Date: **May 26, 2021**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:		
	Site Number:	9JK2338S
	Site Name:	N/A
Crown Castle Designation:	**BU Number:**	877744
	Site Name:	Wilburn
	JDE Job Number:	664691
	Work Order Number:	1975641
	Order Number:	566065 Rev. 1
Engineering Firm Designation:	**B+T Group Project Number:**	151403.001.01
Site Data:	**703 NE Harrington Ct, Lake City, Columbia County, FL** **Latitude *30° 13' 46.6"*, Longitude *-82° 33' 5.2"*** **235 Foot - Self Support Tower**	

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

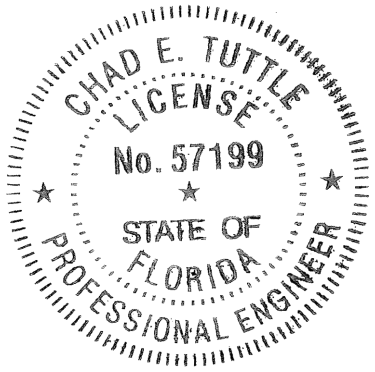
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2020 Florida Building Code 7th Edition. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Mahsa Abdeveis

Respectfully submitted by: B+T Engineering, Inc.
COA: 27496



Chad E Tuttle

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DN: c=US, o=B and T Engineering, ou=A01410C00000175E2085E5D00004E57, cn=Chad E Tuttle
Date: 2021.06.02 17:59:53 -05'00'

Chad E. Tuttle, P.E.

tnxTower Report - version 8.0.9.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 235 ft. Self Support tower designed by Sabre Communications.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 118 mph
Exposure Category: B
Topographic Factor: 1
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)
238.0	238.0	3	Commscope	FFVV-65C-R3-V1_TMO	3	1-5/8
		3	Ericsson	AIR6449 B41_T-MOBILE		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Ericsson	RADIO 4480 B71_TMO		
		3	Sabre	C10857001C Mount		

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)
217.0	223.0	3	Antel	BCD-80010	3	1-5/8
	217.0	1	--	Side Arm Mount [SO 308-3]		
150.0	150.0	1	Radiowaves	HPD3-11	2	3/8
		1	Radiowaves	HPD6-5.9		
		2	Ceragon	ODU 5-11 GHZ		
		2	--	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1548521	CCI Sites
Foundation Drawing	1456952	CCI Sites
Geotech Report	1549664	CCI Sites
Crown CAD Package	Date: 05/21/2021	CCI Sites

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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group 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	235 - 220	Leg	Sabre 2.375"x0.154"	3	-13.392	33.198	40.3	Pass
T2	220 - 200	Leg	Sabre 2.875"x0.375"	27	-39.363	100.096	39.3	Pass
T3	200 - 180	Leg	Sabre 3.5"x0.437"	57	-56.456	159.342	35.4	Pass
T4	180 - 160	Leg	Sabre 3.5" x 0.6"	87	-70.443	202.990	34.7	Pass
T5	160 - 140	Leg	Sabre 4.5"x0.5310"	114	-85.009	247.512	34.3	Pass
T6	140 - 120	Leg	Sabre 5.5625" x 0.5"	135	-101.624	324.977	31.3	Pass
T7	120 - 100	Leg	Sabre 6.625"x0.432"	156	-118.690	360.255	32.9	Pass
T8	100 - 80	Leg	Sabre 6.625" x 0.562"	177	-134.878	402.699	33.5	Pass
T9	80 - 60	Leg	Sabre 8.625"x0.5"	192	-152.578	530.833	28.7	Pass
T10	60 - 40	Leg	Sabre 8.625"x0.5"	207	-170.401	530.833	32.1	Pass
T11	40 - 20	Leg	Sabre 8.625"x0.5"	222	-188.355	530.833	35.5	Pass
T12	20 - 0	Leg	Sabre 8.625"x0.5"	237	-201.688	584.115	34.5	Pass
T1	235 - 220	Diagonal	L1 3/4x1 3/4x3/16	12	-2.016	13.687	14.7	Pass
T2	220 - 200	Diagonal	L1 3/4x1 3/4x1/4	33	-3.258	17.962	18.1	Pass
T3	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	63	-1.869	9.419	19.8	Pass
T4	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	90	-2.110	6.448	32.7	Pass
T5	160 - 140	Diagonal	L2 1/2x2 1/2x3/16	120	-3.633	12.316	29.5	Pass
T6	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	141	-3.805	9.582	39.7	Pass
T7	120 - 100	Diagonal	L3x3x3/16	162	-4.172	13.316	31.3	Pass
T8	100 - 80	Diagonal	L3x3x1/4	183	-4.998	11.740	42.6	Pass
T9	80 - 60	Diagonal	L3x3 1/2x1/4	198	-5.400	12.349	43.7	Pass
T10	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	213	-5.849	13.694	42.7	Pass
T11	40 - 20	Diagonal	L4x4x1/4	225	-6.414	17.634	36.4	Pass
T12	20 - 0	Diagonal	L3x3x1/4	246	-8.531	10.749	79.4	Pass
T12	20 - 0	Horizontal	L3 1/2x3 1/2x1/4	245	-6.348	12.537	50.6	Pass
T1	235 - 220	Top Girt	C4x5.4	5	-0.278	22.727	1.2	Pass
T2	220 - 200	Top Girt	L1 3/4x1 3/4x1/4	29	-0.682	9.895	6.9	Pass
T3	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	59	-0.979	7.838	12.5	Pass
T12	20 - 0	Redund Horz 1 Bracing	L3x3x1/4	250	-3.498	32.056	10.9	Pass
T12	20 - 0	Redund Diag 1 Bracing	L3x3x1/4	255	-2.221	20.631	10.8	Pass
T12	20 - 0	Inner Bracing	L3x3x3/16	261	-0.007	5.612	0.2	Pass
							Summary	

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Leg (T1)	40.3	Pass
						Diagonal (T12)	79.4	Pass
						Horizontal (T12)	50.6	Pass
						Top Girt (T3)	12.5	Pass
						Redund Horz 1 Bracing (T12)	10.9	Pass
						Redund Diag 1 Bracing (T12)	10.8	Pass
						Inner Bracing (T12)	0.2	Pass
						Bolt Checks	39.2	Pass
						Rating =	79.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	28.7	Pass
1	Base Foundation (Structure)	Base	8.1	Pass
1	Base Foundation (Soil Interaction)	Base	61.5	Pass

Structure Rating (max from all components) =	79.4%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5

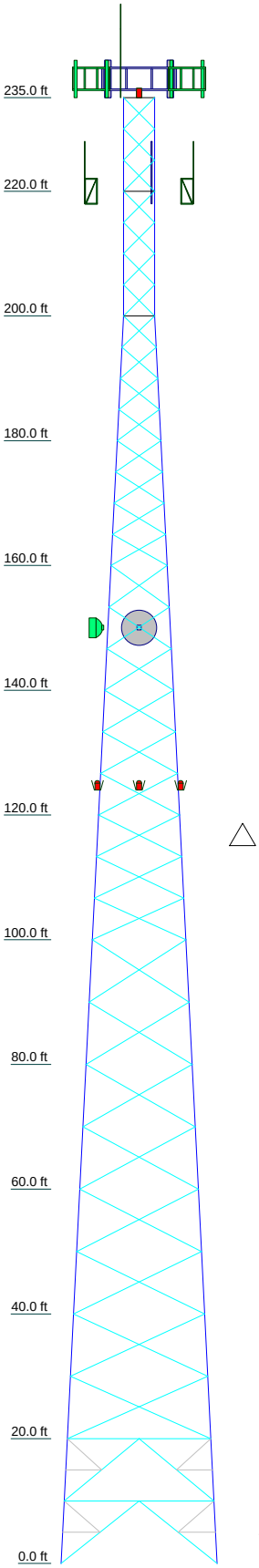
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Sabre 8.625"x0.5"				E	D	C	Sabre 4.5"x0.5310"	Sabre 3.5" x 0.6"	Sabre 3.5"x0.437"	B	A
Leg Grade						A572-50						
Diagonals	L3x3x1/4	L4x4x1/4	L3 1/2x3 1/2x1/4	L3x3 1/2x1/4	L3x3x1/4	L3x3x3/16	L2 1/2x2 1/2x3/16		L1 3/4x1 3/4x3/16		L1 3/4x1 3/4x1/4	F
Diagonal Grade						A36						
Top Girts					N.A.					L1 3/4x1 3/4x3/16	L1 3/4x1 3/4x1/4	C4x5.4
Horizontals	L3 1/2x3 1/2x1/4						N.A.					
Red. Horizontals	L3x3x1/4						N.A.					
Red. Diagonals	L3x3x1/4						N.A.					
Inner Bracing	L3x3x3/16						N.A.					
Face Width (ft)	25	23	21	19	17	15	13	11	9	7	5	
# Panels @ (ft)			10 @ 10				9 @ 6.66667			15 @ 5		
Weight (K)	34.6	5.7	4.8	4.4	4.1	3.5	2.9	2.5	2.1	1.7	1.4	1.2	0.5



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Sabre 2.375"x0.154"	D	Sabre 6.625"x0.432"
B	Sabre 2.875"x0.375"	E	Sabre 6.625" x 0.562"
C	Sabre 5.5625" x 0.5"	F	L1 3/4x1 3/4x3/16

MATERIAL STRENGTH

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

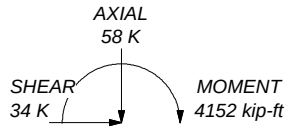
TOWER DESIGN NOTES

1. Tower is located in Columbia County, Florida.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 118 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'
7. TIA-222-H Annex S
8. TOWER RATING: 79.4%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 211 K
SHEAR: 21 K

UPLIFT: -166 K
SHEAR: 17 K



TORQUE 48 kip-ft
REACTIONS - 118 mph WIND

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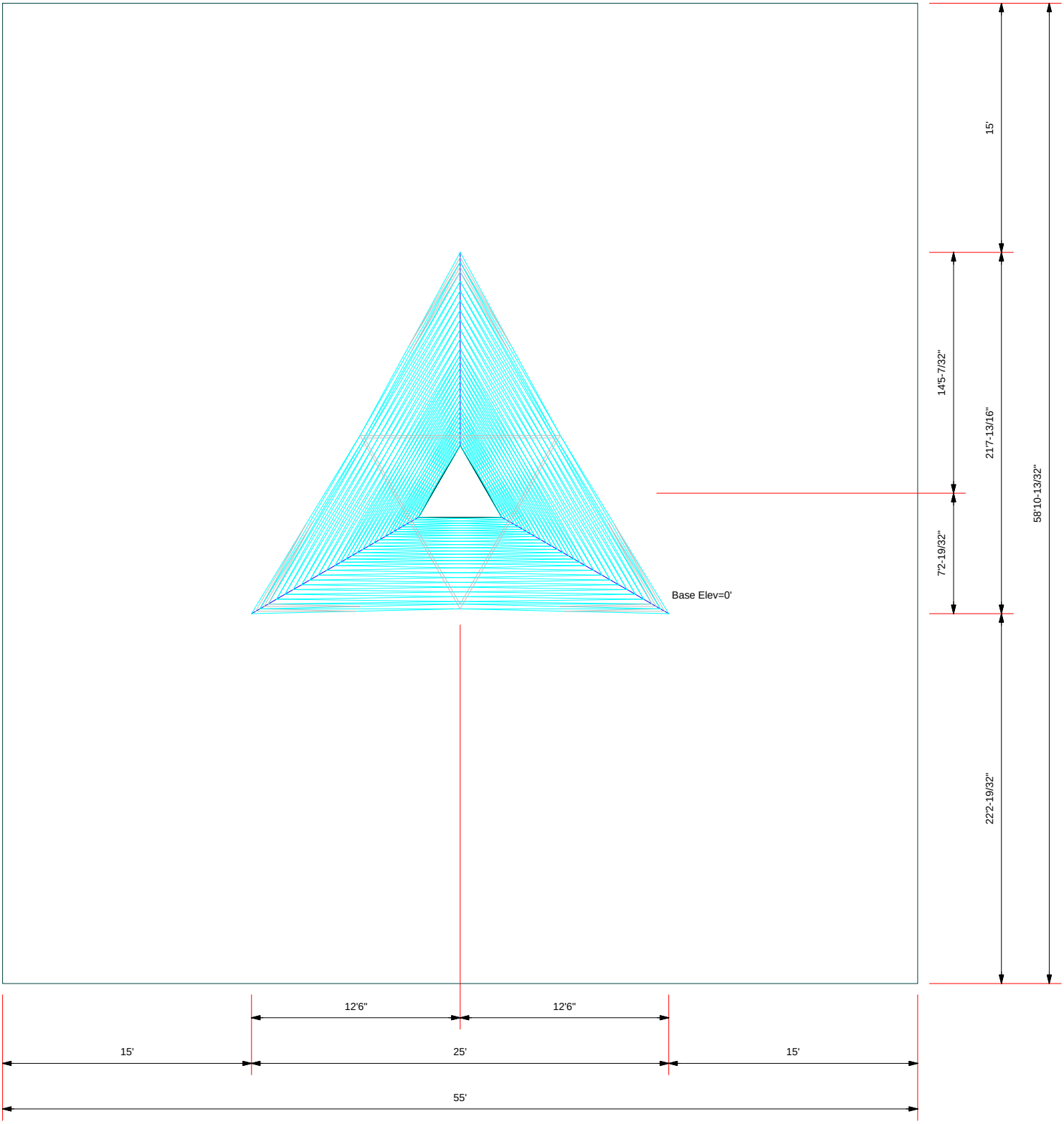
Job:	***151403.001.01- Wilburn, FL (BU# 877744)***		
Project:			
Client: Crown Castle	Drawn by: Sudhanva		App'd:
Code: TIA-222-H	Date: 05/26/21		Scale: NTS
Path: C:\Users\SUDHANVA\Desktop\May 26\151403_877744_Wilburn-----Sudhnva-----ShivaliTnx_001_01\151403_001_01_Wilburn_FL.eri			Dwg No. E-1

