Structural Analysis Report

Structure	: 120 Foot Monopole Tower
VB Site Name	: Wolcott South CT
VB Site Number	: US-CT-5058
Deal Number	: P-047875
Proposed Carrier	: New Cingular Wireless PCS, LLC
Carrier Site Name	: Wolcott Capacity
Carrier Site Number	: CT1432
Site Location	: Chestnut Hill Road Wolcott, CT 06716 (New Haven County) 41.59000790, -73.00861540
Date	: June 27, 2024
Max Member Stress Level	: 57.8% (Anchor Rods) 56.8% (Foundation) 45.2% (Tower)
Result	: **PASS**

Prepared by:

VERTICAL BRIDGE ENGINEERING, LLC

06/27/2024

750 Park of Commerce Drive Suite 200 | Boca Raton, FL 33487 | 561-948-6367
VerticalBridge.com

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Introduction

We have completed our structural analysis of the proposed equipment installation on the foregoing tower to determine its ability to support the new loads proposed by New Cingular Wireless PCS, LLC. The objective of the analysis was to determine if the tower meets the current structural codes and standards with the proposed equipment installation.

Existing Structural Information

The following documents for the existing structure were made available for our structural analysis.

Tower Information	Valmont Tower Drawings Order No. 537228, dated 02/15/2022
Foundation Information	Valmont Foundation Drawings No. CT537228FS, dated 02/15/2022
Geotechnical Information	S.W. Cole Engineering Explorations and Geotechnical Engineering Services Report Job No. 21-1434S, dated 11/10/2021
Existing Equipment Information	Vertical Bridge Collocation Application Version 1
Tower Reinforcement Information	Tower has not been previously modified

Final Proposed Equipment Loading for New Cingular Wireless PCS, LLC

The following proposed loading was obtained from the Vertical Bridge Collocation Application:

Antenna/Equipment					Coax	
Mount (ft)	RAD (ft)	Qty	Antenna	Type	Qty	Size/Type
105	**-**	**3**	**Site Pro VFA12-HD**	**Mount**	**6** **2** **3**	**0.92" DC Power** **0.41" Fiber** **2" Flex Conduit**
	105	**3**	**CCI TPA65R-BU8DA-K**	**Panel**		
		3	**CCI OPA65R-BU8DA-K**	**Panel**		
		3	**Ericsson 4490 B5/B12**	**RRU**		
		3	**Ericsson 4494 B14/B29**	**RRU**		
		3	**Ericsson 4890 B25/B66**	**RRU**		
		2	**Raycap DC9-48-60-24-8C-EV**	**Squid**		

Notes:

1. Proposed equipment shown in bold.
2. Other existing loading can be found on the tower profile attached.
3. All feedlines are assumed to be installed inside monopole shaft.
4. The remainder of 32,000 sq. in. reserved rights for New Cingular Wireless PCS, LLC has been included in this analysis.

Design Criteria

The tower was analyzed using tnxTower (Version 8.2.4) tower analysis software using the following design criteria.

State	Connecticut
City/County Building Code	IBC 2021
TIA/EIA Standard Code	TIA-222-H
Basic Wind Speed	117 mph (V_{ult})
Basic Wind Speed w/Ice	50 mph w/1.0" Ice
Steel Grade	65 ksi Pole / 50 ksi Base Plate / A615 Gr. 75 Anchor Rods
Exposure Category	B
Topographic Category (height)	3 (552 ft.)
Risk Category	II
S_s	0.191
Seismic Design Category	B

Analysis Results

Based on the foregoing information, our structural analysis determined that the existing tower **is structurally capable of supporting the proposed equipment loads without modification**. The existing tower anchor rods, base plate and foundation have also been evaluated and **were found to be structurally capable of supporting the proposed equipment load**. A seismic analysis has been performed on this tower and does not control.

Assumptions

The below assumptions are true, complete, and accurate.

1. The existing tower has been maintained to manufacturer's specifications and is in good condition.
2. Foundations are considered to have been properly designed for the original design loads.
3. All member connections are considered to have been designed to meet the load carrying capacity of the connected member.
4. Antenna mount loads have been estimated based on generally accepted industry standards.
5. The mounts for the proposed antennas have been analyzed and designed by others.
6. See additional assumptions contained in the report attached.
7. Tower is within acceptable engineering tolerance at 105%.
8. Foundations are within acceptable engineering tolerance at 110%.

Conclusions

The existing tower described above **has sufficient capacity** to support the proposed loading based on the governing Building Code. The existing tower anchor rods, base plate and foundation have also been evaluated and **are acceptable**. A seismic analysis has been performed on this tower and does not control.

We appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance, please call us anytime at 561-948-6367.

Sincerely,

Analysis by:

Nicole Hoffman, EI
Design Engineer III

Reviewed by:

Michael T. De Boer, PE
Engineer

06/27/2024

Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but not necessarily limited, to:

- Information supplied by the client regarding the structure itself, the antenna and transmission line loading on the structure and its components, or relevant information.

- Information from drawings in possession of Vertical Bridge Engineering, LLC, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Vertical Bridge Engineering, LLC and used in the performance of our engineering services is correct and complete. In the absence of information contrary, we consider that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated; and we, therefore consider that their capacity has not significantly changed from the original design condition.

All services will be performed to the codes and standards specified by the client, and we do not imply to meet any other code and standard requirements unless explicitly agreed to in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes and standards, the client shall specify the exact requirements. In the absence of information to the contrary, all work will be performed in accordance with the revision of ANSI/TIA/EIA-222-H requested.

All services are performed, results obtained and recommendations made in accordance with the generally accepted engineering principles and practices. Vertical Bridge Engineering LLC and its affiliates are not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

Disclaimer of Warranties

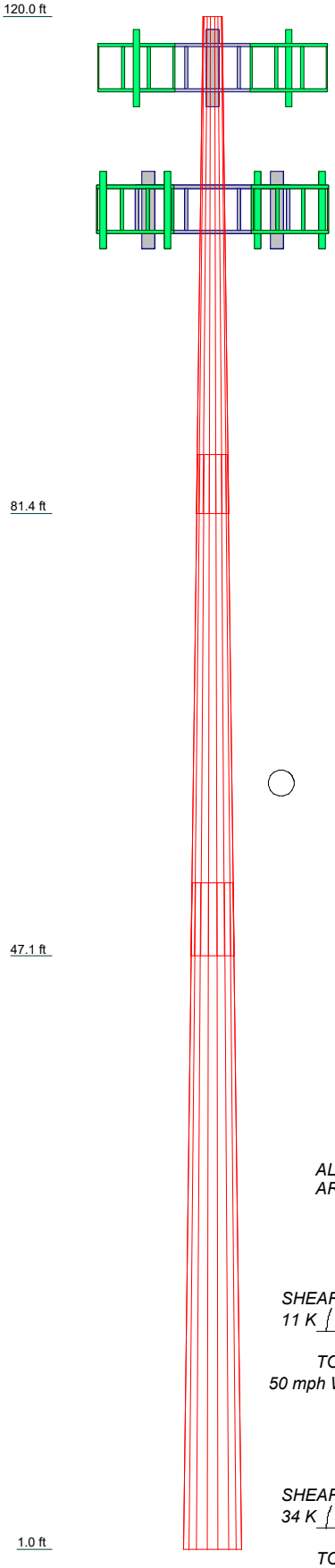
The engineering services by Vertical Bridge Engineering, LLC in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. Vertical Bridge Engineering, LLC does not analyze the fabrication, including welding, except as may be expressly included in this report.

The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines. Any mention of structural modifications are reasonable estimates and should not be used a precise construction document. Precise modification drawings are obtainable from Vertical Bridge Engineering, LLC but are beyond the scope of this report.

Vertical Bridge Engineering, LLC makes no warranties, express or implied, in connection with this report and disclaims any liability arising from material, fabrication and erection of this tower, or installation and compliance with legal and permitting requirements of the proposed equipment. Vertical Bridge Engineering, LLC will not be responsible whatsoever for or on account of, punitive, special, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of Vertical Bridge Engineering, LLC pursuant to this report will be limited to the total fee received for preparation of this report.

