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
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

April 26, 2024

Jeffrey Barbadora
Permitting Specialist
Crown Castle
1800 West Park Drive
Westborough, MA 01581
Jeff.Barbadora@crowncastle.com

RE: **EM-VER-168-230927** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1440 Main Street North, Woodbury, Connecticut. R**equest for Project Change.**

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated April 24, 2024 and the associated Structural Analysis dated October 18, 2023, regarding a project change for the above-referenced exempt modification request acknowledged by the Council on October 30, 2023.

Pursuant to Condition No. 1 of the Council's October 30, 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 April 24, 2024.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/ANM/laf

c: The Honorable Barbara Perkinson, First Selectperson, Town of Woodbury (barbaraperkinson@woodburyct.org)

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Sent: Wednesday, April 24, 2024 12:59 PM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: EM-VER-168-230927 - 1440 Main Street North, Woodbury - 876379

Good afternoon,

Would the CSC please update the approval for EM-VER-168-230927 to include a total of 2 filters?

The original SA submitted with the application and dated 8/01/2023 stated only 1 filter and should have stated 2 filters.

Please see updated SA stating 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

Date: **October 18, 2023**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Site Number:	5000244828
	Site Name:	WOODBURY N CT
Crown Castle Designation:	**BU Number:**	876379
	Site Name:	N. WOODBURY / WOLFF
PARCEL		
	JDE Job Number:	2103468
	Work Order Number:	2264925
	Order Number:	658777 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	2264925
Site Data:	**1440 Main Street North, WOODBURY, LITCHFIELD County, CT** **Latitude *41° 35' 23.81"*, Longitude *-73° 10' 11.52"*** **163.007 Foot - Monopole Tower**	

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

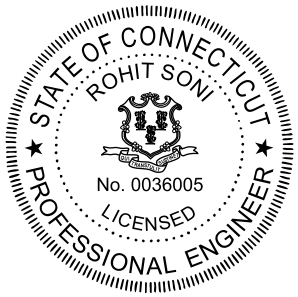
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity-53.8%**

This analysis has been performed in accordance with the 2021 International 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

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1) INTRODUCTION

This tower is a 163.007 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC..

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	116 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
149.0	151.0	2	kaelus	BSF0020F3V1	7	1-5/8
		3	samsung telecom.	RFV01U-D1A		
		3	samsung telecom.	RFV01U-D2A		
	150.0	2	rfs celwave	DB-C1-12C-24AB-0Z		
	149.0	6	antel	LPA-80080/6CF w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 405-1_KCKR-HR-1]		
		1	tower mounts	Side Arm Mount [SO 103-3]		
	148.0	6	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	samsung telecom.	MT6407-77A w/ Mount Pipe		

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)
158.0	172.0	1	sinclair	SC229-SFXLDF w/ Mount Pipe	-	-
	158.0	1	tower mounts	Pipe Mount [PM 601-1]		
157.0	159.0	3	rfs celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	3	1-5/8
	158.0	3	commscope	HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe		
		1	ericsson	RADIO 2X2212 B2		
		3	ericsson	RADIO 4415 B66A_CCIV3		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
	157.0	3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		2	ericsson	RADIO 2X2212 B2		
		1	tower mounts	Platform Mount [LP 602-1]		
139.0	142.0	3	fujitsu	TA08025-B604	1	1-3/4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	fujitsu	TA08025-B605		
	140.0	3	commscope	FFVV-65B-R2 w/ Mount Pipe		
	139.0	1	tower mounts	Commscope MC-PK8-DSH		
	138.0	1	raycap	RDIDC-9181-PF-48		
119.0	124.0	1	raycap	DC6-48-60-0-8C-EV	2 4 2 12	3/8 7/8 Conduit 1-5/8
	123.0	1	ericsson	RRUS 4449 B5/B12		
		2	ericsson	RRUS 4478 B14		
	122.0	1	ericsson	RRUS 4449 B5/B12		
	121.0	1	ericsson	RRUS 4449 B5/B12		
		1	ericsson	RRUS 4478 B14		
		1	ericsson	RRUS 8843 B2/B66A		
		2	powerwave tech.	7770.00 w/ Mount Pipe		
		1	raycap	DC6-48-60-18-8F		
	120.0	6	commscope	NNHH-65B-R4 w/ Mount Pipe		
		2	ericsson	RRUS 8843 B2/B66A		
		1	powerwave tech.	7770.00 w/ Mount Pipe		
		1	powerwave tech.	TT19-08BP111-001		
	119.0	1	tower mounts	Platform Mount [LP 405-1_KCKR-HR-1]		
		1	tower mounts	Side Arm Mount [SO 103-3]		
		2	powerwave tech.	TT19-08BP111-001		
106.0	106.0	1	telewave	ANT150D6-9	1	1/2
21.0	23.0	1	lucent	KS24019-L112A w/ Mount Pipe	1	1/2
	21.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1531966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1614612	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1613543	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	163.007 - 121.587	Pole	TP42.37x34.28x0.3125	1	-17.39	2492.97	17.0	Pass
L2	121.587 - 84.67	Pole	TP48.83x40.6057x0.375	2	-32.08	3448.83	32.8	Pass
L3	84.67 - 42.2067	Pole	TP56.25x46.7975x0.4375	3	-47.34	4636.15	41.6	Pass
L4	42.2067 - 0	Pole	TP63.5x53.916x0.5	4	-71.04	6141.33	46.1	Pass
							Summary	
						Pole (L4)	46.1	Pass
						Rating =	46.1	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.6	Pass
1	Base Plate	0	45.5	Pass
1	Base Foundation (Structure)	0	53.8	Pass
1	Base Foundation (Soil Interaction)	0	25.5	Pass

Structure Rating (max from all components) =	53.8%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

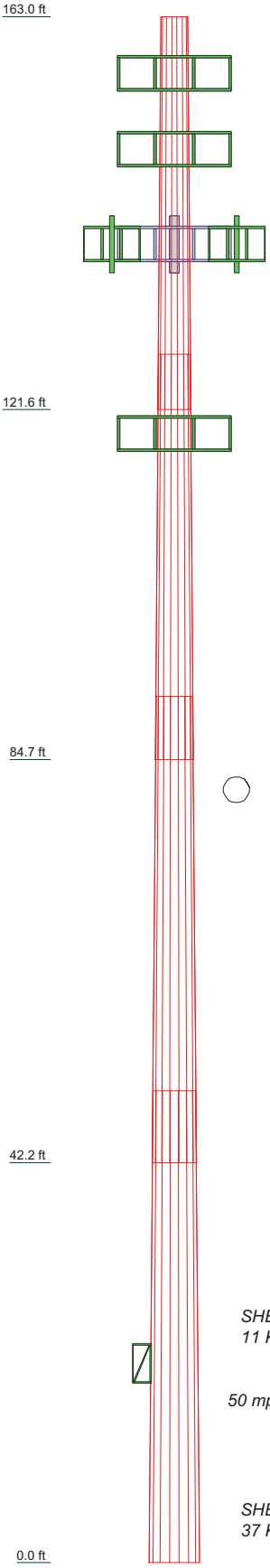
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	41.42	42.75	49.13	49.79
Number of Sides	18	18	18	18
Thickness (in)	0.3125	0.3750	0.4375	0.5000
Socket Length (ft)	5.83	6.67	7.58	
Top Dia (in)	34.2800	40.6057	46.7975	53.9160
Bot Dia (in)	42.3700	48.8300	56.2500	63.5000
Grade	A572-65			
Weight (K)	5.3	7.7	11.9	15.7

