6-50(1-1/4")	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T3	6	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	7	AVA6-50(1-1/4")	100.00 - 120.00	0.6000	0.6000
T3	9	1.5" flat Cable Ladder Rail	100.00 - 120.00	0.6000	0.6000
T3	10	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T3	13	1.5" flat Cable Ladder Rail	100.00 - 115.00	0.6000	0.6000
T3	14	AVA6-50(1-1/4")	100.00 - 115.00	0.6000	0.6000
T3	15	DC (3/4")	100.00 - 115.00	0.6000	0.6000
T3	16	DC (3/4")	100.00 - 115.00	0.6000	0.6000
T3	17	Fiber (3/8")	100.00 - 115.00	0.6000	0.6000
T3	18	3" (Nominal) Conduit	100.00 - 115.00	0.6000	0.6000
T4	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T4	2	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	4	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	6	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	7	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	9	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	10	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T4	13	1.5" flat Cable Ladder Rail	80.00 - 100.00	0.6000	0.6000
T4	14	AVA6-50(1-1/4")	80.00 - 100.00	0.6000	0.6000
T4	15	DC (3/4")	80.00 - 100.00	0.6000	0.6000
T4	16	DC (3/4")	80.00 - 100.00	0.6000	0.6000
T4	17	Fiber (3/8")	80.00 - 100.00	0.6000	0.6000
T4	18	3" (Nominal) Conduit	80.00 - 100.00	0.6000	0.6000
T5	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T5	2	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	4	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	6	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	7	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	9	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	10	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T5	13	1.5" flat Cable Ladder Rail	60.00 - 80.00	0.6000	0.6000
T5	14	AVA6-50(1-1/4")	60.00 - 80.00	0.6000	0.6000
T5	15	DC (3/4")	60.00 - 80.00	0.6000	0.6000
T5	16	DC (3/4")	60.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T5	17	Fiber (3/8")	60.00 - 80.00	0.6000	0.6000
T5	18	3" (Nominal) Conduit	60.00 - 80.00	0.6000	0.6000
T6	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T6	2	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	4	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	6	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	7	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	9	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	10	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T6	13	1.5" flat Cable Ladder Rail	40.00 - 60.00	0.6000	0.6000
T6	14	AVA6-50(1-1/4")	40.00 - 60.00	0.6000	0.6000
T6	15	DC (3/4")	40.00 - 60.00	0.6000	0.6000
T6	16	DC (3/4")	40.00 - 60.00	0.6000	0.6000
T6	17	Fiber (3/8")	40.00 - 60.00	0.6000	0.6000
T6	18	3" (Nominal) Conduit	40.00 - 60.00	0.6000	0.6000
T7	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T7	2	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	4	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	6	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	7	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	9	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	10	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T7	13	1.5" flat Cable Ladder Rail	20.00 - 40.00	0.6000	0.6000
T7	14	AVA6-50(1-1/4")	20.00 - 40.00	0.6000	0.6000
T7	15	DC (3/4")	20.00 - 40.00	0.6000	0.6000
T7	16	DC (3/4")	20.00 - 40.00	0.6000	0.6000
T7	17	Fiber (3/8")	20.00 - 40.00	0.6000	0.6000
T7	18	3" (Nominal) Conduit	20.00 - 40.00	0.6000	0.6000
T8	1	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T8	2	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	4	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	6	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	7	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	9	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	10	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T8	13	1.5" flat Cable Ladder Rail	0.00 - 20.00	0.6000	0.6000
T8	14	AVA6-50(1-1/4")	0.00 - 20.00	0.6000	0.6000
T8	15	DC (3/4")	0.00 - 20.00	0.6000	0.6000
T8	16	DC (3/4")	0.00 - 20.00	0.6000	0.6000
T8	17	Fiber (3/8")	0.00 - 20.00	0.6000	0.6000
T8	18	3" (Nominal) Conduit	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

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 lb
Site Pro 1 VFA12-HD	A	From Leg	2.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	658 804 1015
Site Pro 1 VFA12-HD	B	From Leg	2.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	658 804 1015
Site Pro 1 VFA12-HD	C	From Leg	2.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	13.20 19.50 25.80	9.20 14.60 19.50	658 804 1015
8' x 2" Sch 40 Pipe Mount	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29 44 63
8' x 2" Sch 40 Pipe Mount	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29 44 63
8' x 2" Sch 40 Pipe Mount	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	29 44 63
AIR 32 B66A B2A_T- MOBILE_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	7.09 7.56 8.02	6.39 7.25 7.99	158 222 292
AIR 32 B66A B2A_T- MOBILE_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	7.09 7.56 8.02	6.39 7.25 7.99	158 222 292
AIR 32 B66A B2A_T- MOBILE_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	7.09 7.56 8.02	6.39 7.25 7.99	158 222 292
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	186 322 469
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	186 322 469
APXVAARR24_43-U- NA20_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	186 322 469
AIR 6449 B41_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	128 177 232
AIR 6449 B41_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	128 177 232

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 lb
AIR 6449 B41_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	5.87 6.23 6.61	3.27 3.73 4.20	128 177 232
RRUS 4415 B25	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	44 56 71
RRUS 4415 B25	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	44 56 71
RRUS 4415 B25	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	44 56 71
RADIO 4449 B71 B85_T- MOBILE	A	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	73 93 116
RADIO 4449 B71 B85_T- MOBILE	B	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	73 93 116
RADIO 4449 B71 B85_T- MOBILE	C	From Leg	4.00 0 0	0.000	150.00	No Ice 1/2" Ice 1" Ice	1.97 2.15 2.33	1.59 1.75 1.92	73 93 116
** Sector Mount [SM 802-3]	C	None		0.000	140.00	No Ice 1/2" Ice 1" Ice	25.34 33.44 41.56	25.34 33.44 41.56	930 1388 1977
DT465B-2XR_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
DT465B-2XR_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
DT465B-2XR_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	9.34 9.91 10.44	7.63 8.82 9.72	84 160 245
TD-RRH8x20-25	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
TD-RRH8x20-25	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
TD-RRH8x20-25	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70 97 128
(2) 1900 MHz 4x45W RRH	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110
(2) 1900 MHz 4x45W RRH	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110