Attachment 1: Calculations

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	38.58	18	0.3750	4.58	18.9300	30.5000	A572-65	3.8
2	38.92	18	0.4380	5.67	28.3756	40.0500		6.2
3	51.75	18	0.5000		37.4741	53.0000		12.5
								22.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Site Pro RMQP-4096-HK (Verizon)	116	Site Pro VFA12-HD (ATI)	105
(4) 2.0 STD Mount Pipe (96") (Verizon)	116	Site Pro VFA12-HD (ATI)	105
(4) 2.0 STD Mount Pipe (96") (Verizon)	116	Site Pro VFA12-HD (ATI)	105
(4) 2.0 STD Mount Pipe (96") (Verizon)	116	(4) 2.0 STD Mount Pipe (96") (ATI)	105
(2) COMMSCOPE JAHH-65B-R3B (Verizon)	116	(4) 2.0 STD Mount Pipe (96") (ATI)	105
		(4) 2.0 STD Mount Pipe (96") (ATI)	105
(2) COMMSCOPE JAHH-65B-R3B (Verizon)	116	CCI ANTENNAS TPA65R-BU8D_CCIV2 (ATI)	105
(2) COMMSCOPE JAHH-65B-R3B (Verizon)	116	CCI ANTENNAS TPA65R-BU8D_CCIV2 (ATI)	105
SAMSUNG TELECOMMUNICATIONS MT6407-77A (Verizon)	116	CCI ANTENNAS TPA65R-BU8D_CCIV2 (ATI)	105
SAMSUNG TELECOMMUNICATIONS MT6407-77A (Verizon)	116	CCI ANTENNAS OPA65R-BU8DA-K (ATI)	105
SAMSUNG TELECOMMUNICATIONS MT6407-77A (Verizon)	116	CCI ANTENNAS OPA65R-BU8DA-K (ATI)	105
COMMSCOPE CBC78T-DS-43-2X (Verizon)	116	CCI ANTENNAS OPA65R-BU8DA-K (ATI)	105
COMMSCOPE CBC78T-DS-43-2X (Verizon)	116	ERICSSON 4490 B5/B12 (ATI)	105
		ERICSSON 4490 B5/B12 (ATI)	105
COMMSCOPE CBC78T-DS-43-2X (Verizon)	116	ERICSSON 4490 B5/B12 (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D1A (Verizon)	116	ERICSSON 4494 B14/B29 (ATI)	105
		ERICSSON 4494 B14/B29 (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D1A (Verizon)	116	ERICSSON 4494 B14/B29 (ATI)	105
		ERICSSON 4890 B25/66 (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D1A (Verizon)	116	ERICSSON 4890 B25/66 (ATI)	105
		ERICSSON 4890 B25/66 (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D2A (Verizon)	116	RAYCAP DC9-48-60-24-8C-EV (ATI)	105
		RAYCAP DC9-48-60-24-8C-EV (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D2A (Verizon)	116	1/3 Remaining Reserved Rights (32000 sq.in.) (ATI)	105
SAMSUNG TELECOMMUNICATIONS RFV01U-D2A (Verizon)	116	1/3 Remaining Reserved Rights (32000 sq.in.) (ATI)	105
RAYCAP RVZDC-6627-PF-48 (Verizon)	116	1/3 Remaining Reserved Rights (32000 sq.in.) (ATI)	105

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 117 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 3 with Crest Height of 552.00 ft
7. TOWER RATING: 45.2%

ALL REACTIONS ARE FACTORED

AXIAL 55 K

SHEAR 11 K *MOMENT 892 kip-ft*

TORQUE 2 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 37 K

SHEAR 34 K *MOMENT 2888 kip-ft*

TORQUE 7 kip-ft
REACTIONS - 117 mph WIND

Vertical Bridge, LLC
750 Park of Commerce Drive
Boca Raton, Florida 33487
Phone:
FAX:

Job: *US-CT-5058*			
Project: *P-047875*			
Client: AT&T	Drawn by: Nicole.Hoffman		App'd:
Code: TIA-222-H	Date: 06/27/24		Scale: NTS
Path:			Dwg No. E-1

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	38.58	18	0.3750	4.58	18.9300	30.5000	A572-65	3.8
2	38.92	18	0.4380	5.67	28.3756	40.0500		6.2
3	51.75	18	0.5000		37.4741	53.0000		12.5
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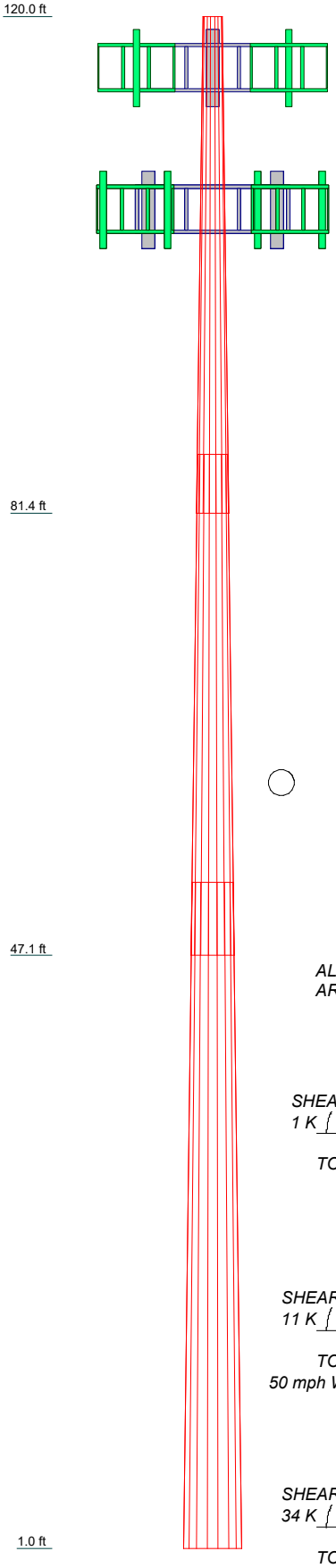


MATERIAL STRENGTH

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 117 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 3 with Crest Height of 552.00 ft
7. TOWER RATING: 45.2%

ALL REACTIONS ARE FACTORED

AXIAL 39 K
SHEAR 1 K *MOMENT 91 kip-ft*
TORQUE 0 kip-ft
SEISMIC

AXIAL 55 K
SHEAR 11 K *MOMENT 892 kip-ft*
TORQUE 2 kip-ft
50 mph WIND - 1.0000 in ICE

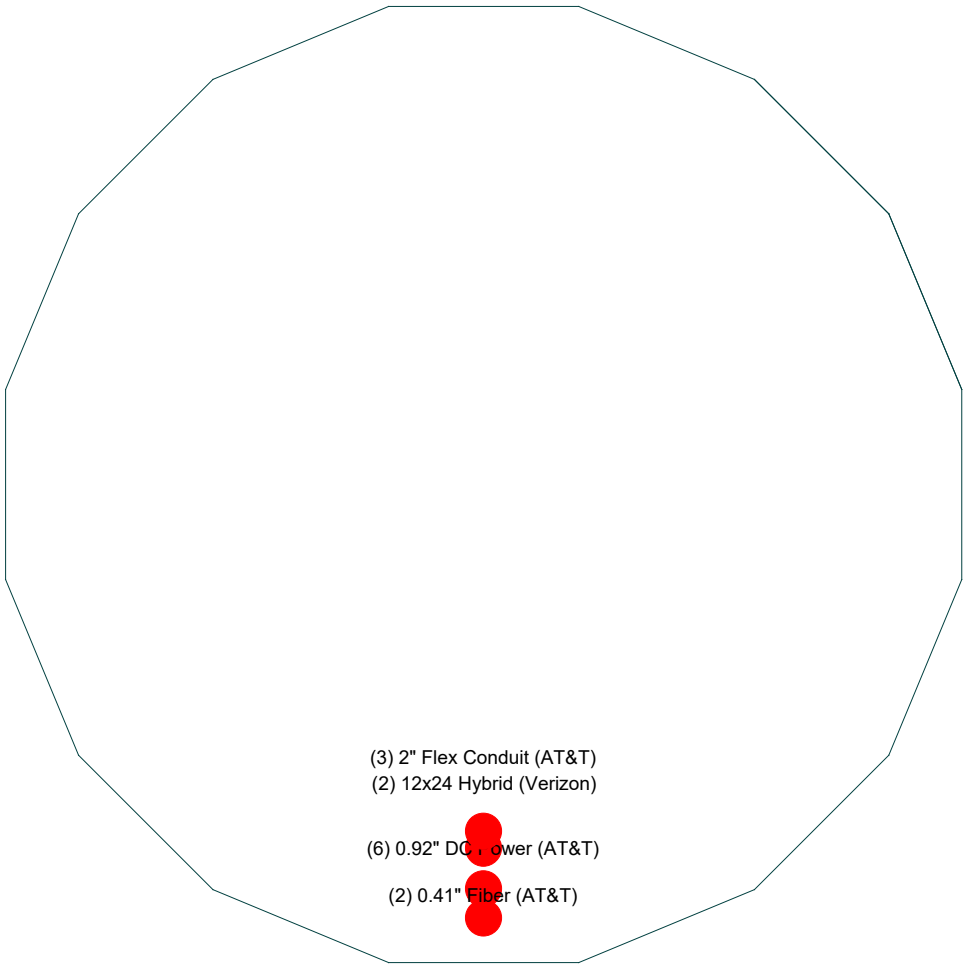
AXIAL 37 K
SHEAR 34 K *MOMENT 2888 kip-ft*
TORQUE 7 kip-ft
REACTIONS - 117 mph WIND

Vertical Bridge, LLC
750 Park of Commerce Drive
Boca Raton, Florida 33487
Phone:
FAX:

Job: ***US-CT-5058***			
Project: ***P-047875***			
Client: AT&T	Drawn by: Nicole.Hoffman		App'd:
Code: TIA-222-H	Date: 06/27/24		Scale: NTS
Path:			Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