40.5



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C 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: 46.1%

CROWN CASTLE
The Foundation for a Wireless World

Crown Castle
2000 Corporate Drive
Canonsburg PA 15317
Phone: (724) 416-2000
FAX: (724) 416-4623

Job: ***BU# 876379***			
Project:			
Client: Crown Castle	Drawn by: Didi Rossmiller		App'd:
Code: TIA-222-H	Date: 10/18/23		Scale: NTS
Path: C:\Users\DRossmiller\Desktop\temporary\876379\WO 2264925 - SA\Prod\876379.er			Dwg No. E-1

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: 490.00 ft.
- Basic wind speed of 116 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- 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		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Forces in Supporting Bracing Members
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	163.01-121.59	41.42	5.83	18	34.2800	42.3700	0.3125	1.2500	A572-65 (65 ksi)
L2	121.59-84.67	42.75	6.67	18	40.6057	48.8300	0.3750	1.5000	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	84.67-42.21	49.13	7.58	18	46.7975	56.2500	0.4375	1.7500	A572-65 (65 ksi)
L4	42.21-0.00	49.79		18	53.9160	63.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	34.7606	33.6915	4911.1720	12.0585	17.4142	282.0205	9828.8063	16.8490	5.4833	17.546
	42.9754	41.7158	9322.3361	14.9304	21.5240	433.1144	18656.9387	20.8619	6.9071	22.103
L2	42.3138	47.8845	9791.4486	14.2819	20.6277	474.6754	19595.7811	23.9468	6.4866	17.298
	49.5254	57.6736	17107.6924	17.2015	24.8056	689.6695	34237.8956	28.8423	7.9341	21.158
L3	48.7543	64.3766	17480.3987	16.4578	23.7731	735.3015	34983.7986	32.1944	7.4664	17.066
	57.0503	77.5026	30501.1953	19.8134	28.5750	1067.4084	61042.5248	38.7587	9.1300	20.869
L4	56.1528	84.7712	30558.2079	18.9627	27.3893	1115.6981	61156.6251	42.3936	8.6092	17.218
	64.4025	99.9810	50134.4235	22.3650	32.2580	1554.1702	100334.8152	50.0000	10.2960	20.592

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 163.01-121.59				1	1	1			
L2 121.59-84.67				1	1	1			
L3 84.67-42.21				1	1	1			
L4 42.21-0.00				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 plf
******										
Safety Line 3/8	C	No	Surface Ar (CaAa)	163.00 - 0.00	1	1	-0.167 -0.167	0.3750		0.22
*** 21 ***										
LDF4-50A(1/2)	C	No	Surface Ar (CaAa)	21.00 - 0.00	1	1	0.167 0.167	0.6300		0.15
******										
*******										
*****										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*** 158 ***									
LDF4-50A(1/2)	B	No	No	Inside Pole	158.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
*** 157 ***									
HB158-21U6S24-xxM_TMO(1-5/8)	A	No	No	Inside Pole	157.00 - 0.00	3	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
*** 149 ***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	149.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
HB158-1-13U6-S6F18(1-5/8)	A	No	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
*** 139 ***									
CU12PSM6P4XXX (1-3/4)	B	No	No	Inside Pole	139.00 - 0.00	1	No Ice	0.00	2.72
							1/2" Ice	0.00	2.72
							1" Ice	0.00	2.72
*** 119 ***									
2" Flexible Conduit	C	No	No	Inside Pole	119.00 - 0.00	2	No Ice	0.00	0.34
							1/2" Ice	0.00	0.34
							1" Ice	0.00	0.34
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	119.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	119.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG66ST-BRD(7/8)	C	No	No	Inside Pole	119.00 - 0.00	2	No Ice	0.00	0.91
							1/2" Ice	0.00	0.91
							1" Ice	0.00	0.91
WR-VG86ST-BRDA(7/8)	C	No	No	Inside Pole	119.00 - 0.00	2	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
LCF158-50A(1-5/8)	C	No	No	Inside Pole	119.00 - 0.00	12	No Ice	0.00	0.80
							1/2" Ice	0.00	0.80
							1" Ice	0.00	0.80
*** 106 ***									
LDF4-50A(1/2)	B	No	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
******									
*******									
*****									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	163.01-121.59	A	0.000	0.000	0.000	0.000	0.45
		B	0.000	0.000	0.000	0.000	0.05
		C	0.000	0.000	1.553	0.000	0.01
L2	121.59-84.67	A	0.000	0.000	0.000	0.000	0.53
		B	0.000	0.000	0.000	0.000	0.11
		C	0.000	0.000	1.384	0.000	0.47
L3	84.67-42.21	A	0.000	0.000	0.000	0.000	0.61
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	1.592	0.000	0.59
L4	42.21-0.00	A	0.000	0.000	0.000	0.000	0.60
		B	0.000	0.000	0.000	0.000	0.13

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	2.906	0.000	0.59

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	163.01-121.59	A	0.983	0.000	0.000	0.000	0.000	0.45
		B		0.000	0.000	0.000	0.000	0.05
		C		0.000	0.000	9.698	0.000	0.08
L2	121.59-84.67	A	0.952	0.000	0.000	0.000	0.000	0.53
		B		0.000	0.000	0.000	0.000	0.11
		C		0.000	0.000	8.645	0.000	0.53
L3	84.67-42.21	A	0.907	0.000	0.000	0.000	0.000	0.61
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	9.680	0.000	0.65
L4	42.21-0.00	A	0.814	0.000	0.000	0.000	0.000	0.60
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	14.373	0.000	0.68

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	163.01-121.59	0.1035	0.2838	0.3596	0.9858
L2	121.59-84.67	0.1036	0.2841	0.3651	1.0010
L3	84.67-42.21	0.1037	0.2843	0.3600	0.9871
L4	42.21-0.00	0.0136	0.5268	0.1454	1.4851