Plot Plan
Total Area - 0.07 Acres



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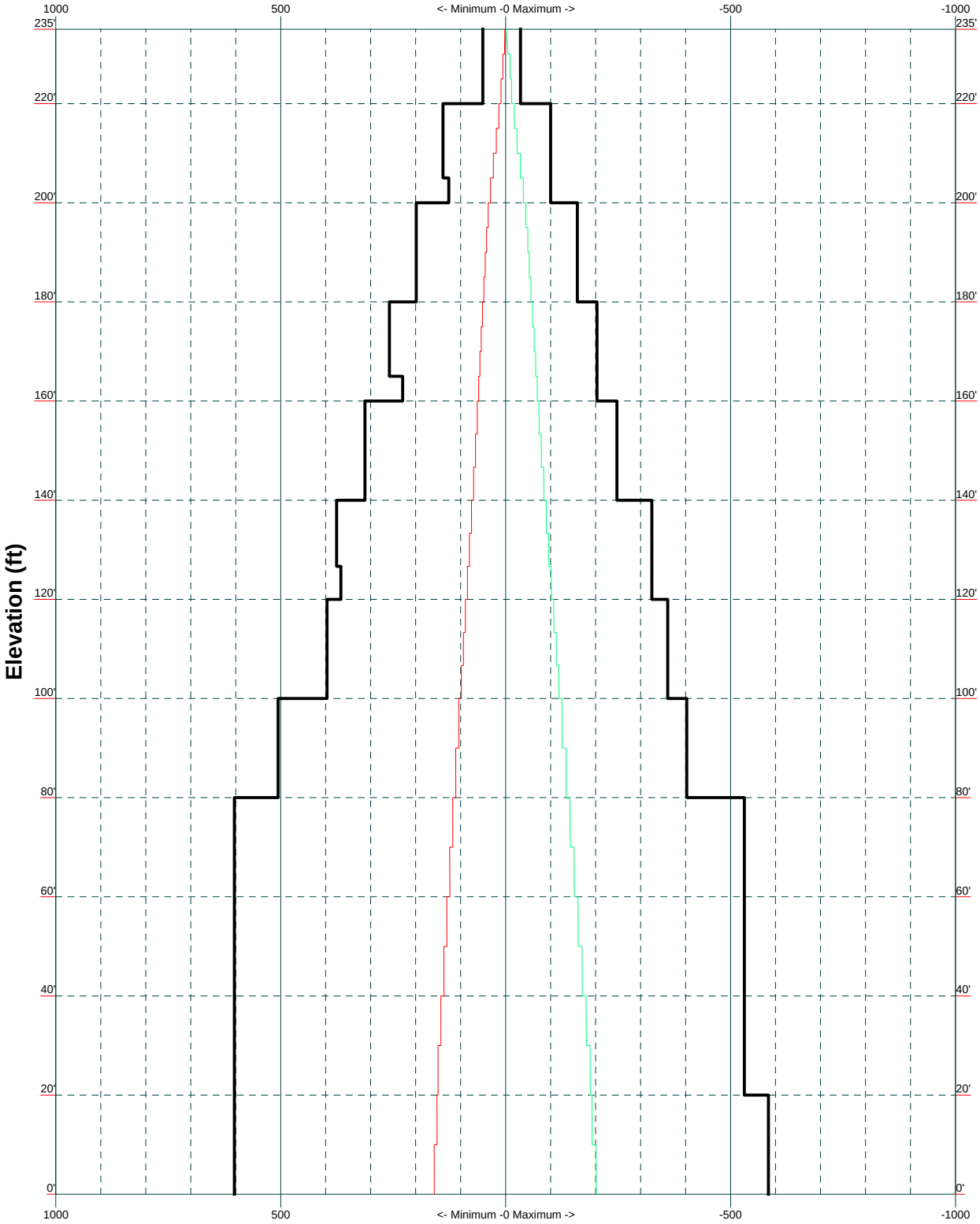
TIA-222-H - 118 mph Exposure B

Leg Capacity ——— **Leg Compression (K)**



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Job: 151403.001.01- Wilburn, FL (BU# 877744)			
Project:			
Client: Crown Castle	Drawn by: Sudhanva	App'd:	
Code: TIA-222-H	Date: 05/26/21	Scale: NTS	
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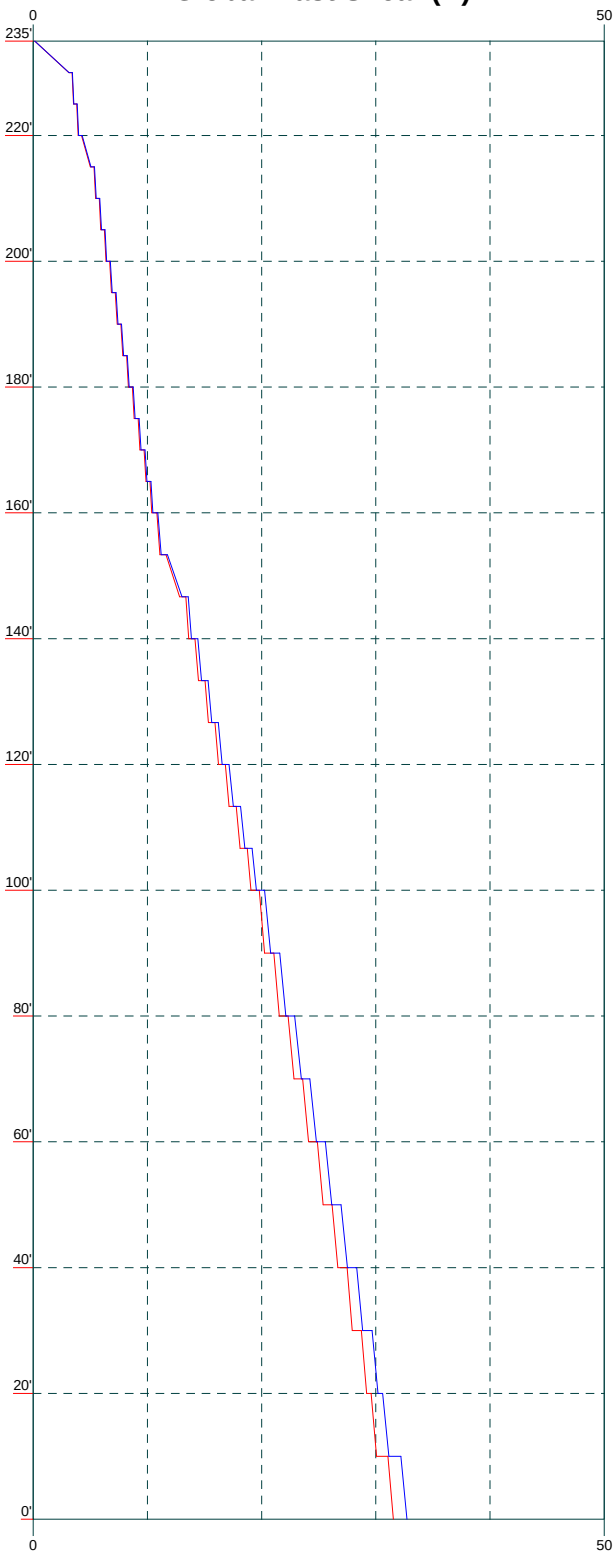
TIA-222-H - 118 mph Exposure B

Vx Vz

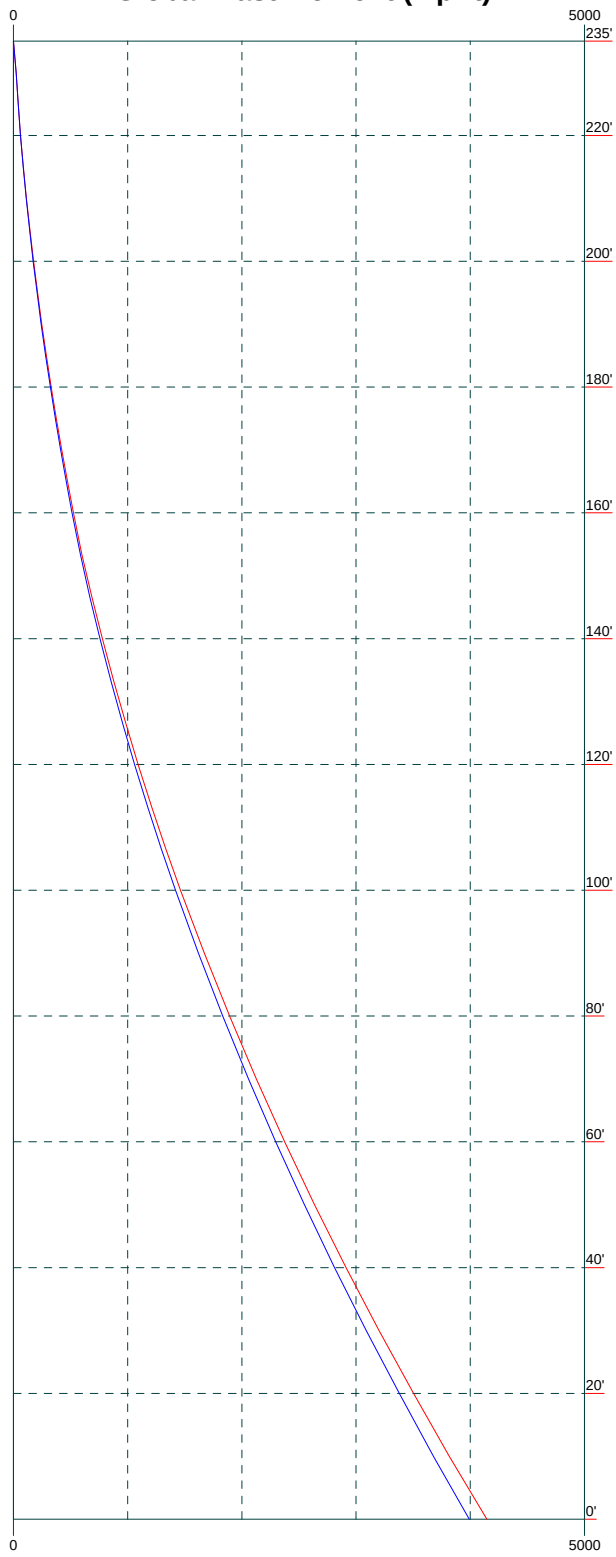
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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Job: 151403.001.01- Wilburn, FL (BU# 877744)		
Project:		
Client: Crown Castle	Drawn by: Sudhanva	App'd:
Code: TIA-222-H	Date: 05/26/21	Scale: NTS
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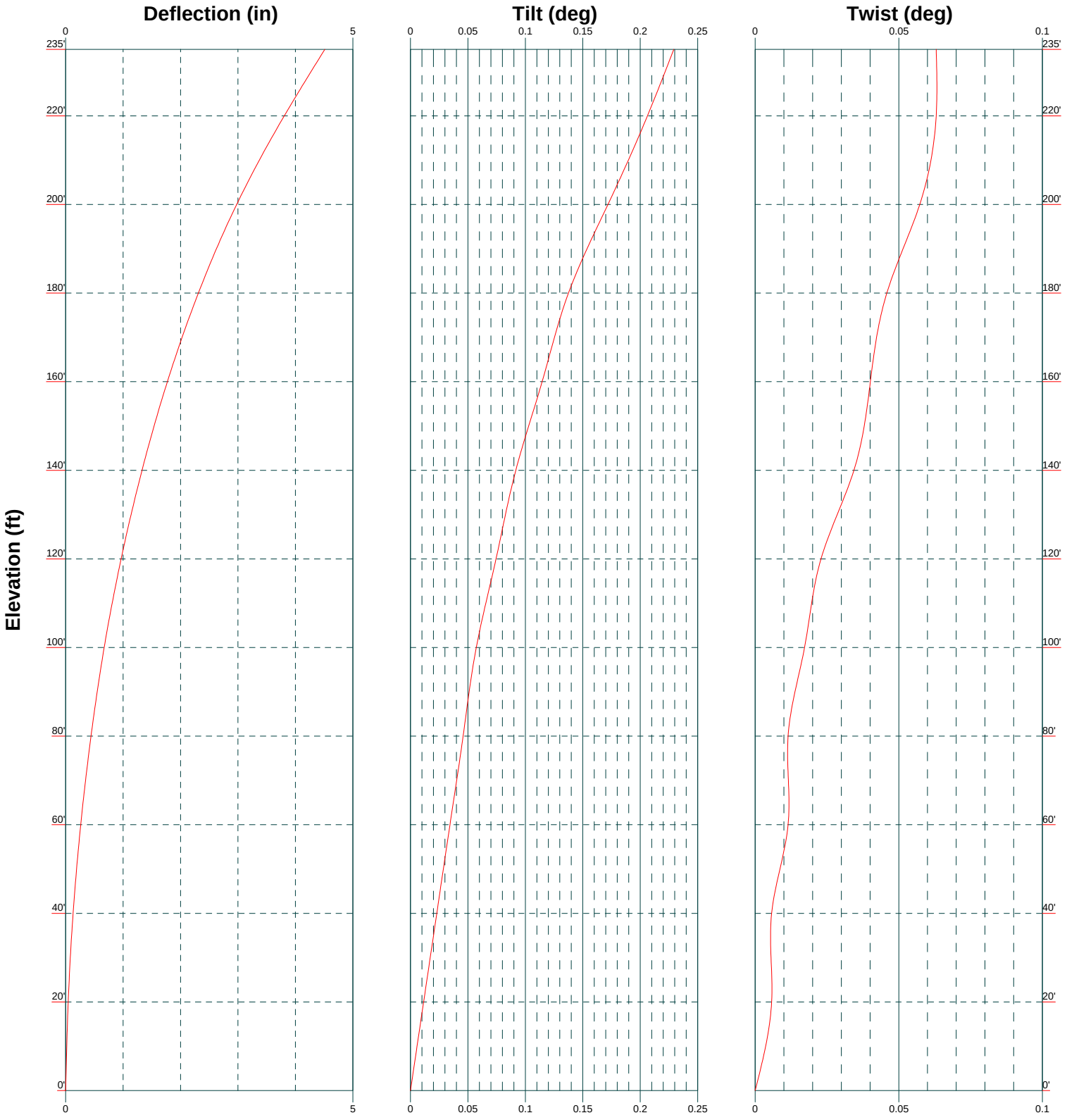
TIA-222-H - Service - 60 mph