Vertical Bridge, LLC
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Boca Raton, Florida 33487
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FAX:

Job: ***US-CT-5058***			
Project: ***P-047875***			
Client: AT&T	Drawn by: Nicole.Hoffman		App'd:
Code: TIA-222-H	Date: 06/27/24		Scale: NTS
Path:			Dwg No. E-7

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: 1.00 ft.
Basic wind speed of 117 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 3.
Crest Height: 552.00 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.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	120.00-81.42	38.58	4.58	18	18.9300	30.5000	0.3750	1.5000	A572-65 (65 ksi)
L2	81.42-47.08	38.92	5.67	18	28.3756	40.0500	0.4380	1.7520	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	47.08-1.00	51.75		18	37.4741	53.0000	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	19.1642	22.0851	960.6352	6.5870	9.6164	99.8951	1922.5345	11.0446	2.6717	7.124
	30.9127	35.8563	4111.0883	10.6944	15.4940	265.3342	8227.5861	17.9315	4.7080	12.555
L2	30.1419	38.8392	3829.8865	9.9178	14.4148	265.6912	7664.8125	19.4233	4.2232	9.642
	40.6003	55.0691	10916.8865	14.0623	20.3454	536.5776	21848.1377	27.5398	6.2779	14.333
L3	39.7014	58.6779	10134.5967	13.1258	19.0368	532.3678	20282.5288	29.3445	5.7154	11.431
	53.7405	83.3175	29012.9766	18.6375	26.9240	1077.5879	58064.1291	41.6667	8.4480	16.896

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 120.00-81.42				1	1	1			
L2 81.42-47.08				1	1	1			
L3 47.08-1.00				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 in	Weight klf
***											

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
***									
12x24 Hybrid (Verizon)	C	No	No	Inside Pole	116.00 - 4.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00
***									
0.92" DC Power (AT&T)	C	No	No	Inside Pole	105.00 - 4.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00
0.41" Fiber (AT&T)	C	No	No	Inside Pole	105.00 - 4.00	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
2" Flex Conduit (AT&T) ***	C	No	No	Inside Pole	105.00 - 4.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00

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	120.00-81.42	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.19
L2	81.42-47.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.25
L3	47.08-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.31

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	120.00-81.42	A	1.365	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.19
L2	81.42-47.08	A	1.337	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.25
L3	47.08-1.00	A	1.244	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.31

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.00-81.42	0.0000	0.0000	0.0000	0.0000
L2	81.42-47.08	0.0000	0.0000	0.0000	0.0000
L3	47.08-1.00	0.0000	0.0000	0.0000	0.0000

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 ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***										
Site Pro RMQP-4096-HK	A	None			0.0000	116.00	No Ice	34.54	31.94	1.95
(Verizon)							1/2" Ice	42.04	39.46	2.33
							1" Ice	49.60	47.16	2.85
(4) 2.0 STD Mount Pipe (96")	A	From Leg	4.00		0.0000	116.00	No Ice	1.90	1.90	0.03
(Verizon)			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(4) 2.0 STD Mount Pipe (96")	B	From Leg	4.00		0.0000	116.00	No Ice	1.90	1.90	0.03
(Verizon)			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(4) 2.0 STD Mount Pipe (96")	C	From Leg	4.00		0.0000	116.00	No Ice	1.90	1.90	0.03
(Verizon)			0.00				1/2" Ice	2.73	2.73	0.04
			0.00				1" Ice	3.40	3.40	0.06
(2) COMMSCOPE	A	From Leg	4.00		0.0000	116.00	No Ice	3.01	2.58	0.06
JAHH-65B-R3B			0.00				1/2" Ice	9.58	6.44	0.12
(Verizon)			0.00				1" Ice	10.05	6.91	0.19
(2) COMMSCOPE	B	From Leg	4.00		0.0000	116.00	No Ice	3.01	2.58	0.06
JAHH-65B-R3B			0.00				1/2" Ice	9.58	6.44	0.12
(Verizon)			0.00				1" Ice	10.05	6.91	0.19
(2) COMMSCOPE	C	From Leg	4.00		0.0000	116.00	No Ice	3.01	2.58	0.06
JAHH-65B-R3B			0.00				1/2" Ice	9.58	6.44	0.12
(Verizon)			0.00				1" Ice	10.05	6.91	0.19
SAMSUNG	A	From Leg	4.00		0.0000	116.00	No Ice	4.69	1.84	0.08
TELECOMMUNICATIONS			0.00				1/2" Ice	4.98	2.06	0.11
MT6407-77A			0.00				1" Ice	5.28	2.29	0.14
(Verizon)										
SAMSUNG	B	From Leg	4.00		0.0000	116.00	No Ice	4.69	1.84	0.08
TELECOMMUNICATIONS			0.00				1/2" Ice	4.98	2.06	0.11
MT6407-77A			0.00				1" Ice	5.28	2.29	0.14
(Verizon)										
SAMSUNG	C	From Leg	4.00		0.0000	116.00	No Ice	4.69	1.84	0.08
TELECOMMUNICATIONS			0.00				1/2" Ice	4.98	2.06	0.11
MT6407-77A			0.00				1" Ice	5.28	2.29	0.14
(Verizon)										
COMMSCOPE	A	From Leg	4.00		0.0000	116.00	No Ice	0.37	0.51	0.02
CBC78T-DS-43-2X			0.00				1/2" Ice	0.45	0.60	0.03
(Verizon)			0.00				1" Ice	0.53	0.70	0.04
COMMSCOPE	B	From Leg	4.00		0.0000	116.00	No Ice	0.37	0.51	0.02
CBC78T-DS-43-2X			0.00				1/2" Ice	0.45	0.60	0.03
(Verizon)			0.00				1" Ice	0.53	0.70	0.04
COMMSCOPE	C	From Leg	4.00		0.0000	116.00	No Ice	0.37	0.51	0.02
CBC78T-DS-43-2X			0.00				1/2" Ice	0.45	0.60	0.03
(Verizon)			0.00				1" Ice	0.53	0.70	0.04
SAMSUNG	A	From Leg	4.00		0.0000	116.00	No Ice	1.88	1.25	0.08
TELECOMMUNICATIONS			0.00				1/2" Ice	2.05	1.39	0.10
RFV01U-D1A			0.00				1" Ice	2.22	1.54	0.12
(Verizon)										
SAMSUNG	B	From Leg	4.00		0.0000	116.00	No Ice	1.88	1.25	0.08
TELECOMMUNICATIONS			0.00				1/2" Ice	2.05	1.39	0.10
RFV01U-D1A			0.00				1" Ice	2.22	1.54	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Verizon)									
SAMSUNG	C	From Leg	4.00	0.0000	116.00	No Ice	1.88	1.25	0.08
TELECOMMUNICATIONS			0.00			1/2" Ice	2.05	1.39	0.10
RFV01U-D1A			0.00			1" Ice	2.22	1.54	0.12
(Verizon)									
SAMSUNG	A	From Leg	4.00	0.0000	116.00	No Ice	1.88	1.01	0.07
TELECOMMUNICATIONS			0.00			1/2" Ice	2.05	1.14	0.09
RFV01U-D2A			0.00			1" Ice	2.22	1.28	0.11
(Verizon)									
SAMSUNG	B	From Leg	4.00	0.0000	116.00	No Ice	1.88	1.01	0.07
TELECOMMUNICATIONS			0.00			1/2" Ice	2.05	1.14	0.09
RFV01U-D2A			0.00			1" Ice	2.22	1.28	0.11
(Verizon)									
SAMSUNG	C	From Leg	4.00	0.0000	116.00	No Ice	1.88	1.01	0.07
TELECOMMUNICATIONS			0.00			1/2" Ice	2.05	1.14	0.09
RFV01U-D2A			0.00			1" Ice	2.22	1.28	0.11
(Verizon)									
RAYCAP	A	From Leg	4.00	0.0000	116.00	No Ice	3.79	2.51	0.03
RVZDC-6627-PF-48			0.00			1/2" Ice	4.04	2.73	0.06
(Verizon)			0.00			1" Ice	4.30	2.95	0.10
***									
Site Pro VFA12-HD	A	From Leg	2.00	0.0000	105.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	19.50	1.01
Site Pro VFA12-HD	B	From Leg	2.00	0.0000	105.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	19.50	1.01
Site Pro VFA12-HD	C	From Leg	2.00	0.0000	105.00	No Ice	13.20	9.20	0.66
(AT&T)			0.00			1/2" Ice	19.50	14.60	0.80
			0.00			1" Ice	25.80	19.50	1.01
(4) 2.0 STD Mount Pipe (96")	A	From Leg	4.00	0.0000	105.00	No Ice	1.90	1.90	0.03
(AT&T)			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
(4) 2.0 STD Mount Pipe (96")	B	From Leg	4.00	0.0000	105.00	No Ice	1.90	1.90	0.03
(AT&T)			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
(4) 2.0 STD Mount Pipe (96")	C	From Leg	4.00	0.0000	105.00	No Ice	1.90	1.90	0.03
(AT&T)			0.00			1/2" Ice	2.73	2.73	0.04
			0.00			1" Ice	3.40	3.40	0.06
CCI ANTENNAS	A	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.09
TPA65R-BU8D_CCIV2			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.29
CCI ANTENNAS	B	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.09
TPA65R-BU8D_CCIV2			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.29
CCI ANTENNAS	C	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.09
TPA65R-BU8D_CCIV2			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.29
CCI ANTENNAS	A	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.08
OPA65R-BU8DA-K			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.28
CCI ANTENNAS	B	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.08
OPA65R-BU8DA-K			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.28
CCI ANTENNAS	C	From Leg	4.00	0.0000	105.00	No Ice	17.87	8.12	0.08
OPA65R-BU8DA-K			0.00			1/2" Ice	18.50	8.72	0.18
(AT&T)			0.00			1" Ice	19.14	9.32	0.28