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_a No Ice	K_a Ice
L1	2	Safety Line 3/8	121.59 - 163.00	1.0000	1.0000
L2	2	Safety Line 3/8	84.67 - 121.59	1.0000	1.0000
L3	2	Safety Line 3/8	42.21 - 84.67	1.0000	1.0000
L4	2	Safety Line 3/8	0.00 - 42.21	1.0000	1.0000
L4	26	LDF4-50A(1/2)	0.00 - 21.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
****** ******* ******* ****** ***** ******* *** 158 ***					
Pipe Mount [PM 601-1]	A	From Leg	0.50 0.00 0.00	0.0000	158.00
SC229-SFXLDF w/ Mount Pipe	A	From Leg	4.00 0.00 14.00	0.0000	158.00
*** 157 ***					
Platform Mount [LP 602-1]	C	None		0.0000	157.00
8' Ladder	C	From Centroid-Face	2.00 0.00 -4.00	0.0000	157.00
6' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	157.00
6' x 2" Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	157.00
6' x 2" Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	157.00
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	157.00
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	157.00
HBXX-6516DS-A2M_T-MOBILE w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	157.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	157.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	157.00
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	157.00
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	157.00
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	157.00
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	157.00
RADIO 2X2212 B2	A	From Leg	4.00 0.00 0.00	0.0000	157.00
RADIO 2X2212 B2	B	From Leg	4.00 0.00 1.00	0.0000	157.00
RADIO 2X2212 B2	C	From Leg	4.00 0.00 0.00	0.0000	157.00
RADIO 4415 B66A_CCIV3	A	From Leg	4.00 0.00	0.0000	157.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RADIO 4415 B66A_CCIV3	B	From Leg	1.00 4.00 0.00	0.0000	157.00
RADIO 4415 B66A_CCIV3	C	From Leg	1.00 4.00 0.00	0.0000	157.00
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	1.00 4.00 0.00	0.0000	157.00
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	1.00 4.00 0.00	0.0000	157.00
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	1.00 4.00 0.00	0.0000	157.00
*** 149 *** BSF0020F3V1	B	From Leg	1.00 4.00 0.00	0.0000	149.00
BSF0020F3V1	C	From Leg	2.00 4.00 0.00	0.0000	149.00
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	2.00 4.00 0.00	0.0000	149.00
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	-1.00 4.00 0.00	0.0000	149.00
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	-1.00 4.00 0.00	0.0000	149.00
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	-1.00 4.00 0.00	0.0000	149.00
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	0.00 4.00 0.00	0.0000	149.00
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	0.00 4.00 0.00	0.0000	149.00
MT6407-77A w/ Mount Pipe	A	From Leg	0.00 4.00 0.00	0.0000	149.00
MT6407-77A w/ Mount Pipe	B	From Leg	-1.00 4.00 0.00	0.0000	149.00
MT6407-77A w/ Mount Pipe	C	From Leg	-1.00 4.00 0.00	0.0000	149.00
(2) DB-C1-12C-24AB-0Z	A	From Leg	-1.00 4.00 0.00	0.0000	149.00
RFV01U-D1A	A	From Leg	1.00 4.00 0.00	0.0000	149.00
RFV01U-D1A	B	From Leg	2.00 4.00 0.00	0.0000	149.00
RFV01U-D1A	C	From Leg	2.00 4.00 0.00	0.0000	149.00
RFV01U-D2A	A	From Leg	2.00 4.00 0.00 2.00	0.0000	149.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RFV01U-D2A	B	From Leg	4.00 0.00 2.00	0.0000	149.00
RFV01U-D2A	C	From Leg	4.00 0.00 2.00	0.0000	149.00
Platform Mount [LP 405-1_KCKR-HR-1]	C	None		0.0000	149.00
Side Arm Mount [SO 103-3]	C	None		0.0000	149.00
*** 139 ***					
FFVV-65B-R2 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	139.00
FFVV-65B-R2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	139.00
FFVV-65B-R2 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	139.00
TA08025-B604	A	From Leg	4.00 0.00 3.00	0.0000	139.00
TA08025-B604	B	From Leg	4.00 0.00 3.00	0.0000	139.00
TA08025-B604	C	From Leg	4.00 0.00 3.00	0.0000	139.00
TA08025-B605	A	From Leg	4.00 0.00 3.00	0.0000	139.00
TA08025-B605	B	From Leg	4.00 0.00 3.00	0.0000	139.00
TA08025-B605	C	From Leg	4.00 0.00 3.00	0.0000	139.00
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 -1.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	139.00
(2) 8' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	139.00
Commscope MC-PK8-DSH	C	None		0.0000	139.00
*** 119 ***					
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	119.00
(2) NNHH-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	119.00
(2) NNHH-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	119.00
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	119.00
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	119.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	119.00
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 3.00	0.0000	119.00
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 4.00	0.0000	119.00
RRUS 4449 B5/B12	C	From Leg	4.00 0.00 2.00	0.0000	119.00
RRUS 4478 B14	A	From Leg	4.00 0.00 4.00	0.0000	119.00
RRUS 4478 B14	B	From Leg	4.00 0.00 4.00	0.0000	119.00
RRUS 4478 B14	C	From Leg	4.00 0.00 2.00	0.0000	119.00
RRUS 8843 B2/B66A	A	From Leg	4.00 0.00 1.00	0.0000	119.00
RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 2.00	0.0000	119.00
RRUS 8843 B2/B66A	C	From Leg	4.00 0.00 1.00	0.0000	119.00
TT19-08BP111-001	A	From Leg	4.00 0.00 0.00	0.0000	119.00
TT19-08BP111-001	B	From Leg	4.00 0.00 0.00	0.0000	119.00
TT19-08BP111-001	C	From Leg	4.00 0.00 1.00	0.0000	119.00
DC6-48-60-0-8C-EV	C	From Leg	4.00 0.00 5.00	0.0000	119.00
DC6-48-60-18-8F	A	From Leg	4.00 0.00 2.00	0.0000	119.00
Platform Mount [LP 405-1_KCKR-HR-1]	C	None		0.0000	119.00
Side Arm Mount [SO 103-3]	C	None		0.0000	119.00
6' x 2" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	119.00
6' x 2" Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	119.00
6' x 2" Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	119.00
*** 106 *** ANT150D6-9	A	From Leg	4.00 0.00 0.00	0.0000	106.00
*** 21 *** KS24019-L112A w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	21.00
Side Arm Mount [SO 701-1]	C	From Leg	1.50	0.0000	21.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
			0.00 0.00		
** *** *** ***					

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
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