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 lb
(2) 1900 MHz 4x45W RRH	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	60 83 110
APXV9ERR18-C-A20_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
APXV9ERR18-C-A20_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
APXV9ERR18-C-A20_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	7.47 8.66 9.56	95 166 244
(2) RRH2X50-800	A	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	53 70 90
(2) RRH2X50-800	B	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	53 70 90
(2) RRH2X50-800	C	From Leg	4.00 0 0	0.000	140.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	53 70 90
**									
Sector Mount [SM 802-3]	C	None		0.000	126.00	No Ice 1/2" Ice 1" Ice	25.34 33.44 41.56	25.34 33.44 41.56	930 1388 1977
BSAMNT-SBS-2-2 (Mount Bracket)	A	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	67 88 108
BSAMNT-SBS-2-2 (Mount Bracket)	B	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	67 88 108
BSAMNT-SBS-2-2 (Mount Bracket)	C	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	67 88 108
Miscellaneous [NA 509-1]	A	From Leg	2.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	6.32 7.79 9.36	4.85 6.36 7.94	275 417 598
Miscellaneous [NA 509-1]	B	From Leg	2.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	6.32 7.79 9.36	4.85 6.36 7.94	275 417 598
Miscellaneous [NA 509-1]	C	From Leg	2.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	6.32 7.79 9.36	4.85 6.36 7.94	275 417 598
12.5' x 2.375" Pipe (Hoirz)	A	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	2.97 4.25 5.54	1.07 1.54 2.01	30 52 83
12.5' x 2.375" Pipe (Hoirz)	B	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	2.97 4.25 5.54	1.07 1.54 2.01	30 52 83

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 lb
12.5' x 2.375" Pipe (Hoirz)	C	From Leg	4.00 0 0	0.000	126.00	No Ice 1/2" Ice 1" Ice	2.97 4.25 5.54	1.07 1.54 2.01	30 52 83
64T64R w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.70 5.03 5.37	1.99 2.39 2.80	87 123 164
64T64R w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.70 5.03 5.37	1.99 2.39 2.80	87 123 164
64T64R w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.70 5.03 5.37	1.99 2.39 2.80	87 123 164
(2) JAHH-65B-R3B_TIA w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	89 165 250
(2) JAHH-65B-R3B_TIA w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	89 165 250
(2) JAHH-65B-R3B_TIA w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	89 165 250
APL866513_TIA w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.29 4.66 5.04	4.80 5.42 6.04	34 79 129
APL866513_TIA w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	4.29 4.66 5.04	4.80 5.42 6.04	34 79 129
APL868013_TIA w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
APL868013_TIA w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
(2) APL868013_TIA w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	30 69 113
B2/B66A RRH-BR049	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B2/B66A RRH-BR049	B	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B2/B66A RRH-BR049	C	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B5/B13 RRH-BR04C	A	From Leg	4.00 0 2	0.000	126.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.01 1.14 1.28	70 87 106
B5/B13 RRH-BR04C	B	From Leg	4.00	0.000	126.00	No Ice	1.88	1.01	70

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
			0			1/2"	2.05	1.14	87
			2			Ice	2.22	1.28	106
B5/B13 RRH-BR04C	C	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	1.88	1.01	70
			2			1/2"	2.05	1.14	87
			2			Ice	2.22	1.28	106
CBC78T-DS-43-2X	A	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	0.37	0.51	21
			2			1/2"	0.45	0.60	27
			2			Ice	0.53	0.70	35
CBC78T-DS-43-2X	B	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	0.37	0.51	21
			2			1/2"	0.45	0.60	27
			2			Ice	0.53	0.70	35
CBC78T-DS-43-2X	C	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	0.37	0.51	21
			2			1/2"	0.45	0.60	27
			2			Ice	0.53	0.70	35
RRFDC-3315-PF-48	A	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	3.36	2.19	32
			2			1/2"	3.60	2.39	61
			2			Ice	3.84	2.61	93
DB-B1-6C-12AB-0Z	B	From Leg	4.00	0.000	126.00	1" Ice			
			0			No Ice	2.60	2.08	55
			2			1/2"	2.81	2.27	78
			2			Ice	3.04	2.47	105
						1" Ice			
** Site Pro 1 VFA12-HD	A	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
Site Pro 1 VFA12-HD	B	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
Site Pro 1 VFA12-HD	C	From Leg	2.00	0.000	115.00	No Ice	13.20	9.20	658
			0			1/2"	19.50	14.60	804
			0			Ice	25.80	19.50	1015
						1" Ice			
7770_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
7770_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
7770_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	5.75	4.25	55
			0			1/2"	6.18	5.01	103
			0			Ice	6.61	5.71	157
						1" Ice			
OPA-65R-LCUU-H8_TIA w/ Mount Pipe	A	From Leg	4.00	0.000	115.00	No Ice	13.00	9.56	103
			0			1/2"	13.69	11.03	198
			0			Ice	14.38	12.49	303
						1" Ice			
OPA-65R-LCUU-H6_TIA w/ Mount Pipe	B	From Leg	4.00	0.000	115.00	No Ice	9.68	7.12	106
			0			1/2"	10.25	8.30	181
			0			Ice	10.79	9.20	265
						1" Ice			
OPA-65R-LCUU-H6_TIA w/ Mount Pipe	C	From Leg	4.00	0.000	115.00	No Ice	9.68	7.12	106
			0			1/2"	10.25	8.30	181
			0			Ice	10.79	9.20	265
						1" Ice			