Maximum Values



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Job:	***151403.001.01- Wilburn, FL (BU# 877744)***		
Project:			
Client: Crown Castle		Drawn by: Sudhanva	App'd:
Code: TIA-222-H		Date: 05/26/21	Scale: NTS
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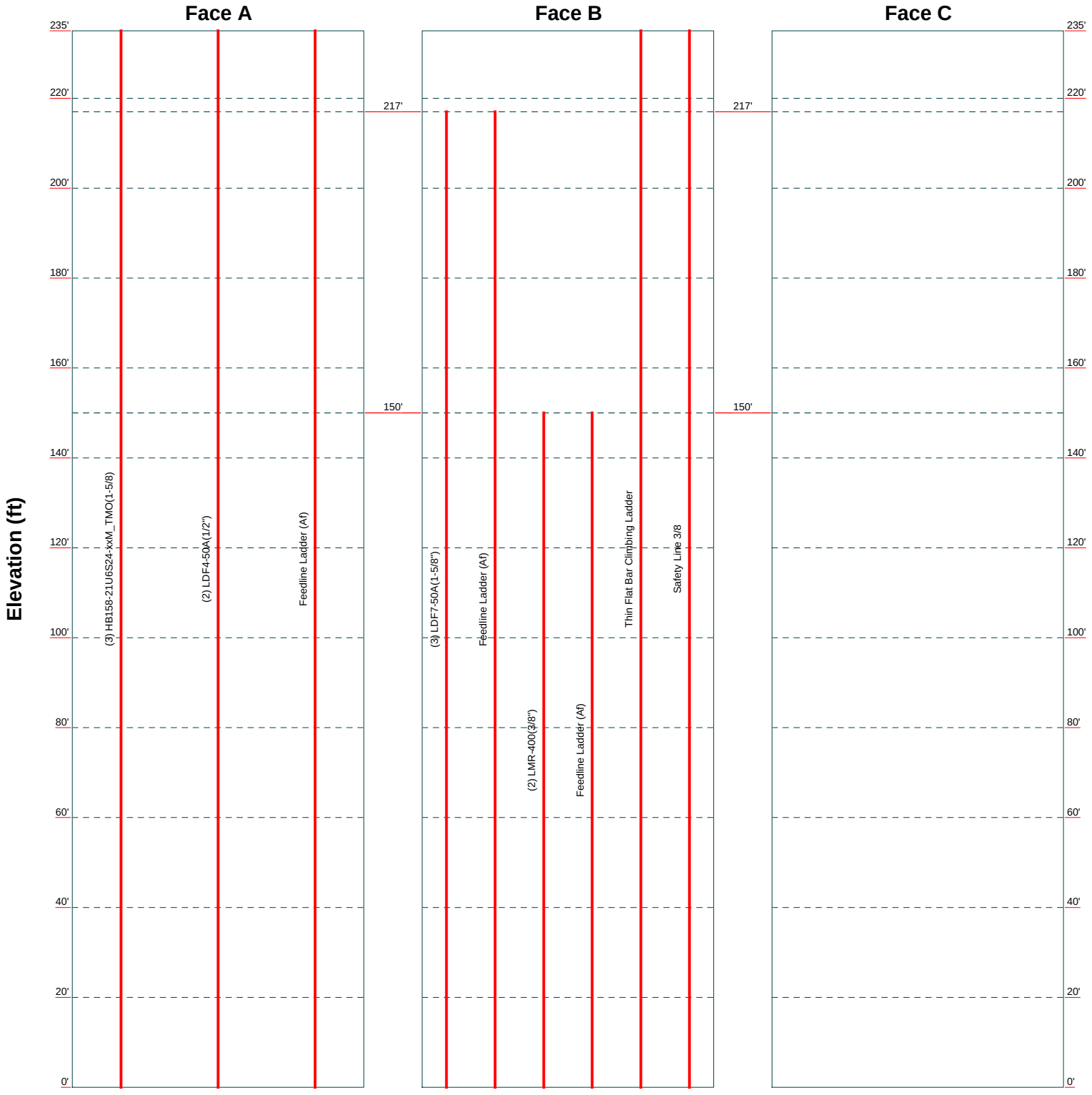
Feed Line Distribution Chart
0' - 235'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T GRP

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Project:		
Client: Crown Castle	Drawn by: Sudhanva	App'd:
Code: TIA-222-H	Date: 05/26/21	Scale: NTS
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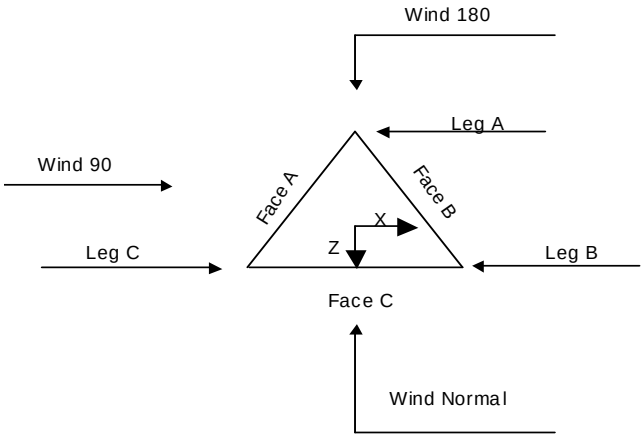
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 235' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 5' at the top and 25' 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: 151'.
Basic wind speed of 118 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0'.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
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: 1.05.
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. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H 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	235'-220'			5'	1	15'
T2	220'-200'			5'	1	20'
T3	200'-180'			5'	1	20'
T4	180'-160'			7'	1	20'
T5	160'-140'			9'	1	20'
T6	140'-120'			11'	1	20'
T7	120'-100'			13'	1	20'
T8	100'-80'			15'	1	20'
T9	80'-60'			17'	1	20'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

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	235'-220'	5'	X Brace	No	Yes	0.000	0.000
T2	220'-200'	5'	X Brace	No	Yes	0.000	0.000
T3	200'-180'	5'	X Brace	No	Yes	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T4	180'-160'	5'	X Brace	No	No	0.000	0.000
T5	160'-140'	6'8"	X Brace	No	No	0.000	0.000
T6	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T7	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T8	100'-80'	10'	X Brace	No	No	0.000	0.000
T9	80'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000
T12	20'-0'	10'	K1 Down	No	Yes	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 235'-220'	Pipe	Sabre 2.375"x0.154"	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 220'-200'	Pipe	Sabre 2.875"x0.375"	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x1/4	A36 (36 ksi)
T3 200'-180'	Pipe	Sabre 3.5"x0.437"	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 180'-160'	Pipe	Sabre 3.5" x 0.6"	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T5 160'-140'	Pipe	Sabre 4.5"x0.5310"	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 140'-120'	Pipe	Sabre 5.5625" x 0.5"	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 120'-100'	Pipe	Sabre 6.625"x0.432"	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 100'-80'	Pipe	Sabre 6.625" x 0.562"	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T9 80'-60'	Pipe	Sabre 8.625"x0.5"	A572-50 (50 ksi)	Single Angle	L3x3 1/2x1/4	A36 (36 ksi)
T10 60'-40'	Pipe	Sabre 8.625"x0.5"	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T11 40'-20'	Pipe	Sabre 8.625"x0.5"	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T12 20'-0'	Pipe	Sabre 8.625"x0.5"	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	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 235'-220'	Channel	C4x5.4	A36 (36 ksi)	Pipe		A36 (36 ksi)
T2 220'-200'	Equal Angle	L1 3/4x1 3/4x1/4	A36 (36 ksi)	Pipe		A36 (36 ksi)
T3 200'-180'	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Pipe		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
T12 20'-0'	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	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
T12 20'-0'	Pipe		A36 (36 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T12 20'-0'	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/4	1
		Diagonal (1)	Equal Angle	L3x3x1/4	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 235'-220'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 220'-200'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 200'-180'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 180'-160'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 160'-140'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 140'-120'	0.000	0.375	A36 (36 ksi)	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 120'-100'	0.000	0.375	A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T8 100'-80'	0.000	0.375	(36 ksi) A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 80'-60'	0.000	0.375	(36 ksi) A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T10 60'-40'	0.000	0.375	(36 ksi) A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 40'-20'	0.000	0.375	(36 ksi) A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 20'-0'	0.000	0.375	(36 ksi) A36	1.05	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 235'-220'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T2 220'-200'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T3 200'-180'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T4 180'-160'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T5 160'-140'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T6 140'-120'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T7 120'-100'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T8 100'-80'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T9 80'-60'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T12 20'-0'	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: 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 235'-220'	0.000	1	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 220'-200'	0.000	1	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 200'-180'	0.000	1	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 180'-160'	0.000	1	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 160'-140'	0.000	1	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 140'-120'	0.000	1	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 120'-100'	0.000	1	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 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 80'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	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 235'-220'	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 220'-200'	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 200'-180'	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 180'-160'	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 160'-140'	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 140'-120'	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 120'-100'	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 100'-80'	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
T9 80'-60'	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
T10 60'-40'	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
T11 40'-20'	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
T12 20'-0'	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 235'-220'	Flange	0.750 A325N	4	0.625 A325X	1	0.625 A325X	3	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T2 220'-200'	Flange	0.750 A325N	4	0.625 A325X	1	0.625 A325X	1	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T3 200'-180'	Flange	1.000 A325N	4	0.625 A325X	1	0.625 A325X	1	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T4 180'-160'	Flange	1.000 A325N	4	0.625 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T5 160'-140'	Flange	1.250 A325N	4	0.625 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0

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.
T6 140'-120'	Flange	1.250 A325N	4	0.625 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T7 120'-100'	Flange	1.250 A325N	6	0.750 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T8 100'-80'	Flange	1.250 A325N	6	0.750 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T9 80'-60'	Flange	1.375 A325N	6	0.750 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T10 60'-40'	Flange	1.375 A325N	6	0.750 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T11 40'-20'	Flange	1.375 A325N	6	0.750 A325X	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0
T12 20'-0'	Flange	1.500 A572-50	0	0.625 A325X	2	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	2	0.625 A325N	0

