

**From:** [Aja Chase](#)  
**To:** [LaFountain, Dakota](#)  
**Cc:** [CSC-DL Siting Council](#)  
**Subject:** RE: Council Outstanding Condition Letter: EM-AT&T-060-220921 - 201 Granite Road, Guilford FCCA  
**Date:** Thursday, March 14, 2024 8:33:13 AM  
**Attachments:** [10071060.DE113.10172022.pdf](#)

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EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Good Morning Dakota,

Thank you for bringing this to my attention! Please see the structural analysis attached.

Kindly,

Aja

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**From:** LaFountain, Dakota <Dakota.LaFountain@ct.gov>  
**Sent:** Wednesday, March 13, 2024 4:28 PM  
**To:** Aja Chase <aja.chase@ericsson.com>  
**Cc:** CSC-DL Siting Council <Siting.Council@ct.gov>  
**Subject:** Council Outstanding Condition Letter: EM-AT&T-060-220921 - 201 Granite Road, Guilford

Good Afternoon,

Please see the attached correspondence.

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**From:** Aja Chase <[aja.chase@ericsson.com](mailto:aja.chase@ericsson.com)>  
**Sent:** Wednesday, March 6, 2024 12:03 PM  
**To:** CSC-DL Siting Council <[Siting.Council@ct.gov](mailto:Siting.Council@ct.gov)>  
**Subject:** EM-AT&T-060-220921

Good Afternoon CSC,

Please accept this email as confirmation construction is complete on the site listed below. A photo of the overall work completed is attached, please reach out with any questions!

CTL05200	MRCTB056506	201 GRANITE ROAD	GUILFORD	06437	EM-AT&T-060-220921
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*Aja Chase*  
Construction Manager  
ATT New England  
401-952-6205



Date: **October 17, 2022**

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

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Site Number:** CT5200  
**Site Name:** Guilford SW  
**FA Number:** 10071060

**Crown Castle Designation:** **BU Number:** 842864  
**Site Name:** Guilford SW  
**JDE Job Number:** 731888  
**Work Order Number:** 2166280  
**Order Number:** 634335 Rev. 0

**Engineering Firm Designation:** **B+T Group Project Number:** 93996.012.01.0001

**Site Data:** **201 Granite Road, Guilford, New Haven County, CT**  
**Latitude 41° 17' 31.14", Longitude -72° 43' 58.28"**  
**109 Foot - Monopole Tower**

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

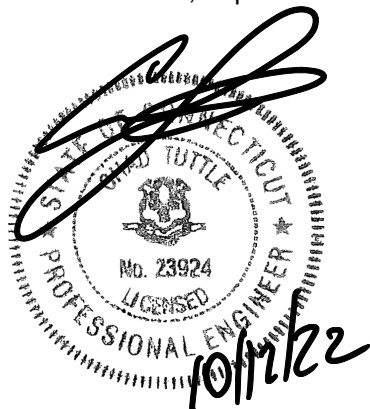
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity – 47.7%**

This analysis utilizes an ultimate 3-second gust wind speed of 122 mph as required by the 2022 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Dominique Jones

Respectfully submitted by: B+T Engineering, Inc.  
COA: PEC.0001564; Expires: 02/01/2023



Chad E. Tuttle, P.E.

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## 1) INTRODUCTION

This tower is a 109 ft. Monopole tower designed by Engineered Endeavors, Inc. in November 2003.

The tower has been modified per reinforcement drawings prepared by B+T Group in February 2014. Reinforcement consists of a 10-ft tower extension, bringing the total tower height to 109 ft.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	122 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	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)
96.0	98.0	3	Ericsson	AIR 6449 B77D	12 4 2 3	1-1/4 7/8 13/16 3/8
	97.0	1	CCI Antennas	OPA65R-BU4D		
		2	CCI Antennas	OPA65R-BU6D		
		1	CCI Antennas	TPA65R-BU4D		
		2	CCI Antennas	TPA65R-BU6D_CCIV2		
		3	Ericsson	RADIO 4478 B14		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 8843 B2/B66A		
	96.0	3	Raycap	DC6-48-60-18-8F		
		3	Site Pro 1	VFA12-M3-WLL Sector Frame		
		3	Ericsson	AIR 6419 B77G		

**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)
106.0	107.0	3	Amphenol	BXA-70063-6CF-EDIN-X	2	1-5/8
		6	Commscope	NHH-65B-R2B		
		2	Raycap	RRFDC-3315-PF-48		
		3	Samsung Telecomm.	MT6407-77A		
		3	Samsung Telecomm.	RFV01U-D1A		
		3	Samsung Telecomm.	RFV01U-D2A		
	106.0	3	Commscope	BSAMNT-SBS-1-2 Brackets		
1		--	Platform Mount [LP 303-1]			
87.0	87.0	1	--	Platform Mount [LP 303-1_KCKR-HR-1]	4	1-5/8
	86.0	3	Ericsson	AIR6449 B41_T-MOBILE		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
77.0	77.0	3	Ericsson	RADIO 4449 B12/B71	1	1-3/8
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	RFS Celwave	APXVAARR24_43-U-NA20		
		1	--	Commscope MC-PK8-DSH		
		3	Fujitsu	TA08025-B604		
		3	Fujitsu	TA08025-B605		
		3	JMA Wireless	MX08FRO665-21		
		1	Raycap	RDIDC-9181-PF-48		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
Tower Manufacturer Drawing	4492171	CCI Sites
Tower Extension Drawing	4492170	CCI Sites
Post Modification Inspection	5415537	CCI Sites
Foundation Drawing	4492141	CCI Sites
Geotech Report	4713222	CCI Sites
Crown CAD Package	Date: 10/05/2022	CCI Sites

#### 3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. 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) The 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
L1	109 - 99.5	Pole	TP24x24x0.375	1	-4.532	920.561	6.4	Pass
L2	99.5 - 99	Pole	TP26.42x24x0.375	2	-4.532	920.561	6.4	Pass
L3	99 - 46.93	Pole	TP37.125x26.42x0.313	3	-24.745	2178.456	36.2	Pass
L4	46.93 - 0	Pole	TP46x35.443x0.375	4	-37.803	3335.692	45.8	Pass
							Summary	
						Pole (L4)	45.8	Pass
						Rating =	45.8	Pass

**Table 5 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Connections	99.0	9.6	Pass
1,2	Anchor Rods	Base	39.2	Pass
1,2	Base Plate	Base	47.7	Pass
1,2	Base Foundation (Structure)	Base	42.0	Pass
1,2	Base Foundation (Soil Interaction)	Base	41.4	Pass

<b>Structure Rating (max from all components) =</b>	<b>47.7%</b>
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Notes:

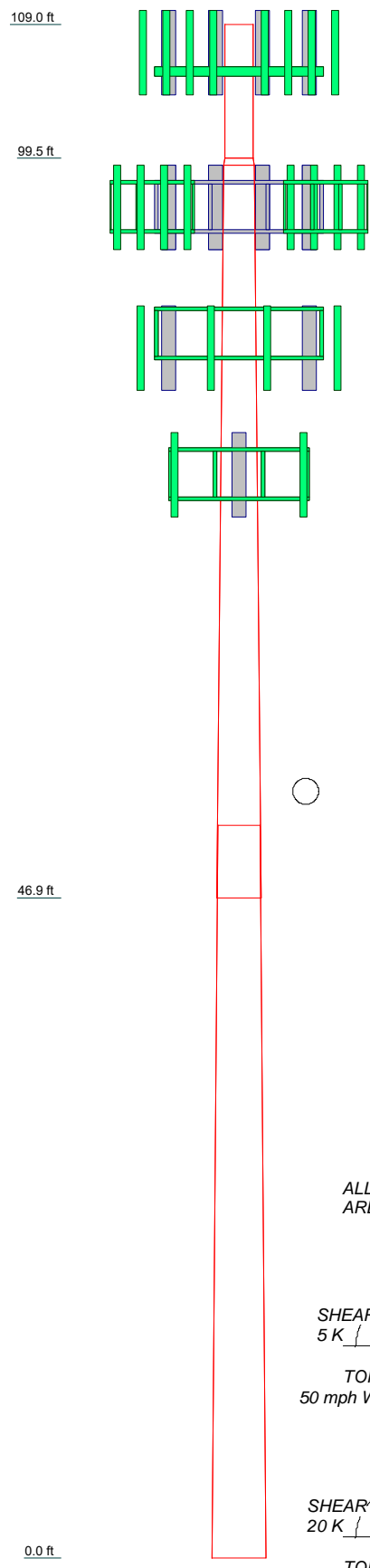
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H Section 15.5.

#### 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	1	2	3	4
Length (ft)	9.500	0.500	52.070	52.070
Number of Sides	1	1	18	18
Thickness (in)	0.375	0.375	0.313	0.375
Socket Length (ft)			5.140	
Top Dia (in)	24.000	24.000	26.420	35.443
Bot Dia (in)	24.000	26.420	37.125	46.000
Grade			A53-B-35	A572-65
Weight (K)	0.9	0.0	5.5	8.5



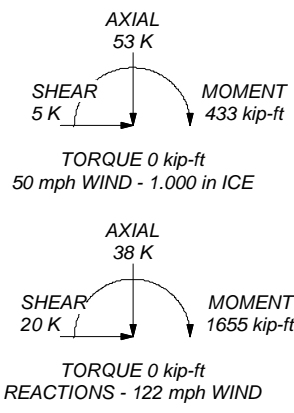
### MATERIAL STRENGTH


GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A572-65	65 ksi	80 ksi

### TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 122 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 45.8%

ALL REACTIONS ARE FACTORED




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Job:	93996.012.01.0001 - GUILFORD SW, CT (BU# 84286)		
Project:			
Client:	Crown Castle	Drawn by:	R AITHAL
Code:	TIA-222-H	Date:	10/15/22
Path:			App'd: NTS
			Dwg No. E-1

