



STATE OF CONNECTICUT  
*CONNECTICUT SITING COUNCIL*

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

Web Site: [portal.ct.gov/csc](http://portal.ct.gov/csc)

**VIA ELECTRONIC MAIL**

May 15, 2024

Jeffrey Barbadora  
Permitting Specialist  
Crown Castle  
1800 West Park Drive  
Westborough, MA 01581  
[Jeff.Barbadora@crowncastle.com](mailto:Jeff.Barbadora@crowncastle.com)

RE: **EM-VER-057-230823** - Verizon Wireless notice of intent to modify an existing telecommunications facility located at 363 Riversville Road, Greenwich, Connecticut.  
**Request for Project Change.**

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated May 8, 2024 and the associated Structural Analysis dated October 26, 2023, regarding a project change for the above-referenced exempt modification request acknowledged by the Council on September 18, 2023.

Pursuant to Condition No. 1 of the Council's September 18, 2023 exempt modification approval, the request to increase the number of Kaelus interference mitigation filters to be installed from one to two is hereby approved.

This approval applies only to the project change in the correspondence dated May 8, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman  
Executive Director

MAB/ANM/laf

c: The Honorable Fred Camillo, First Selectperson, Town of Greenwich ([fred.camillo@greenwichct.org](mailto:fred.camillo@greenwichct.org))

**From:** Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>  
**Sent:** Wednesday, May 8, 2024 3:44 PM  
**To:** CSC-DL Siting Council <Siting.Council@ct.gov>  
**Subject:** EM-VER-057-230823 - 363 Riversville Road Greenwich CT - 841290

Good afternoon,

Would the CSC please update the approval for EM-VER-057-230823 to include a total of 2 filters?

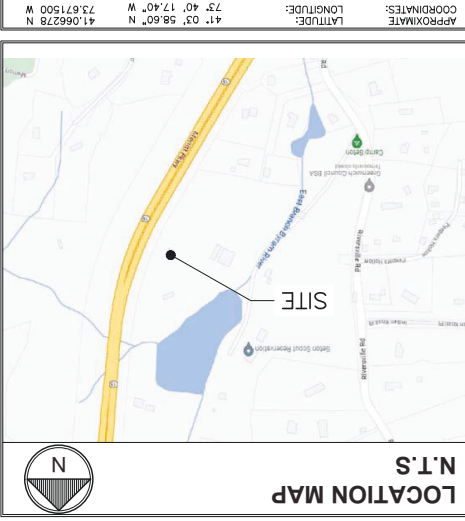
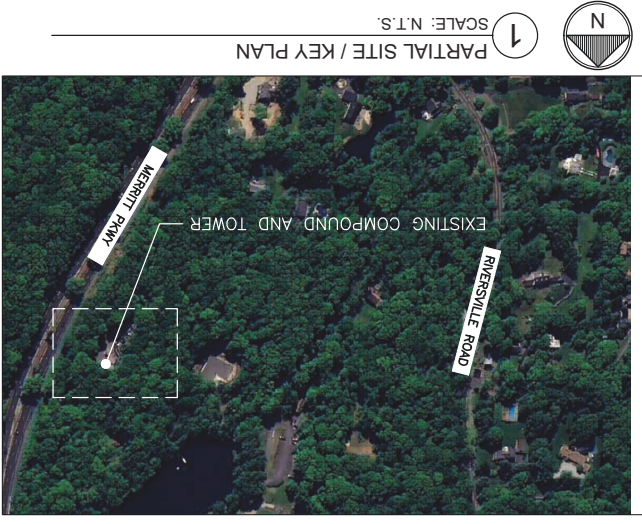
The original SA submitted with the application and dated 7/31/2023 stated only 1 filter and should have stated 2 filters.

Please see updated SA stating a total of 2 filters and let me know if you have any questions.

Thanks,

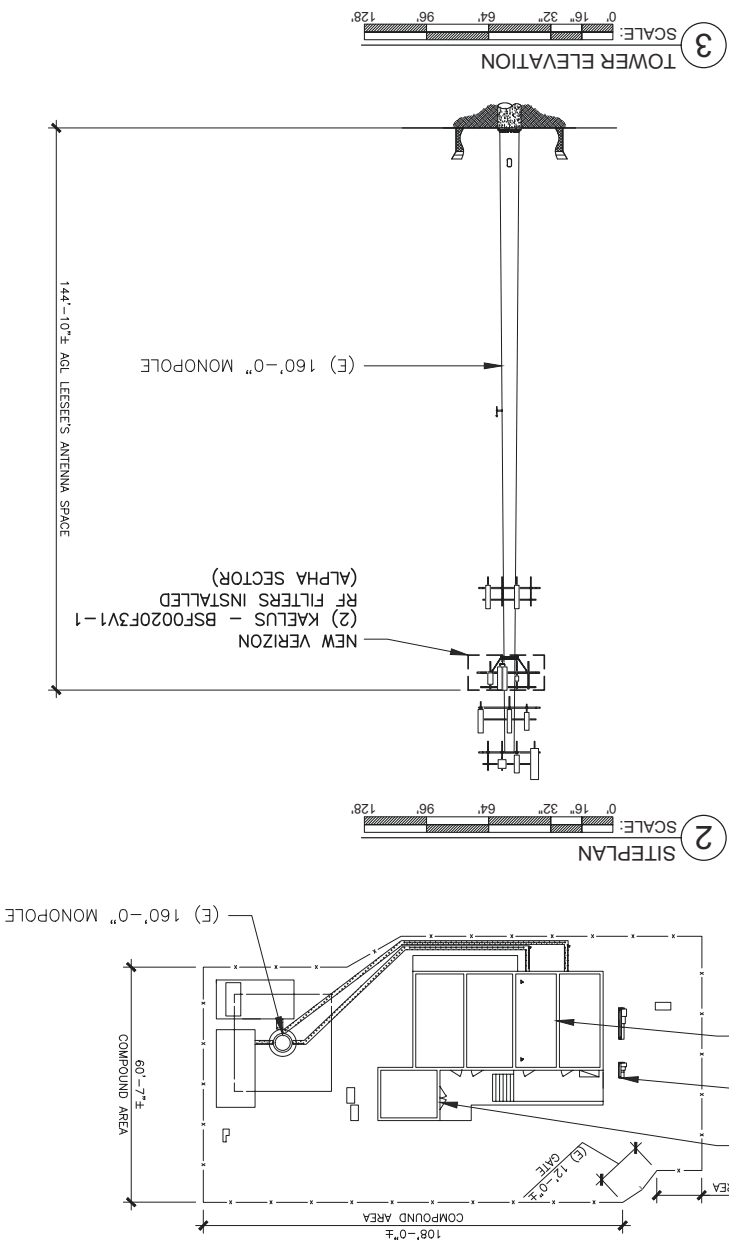
**Jeffrey Barbadora**  
Permitting Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive, Suite 250  
Westborough, MA 01581



**NOTE:**  
 AN ANALYSIS OF THE CAPACITY OF THE STRUCTURE TO SUPPORT THE PROPOSED LOADING HAS NOT BEEN COMPLETED BY B+T GRP. CLAIMS ARE SUBJECT TO CHANGE PENDING OUTCOME OF A STRUCTURAL ANALYSIS.  
 THIS LEASE EXHIBIT IS DIAGRAMMATIC IN NATURE AND IS INTENDED TO PROVIDE GENERAL INFORMATION REGARDING THE LOCATION AND SIZE OF THE PROPOSED WIRELESS COMMUNICATION FACILITY. THE SITE LAYOUT WILL BE FINALIZED UPON COMPLETION OF THE SITE SURVEY AND FACILITY DESIGN.