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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 235'-220'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T2 220'-200'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T3 200'-180'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T4 180'-160'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T5 160'-140'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T6 140'-120'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T7 120'-100'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T8 100'-80'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T9 80'-60'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T10 60'-40'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T11 40'-20'	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0
T12 20'-0'	0.625 A325X	1	0.625 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 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 Spacing in	Width or Diameter in	Perimeter in	Weight klf
HB158-21U6S24-xxM_TMO (1-5/8)	A	No	No	Ar (CaAa)	235' - 0'	0.000	0.44	3	3	0.850 0.750	1.996		0.003
LDF4-50A(1/2")	A	No	No	Ar (CaAa)	235' - 0'	0.000	0.47	2	1	0.100	0.630		0.000
Feedline Ladder (Af) *	A	No	No	Af (CaAa)	235' - 0'	0.000	0.45	1	1	3.000	3.000		0.008
LDF7-50A(1-5/8")	B	No	No	Ar (CaAa)	217' - 0'	0.000	-0.44	3	3	1.000	1.980		0.001
Feedline Ladder (Af) *	B	No	No	Af (CaAa)	217' - 0'	0.000	-0.45	1	1	3.000	3.000		0.008
LMR-400(3/8")	B	No	No	Ar (CaAa)	150' - 0'	0.000	0.44	2	2	0.405	0.405		0.000
Feedline Ladder (Af) *	B	No	No	Af (CaAa)	150' - 0'	0.000	0.45	1	1	3.000	3.000		0.008
Thin Flat Bar Climbing Ladder	B	No	No	Af (CaAa)	235' - 0'	0.000	0	1	1	2.000	2.000		0.004
Safety Line 3/8 *	B	No	No	Ar (CaAa)	235' - 0'	0.000	0.01	1	1	0.375	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
*								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	235'-220'	A	0.000	0.000	18.372	0.000	0.243
		B	0.000	0.000	5.563	0.000	0.063
		C	0.000	0.000	0.000	0.000	0.000
T2	220'-200'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	26.015	0.000	0.269
		C	0.000	0.000	0.000	0.000	0.000
T3	200'-180'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	29.297	0.000	0.302
		C	0.000	0.000	0.000	0.000	0.000
T4	180'-160'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	29.297	0.000	0.302
		C	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T5	160'-140'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	35.107	0.000	0.387
		C	0.000	0.000	0.000	0.000	0.000
T6	140'-120'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T7	120'-100'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T8	100'-80'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T9	80'-60'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T10	60'-40'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T11	40'-20'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000
T12	20'-0'	A	0.000	0.000	24.496	0.000	0.324
		B	0.000	0.000	40.917	0.000	0.472
		C	0.000	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	235'-220'	0.475	-8.577	0.475	-8.577
T2	220'-200'	0.789	-12.551	0.789	-12.551
T3	200'-180'	0.910	-14.419	0.910	-14.419
T4	180'-160'	1.115	-17.884	1.115	-17.884
T5	160'-140'	2.914	-17.396	2.876	-17.163
T6	140'-120'	4.795	-17.607	4.640	-17.018
T7	120'-100'	4.734	-17.661	4.512	-16.794
T8	100'-80'	5.810	-21.482	5.502	-20.301
T9	80'-60'	6.096	-22.607	5.520	-20.386
T10	60'-40'	5.959	-22.392	5.481	-20.501
T11	40'-20'	5.747	-21.836	5.396	-20.418
T12	20'-0'	5.323	-20.515	5.056	-19.402

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	3	HB158-21U6S24-xxM_TMO (1-5/8)	220.00 - 235.00	0.6000	0.6000
T1	4	LDF4-50A(1/2")	220.00 - 235.00	0.6000	0.6000
T1	5	Feedline Ladder (Af)	220.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			235.00		
T1	13	Thin Flat Bar Climbing Ladder	220.00 - 235.00	0.6000	0.6000
T1	14	Safety Line 3/8	220.00 - 235.00	0.6000	0.6000
T2	3	HB158-21U6S24-xxM_TMO (1-5/8)	200.00 - 220.00	0.6000	0.6000
T2	4	LDF4-50A(1/2")	200.00 - 220.00	0.6000	0.6000
T2	5	Feedline Ladder (Af)	200.00 - 220.00	0.6000	0.6000
T2	7	LDF7-50A(1-5/8")	200.00 - 217.00	0.6000	0.6000
T2	8	Feedline Ladder (Af)	200.00 - 217.00	0.6000	0.6000
T2	13	Thin Flat Bar Climbing Ladder	200.00 - 220.00	0.6000	0.6000
T2	14	Safety Line 3/8	200.00 - 220.00	0.6000	0.6000
T3	3	HB158-21U6S24-xxM_TMO (1-5/8)	180.00 - 200.00	0.6000	0.6000
T3	4	LDF4-50A(1/2")	180.00 - 200.00	0.6000	0.6000
T3	5	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T3	7	LDF7-50A(1-5/8")	180.00 - 200.00	0.6000	0.6000
T3	8	Feedline Ladder (Af)	180.00 - 200.00	0.6000	0.6000
T3	13	Thin Flat Bar Climbing Ladder	180.00 - 200.00	0.6000	0.6000
T3	14	Safety Line 3/8	180.00 - 200.00	0.6000	0.6000
T4	3	HB158-21U6S24-xxM_TMO (1-5/8)	160.00 - 180.00	0.6000	0.6000
T4	4	LDF4-50A(1/2")	160.00 - 180.00	0.6000	0.6000
T4	5	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T4	7	LDF7-50A(1-5/8")	160.00 - 180.00	0.6000	0.6000
T4	8	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T4	13	Thin Flat Bar Climbing Ladder	160.00 - 180.00	0.6000	0.6000
T4	14	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T5	3	HB158-21U6S24-xxM_TMO (1-5/8)	140.00 - 160.00	0.6000	0.6000
T5	4	LDF4-50A(1/2")	140.00 - 160.00	0.6000	0.6000
T5	5	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T5	7	LDF7-50A(1-5/8")	140.00 - 160.00	0.6000	0.6000
T5	8	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T5	10	LMR-400(3/8")	140.00 - 150.00	0.6000	0.6000
T5	11	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.6000
T5	13	Thin Flat Bar Climbing	140.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		Ladder	160.00		
T5	14	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T6	3	HB158-21U6S24-xxM_TMO (1-5/8)	120.00 - 140.00	0.6000	0.6000
T6	4	LDF4-50A(1/2")	120.00 - 140.00	0.6000	0.6000
T6	5	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T6	7	LDF7-50A(1-5/8")	120.00 - 140.00	0.6000	0.6000
T6	8	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T6	10	LMR-400(3/8")	120.00 - 140.00	0.6000	0.6000
T6	11	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T6	13	Thin Flat Bar Climbing Ladder	120.00 - 140.00	0.6000	0.6000
T6	14	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T7	3	HB158-21U6S24-xxM_TMO (1-5/8)	100.00 - 120.00	0.6000	0.6000
T7	4	LDF4-50A(1/2")	100.00 - 120.00	0.6000	0.6000
T7	5	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T7	7	LDF7-50A(1-5/8")	100.00 - 120.00	0.6000	0.6000
T7	8	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T7	10	LMR-400(3/8")	100.00 - 120.00	0.6000	0.6000
T7	11	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T7	13	Thin Flat Bar Climbing Ladder	100.00 - 120.00	0.6000	0.6000
T7	14	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T8	3	HB158-21U6S24-xxM_TMO (1-5/8)	80.00 - 100.00	0.6000	0.6000
T8	4	LDF4-50A(1/2")	80.00 - 100.00	0.6000	0.6000
T8	5	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T8	7	LDF7-50A(1-5/8")	80.00 - 100.00	0.6000	0.6000
T8	8	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T8	10	LMR-400(3/8")	80.00 - 100.00	0.6000	0.6000
T8	11	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T8	13	Thin Flat Bar Climbing Ladder	80.00 - 100.00	0.6000	0.6000
T8	14	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T9	3	HB158-21U6S24-xxM_TMO (1-5/8)	60.00 - 80.00	0.6000	0.6000
T9	4	LDF4-50A(1/2")	60.00 - 80.00	0.6000	0.6000
T9	5	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T9	7	LDF7-50A(1-5/8")	60.00 - 80.00	0.6000	0.6000
T9	8	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T9	10	LMR-400(3/8")	60.00 - 80.00	0.6000	0.6000
T9	11	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T9	13	Thin Flat Bar Climbing Ladder	60.00 - 80.00	0.6000	0.6000
T9	14	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T10	3	HB158-21U6S24-xxM_TMO	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		(1-5/8)			
T10	4	LDF4-50A(1/2")	40.00 - 60.00	0.6000	0.6000
T10	5	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	7	LDF7-50A(1-5/8")	40.00 - 60.00	0.6000	0.6000
T10	8	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	10	LMR-400(3/8")	40.00 - 60.00	0.6000	0.6000
T10	11	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	13	Thin Flat Bar Climbing Ladder	40.00 - 60.00	0.6000	0.6000
T10	14	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	3	HB158-21U6S24-xxM_TMO (1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	4	LDF4-50A(1/2")	20.00 - 40.00	0.6000	0.6000
T11	5	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	7	LDF7-50A(1-5/8")	20.00 - 40.00	0.6000	0.6000
T11	8	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	10	LMR-400(3/8")	20.00 - 40.00	0.6000	0.6000
T11	11	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	13	Thin Flat Bar Climbing Ladder	20.00 - 40.00	0.6000	0.6000
T11	14	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	3	HB158-21U6S24-xxM_TMO (1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	4	LDF4-50A(1/2")	0.00 - 20.00	0.6000	0.6000
T12	5	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	7	LDF7-50A(1-5/8")	0.00 - 20.00	0.6000	0.6000
T12	8	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	10	LMR-400(3/8")	0.00 - 20.00	0.6000	0.6000
T12	11	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	13	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T12	14	Safety Line 3/8	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 Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8x4'	C	From Leg	0.500 0' 2'	0.000	246'	No Ice	0.250	0.250	0.031
11' x 2" Mount Pipe	C	From Leg	0.500 0' 5'6"	0.000	235'	No Ice	2.200	2.200	0.085
Flash Beacon Lighting	C	None		0.000	235'	No Ice	2.700	2.700	0.050
Side Lighting	A	From Leg	0.500 0' 0'	0.000	124'	No Ice	0.115	0.115	0.005
Side Lighting	B	From Leg	0.500 0' 0'	0.000	124'	No Ice	0.115	0.115	0.005

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Lighting	C	From Leg	0.500 0' 0'	0.000	124'	No Ice	0.115	0.115	0.005
Sabre Top Hat *	C	None		0.000	237'6"	No Ice	5.500	5.500	0.775
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	238'	No Ice	5.190	2.710	0.128
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	238'	No Ice	5.190	2.710	0.128
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	238'	No Ice	5.190	2.710	0.128
FFVV-65C-R3-V1_TMO w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	238'	No Ice	12.970	6.200	0.157
FFVV-65C-R3-V1_TMO w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	238'	No Ice	12.970	6.200	0.157
FFVV-65C-R3-V1_TMO w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	238'	No Ice	12.970	6.200	0.157
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.139	1.686	0.109
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.139	1.686	0.109
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.139	1.686	0.109
RADIO 4480 B71_TMO	A	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.852	1.383	0.093
RADIO 4480 B71_TMO	B	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.852	1.383	0.093
RADIO 4480 B71_TMO	C	From Leg	4.000 0' 0'	0.000	238'	No Ice	2.852	1.383	0.093
Sector Mount [SM 502-3] *	C	None		0.000	238'	No Ice	29.820	29.820	1.673
BCD-80010	A	From Leg	6.000 0' 6'	0.000	217'	No Ice	2.947	2.947	0.027
BCD-80010	B	From Leg	6.000 0' 6'	0.000	217'	No Ice	2.947	2.947	0.027
BCD-80010	C	From Leg	6.000 0' 6'	0.000	217'	No Ice	2.947	2.947	0.027
12' horizontal x 2.375" Pipe Mount	A	From Leg	1.000 0' 0'	0.000	217'	No Ice	2.850	2.850	0.050
12' horizontal x 2.375" Pipe Mount	B	From Leg	1.000 0'	0.000	217'	No Ice	2.850	2.850	0.050

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'						
12' horizontal x 2.375" Pipe Mount	C	From Leg	1.000 0' 0'	0.000	217'	No Ice	2.850	2.850	0.050
3' x 2" Pipe Mount	A	From Leg	6.000 0' 0'	0.000	217'	No Ice	0.583	0.583	0.011
3' x 2" Pipe Mount	B	From Leg	6.000 0' 0'	0.000	217'	No Ice	0.583	0.583	0.011
3' x 2" Pipe Mount	C	From Leg	6.000 0' 0'	0.000	217'	No Ice	0.583	0.583	0.011
Side Arm Mount [SO 308-3] *	C	None		0.000	217'	No Ice	4.160	4.160	0.159
ODU 5-11 GHZ	A	From Leg	1.000 0' 0'	0.000	150'	No Ice	0.585	0.705	0.018
ODU 5-11 GHZ	C	From Leg	1.000 0' 0'	0.000	150'	No Ice	0.585	0.705	0.018
Pipe Mount [PM 601-1]	A	From Leg	0.500 0' 0'	0.000	150'	No Ice	1.320	1.320	0.065
Pipe Mount [PM 601-1] *	C	From Leg	0.500 0' 0'	0.000	150'	No Ice	1.320	1.320	0.065