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 lb
EPBQ-654L8H8-L2_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	18.33 19.06 19.81	9.17 10.68 12.22	119 236 363
EPBQ-654L8H6-L2_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	13.47 14.09 14.66	6.64 7.83 8.75	110 201 300
EPBQ-654L8H6-L2_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	13.47 14.09 14.66	6.64 7.83 8.75	110 201 300
DMP65R-BU8D_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	18.11 18.84 19.59	10.26 11.78 13.33	138 260 392
DMP65R-BU6D_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	12.95 13.55 14.11	7.26 8.43 9.31	115 207 308
DMP65R-BU6D_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	12.95 13.55 14.11	7.26 8.43 9.31	115 207 308
RRUS E2 B29	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	60 83 110
RRUS E2 B29	B	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	60 83 110
RRUS E2 B29	C	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	60 83 110
RRUS 4449 B5/B12	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	71 90 111
RRUS 4449 B5/B12	B	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	71 90 111
RRUS 4449 B5/B12	C	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	71 90 111
RRUS 4478 B14	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39	1.25 1.40 1.55	59 77 97
RRUS 4478 B14	B	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39	1.25 1.40 1.55	59 77 97
RRUS 4478 B14	C	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	2.02 2.20 2.39	1.25 1.40 1.55	59 77 97
RRUS 32 B66A	A	From Leg	4.00 0 0	0.000	115.00	No Ice 1/2" Ice 1" Ice	2.86 3.09 3.32	1.78 1.97 2.17	55 77 103
RRUS 32 B66A	B	From Leg	4.00	0.000	115.00	No Ice	2.86	1.78	55

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
			0			1/2"	3.09	1.97	77
			0			Ice	3.32	2.17	103
RRUS 32 B66A	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.86	1.78	55
			0			1/2"	3.09	1.97	77
			0			Ice	3.32	2.17	103
RRUS 32 B30	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B30	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B30	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B2	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B2	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
RRUS 32 B2	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	2.74	1.67	53
			0			1/2"	2.96	1.86	74
			0			Ice	3.19	2.05	98
(2) DC6-48-60-18-8F	A	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
DC6-48-60-18-8F	B	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
DC6-48-60-18-8F	C	From Leg	0.00	0.000	115.00	1" Ice			
			0			No Ice	1.21	1.21	33
			0			1/2"	1.89	1.89	55
			0			Ice	2.11	2.11	80
(2) LGP21401	A	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
(2) LGP21401	B	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
(2) LGP21401	C	From Leg	4.00	0.000	115.00	1" Ice			
			0			No Ice	1.10	0.35	14
			0			1/2"	1.24	0.44	21
			0			Ice	1.38	0.54	30
						1" Ice			
**									
**									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 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 Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	295490	24895	-14663
	Max. H _x	18	295490	24895	-14663
	Max. H _z	7	-260942	-22709	13414
	Min. Vert	7	-260942	-22709	13414
	Min. H _x	7	-260942	-22709	13414
	Min. H _z	18	295490	24895	-14663
Leg B	Max. Vert	10	284604	-23917	-13614
	Max. H _x	23	-250358	21711	12332
	Max. H _z	23	-250358	21711	12332
	Min. Vert	23	-250358	21711	12332

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg A	Min. H _x	10	284604	-23917	-13614
	Min. H _z	10	284604	-23917	-13614
	Max. Vert	2	288664	-151	27968
	Max. H _x	21	11296	3552	745
	Max. H _z	2	288664	-151	27968
	Min. Vert	15	-254168	156	-25425
	Min. H _x	9	10960	-3555	719
	Min. H _z	15	-254168	156	-25425

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturing Moment, M _x lb-ft	Overturing Moment, M _z lb-ft	Torque lb-ft
Dead Only	36986	0	0	-488	1248	0
1.2 Dead+1.6 Wind 0 deg - No Ice	44384	-20	-45403	-4269197	4124	-4796
0.9 Dead+1.6 Wind 0 deg - No Ice	33288	-20	-45403	-4263063	3746	-4796
1.2 Dead+1.6 Wind 30 deg - No Ice	44384	22584	-39297	-3687402	-2114579	1142
0.9 Dead+1.6 Wind 30 deg - No Ice	33288	22584	-39297	-3682101	-2111995	1143
1.2 Dead+1.6 Wind 60 deg - No Ice	44384	39142	-22680	-2131402	-3672694	-7912
0.9 Dead+1.6 Wind 60 deg - No Ice	33288	39142	-22680	-2128274	-3667931	-7911
1.2 Dead+1.6 Wind 90 deg - No Ice	44384	42537	20	1973	-4046962	-19716
0.9 Dead+1.6 Wind 90 deg - No Ice	33288	42538	20	2119	-4041614	-19714
1.2 Dead+1.6 Wind 120 deg - No Ice	44384	38597	22389	2112559	-3636892	5473
0.9 Dead+1.6 Wind 120 deg - No Ice	33288	38597	22389	2109736	-3632150	5475
1.2 Dead+1.6 Wind 150 deg - No Ice	44384	20469	35593	3439019	-1974827	19066
0.9 Dead+1.6 Wind 150 deg - No Ice	33288	20469	35593	3434247	-1972373	19067
1.2 Dead+1.6 Wind 180 deg - No Ice	44384	20	43567	4140745	-1121	4795
0.9 Dead+1.6 Wind 180 deg - No Ice	33288	20	43567	4135049	-1490	4795
1.2 Dead+1.6 Wind 210 deg - No Ice	44384	-22584	39297	3686230	2117554	-1144
0.9 Dead+1.6 Wind 210 deg - No Ice	33288	-22584	39297	3681226	2114224	-1145
1.2 Dead+1.6 Wind 240 deg - No Ice	44384	-40732	23598	2193814	3785928	7912
0.9 Dead+1.6 Wind 240 deg - No Ice	33288	-40733	23598	2190914	3780296	7910
1.2 Dead+1.6 Wind 270 deg - No Ice	44384	-42537	-20	-3271	4049954	19717
0.9 Dead+1.6 Wind 270 deg - No Ice	33288	-42538	-20	-3118	4043859	19715
1.2 Dead+1.6 Wind 300 deg - No Ice	44384	-37006	-21470	-2050095	3529670	-5472
0.9 Dead+1.6 Wind 300 deg - No Ice	33288	-37006	-21470	-2047045	3524302	-5473
1.2 Dead+1.6 Wind 330 deg - No Ice	44384	-20469	-35593	-3440161	1977889	-19066
0.9 Dead+1.6 Wind 330 deg - No Ice	33288	-20469	-35593	-3435092	1974687	-19067
1.2 Dead+1.0 Ice+1.0 Temp	126013	0	0	8023	12896	0