1 PARTIAL SITE / KEY PLAN  
 SCALE: N.T.S.



REVISION: **LE-1** SHEET NUMBER: **2**

IT IS A VIOLATION OF LAW FOR ANY PERSON, FIRM OR COMPANY TO REPRODUCE, COPIY, ALTER OR TRANSMIT THIS DOCUMENT, WITHOUT THE WRITTEN PERMISSION OF A LICENSED PROFESSIONAL ENGINEER.  
 PROFESSIONAL ENGINEER  
 No. 25924  
 State of Connecticut  
 B&T ENGINEERING, INC.  
 PEC 0001564  
 Expires 2/10/25  
 4/16/24

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/28/23	YX	CONSTRUCTION
1	4/1/24	BLB	CONSTRUCTION
2	4/16/24	BLB	CONSTRUCTION

CHECKED BY: TDG  
 PROJECT NO: 94951.007.01

**GREENWICH**  
 363 RIVERSVILLE ROAD  
 GREENWICH, CT 06831  
 EXISTING MONOPOLE

**B+T GRP**  
 477 S. ROUTE 17  
 SUITE 300  
 WALLINGFORD, CT 06492  
 PH: (203) 942-4300  
 WWW.BTGRP.COM

**verizon**  
 20 ALEXANDER DRIVE  
 WALLINGFORD, CT 06492



RRUDSM	DWG. NO.	RRUDSM
RRUDSM	PART NO.	RRUDSM

81	CLASS	81	SHOP
01	SUB	CEK	CEK
1/1/2015	DRAWN BY	1/1/2015	CEK
	CHKD BY		CEK
2/3/2015	ENG. APPROVAL	2/3/2015	BMC

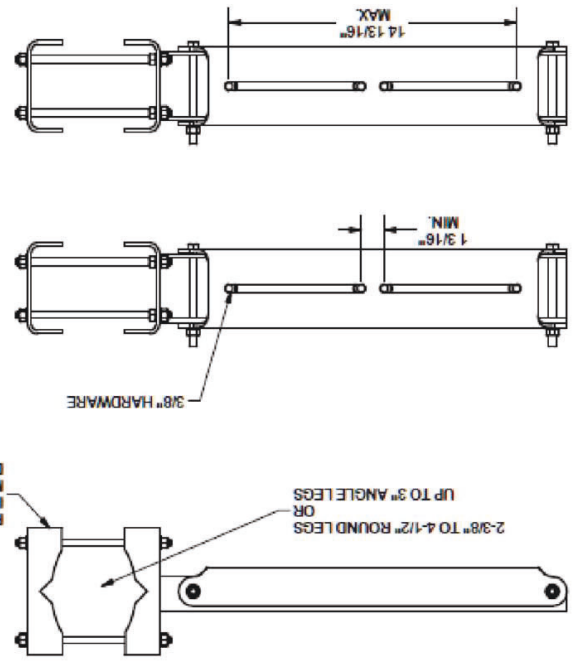
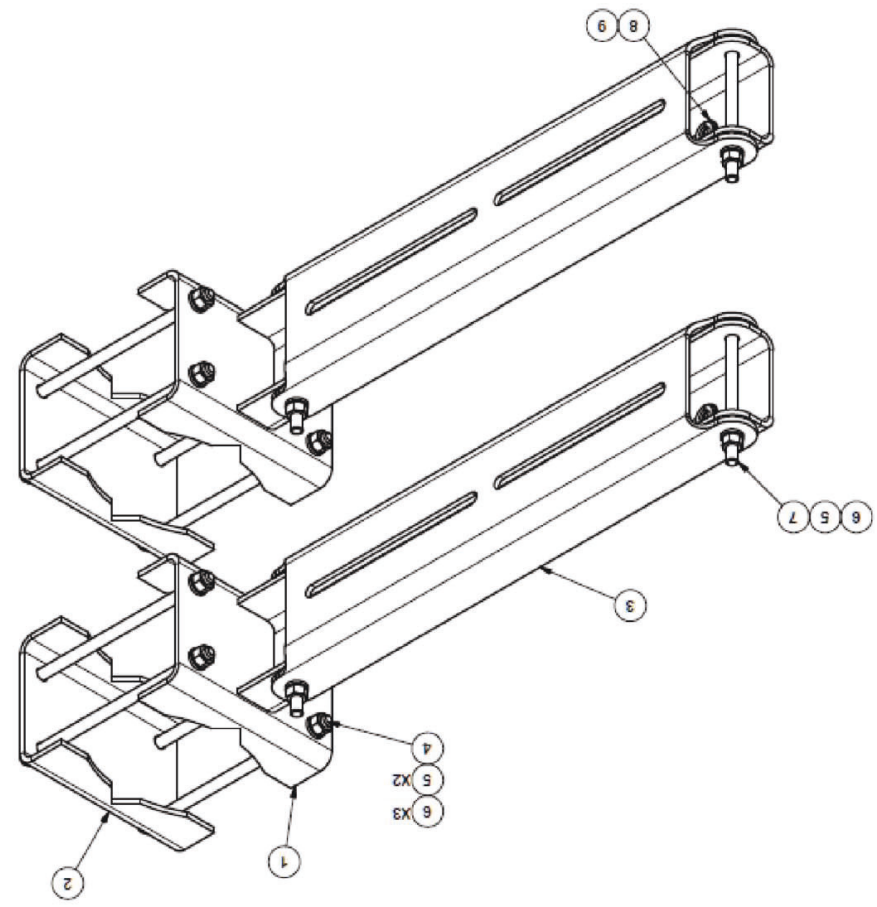
DESCRIPTION  
RRU  
DUAL SWIVEL MOUNT

Locations:  
NEW YORK, NY  
ALLEN, CA  
Engineering  
Support Team:  
1-888-753-7446  
Plymouth, IN  
Salem, OR  
Dallas, TX

**SITE PRO 1**  
A Valmont COMPANY

TOLERANCE NOTES  
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
SAWED, SHEARED AND GAS CUT EDGES  $\pm 0.037$   
DRILLED AND GAS CUT HOLES  $\pm 0.037$  - NO CONING OF HOLES  
LASER CUT EDGES AND HOLES  $\pm 0.0107$  - NO CONING OF HOLES  
BENDS ARE  $\pm 1/2$  DEGREE  
ALL OTHER MACHINING  $\pm 0.0307$   
ALL OTHER ASSEMBLY  $\pm 0.0307$

PROPERTY NOTE:  
THIS DRAWING AND THE DIMENSIONS CONTAINED THEREIN ARE THE PROPERTY OF VALMONT INDUSTRIES. ANY USE OR REPRODUCTION WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.



PARTS LIST

ITEM	QTY	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	MOUNTING ARM		8.99	17.97
2	2	CLAMP PLATE		2.35	4.69
3	2	SWIVEL MOUNT		6.65	13.30
4	8	3/8"-16 UNC X 8" GALV. THREADED ROD		0.25	2.00
5	20	3/8" GALV LOCK WASHER		0.01	0.13
6	28	3/8"-16 UNC GALV HEX NUT		0.02	0.52
7	4	3/8" X 5" GALV BOLT		0.18	0.71
8	8	3/8" SS FLAT WASHER		0.01	0.06
9	8	3/8" SS LOCK WASHER		0.01	0.05
TOTAL WT. #				39.43	

2-3/8" TO 4-1/2" ROUND LEGS  
OR  
UP TO 5" ANGLE LEGS

FLIP BRACKET  
IN ORDER TO  
MOUNT TO SMALLER  
DIAMETER RODS

Date: **October 26, 2023**



Crown Castle  
2000 Corporate Drive  
Canonsburg PA 15317  
(724) 416-2000

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

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Site Number:** 5000382493  
**Site Name:** W GREENWICH CT

**Crown Castle Designation:** **BU Number:** 841290  
**Site Name:** GREENWICH NORTH  
**JDE Job Number:** 2103496  
**Work Order Number:** 2265210  
**Order Number:** 658809 Rev. 0

**Engineering Firm Designation:** **Crown Castle Project Number:** 2265210

**Site Data:** **363 RIVERSVILLE ROAD, GREENWICH, FAIRFIELD County, CT**  
**Latitude 41° 3' 58.6", Longitude -73° 40' 17.4"**  
**160 Foot - Monopole Tower**

Crown Castle 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:

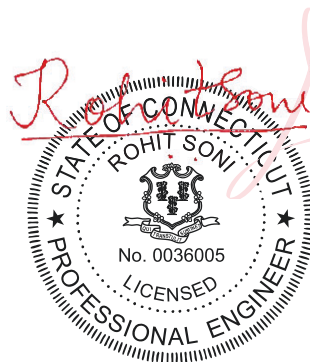
LC5: Proposed Equipment Configuration **Sufficient Capacity-57.7%**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 116 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Didi Rossmiller

Respectfully submitted by:

Rohit Soni, P.E.  
Senior Project Engineer



Digitally signed by  
Rohit Soni  
Date: 2023.10.26  
21:18:36 -04'00'



## 1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC..

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	116 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)
140.0	141.0	3	commscope	CBC78T-DS-43-2X	8	1-5/8
		6	commscope	JAHH-65B-R3B		
		2	commscope	RC2DC-3315-PF-48		
		3	commscope	TD-850AB-LTE15-43		
		2	kaelus	BSF0020F3V1		
		3	samsung telecom.	CBRS w/ Mount Pipe		
		3	samsung telecom.	MT6407-77A		
		3	samsung telecom.	RFV01U-D1A		
	3	samsung telecom.	RFV01U-D2A			
	140.0	3	Tower mounts	Mount Modifications		
	1	tower mounts	Platform Mount [LP 602-1]			

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
160.0	163.0	3	commscope	SDX1926Q-43	6 3	1-5/8 1-3/8
		3	ericsson	AIR 32 B2A/B66AA		
		3	ericsson	AIR6449 B41_T-MOBILE		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	3	rfs celwave	ATMAA1412D-1A20			
	160.0	1	tower mounts	Platform Mount [LP 602-1]		
152.0	152.0	3	ericsson	RRUS 11	-	-
		3	ericsson	RRUS 32 B2		
		1	tower mounts	Side Arm Mount [SO 102-3]		



Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	152.0	3	cci antennas	HPA-65R-BUU-H6	2 4 2 12	3/8 3/4 Conduit 1-5/8
		3	ericsson	RADIO 4426		
		3	ericsson	RRUS 32		
		3	kaelus	DBC0061F1V51-2		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		3	quintel technology	QS66512-2 w/ Mount Pipe		
		1	raycap	DC6-48-60-18-8C		
	1	raycap	DC6-48-60-18-8F			
	150.0	1	tower mounts	Platform Mount [LP 602-1]		
120.0	120.0	3	alcatel lucent	TD-RRH8X20-25	3	1-1/4
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20		
		1	tower mounts	Platform Mount [LP 602-1]		
119.0	119.0	3	alcatel lucent	1900MHZ RRH	-	-
		3	alcatel lucent	800MHZ RRH		
		1	tower mounts	Side Arm Mount [SO 102-3]		
72.0	73.0	2	gps	GPS_A	3	1/2
	72.0	1	tower mounts	Side Arm Mount [SO 601-1]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	5164738	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5121536	CCISITES
4-GEOTECHNICAL REPORTS	5121535	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.1.4.0), 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. Crown Castle 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	160 - 152	Pole	TP30.62x29x0.1875	1	-4.41	1112.47	6.3	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-20.51	1828.41	34.3	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-28.17	2653.22	45.1	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-42.17	4330.74	39.6	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-61.63	5702.67	40.2	Pass
							Summary	
						Pole (L3)	45.1	Pass
						Rating =	45.1	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	152.0	8.0	Pass
1	Flange Plate	152.0	6.8	Pass
1	Anchor Rods	0	36.5	Pass
1	Base Plate	0	43.4	Pass
1	Base Foundation (Structure)	0	57.7	Pass
1	Base Foundation (Soil Interaction)	0	38.8	Pass

<b>Structure Rating (max from all components) =</b>	<b>57.7%</b>
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Notes:

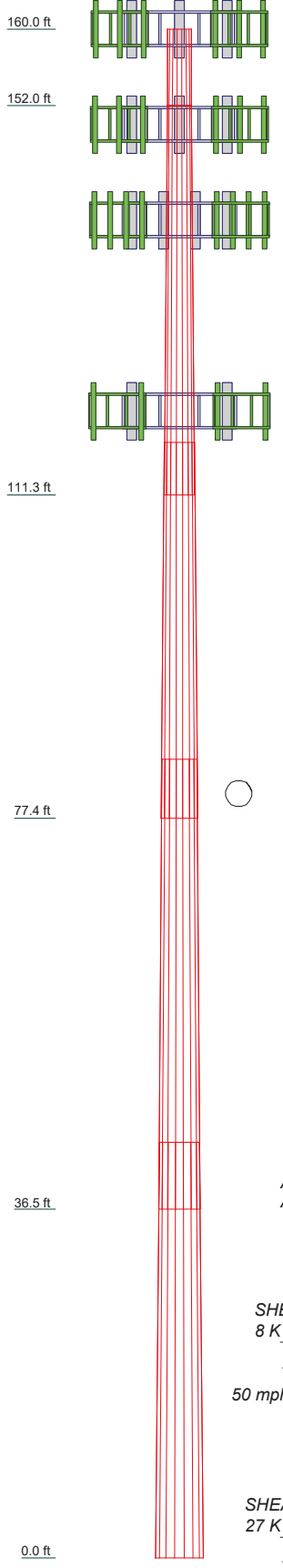
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5
Length (ft)	8.00	40.71	39.29	47.13	43.54
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.4375	0.5000
Socket Length (ft)		5.42	6.17	7.08	
Top Dia (in)	29.0000	30.6200	37.2630	43.2359	50.3353
Bot Dia (in)	30.6200	38.8600	45.0900	52.6200	59.0000
Grade			A572-65		
Weight (K)	0.5	3.8	5.4	10.6	12.7



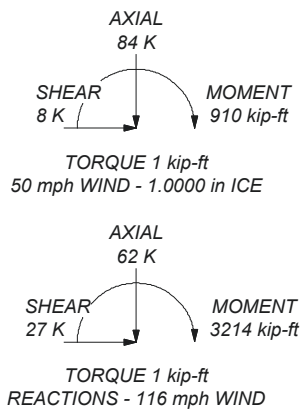
**MATERIAL STRENGTH**


GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 116 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 45.1%

ALL REACTIONS ARE FACTORED



 <p><b>CROWN CASTLE</b> The Foundation for a Wireless World</p>	<p><b>Crown Castle</b> 2000 Corporate Drive Canonsburg PA 15317</p>		<p>Job: <b>BU 841290</b></p>	
	<p>Phone: (724) 416-2000</p>		<p>Project: Crown Castle USA</p>	
	<p>FAX: (724) 416-4623</p>		<p>Drawn by: Didi Rossmiller</p>	
			<p>Date: 10/25/23</p>	
			<p>Scale: NTS</p>	
		<p>Dwg No. E-1</p>		

## Tower Input Data

The tower is a monopole.  
 This tower is designed using the TIA-222-H standard.  
 The following design criteria apply:

- Tower base elevation above sea level: 223.00 ft.
- Basic wind speed of 116 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals  Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned  ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Forces in Supporting Bracing Members Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #f0f0f0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets ✓ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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## 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	160.00-152.00	8.00	0.00	18	29.0000	30.6200	0.1875	0.7500	A572-65 (65 ksi)
L2	152.00-111.29	40.71	5.42	18	30.6200	38.8600	0.2500	1.0000	A572-65 (65 ksi)

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
L3	111.29-77.42	39.29	6.17	18	37.2630	45.0900	0.3125	1.2500	A572-65 (65 ksi)
L4	77.42-36.46	47.13	7.08	18	43.2359	52.6200	0.4375	1.7500	A572-65 (65 ksi)
L5	36.46-0.00	43.54		18	50.3353	59.0000	0.5000	2.0000	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>	It/Q in <sup>2</sup>	w in	w/t
L1	29.4184	17.1470	1798.4090	10.2284	14.7320	122.0750	3599.1844	8.5751	4.7740	25.461
	31.0634	18.1111	2119.1346	10.8035	15.5550	136.2353	4241.0576	9.0573	5.0591	26.982
L2	31.0538	24.0986	2808.1400	10.7814	15.5550	180.5302	5619.9750	12.0516	4.9491	19.796
	39.4209	30.6370	5770.1059	13.7066	19.7409	292.2922	11547.804	15.3214	6.3994	25.597
L3	38.8860	36.6502	6321.9884	13.1174	18.9296	333.9740	12652.295	18.3286	6.0083	19.226
	45.7374	44.4137	11250.554	15.8960	22.9057	491.1679	22515.912	22.2111	7.3858	23.635
L4	45.0828	59.4309	13753.202	15.1934	21.9638	626.1754	27524.502	29.7211	6.8395	15.633
	53.3643	72.4619	24928.553	18.5248	26.7310	932.5723	49889.908	36.2378	8.4911	19.408
L5	52.4654	79.0886	24815.629	17.6915	25.5703	970.4854	49663.911	39.5518	7.9790	15.958
	59.8330	92.8395	40140.425	20.7675	29.9720	1339.2642	80333.669	46.4286	9.5040	19.008

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.00- 152.00				1	1	1			
L2 152.00- 111.29				1	1	1			
L3 111.29- 77.42				1	1	1			
L4 77.42- 36.46				1	1	1			
L5 36.46-0.00				1	1	1			

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter r in	Weight plf
***											
***											
***											
***											

**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>AA</sub> ft <sup>2</sup> /ft	Weight plf
*** ***									
Safety Line 3/8	B	No	No	CaAa (Out Of Face)	160.00 - 6.00	1	No Ice 1/2" Ice 1" Ice	0.04 0.14 0.24	0.22 0.75 1.28
5/8 rod/step	B	No	No	CaAa (Out Of Face)	160.00 - 6.00	1	No Ice 1/2" Ice 1" Ice	0.02 0.12 0.22	0.27 0.70 1.74
*** ***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	160.00 - 3.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
HCS 6X12 6AWG(1-3/8)	A	No	No	Inside Pole	160.00 - 3.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.70 1.70 1.70
*** ***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	150.00 - 6.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
FB-L98B-034- XXX(3/8)	A	No	No	Inside Pole	150.00 - 6.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.06 0.06 0.06
WR-VG86ST- BRD(3/4)	A	No	No	Inside Pole	150.00 - 6.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.58 0.58 0.58
CONDUIT (2)	A	No	No	Inside Pole	150.00 - 6.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.36 0.36 0.36
*** ***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	140.00 - 6.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
HB158-1-08U8- S8J18(1-5/8)	A	No	No	Inside Pole	140.00 - 6.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.30 1.30 1.30
*** ***									
CU12PSM9P6XXX (1-1/2)	A	No	No	Inside Pole	132.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	2.35 2.35 2.35
*** ***									
HB114-1-05U3- S3J(1-1/4)	C	No	No	Inside Pole	120.00 - 0.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.90 0.90 0.90
*** ***									
LDF4-50A(1/2)	C	No	No	Inside Pole	72.00 - 0.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
*** ***									

### Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	160.00-152.00	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.460	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	0.000	0.000	0.000	0.000	1.18
		B	0.000	0.000	0.000	2.341	0.02
		C	0.000	0.000	0.000	0.000	0.02

Tower Section n	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
L3	111.29-77.42	A	0.000	0.000	0.000	0.000	1.11
		B	0.000	0.000	0.000	1.948	0.02
		C	0.000	0.000	0.000	0.000	0.09
L4	77.42-36.46	A	0.000	0.000	0.000	0.000	1.35
		B	0.000	0.000	0.000	2.355	0.02
		C	0.000	0.000	0.000	0.000	0.13
L5	36.46-0.00	A	0.000	0.000	0.000	0.000	1.05
		B	0.000	0.000	0.000	1.751	0.02
		C	0.000	0.000	0.000	0.000	0.11

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

Tower Section n	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	160.00-152.00	A	0.993	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	3.637	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	0.976	0.000	0.000	0.000	0.000	1.18
		B		0.000	0.000	0.000	18.229	0.12
		C		0.000	0.000	0.000	0.000	0.02
L3	111.29-77.42	A	0.944	0.000	0.000	0.000	0.000	1.11
		B		0.000	0.000	0.000	15.166	0.10
		C		0.000	0.000	0.000	0.000	0.09
L4	77.42-36.46	A	0.898	0.000	0.000	0.000	0.000	1.35
		B		0.000	0.000	0.000	17.820	0.12
		C		0.000	0.000	0.000	0.000	0.13
L5	36.46-0.00	A	0.799	0.000	0.000	0.000	0.000	1.05
		B		0.000	0.000	0.000	12.688	0.08
		C		0.000	0.000	0.000	0.000	0.11

**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	160.00-152.00	0.4512	0.2605	1.7216	0.9940
L2	152.00-111.29	0.4535	0.2618	1.7465	1.0084
L3	111.29-77.42	0.4558	0.2631	1.7977	1.0379
L4	77.42-36.46	0.4575	0.2641	1.7890	1.0329
L5	36.46-0.00	0.3803	0.2196	1.4630	0.8447

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

**Discrete Tower Loads**

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
***** AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.00	0.0000	160.00



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	3.00 4.00 0.00	0.0000	160.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	3.00 4.00 0.00	0.0000	160.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	3.00 4.00 0.00	0.0000	160.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	3.00 4.00 0.00	0.0000	160.00
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	3.00 4.00 0.00	0.0000	160.00
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	3.00 4.00 0.00	0.0000	160.00
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	3.00 4.00 0.00	0.0000	160.00
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	3.00 4.00 0.00	0.0000	160.00
SDX1926Q-43	A	From Leg	3.00 4.00 0.00	0.0000	160.00
SDX1926Q-43	B	From Leg	3.00 4.00 0.00	0.0000	160.00
SDX1926Q-43	C	From Leg	3.00 4.00 0.00	0.0000	160.00
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	3.00 4.00 0.00	0.0000	160.00
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	3.00 4.00 0.00	0.0000	160.00
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	3.00 4.00 0.00	0.0000	160.00
RRUS 4415 B25	A	From Leg	3.00 4.00 0.00	0.0000	160.00
RRUS 4415 B25	B	From Leg	3.00 4.00 0.00	0.0000	160.00
RRUS 4415 B25	C	From Leg	3.00 4.00 0.00	0.0000	160.00
ATMAA1412D-1A20	A	From Leg	3.00 4.00 0.00	0.0000	160.00
ATMAA1412D-1A20	B	From Leg	3.00 4.00 0.00	0.0000	160.00
ATMAA1412D-1A20	C	From Leg	3.00 4.00 0.00	0.0000	160.00
8' x 2" Mount Pipe	A	From Leg	3.00 4.00 0.00	0.0000	160.00
8' x 2" Mount Pipe	B	From Leg	3.00 4.00	0.0000	160.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.00		
			0.00		
8' x 2" Mount Pipe	C	From Leg	4.00	0.0000	160.00
			0.00		
			0.00		
Platform Mount [LP 602-1] *****	C	None		0.0000	160.00
RRUS 11	A	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
RRUS 11	B	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
RRUS 11	C	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
RRUS 32 B2	A	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
RRUS 32 B2	B	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
RRUS 32 B2	C	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
(2) 6' x 2" Mount Pipe	A	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
(2) 6' x 2" Mount Pipe	B	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
(2) 6' x 2" Mount Pipe	C	From Leg	2.00	0.0000	152.00
			0.00		
			0.00		
Side Arm Mount [SO 102-3] *****	C	None		0.0000	152.00
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
QS66512-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
QS66512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
QS66512-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	150.00
			0.00		
			2.00		
RRUS 32	A	From Leg	4.00	0.0000	150.00
			0.00		

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement
			Horz	Lateral		
			ft	ft	°	ft
RRUS 32	B	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
RRUS 32	C	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
RADIO 4426	A	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
RADIO 4426	B	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
RADIO 4426	C	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
DBC0061F1V51-2	A	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
DBC0061F1V51-2	B	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
DBC0061F1V51-2	C	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
(2) LGP21401	A	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
(2) LGP21401	B	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
(2) LGP21401	C	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
DC6-48-60-18-8F	A	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
DC6-48-60-18-8C	B	From Leg	2.00	4.00	0.0000	150.00
			0.00	0.00		
Platform Mount [LP 602-1] *****	C	None	2.00	0.00	0.0000	150.00
Side by Side Mounting Kit	A	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
Side by Side Mounting Kit	B	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
Side by Side Mounting Kit	C	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
8' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
8' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
8' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	140.00
			0.00	0.00		
Platform Mount [LP 602-1]	C	None	0.00	0.00	0.0000	140.00
OVP Pipe [#VZWSMART-P40-238x048]	A	From Leg	1.00	0.00	0.0000	140.00
			0.00	0.00		
OVP Pipe [#VZWSMART-P40-238x048]	B	From Leg	1.00	0.00	0.0000	140.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.00		
			0.00		
Collar Mount [#VZWSMART-PLK7]	C	None		0.0000	140.00
Kicker Kit [#VZWSMART-PLK5]	C	None		0.0000	140.00
MT6407-77A w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
MT6407-77A w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
MT6407-77A w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBRS w/ Mount Pipe	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBRS w/ Mount Pipe	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBRS w/ Mount Pipe	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
(3) RFV01U-D1A	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
RFV01U-D2A	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
(2) RFV01U-D2A	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBC78T-DS-43-2X	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBC78T-DS-43-2X	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
CBC78T-DS-43-2X	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
TD-850AB-LTE15-43	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
TD-850AB-LTE15-43	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
TD-850AB-LTE15-43	C	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
BSF0020F3V1	A	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
BSF0020F3V1	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
RC2DC-3315-PF-48	A	From Leg	4.00	0.0000	140.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.00		
			1.00		
RC2DC-3315-PF-48	B	From Leg	4.00	0.0000	140.00
			0.00		
			1.00		
***					
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
TD-RRH8X20-25	A	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
TD-RRH8X20-25	B	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
TD-RRH8X20-25	C	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
(2) 8' x 2" Mount Pipe	A	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
(2) 8' x 2" Mount Pipe	C	From Leg	4.00	0.0000	120.00
			0.00		
			0.00		
Platform Mount [LP 602-1]	C	None		0.0000	120.00
***					
800MHZ RRH	A	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
800MHZ RRH	B	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
800MHZ RRH	C	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
1900MHZ RRH	A	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
1900MHZ RRH	B	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
1900MHZ RRH	C	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		
(2) 6' x 2" Mount Pipe	A	From Leg	2.00	0.0000	119.00
			0.00		
			0.00		

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) 6' x 2" Mount Pipe	B	From Leg	2.00 0.00 0.00	0.0000	119.00
(2) 6' x 2" Mount Pipe	C	From Leg	2.00 0.00 0.00	0.0000	119.00
Side Arm Mount [SO 102-3] ***	C	None		0.0000	119.00
(2) GPS_A	B	From Leg	3.00 0.00 1.00	0.0000	72.00
(2) 3' x 2" Pipe Mount	B	From Leg	3.00 0.00 0.00	0.0000	72.00
Side Arm Mount [SO 601-1]	B	From Leg	1.50 0.00 0.00	0.0000	72.00
*** ***** ***** ***** ***** ***** ***** ***** ***** *****					