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPD6-5.9	A	Paraboloid w/Shroud (HP)	From Leg	1.000 0' 0'	40.000		150'	5.833	No Ice	26.730	0.250
HPD3-11 *	C	Paraboloid w/Shroud (HP)	From Leg	1.000 0' 0'	-40.000		150'	3.167	No Ice	7.880	0.050

Load Combinations

Comb. No.	Description

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	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	235 - 220	Leg	Max Tension	23	10.169	0.063	0.052
			Max. Compression	2	-13.392	0.001	0.096
			Max. Mx	18	-13.255	0.077	-0.059
			Max. My	2	-13.392	0.001	0.096
			Max. Vy	8	-0.971	0.000	0.000
			Max. Vx	3	0.995	0.000	0.000
		Diagonal	Max Tension	16	1.785	0.000	0.000
			Max. Compression	18	-2.016	0.000	0.000
			Max. Mx	2	1.295	0.019	-0.002
			Max. My	20	1.600	0.012	-0.003
			Max. Vy	2	-0.009	0.019	-0.002
			Max. Vx	20	-0.001	-0.007	-0.003
		Top Girt	Max Tension	10	0.413	0.000	0.000
			Max. Compression	7	-0.278	0.000	0.000
			Max. Mx	2	-0.091	0.021	0.000
			Max. Vy	2	-0.017	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	220 - 200	Leg	Max Tension	23	33.581	0.030	0.031
			Max. Compression	2	-39.363	0.001	0.211
			Max. Mx	20	-2.520	0.241	-0.012
			Max. My	2	-39.363	0.001	0.211
			Max. Vy	20	-0.217	0.241	-0.012
			Max. Vx	2	-0.187	-0.029	0.207
		Diagonal	Max Tension	13	3.071	0.000	0.000
			Max. Compression	10	-3.258	0.000	0.000
			Max. Mx	2	2.318	0.026	-0.004
			Max. My	20	-2.645	-0.010	-0.006
			Max. Vy	2	-0.012	0.026	-0.004
			Max. Vx	20	-0.002	-0.010	-0.006
		Top Girt	Max Tension	22	0.356	0.000	0.000
			Max. Compression	3	-0.205	0.000	0.000
			Max. Mx	2	0.217	-0.011	0.000
			Max. Vy	2	0.009	0.000	0.000
T3	200 - 180	Leg	Max Tension	23	48.402	-0.116	-0.018
			Max. Compression	2	-56.456	0.132	-0.001
			Max. Mx	2	-44.993	0.211	-0.001
			Max. My	20	-3.548	-0.025	-0.297
			Max. Vy	18	0.058	0.209	-0.047
			Max. Vx	20	0.108	-0.025	-0.297
		Diagonal	Max Tension	10	1.825	0.000	0.000
			Max. Compression	10	-1.948	0.000	0.000
			Max. Mx	2	1.394	0.015	-0.001
			Max. My	22	-1.368	-0.005	-0.004
			Max. Vy	2	-0.008	0.015	-0.001
			Max. Vx	10	-0.001	0.000	0.000
		Top Girt	Max Tension	23	0.050	0.000	0.000
			Max. Compression	2	-0.093	0.000	0.000
			Max. Mx	2	0.010	-0.008	0.000
			Max. My	2	-0.093	0.000	0.000
			Max. Vy	2	0.007	0.000	0.000
			Max. Vx	2	-0.000	0.000	0.000
T4	180 - 160	Leg	Max Tension	23	60.026	-0.110	-0.013
			Max. Compression	2	-70.443	0.147	-0.024
			Max. Mx	11	-68.730	0.161	0.027
			Max. My	9	-4.121	-0.021	0.222
			Max. Vy	22	0.038	-0.159	-0.032
			Max. Vx	20	0.084	0.015	-0.222
		Diagonal	Max Tension	10	2.119	0.000	0.000
			Max. Compression	10	-2.120	0.000	0.000
			Max. Mx	6	1.018	0.012	0.002
			Max. My	8	-1.469	0.008	0.003
			Max. Vy	6	0.008	0.012	0.002
			Max. Vx	20	0.001	0.000	0.000
T5	160 - 140	Leg	Max Tension	7	71.291	-0.384	0.200
			Max. Compression	2	-85.009	0.172	-0.042
			Max. Mx	19	-77.042	0.413	-0.199
			Max. My	18	30.842	-0.272	0.615
			Max. Vy	14	-0.244	-0.411	-0.168
			Max. Vx	19	-0.367	-0.267	-0.501
		Diagonal	Max Tension	18	3.451	0.000	0.000
			Max. Compression	18	-3.633	0.000	0.000
			Max. Mx	2	2.554	0.030	-0.001
			Max. My	20	-2.746	0.006	-0.007
			Max. Vy	6	0.015	0.029	0.006
			Max. Vx	8	-0.001	0.000	0.000
T6	140 - 120	Leg	Max Tension	7	84.893	-0.259	0.013
			Max. Compression	2	-101.624	0.474	0.001
			Max. Mx	18	-100.803	0.483	-0.049

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-9.657	0.014	0.462
			Max. Vy	19	-0.088	0.481	-0.050
			Max. Vx	8	-0.099	0.014	0.462
		Diagonal	Max Tension	18	3.686	0.000	0.000
			Max. Compression	18	-3.805	0.000	0.000
			Max. Mx	2	2.498	0.031	0.003
			Max. My	8	-2.449	0.020	0.006
			Max. Vy	6	0.017	0.031	0.006
			Max. Vx	20	0.001	0.000	0.000
T7	120 - 100	Leg	Max Tension	7	98.495	-0.397	-0.001
			Max. Compression	2	-118.690	0.702	-0.001
			Max. Mx	19	-116.203	0.723	-0.106
			Max. My	21	-5.732	-0.025	-0.741
			Max. Vy	14	0.108	-0.678	-0.002
			Max. Vx	20	0.147	-0.028	-0.741
		Diagonal	Max Tension	18	4.148	0.000	0.000
			Max. Compression	18	-4.178	0.000	0.000
			Max. Mx	6	2.067	0.049	0.007
			Max. My	8	-2.708	0.022	0.009
			Max. Vy	6	0.023	0.049	0.007
			Max. Vx	8	-0.002	0.000	0.000
T8	100 - 80	Leg	Max Tension	7	111.015	-0.401	0.029
			Max. Compression	2	-134.878	0.733	-0.008
			Max. Mx	18	-134.358	0.749	-0.055
			Max. My	21	-5.665	-0.025	-0.741
			Max. Vy	14	0.121	-0.678	0.009
			Max. Vx	20	-0.130	-0.028	-0.741
		Diagonal	Max Tension	18	4.871	0.000	0.000
			Max. Compression	18	-4.998	0.000	0.000
			Max. Mx	6	2.592	0.081	0.012
			Max. My	8	2.991	0.080	0.013
			Max. Vy	6	0.034	0.081	0.012
			Max. Vx	8	-0.002	0.000	0.000
T9	80 - 60	Leg	Max Tension	7	124.300	-0.847	0.030
			Max. Compression	2	-152.578	0.952	-0.002
			Max. Mx	18	-152.167	0.968	-0.051
			Max. My	8	-15.157	-0.039	0.895
			Max. Vy	14	0.123	-0.848	0.001
			Max. Vx	8	-0.154	-0.039	0.895
		Diagonal	Max Tension	18	5.163	0.000	0.000
			Max. Compression	18	-5.400	0.000	0.000
			Max. Mx	6	2.910	0.098	0.014
			Max. My	8	-3.399	0.084	0.016
			Max. Vy	6	0.041	0.098	0.014
			Max. Vx	8	-0.003	0.000	0.000
T10	60 - 40	Leg	Max Tension	7	137.429	-0.754	0.027
			Max. Compression	2	-170.401	1.114	-0.009
			Max. Mx	18	-170.062	1.133	-0.062
			Max. My	8	-17.608	-0.074	0.984
			Max. Vy	18	-0.129	1.133	-0.062
			Max. Vx	8	0.157	-0.074	0.984
		Diagonal	Max Tension	18	5.474	0.000	0.000
			Max. Compression	18	-5.849	0.000	0.000
			Max. Mx	6	3.235	0.129	0.017
			Max. My	8	3.826	0.120	0.019
			Max. Vy	6	0.049	0.129	0.017
			Max. Vx	8	-0.003	0.000	0.000
T11	40 - 20	Leg	Max Tension	7	150.343	-0.872	0.041
			Max. Compression	2	-188.355	-0.439	0.016
			Max. Mx	18	-178.848	1.133	-0.062
			Max. My	8	-20.123	-0.064	1.321

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	19	0.196	0.820	-0.023
			Max. Vx	8	-0.178	-0.064	1.321
		Diagonal	Max Tension	12	5.905	0.000	0.000
			Max. Compression	10	-6.414	0.000	0.000
			Max. Mx	2	4.780	0.176	0.020
			Max. My	8	4.014	0.174	0.027
			Max. Vy	8	0.062	0.174	0.027
			Max. Vx	8	-0.004	0.000	0.000
T12	20 - 0	Leg	Max Tension	7	158.881	1.790	0.434
			Max. Compression	2	-201.688	0.000	0.000
			Max. Mx	2	-192.223	4.089	0.062
			Max. My	21	-11.327	-0.484	-3.187
			Max. Vy	2	1.445	4.089	0.062
			Max. Vx	20	-1.077	-0.664	-3.186
		Diagonal	Max Tension	11	7.492	0.000	0.000
			Max. Compression	10	-8.531	0.000	0.000
			Max. Mx	10	-1.415	0.057	0.011
			Max. My	14	0.086	0.018	-0.011
			Max. Vy	10	0.026	0.057	0.011
			Max. Vx	18	0.002	0.000	0.000
		Horizontal	Max Tension	10	5.883	0.133	0.001
			Max. Compression	10	-6.348	0.143	0.003
			Max. Mx	6	-1.597	0.151	0.008
			Max. My	18	1.581	0.115	-0.017
			Max. Vy	6	0.056	0.151	0.008
			Max. Vx	18	-0.003	0.115	-0.017
		Redund Horz 1 Bracing	Max Tension	22	1.989	0.000	0.000
			Max. Compression	19	-1.691	0.000	0.000
			Max. Mx	2	0.564	-0.028	0.000
			Max. My	2	-1.220	0.000	0.001
			Max. Vy	2	-0.019	0.000	0.000
			Max. Vx	2	-0.001	0.000	0.000
		Redund Diag 1 Bracing	Max Tension	19	1.168	0.000	0.000
			Max. Compression	22	-1.229	0.000	0.000
			Max. Mx	2	-0.710	-0.034	0.000
			Max. My	2	0.903	0.000	0.001
			Max. Vy	2	0.018	0.000	0.000
			Max. Vx	2	-0.001	0.000	0.000
		Inner Bracing	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-0.007	0.000	0.000
			Max. Mx	2	-0.006	-0.084	0.000
			Max. Vy	2	0.028	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	210.516	18.190	-11.482
	Max. H_x	18	210.516	18.190	-11.482
	Max. H_z	7	-165.691	-14.544	9.313
	Min. Vert	7	-165.691	-14.544	9.313
	Min. H_x	7	-165.691	-14.544	9.313
	Min. H_z	18	210.516	18.190	-11.482
Leg B	Max. Vert	10	208.274	-17.851	-11.453

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_x	23	-162.198	14.250	9.293
	Max. H_z	23	-162.198	14.250	9.293
	Min. Vert	23	-162.198	14.250	9.293
	Min. H_x	10	208.274	-17.851	-11.453
	Min. H_z	10	208.274	-17.851	-11.453
Leg A	Max. Vert	2	210.648	0.140	21.147
	Max. H_x	20	17.980	3.823	1.171
	Max. H_z	2	210.648	0.140	21.147
	Min. Vert	15	-160.102	-0.099	-16.941
	Min. H_x	9	19.190	-3.801	1.380
	Min. H_z	15	-160.102	-0.099	-16.941