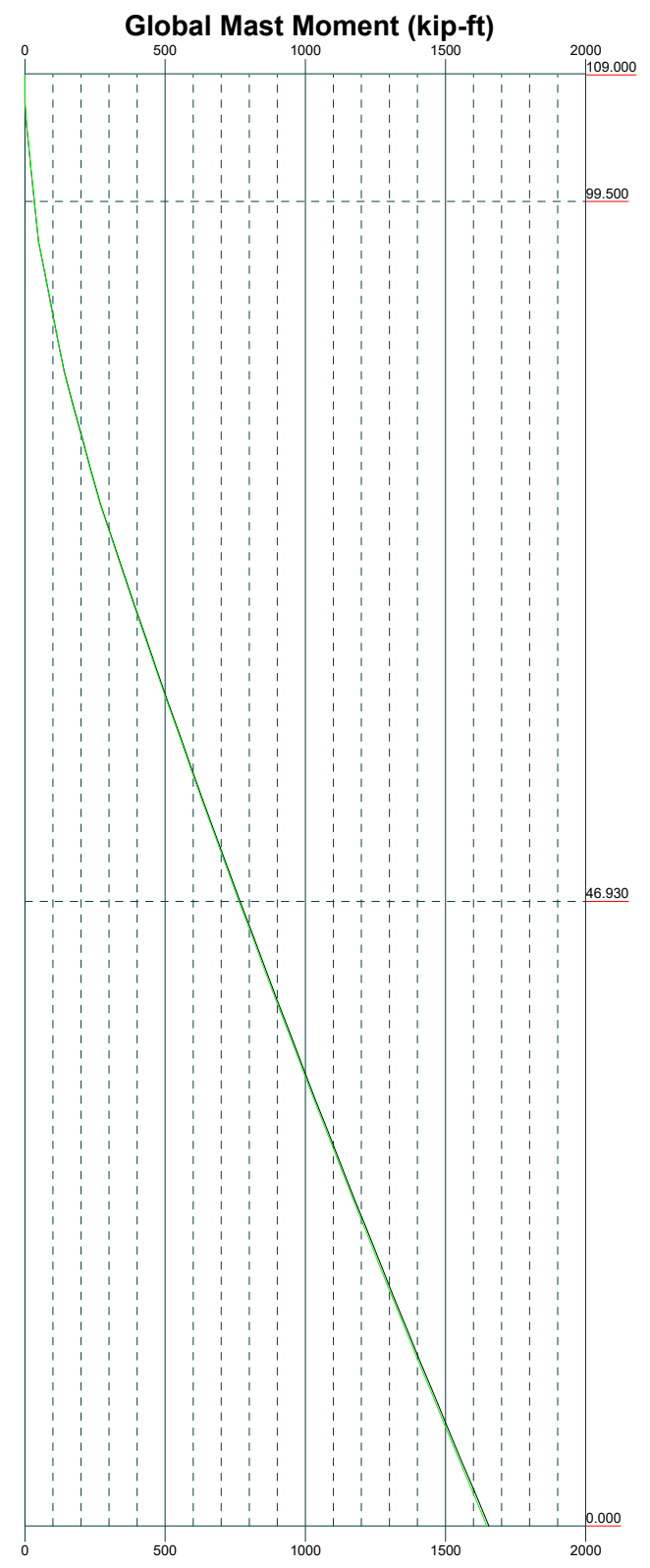
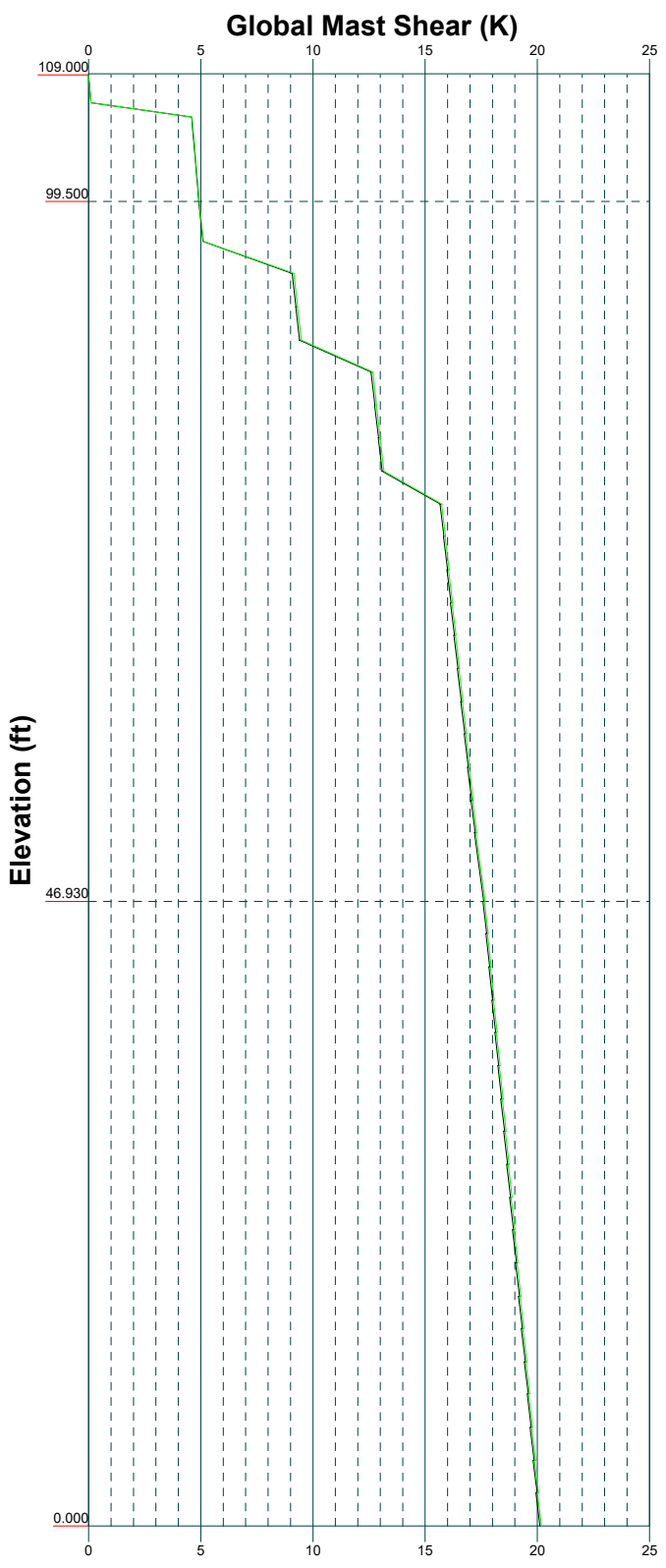


Vx

Vz

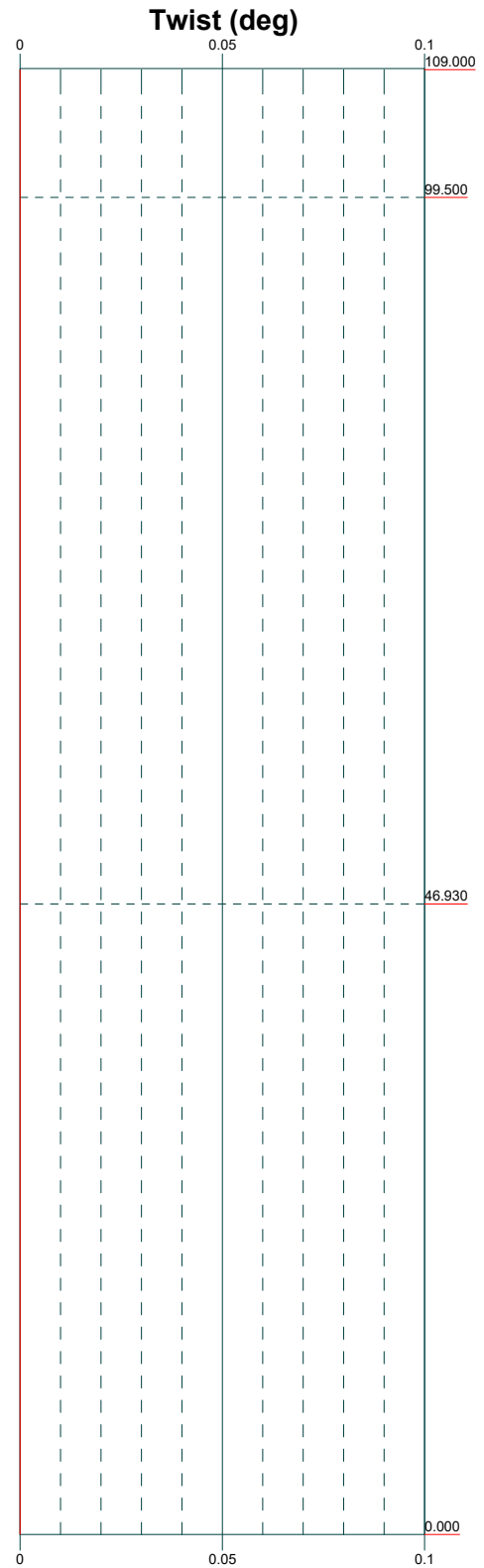
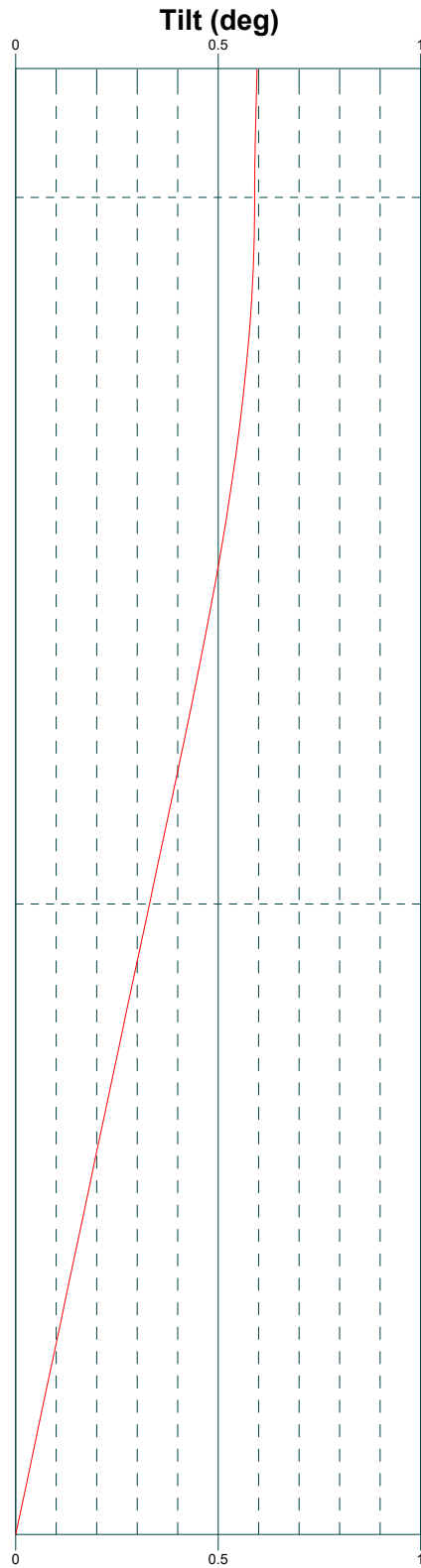
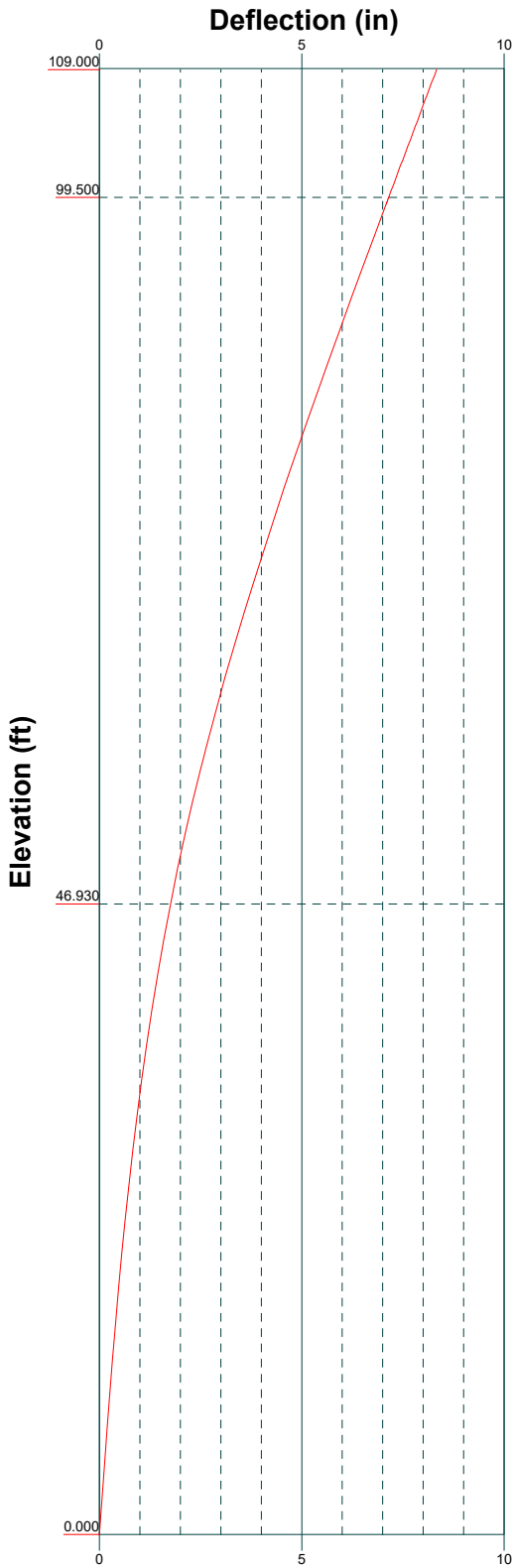
Mx