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	126013	-3	-11726	-1085113	13365	-2704
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	126013	5829	-10114	-933773	-529528	830
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	126013	10052	-5811	-534265	-924962	-1342
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	126013	10816	3	8472	-1013261	-1756
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	126013	9551	5525	531286	-891028	4712
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	126013	5442	9438	905460	-504307	7408
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	126013	3	11504	1086309	12573	2703
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	126013	-5829	10114	949929	555459	-830
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	126013	-10244	5922	557896	963851	1342
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	126013	-10816	-3	7678	1039194	1756
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	126013	-9358	-5414	-507643	904006	-4711
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	126013	-5442	-9438	-889302	530248	-7408
Dead+Wind 0 deg - Service	36986	-4	-9472	-880561	1782	-979
Dead+Wind 30 deg - Service	36986	4712	-8198	-760635	-435070	228
Dead+Wind 60 deg - Service	36986	8166	-4731	-439811	-756323	-1616
Dead+Wind 90 deg - Service	36986	8887	4	41	-833925	-4022
Dead+Wind 120 deg - Service	36986	8055	4672	435227	-749019	1116
Dead+Wind 150 deg - Service	36986	4280	7442	709227	-406572	3887
Dead+Wind 180 deg - Service	36986	4	9097	853619	713	979
Dead+Wind 210 deg - Service	36986	-4712	8198	759652	437563	-228
Dead+Wind 240 deg - Service	36986	-8491	4919	451805	781298	1616
Dead+Wind 270 deg - Service	36986	-8887	-4	-1029	836419	4022
Dead+Wind 300 deg - Service	36986	-7730	-4484	-423231	729033	-1116
Dead+Wind 330 deg - Service	36986	-4280	-7442	-710209	409069	-3887

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0	-36986	0	0	36986	0	0.000%
2	-20	-44384	-45404	20	44384	45403	0.001%
3	-20	-33288	-45404	20	33288	45403	0.001%
4	22584	-44384	-39298	-22584	44384	39297	0.001%
5	22584	-33288	-39298	-22584	33288	39297	0.001%
6	39142	-44384	-22680	-39142	44384	22680	0.001%
7	39142	-33288	-22680	-39142	33288	22680	0.001%
8	42538	-44384	20	-42537	44384	-20	0.001%
9	42538	-33288	20	-42538	33288	-20	0.001%
10	38598	-44384	22389	-38597	44384	-22389	0.001%
11	38598	-33288	22389	-38597	33288	-22389	0.001%
12	20469	-44384	35594	-20469	44384	-35593	0.001%
13	20469	-33288	35594	-20469	33288	-35593	0.001%
14	20	-44384	43567	-20	44384	-43567	0.001%
15	20	-33288	43567	-20	33288	-43567	0.001%
16	-22584	-44384	39298	22584	44384	-39297	0.001%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
17	-22584	-33288	39298	22584	33288	-39297	0.001%
18	-40733	-44384	23598	40732	44384	-23598	0.001%
19	-40733	-33288	23598	40733	33288	-23598	0.001%
20	-42538	-44384	-20	42537	44384	20	0.001%
21	-42538	-33288	-20	42538	33288	20	0.001%
22	-37007	-44384	-21471	37006	44384	21470	0.001%
23	-37007	-33288	-21471	37006	33288	21470	0.001%
24	-20469	-44384	-35594	20469	44384	35593	0.001%
25	-20469	-33288	-35594	20469	33288	35593	0.001%
26	0	-126013	0	0	126013	0	0.000%
27	-3	-126013	-11726	3	126013	11726	0.000%
28	5829	-126013	-10114	-5829	126013	10114	0.000%
29	10052	-126013	-5811	-10052	126013	5811	0.000%
30	10817	-126013	3	-10816	126013	-3	0.000%
31	9551	-126013	5525	-9551	126013	-5525	0.000%
32	5442	-126013	9439	-5442	126013	-9438	0.000%
33	3	-126013	11504	-3	126013	-11504	0.000%
34	-5829	-126013	10114	5829	126013	-10114	0.000%
35	-10245	-126013	5922	10244	126013	-5922	0.000%
36	-10817	-126013	-3	10816	126013	3	0.000%
37	-9358	-126013	-5414	9358	126013	5414	0.000%
38	-5442	-126013	-9439	5442	126013	9438	0.000%
39	-4	-36986	-9472	4	36986	9472	0.000%
40	4712	-36986	-8198	-4712	36986	8198	0.000%
41	8166	-36986	-4731	-8166	36986	4731	0.000%
42	8887	-36986	4	-8887	36986	-4	0.000%
43	8055	-36986	4672	-8055	36986	-4672	0.000%
44	4280	-36986	7442	-4280	36986	-7442	0.000%
45	4	-36986	9097	-4	36986	-9097	0.000%
46	-4712	-36986	8198	4712	36986	-8198	0.000%
47	-8491	-36986	4919	8491	36986	-4919	0.000%
48	-8887	-36986	-4	8887	36986	4	0.000%
49	-7730	-36986	-4485	7730	36986	4484	0.000%
50	-4280	-36986	-7442	4280	36986	7442	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	10	0.00000001	0.00006762
3	Yes	10	0.00000001	0.00004961
4	Yes	10	0.00000001	0.00006878
5	Yes	10	0.00000001	0.00005075
6	Yes	10	0.00000001	0.00007008
7	Yes	10	0.00000001	0.00005200
8	Yes	10	0.00000001	0.00006924
9	Yes	10	0.00000001	0.00005111
10	Yes	10	0.00000001	0.00006777
11	Yes	10	0.00000001	0.00004972
12	Yes	10	0.00000001	0.00006975
13	Yes	10	0.00000001	0.00005149
14	Yes	10	0.00000001	0.00007044
15	Yes	10	0.00000001	0.00005227
16	Yes	10	0.00000001	0.00006878
17	Yes	10	0.00000001	0.00005076
18	Yes	10	0.00000001	0.00006719
19	Yes	10	0.00000001	0.00004929
20	Yes	10	0.00000001	0.00006921
21	Yes	10	0.00000001	0.00005109
22	Yes	10	0.00000001	0.00007053
23	Yes	10	0.00000001	0.00005234
24	Yes	10	0.00000001	0.00006972
25	Yes	10	0.00000001	0.00005146
26	Yes	6	0.00000001	0.00001190
27	Yes	11	0.00000001	0.00004397
28	Yes	11	0.00000001	0.00004391
29	Yes	11	0.00000001	0.00004400
30	Yes	11	0.00000001	0.00004336
31	Yes	11	0.00000001	0.00004362
32	Yes	11	0.00000001	0.00004365
33	Yes	11	0.00000001	0.00004403
34	Yes	11	0.00000001	0.00004382
35	Yes	11	0.00000001	0.00004378
36	Yes	11	0.00000001	0.00004317
37	Yes	11	0.00000001	0.00004347
38	Yes	11	0.00000001	0.00004353
39	Yes	10	0.00000001	0.00005402
40	Yes	10	0.00000001	0.00005414
41	Yes	10	0.00000001	0.00005440
42	Yes	10	0.00000001	0.00005431
43	Yes	10	0.00000001	0.00005409
44	Yes	10	0.00000001	0.00005462
45	Yes	10	0.00000001	0.00005454
46	Yes	10	0.00000001	0.00005406
47	Yes	10	0.00000001	0.00005372
48	Yes	10	0.00000001	0.00005418
49	Yes	10	0.00000001	0.00005455
50	Yes	10	0.00000001	0.00005458