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON 4490 B5/B12 (AT&T)	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.99 1.13 1.28	0.07 0.09 0.10
ERICSSON 4490 B5/B12 (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.99 1.13 1.28	0.07 0.09 0.10
ERICSSON 4490 B5/B12 (AT&T)	C	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.99 1.13 1.28	0.07 0.09 0.10
ERICSSON 4494 B14/B29 (AT&T)	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.84 0.96 1.10	0.06 0.07 0.09
ERICSSON 4494 B14/B29 (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.84 0.96 1.10	0.06 0.07 0.09
ERICSSON 4494 B14/B29 (AT&T)	C	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	0.84 0.96 1.10	0.06 0.07 0.09
ERICSSON 4890 B25/66 (AT&T)	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	1.01 1.15 1.29	0.07 0.09 0.11
ERICSSON 4890 B25/66 (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	1.01 1.15 1.29	0.07 0.09 0.11
ERICSSON 4890 B25/66 (AT&T)	C	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.58	1.01 1.15 1.29	0.07 0.09 0.11
RAYCAP DC9-48-60-24-8C-EV (AT&T)	A	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	4.78 5.06 5.35	0.03 0.06 0.10
RAYCAP DC9-48-60-24-8C-EV (AT&T)	B	From Leg	4.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	4.78 5.06 5.35	0.03 0.06 0.10
1/3 Remaining Reserved Rights (32000 sq.in.) (AT&T)	A	None		0.0000	105.00	No Ice 1/2" Ice 1" Ice	32.08 37.64 43.20	32.08 37.64 43.20	0.34 0.51 0.68
1/3 Remaining Reserved Rights (32000 sq.in.) (AT&T)	B	None		0.0000	105.00	No Ice 1/2" Ice 1" Ice	32.08 37.64 43.20	32.08 37.64 43.20	0.34 0.51 0.68
1/3 Remaining Reserved Rights (32000 sq.in.) (AT&T)	C	None		0.0000	105.00	No Ice 1/2" Ice 1" Ice	32.08 37.64 43.20	32.08 37.64 43.20	0.34 0.51 0.68
***									

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	99.30	0.986	0	80.505	A	0.000	80.505	80.505	100.00	0.000	0.000
120.00-81.42					B	0.000	80.505		100.00	0.000	0.000
					C	0.000	80.505		100.00	0.000	0.000
L2 81.42-47.08	63.59	0.868	0	101.201	A	0.000	101.201	101.201	100.00	0.000	0.000
					B	0.000	101.201		100.00	0.000	0.000
					C	0.000	101.201		100.00	0.000	0.000
L3 47.08-1.00	22.87	0.7	0	179.421	A	0.000	179.421	179.421	100.00	0.000	0.000
					B	0.000	179.421		100.00	0.000	0.000
					C	0.000	179.421		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.00-81.42	99.30	0.986	0	1.3652	89.284	A	0.000	89.284	89.284	100.00	0.000	0.000
						B	0.000	89.284		100.00	0.000	0.000
						C	0.000	89.284		100.00	0.000	0.000
L2 81.42-47.08	63.59	0.868	0	1.3370	109.013	A	0.000	109.013	109.013	100.00	0.000	0.000
						B	0.000	109.013		100.00	0.000	0.000
						C	0.000	109.013		100.00	0.000	0.000
L3 47.08-1.00	22.87	0.7	0	1.2437	189.690	A	0.000	189.690	189.690	100.00	0.000	0.000
						B	0.000	189.690		100.00	0.000	0.000
						C	0.000	189.690		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	99.30	0.986	0	80.505	A	0.000	80.505	80.505	100.00	0.000	0.000
120.00-81.42					B	0.000	80.505		100.00	0.000	0.000
					C	0.000	80.505		100.00	0.000	0.000
L2 81.42-47.08	63.59	0.868	0	101.201	A	0.000	101.201	101.201	100.00	0.000	0.000
					B	0.000	101.201		100.00	0.000	0.000
					C	0.000	101.201		100.00	0.000	0.000
L3 47.08-1.00	22.87	0.7	0	179.421	A	0.000	179.421	179.421	100.00	0.000	0.000
					B	0.000	179.421		100.00	0.000	0.000
					C	0.000	179.421		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	3.77	0.10	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	4.45	0.13	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	7.11	0.15	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	804.45 kip-ft	15.33		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	3.77	0.10	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	4.45	0.13	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	7.11	0.15	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	804.45 kip-ft	15.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	3.77	0.10	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	4.45	0.13	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	7.11	0.15	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	804.45 kip-ft	15.33		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	5.50	A	1	1.2	0	1	1	89.284	1.25	0.03	C
120.00-81.42			B	1	1.2		1	1	89.284			
			C	1	1.2		1	1	89.284			
L2	0.25	8.27	A	1	1.2	0	1	1	108.852	1.44	0.04	C
81.42-47.08			B	1	1.2		1	1	108.852			
			C	1	1.2		1	1	108.852			
L3 47.08-1.00	0.31	15.85	A	1	1.2	0	1	1	188.974	2.25	0.05	C
			B	1	1.2		1	1	188.974			
			C	1	1.2		1	1	188.974			
Sum Weight:	0.75	29.62						OTM	262.44 kip-ft	4.94		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	5.50	A	1	1.2	0	1	1	89.284	1.25	0.03	C
120.00-81.42			B	1	1.2		1	1	89.284			
			C	1	1.2		1	1	89.284			
L2	0.25	8.27	A	1	1.2	0	1	1	108.852	1.44	0.04	C
81.42-47.08			B	1	1.2		1	1	108.852			
			C	1	1.2		1	1	108.852			
L3 47.08-1.00	0.31	15.85	A	1	1.2	0	1	1	188.974	2.25	0.05	C
			B	1	1.2		1	1	188.974			
			C	1	1.2		1	1	188.974			
Sum Weight:	0.75	29.62						OTM	262.44 kip-ft	4.94		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	5.50	A	1	1.2	0	1	1	89.284	1.25	0.03	C
120.00-81.42			B	1	1.2		1	1	89.284			
			C	1	1.2		1	1	89.284			
L2	0.25	8.27	A	1	1.2	0	1	1	108.852	1.44	0.04	C
81.42-47.08			B	1	1.2		1	1	108.852			
			C	1	1.2		1	1	108.852			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L3 47.08-1.00	0.31	15.85	A	1	1.2	0	1	1	188.974	2.25	0.05	C
			B	1	1.2		1	1	188.974			
			C	1	1.2		1	1	188.974			
Sum Weight:	0.75	29.62						OTM	262.44 kip-ft	4.94		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	0.89	0.02	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	1.05	0.03	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	1.67	0.04	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	189.29 kip-ft	3.61		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	0.89	0.02	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	1.05	0.03	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	1.67	0.04	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	189.29 kip-ft	3.61		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.19	3.80	A	1	0.73	0	1	1	80.505	0.89	0.02	C
120.00-81.42			B	1	0.73		1	1	80.505			
			C	1	0.73		1	1	80.505			
L2	0.25	6.22	A	1	0.73	0	1	1	101.201	1.05	0.03	C
81.42-47.08			B	1	0.73		1	1	101.201			
			C	1	0.73		1	1	101.201			
L3 47.08-1.00	0.31	12.50	A	1	0.73	0	1	1	179.421	1.67	0.04	C
			B	1	0.73		1	1	179.421			
			C	1	0.73		1	1	179.421			
Sum Weight:	0.75	22.52						OTM	189.29 kip-ft	3.61		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	22.52					
Bracing Weight	0.00					
Total Member Self-Weight	22.52			-0.22	-0.13	
Total Weight	31.24			-0.22	-0.13	
Wind 0 deg - No Ice		0.00	-34.28	-2828.30	-0.13	0.95
Wind 30 deg - No Ice		17.16	-29.72	-2452.51	-1415.96	-5.50
Wind 60 deg - No Ice		29.71	-17.15	-1415.51	-2451.48	-0.62
Wind 90 deg - No Ice		34.26	0.00	-0.22	-2826.04	4.43
Wind 120 deg - No Ice		29.64	17.11	1410.95	-2444.34	-1.57
Wind 150 deg - No Ice		17.12	29.65	2444.93	-1411.84	-7.14
Wind 180 deg - No Ice		0.00	34.28	2827.86	-0.13	-0.95
Wind 210 deg - No Ice		-17.16	29.72	2452.07	1415.70	5.50
Wind 240 deg - No Ice		-29.71	17.15	1415.07	2451.22	0.62
Wind 270 deg - No Ice		-34.26	0.00	-0.22	2825.79	-4.43
Wind 300 deg - No Ice		-29.64	-17.11	-1411.39	2444.08	1.57
Wind 330 deg - No Ice		-17.12	-29.65	-2445.37	1411.58	7.14
Member Ice	7.10					
Total Weight Ice	47.84			-0.98	-0.60	
Wind 0 deg - Ice		0.00	-10.51	-861.00	-0.60	0.20
Wind 30 deg - Ice		5.26	-9.11	-746.38	-430.96	-1.27
Wind 60 deg - Ice		9.11	-5.26	-431.23	-745.82	-0.14
Wind 90 deg - Ice		10.51	0.00	-0.98	-860.19	1.03
Wind 120 deg - Ice		9.09	5.25	428.46	-744.42	-0.34
Wind 150 deg - Ice		5.25	9.09	743.03	-430.16	-1.63
Wind 180 deg - Ice		0.00	10.51	859.04	-0.60	-0.20
Wind 210 deg - Ice		-5.26	9.11	744.42	429.76	1.27
Wind 240 deg - Ice		-9.11	5.26	429.27	744.61	0.14
Wind 270 deg - Ice		-10.51	0.00	-0.98	858.98	-1.03
Wind 300 deg - Ice		-9.09	-5.25	-430.42	743.21	0.34
Wind 330 deg - Ice		-5.25	-9.09	-744.99	428.95	1.63
Total Weight	31.24			-0.22	-0.13	
Wind 0 deg - Service		0.00	-8.07	-665.67	-0.13	0.22
Wind 30 deg - Service		4.04	-6.99	-577.25	-333.28	-1.29
Wind 60 deg - Service		6.99	-4.04	-333.24	-576.94	-0.15
Wind 90 deg - Service		8.06	0.00	-0.22	-665.07	1.04
Wind 120 deg - Service		6.97	4.03	331.83	-575.26	-0.37