Comb. No.	Description
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	163.007 - 121.587	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	26	-29.14	0.01	4.83
			Max. Mx	20	-17.39	392.56	1.74
			Max. My	2	-17.39	0.00	391.20
			Max. Vy	20	-17.89	392.56	1.74
			Max. Vx	2	-17.78	0.00	391.20
			Max. Torque	9			5.56
L2	121.587 - 84.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.96	0.38	4.91
			Max. Mx	20	-32.08	1247.40	1.92
			Max. My	2	-32.08	0.23	1242.10
			Max. Vy	20	-26.91	1247.40	1.92
			Max. Vx	2	-26.80	0.23	1242.10
			Max. Torque	9			6.58
L3	84.67 - 42.2067	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.81	0.38	4.74
			Max. Mx	20	-47.34	2469.84	2.00
			Max. My	2	-47.35	0.24	2460.18
			Max. Vy	20	-31.82	2469.84	2.00
			Max. Vx	2	-31.72	0.24	2460.18
			Max. Torque	9			6.58
L4	42.2067 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-94.52	0.60	4.16
			Max. Mx	20	-71.04	4184.50	2.02
			Max. My	2	-71.04	0.68	4169.57
			Max. Vy	20	-36.71	4184.50	2.02
			Max. Vx	2	-36.62	0.68	4169.57
			Max. Torque	9			6.58

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	94.52	0.00	10.83
	Max. H_x	20	71.06	36.68	0.01
	Max. H_z	2	71.06	0.01	36.59
	Max. M_x	2	4169.57	0.01	36.59
	Max. M_z	8	4183.72	-36.68	-0.01
	Max. Torsion	9	6.44	-36.68	-0.01
	Min. Vert	17	53.29	18.33	-31.68
	Min. H_x	8	71.06	-36.68	-0.01
	Min. H_z	14	71.06	-0.01	-36.59
	Min. M_x	14	-4166.07	-0.01	-36.59
	Min. M_z	20	-4184.50	36.68	0.01
	Min. Torsion	21	-6.44	36.68	0.01

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	59.21	0.00	0.00	-1.37	0.32	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	71.06	-0.01	-36.59	-4169.57	0.68	-0.31
0.9 Dead+1.0 Wind 0 deg - No Ice	53.29	-0.01	-36.59	-4135.44	0.57	-0.31
1.2 Dead+1.0 Wind 30 deg - No Ice	71.06	18.33	-31.68	-3611.05	-2091.43	-3.48
0.9 Dead+1.0 Wind 30 deg - No Ice	53.29	18.33	-31.68	-3581.42	-2074.61	-3.49
1.2 Dead+1.0 Wind 60 deg - No Ice	71.06	31.76	-18.28	-2085.40	-3623.02	-5.73
0.9 Dead+1.0 Wind 60 deg - No Ice	53.29	31.76	-18.28	-2068.10	-3593.82	-5.73
1.2 Dead+1.0 Wind 90 deg - No Ice	71.06	36.68	0.01	-1.45	-4183.72	-6.43
0.9 Dead+1.0 Wind 90 deg - No Ice	53.29	36.68	0.01	-1.00	-4149.98	-6.44
1.2 Dead+1.0 Wind 120 deg - No Ice	71.06	31.77	18.30	2082.41	-3623.29	-5.42
0.9 Dead+1.0 Wind 120 deg - No Ice	53.29	31.77	18.30	2066.03	-3594.09	-5.42
1.2 Dead+1.0 Wind 150 deg - No Ice	71.06	18.35	31.69	3607.83	-2091.91	-2.95
0.9 Dead+1.0 Wind 150 deg - No Ice	53.29	18.35	31.69	3579.12	-2075.09	-2.95
1.2 Dead+1.0 Wind 180 deg - No Ice	71.06	0.01	36.59	4166.07	0.11	0.31
0.9 Dead+1.0 Wind 180 deg - No Ice	53.29	0.01	36.59	4132.85	0.01	0.31
1.2 Dead+1.0 Wind 210 deg - No Ice	71.06	-18.33	31.68	3607.55	2092.20	3.48
0.9 Dead+1.0 Wind 210 deg - No Ice	53.29	-18.33	31.68	3578.84	2075.18	3.49
1.2 Dead+1.0 Wind 240 deg - No Ice	71.06	-31.76	18.28	2081.92	3623.79	5.73
0.9 Dead+1.0 Wind 240 deg - No Ice	53.29	-31.76	18.28	2065.54	3594.39	5.73
1.2 Dead+1.0 Wind 270 deg - No Ice	71.06	-36.68	-0.01	-2.02	4184.50	6.43
0.9 Dead+1.0 Wind 270 deg - No Ice	53.29	-36.68	-0.01	-1.56	4150.57	6.44
1.2 Dead+1.0 Wind 300 deg - No Ice	71.06	-31.77	-18.30	-2085.89	3624.09	5.42
0.9 Dead+1.0 Wind 300 deg - No Ice	53.29	-31.77	-18.30	-2068.59	3594.69	5.42
1.2 Dead+1.0 Wind 330 deg - No Ice	71.06	-18.35	-31.69	-3611.33	2092.71	2.95
0.9 Dead+1.0 Wind 330 deg - No Ice	53.29	-18.35	-31.69	-3581.70	2075.69	2.95
1.2 Dead+1.0 Ice+1.0 Temp	94.52	-0.00	-0.00	-4.16	0.60	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	94.52	-0.00	-10.83	-1231.08	0.71	-0.10
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	94.52	5.42	-9.38	-1066.69	-614.03	-1.09
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	94.52	9.39	-5.41	-617.66	-1064.07	-1.79
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	94.52	10.84	0.00	-4.31	-1228.82	-2.01
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	94.52	9.39	5.42	609.01	-1064.15	-1.69
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	94.52	5.42	9.38	1057.98	-614.17	-0.92
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	94.52	0.00	10.83	1222.27	0.53	0.10
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	94.52	-5.42	9.38	1057.89	615.27	1.09
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	94.52	-9.39	5.41	608.86	1065.30	1.79

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	94.52	-10.84	-0.00	-4.48	1230.06	2.01
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	94.52	-9.39	-5.42	-617.81	1065.39	1.69
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	94.52	-5.42	-9.38	-1066.77	615.42	0.92
Dead+Wind 0 deg - Service	59.21	-0.00	-9.22	-1046.66	0.40	-0.09
Dead+Wind 30 deg - Service	59.21	4.62	-7.98	-906.60	-524.26	-0.89
Dead+Wind 60 deg - Service	59.21	8.00	-4.61	-523.99	-908.36	-1.45
Dead+Wind 90 deg - Service	59.21	9.24	0.00	-1.38	-1048.97	-1.63
Dead+Wind 120 deg - Service	59.21	8.01	4.61	521.22	-908.43	-1.37
Dead+Wind 150 deg - Service	59.21	4.62	7.99	903.77	-524.38	-0.74
Dead+Wind 180 deg - Service	59.21	0.00	9.22	1043.76	0.25	0.09
Dead+Wind 210 deg - Service	59.21	-4.62	7.98	903.70	524.91	0.89
Dead+Wind 240 deg - Service	59.21	-8.00	4.61	521.10	909.01	1.45
Dead+Wind 270 deg - Service	59.21	-9.24	-0.00	-1.52	1049.62	1.63
Dead+Wind 300 deg - Service	59.21	-8.01	-4.61	-524.12	909.08	1.37
Dead+Wind 330 deg - Service	59.21	-4.62	-7.99	-906.67	525.04	0.74

