Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

October 18, 2016

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-152-160829 – Cellco Partnership d/b/a Verizon Wireless**
53 Dayton Road, Waterford, Connecticut

Dear Ms. Bachman:

On September 19, 2016, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its existing telecommunications facility at 53 Dayton Road in Waterford, Connecticut. The modifications involved the replacement of antennas and the installation of remote radio heads at the above-referenced facility.

As a condition of the acknowledgement, Cellco was required to provide the Council with a copy of the Structural Analysis Report referencing the Rev. G of the Structural Standards. The updated Structural Analysis Report referencing Rev. G is attached.

If you have any questions please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks

15354425-v1

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing ROHN Lattice Tower

Proposed Verizon Wireless
Antenna Installation

Verizon Site Ref: Waterford

53 Dayton Road
Waterford, CT

Centek Project No. 15001.009

~~Date: February 6, 2015~~
~~Rev 1: August 15, 2016~~
Rev 2: October 7, 2016

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon Wireless on the existing lattice tower located in Waterford, Connecticut.

The host tower is a 180-ft, nine-section, three legged, self-supporting tapered lattice tower originally designed and manufactured by ROHN Industries Inc., Eng file no. 38103AE, dated August 24, 1998. The tower geometry, structure member sizes and anchor bolt properties were obtained from a previous structural analysis report prepared by Centek Engineering job no. 12124.CO24 signed and sealed January 14, 2013. Original foundation loading was obtained from a structural analysis report prepared by URS Corporation, signed and sealed on November 8, 2002.

Antenna and appurtenance inventory were taken from the aforementioned Centek structural report and a Verizon RF data sheet.

The tower consists of nine (9) tapered vertical sections with steel pipe legs conforming to ASTM A572-50. Horizontal and diagonal lateral support bracing consists of steel pipe construction conforming to ASTM A36M-42. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 8.54-ft at the top and 25.48-ft at the base.

Verizon Wireless proposes the removal of fifteen (15) panel antennas and six (6) remote radio heads and the installation of nine (9) panel antennas, nine (9) remote radio heads and one (1) main distribution box mounted on the existing boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- TOWN (Existing):
  Antennas: Five (5) 15-ft Omni-directional whip antennas, two (2) 9-ft Omni-directional whip antennas and one (1) 8-ft Omni-directional whip antenna mounted on two (2) 6-ft side-arms and one (1) lightweight T-Arm to the top of the the tower.
  Coax Cables: One (1) 1-5/8" ∅ and seven (7) 7/8" ∅ coax cables (face mounted).
- T-Mobile (Existing):
  Antennas: Six (6) EMS RR90-17-02DP panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, six (6) 14"x8"x4" TMAs and three (3) 14"x9"x5" TMA's mounted to three (3) 10-ft T-Arms with a RAD center elevation of 163-ft above grade level.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables (face mounted).

- AT&T (Existing):
  Antennas: Six (6) Powerwave 7770 panel antennas, two (2) Andrew SBNH-1D6565C panel antennas, one (1) Powerwave P65-17-XLH-RR panel antennas, six (6) Powerwave LGP21401 TMA's, six (6) Powerwave LGP13519 Diplexers, six (6) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on three (3) 14' boom gates at a RAD center elevation of 157-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 3" dia. flex conduit (face mounted).
- TOWN (Existing):
  Antennas: One (1) 12-ft Omni-directional whip antenna mounted on a 6-ft side-arm with an elevation of 146-ft above grade level.
  Coax Cables: One (1) 7/8" ∅ coax cable (face mounted).
- MetroPCS (Existing):
  Antennas: Three (3) Kathrein 800-10504 panel antennas mounted to three (3) 10-ft T-Arms with a RAD center elevation of 126.5-ft above grade level.
  Coax Cables: Six (6) 7/8" ∅ coax cables (face mounted).
- VERIZON (Existing):
  GPS: One (1) GPS antenna mounted on a 1-ft standoff arm with a RAD center elevation of 51-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable (face mounted).
- VERIZON (Existing to Remain):
  Antennas: One (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remove):
  Antennas: One (1) Antel BXA-70063-6CF panel antenna, two (2) Swedcom SLCP 2x6015 panel antennas, two (2) Antel LPA-80063-4CF panel antennnas, four (4) Swedcom SC-E 6014 rev2 panel antennas, two (2) Antel BXA-171063-12BF panel antennas, one (1) Swedcom SACP 2x5516 panel antenna, three (3) Antel BXA-171063-8CF panel antennas, three (3) Alcatel-Lucent RRH-2x40-AWS remote radio heads and three (3) Alcatel-Lucent RRH-2x40-07U mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- **VERIZON (Proposed):**
  Antennas: Six (6) Andrew SBNHH-1D65B panel antennas, three (3) Andrew LNX-6512DS panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above existing grade.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable mounted to the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables should be routed as specified in section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	New London; v = 105-120 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Waterford; v = 105 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 105 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA code.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **53.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T9)	0'-0"-20'-0"	42.2%	**PASS**
Diagonal (T7)	40'-0"-60'-0"	53.5%	**PASS**
Horizontal (T7)	40'-0"-60'-0"	42.5%	**PASS**

Foundation and Anchors

The existing foundation information was unavailable for use in this structural analysis. Review of the foundation design consisted of a comparison of the proposed applied loads obtained from the tower design calculations; governing Load Case 2 with the original tower loading obtained from the aforementioned URS structural design report signed and sealed on November 8, 2002.