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 150 deg - Service		4.03	6.98	575.13	-332.31	-1.68
Wind 180 deg - Service		0.00	8.07	665.23	-0.13	-0.22
Wind 210 deg - Service		-4.04	6.99	576.81	333.02	1.29
Wind 240 deg - Service		-6.99	4.04	332.80	576.68	0.15
Wind 270 deg - Service		-8.06	0.00	-0.22	664.82	-1.04
Wind 300 deg - Service		-6.97	-4.03	-332.27	575.00	0.37
Wind 330 deg - Service		-4.03	-6.98	-575.57	332.05	1.68

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

Comb. No.	Description
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	120 - 81.4167	Pole	Max Tension	27	0.00	0.00	-0.00
			Max. Compression	26	-24.67	-0.63	1.03
			Max. Mx	8	-12.57	-478.78	0.38
			Max. My	2	-12.57	-0.13	479.91
			Max. Vy	8	22.81	-478.78	0.38
			Max. Vx	2	-22.83	-0.13	479.91
			Max. Torque	13			7.13
L2	81.4167 - 47.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.00	-0.63	1.03
			Max. Mx	8	-20.07	-1304.35	0.30
			Max. My	2	-20.07	-0.15	1305.96
			Max. Vy	8	26.92	-1304.35	0.30
			Max. Vx	2	-26.94	-0.15	1305.96
			Max. Torque	13			7.12
L3	47.0833 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.77	-0.63	1.03
			Max. Mx	8	-37.47	-2881.74	0.29
			Max. My	2	-37.47	-0.16	2884.07
			Max. Vy	8	34.29	-2881.74	0.29
			Max. Vx	2	-34.30	-0.16	2884.07
			Max. Torque	13			7.11

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	54.77	-0.00	10.51
	Max. H_x	20	37.49	34.26	-0.00
	Max. H_z	2	37.49	-0.00	34.28
	Max. M_x	2	2884.07	-0.00	34.28
	Max. M_z	8	2881.74	-34.26	-0.00
	Max. Torsion	13	7.11	-17.12	-29.65
	Min. Vert	25	28.12	17.12	29.65
	Min. H_x	8	37.49	-34.26	-0.00
	Min. H_z	14	37.49	-0.00	-34.28
	Min. M_x	14	-2883.52	-0.00	-34.28
	Min. M_z	20	-2881.42	34.26	-0.00
	Min. Torsion	25	-7.11	17.12	29.65

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	31.24	0.00	0.00	-0.22	-0.13	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	37.49	0.00	-34.28	-2884.07	-0.16	0.94
0.9 Dead+1.0 Wind 0 deg - No Ice	28.12	0.00	-34.28	-2869.43	-0.12	0.94
1.2 Dead+1.0 Wind 30 deg - No Ice	37.49	17.16	-29.72	-2500.87	-1443.90	-5.47
0.9 Dead+1.0 Wind 30 deg - No Ice	28.12	17.16	-29.72	-2488.17	-1436.56	-5.47
1.2 Dead+1.0 Wind 60 deg - No Ice	37.49	29.71	-17.15	-1443.44	-2499.80	-0.62
0.9 Dead+1.0 Wind 60 deg - No Ice	28.12	29.71	-17.15	-1436.08	-2487.13	-0.62
1.2 Dead+1.0 Wind 90 deg - No Ice	37.49	34.26	0.00	-0.29	-2881.74	4.41
0.9 Dead+1.0 Wind 90 deg - No Ice	28.12	34.26	0.00	-0.21	-2867.14	4.41
1.2 Dead+1.0 Wind 120 deg - No Ice	37.49	29.64	17.11	1438.69	-2492.52	-1.56
0.9 Dead+1.0 Wind 120 deg - No Ice	28.12	29.64	17.11	1431.50	-2479.89	-1.56
1.2 Dead+1.0 Wind 150 deg - No Ice	37.49	17.12	29.65	2493.06	-1439.66	-7.11
0.9 Dead+1.0 Wind 150 deg - No Ice	28.12	17.12	29.65	2480.53	-1432.35	-7.11
1.2 Dead+1.0 Wind 180 deg - No Ice	37.49	0.00	34.28	2883.52	-0.16	-0.94
0.9 Dead+1.0 Wind 180 deg - No Ice	28.12	0.00	34.28	2869.02	-0.12	-0.94
1.2 Dead+1.0 Wind 210 deg - No Ice	37.49	-17.16	29.72	2500.34	1443.55	5.47
0.9 Dead+1.0 Wind 210 deg - No Ice	28.12	-17.16	29.72	2487.77	1436.30	5.47
1.2 Dead+1.0 Wind 240 deg - No Ice	37.49	-29.71	17.15	1442.90	2499.48	0.62
0.9 Dead+1.0 Wind 240 deg - No Ice	28.12	-29.71	17.15	1435.68	2486.89	0.62
1.2 Dead+1.0 Wind 270 deg - No Ice	37.49	-34.26	0.00	-0.29	2881.42	-4.41
0.9 Dead+1.0 Wind 270 deg - No Ice	28.12	-34.26	0.00	-0.21	2866.90	-4.41
1.2 Dead+1.0 Wind 300 deg - No Ice	37.49	-29.64	-17.11	-1439.23	2492.20	1.56
0.9 Dead+1.0 Wind 300 deg - No Ice	28.12	-29.64	-17.11	-1431.90	2479.65	1.56
1.2 Dead+1.0 Wind 330 deg - No Ice	37.49	-17.12	-29.65	-2493.58	1439.38	7.11
0.9 Dead+1.0 Wind 330 deg - No Ice	28.12	-17.12	-29.65	-2480.92	1432.14	7.11
1.2 Dead+1.0 Ice+1.0 Temp	54.77	0.00	0.00	-1.03	-0.63	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	54.77	0.00	-10.51	-891.14	-0.67	0.20
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	54.77	5.26	-9.11	-772.52	-446.06	-1.28
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	54.77	9.11	-5.26	-446.37	-771.90	-0.14