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-59.21	0.00	0.00	59.21	0.00	0.000%
2	-0.01	-71.06	-36.59	0.01	71.06	36.59	0.000%
3	-0.01	-53.29	-36.59	0.01	53.29	36.59	0.000%
4	18.33	-71.06	-31.68	-18.33	71.06	31.68	0.000%
5	18.33	-53.29	-31.68	-18.33	53.29	31.68	0.000%
6	31.76	-71.06	-18.28	-31.76	71.06	18.28	0.000%
7	31.76	-53.29	-18.28	-31.76	53.29	18.28	0.000%
8	36.68	-71.06	0.01	-36.68	71.06	-0.01	0.000%
9	36.68	-53.29	0.01	-36.68	53.29	-0.01	0.000%
10	31.77	-71.06	18.30	-31.77	71.06	-18.30	0.000%
11	31.77	-53.29	18.30	-31.77	53.29	-18.30	0.000%
12	18.35	-71.06	31.69	-18.35	71.06	-31.69	0.000%
13	18.35	-53.29	31.69	-18.35	53.29	-31.69	0.000%
14	0.01	-71.06	36.59	-0.01	71.06	-36.59	0.000%
15	0.01	-53.29	36.59	-0.01	53.29	-36.59	0.000%
16	-18.33	-71.06	31.68	18.33	71.06	-31.68	0.000%
17	-18.33	-53.29	31.68	18.33	53.29	-31.68	0.000%
18	-31.76	-71.06	18.28	31.76	71.06	-18.28	0.000%
19	-31.76	-53.29	18.28	31.76	53.29	-18.28	0.000%
20	-36.68	-71.06	-0.01	36.68	71.06	0.01	0.000%
21	-36.68	-53.29	-0.01	36.68	53.29	0.01	0.000%
22	-31.77	-71.06	-18.30	31.77	71.06	18.30	0.000%
23	-31.77	-53.29	-18.30	31.77	53.29	18.30	0.000%
24	-18.35	-71.06	-31.69	18.35	71.06	31.69	0.000%
25	-18.35	-53.29	-31.69	18.35	53.29	31.69	0.000%
26	0.00	-94.52	0.00	0.00	94.52	0.00	0.000%
27	-0.00	-94.52	-10.83	0.00	94.52	10.83	0.000%
28	5.42	-94.52	-9.38	-5.42	94.52	9.38	0.000%
29	9.39	-94.52	-5.41	-9.39	94.52	5.41	0.000%
30	10.84	-94.52	0.00	-10.84	94.52	-0.00	0.000%
31	9.39	-94.52	5.42	-9.39	94.52	-5.42	0.000%
32	5.42	-94.52	9.38	-5.42	94.52	-9.38	0.000%
33	0.00	-94.52	10.83	-0.00	94.52	-10.83	0.000%
34	-5.42	-94.52	9.38	5.42	94.52	-9.38	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
35	-9.39	-94.52	5.41	9.39	94.52	-5.41	0.000%
36	-10.84	-94.52	-0.00	10.84	94.52	0.00	0.000%
37	-9.39	-94.52	-5.42	9.39	94.52	5.42	0.000%
38	-5.42	-94.52	-9.38	5.42	94.52	9.38	0.000%
39	-0.00	-59.21	-9.22	0.00	59.21	9.22	0.000%
40	4.62	-59.21	-7.98	-4.62	59.21	7.98	0.000%
41	8.00	-59.21	-4.61	-8.00	59.21	4.61	0.000%
42	9.24	-59.21	0.00	-9.24	59.21	-0.00	0.000%
43	8.01	-59.21	4.61	-8.01	59.21	-4.61	0.000%
44	4.62	-59.21	7.99	-4.62	59.21	-7.99	0.000%
45	0.00	-59.21	9.22	-0.00	59.21	-9.22	0.000%
46	-4.62	-59.21	7.98	4.62	59.21	-7.98	0.000%
47	-8.00	-59.21	4.61	8.00	59.21	-4.61	0.000%
48	-9.24	-59.21	-0.00	9.24	59.21	0.00	0.000%
49	-8.01	-59.21	-4.61	8.01	59.21	4.61	0.000%
50	-4.62	-59.21	-7.99	4.62	59.21	7.99	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	0.00015525
3	Yes	4	0.00000001	0.00008006
4	Yes	5	0.00000001	0.00020586
5	Yes	5	0.00000001	0.00009935
6	Yes	5	0.00000001	0.00024966
7	Yes	5	0.00000001	0.00012171
8	Yes	5	0.00000001	0.00005834
9	Yes	5	0.00000001	0.00002920
10	Yes	5	0.00000001	0.00019882
11	Yes	5	0.00000001	0.00009593
12	Yes	5	0.00000001	0.00023328
13	Yes	5	0.00000001	0.00011347
14	Yes	4	0.00000001	0.00015488
15	Yes	4	0.00000001	0.00007987
16	Yes	5	0.00000001	0.00023509
17	Yes	5	0.00000001	0.00011440
18	Yes	5	0.00000001	0.00019837
19	Yes	5	0.00000001	0.00009570
20	Yes	5	0.00000001	0.00005837
21	Yes	5	0.00000001	0.00002921
22	Yes	5	0.00000001	0.00024866
23	Yes	5	0.00000001	0.00012117
24	Yes	5	0.00000001	0.00020712
25	Yes	5	0.00000001	0.00009996
26	Yes	4	0.00000001	0.00001017
27	Yes	5	0.00000001	0.00011178
28	Yes	5	0.00000001	0.00012513
29	Yes	5	0.00000001	0.00012711
30	Yes	5	0.00000001	0.00011227
31	Yes	5	0.00000001	0.00012355
32	Yes	5	0.00000001	0.00012416
33	Yes	5	0.00000001	0.00010994
34	Yes	5	0.00000001	0.00012439
35	Yes	5	0.00000001	0.00012372
36	Yes	5	0.00000001	0.00011242
37	Yes	5	0.00000001	0.00012719
38	Yes	5	0.00000001	0.00012527
39	Yes	4	0.00000001	0.00003194
40	Yes	4	0.00000001	0.00010756
41	Yes	4	0.00000001	0.00016953
42	Yes	4	0.00000001	0.00010186
43	Yes	4	0.00000001	0.00011184
44	Yes	4	0.00000001	0.00013918
45	Yes	4	0.00000001	0.00003174
46	Yes	4	0.00000001	0.00014292
47	Yes	4	0.00000001	0.00011291
48	Yes	4	0.00000001	0.00010194
49	Yes	4	0.00000001	0.00016727
50	Yes	4	0.00000001	0.00010768