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

**Maximum Member Forces**

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
L1	160 - 152	Pole	Max Tension	26	0.00	0.00	-0.00			
			Max. Compression	26	-8.21	-0.03	-0.01			
			Max. Mx	8	-4.41	-43.23	0.00			
			Max. My	2	-4.41	-0.01	43.24			
			Max. Vy	20	-4.72	43.22	0.00			
			Max. Vx	2	-4.72	-0.01	43.24			
			Max. Torque	28			-0.03			
			L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
						Max. Compression	26	-36.42	-0.18	2.81
						Max. Mx	20	-20.52	507.76	1.85
Max. My	2	-20.51				0.30	511.51			
Max. Vy	8	18.89				-507.30	1.72			
Max. Vx	2	-18.98				0.30	511.51			
Max. Torque	11						0.90			
L3	111.29 - 77.42	Pole				Max Tension	1	0.00	0.00	0.00
						Max. Compression	26	-45.84	-0.32	2.73
						Max. Mx	20	-28.18	1173.92	1.95
			Max. My	2	-28.17	0.34	1180.67			
			Max. Vy	8	21.28	-1173.52	1.66			
			Max. Vx	2	-21.37	0.34	1180.67			
			Max. Torque	11			0.90			
			L4	77.42 - 36.46	Pole	Max Tension	1	0.00	0.00	0.00
						Max. Compression	26	-62.25	-1.60	1.99
						Max. Mx	8	-42.17	-2087.76	2.81
Max. My	2	-42.17				-1.89	2099.22			
Max. Vy	8	24.17				-2087.76	2.81			
Max. Vx	2	-24.33				-1.89	2099.22			
Max. Torque	2						-1.35			
L5	36.46 - 0	Pole				Max Tension	1	0.00	0.00	0.00
						Max. Compression	26	-84.21	-1.80	1.87
						Max. Mx	8	-61.63	-3195.62	5.15
			Max. My	2	-61.63	-4.29	3213.64			
			Max. Vy	8	26.61	-3195.62	5.15			
			Max. Vx	2	-26.76	-4.29	3213.64			
			Max. Torque	2			-1.45			

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	84.21	-0.01	7.82
	Max. H <sub>x</sub>	20	61.64	26.59	-0.05
	Max. H <sub>z</sub>	2	61.64	-0.05	26.74
	Max. M <sub>x</sub>	2	3213.64	-0.05	26.74
	Max. M <sub>z</sub>	8	3195.62	-26.59	0.05
	Max. Torsion	14	1.45	0.05	-26.74
	Min. Vert	23	46.23	23.00	13.32
	Min. H <sub>x</sub>	8	61.64	-26.59	0.05
	Min. H <sub>z</sub>	14	61.64	0.05	-26.74
	Min. M <sub>x</sub>	14	-3210.80	0.05	-26.74
	Min. M <sub>z</sub>	20	-3194.49	26.59	-0.05
	Min. Torsion	2	-1.45	-0.05	26.74

### 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	51.37	0.00	0.00	-1.10	-0.46	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	61.64	0.05	-26.74	-3213.64	-4.29	1.45
0.9 Dead+1.0 Wind 0 deg - No Ice	46.23	0.05	-26.74	-3182.59	-4.13	1.44
1.2 Dead+1.0 Wind 30 deg - No Ice	61.64	13.34	-23.18	-2785.16	-1601.31	1.16
0.9 Dead+1.0 Wind 30 deg - No Ice	46.23	13.34	-23.18	-2758.21	-1585.89	1.15
1.2 Dead+1.0 Wind 60 deg - No Ice	61.64	23.05	-13.41	-1610.77	-2769.43	0.56
0.9 Dead+1.0 Wind 60 deg - No Ice	46.23	23.05	-13.41	-1595.04	-2742.84	0.55
1.2 Dead+1.0 Wind 90 deg - No Ice	61.64	26.59	-0.05	-5.15	-3195.62	-0.19
0.9 Dead+1.0 Wind 90 deg - No Ice	46.23	26.59	-0.05	-4.75	-3164.96	-0.21
1.2 Dead+1.0 Wind 120 deg - No Ice	61.64	23.00	13.32	1601.48	-2765.71	-0.89
0.9 Dead+1.0 Wind 120 deg - No Ice	46.23	23.00	13.32	1586.53	-2739.14	-0.90
1.2 Dead+1.0 Wind 150 deg - No Ice	61.64	13.25	23.13	2778.60	-1594.86	-1.35
0.9 Dead+1.0 Wind 150 deg - No Ice	46.23	13.25	23.13	2752.42	-1579.47	-1.35
1.2 Dead+1.0 Wind 180 deg - No Ice	61.64	-0.05	26.74	3210.80	3.16	-1.45
0.9 Dead+1.0 Wind 180 deg - No Ice	46.23	-0.05	26.74	3180.51	3.29	-1.44
1.2 Dead+1.0 Wind 210 deg - No Ice	61.64	-13.34	23.18	2782.32	1600.19	-1.16
0.9 Dead+1.0 Wind 210 deg - No Ice	46.23	-13.34	23.18	2756.12	1585.05	-1.14
1.2 Dead+1.0 Wind 240 deg - No Ice	61.64	-23.05	13.41	1607.92	2768.30	-0.56
0.9 Dead+1.0 Wind 240 deg - No Ice	46.23	-23.05	13.41	1592.95	2742.00	-0.54
1.2 Dead+1.0 Wind 270 deg - No Ice	61.64	-26.59	0.05	2.31	3194.49	0.19
0.9 Dead+1.0 Wind 270 deg - No Ice	46.23	-26.59	0.05	2.66	3164.11	0.21



Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 300 deg - No Ice	61.64	-23.00	-13.32	-1604.31	2764.58	0.89
0.9 Dead+1.0 Wind 300 deg - No Ice	46.23	-23.00	-13.32	-1588.61	2738.29	0.90
1.2 Dead+1.0 Wind 330 deg - No Ice	61.64	-13.25	-23.13	-2781.43	1593.74	1.35
0.9 Dead+1.0 Wind 330 deg - No Ice	46.23	-13.25	-23.13	-2754.50	1578.63	1.35
1.2 Dead+1.0 Ice+1.0 Temp	84.21	0.00	-0.00	-1.87	-1.80	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	84.21	0.01	-7.82	-909.81	-2.86	0.88
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	84.21	3.91	-6.78	-788.68	-454.73	0.89
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	84.21	6.75	-3.92	-456.76	-785.26	0.67
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	84.21	7.79	-0.01	-3.01	-905.90	0.26
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	84.21	6.74	3.90	451.01	-784.30	-0.21
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	84.21	3.88	6.77	783.63	-453.06	-0.63
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	84.21	-0.01	7.82	905.73	-0.94	-0.88
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	84.21	-3.91	6.78	784.59	450.93	-0.89
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	84.21	-6.75	3.92	452.67	781.46	-0.67
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	84.21	-7.79	0.01	-1.08	902.09	-0.26
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	84.21	-6.74	-3.90	-455.10	780.50	0.21
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	84.21	-3.88	-6.77	-787.71	449.26	0.63
Dead+Wind 0 deg - Service	51.37	0.01	-6.74	-806.22	-1.41	0.37
Dead+Wind 30 deg - Service	51.37	3.36	-5.84	-698.83	-401.65	0.30
Dead+Wind 60 deg - Service	51.37	5.81	-3.38	-404.51	-694.40	0.14
Dead+Wind 90 deg - Service	51.37	6.70	-0.01	-2.11	-801.21	-0.05
Dead+Wind 120 deg - Service	51.37	5.80	3.36	400.54	-693.46	-0.23
Dead+Wind 150 deg - Service	51.37	3.34	5.83	695.55	-400.03	-0.35
Dead+Wind 180 deg - Service	51.37	-0.01	6.74	803.87	0.47	-0.37
Dead+Wind 210 deg - Service	51.37	-3.36	5.84	696.48	400.71	-0.30
Dead+Wind 240 deg - Service	51.37	-5.81	3.38	402.16	693.46	-0.14
Dead+Wind 270 deg - Service	51.37	-6.70	0.01	-0.24	800.27	0.05
Dead+Wind 300 deg - Service	51.37	-5.80	-3.36	-402.88	692.52	0.23
Dead+Wind 330 deg - Service	51.37	-3.34	-5.83	-697.89	399.09	0.35