Mz



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Project:		
Client: Crown Castle	Drawn by: R AITHAL	App'd:
Code: TIA-222-H	Date: 10/15/22	Scale: NTS
Path:	Dwg No. E-4	



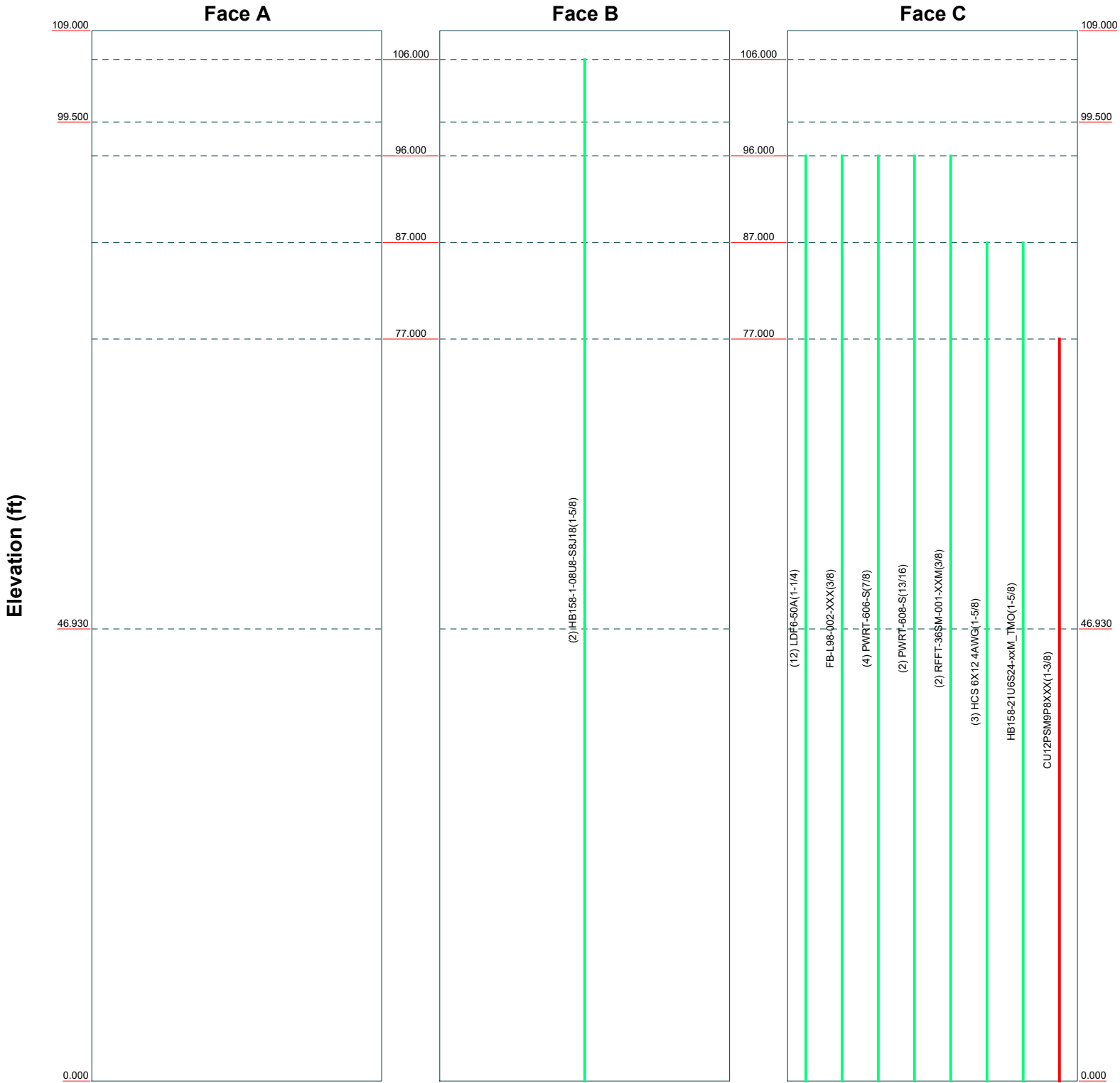
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Job: <b>93996.012.01.0001 - GUILFORD SW, CT (BU# 84286)</b>		
Project:		
Client: Crown Castle	Drawn by: R AITHAL	App'd:
Code: TIA-222-H	Date: 10/15/22	Scale: NTS
Path:	Dwg No. E-5	

# Feed Line Distribution Chart

## 0' - 109'

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




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Job: <b>93996.012.01.0001 - GUILFORD SW, CT (BU# 84286)</b>			
Project:			
Client: Crown Castle	Drawn by: R AITHAL	App'd:	
Code: TIA-222-H	Date: 10/15/22	Scale: NTS	
Path:	Dwg No. E-7		

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	<b>Job</b> 93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)	<b>Page</b> 1 of 17
	<b>Project</b>	<b>Date</b> 15:44:13 10/15/22
	<b>Client</b> Crown Castle	<b>Designed by</b> R AITHAL

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Tower base elevation above sea level: 106.000 ft.
- Basic wind speed of 122 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- TIA-222-H Annex S.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

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

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	<b>Job</b> 93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)	<b>Page</b> 2 of 17
	<b>Project</b>	<b>Date</b> 15:44:13 10/15/22
	<b>Client</b> Crown Castle	<b>Designed by</b> R AITHAL

### Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	109.000-99.500	9.500	0.000	Round	24.000	24.000	0.375		A53-B-35 (35 ksi)
L2	99.500-99.000	0.500	0.000	Round	24.000	26.420	0.375		A53-B-35 (35 ksi)
L3	99.000-46.930	52.070	5.140	18	26.420	37.125	0.313	1.250	A572-65 (65 ksi)
L4	46.930-0.000	52.070		18	35.443	46.000	0.375	1.500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I <sup>2</sup> /Q in <sup>2</sup>	w in	w/t
L1	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
L2	24.000	27.833	1942.299	8.354	12.000	161.858	3884.597	13.908	0.000	0
	26.420	30.684	2602.281	9.209	13.210	196.993	5204.563	15.333	0.000	0
L3	26.779	25.895	2229.925	9.268	13.421	166.147	4462.784	12.950	4.100	13.12
	37.650	36.513	6251.444	13.068	18.860	331.475	12511.113	18.260	5.984	19.149
L4	36.990	41.740	6485.132	12.449	18.005	360.181	12978.797	20.874	5.578	14.875
	46.652	54.305	14281.844	16.197	23.368	611.171	28582.480	27.158	7.436	19.829

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 109.000-99.500				1	1	1			
L2 99.500-99.000				1	1	1			
L3 99.000-46.930				1	1	1			
L4 46.930-0.000				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
* CU12PSM9P8XXX(1-3/8) * *	C	No	Surface Ar (CaAa)	77.000 - 0.000	1	1	0.300 - 0.330	1.411		0.002

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	<b>Project</b>	<b>Date</b> 15:44:13 10/15/22
	<b>Client</b> Crown Castle	<b>Designed by</b> R AITHAL

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight klf
HB158-1-08U8-S8J 18(1-5/8)	B	No	No	Inside Pole	106.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
LDF6-50A(1-1/4)	C	No	No	Inside Pole	96.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
FB-L98-002-XXX(3/8)	C	No	No	Inside Pole	96.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
PWRT-606-S(7/8)	C	No	No	Inside Pole	96.000 - 0.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
PWRT-608-S(13/16)	C	No	No	Inside Pole	96.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
RFFT-36SM-001-X XM(3/8)	C	No	No	Inside Pole	96.000 - 0.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
*									
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	87.000 - 0.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	87.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
*									