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	48.035	0.000	0.000	-43.581	-12.484	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	57.642	0.360	-33.771	-4144.666	-68.995	6.487
0.9 Dead+1.0 Wind 0 deg - No Ice	43.232	0.360	-33.771	-4131.591	-65.250	6.487
1.2 Dead+1.0 Wind 30 deg - No Ice	57.642	15.811	-27.327	-3403.910	-1955.105	-13.139
0.9 Dead+1.0 Wind 30 deg - No Ice	43.232	15.811	-27.327	-3390.835	-1951.360	-13.139
1.2 Dead+1.0 Wind 60 deg - No Ice	57.642	27.054	-15.909	-2019.801	-3347.705	-34.573
0.9 Dead+1.0 Wind 60 deg - No Ice	43.232	27.054	-15.909	-2006.726	-3343.960	-34.573
1.2 Dead+1.0 Wind 90 deg - No Ice	57.642	32.415	-0.428	-116.556	-3991.410	-47.922
0.9 Dead+1.0 Wind 90 deg - No Ice	43.232	32.415	-0.428	-103.481	-3987.664	-47.922
1.2 Dead+1.0 Wind 120 deg - No Ice	57.642	29.438	16.858	1985.444	-3580.193	-41.739
0.9 Dead+1.0 Wind 120 deg - No Ice	43.232	29.438	16.858	1998.519	-3576.447	-41.739
1.2 Dead+1.0 Wind 150 deg - No Ice	57.642	15.235	27.256	3300.945	-1875.816	-24.237
0.9 Dead+1.0 Wind 150 deg - No Ice	43.232	15.235	27.256	3314.019	-1872.070	-24.237
1.2 Dead+1.0 Wind 180 deg - No Ice	57.642	-0.421	30.929	3765.232	48.108	-5.672
0.9 Dead+1.0 Wind 180 deg - No Ice	43.232	-0.421	30.929	3778.306	51.854	-5.672
1.2 Dead+1.0 Wind 210 deg - No Ice	57.642	-15.915	27.420	3313.377	1940.728	13.909
0.9 Dead+1.0 Wind 210 deg - No Ice	43.232	-15.915	27.420	3326.451	1944.473	13.909
1.2 Dead+1.0 Wind 240 deg - No Ice	57.642	-29.711	17.474	2074.290	3584.964	34.937
0.9 Dead+1.0 Wind 240 deg - No Ice	43.232	-29.711	17.474	2087.365	3588.709	34.937
1.2 Dead+1.0 Wind 270 deg - No Ice	57.642	-32.517	0.527	26.713	3976.756	47.834
0.9 Dead+1.0 Wind 270 deg -	43.232	-32.517	0.527	39.788	3980.501	47.834

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
No Ice 1.2 Dead+1.0 Wind 300 deg - No Ice	57.642	-26.857	-15.407	-1948.079	3294.293	41.380
0.9 Dead+1.0 Wind 300 deg - No Ice	43.232	-26.857	-15.407	-1935.004	3298.038	41.380
1.2 Dead+1.0 Wind 330 deg - No Ice	57.642	-15.309	-27.253	-3405.041	1856.923	25.126
0.9 Dead+1.0 Wind 330 deg - No Ice	43.232	-15.309	-27.253	-3391.966	1860.669	25.126
Dead+Wind 0 deg - Service	48.035	0.098	-9.536	-1180.021	-27.184	1.765
Dead+Wind 30 deg - Service	48.035	4.475	-7.736	-975.382	-551.840	-3.576
Dead+Wind 60 deg - Service	48.035	7.662	-4.502	-590.388	-939.144	-9.409
Dead+Wind 90 deg - Service	48.035	9.167	-0.117	-61.069	-1117.371	-13.042
Dead+Wind 120 deg - Service	48.035	8.310	4.761	522.341	-1002.417	-11.359
Dead+Wind 150 deg - Service	48.035	4.319	7.717	888.663	-530.260	-6.596
Dead+Wind 180 deg - Service	48.035	-0.114	8.762	1018.060	4.686	-1.544
Dead+Wind 210 deg - Service	48.035	-4.504	7.761	892.047	531.113	3.785
Dead+Wind 240 deg - Service	48.035	-8.385	4.928	546.521	986.901	9.508
Dead+Wind 270 deg - Service	48.035	-9.195	0.143	-22.078	1096.568	13.018
Dead+Wind 300 deg - Service	48.035	-7.608	-4.366	-570.868	907.794	11.262
Dead+Wind 330 deg - Service	48.035	-4.339	-7.716	-975.690	508.305	6.838

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-48.035	0.000	0.000	48.035	-0.000	0.000%
2	0.360	-57.642	-33.771	-0.360	57.642	33.771	0.000%
3	0.360	-43.232	-33.771	-0.360	43.232	33.771	0.000%
4	15.811	-57.642	-27.327	-15.811	57.642	27.327	0.000%
5	15.811	-43.232	-27.327	-15.811	43.232	27.327	0.000%
6	27.054	-57.642	-15.909	-27.054	57.642	15.909	0.000%
7	27.054	-43.232	-15.909	-27.054	43.232	15.909	0.000%
8	32.415	-57.642	-0.428	-32.415	57.642	0.428	0.000%
9	32.415	-43.232	-0.428	-32.415	43.232	0.428	0.000%
10	29.438	-57.642	16.858	-29.438	57.642	-16.858	0.000%
11	29.438	-43.232	16.858	-29.438	43.232	-16.858	0.000%
12	15.235	-57.642	27.256	-15.235	57.642	-27.256	0.000%
13	15.235	-43.232	27.256	-15.235	43.232	-27.256	0.000%
14	-0.421	-57.642	30.929	0.421	57.642	-30.929	0.000%
15	-0.421	-43.232	30.929	0.421	43.232	-30.929	0.000%
16	-15.915	-57.642	27.420	15.915	57.642	-27.420	0.000%
17	-15.915	-43.232	27.420	15.915	43.232	-27.420	0.000%
18	-29.711	-57.642	17.474	29.711	57.642	-17.474	0.000%
19	-29.711	-43.232	17.474	29.711	43.232	-17.474	0.000%
20	-32.517	-57.642	0.527	32.517	57.642	-0.527	0.000%
21	-32.517	-43.232	0.527	32.517	43.232	-0.527	0.000%
22	-26.857	-57.642	-15.407	26.857	57.642	15.407	0.000%
23	-26.857	-43.232	-15.407	26.857	43.232	15.407	0.000%
24	-15.309	-57.642	-27.253	15.309	57.642	27.253	0.000%
25	-15.309	-43.232	-27.253	15.309	43.232	27.253	0.000%
26	0.098	-48.035	-9.536	-0.098	48.035	9.536	0.000%
27	4.475	-48.035	-7.736	-4.475	48.035	7.736	0.000%
28	7.662	-48.035	-4.502	-7.662	48.035	4.502	0.000%
29	9.167	-48.035	-0.117	-9.167	48.035	0.117	0.000%
30	8.310	-48.035	4.761	-8.310	48.035	-4.761	0.000%
31	4.319	-48.035	7.717	-4.319	48.035	-7.717	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
32	-0.114	-48.035	8.762	0.114	48.035	-8.762	0.000%
33	-4.504	-48.035	7.761	4.504	48.035	-7.761	0.000%
34	-8.385	-48.035	4.928	8.385	48.035	-4.928	0.000%
35	-9.195	-48.035	0.143	9.195	48.035	-0.143	0.000%
36	-7.608	-48.035	-4.366	7.608	48.035	4.366	0.000%
37	-4.339	-48.035	-7.716	4.339	48.035	7.716	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	235 - 220	4.511	26	0.229	0.064
T2	220 - 200	3.806	26	0.209	0.063
T3	200 - 180	2.977	26	0.174	0.058
T4	180 - 160	2.311	26	0.139	0.049
T5	160 - 140	1.771	26	0.113	0.039
T6	140 - 120	1.330	26	0.092	0.032
T7	120 - 100	0.966	26	0.074	0.024
T8	100 - 80	0.671	26	0.058	0.018
T9	80 - 60	0.442	26	0.045	0.014
T10	60 - 40	0.263	26	0.033	0.010
T11	40 - 20	0.130	26	0.022	0.007
T12	20 - 0	0.045	34	0.011	0.004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
246'	Lightning Rod 5/8x4'	26	4.511	0.229	0.064	103451
238'	AIR6449 B41_T-MOBILE w/ Mount Pipe	26	4.511	0.229	0.064	103451
237'6"	Sabre Top Hat	26	4.511	0.229	0.064	103451
235'	11' x 2" Mount Pipe	26	4.511	0.229	0.064	103451
217'	BCD-80010	26	3.672	0.204	0.063	33270
150'	HPD6-5.9	26	1.540	0.102	0.036	55518
124'	Side Lighting	26	1.033	0.078	0.026	68797

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	235 - 220	16.013	2	0.816	0.235
T2	220 - 200	13.504	2	0.743	0.232
T3	200 - 180	10.558	2	0.619	0.214
T4	180 - 160	8.192	19	0.492	0.178

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	160 - 140	6.284	19	0.399	0.145
T6	140 - 120	4.725	19	0.325	0.118
T7	120 - 100	3.432	19	0.263	0.088
T8	100 - 80	2.385	19	0.204	0.065
T9	80 - 60	1.573	19	0.157	0.050
T10	60 - 40	0.938	19	0.118	0.037
T11	40 - 20	0.465	19	0.078	0.026
T12	20 - 0	0.159	18	0.039	0.016

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
246'	Lightning Rod 5/8x4'	2	16.013	0.816	0.235	28811
238'	AIR6449 B41_T-MOBILE w/ Mount Pipe	2	16.013	0.816	0.235	28811
237'6"	Sabre Top Hat	2	16.013	0.816	0.235	28811
235'	11' x 2" Mount Pipe	2	16.013	0.816	0.235	28811
217'	BCD-80010	2	13.027	0.726	0.230	9248
150'	HPD6-5.9	19	5.467	0.360	0.131	15631
124'	Side Lighting	19	3.671	0.275	0.094	19355

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	235	Leg	A325N	0.750	4	2.542	30.101	0.084 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	1.785	7.875	0.227 ✓	1.05	Member Block Shear
		Top Girt	A325X	0.625	3	0.138	11.099	0.012 ✓	1.05	Member Bearing
T2	220	Leg	A325N	0.750	4	8.395	30.101	0.279 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	3.071	10.500	0.292 ✓	1.05	Member Block Shear
		Top Girt	A325X	0.625	1	0.682	10.500	0.065 ✓	1.05	Member Block Shear
T3	200	Leg	A325N	1.000	4	12.100	54.517	0.222 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	1.825	7.875	0.232 ✓	1.05	Member Block Shear
		Top Girt	A325X	0.625	1	0.979	7.875	0.124 ✓	1.05	Member Block Shear
T4	180	Leg	A325N	1.000	4	15.006	54.517	0.275 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	2.119	7.875	0.269 ✓	1.05	Member Block Shear
T5	160	Leg	A325N	1.250	4	17.823	87.220	0.204 ✓	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	3.451	9.914	0.348 ✓	1.05	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T6	140	Leg	A325N	1.250	4	21.223	87.220	0.243 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.625	1	3.686	9.914	0.372 ✔	1.05	Member Block Shear
T7	120	Leg	A325N	1.250	6	16.416	87.220	0.188 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	4.148	10.424	0.398 ✔	1.05	Member Block Shear
T8	100	Leg	A325N	1.250	6	18.503	87.220	0.212 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	4.871	13.898	0.350 ✔	1.05	Member Block Shear
T9	80	Leg	A325N	1.375	6	20.717	103.939	0.199 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	5.163	13.898	0.372 ✔	1.05	Member Block Shear
T10	60	Leg	A325N	1.375	6	22.905	103.939	0.220 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	5.474	14.355	0.381 ✔	1.05	Member Bearing
T11	40	Leg	A325N	1.375	6	25.057	103.939	0.241 ✔	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	5.905	14.355	0.411 ✔	1.05	Member Bearing
T12	20	Diagonal	A325X	0.625	2	3.746	11.086	0.338 ✔	1.05	Member Block Shear
		Horizontal	A325X	0.625	2	2.942	12.445	0.236 ✔	1.05	Member Block Shear
		Redund Horz 1 Bracing	A325X	0.625	1	3.498	14.578	0.240 ✔	1.05	Member Block Shear
		Redund Diag 1 Bracing	A325X	0.625	1	2.261	14.578	0.155 ✔	1.05	Member Block Shear