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-51.37	0.00	0.00	51.37	0.00	0.000%
2	0.05	-61.64	-26.74	-0.05	61.64	26.74	0.000%
3	0.05	-46.23	-26.74	-0.05	46.23	26.74	0.000%
4	13.34	-61.64	-23.18	-13.34	61.64	23.18	0.000%
5	13.34	-46.23	-23.18	-13.34	46.23	23.18	0.000%
6	23.05	-61.64	-13.41	-23.05	61.64	13.41	0.000%
7	23.05	-46.23	-13.41	-23.05	46.23	13.41	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
8	26.59	-61.64	-0.05	-26.59	61.64	0.05	0.000%
9	26.59	-46.23	-0.05	-26.59	46.23	0.05	0.000%
10	23.00	-61.64	13.32	-23.00	61.64	-13.32	0.000%
11	23.00	-46.23	13.32	-23.00	46.23	-13.32	0.000%
12	13.25	-61.64	23.13	-13.25	61.64	-23.13	0.000%
13	13.25	-46.23	23.13	-13.25	46.23	-23.13	0.000%
14	-0.05	-61.64	26.74	0.05	61.64	-26.74	0.000%
15	-0.05	-46.23	26.74	0.05	46.23	-26.74	0.000%
16	-13.34	-61.64	23.18	13.34	61.64	-23.18	0.000%
17	-13.34	-46.23	23.18	13.34	46.23	-23.18	0.000%
18	-23.05	-61.64	13.41	23.05	61.64	-13.41	0.000%
19	-23.05	-46.23	13.41	23.05	46.23	-13.41	0.000%
20	-26.59	-61.64	0.05	26.59	61.64	-0.05	0.000%
21	-26.59	-46.23	0.05	26.59	46.23	-0.05	0.000%
22	-23.00	-61.64	-13.32	23.00	61.64	13.32	0.000%
23	-23.00	-46.23	-13.32	23.00	46.23	13.32	0.000%
24	-13.25	-61.64	-23.13	13.25	61.64	23.13	0.000%
25	-13.25	-46.23	-23.13	13.25	46.23	23.13	0.000%
26	0.00	-84.21	0.00	-0.00	84.21	0.00	0.000%
27	0.01	-84.21	-7.82	-0.01	84.21	7.82	0.000%
28	3.91	-84.21	-6.78	-3.91	84.21	6.78	0.000%
29	6.75	-84.21	-3.92	-6.75	84.21	3.92	0.000%
30	7.79	-84.21	-0.01	-7.79	84.21	0.01	0.000%
31	6.74	-84.21	3.90	-6.74	84.21	-3.90	0.000%
32	3.88	-84.21	6.77	-3.88	84.21	-6.77	0.000%
33	-0.01	-84.21	7.82	0.01	84.21	-7.82	0.000%
34	-3.91	-84.21	6.78	3.91	84.21	-6.78	0.000%
35	-6.75	-84.21	3.92	6.75	84.21	-3.92	0.000%
36	-7.79	-84.21	0.01	7.79	84.21	-0.01	0.000%
37	-6.74	-84.21	-3.90	6.74	84.21	3.90	0.000%
38	-3.88	-84.21	-6.77	3.88	84.21	6.77	0.000%
39	0.01	-51.37	-6.74	-0.01	51.37	6.74	0.000%
40	3.36	-51.37	-5.84	-3.36	51.37	5.84	0.000%
41	5.81	-51.37	-3.38	-5.81	51.37	3.38	0.000%
42	6.70	-51.37	-0.01	-6.70	51.37	0.01	0.000%
43	5.80	-51.37	3.36	-5.80	51.37	-3.36	0.000%
44	3.34	-51.37	5.83	-3.34	51.37	-5.83	0.000%
45	-0.01	-51.37	6.74	0.01	51.37	-6.74	0.000%
46	-3.36	-51.37	5.84	3.36	51.37	-5.84	0.000%
47	-5.81	-51.37	3.38	5.81	51.37	-3.38	0.000%
48	-6.70	-51.37	0.01	6.70	51.37	-0.01	0.000%
49	-5.80	-51.37	-3.36	5.80	51.37	3.36	0.000%
50	-3.34	-51.37	-5.83	3.34	51.37	5.83	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	0.00049505
3	Yes	4	0.00000001	0.00032132
4	Yes	5	0.00000001	0.00048832
5	Yes	5	0.00000001	0.00023821
6	Yes	5	0.00000001	0.00048391
7	Yes	5	0.00000001	0.00023621
8	Yes	4	0.00000001	0.00041768
9	Yes	4	0.00000001	0.00026824
10	Yes	5	0.00000001	0.00046807
11	Yes	5	0.00000001	0.00022840
12	Yes	5	0.00000001	0.00049269
13	Yes	5	0.00000001	0.00024111
14	Yes	4	0.00000001	0.00046711
15	Yes	4	0.00000001	0.00030182
16	Yes	5	0.00000001	0.00047558
17	Yes	5	0.00000001	0.00023220
18	Yes	5	0.00000001	0.00047856
19	Yes	5	0.00000001	0.00023369
20	Yes	4	0.00000001	0.00039415
21	Yes	4	0.00000001	0.00025121
22	Yes	5	0.00000001	0.00049316
23	Yes	5	0.00000001	0.00024111
24	Yes	5	0.00000001	0.00046991
25	Yes	5	0.00000001	0.00022889
26	Yes	4	0.00000001	0.00000931
27	Yes	5	0.00000001	0.00019653
28	Yes	5	0.00000001	0.00022535
29	Yes	5	0.00000001	0.00022356
30	Yes	5	0.00000001	0.00019469
31	Yes	5	0.00000001	0.00022077
32	Yes	5	0.00000001	0.00022218
33	Yes	5	0.00000001	0.00019399
34	Yes	5	0.00000001	0.00022008
35	Yes	5	0.00000001	0.00022092
36	Yes	5	0.00000001	0.00019378
37	Yes	5	0.00000001	0.00022317
38	Yes	5	0.00000001	0.00022263
39	Yes	4	0.00000001	0.00005191
40	Yes	4	0.00000001	0.00020418
41	Yes	4	0.00000001	0.00019907
42	Yes	4	0.00000001	0.00004843
43	Yes	4	0.00000001	0.00018242
44	Yes	4	0.00000001	0.00021053
45	Yes	4	0.00000001	0.00005127
46	Yes	4	0.00000001	0.00018890
47	Yes	4	0.00000001	0.00019244
48	Yes	4	0.00000001	0.00004820
49	Yes	4	0.00000001	0.00021175
50	Yes	4	0.00000001	0.00018493

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	15.655	39	0.8546	0.0011
L2	152 - 111.29	14.227	39	0.8474	0.0011
L3	116.71 - 77.42	8.377	39	0.7003	0.0007
L4	83.59 - 36.46	4.207	39	0.4767	0.0004
L5	43.54 - 0	1.146	39	0.2365	0.0002

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	AIR6449 B41_T-MOBILE w/ Mount Pipe	39	15.655	0.8546	0.0011	59369
152.00	RRUS 11	39	14.227	0.8474	0.0011	38138
150.00	HPA-65R-BUU-H6 w/ Mount Pipe	39	13.873	0.8442	0.0011	31569
140.00	Side by Side Mounting Kit	39	12.129	0.8172	0.0010	17864
120.00	APXVTM14-ALU-I20 w/ Mount Pipe	39	8.871	0.7202	0.0007	9601
119.00	800MHZ RRH	39	8.719	0.7142	0.0007	9405
72.00	(2) GPS_A	39	3.092	0.4023	0.0003	8786

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	62.364	2	3.4018	0.0043
L2	152 - 111.29	56.687	2	3.3731	0.0043
L3	116.71 - 77.42	33.399	2	2.7911	0.0026
L4	83.59 - 36.46	16.777	2	1.9016	0.0015
L5	43.54 - 0	4.571	2	0.9433	0.0006

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	AIR6449 B41_T-MOBILE w/ Mount Pipe	2	62.364	3.4018	0.0043	15118
152.00	RRUS 11	2	56.687	3.3731	0.0043	9706
150.00	HPA-65R-BUU-H6 w/ Mount Pipe	2	55.277	3.3603	0.0043	8032
140.00	Side by Side Mounting Kit	2	48.337	3.2536	0.0039	4539
120.00	APXVTM14-ALU-I20 w/ Mount Pipe	2	35.367	2.8702	0.0028	2436
119.00	800MHZ RRH	2	34.763	2.8465	0.0027	2386
72.00	(2) GPS_A	2	12.331	1.6049	0.0013	2206

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	8.00	0.00	0.0	18.111	-4.41	1059.50	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.71	0.00	0.0	29.766	-20.51	1741.34	0.012
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	39.29	0.00	0.0	43.194	-28.17	2526.88	0.011

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 $\frac{P_u}{\phi P_n}$
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	47.13	0.00	0.0	70.504 4	-42.17	4124.51	0.010
L5	36.46 - 0 (5)	TP59x50.3353x0.5	43.54	0.00	0.0	92.839 5	-61.63	5431.11	0.011