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	163.007 - 121.587	14.457	49	0.6940	0.0048
L2	127.42 - 84.67	9.384	49	0.6461	0.0032
L3	91.3367 - 42.2067	4.974	48	0.4969	0.0017
L4	49.79 - 0	1.528	48	0.2735	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.00	Pipe Mount [PM 601-1]	49	13.726	0.6905	0.0046	140727
157.00	Platform Mount [LP 602-1]	49	13.580	0.6897	0.0045	117299
149.00	BSF0020F3V1	49	12.418	0.6829	0.0042	50303
139.00	FFVV-65B-R2 w/ Mount Pipe	49	10.988	0.6703	0.0037	29349
119.00	(2) NNHH-65B-R4 w/ Mount Pipe	49	8.267	0.6200	0.0028	17334
106.00	ANT150D6-9	49	6.640	0.5676	0.0023	14532
21.00	KS24019-L112A w/ Mount Pipe	48	0.430	0.1151	0.0003	19032

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	163.007 - 121.587	57.667	20	2.7667	0.0191
L2	127.42 - 84.67	37.443	20	2.5777	0.0127
L3	91.3367 - 42.2067	19.847	20	1.9833	0.0069
L4	49.79 - 0	6.093	20	1.0911	0.0028

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.00	Pipe Mount [PM 601-1]	20	54.752	2.7530	0.0182	35731
157.00	Platform Mount [LP 602-1]	20	54.171	2.7502	0.0180	29782
149.00	BSF0020F3V1	20	49.539	2.7235	0.0166	12771
139.00	FFVV-65B-R2 w/ Mount Pipe	20	43.838	2.6737	0.0148	7450
119.00	(2) NNHH-65B-R4 w/ Mount Pipe	20	32.986	2.4739	0.0112	4382
106.00	ANT150D6-9	20	26.496	2.2653	0.0091	3659
21.00	KS24019-L112A w/ Mount Pipe	20	1.715	0.4593	0.0010	4769

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	41.42	0.00	0.0	40.5857	-17.39	2374.26	0.007
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	42.75	0.00	0.0	56.1470	-32.08	3284.60	0.010
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	49.13	0.00	0.0	75.4766	-47.34	4415.38	0.011
L4	42.2067 - 0 (4)	TP63.5x53.916x0.5	49.79	0.00	0.0	99.9810	-71.04	5848.89	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	392.69	2309.38	0.170	0.00	2309.38	0.000
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	1247.41	3734.23	0.334	0.00	3734.23	0.000
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	2469.83	5807.86	0.425	0.00	5807.86	0.000
L4	42.2067 - 0 (4)	TP63.5x53.916x0.5	4184.51	8875.75	0.471	0.00	8875.75	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	163.007 - 121.587 (1)	TP42.37x34.28x0.3125	17.86	712.28	0.025	4.81	2552.38	0.002
L2	121.587 - 84.67 (2)	TP48.83x40.6057x0.375	26.91	985.38	0.027	6.58	4070.72	0.002
L3	84.67 - 42.2067 (3)	TP56.25x46.7975x0.4375	31.82	1324.61	0.024	6.57	6305.17	0.001
L4	42.2067 - 0 (4)	TP63.5x53.916x0.5	36.71	1754.67	0.021	6.43	9680.92	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	163.007 - 121.587 (1)	0.007	0.170	0.000	0.025	0.002	0.178	1.050	4.8.2
L2	121.587 - 84.67 (2)	0.010	0.334	0.000	0.027	0.002	0.345	1.050	4.8.2
L3	84.67 - 42.2067 (3)	0.011	0.425	0.000	0.024	0.001	0.437	1.050	4.8.2
L4	42.2067 - 0 (4)	0.012	0.471	0.000	0.021	0.001	0.484	1.050	4.8.2