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	109.000-99.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.017
		C	0.000	0.000	0.000	0.000	0.000
L2	99.500-99.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.001
		C	0.000	0.000	0.000	0.000	0.000
L3	99.000-46.930	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.135
		C	0.000	0.000	4.243	0.000	1.040
L4	46.930-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.122
		C	0.000	0.000	6.622	0.000	1.108

<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	<b>Job</b> 93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)	<b>Page</b> 4 of 17
	<b>Project</b>	<b>Date</b> 15:44:13 10/15/22
	<b>Client</b> Crown Castle	<b>Designed by</b> R AITHAL

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	109.000-99.500	A	0.954	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.017
		C		0.000	0.000	0.000	0.000	0.000
L2	99.500-99.000	A	0.949	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.001
		C		0.000	0.000	0.000	0.000	0.000
L3	99.000-46.930	A	0.919	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.135
		C		0.000	0.000	9.771	0.000	1.118
L4	46.930-0.000	A	0.819	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.122
		C		0.000	0.000	15.249	0.000	1.231

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	109.000-99.500	0.000	0.000	0.000	0.000
L2	99.500-99.000	0.000	0.000	0.000	0.000
L3	99.000-46.930	-0.434	0.559	-0.567	0.731
L4	46.930-0.000	-0.687	0.885	-0.909	1.172

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

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L3	15	CU12PSM9P8XXX(1-3/8)	46.93 - 77.00	1.0000	1.0000
L4	15	CU12PSM9P8XXX(1-3/8)	0.00 - 46.93	1.0000	1.0000

### Discrete Tower Loads

# tnxTower

**B+T Group**  
1717 S. Boulder, Suite 300  
Tulsa, OK 74119  
Phone: (918) 587-4630  
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**Job**  
93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)

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**Date**  
15:44:13 10/15/22

**Client**  
Crown Castle  
**Designed by**  
R AITHAL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front	CAAA Side	Weight K	
NHH-65B-R2B w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.095 4.483 4.880	3.295 3.672 4.058	0.069 0.132 0.205
NHH-65B-R2B w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.095 4.483 4.880	3.295 3.672 4.058	0.069 0.132 0.205
NHH-65B-R2B w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.095 4.483 4.880	3.295 3.672 4.058	0.069 0.132 0.205
NHH-65B-R2B	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.159 4.564 4.979	2.493 2.875 3.267	0.044 0.094 0.150
NHH-65B-R2B	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.159 4.564 4.979	2.493 2.875 3.267	0.044 0.094 0.150
NHH-65B-R2B	C	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.159 4.564 4.979	2.493 2.875 3.267	0.044 0.094 0.150
BXA-70063-6CF-EDIN-X w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	7.399 8.139 8.897	5.388 6.099 6.829	0.058 0.113 0.178
BXA-70063-6CF-EDIN-X w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	7.399 8.139 8.897	5.388 6.099 6.829	0.058 0.113 0.178
BXA-70063-6CF-EDIN-X w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	7.399 8.139 8.897	5.388 6.099 6.829	0.058 0.113 0.178
RRFDC-3315-PF-48	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	3.364 3.597 3.838	2.192 2.395 2.606	0.021 0.050 0.082
RRFDC-3315-PF-48	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	3.364 3.597 3.838	2.192 2.395 2.606	0.021 0.050 0.082
RFV01U-D1A	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.250 1.393 1.543	0.084 0.103 0.124
RFV01U-D1A	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.250 1.393 1.543	0.084 0.103 0.124
RFV01U-D1A	C	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.250 1.393 1.543	0.084 0.103 0.124
RFV01U-D2A	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.013 1.145 1.284	0.070 0.087 0.106
RFV01U-D2A	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.013 1.145 1.284	0.070 0.087 0.106
RFV01U-D2A	C	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.875 2.045 2.223	1.013 1.145 1.284	0.070 0.087 0.106
MT6407-77A	A	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.692 4.980 5.275	1.840 2.063 2.292	0.082 0.111 0.144
MT6407-77A	B	From Leg	4.000 0.000 1.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	4.692 4.980 5.275	1.840 2.063 2.292	0.082 0.111 0.144



<b>tnxTower</b>  <b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	<b>Job</b>		93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)		<b>Page</b>		6 of 17	
	<b>Project</b>				<b>Date</b>		15:44:13 10/15/22	
	<b>Client</b>		Crown Castle		<b>Designed by</b>		R AITHAL	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						Vert
MT6407-77A	C	From Leg	4.000	0.000	0.000	106.000	No Ice	4.692	1.840	0.082
			0.000				1/2" Ice	4.980	2.063	0.111
			1.000				1" Ice	5.275	2.292	0.144
(2) 8' x 2" Mount Pipe	A	From Leg	4.000	0.000	0.000	106.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000	0.000	0.000	106.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000	0.000	0.000	106.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
Side Arm Mount [SO 102-3]	C	None		0.000	0.000	106.000	No Ice	3.600	3.600	0.075
							1/2" Ice	4.180	4.180	0.105
							1" Ice	4.750	4.750	0.135
Platform Mount [LP 303-1]	C	None		0.000	0.000	106.000	No Ice	14.690	14.690	1.250
							1/2" Ice	18.010	18.010	1.569
							1" Ice	21.340	21.340	1.942
Mount Reinforcement Specifications	C	None		0.000	0.000	106.000	No Ice	28.630	28.630	0.280
							1/2" Ice	37.310	37.310	0.670
							1" Ice	45.800	45.800	0.940
*										
DC6-48-60-18-8F	B	From Leg	4.000	0.000	0.000	96.000	No Ice	1.212	1.212	0.033
			0.000				1/2" Ice	1.892	1.892	0.055
			1.000				1" Ice	2.105	2.105	0.080
DC6-48-60-18-8F	C	From Leg	4.000	0.000	0.000	96.000	No Ice	1.212	1.212	0.033
			0.000				1/2" Ice	1.892	1.892	0.055
			1.000				1" Ice	2.105	2.105	0.080
AIR 6419 B77G w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	96.000	No Ice	4.325	2.492	0.078
			0.000				1/2" Ice	4.740	2.841	0.110
			0.000				1" Ice	5.173	3.209	0.147
AIR 6419 B77G w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	96.000	No Ice	4.325	2.492	0.078
			0.000				1/2" Ice	4.740	2.841	0.110
			0.000				1" Ice	5.173	3.209	0.147
AIR 6419 B77G w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	96.000	No Ice	4.325	2.492	0.078
			0.000				1/2" Ice	4.740	2.841	0.110
			0.000				1" Ice	5.173	3.209	0.147
AIR 6449 B77D w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	96.000	No Ice	3.583	2.307	0.095
			0.000				1/2" Ice	3.920	2.602	0.130
			2.000				1" Ice	4.272	2.912	0.173
AIR 6449 B77D w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	96.000	No Ice	3.583	2.307	0.095
			0.000				1/2" Ice	3.920	2.602	0.130
			2.000				1" Ice	4.272	2.912	0.173
AIR 6449 B77D w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	96.000	No Ice	3.583	2.307	0.095
			0.000				1/2" Ice	3.920	2.602	0.130
			2.000				1" Ice	4.272	2.912	0.173
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	96.000	No Ice	12.248	6.047	0.089
			0.000				1/2" Ice	12.998	6.710	0.176
			1.000				1" Ice	13.764	7.388	0.275
OPA65R-BU4D w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	96.000	No Ice	8.100	4.033	0.081
			0.000				1/2" Ice	8.650	4.498	0.142
			1.000				1" Ice	9.214	4.978	0.212
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	96.000	No Ice	12.248	6.047	0.089
			0.000				1/2" Ice	12.998	6.710	0.176
			1.000				1" Ice	13.764	7.388	0.275
TPA65R-BU6D_CCIV2 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	96.000	No Ice	11.961	5.969	0.094
			0.000				1/2" Ice	12.703	6.627	0.181

<p><b>tnxTower</b></p> <p><b>B+T Group</b> 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630</p>	<b>Job</b>		93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)		<b>Page</b>		7 of 17	
	<b>Project</b>				<b>Date</b>		15:44:13 10/15/22	
	<b>Client</b>		Crown Castle		<b>Designed by</b>		R AITHAL	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						Vert
TPA65R-BU4D w/ Mount Pipe	B	From Leg	1.000		0.000	96.000	1" Ice	13.461	7.300	0.278
			4.000				No Ice	8.100	4.033	0.080
			0.000				1/2" Ice	8.650	4.498	0.141
TPA65R-BU6D_CCIV2 w/ Mount Pipe	C	From Leg	1.000		0.000	96.000	1" Ice	9.214	4.978	0.212
			4.000				No Ice	11.961	5.969	0.094
			0.000				1/2" Ice	12.703	6.627	0.181
RADIO 4478 B14	A	From Leg	1.000		0.000	96.000	1" Ice	13.461	7.300	0.278
			4.000				No Ice	2.021	1.246	0.059
			0.000				1/2" Ice	2.200	1.396	0.077
RADIO 4478 B14	B	From Leg	1.000		0.000	96.000	1" Ice	2.386	1.554	0.097
			4.000				No Ice	2.021	1.246	0.059
			0.000				1/2" Ice	2.200	1.396	0.077
RADIO 4478 B14	C	From Leg	1.000		0.000	96.000	1" Ice	2.386	1.554	0.097
			4.000				No Ice	2.021	1.246	0.059
			0.000				1/2" Ice	2.200	1.396	0.077
RRUS 4449 B5/B12	A	From Leg	1.000		0.000	96.000	1" Ice	2.386	1.554	0.097
			4.000				No Ice	1.968	1.408	0.071
			0.000				1/2" Ice	2.144	1.564	0.090
RRUS 4449 B5/B12	B	From Leg	1.000		0.000	96.000	1" Ice	2.328	1.727	0.111
			4.000				No Ice	1.968	1.408	0.071
			0.000				1/2" Ice	2.144	1.564	0.090
RRUS 4449 B5/B12	C	From Leg	1.000		0.000	96.000	1" Ice	2.328	1.727	0.111
			4.000				No Ice	1.968	1.408	0.071
			0.000				1/2" Ice	2.144	1.564	0.090
RRUS 8843 B2/B66A	A	From Leg	1.000		0.000	96.000	1" Ice	2.328	1.727	0.111
			4.000				No Ice	1.639	1.353	0.072
			0.000				1/2" Ice	1.799	1.500	0.090
RRUS 8843 B2/B66A	B	From Leg	1.000		0.000	96.000	1" Ice	1.966	1.655	0.110
			4.000				No Ice	1.639	1.353	0.072
			0.000				1/2" Ice	1.799	1.500	0.090
RRUS 8843 B2/B66A	C	From Leg	1.000		0.000	96.000	1" Ice	1.966	1.655	0.110
			4.000				No Ice	1.639	1.353	0.072
			0.000				1/2" Ice	1.799	1.500	0.090
DC6-48-60-18-8F	A	From Leg	1.000		0.000	96.000	1" Ice	1.966	1.655	0.110
			4.000				No Ice	1.212	1.212	0.033
			0.000				1/2" Ice	1.892	1.892	0.055
(2) 6' x 2" Mount Pipe	A	From Leg	1.000		0.000	96.000	1" Ice	2.105	2.105	0.080
			2.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
(2) 6' x 2" Mount Pipe	B	From Leg	0.000		0.000	96.000	1" Ice	2.294	2.294	0.048
			2.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
(2) 6' x 2" Mount Pipe	C	From Leg	0.000		0.000	96.000	1" Ice	2.294	2.294	0.048
			2.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
(2) 6' x 2" Horizontal Mount Pipe	A	From Leg	0.000		0.000	96.000	1" Ice	2.294	2.294	0.048
			2.000				No Ice	1.140	0.010	0.016
			0.000				1/2" Ice	1.760	0.040	0.025
(2) 6' x 2" Horizontal Mount Pipe	B	From Leg	0.000		0.000	96.000	1" Ice	2.140	0.090	0.038
			2.000				No Ice	1.140	0.010	0.016
			0.000				1/2" Ice	1.760	0.040	0.025
(2) 6' x 2" Horizontal Mount Pipe	C	From Leg	0.000		0.000	96.000	1" Ice	2.140	0.090	0.038
			2.000				No Ice	1.140	0.010	0.016
			0.000				1/2" Ice	1.760	0.040	0.025
(3) VFA12-M3-WLL	C	None	0.000		0.000	96.000	1" Ice	2.140	0.090	0.038
							No Ice	18.910	18.910	2.999
							1/2" Ice	28.290	28.290	3.461