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 90 deg+1.0 Ice+1.0 Temp	54.77	10.51	-0.00	-1.10	-890.25	1.04
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	54.77	9.09	5.25	443.33	-770.45	-0.34
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	54.77	5.25	9.09	768.87	-445.22	-1.62
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	54.77	0.00	10.51	888.94	-0.67	-0.20
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	54.77	-5.26	9.11	770.32	444.70	1.28
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	54.77	-9.11	5.26	444.17	770.55	0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	54.77	-10.51	-0.00	-1.10	888.90	-1.04
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	54.77	-9.09	-5.25	-445.53	769.10	0.34
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	54.77	-5.25	-9.09	-771.07	443.87	1.62
Dead+Wind 0 deg - Service	31.24	0.00	-8.07	-676.84	-0.13	0.22
Dead+Wind 30 deg - Service	31.24	4.04	-6.99	-586.94	-338.87	-1.29
Dead+Wind 60 deg - Service	31.24	6.99	-4.04	-338.83	-586.62	-0.15
Dead+Wind 90 deg - Service	31.24	8.06	0.00	-0.23	-676.23	1.04
Dead+Wind 120 deg - Service	31.24	6.97	4.03	337.39	-584.91	-0.37
Dead+Wind 150 deg - Service	31.24	4.03	6.98	584.77	-337.88	-1.68
Dead+Wind 180 deg - Service	31.24	0.00	8.07	676.39	-0.13	-0.22
Dead+Wind 210 deg - Service	31.24	-4.04	6.99	586.48	338.60	1.29
Dead+Wind 240 deg - Service	31.24	-6.99	4.04	338.38	586.35	0.15
Dead+Wind 270 deg - Service	31.24	-8.06	0.00	-0.23	675.96	-1.04
Dead+Wind 300 deg - Service	31.24	-6.97	-4.03	-337.85	584.64	0.37
Dead+Wind 330 deg - Service	31.24	-4.03	-6.98	-585.23	337.62	1.68

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	-31.24	0.00	0.00	31.24	0.00	0.000%
2	0.00	-37.49	-34.28	-0.00	37.49	34.28	0.000%
3	0.00	-28.12	-34.28	0.00	28.12	34.28	0.000%
4	17.16	-37.49	-29.72	-17.16	37.49	29.72	0.000%
5	17.16	-28.12	-29.72	-17.16	28.12	29.72	0.000%
6	29.71	-37.49	-17.15	-29.71	37.49	17.15	0.000%
7	29.71	-28.12	-17.15	-29.71	28.12	17.15	0.000%
8	34.26	-37.49	0.00	-34.26	37.49	-0.00	0.000%
9	34.26	-28.12	0.00	-34.26	28.12	-0.00	0.000%
10	29.64	-37.49	17.11	-29.64	37.49	-17.11	0.000%
11	29.64	-28.12	17.11	-29.64	28.12	-17.11	0.000%
12	17.12	-37.49	29.65	-17.12	37.49	-29.65	0.000%
13	17.12	-28.12	29.65	-17.12	28.12	-29.65	0.000%
14	0.00	-37.49	34.28	-0.00	37.49	-34.28	0.000%
15	0.00	-28.12	34.28	0.00	28.12	-34.28	0.000%
16	-17.16	-37.49	29.72	17.16	37.49	-29.72	0.000%
17	-17.16	-28.12	29.72	17.16	28.12	-29.72	0.000%
18	-29.71	-37.49	17.15	29.71	37.49	-17.15	0.000%
19	-29.71	-28.12	17.15	29.71	28.12	-17.15	0.000%
20	-34.26	-37.49	0.00	34.26	37.49	-0.00	0.000%
21	-34.26	-28.12	0.00	34.26	28.12	-0.00	0.000%
22	-29.64	-37.49	-17.11	29.64	37.49	17.11	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
23	-29.64	-28.12	-17.11	29.64	28.12	17.11	0.000%
24	-17.12	-37.49	-29.65	17.12	37.49	29.65	0.000%
25	-17.12	-28.12	-29.65	17.12	28.12	29.65	0.000%
26	0.00	-54.77	0.00	0.00	54.77	0.00	0.000%
27	0.00	-54.77	-10.51	-0.00	54.77	10.51	0.000%
28	5.26	-54.77	-9.11	-5.26	54.77	9.11	0.000%
29	9.11	-54.77	-5.26	-9.11	54.77	5.26	0.000%
30	10.51	-54.77	0.00	-10.51	54.77	0.00	0.000%
31	9.09	-54.77	5.25	-9.09	54.77	-5.25	0.000%
32	5.25	-54.77	9.09	-5.25	54.77	-9.09	0.000%
33	0.00	-54.77	10.51	-0.00	54.77	-10.51	0.000%
34	-5.26	-54.77	9.11	5.26	54.77	-9.11	0.000%
35	-9.11	-54.77	5.26	9.11	54.77	-5.26	0.000%
36	-10.51	-54.77	0.00	10.51	54.77	0.00	0.000%
37	-9.09	-54.77	-5.25	9.09	54.77	5.25	0.000%
38	-5.25	-54.77	-9.09	5.25	54.77	9.09	0.000%
39	0.00	-31.24	-8.07	0.00	31.24	8.07	0.000%
40	4.04	-31.24	-6.99	-4.04	31.24	6.99	0.000%
41	6.99	-31.24	-4.04	-6.99	31.24	4.04	0.000%
42	8.06	-31.24	0.00	-8.06	31.24	0.00	0.000%
43	6.97	-31.24	4.03	-6.97	31.24	-4.03	0.000%
44	4.03	-31.24	6.98	-4.03	31.24	-6.98	0.000%
45	0.00	-31.24	8.07	0.00	31.24	-8.07	0.000%
46	-4.04	-31.24	6.99	4.04	31.24	-6.99	0.000%
47	-6.99	-31.24	4.04	6.99	31.24	-4.04	0.000%
48	-8.06	-31.24	0.00	8.06	31.24	0.00	0.000%
49	-6.97	-31.24	-4.03	6.97	31.24	4.03	0.000%
50	-4.03	-31.24	-6.98	4.03	31.24	6.98	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	0.00011333
3	Yes	4	0.00000001	0.00006852
4	Yes	5	0.00000001	0.00004570
5	Yes	5	0.00000001	0.00001952
6	Yes	5	0.00000001	0.00005255
7	Yes	5	0.00000001	0.00002262
8	Yes	4	0.00000001	0.00051286
9	Yes	4	0.00000001	0.00031364
10	Yes	5	0.00000001	0.00004891
11	Yes	5	0.00000001	0.00002098
12	Yes	5	0.00000001	0.00006546
13	Yes	5	0.00000001	0.00002865
14	Yes	4	0.00000001	0.00011330
15	Yes	4	0.00000001	0.00006851
16	Yes	5	0.00000001	0.00006208
17	Yes	5	0.00000001	0.00002705
18	Yes	5	0.00000001	0.00005050
19	Yes	5	0.00000001	0.00002168
20	Yes	4	0.00000001	0.00051278
21	Yes	4	0.00000001	0.00031361
22	Yes	5	0.00000001	0.00005382
23	Yes	5	0.00000001	0.00002324

24	Yes	5	0.00000001	0.00004483
25	Yes	5	0.00000001	0.00001921
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00090240
28	Yes	5	0.00000001	0.00004992
29	Yes	5	0.00000001	0.00005010
30	Yes	4	0.00000001	0.00090730
31	Yes	5	0.00000001	0.00004952
32	Yes	5	0.00000001	0.00005105
33	Yes	4	0.00000001	0.00089714
34	Yes	5	0.00000001	0.00005062
35	Yes	5	0.00000001	0.00004954
36	Yes	4	0.00000001	0.00090413
37	Yes	5	0.00000001	0.00004991
38	Yes	5	0.00000001	0.00004975
39	Yes	4	0.00000001	0.00001080
40	Yes	4	0.00000001	0.00004779
41	Yes	4	0.00000001	0.00004467
42	Yes	4	0.00000001	0.00003795
43	Yes	4	0.00000001	0.00003778
44	Yes	4	0.00000001	0.00008706
45	Yes	4	0.00000001	0.00001078
46	Yes	4	0.00000001	0.00007520
47	Yes	4	0.00000001	0.00003981
48	Yes	4	0.00000001	0.00003791
49	Yes	4	0.00000001	0.00004890
50	Yes	4	0.00000001	0.00005693

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	120 - 81.4167	11.059	40	0.7946	0.0103
L2	86 - 47.0833	5.678	40	0.6563	0.0048
L3	52.75 - 1	2.032	40	0.3712	0.0017

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
116.00	Site Pro RMQP-4096-HK	40	10.389	0.7833	0.0096	50030
105.00	Site Pro VFA12-HD	40	8.573	0.7489	0.0077	16676

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	120 - 81.4167	47.112	4	3.3861	0.0439

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	86 - 47.0833	24.200	4	2.7981	0.0205
L3	52.75 - 1	8.661	4	1.5827	0.0074

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.00	Site Pro RMQP-4096-HK	4	44.262	3.3383	0.0409	11831
105.00	Site Pro VFA12-HD	4	36.529	3.1922	0.0328	3943

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	120 - 81.4167 (1)	TP30.5x18.93x0.375	38.58	0.00	0.0	34.2204	-12.56	2001.89	0.006
L2	81.4167 - 47.0833 (2)	TP40.05x28.3756x0.438	38.92	0.00	0.0	52.7058	-20.07	3083.29	0.007
L3	47.0833 - 1 (3)	TP53x37.4741x0.5	51.75	0.00	0.0	83.3175	-37.47	4874.07	0.008