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	43.24	701.24	0.062	0.00	701.24	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	511.51	1472.44	0.347	0.00	1472.44	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	1180.68	2556.32	0.462	0.00	2556.32	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	2099.22	5177.14	0.405	0.00	5177.14	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	3213.64	7835.57	0.410	0.00	7835.57	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	160 - 152 (1)	TP30.62x29x0.1875	4.72	317.85	0.015	0.02	847.11	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	18.98	517.17	0.037	0.44	1716.19	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	21.37	752.73	0.028	0.53	2891.07	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	24.33	1237.35	0.020	1.35	5501.79	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	26.76	1629.33	0.016	1.45	8347.33	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P <sub>u</sub> φP <sub>n</sub>	Ratio M <sub>ux</sub> φM <sub>nx</sub>	Ratio M <sub>uy</sub> φM <sub>ny</sub>	Ratio V <sub>u</sub> φV <sub>n</sub>	Ratio T <sub>u</sub> φT <sub>n</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.062	0.000	0.015	0.000	0.066	1.050	4.8.2
L2	152 - 111.29 (2)	0.012	0.347	0.000	0.037	0.000	0.361	1.050	4.8.2
L3	111.29 - 77.42 (3)	0.011	0.462	0.000	0.028	0.000	0.474	1.050	4.8.2
L4	77.42 - 36.46 (4)	0.010	0.405	0.000	0.020	0.000	0.416	1.050	4.8.2
L5	36.46 - 0 (5)	0.011	0.410	0.000	0.016	0.000	0.422	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	160 - 152	Pole	TP30.62x29x0.1875	1	-4.41	1112.47	6.3	Pass	
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-20.51	1828.41	34.3	Pass	
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-28.17	2653.22	45.1	Pass	
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-42.17	4330.74	39.6	Pass	
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-61.63	5702.67	40.2	Pass	
							Summary		
							Pole (L3)	45.1	Pass
							<b>RATING =</b>	<b>45.1</b>	<b>Pass</b>

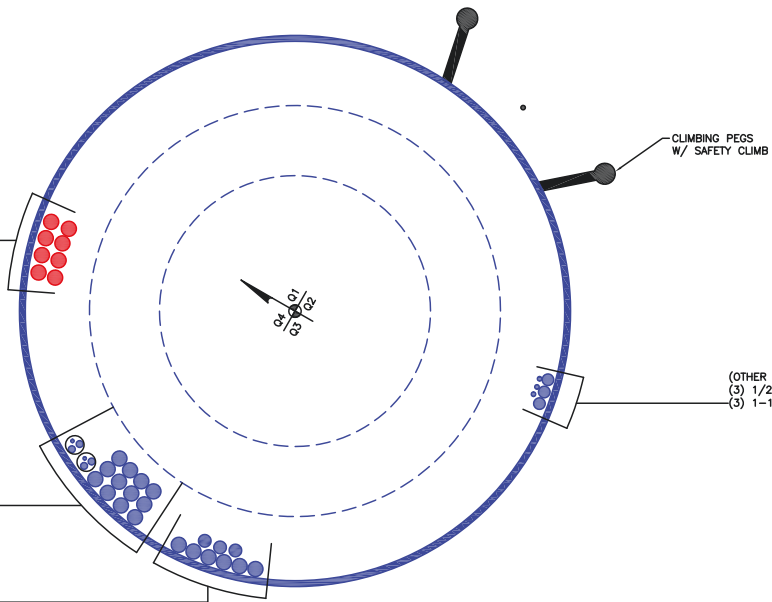
**APPENDIX B**  
**BASE LEVEL DRAWING**



(PROPOSED EQUIPMENT CONFIGURATION)  
(8) 1-5/8" TO 140 FT LEVEL

(OTHER CONSIDERED EQUIPMENT-IN CONDUITS)  
(2) 3/8" TO 150 FT LEVEL  
(4) 3/4" TO 150 FT LEVEL  
(OTHER CONSIDERED EQUIPMENT)  
(12) 1-5/8" TO 150 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(3) 1-3/8" TO 160 FT LEVEL  
(6) 1-5/8" TO 160 FT LEVEL



CLIMBING PEGS  
W/ SAFETY CLIMB

(OTHER CONSIDERED EQUIPMENT)  
(3) 1/2" TO 72 FT LEVEL  
(3) 1-1/4" TO 120 FT LEVEL



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

# Monopole Flange Plate Connection

Elevation = 152 ft.

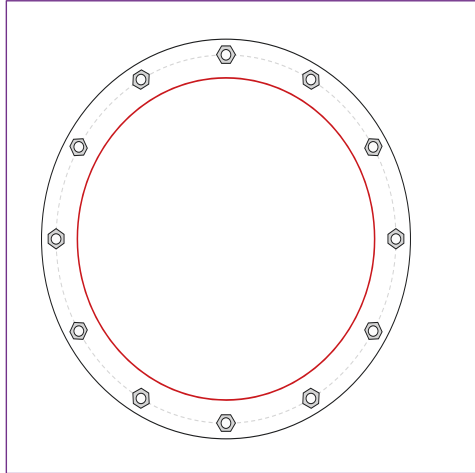


BU #	841290
Site Name	Greenwich North
Order #	
TIA-222 Revision	
	H

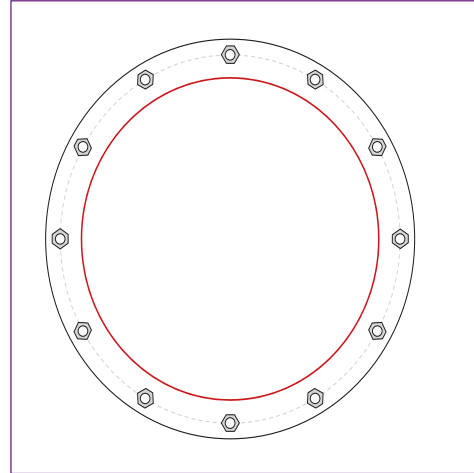
Applied Loads	
Moment (kip-ft)	43.24
Axial Force (kips)	4.41
Shear Force (kips)	4.72

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



### Connection Properties

#### Bolt Data

(12) 1"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 35" BC

#### Top Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

#### Top Stiffener Data

N/A

#### Top Pole Data

30.62" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

#### Bottom Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

#### Bottom Stiffener Data

N/A

#### Bottom Pole Data

30.62" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

### Analysis Results

#### Bolt Capacity

Max Load (kips)	4.57
Allowable (kips)	54.54
Stress Rating:	<b>8.0%</b> Pass

#### Top Plate Capacity

Max Stress (ksi):	3.87	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.8%</b>	Pass
Tension Side Stress Rating:	<b>2.9%</b>	Pass

#### Bottom Plate Capacity

Max Stress (ksi):	3.87	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.8%</b>	Pass
Tension Side Stress Rating:	<b>2.9%</b>	Pass

# Monopole Base Plate Connection

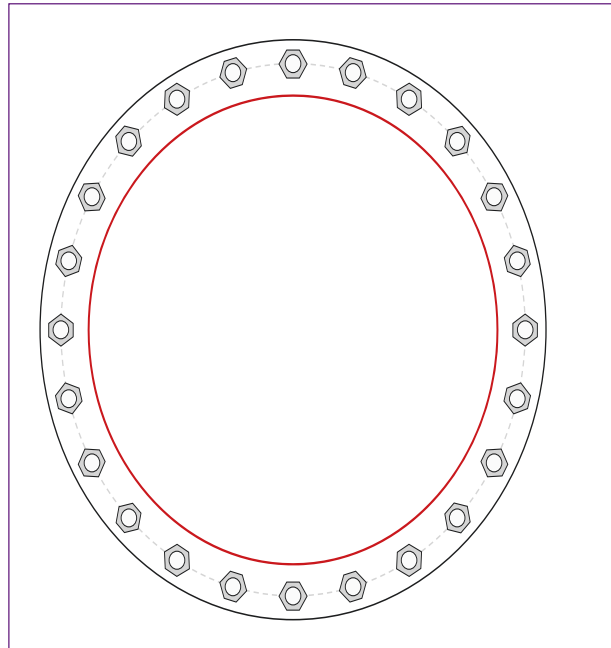


Site Info	
BU #	841290
Site Name	Greenwich North
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$I_{ar}$ (in)	0.625

Applied Loads	
Moment (kip-ft)	3213.64
Axial Force (kips)	61.63
Shear Force (kips)	26.76

\*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data	
(24) 2-1/4" $\phi$ bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 67" BC	
Base Plate Data	
73" OD x 2.25" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)	
Stiffener Data	
N/A	
Pole Data	
59" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)	

Anchor Rod Summary		<i>(units of kips, kip-in)</i>	
$Pu_t = 93.32$	$\phi Pn_t = 243.75$		<b>Stress Rating</b>
$Vu = 1.11$	$\phi Vn = 149.1$		<b>36.5%</b>
$Mu = n/a$	$\phi Mn = n/a$		<b>Pass</b>
Base Plate Summary			
Max Stress (ksi):	24.62		(Flexural)
Allowable Stress (ksi):	54		
Stress Rating:	<b>43.4%</b>		<b>Pass</b>

# Pier and Pad Foundation



BU #: 841290  
 Site Name: Greenwich North  
 App. Number:

TIA-222 Revision: H  
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	61.64	kips
Base Shear, $Vu_{comp}$ :	26.74	kips
Moment, $M_u$ :	3213.64	ft-kips
Tower Height, $H$ :	160	ft
BP Dist. Above Fdn, $bp_{dist}$ :	2.875	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	578.65	26.74	4.4%	Pass
<i>Bearing Pressure (ksf)</i>	22.50	2.97	13.2%	Pass
<i>Overtuning (kip*ft)</i>	8998.40	3487.45	38.8%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	5549.96	3360.71	57.7%	Pass
<i>Pier Compression (kip)</i>	31187.52	110.15	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	6340.37	1151.79	17.3%	Pass
<i>Pad Shear - 1-way (kips)</i>	1397.27	146.77	10.0%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.017	8.7%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	10196.70	2016.43	18.8%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$ :	7	ft
Ext. Above Grade, $E$ :	0.5	ft
Pier Rebar Size, $Sc$ :	11	
Pier Rebar Quantity, $mc$ :	22	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	4	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	57.7%
Soil Rating*:	38.8%

Pad Properties		
Depth, $D$ :	9.5	ft
Pad Width, $W_1$ :	25	ft
Pad Thickness, $T$ :	4.5	ft
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	10	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	23	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $Fy$ :	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 Gross Bearing, $Qult$ :	30.000	ksf
Cohesion, $Cu$ :	0.000	ksf
Friction Angle, $\phi$ :	34	degrees
SPT Blow Count, $N_{blows}$ :	16	
Base Friction, $\mu$ :	0.55	
Neglected Depth, $N$ :	5.00	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	N/A	ft

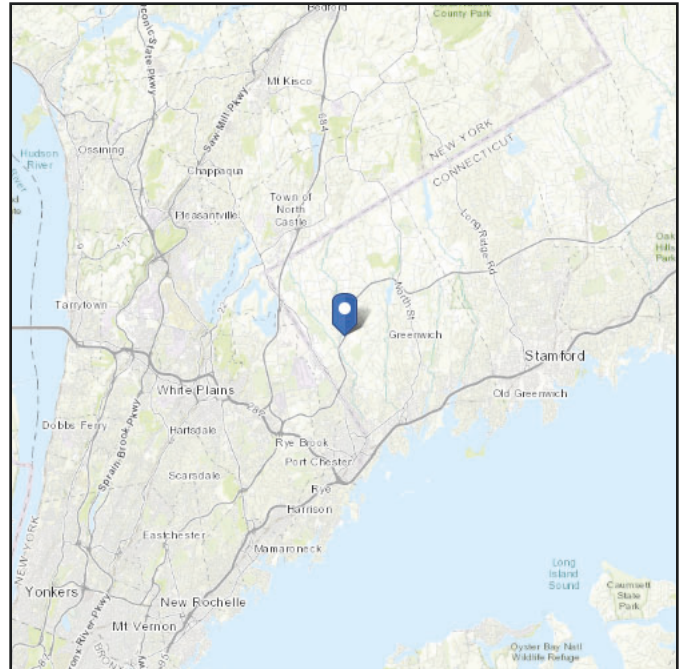
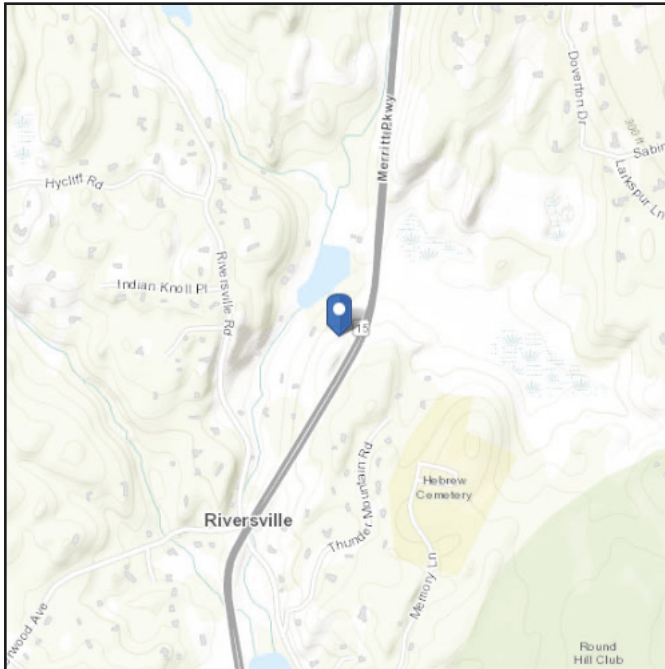
<-- Toggle between Gross and Net

# 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)

**Latitude:** 41.066278  
**Longitude:** -73.6715  
**Elevation:** 223.25246128449845 ft (NAVD 88)



## Wind

### Results:

Wind Speed	116 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 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 Oct 25 2023

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).

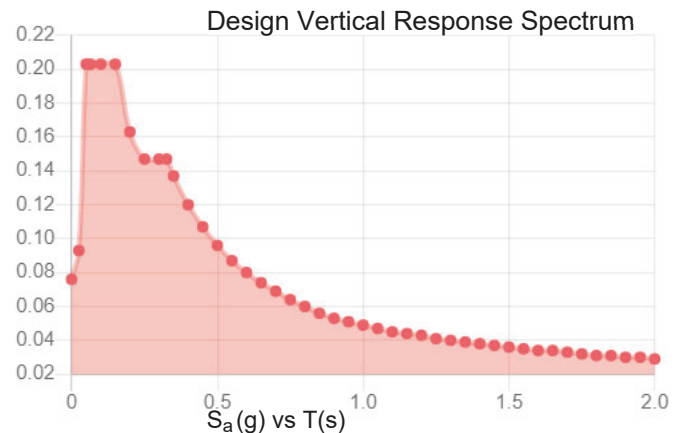
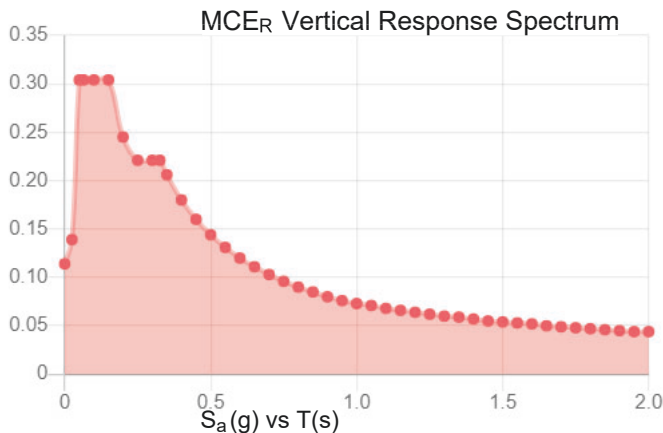
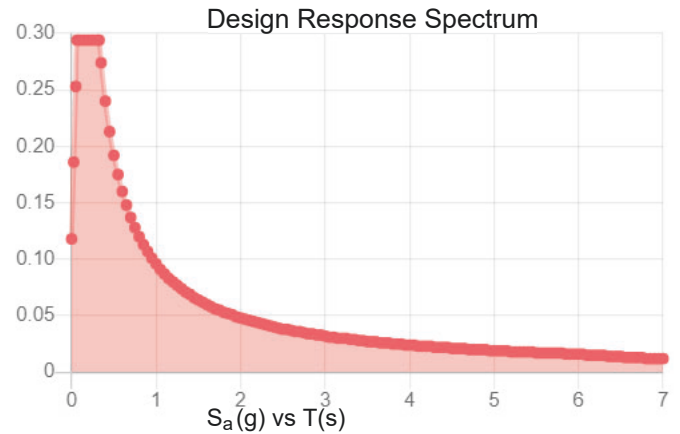
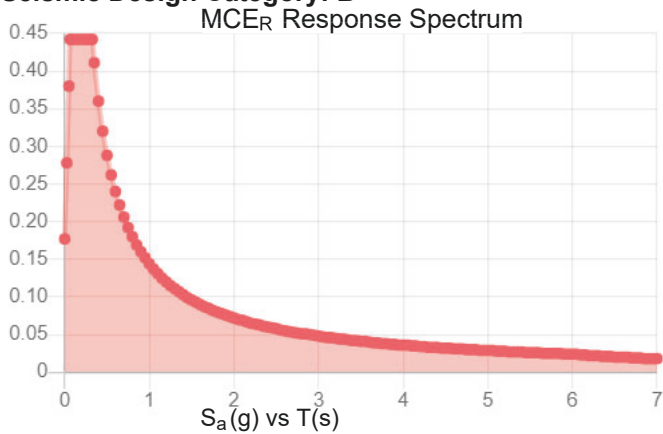
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:**

**Results:**

$S_s$ :	0.28	$S_{D1}$ :	0.096
$S_1$ :	0.06	$T_L$ :	6
$F_a$ :	1.576	PGA :	0.171
$F_v$ :	2.4	PGA <sub>M</sub> :	0.25
$S_{MS}$ :	0.442	$F_{PGA}$ :	1.457
$S_{M1}$ :	0.144	$I_e$ :	1
$S_{DS}$ :	0.294	$C_v$ :	0.861

**Seismic Design Category: B**



**Data Accessed:**

**Wed Oct 25 2023**

**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:** Wed Oct 25 2023

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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