# tnxTower

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**Job**  
 93996.012.01.0001 - GUILFORD SW, CT (BU# 842864)

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**Project**  
 Date  
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**Client**  
 Crown Castle  
 Designed by  
 R AITHAL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
						1" Ice	36.920	36.920	4.134
*						No Ice	5.272	2.033	0.115
AIR6449 B41_T-MOBILE	A	From Leg	4.000 0.000 -1.000	0.000	87.000	1/2" Ice 1" Ice	5.697 6.137	2.360 2.702	0.154 0.197
AIR6449 B41_T-MOBILE	B	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	5.272 5.697 6.137	2.033 2.360 2.702	0.115 0.154 0.197
AIR6449 B41_T-MOBILE	C	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	5.272 5.697 6.137	2.033 2.360 2.702	0.115 0.154 0.197
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.186 0.315 0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.186 0.315 0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	14.694 15.455 16.230	6.873 7.554 8.247	0.186 0.315 0.458
RADIO 4449 B12/B71	A	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.163 1.301 1.447	0.074 0.090 0.109
RADIO 4449 B12/B71	B	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.163 1.301 1.447	0.074 0.090 0.109
RADIO 4449 B12/B71	C	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.163 1.301 1.447	0.074 0.090 0.109
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000 0.000 -1.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	2.139 2.321 2.511	1.686 1.850 2.022	0.109 0.131 0.156
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
Platform Mount [LP 303-1_KCKR-HR-1]	C	None	0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice	28.310 35.690 43.110	28.310 35.690 43.110	1.770 2.297 2.943
*						No Ice	8.009	4.233	0.108
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	77.000	1/2" Ice 1" Ice	8.518 9.038	4.689 5.156	0.194 0.292
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	77.000	No Ice 1/2" Ice 1" Ice	8.009 8.518 9.038	4.233 4.689 5.156	0.108 0.194 0.292

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						°
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	77.000	No Ice	8.009	4.233	0.108
			0.000				1/2" Ice	8.518	4.689	0.194
			0.000				1" Ice	9.038	5.156	0.292
TA08025-B604	A	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	0.981	0.064
			0.000				1/2" Ice	2.138	1.112	0.081
			0.000				1" Ice	2.320	1.250	0.100
TA08025-B604	B	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	0.981	0.064
			0.000				1/2" Ice	2.138	1.112	0.081
			0.000				1" Ice	2.320	1.250	0.100
TA08025-B604	C	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	0.981	0.064
			0.000				1/2" Ice	2.138	1.112	0.081
			0.000				1" Ice	2.320	1.250	0.100
TA08025-B605	A	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	1.129	0.075
			0.000				1/2" Ice	2.138	1.267	0.093
			0.000				1" Ice	2.320	1.411	0.114
TA08025-B605	B	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	1.129	0.075
			0.000				1/2" Ice	2.138	1.267	0.093
			0.000				1" Ice	2.320	1.411	0.114
TA08025-B605	C	From Leg	4.000	0.000	0.000	77.000	No Ice	1.964	1.129	0.075
			0.000				1/2" Ice	2.138	1.267	0.093
			0.000				1" Ice	2.320	1.411	0.114
RDIDC-9181-PF-48	B	From Leg	4.000	0.000	0.000	77.000	No Ice	2.012	1.168	0.022
			0.000				1/2" Ice	2.189	1.311	0.040
			0.000				1" Ice	2.373	1.461	0.060
(2) 8' x 2" Mount Pipe	A	From Leg	4.000	0.000	0.000	77.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000	0.000	0.000	77.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000	0.000	0.000	77.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044
			0.000				1" Ice	3.401	3.401	0.063
Commscope MC-PK8-DSH	C	None		0.000	0.000	77.000	No Ice	34.240	34.240	1.749
							1/2" Ice	62.950	62.950	2.099
							1" Ice	91.660	91.660	2.450

\*  
\*

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice

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<i>Comb. No.</i>	<i>Description</i>
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Axial K</i>	<i>Major Axis Moment kip-ft</i>	<i>Minor Axis Moment kip-ft</i>
L1	109 - 99.5	Pole	Max Tension	14	0.000	-0.000	0.000
			Max. Compression	26	-8.119	-0.361	0.208
			Max. Mx	8	-4.533	-33.306	-0.056
			Max. My	2	-4.531	0.018	33.400
			Max. Vy	8	4.912	-33.306	-0.056
			Max. Vx	2	-4.931	0.018	33.400
			Max. Torque	12			0.334
L2	99.5 - 99	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-8.195	-0.361	0.208
			Max. Mx	8	-4.594	-35.768	-0.063
			Max. My	2	-4.592	0.025	35.871

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	99 - 46.93	Pole	Max. Vy	8	4.938	-35.768	-0.063
			Max. Vx	2	-4.957	0.025	35.871
			Max. Torque	12			0.334
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.667	-0.075	0.189
			Max. Mx	8	-24.749	-673.778	1.273
			Max. My	14	-24.745	1.181	-677.224
			Max. Vy	8	17.229	-673.778	1.273
L4	46.93 - 0	Pole	Max. Vx	14	17.299	1.181	-677.224
			Max. Torque	19			-0.518
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-52.784	-0.075	-0.215
			Max. Mx	8	-37.803	-1647.779	2.512
			Max. My	14	-37.802	2.593	-1654.942
			Max. Vy	8	20.120	-1647.779	2.512
			Max. Vx	14	20.186	2.593	-1654.942
		Max. Torque	21			-0.380	

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	52.784	0.004	-5.317
	Max. H <sub>x</sub>	20	37.817	20.093	-0.026
	Max. H <sub>z</sub>	2	37.817	-0.026	20.159
	Max. M <sub>x</sub>	2	1654.552	-0.026	20.159
	Max. M <sub>z</sub>	8	1647.779	-20.093	0.026
	Max. Torsion	9	0.377	-20.093	0.026
	Min. Vert	23	28.363	17.388	10.056
	Min. H <sub>x</sub>	8	37.817	-20.093	0.026
	Min. H <sub>z</sub>	14	37.817	0.026	-20.159
	Min. M <sub>x</sub>	14	-1654.942	0.026	-20.159
	Min. M <sub>z</sub>	20	-1647.549	20.093	-0.026
	Min. Torsion	21	-0.379	20.093	-0.026

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	31.514	0.000	0.000	0.160	-0.091	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	37.817	0.026	-20.159	-1654.552	-2.824	-0.079
0.9 Dead+1.0 Wind 0 deg - No Ice	28.363	0.026	-20.159	-1639.826	-2.768	-0.080
1.2 Dead+1.0 Wind 30 deg - No Ice	37.817	10.069	-17.471	-1434.215	-826.293	-0.257
0.9 Dead+1.0 Wind 30 deg - No Ice	28.363	10.069	-17.471	-1421.453	-818.886	-0.258
1.2 Dead+1.0 Wind 60 deg - No Ice	37.817	17.414	-10.102	-829.526	-1428.390	-0.366
0.9 Dead+1.0 Wind 60 deg - No Ice	28.363	17.414	-10.102	-822.164	-1415.610	-0.366