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	3.44	47	0.225	0.019
T2	140 - 120	2.94	47	0.222	0.019
T3	120 - 100	2.02	47	0.183	0.019
T4	100 - 80	1.29	47	0.138	0.014
T5	80 - 60	0.76	47	0.094	0.010
T6	60 - 40	0.41	47	0.058	0.007
T7	40 - 20	0.19	47	0.033	0.004
T8	20 - 0	0.06	47	0.017	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Site Pro 1 VFA12-HD	47	3.44	0.225	0.019	106075
140.00	Sector Mount [SM 802-3]	47	2.94	0.222	0.019	54349
126.00	Sector Mount [SM 802-3]	47	2.27	0.197	0.019	26341
115.00	Site Pro 1 VFA12-HD	47	1.81	0.171	0.018	22159

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	16.82	18	1.106	0.091
T2	140 - 120	14.36	18	1.090	0.093
T3	120 - 100	9.84	18	0.896	0.091
T4	100 - 80	6.27	18	0.673	0.071
T5	80 - 60	3.70	18	0.460	0.050
T6	60 - 40	1.99	18	0.282	0.034
T7	40 - 20	0.90	18	0.161	0.018
T8	20 - 0	0.28	18	0.081	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	Site Pro 1 VFA12-HD	18	16.82	1.106	0.091	21726
140.00	Sector Mount [SM 802-3]	18	14.36	1.090	0.093	11133
126.00	Sector Mount [SM 802-3]	18	11.11	0.967	0.093	5385
115.00	Site Pro 1 VFA12-HD	18	8.85	0.838	0.088	4518

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria
T1	150	Leg	A325N	0.750	4	2105	29821	0.071 ✓	1	Bolt Tension
		Diagonal	A325N	0.500	1	2687	5966	0.450 ✓	1	Member Block Shear
		Top Girt	A325N	0.500	1	731	7952	0.092 ✓	1	Bolt Shear
T2	140	Leg	A325N	1.000	4	12247	53014	0.231 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7038	7495	0.939 ✓	1	Member Block Shear
T3	120	Leg	A325N	1.000	6	16151	53014	0.305 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7033	7495	0.938 ✓	1	Member Block Shear
T4	100	Leg	A325N	1.000	8	17246	53014	0.325 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7475	9534	0.784 ✓	1	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria
T5	80	Leg	A325N	1.250	8	21653	82835	0.261 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7429	9788	0.759 ✓	1	Member Bearing
T6	60	Leg	A325N	1.250	8	25670	82835	0.310 ✓	1	Bolt Tension
		Diagonal	A325N	0.625	1	7749	9788	0.792 ✓	1	Member Bearing
T7	40	Leg	A325N	1.250	8	29340	82835	0.354 ✓	1	Bolt Tension
		Diagonal	A325N	0.750	1	8444	14355	0.588 ✓	1	Member Bearing
T8	20	Diagonal	A325N	0.750	1	8930	14355	0.622 ✓	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	Pipe 2.875" x 0.203" (2.5 STD)	10.00	0.67	8.4 K=1.00	1.704	-11467	82352	0.139 ¹ ✓
T2	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	4.67	59.1 K=1.00	1.704	-50357	62849	0.801 ¹ ✓
T3	120 - 100	Pipe 4.5" x 0.237" (4 STD)	20.03	4.67	37.2 K=1.00	3.174	-104337	138323	0.754 ¹ ✓
T4	100 - 80	Pipe 5.563" x 0.258" (5 STD)	20.03	6.23	39.8 K=1.00	4.300	-147335	184369	0.799 ¹ ✓
T5	80 - 60	Pipe 6.625" x 0.280" (6 STD)	20.03	6.23	33.3 K=1.00	5.581	-186761	248502	0.752 ¹ ✓
T6	60 - 40	Pipe 8.625" x 0.322" (8 STD)	20.03	6.23	25.5 K=1.00	8.399	-223308	387837	0.576 ¹ ✓
T7	40 - 20	Pipe 8.625" x 0.50" (8 XS)	20.03	9.35	39.0 K=1.00	12.763	-255394	550137	0.464 ¹ ✓
T8	20 - 0	Pipe 8.625" x 0.50" (8 XS)	20.03	9.35	39.0 K=1.00	12.763	-287588	550137	0.523 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 1.5 x 1.5 x 3/16	7.40	3.42	139.8 K=1.00	0.527	-2579	6096	0.423 ¹ ✓
T2	140 - 120	L 2 x 2 x 3/16	7.60	3.51	110.3 K=1.03	0.715	-6991	12216	0.572 ¹ ✓
T3	120 - 100	L 2 x 2 x 3/16	9.00	4.28	130.5 K=1.00	0.715	-6966	9453	0.737 ¹ ✓
T4	100 - 80	L 2.5 x 2.5 x 3/16	11.46	5.50	133.4 K=1.00	0.902	-7238	11448	0.632 ¹ ✓