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 $\frac{P_u}{\phi P_n}$
T1	235 - 220	Sabre 2.375"x0.154"	15'	5'	76.2 K=1.00	1.075	-13.392	31.617	0.424 [1] ✔
T2	220 - 200	Sabre 2.875"x0.375"	20'	5'	67.1 K=1.00	2.945	-39.363	95.330	0.413 [1] ✔
T3	200 - 180	Sabre 3.5"x0.437"	20'13/32"	5'3/32"	54.9 K=1.00	4.205	-56.456	151.754	0.372 [1] ✔
T4	180 - 160	Sabre 3.5" x 0.6"	20'13/32"	5'3/32"	57.4 K=1.00	5.466	-70.443	193.324	0.364 [1] ✔
T5	160 - 140	Sabre 4.5"x0.5310"	20'13/32"	6'8-1/8"	56.6 K=1.00	6.621	-85.009	235.726	0.361 [1] ✔
T6	140 - 120	Sabre 5.5625" x 0.5"	20'13/32"	6'8-1/8"	44.6 K=1.00	7.952	-101.624	309.502	0.328 [1] ✔
T7	120 - 100	Sabre 6.625"x0.432"	20'13/32"	6'8-1/8"	36.5 K=1.00	8.405	-118.690	343.100	0.346 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T8	100 - 80	Sabre 6.625" x 0.562"	20'13/32"	10'7/32"	55.8 K=1.00	10.705	-134.878	383.523	0.352 [1] ✔
T9	80 - 60	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8 K=1.00	12.763	-152.578	505.555	0.302 [1] ✔
T10	60 - 40	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8 K=1.00	12.763	-170.401	505.555	0.337 [1] ✔
T11	40 - 20	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8 K=1.00	12.763	-188.355	505.555	0.373 [1] ✔
T12	20 - 0	Sabre 8.625"x0.5"	20'13/32"	5'3/32"	20.9 K=1.00	12.763	-201.688	556.300	0.363 [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	235 - 220	L1 3/4x1 3/4x3/16	7'27/32"	3'3"	115.2 K=1.01	0.621	-2.016	13.035	0.155 [1] ✔
T2	220 - 200	L1 3/4x1 3/4x1/4	7'27/32"	3'2-5/8"	114.9 K=1.02	0.813	-3.258	17.107	0.190 [1] ✔
T3	200 - 180	L1 3/4x1 3/4x3/16	8'4-13/16"	4'11/32"	140.8 K=1.00	0.621	-1.869	8.971	0.208 [1] ✔
T4	180 - 160	L1 3/4x1 3/4x3/16	10'15/16"	4'10-7/16"	170.1 K=1.00	0.621	-2.110	6.141	0.344 [1] ✔
T5	160 - 140	L2 1/2x2 1/2x3/16	12'6-31/32"	6'1-7/16"	148.4 K=1.00	0.902	-3.633	11.730	0.310 [1] ✔
T6	140 - 120	L2 1/2x2 1/2x3/16	14'3-25/32"	6'11-1/4"	168.2 K=1.00	0.902	-3.805	9.125	0.417 [1] ✔
T7	120 - 100	L3x3x3/16	16'1-11/32"	7'9-15/32"	156.8 K=1.00	1.090	-4.172	12.682	0.329 [1] ✔
T8	100 - 80	L3x3x1/4	19'3-9/16"	9'5-21/32"	192.0 K=1.00	1.440	-4.998	11.181	0.447 [1] ✔
T9	80 - 60	L3x3 1/2x1/4	21'3/8"	10'2-15/16"	194.8 K=1.00	1.560	-5.400	11.761	0.459 [1] ✔
T10	60 - 40	L3 1/2x3 1/2x1/4	22'9-23/32"	11'1-21/32"	192.6 K=1.00	1.690	-5.849	13.042	0.448 [1] ✔
T11	40 - 20	L4x4x1/4	24'7-1/2"	12'9/16"	181.8 K=1.00	1.940	-6.414	16.794	0.382 [1] ✔
T12	20 - 0	L3x3x1/4	16'1/8"	15'6-19/32"	200.6 K=1.00	1.440	-8.531	10.237	0.833 [1] ✔
		KL/R > 200 (C) - 246							

[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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3 1/2x3 1/2x1/4	24'	11'7-11/16"	201.3 K=1.00	1.690	-6.348	11.940	0.532 [1] ✔
		KL/R > 200 (C) - 245							

[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	235 - 220	C4x5.4	5'	4'9-5/8"	128.3 K=1.00	1.590	-0.278	21.645	0.013 [1] ✔
T2	220 - 200	L1 3/4x1 3/4x1/4	5'	4'5-5/8"	157.1 K=1.00	0.813	-0.682	9.423	0.072 [1] ✔
T3	200 - 180	L1 3/4x1 3/4x3/16	5'	4'5"	154.3 K=1.00	0.621	-0.979	7.465	0.131 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3x3x1/4	6'	5'7-11/16"	114.3 K=1.00	1.440	-3.498	30.530	0.115 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3x3x1/4	7'7-7/16"	7'1-3/4"	144.8 K=1.00	1.440	-2.221	19.648	0.113 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing 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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3x3x3/16	12'	12'	241.6 K=1.00	1.090	-0.007	5.344	0.001 [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	235 - 220	Sabre 2.375"x0.154"	15'	5'	76.2	1.075	10.169	48.354	0.210 [1] ✔
T2	220 - 200	Sabre 2.875"x0.375"	20'	5'	67.1	2.945	33.581	132.536	0.253 [1] ✔
T3	200 - 180	Sabre 3.5"x0.437"	20'13/32"	5'3/32"	54.9	4.205	48.401	189.230	0.256 [1] ✔
T4	180 - 160	Sabre 3.5" x 0.6"	20'13/32"	5'3/32"	57.4	5.466	60.026	245.987	0.244 [1] ✔
T5	160 - 140	Sabre 4.5"x0.5310"	20'13/32"	6'8-1/8"	56.6	6.621	71.291	297.946	0.239 [1] ✔
T6	140 - 120	Sabre 5.5625" x 0.5"	20'13/32"	6'8-1/8"	44.6	7.952	84.893	357.847	0.237 [1] ✔
T7	120 - 100	Sabre 6.625"x0.432"	20'13/32"	6'8-1/8"	36.5	8.405	98.495	378.222	0.260 [1] ✔
T8	100 - 80	Sabre 6.625" x 0.562"	20'13/32"	10'7/32"	55.8	10.705	111.015	481.711	0.230 [1] ✔
T9	80 - 60	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8	12.763	124.300	574.322	0.216 [1] ✔
T10	60 - 40	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8	12.763	137.429	574.322	0.239 [1] ✔
T11	40 - 20	Sabre 8.625"x0.5"	20'13/32"	10'7/32"	41.8	12.763	150.344	574.322	0.262 [1] ✔
T12	20 - 0	Sabre 8.625"x0.5"	20'13/32"	5'3/32"	20.9	12.763	158.881	574.322	0.277 [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	235 - 220	L1 3/4x1 3/4x3/16	7'27/32"	3'3"	75.9	0.360	1.785	15.675	0.114 [1] ✔
T2	220 - 200	L1 3/4x1 3/4x1/4	7'27/32"	3'2-5/8"	76.4	0.469	3.071	20.391	0.151 [1] ✔
T3	200 - 180	L1 3/4x1 3/4x3/16	7'7-7/16"	3'7-25/32"	84.8	0.360	1.825	15.675	0.116 [1] ✔
T4	180 - 160	L1 3/4x1 3/4x3/16	10'15/16"	4'10-7/16"	112.1	0.360	2.119	15.675	0.135 [1] ✔
T5	160 - 140	L2 1/2x2 1/2x3/16	12'6-31/32"	6'1-7/16"	96.6	0.571	3.451	24.840	0.139 [1] ✔
T6	140 - 120	L2 1/2x2 1/2x3/16	14'3-25/32"	6'11-1/4"	109.3	0.571	3.686	24.840	0.148 [1] ✔
T7	120 - 100	L3x3x3/16	16'1-11/32"	7'9-15/32"	101.4	0.694	4.148	30.209	0.137 [1] ✔
T8	100 - 80	L3x3x1/4	19'3-9/16"	9'5-21/32"	124.1	0.916	4.871	39.843	0.122 [1] ✔
T9	80 - 60	L3x3 1/2x1/4	21'3/8"	10'2-15/16"	136.6	1.006	5.163	43.758	0.118 [1] ✔
T10	60 - 40	L3 1/2x3 1/2x1/4	22'9-23/32"	11'1-21/32"	124.2	1.103	5.474	47.999	0.114 [1] ✔
T11	40 - 20	L4x4x1/4	24'7-1/2"	12'9/16"	117.0	1.291	5.905	56.156	0.105 [1] ✔
T12	20 - 0	L3x3x1/4	16'1/8"	15'6-19/32"	200.6	0.939	7.492	40.863	0.183 [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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3 1/2x3 1/2x1/4	23'	11'1-11/16"	122.6	1.127	5.883	49.019	0.120 [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	235 - 220	C4x5.4	5'	4'9-5/8"	128.3	1.089	0.413	47.371	0.009 [1] ✔
T2	220 - 200	L1 3/4x1 3/4x1/4	5'	4'5-5/8"	108.0	0.469	0.682	20.391	0.033 [1] ✔
T3	200 - 180	L1 3/4x1 3/4x3/16	5'	4'5"	105.2	0.360	0.979	15.675	0.062 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
									✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3x3x1/4	6'	5'7-11/16"	72.8	0.939	3.498	40.863	0.086 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T12	20 - 0	L3x3x1/4	7'5-7/32''	6'11-1/2''	89.8	0.939	2.261	40.863	0.055 [1] ✔

[1] P_u / ϕP_n controls

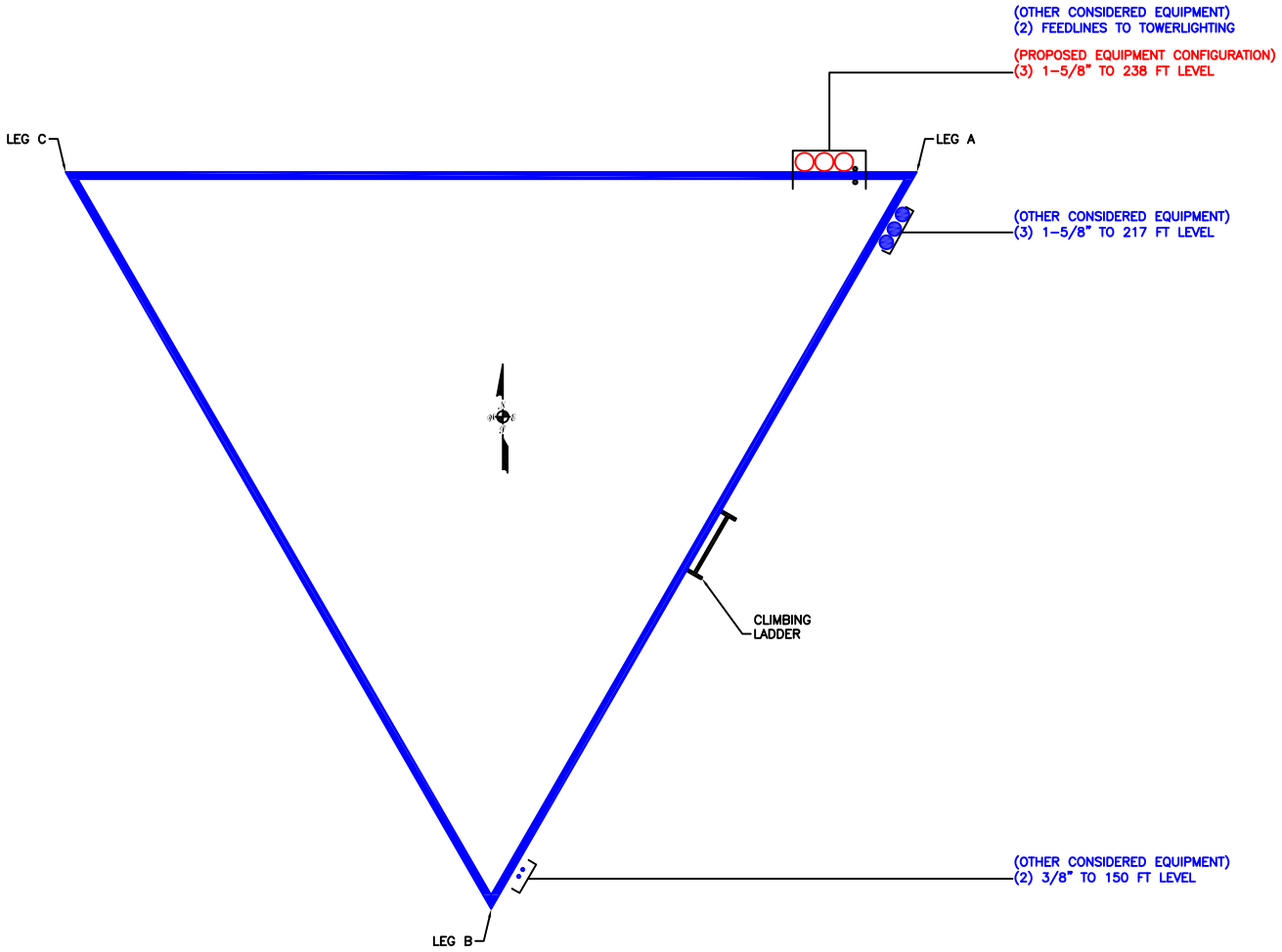
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	235 - 220	Leg	Sabre 2.375"x0.154"	3	-13.392	33.198	40.3	Pass
T2	220 - 200	Leg	Sabre 2.875"x0.375"	27	-39.363	100.096	39.3	Pass
T3	200 - 180	Leg	Sabre 3.5"x0.437"	57	-56.456	159.342	35.4	Pass
T4	180 - 160	Leg	Sabre 3.5" x 0.6"	87	-70.443	202.990	34.7	Pass
T5	160 - 140	Leg	Sabre 4.5"x0.5310"	114	-85.009	247.512	34.3	Pass
T6	140 - 120	Leg	Sabre 5.5625" x 0.5"	135	-101.624	324.977	31.3	Pass
T7	120 - 100	Leg	Sabre 6.625"x0.432"	156	-118.690	360.255	32.9	Pass
T8	100 - 80	Leg	Sabre 6.625" x 0.562"	177	-134.878	402.699	33.5	Pass
T9	80 - 60	Leg	Sabre 8.625"x0.5"	192	-152.578	530.833	28.7	Pass
T10	60 - 40	Leg	Sabre 8.625"x0.5"	207	-170.401	530.833	32.1	Pass
T11	40 - 20	Leg	Sabre 8.625"x0.5"	222	-188.355	530.833	35.5	Pass
T12	20 - 0	Leg	Sabre 8.625"x0.5"	237	-201.688	584.115	34.5	Pass
T1	235 - 220	Diagonal	L1 3/4x1 3/4x3/16	12	-2.016	13.687	14.7	Pass
T2	220 - 200	Diagonal	L1 3/4x1 3/4x1/4	33	-3.258	17.962	18.1	Pass
T3	200 - 180	Diagonal	L1 3/4x1 3/4x3/16	63	-1.869	9.419	19.8	Pass
T4	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	90	-2.110	6.448	32.7	Pass
T5	160 - 140	Diagonal	L2 1/2x2 1/2x3/16	120	-3.633	12.316	29.5	Pass
T6	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	141	-3.805	9.582	39.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T7	120 - 100	Diagonal	L3x3x3/16	162	-4.172	13.316	31.3	Pass
T8	100 - 80	Diagonal	L3x3x1/4	183	-4.998	11.740	42.6	Pass
T9	80 - 60	Diagonal	L3x3 1/2x1/4	198	-5.400	12.349	43.7	Pass
T10	60 - 40	Diagonal	L3 1/2x3 1/2x1/4	213	-5.849	13.694	42.7	Pass
T11	40 - 20	Diagonal	L4x4x1/4	225	-6.414	17.634	36.4	Pass
T12	20 - 0	Diagonal	L3x3x1/4	246	-8.531	10.749	79.4	Pass
T12	20 - 0	Horizontal	L3 1/2x3 1/2x1/4	245	-6.348	12.537	50.6	Pass
T1	235 - 220	Top Girt	C4x5.4	5	-0.278	22.727	1.2	Pass
T2	220 - 200	Top Girt	L1 3/4x1 3/4x1/4	29	-0.682	9.895	6.9	Pass
T3	200 - 180	Top Girt	L1 3/4x1 3/4x3/16	59	-0.979	7.838	12.5	Pass
T12	20 - 0	Redund Horz 1 Bracing	L3x3x1/4	250	-3.498	32.056	10.9	Pass
T12	20 - 0	Redund Diag 1 Bracing	L3x3x1/4	255	-2.221	20.631	10.8	Pass
T12	20 - 0	Inner Bracing	L3x3x3/16	261	-0.007	5.612	0.2	Pass
							Summary	
							Leg (T1) 40.3	Pass
							Diagonal (T12) 79.4	Pass
							Horizontal (T12) 50.6	Pass
							Top Girt (T3) 12.5	Pass
							Redund Horz 1 Bracing (T12) 10.9	Pass
							Redund Diag 1 Bracing (T12) 10.8	Pass
							Inner Bracing (T12) 0.2	Pass
							Bolt Checks 39.2	Pass
							RATING = 79.4	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT:877744