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.0 Wind 90 deg - No Ice	37.817	20.093	-0.026	-2.512	-1647.779	-0.377
0.9 Dead+1.0 Wind 90 deg - No Ice	28.363	20.093	-0.026	-2.536	-1633.045	-0.377
1.2 Dead+1.0 Wind 120 deg - No Ice	37.817	17.388	10.056	825.230	-1425.684	-0.288
0.9 Dead+1.0 Wind 120 deg - No Ice	28.363	17.388	10.056	817.813	-1412.930	-0.288
1.2 Dead+1.0 Wind 150 deg - No Ice	37.817	10.023	17.445	1431.901	-821.602	-0.122
0.9 Dead+1.0 Wind 150 deg - No Ice	28.363	10.023	17.445	1419.066	-814.241	-0.122
1.2 Dead+1.0 Wind 180 deg - No Ice	37.817	-0.026	20.159	1654.942	2.593	0.077
0.9 Dead+1.0 Wind 180 deg - No Ice	28.363	-0.026	20.159	1640.118	2.597	0.078
1.2 Dead+1.0 Wind 210 deg - No Ice	37.817	-10.069	17.471	1434.607	826.060	0.256
0.9 Dead+1.0 Wind 210 deg - No Ice	28.363	-10.069	17.471	1421.746	818.714	0.257
1.2 Dead+1.0 Wind 240 deg - No Ice	37.817	-17.414	10.102	829.919	1428.158	0.367
0.9 Dead+1.0 Wind 240 deg - No Ice	28.363	-17.414	10.102	822.458	1415.438	0.368
1.2 Dead+1.0 Wind 270 deg - No Ice	37.817	-20.093	0.026	2.905	1647.549	0.379
0.9 Dead+1.0 Wind 270 deg - No Ice	28.363	-20.093	0.026	2.829	1632.874	0.379
1.2 Dead+1.0 Wind 300 deg - No Ice	37.817	-17.388	-10.056	-824.837	1425.454	0.289
0.9 Dead+1.0 Wind 300 deg - No Ice	28.363	-17.388	-10.056	-817.521	1412.760	0.288
1.2 Dead+1.0 Wind 330 deg - No Ice	37.817	-10.023	-17.445	-1431.510	821.372	0.121
0.9 Dead+1.0 Wind 330 deg - No Ice	28.363	-10.023	-17.445	-1418.775	814.071	0.120
1.2 Dead+1.0 Ice+1.0 Temp	52.784	0.000	0.000	0.215	-0.075	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	52.784	0.004	-5.317	-432.908	-0.521	-0.013
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	52.784	2.656	-4.606	-375.102	-216.407	-0.049
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	52.784	4.597	-2.662	-216.733	-374.329	-0.071
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	52.784	5.306	-0.004	-0.235	-431.971	-0.075
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	52.784	4.593	2.655	216.381	-373.889	-0.058
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	52.784	2.649	4.602	375.072	-215.644	-0.026
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	52.784	-0.004	5.317	433.319	0.360	0.013
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	52.784	-2.656	4.606	375.513	216.246	0.049
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	52.784	-4.597	2.662	217.144	374.168	0.071
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	52.784	-5.306	0.004	0.646	431.811	0.075
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	52.784	-4.593	-2.655	-215.970	373.728	0.058
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	52.784	-2.649	-4.602	-374.662	215.484	0.026

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	31.514	0.006	-4.597	-375.143	-0.709	-0.018
Dead+Wind 30 deg - Service	31.514	2.296	-3.984	-325.168	-187.476	-0.059
Dead+Wind 60 deg - Service	31.514	3.971	-2.304	-188.021	-324.035	-0.084
Dead+Wind 90 deg - Service	31.514	4.582	-0.006	-0.451	-373.795	-0.086
Dead+Wind 120 deg - Service	31.514	3.965	2.293	187.284	-323.422	-0.066
Dead+Wind 150 deg - Service	31.514	2.286	3.978	324.879	-186.414	-0.028
Dead+Wind 180 deg - Service	31.514	-0.006	4.597	375.467	0.518	0.018
Dead+Wind 210 deg - Service	31.514	-2.296	3.984	325.492	187.286	0.059
Dead+Wind 240 deg - Service	31.514	-3.971	2.304	188.346	323.845	0.084
Dead+Wind 270 deg - Service	31.514	-4.582	0.006	0.776	373.605	0.086
Dead+Wind 300 deg - Service	31.514	-3.965	-2.293	-186.959	323.232	0.066
Dead+Wind 330 deg - Service	31.514	-2.286	-3.978	-324.555	186.224	0.028

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-31.514	0.000	0.000	31.514	0.000	0.000%
2	0.026	-37.817	-20.159	-0.026	37.817	20.159	0.000%
3	0.026	-28.363	-20.159	-0.026	28.363	20.159	0.000%
4	10.069	-37.817	-17.471	-10.069	37.817	17.471	0.000%
5	10.069	-28.363	-17.471	-10.069	28.363	17.471	0.000%
6	17.414	-37.817	-10.102	-17.414	37.817	10.102	0.000%
7	17.414	-28.363	-10.102	-17.414	28.363	10.102	0.000%
8	20.093	-37.817	-0.026	-20.093	37.817	0.026	0.000%
9	20.093	-28.363	-0.026	-20.093	28.363	0.026	0.000%
10	17.388	-37.817	10.056	-17.388	37.817	-10.056	0.000%
11	17.388	-28.363	10.056	-17.388	28.363	-10.056	0.000%
12	10.023	-37.817	17.445	-10.023	37.817	-17.445	0.000%
13	10.023	-28.363	17.445	-10.023	28.363	-17.445	0.000%
14	-0.026	-37.817	20.159	0.026	37.817	-20.159	0.000%
15	-0.026	-28.363	20.159	0.026	28.363	-20.159	0.000%
16	-10.069	-37.817	17.471	10.069	37.817	-17.471	0.000%
17	-10.069	-28.363	17.471	10.069	28.363	-17.471	0.000%
18	-17.414	-37.817	10.102	17.414	37.817	-10.102	0.000%
19	-17.414	-28.363	10.102	17.414	28.363	-10.102	0.000%
20	-20.093	-37.817	0.026	20.093	37.817	-0.026	0.000%
21	-20.093	-28.363	0.026	20.093	28.363	-0.026	0.000%
22	-17.388	-37.817	-10.056	17.388	37.817	10.056	0.000%
23	-17.388	-28.363	-10.056	17.388	28.363	10.056	0.000%
24	-10.023	-37.817	-17.445	10.023	37.817	17.445	0.000%
25	-10.023	-28.363	-17.445	10.023	28.363	17.445	0.000%
26	0.000	-52.784	0.000	0.000	52.784	0.000	0.000%
27	0.004	-52.784	-5.317	-0.004	52.784	5.317	0.000%
28	2.656	-52.784	-4.606	-2.656	52.784	4.606	0.000%
29	4.597	-52.784	-2.662	-4.597	52.784	2.662	0.000%
30	5.306	-52.784	-0.004	-5.306	52.784	0.004	0.000%
31	4.593	-52.784	2.655	-4.593	52.784	-2.655	0.000%
32	2.649	-52.784	4.602	-2.649	52.784	-4.602	0.000%
33	-0.004	-52.784	5.317	0.004	52.784	-5.317	0.000%
34	-2.656	-52.784	4.606	2.656	52.784	-4.606	0.000%
35	-4.597	-52.784	2.662	4.597	52.784	-2.662	0.000%
36	-5.306	-52.784	0.004	5.306	52.784	-0.004	0.000%
37	-4.593	-52.784	-2.655	4.593	52.784	2.655	0.000%
38	-2.649	-52.784	-4.602	2.649	52.784	4.602	0.000%
39	0.006	-31.514	-4.597	-0.006	31.514	4.597	0.000%



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		R AITHAL

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
40	2.296	-31.514	-3.984	-2.296	31.514	3.984	0.000%
41	3.971	-31.514	-2.304	-3.971	31.514	2.304	0.000%
42	4.582	-31.514	-0.006	-4.582	31.514	0.006	0.000%
43	3.965	-31.514	2.293	-3.965	31.514	-2.293	0.000%
44	2.286	-31.514	3.978	-2.286	31.514	-3.978	0.000%
45	-0.006	-31.514	4.597	0.006	31.514	-4.597	0.000%
46	-2.296	-31.514	3.984	2.296	31.514	-3.984	0.000%
47	-3.971	-31.514	2.304	3.971	31.514	-2.304	0.000%
48	-4.582	-31.514	0.006	4.582	31.514	-0.006	0.000%
49	-3.965	-31.514	-2.293	3.965	31.514	2.293	0.000%
50	-2.286	-31.514	-3.978	2.286	31.514	3.978	0.000%

## Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00013055
3	Yes	4	0.00000001	0.00007746
4	Yes	5	0.00000001	0.00045986
5	Yes	5	0.00000001	0.00022500
6	Yes	5	0.00000001	0.00048080
7	Yes	5	0.00000001	0.00023588
8	Yes	4	0.00000001	0.00062485
9	Yes	4	0.00000001	0.00042402
10	Yes	5	0.00000001	0.00045397
11	Yes	5	0.00000001	0.00022232
12	Yes	5	0.00000001	0.00046801
13	Yes	5	0.00000001	0.00022943
14	Yes	4	0.00000001	0.00020281
15	Yes	4	0.00000001	0.00013077
16	Yes	5	0.00000001	0.00047793
17	Yes	5	0.00000001	0.00023435
18	Yes	5	0.00000001	0.00045546
19	Yes	5	0.00000001	0.00022287
20	Yes	4	0.00000001	0.00053859
21	Yes	4	0.00000001	0.00036609
22	Yes	5	0.00000001	0.00047272
23	Yes	5	0.00000001	0.00023200
24	Yes	5	0.00000001	0.00046021
25	Yes	5	0.00000001	0.00022548
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00013657
28	Yes	5	0.00000001	0.00015734
29	Yes	5	0.00000001	0.00015764
30	Yes	5	0.00000001	0.00013612
31	Yes	5	0.00000001	0.00015641
32	Yes	5	0.00000001	0.00015688
33	Yes	5	0.00000001	0.00013638
34	Yes	5	0.00000001	0.00015739
35	Yes	5	0.00000001	0.00015674
36	Yes	5	0.00000001	0.00013605
37	Yes	5	0.00000001	0.00015706
38	Yes	5	0.00000001	0.00015694
39	Yes	4	0.00000001	0.00001474
40	Yes	4	0.00000001	0.00013064

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41	Yes	4	0.00000001	0.00015463
42	Yes	4	0.00000001	0.00003305
43	Yes	4	0.00000001	0.00012860
44	Yes	4	0.00000001	0.00014194
45	Yes	4	0.00000001	0.00001523
46	Yes	4	0.00000001	0.00014998
47	Yes	4	0.00000001	0.00012774
48	Yes	4	0.00000001	0.00003209
49	Yes	4	0.00000001	0.00014861
50	Yes	4	0.00000001	0.00013355

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 99.5	8.332	40	0.595	0.001
L2	99.5 - 99	7.149	40	0.591	0.001
L3	99 - 46.93	7.087	40	0.591	0.001
L4	52.07 - 0	2.114	46	0.367	0.000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
106.000	NHH-65B-R2B w/ Mount Pipe	40	7.958	0.595	0.001	117699
96.000	DC6-48-60-18-8F	40	6.717	0.587	0.001	42461
87.000	AIR6449 B41 T-MOBILE	46	5.625	0.564	0.001	19360
77.000	MX08FRO665-21 w/ Mount Pipe	46	4.472	0.521	0.000	12021

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	109 - 99.5	36.771	4	2.628	0.003
L2	99.5 - 99	31.554	4	2.611	0.003
L3	99 - 46.93	31.281	4	2.609	0.003
L4	52.07 - 0	9.328	16	1.620	0.001

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
106.000	NHH-65B-R2B w/ Mount Pipe	4	35.120	2.625	0.003	27115