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	120 - 81.4167 (1)	TP30.5x18.93x0.375	480.47	1495.40	0.321	0.00	1495.40	0.000
L2	81.4167 - 47.0833 (2)	TP40.05x28.3756x0.438	1307.75	3041.58	0.430	0.00	3041.58	0.000
L3	47.0833 - 1 (3)	TP53x37.4741x0.5	2887.77	6505.36	0.444	0.00	6505.36	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	120 - 81.4167 (1)	TP30.5x18.93x0.375	22.87	600.57	0.038	5.49	1512.13	0.004

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 $\frac{T_u}{\phi T_n}$
L2	81.4167 - 47.0833 (2)	TP40.05x28.3756x0.438	26.98	924.99	0.029	5.48	3071.10	0.002
L3	47.0833 - 1 (3)	TP53x37.4741x0.5	34.34	1462.22	0.023	5.47	6722.84	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	120 - 81.4167 (1)	0.006	0.321	0.000	0.038	0.004	0.329 ✔	1.000	✔
L2	81.4167 - 47.0833 (2)	0.007	0.430	0.000	0.029	0.002	0.437 ✔	1.000	✔
L3	47.0833 - 1 (3)	0.008	0.444	0.000	0.023	0.001	0.452 ✔	1.000	✔

Section Capacity Table

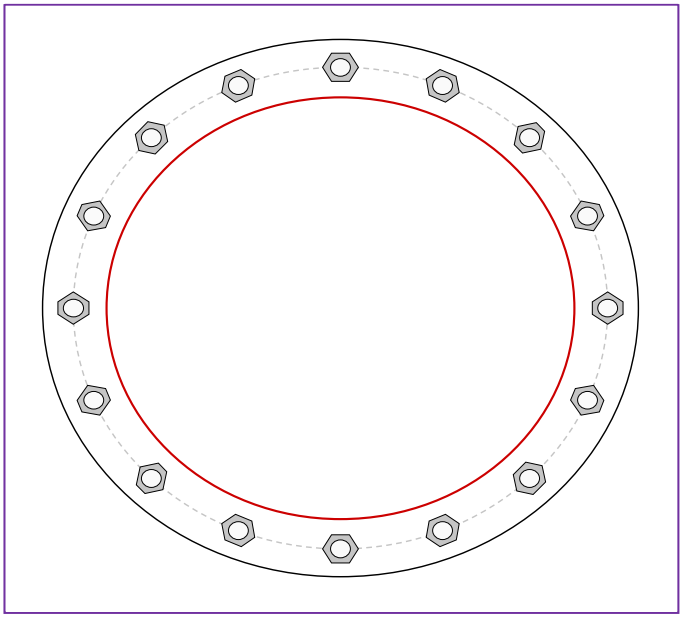
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 81.4167	Pole	TP30.5x18.93x0.375	1	-12.56	2001.89	32.9	Pass
L2	81.4167 - 47.0833	Pole	TP40.05x28.3756x0.438	2	-20.07	3083.29	43.7	Pass
L3	47.0833 - 1	Pole	TP53x37.4741x0.5	3	-37.47	4874.07	45.2	Pass
							Summary	
						Pole (L3)	45.2	Pass
						RATING =	**45.2**	**Pass**

Monopole Base Plate Connection

Site Info	
Site Number	US-CT-5058

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	2887.76
Axial Force (kips)	37.47
Shear Force (kips)	34.34



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 60.5" BC

Base Plate Data

67.53" OD x 2.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

53" 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 = 140.77	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.15	ϕVn = 149.1	**57.8%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	16.95	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**37.7%**	**Pass**

Pier and Pad Foundation

Site Number: US-CT-5058

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	37.49	kips
Base Shear, Vu_comp:	34.32	kips
Moment, M_u:	2887.77	ft-kips
Tower Height, **H**:	120	ft
BP Dist. Above Fdn, bp_{dist}:		in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	36	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	5.5	ft
Pad Width, W_1:	25	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	42	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	8	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	5	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Net Bearing, Qnet:	10.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.4	
Neglected Depth, **N**:	4.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	186.65	34.32	**18.4%**	**Pass**
Bearing Pressure (ksf)	8.02	2.09	**26.1%**	**Pass**
*Overturning (kip*ft)*	5448.70	3093.69	**56.8%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5864.91	3007.89	**51.3%**	**Pass**
Pier Compression (kip)	27556.45	61.74	**0.2%**	**Pass**
*Pad Flexure (kip*ft)*	3280.02	1093.59	**33.3%**	**Pass**
Pad Shear - 1-way (kips)	712.85	178.60	**25.1%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.201	0.044	**21.8%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3436.05	1804.73	**52.5%**	**Pass**

Structural Rating:	**52.5%**
Soil Rating:	**56.8%**

Site: US-CT-5058 Structure: A

Tower Details

Tower Type:	Tapered Monopole		
Height, h:	119	ft	
Effective Seismic Weight, W:	31.24	kips	
Amplification Factor, A_s:	1.0		2.7.8.1

Seismic Base Shear

Response Modification Factor, R:	1.5		
Discrete Appurtenance Weight in Top 1/3 of Structure, W_u:	7.9756	kips	
W_L:	23.26814496	kips	
E:	29000.0	ksi	
g:	386.088	in/s^2	
Average Moment of Inertia, I_{avg}:	10212.09125	in^4	
F_a:	0.470711069	hz	
Approximate Fundamental Period Monopole, T_a:	2.1244	s	2.7.7.1.3.3
Seismic Response Coefficient, C_s	0.1358		2.7.7.1.1
Seismic Response Coefficient Max 1, C_{smax}	0.0271		2.7.7.1.1
Seismic Response Coefficient Max 2, C_{smax}	N/A		2.7.7.1.1
Seismic Response Coefficient Min 1, C_{smin}	0.0300		2.7.7.1.1
Seismic Response Coefficient Min 2, C_{smin}	N/A		2.7.7.1.1
Controlling Seismic Response Coefficient, C_{sc}	0.0300		
Seismic Base Shear, V	0.937	kips	2.7.7.1.1

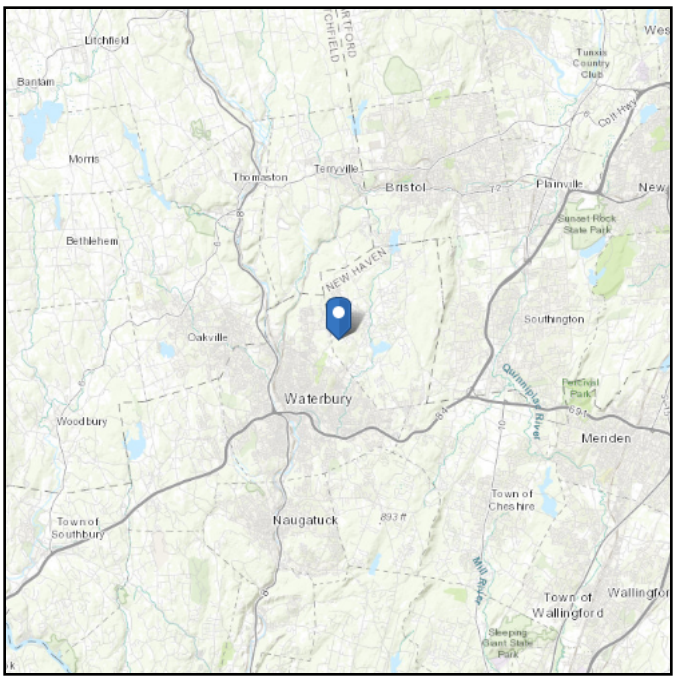
Vertical Distribution Factors

Period Related Exponent, k:	1.812	2.7.7.1.2
Sum of $w_i h_i^k$	73374.86	2.7.7.1.2

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.590008
Risk Category:	II	**Longitude:**	-73.008615
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	0 ft (NAVD 88)



Wind

Results:

Wind Speed	117 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Tue Apr 30 2024

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

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

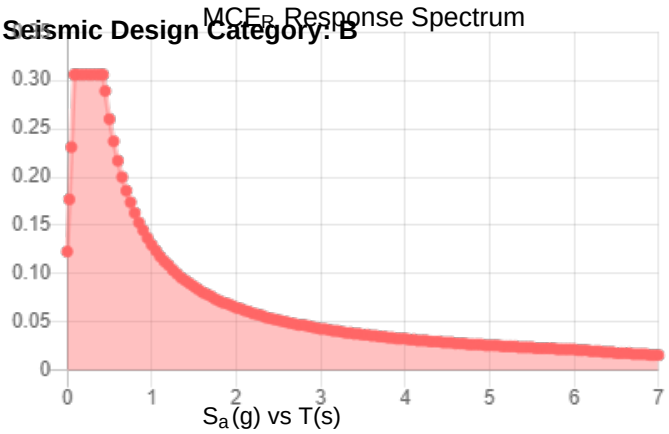
Seismic

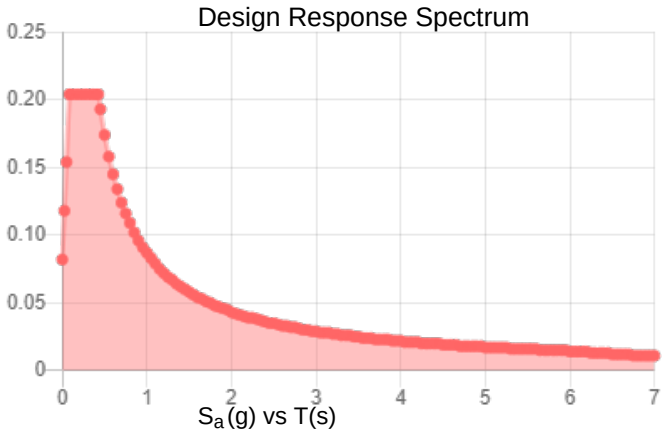
Site Soil Class: D - Default (see Section 11.4.3)