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	80 - 60	L 3 x 3 x 3/16	13.18	6.32	127.2 K=1.00	1.090	-7349	14985	0.490 ¹ ✓
T6	60 - 40	L 3 x 3 x 3/16	14.98	7.13	143.5 K=1.00	1.090	-7879	11963	0.659 ¹ ✓
T7	40 - 20	L 3.5 x 3.5 x 1/4	18.07	8.74	151.1 K=1.00	1.690	-8570	16716	0.513 ¹ ✓
T8	20 - 0	L 3.5 x 3.5 x 1/4	19.81	9.61	166.2 K=1.00	1.690	-9129	13815	0.661 ¹ ✓

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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 3 x 3 x 1/4	6.00	5.49	115.6 K=1.04	1.438	-731	23047	0.032 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	Pipe 2.875" x 0.203" (2.5 STD)	10.00	0.67	8.4	1.704	8420	82817	0.102 ¹ ✓
T2	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	0.67	8.4	1.704	48987	82817	0.592 ¹ ✓
T3	120 - 100	Pipe 4.5" x 0.237" (4 STD)	20.03	0.67	5.3	3.174	96905	154259	0.628 ¹ ✓
T4	100 - 80	Pipe 5.563" x 0.258" (5 STD)	20.03	0.67	4.3	4.300	137965	208974	0.660 ¹ ✓
T5	80 - 60	Pipe 6.625" x 0.280" (6 STD)	20.03	0.67	3.6	5.581	173223	271254	0.639 ¹ ✓
T6	60 - 40	Pipe 8.625" x 0.322" (8 STD)	20.03	0.67	2.7	8.399	205358	408204	0.503 ¹ ✓
T7	40 - 20	Pipe 8.625" x 0.50" (8 XS)	20.03	0.67	2.8	12.763	234718	620268	0.378 ¹ ✓
T8	20 - 0	Pipe 8.625" x 0.50" (8 XS)	20.03	0.67	2.8	12.763	262078	620268	0.423 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 1.5 x 1.5 x 3/16	7.40	3.42	93.4	0.308	2687	13381	0.201 ¹ ✓
T2	140 - 120	L 2 x 2 x 3/16	7.60	3.51	71.0	0.431	7038	18739	0.376 ¹ ✓
T3	120 - 100	L 2 x 2 x 3/16	9.00	4.28	86.0	0.431	7033	18739	0.375 ¹ ✓
T4	100 - 80	L 2.5 x 2.5 x 3/16	10.44	5.00	79.1	0.571	7475	24840	0.301 ¹ ✓
T5	80 - 60	L 3 x 3 x 3/16	12.10	5.78	75.6	0.712	7429	30968	0.240 ¹ ✓
T6	60 - 40	L 3 x 3 x 3/16	14.98	7.13	92.8	0.712	7749	30968	0.250 ¹ ✓
T7	40 - 20	L 3.5 x 3.5 x 1/4	18.07	8.74	97.8	1.103	8444	48000	0.176 ¹ ✓
T8	20 - 0	L 3.5 x 3.5 x 1/4	19.81	9.61	107.4	1.103	8930	48000	0.186 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 lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 3 x 3 x 1/4	6.00	5.49	74.3	0.961	705	41801	0.017 ¹ ✓