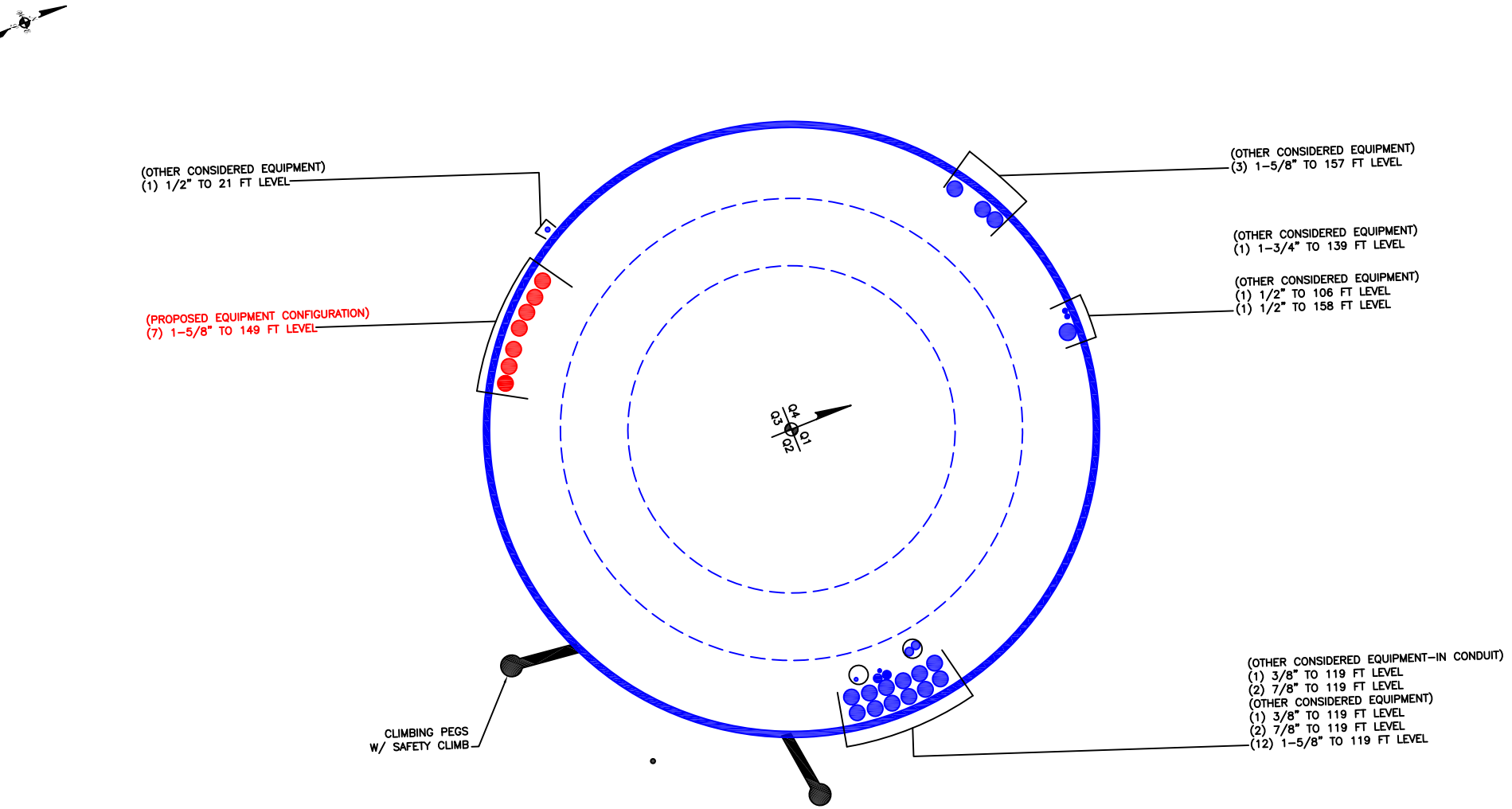
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	163.007 - 121.587	Pole	TP42.37x34.28x0.3125	1	-17.39	2492.97	17.0	Pass
L2	121.587 - 84.67	Pole	TP48.83x40.6057x0.375	2	-32.08	3448.83	32.8	Pass
L3	84.67 - 42.2067	Pole	TP56.25x46.7975x0.4375	3	-47.34	4636.15	41.6	Pass
L4	42.2067 - 0	Pole	TP63.5x53.916x0.5	4	-71.04	6141.33	46.1	Pass
							Summary	
						Pole (L4)	46.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						RATING =	**46.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 21 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(7) 1-5/8" TO 149 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 157 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-3/4" TO 139 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 106 FT LEVEL
(1) 1/2" TO 158 FT LEVEL
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 3/8" TO 119 FT LEVEL
(2) 7/8" TO 119 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 119 FT LEVEL
(2) 7/8" TO 119 FT LEVEL
(12) 1-5/8" TO 119 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

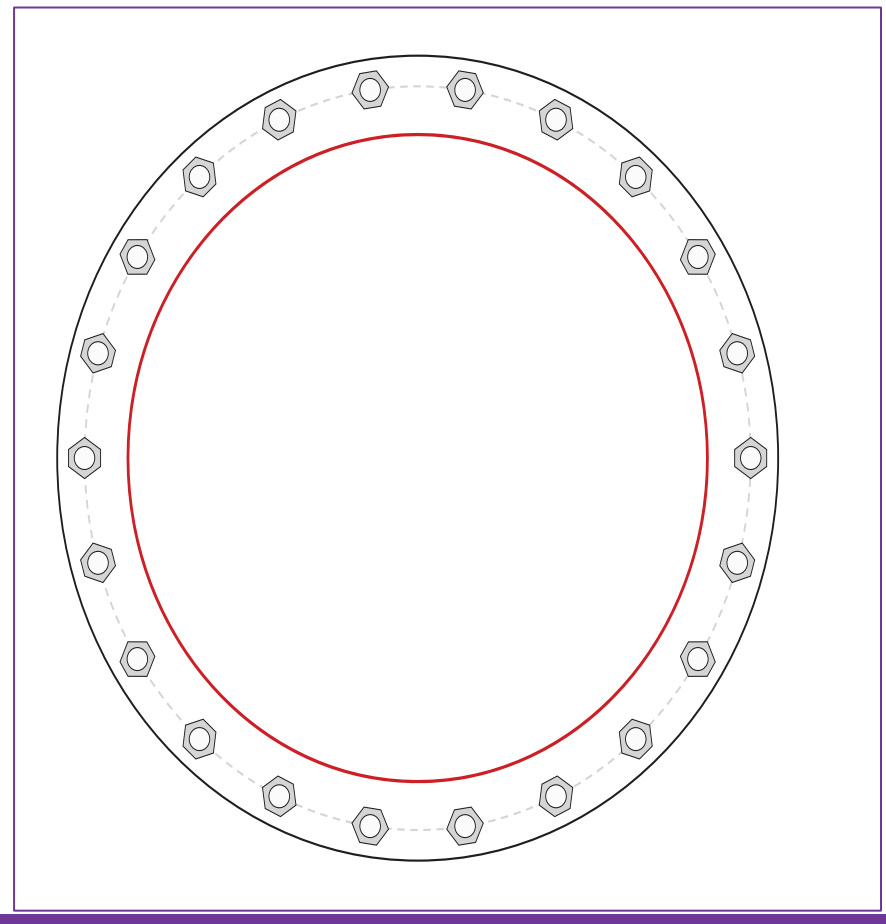
Monopole Base Plate Connection

Site Info	
BU #	876379
Site Name	OODBURY / WOLFF PA
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	4184.50
Axial Force (kips)	71.04
Shear Force (kips)	36.71

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(22) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 73" BC

Base Plate Data

79" OD x 2.5" Plate (A871 GR60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

63.5" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, kip-in)*
Pu_t = 121.79	ϕPn_t = 243.75	**Stress Rating**
Vu = 1.67	ϕVn = 149.1	**47.6%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary		
Max Stress (ksi):	25.8	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**45.5%**	**Pass**

Drilled Pier Foundation

BU # :	876379
Site Name:	N. WOODWAY / WOLFF P
Order Number:	
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	4184.5	
Axial Force (kips)	71.06	
Shear Force (kips)	36.68	

Material Properties			Rebar 2, Fy Override (ksi)
Concrete Strength, f'c:	4	ksi	
Rebar Strength, Fy:	60	ksi	
Tie Yield Strength, Fyt:	40	ksi	

Pier Design Data		
Depth	28	ft
Ext. Above Grade	1	ft
Pier Section 1		
From 1' above grade to 28' below grade		
Pier Diameter	8	ft
Rebar Quantity	32	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing		in

Rebar & Pier Options
Embedded Pole Inputs
Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	7.53	-
Soil Safety Factor	4.96	-
Max Moment (kip-ft)	4508.03	-
Rating*	*25.5%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	557.95	-
End Bearing (kips)	1206.37	-
Weight of Concrete (kips)	211.52	-
Total Capacity (kips)	1764.32	-
Axial (kips)	282.58	-
Rating*	*15.3%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	7.21	-
Critical Moment (kip-ft)	4507.13	-
Critical Moment Capacity	9260.68	-
Rating*	*46.4%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	20.60	-
Critical Shear (kip)	453.34	-
Critical Shear Capacity	803.15	-
Rating*	*53.8%*	-