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
96.000	DC6-48-60-18-8F	4	29.646	2.592	0.003	9704
87.000	AIR6449 B41 T-MOBILE	16	24.828	2.491	0.002	4405
77.000	MX08FRO665-21 w/ Mount Pipe	16	19.738	2.301	0.002	2731

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	109 - 99.5 (1)	TP24x24x0.375	9.500	0.000	0.0	27.833	-4.532	876.725	0.005
L2	99.5 - 99 (2)	TP26.42x24x0.375	0.500	0.000	0.0	27.833	-4.532	876.725	0.005
L3	99 - 46.93 (3)	TP37.125x26.42x0.313	52.070	0.000	0.0	35.465	-24.745	2074.720	0.012
L4	46.93 - 0 (4)	TP46x35.443x0.375	52.070	0.000	0.0	54.305	-37.803	3176.850	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>ux</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> kip-ft	φM <sub>uy</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	109 - 99.5 (1)	TP24x24x0.375	33.400	538.742	0.062	0.000	538.742	0.000
L2	99.5 - 99 (2)	TP26.42x24x0.375	33.400	538.742	0.062	0.000	538.742	0.000
L3	99 - 46.93 (3)	TP37.125x26.42x0.313	677.484	1841.675	0.368	0.000	1841.675	0.000
L4	46.93 - 0 (4)	TP46x35.443x0.375	1655.433	3531.475	0.469	0.000	3531.475	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	109 - 99.5 (1)	TP24x24x0.375	4.939	263.018	0.019	0.334	546.307	0.001
L2	99.5 - 99 (2)	TP26.42x24x0.375	4.957	263.018	0.019	0.289	546.307	0.001
L3	99 - 46.93 (3)	TP37.125x26.42x0.313	17.305	622.415	0.028	0.257	1948.975	0.000
L4	46.93 - 0 (4)	TP46x35.443x0.375	20.192	953.056	0.021	0.256	3808.033	0.000

### Pole Interaction Design Data

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Section No.	Elevation ft	Ratio $P_u$	Ratio $M_{ux}$	Ratio $M_{uy}$	Ratio $V_u$	Ratio $T_u$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\phi P_n$	$\phi M_{nx}$	$\phi M_{ny}$	$\phi V_n$	$\phi T_n$			
L1	109 - 99.5 (1)	0.005	0.062	0.000	0.019	0.001	0.068	1.050	4.8.2 ✓
L2	99.5 - 99 (2)	0.005	0.062	0.000	0.019	0.001	0.068	1.050	4.8.2 ✓
L3	99 - 46.93 (3)	0.012	0.368	0.000	0.028	0.000	0.381	1.050	4.8.2 ✓
L4	46.93 - 0 (4)	0.012	0.469	0.000	0.021	0.000	0.481	1.050	4.8.2 ✓

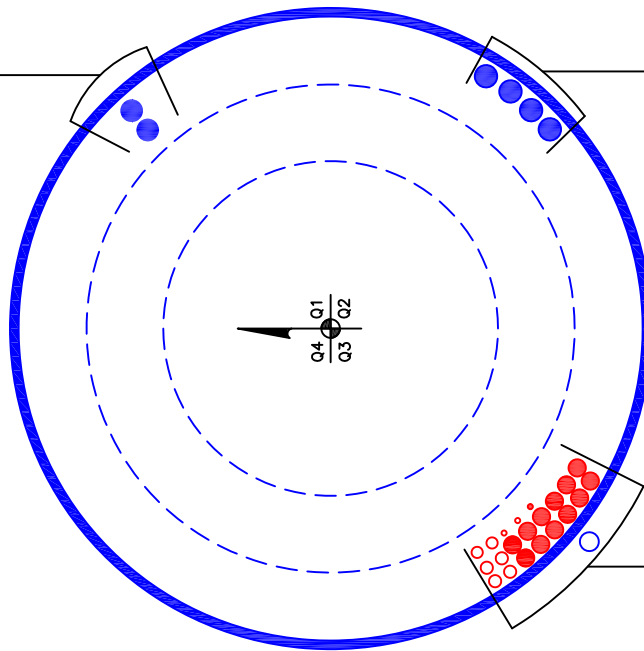
### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	109 - 99.5	Pole	TP24x24x0.375	1	-4.532	920.561	6.4	Pass
L2	99.5 - 99	Pole	TP26.42x24x0.375	2	-4.532	920.561	6.4	Pass
L3	99 - 46.93	Pole	TP37.125x26.42x0.313	3	-24.745	2178.456	36.2	Pass
L4	46.93 - 0	Pole	TP46x35.443x0.375	4	-37.803	3335.692	45.8	Pass
Summary								
Pole (L4)							45.8	Pass
<b>RATING =</b>							<b>45.8</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**

(OTHER CONSIDERED EQUIPMENT)  
(2) 1-5/8" TO 106 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(4) 1-5/8" TO 87 FT LEVEL



(OTHER CONSIDERED EQUIPMENT)  
(1) 1-3/8" TO 77 FT LEVEL  
(PROPOSED EQUIPMENT CONFIGURATION)  
(3) 3/8" TO 96 FT LEVEL  
(2) 13/16" TO 96 FT LEVEL  
(4) 7/8" TO 96 FT LEVEL  
(12) 1-1/4" TO 96 FT LEVEL

BUSINESS UNIT: 842864

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Monopole Flange Plate Connection

Elevation = 99 ft.



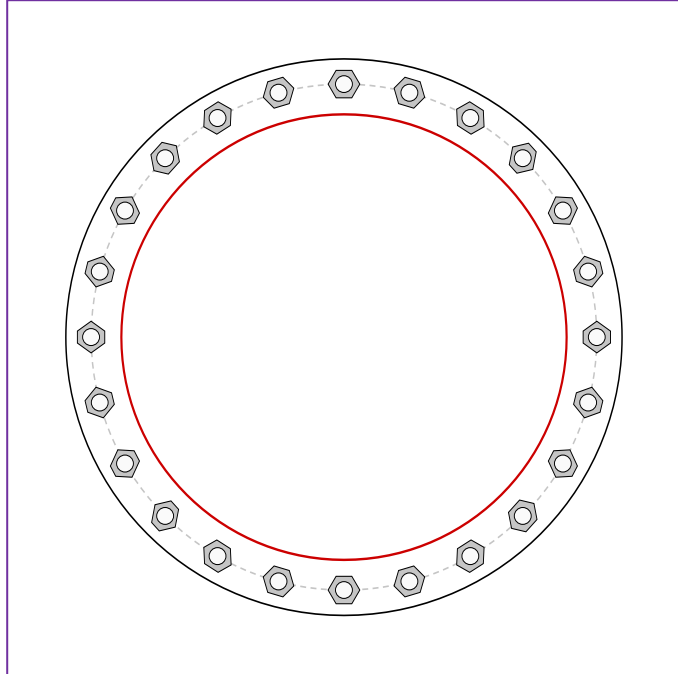
BU #	842864
Site Name	GUILFORD SW, CT
Order #	634335, Rev# 0

TIA-222 Revision	H
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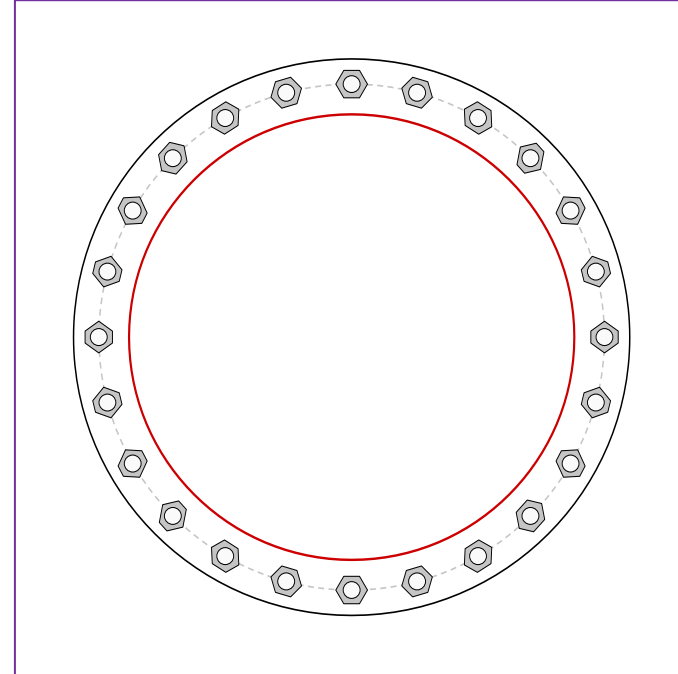
Applied Loads	
Moment (kip-ft)	35.88
Axial Force (kips)	4.59
Shear Force (kips)	4.97

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



### Connection Properties

#### Bolt Data

(24) 1"  $\phi$  bolts (A325 X; Fy=92 ksi, Fu=120 ksi) on 30" BC

#### Top Plate Data

33" OD x 1" Plate (A36; Fy=36 ksi, Fu=58 ksi)

#### Top Stiffener Data

N/A

#### Top Pole Data

26.42" x 0.375" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

#### Bottom Plate Data

33" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

#### Bottom Stiffener Data

N/A

#### Bottom Pole Data

26.42" x 0.3125" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

### Analysis Results

#### Bolt Capacity

Max Load (kips)	2.20
Allowable (kips)	54.54
Stress Rating:	<b>3.8%</b> Pass

#### Top Plate Capacity

Max Stress (ksi):	3.27	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	<b>9.6%</b>	Pass
Tension Side Stress Rating:	<b>3.5%</b>	Pass

#### Bottom Plate Capacity

Max Stress (ksi):	1.45	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>2.6%</b>	Pass
Tension Side Stress Rating:	<b>1.2%</b>	Pass