¹ P_u / φP_n controls

Section Capacity Table

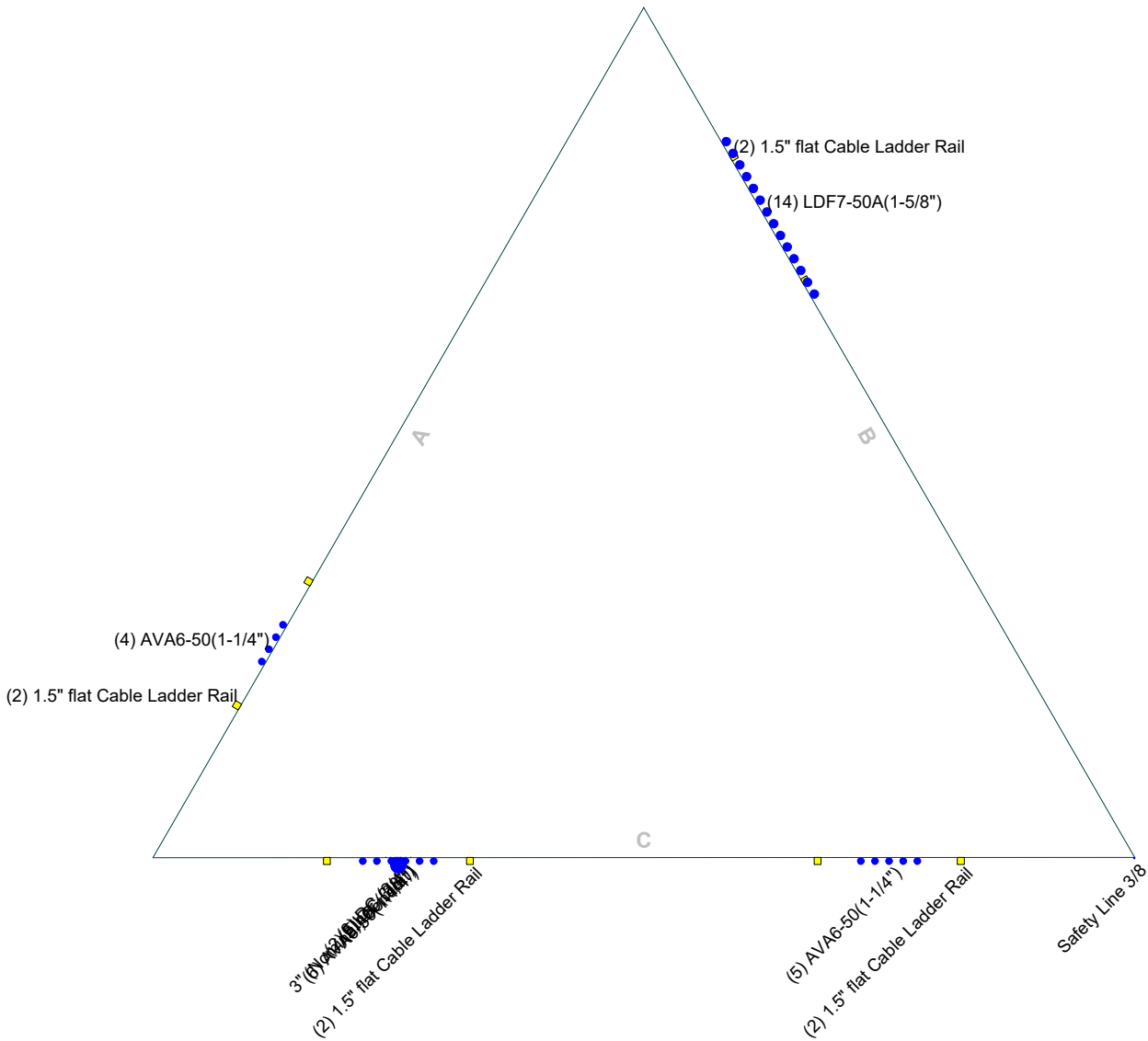
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	φP _{allow} lb	% Capacity	Pass Fail
T1	150 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-11467	82352	13.9	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	21	-50357	62849	80.1	Pass
T3	120 - 100	Leg	Pipe 4.5" x 0.237" (4 STD)	46	-104337	138323	75.4	Pass
T4	100 - 80	Leg	Pipe 5.563" x 0.258" (5 STD)	73	-147335	184369	79.9	Pass
T5	80 - 60	Leg	Pipe 6.625" x 0.280" (6 STD)	94	-186761	248502	75.2	Pass
T6	60 - 40	Leg	Pipe 8.625" x 0.322" (8 STD)	115	-223308	387837	57.6	Pass
T7	40 - 20	Leg	Pipe 8.625" x 0.50" (8 XS)	136	-255394	550137	46.4	Pass
T8	20 - 0	Leg	Pipe 8.625" x 0.50" (8 XS)	151	-287588	550137	52.3	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 3/16	9	-2579	6096	42.3	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 3/16	24	-6991	12216	45.0 (b) 57.2	Pass
T3	120 - 100	Diagonal	L 2 x 2 x 3/16	54	-6966	9453	93.9 (b) 73.7	Pass
T4	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	81	-7238	11448	93.8 (b) 63.2	Pass
T5	80 - 60	Diagonal	L 3 x 3 x 3/16	102	-7349	14985	78.4 (b) 49.0	Pass
T6	60 - 40	Diagonal	L 3 x 3 x 3/16	123	-7879	11963	75.9 (b) 65.9	Pass
T7	40 - 20	Diagonal	L 3.5 x 3.5 x 1/4	144	-8570	16716	79.2 (b) 51.3 58.8 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T8	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	158	-9129	13815	66.1	Pass
T1	150 - 140	Top Girt	L 3 x 3 x 1/4	5	-731	23047	3.2	Pass
							9.2 (b) Summary	
							Leg (T2)	Pass
							Diagonal (T2)	Pass
							Top Girt (T1)	Pass
							Bolt	Pass
							Checks	
							RATING =	93.9 Pass

APPENDIX B
BASE LEVEL DRAWING

Feed Line Plan

Round Flat App In Face App Out Face



Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job: 150-ft Norwich, CT S/S Tower		
Project: PJF 13321-0008		
Client: Everest Infrastructure Partners	Drawn by: Anna Trudo	App'd:
Code: TIA-222-G	Date: 09/08/21	Scale: NTS
Path:	Dwg No. E-7	

G:\TCHEER\133_Everest Infrastructure Partners\2021\13321-0008_Norwich.CDT\13321-0008.002.0700_TMO SAInvt\13321-0008.002.0700.dgn

APPENDIX C

ADDITIONAL CALCULATIONS

Self-Support Tower Anchor Rod Capacity - TIA-G

Loads

Compression :	<u>295.5</u> kips	Tension :	<u>260.9</u> kips
Comp. Shear :	<u>28.9</u> kips	Ten. Shear :	<u>26.3</u> kips

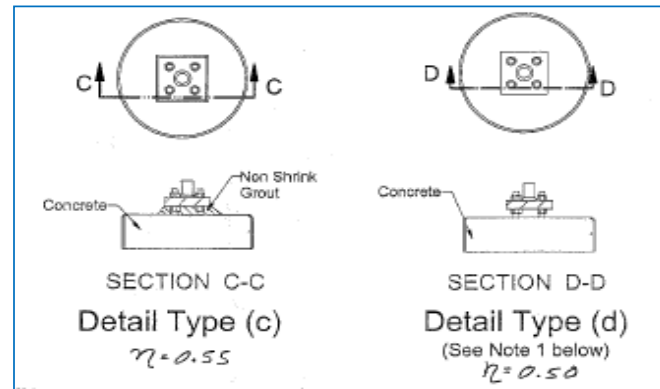
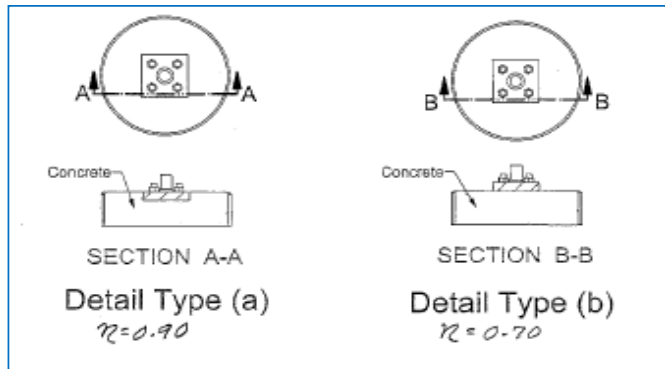
Code:	<u>TIA-G</u>
Maximum Ratio:	<u>1.00</u>