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	877744
Site Name	WILBURN, FL
Order #	566065 Rev# 1

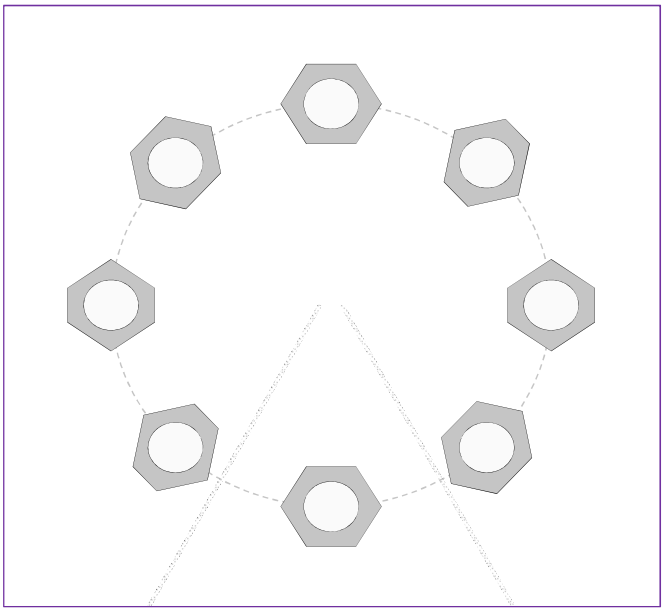
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	0

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	210.65	165.69
Shear Force (kips)	21.15	17.27

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(8) 1-1/2" ø bolts (A572-50 N; Fy=50 ksi, Fu=65 ksi)

l_{ar} (in): 0

Analysis Results

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

Pu_t = 20.71	ϕPn_t = 68.74	**Stress Rating**
Vu = 2.16	ϕVn = 43.07	**28.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Drilled Pier Foundation

BU # :	877744
Site Name:	WILBURN, FL
Order Number:	566065 Rev# 1
TIA-222 Revison:	H
Tower Type:	Self Support

Applied Loads	Comp.	Uplift
Moment (kip-ft)	0	0
Axial Force (kips)	210.65	165.69
Shear Force (kips)	21.15	17.27

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

Pier Design Data		
Depth	34	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 34' below grade		
Pier Diameter	5.5	ft
Rebar Quantity	18	
Rebar Size	9	
Clear Cover to Ties	3	in
Tie Size	4	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	13.27	13.27
Soil Safety Factor	23.78	29.12
Max Moment (kip-ft)	214.62	175.24
Rating*	*5.3%*	*4.3%*
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	203.46	203.46
End Bearing (kips)	267.28	-
Weight of Concrete (kips)	93.25	69.94
Total Capacity (kips)	470.74	273.40
Axial (kips)	303.90	165.69
Rating*	*61.5%*	*57.7%*
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	13.51	12.73
Critical Moment (kip-ft)	214.51	174.81
Critical Moment Capacity	2514.58	2053.95
Rating*	*8.1%*	*8.1%*
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	26.25	26.25
Critical Shear (kip)	30.36	24.79
Critical Shear Capacity	524.20	314.16
Rating*	*5.5%*	*7.5%*

Soil Interaction Rating*	**61.5%**
Structural Foundation Rating*	**8.1%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

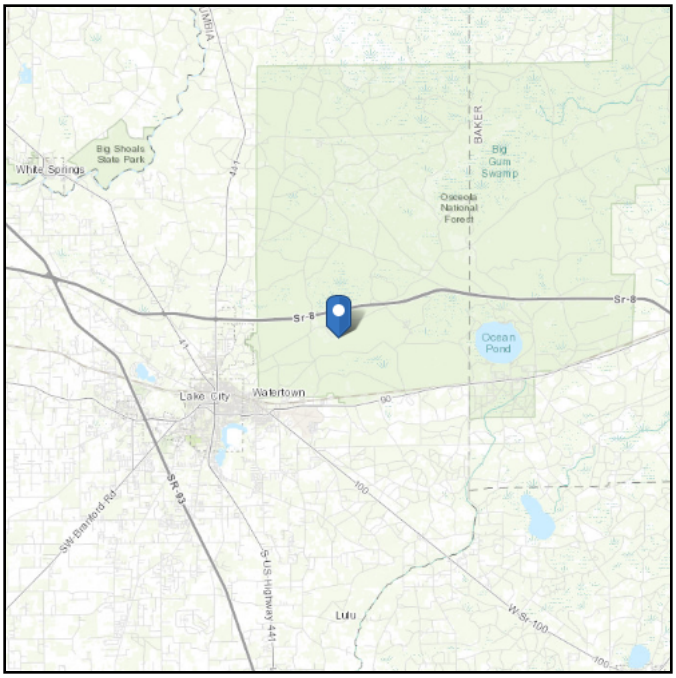
Groundwater Depth	3.5	# of Layers	7

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	105	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	5	1.5	42.6	87.6	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	5	8	3	52.6	87.6	0	32	0.000	0.000	0.70	0.70			Cohesionless
4	8	13	5	52.6	87.6	2	0	1.100	1.100	1.10	1.10			Cohesive
5	13	21	8	42.6	87.6	0.25	0	0.138	0.138	0.10	0.10			Cohesive
6	21	27	6	62.6	87.6	0	45	0.000	0.000	0.05	0.05			Cohesionless
7	27	34	7	52.6	87.6	1.75	0	0.96	0.96	1.00	1.00	15		Cohesive

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	150.83 ft (NAVD 88)
Risk Category:	II	**Latitude:**	30.229611
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-82.551444



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Wed May 26 2021

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

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

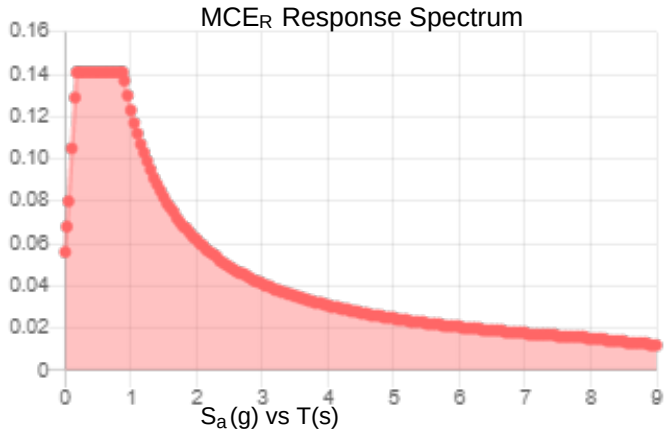
Seismic

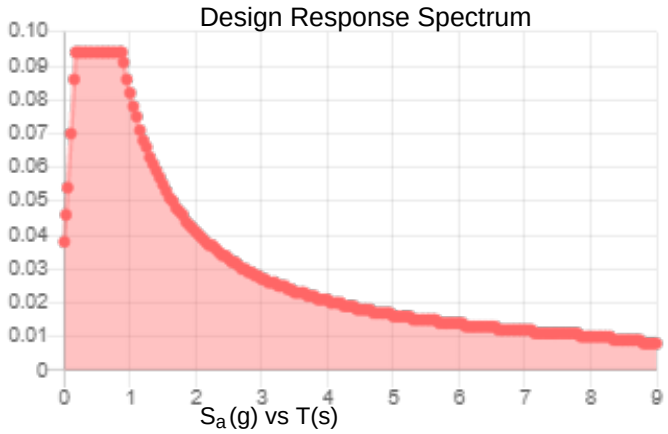
Site Soil Class: D - Default (see Section 11.4.3)

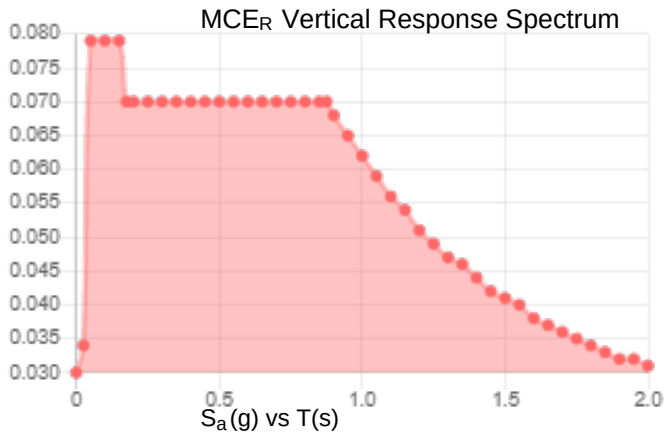
Results:

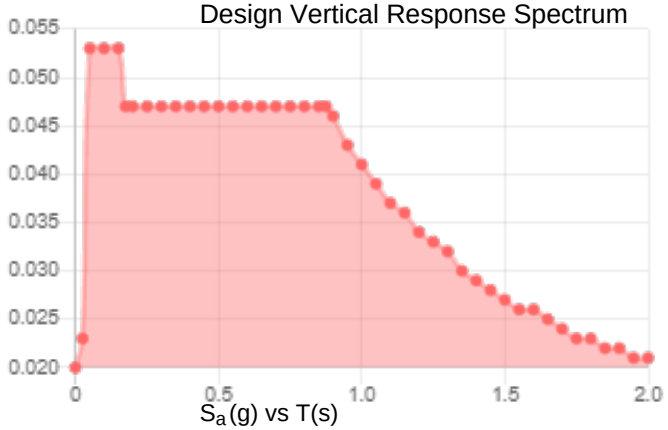
S_S :	0.088	S_{D1} :	0.082
S_1 :	0.051	T_L :	8
F_a :	1.6	PGA :	0.042
F_v :	2.4	PGA_M :	0.067
S_{MS} :	0.141	F_{PGA} :	1.6
S_{M1} :	0.123	I_e :	1
S_{DS} :	0.094	C_v :	0.7

Seismic Design Category B









Data Accessed: Wed May 26 2021

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

Ice

Results:

Ice Thickness:	0.25 in.
Concurrent Temperature:	25 F
Gust Speed:	30 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed May 26 2021

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

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