# Monopole Base Plate Connection

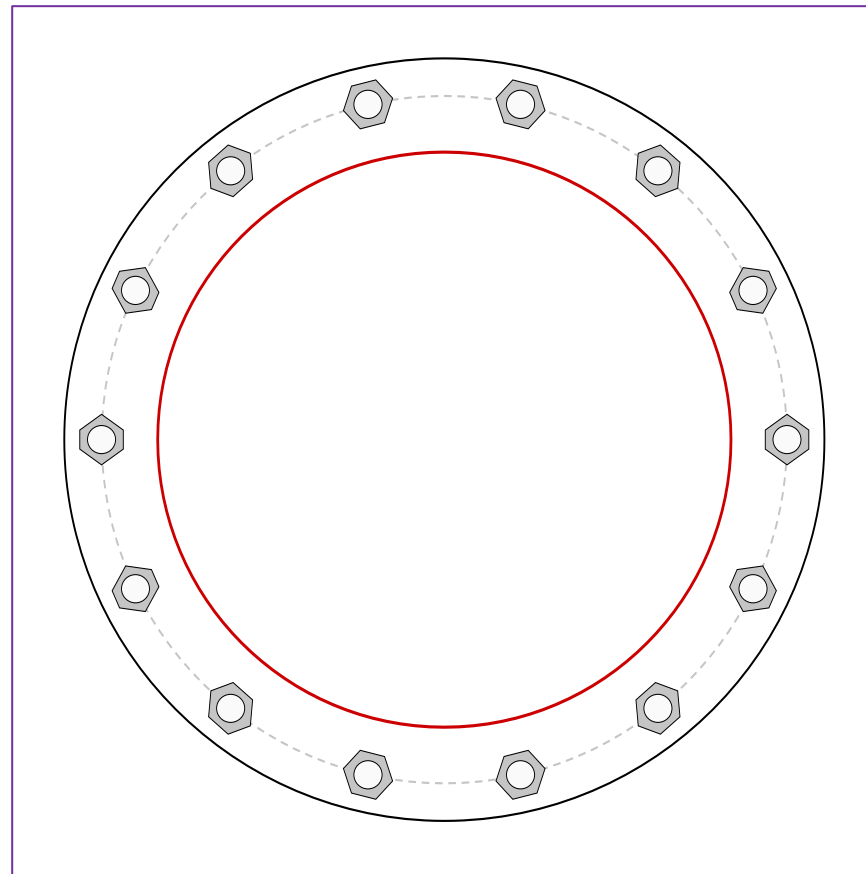


Site Info	
BU #	842864
Site Name	GUILFORD SW, CT
Order #	634335, Rev# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0.25

Applied Loads	
Moment (kip-ft)	1655.44
Axial Force (kips)	37.80
Shear Force (kips)	20.19

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(14) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 55" BC
Base Plate Data
61" OD x 2" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi)
Stiffener Data
N/A
Pole Data
46" x 0.375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$P_{u,t} = 100.43$	$\phi P_{n,t} = 243.75$	<b>Stress Rating</b>	
$V_u = 1.44$	$\phi V_n = 149.1$	<b>39.2%</b>	
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>	
Base Plate Summary			
Max Stress (ksi):	27.06	(Flexural)	
Allowable Stress (ksi):	54		
Stress Rating:	<b>47.7%</b>	<b>Pass</b>	

# Pier and Pad Foundation



**BU #:** 842864  
**Site Name:** GUILFORD SW, C  
**App. Number:** 634335, Rev# 0

**TIA-222 Revision:** H  
**Tower Type:** Monopole

**Top & Bot. Pad Rein. Different?:**   
**Block Foundation?:**   
**Rectangular Pad?:**

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	37.82	kips
Base Shear, $Vu_{comp}$ :	20.16	kips
Moment, $M_u$ :	1655.44	ft-kips
Tower Height, $H$ :	109	ft
BP Dist. Above Fdn, $bp_{dist}$ :	2.75	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	259.52	20.16	7.4%	Pass
<i>Bearing Pressure (ksf)</i>	12.63	2.32	18.3%	Pass
<i>Overturning (kip*ft)</i>	4396.94	1821.34	41.4%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	3986.29	1756.24	42.0%	Pass
<i>Pier Compression (kip)</i>	31187.52	81.92	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	3273.03	547.28	15.9%	Pass
<i>Pad Shear - 1-way (kips)</i>	770.99	97.37	12.0%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.020	10.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	4186.18	1053.74	24.0%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	7	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $Sc$ :	8	
Pier Rebar Quantity, $mc$ :	30	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	42.0%
Soil Rating*:	41.4%

Pad Properties		
Depth, $D$ :	7	ft
Pad Width, $W_1$ :	21.5	ft
Pad Thickness, $T$ :	3	ft
Pad Rebar Size (Top dir.2), $Sp_{top2}$ :	8	
Pad Rebar Quantity (Top dir. 2), $mp_{top2}$ :	22	
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	8	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	30	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $F_y$ :	60	ksi
Concrete Compressive Strength, $F'_c$ :	4	ksi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Net Bearing, $Q_{net}$ :	16.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	30	degrees
SPT Blow Count, $N_{blows}$ :	5	
Base Friction, $\mu$ :	0.5	
Neglected Depth, $N$ :	3.50	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	N/A	ft

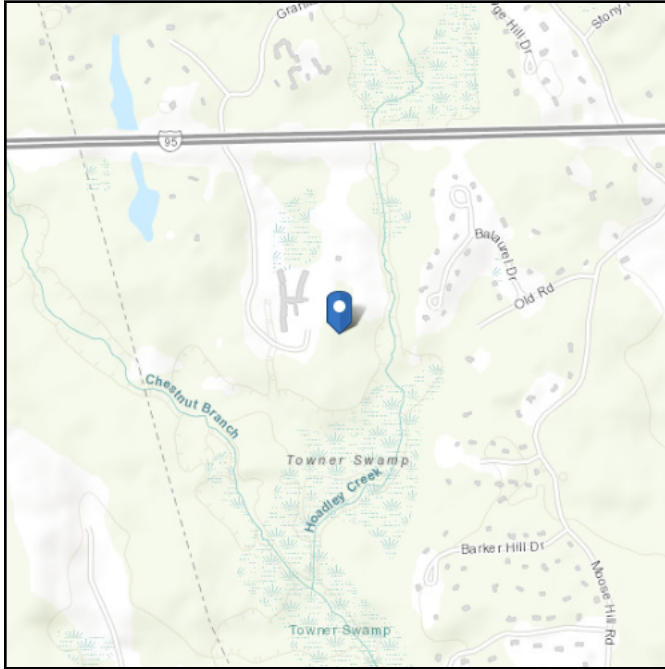
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# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Default (see  
Section 11.4.3)

**Elevation:** 105.75 ft (NAVD 88)  
**Latitude:** 41.291983  
**Longitude:** -72.732856



## Wind

### Results:

Wind Speed	122 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	93 Vmph
100-year MRI	99 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: Sat Oct 15 2022

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).

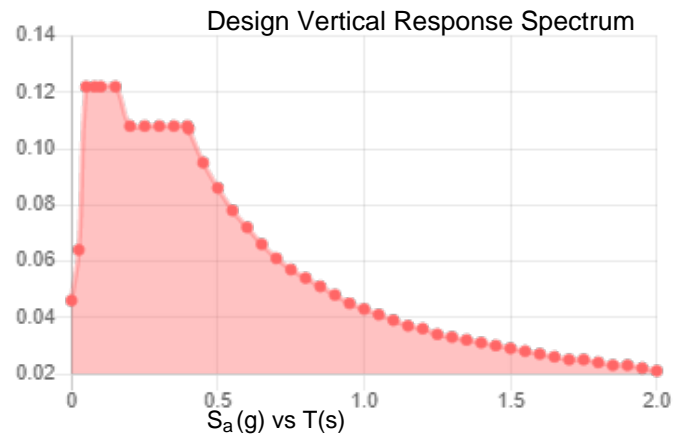
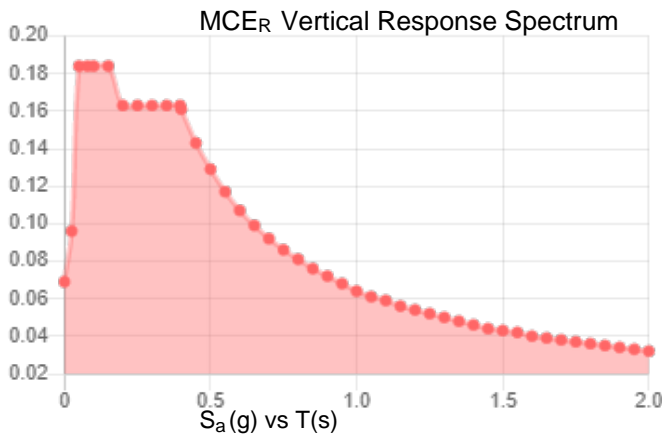
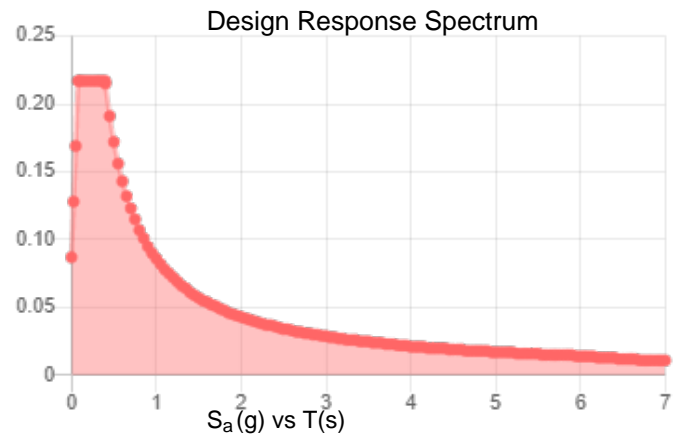
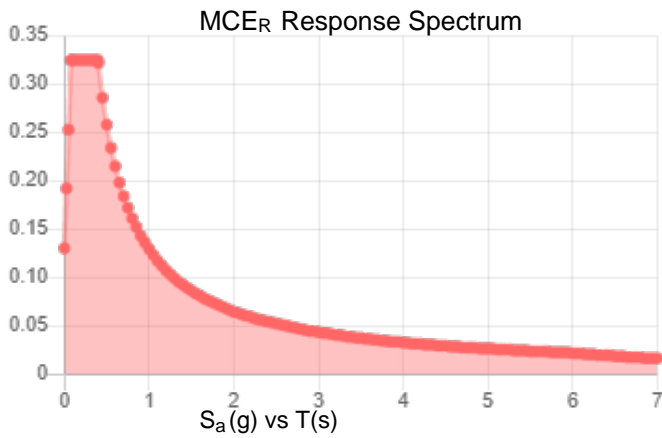
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:**

$S_s$ :	0.203	$S_{D1}$ :	0.086
$S_1$ :	0.054	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.114
$F_v$ :	2.4	PGA <sub>M</sub> :	0.179
$S_{MS}$ :	0.325	$F_{PGA}$ :	1.573
$S_{M1}$ :	0.129	$I_e$ :	1
$S_{DS}$ :	0.217	$C_v$ :	0.706

**Seismic Design Category** B



**Data Accessed:** Sat Oct 15 2022

**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

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### Results:

Ice Thickness: 1.00 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Sat Oct 15 2022

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.

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