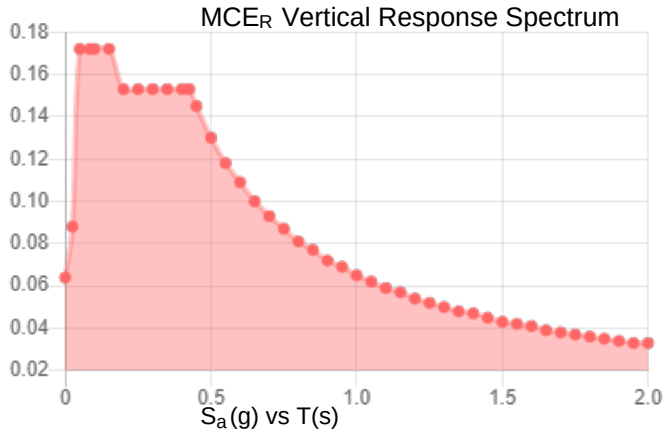
Results:

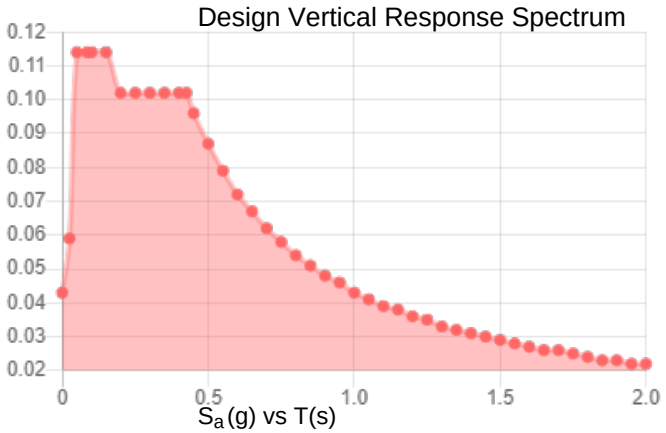
S_S :	0.191	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.105
F_v :	2.4	PGA_M :	0.167
S_{MS} :	0.306	F_{PGA} :	1.59
S_{M1} :	0.13	I_e :	1
S_{DS} :	0.204	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Tue Apr 30 2024**

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:	Tue Apr 30 2024

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.

Attachment 2: Collocation Application

COLOCATION APPLICATION - P-047875
US-CT-5058
Version 1
New Cingular Wireless PCS, LLC

Vertical Bridge REIT, LLC.
750 Park of Commerce Dr, ste 200
Boca Raton, FL 33487

SUMMARY

PRIMARY INFO

Application #:	P-047875
Application Version:	1 (Submitted: 3/20/2024 2:43:00 PM)
Application Type:	Broadband
Application Name:	Wolcott Capacity
Lease Type:	New Lease
ASR Number:	
Description:	Install 6 antennas, 9 RRHs, 2 surge arrestors, 2 fiber and 6 DC lines at at CL height of 105'

VERTICAL BRIDGE SITE INFO

VB Site #:	US-CT-5058
VB Site Name:	Wolcott South CT
Latitude:	41.59000790
Longitude:	-73.00861540
Structure Type:	TWR - IP
Structure Height:	120.0000
Site Address:	Chestnut Hill Road - Wolcott, CT 06716

VERTICAL BRIDGE DEAL TEAM

RLM:	Floyd Jenkins Floyd.Jenkins@verticalbridge.com (301) 667-0069	**LPM:**	Sam Bowden Sam.Bowden@verticalbridge.com	**ROM:**	Joe Bascelli Joe.Bascelli@verticalbridge.com (484) 288-9586

TENANT LEGAL INFO

Tenant Legal Name:	New Cingular Wireless PCS, LLC
State of Registration:	Delaware
Type of Entity:	LLC
Carrier NOC #:	8775186937
Tenant Site #:	CT1432
Tenant Site Name:	Wolcott Capacity

APPLICANT

Name:	Dan Bilezikian
Address:	12 Industrial Way Salem, NH 02079
Phone Number:	(401) 368-0006
Email Address:	dbilezikian@saigrp.com

FINAL LEASED RIGHTS CONFIGURATION TOTALS

This is a summary of your remaining existing equipment plus the new equipment.

FINAL EQUIPMENT

QTY	Equipment Type
2	Surge Arrestor/Raycap/Squid
6	Panel
9	RRU

FINAL LINES

QTY	Line Type
2	Fiber
3	Flex Conduit
6	DC Power

FREQUENCY & TECHNOLOGY INFO

Type of Tehnology:	Broadband Wireless
Is TX Frequency Licensed:	Yes
TX Frequency:	716-728, 734-736, 788-798, 880-890, 1930-1945, 1965-1970, 1985-1990, 2170-2180, 2345-2360 MHz
Is RX Frequency Licensed:	Yes
RX Frequency:	704-716, 758-768, 835-845, 1770-1780, 1850-1865, 1885-1890, 2305-2320

MOUNT & STRUCTURAL ANALYSIS

MOUNT ANALYSIS

Provided by Tenant:	Yes
To Be Run by VB:	
Include Mount Mapping:	

STRUCTURAL HARD COPIES

Required:	No
Number of Hard Copies:	

CONTACTS

INVOICE CONTACT

Attention To	Name	Address	Phone Number 1	Phone Number 2	Email 1	Email 2
Accounts Payable	Lou Ann Pinard	12 Industrial Way Salem, NH 03079	(603) 421-0470		AP@saigrp.com	

PO CONTACT

Name	Phone	Email
Dan Bilezikian	(401) 368-0006	dbilezikian@saigrp.com

LEASING CONTACT

Name	Phone	Email
Lynn Brady	(508) 271-8391	SB368E@att.com

LINE & EQUIPMENT

NEW LINE(S)

Qty	Line Type	Line Diameter(In.)	Line Location	Comments
6	DC Power	0.92	Interior	
2	Fiber	0.41	Interior	
3	Flex Conduit	2	Interior	

NEW EQUIPMENT

Qty	Equipment Type	Mount RAD Height	Equipment RAD Height (H')	Mount Type	Manfacturer	Model Number	Dimensions (H"xW"xD")	Weight (Lbs.)	Azimuth	Comments
3	Panel	105.00	105.00	Sector Frames	CCI	TPA65R-BU8DA- K	96.00 x 20.70 x 7.70	87.10	0/ 110/ 260	
3	Panel	105.00	105.00	Sector Frames	CCI	OPA65R-BU8DA- K	96.00 x 20.70 x 7.70	78.40	0/ 110/ 260	
3	RRU	105.00	105.00	Sector Frames	Ericsson	4490 B5/B12	17.50 x 15.10 x 6.80	68.00	0/ 110/ 260	
3	RRU	105.00	105.00	Sector Frames	Ericsson	4494 B14/B29	17.50 x 15.10 x 5.60	57.30	0/ 110/ 260	
3	RRU	105.00	105.00	Sector Frames	Ericsson	4890 B25/B66	17.50 x 15.10 x 6.90	68.00	0/ 110/ 260	
2	Surge Arrestor/ Raycap/ Squid	105.00	105.00	Sector Frames	Raycap	DC9- 48- 60- 24- 8C- EV	18.30 x 10.20 x 31.40	26.20	0	

NEW EQUIPMENT CABINET(S)

Qty of Cabinets	Cabinet Dimensions (H x W x D)	Manfacturer	Comments
1	74.00 x 102.00 x 54.00	Vertiv	3-bay walk-up-cabinet on steel platform

ADDITIONAL SITE REQUIREMENTS

GROUND & INTERIOR SPACE REQUIREMENTS

Requirement Type	Total Lease Area (L x W)	Cabinet Required	Cabinet Area (L x W)	Shelter Required	Shelter Pad (L x W)	Comments
New	20.00 x 12.50	Yes	14.00 x 7.00			

GENERATOR REQUIREMENTS

Requirement Type	Fuel Type	Kilowatt Size	Pad Dimensions (L x D)	Generator Manufacturer	Fuel Tank Manufacturer	Comments
New	Diesel	20	10.00 x 4.00	Generac	Generac	Fuel tank sits under the unit, same H and W dimensions.

AC POWER REQUIREMENTS

Meter Type	Additional Details	Comments
New Tenant Meter		

BACKHAUL REQUIREMENTS

Requirement Type	Cable Type	Number of Points of Entry	Riser Size (Inches)	Comments
New	Fiber	1	1.00	