Structural Foundation Rating*	**53.8%**
Soil Interaction Rating*	**25.5%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☑
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

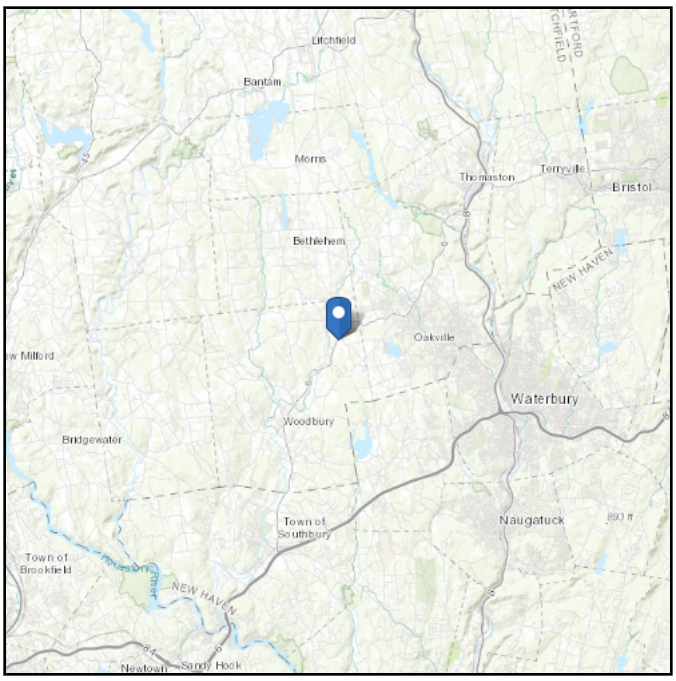
Groundwater Depth	14.5	# of Layers	4

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4	4	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	4	14.5	10.5	135	150	0	38	0.000	0.000	0.80	0.80			Cohesionless
3	14.5	15	0.5	75	87.6	0	38	0.000	0.000	0.80	0.80			Cohesionless
4	15	28	13	75	87.6	0	38	0.000	0.000	1.60	1.60	32		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.589947
Risk Category:	II	**Longitude:**	-73.169867
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	490.0342742670543 ft (NAVD 88)



Wind

Results:

Wind Speed	116 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	89 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 18 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.

Seismic

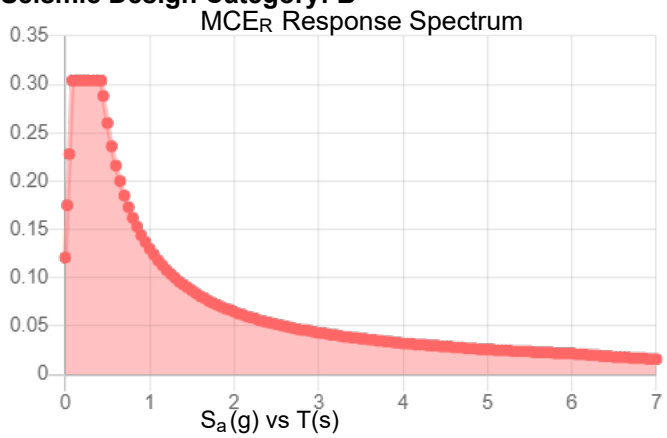
D - Default (see Section 11.4.3)

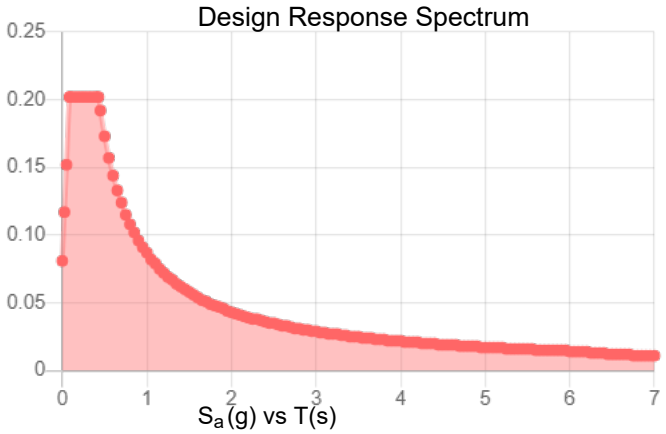
Site Soil Class:

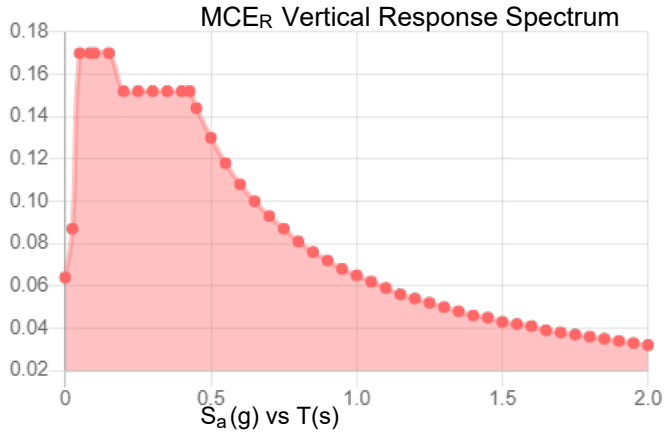
Results:

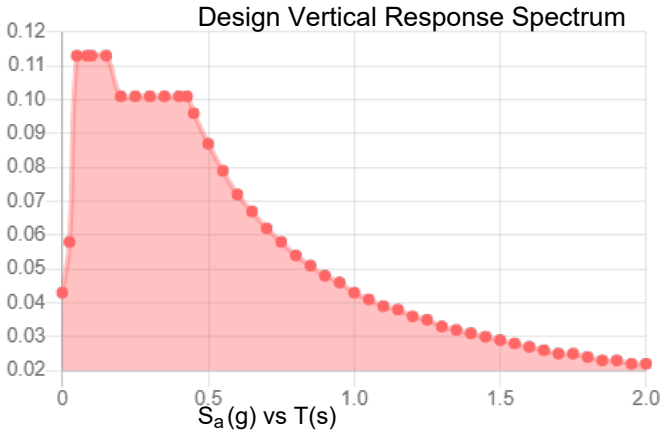
S_S :	0.19	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.104
F_v :	2.4	PGA_M :	0.166
S_{MS} :	0.304	F_{PGA} :	1.592
S_{M1} :	0.13	I_e :	1
S_{DS} :	0.202	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Wed Oct 18 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

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 18 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.