Existing Anchor Rods

Anchor Rod Condition (n) :	<u>0.5</u>
Anchor Rod ϕ :	<u>1 1/2</u> in
Anchor Rod Quantity :	<u>8</u>
Anchor Rod Grade :	<u>F1554 Gr. 36</u>
F_y :	36 ksi
F_u :	58 ksi
Threads per Inch	6
Net Tensile Area	1.41 in ²
ϕ_t :	0.80
$\phi_t R_{nt}$:	521.63 kip
Anchor Rod Ratio :	<u>0.743</u>

l_{ar} :	<u>1.5</u> inches
Comp. M_u :	28.18 k-in

ϕ_v :	0.75
ϕ_f :	0.90
$\phi_v R_{nv}$:	276.74 kips
$\phi_f R_{nm}$:	97.44 k-in



DRILLED PIER STEEL ANALYSIS - STEEL CALCULATIONS - TIA-222-G

BASED ON ACI 318-05, SECTIONS 9 & 10 (ASSUMING TIE REINFORCEMENT)

Factored Internal Loads from Analysis

Reference Standard =	TIA-222-G
ACI Code =	ACI 318-05
Maximum Ratio =	100.0%
Axial Load, Pu =	295.5 kips, (+Comp, -Tension)
Moment, Mu =	124.2 k-ft (Must be Positive)
Depth to Analysis Section =	3.80 ft, from Grade

Factored Internal Loads

Load Factor =	1.0
Axial Load, Pu = ΦP_n =	295.5 kips
Moment, Mu =	124.2 k-ft

Drilled Pier Geometry and Concrete Specifications

Diameter =	42 in
f_c' =	0.416 ksi
ϵ_c =	0.003 in/in
β_1 =	0.85
Ag =	1385.4 in ²
Height Above Grade =	0.5 ft
Depth Below Grade =	3.8 ft

Nominal Axial Load and Moment

$\Phi P_n(\max)$ =	488.4 kips
$\Phi P_n(\min)$ =	-406.4 kips
ΦP_n =	295.5 kips
Φ =	0.650
ΦM_n (Resultant) =	198.6 k-ft
at θ =	180.00 degrees
NA Depth =	29.18 in

Rebar Size and Specifications

	Existing	Bar Circle 2	
Bar Size =	#10		
Override Bar Diameter =			in
Bar Diameter =	1.2700	0.0000	in
Bar Area =	1.2700	0.0000	in ²
Effective Bar Area =	1.2700	0.0000	in ²
Number Bars =	5		
Spacing =	Symmetric		
f_y =	71.111111		ksi
E_s =	29000	29000	ksi
ϵ_y =	0.00245	0.00000	in/in
Tie Size =	#4		
Clear Cover to Ties =	6.865		in
Bar Circle =	26		in
Adjust =	18.0000		
% of Area Effective =	100.0%	100.0%	
Include in Calcs =	Yes	Yes	
Bar Circle Valid =	Yes	No	

ROCK ANCHOR CHECK -
TOWER COMPRESSION LEG

AXIAL RATIO = 60.5% OK

MOMENT RATIO = 62.5% OK

Minimum Required Steel

Seismic Design Category =	D
As(min) =	3.90 sq in
As =	6.35 sq in
Stl Area Reduction Factor =	1.00

ACI Section 10.5.1 & 10.5.3

DRILLED PIER STEEL ANALYSIS - STEEL CALCULATIONS - TIA-222-G

BASED ON ACI 318-05, SECTIONS 9 & 10 (ASSUMING TIE REINFORCEMENT)

Factored Internal Loads from Analysis

Reference Standard =	TIA-222-G
ACI Code =	ACI 318-05
Maximum Ratio =	100.0%
Axial Load, Pu =	-260.9 kips, (+Comp, -Tension)
Moment, Mu =	113.4 k-ft (Must be Positive)
Depth to Analysis Section =	3.80 ft, from Grade

Factored Internal Loads

Load Factor =	1.0
Axial Load, Pu = ΦP_n =	-260.9 kips
Moment, Mu =	113.4 k-ft

Drilled Pier Geometry and Concrete Specifications

Diameter =	42 in
f_c' =	0.416 ksi
ϵ_c =	0.003 in/in
β_1 =	0.85
Ag =	1385.4 in ²
Height Above Grade =	0.5 ft
Depth Below Grade =	3.8 ft

Nominal Axial Load and Moment

$\Phi P_n(\max)$ =	488.4 kips
$\Phi P_n(\min)$ =	-406.4 kips
ΦP_n =	-260.9 kips
Φ =	0.900
ΦM_n (Resultant) =	152.3 k-ft
at θ =	0.00 degrees
NA Depth =	7.96 in

Rebar Size and Specifications

	Existing	Bar Circle 2
Bar Size =	#10	
Override Bar Diameter =		
Bar Diameter =	1.2700	0.0000 in
Bar Area =	1.2700	0.0000 in ²
Effective Bar Area =	1.2700	0.0000 in ²
Number Bars =	5	
Spacing =	Symmetric	
f_y =	71.111111	ksi
E_s =	29000	ksi
ϵ_y =	0.00245	in/in
Tie Size =	#4	
Clear Cover to Ties =	6.865	in
Bar Circle =	26	in
Adjust =	18.0000	
% of Area Effective =	100.0%	100.0%
Include in Calcs =	Yes	Yes
Bar Circle Valid =	Yes	No

ROCK ANCHOR CHECK -
TOWER UPLIFT LEG

AXIAL RATIO = 64.2% OK

MOMENT RATIO = 74.5% OK

Minimum Required Steel

Seismic Design Category =	D
As(min) =	3.90 sq in
As =	6.35 sq in
Stl Area Reduction Factor =	1.00

ACI Section 10.5.1 & 10.5.3

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON
EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

- 1) Paul J. Ford and Company has not made a field inspection to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.
- 2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.
- 3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.
- 4) The structural integrity of the existing tower foundation can only be verified if exact foundation sizes and soil conditions are known. Paul J. Ford and Company will not accept any responsibility for the adequacy of the existing foundations unless the foundation sizes and a soils report are provided.
- 5) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-G. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.
- 6) The enclosed sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.
- 7) Miscellaneous items such as antenna mounts etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.