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation:

Reactions	Vector	Proposed Base Reactions
Base	Shear	**74 kips**
	Compression	**69 kips**
	Moment	**7497 kip-ft**
Leg	Shear	**45 kips**
	Uplift	**321 kips**
	Compression	**363 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	23.0%	**PASS**

- The foundation was found to be within allowable limits.

Tower Reactions	Original Tower Reactions[1]	Proposed Reactions	Result
Leg Compression	989.4 kips	363 kips	**PASS**
Leg Uplift	838.8 kips	321 kips	**PASS**
Leg Shear	191.4 kips	45 kips	**PASS**
Overturning Moment	19538.0 kip-ft	7497 kip-ft	**PASS**

1. Original design reactions multiplied by 1.35 for comparison to proposed reactions per section 15.5 of TIA-222-G

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

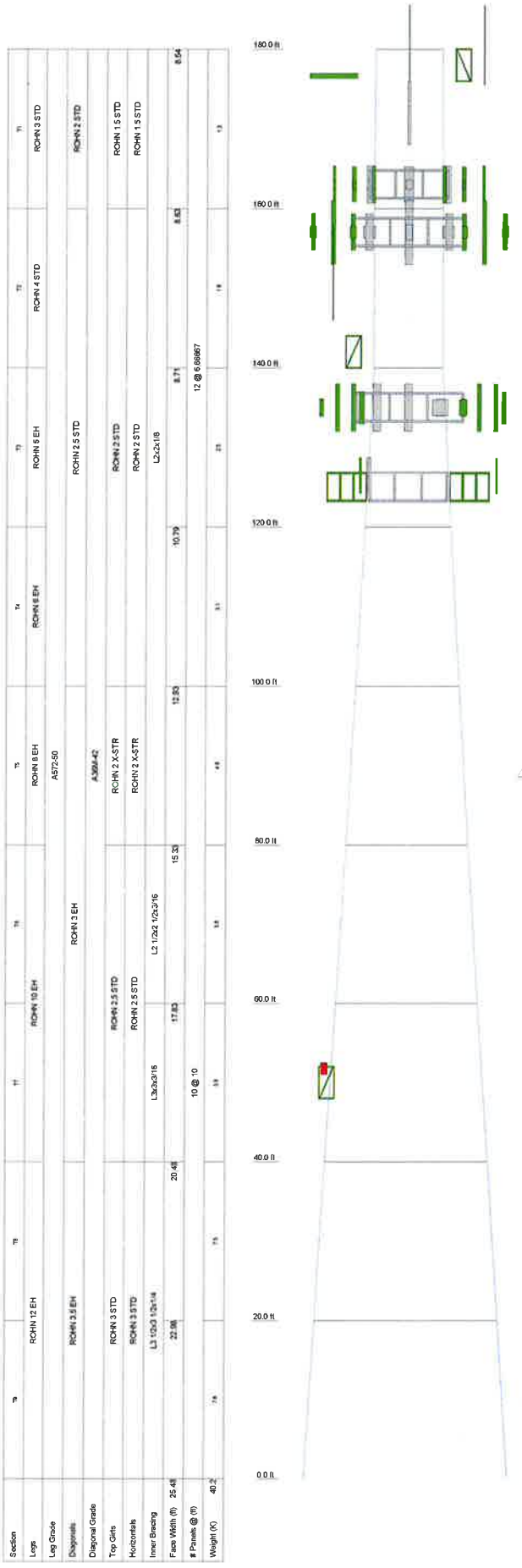
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
15' 2.5" Dia omni (Tower)	180	(2) LGP13519 Diplexer (ATT - Existing)	157
15' 2.5" Dia omni (Tower)	180	SBNHH-1D6565C (ATT - Existing)	157
15' 2.5" Dia omni (Tower)	180	SBNHH-1D6565C (ATT - Existing)	157
Rohn 6' Side-Arm(1) (Tower)	178	P65-17-XLH-RR (ATT - Existing)	157
Rohn 6' Side-Arm(1) (Tower)	178	(2) RRUS-11 (ATT - Existing)	157
Filler (Tower)	177	(2) RRUS-11 (ATT - Existing)	157
15' 2.5" Dia omni (Tower)	177	(2) RRUS-11 (ATT - Existing)	157
15' 2.5" Dia omni (Tower)	177	DC6-48-60-18-8F Surge Arrestor (ATT - Existing)	157
Pirod 15' T-Frame Sector Mount (1) (Tower)	177	Rohn 6'x14' Boom Gate (3) (ATT - Existing)	157
8' x 3" Dia Omni (Tower)	176	12' x 2" Dia Omni (Tower)	146
9-ft Omni (Tower)	176	Rohn 6' Side-Arm(1) (Tower)	142
9-ft Omni (Tower)	176	LNX-6512DS (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
		SBNHH-1D65B (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	LNX-6512DS (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
		LNX-6512DS (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	SBNHH-1D65B (Verizon - Proposed)	135
APX16DWV-16DWV-S-E-ACU (T-Mobile - Existing)	163	RRH4x30-B13 (Verizon - Proposed)	135
		RRH4x30-B13 (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	RRH4x30-B13 (Verizon - Proposed)	135
RR90-17-02DP (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH4x45/2x90-AWS (Verizon - Proposed)	135
(2) 14"x8"x4" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	RRH2x60-PCS (Verizon - Proposed)	135
14"x9"x5" TMA (T-Mobile - Existing)	163	DB-T1-6Z-8AB-0Z (Verizon - Existing)	135
Valmont 10' Wireless Frame (3) (T-Mobile - Existing)	163	DB-T1-6Z-8AB-0Z (Verizon - Proposed)	135
		Rohn 6'x14' Boom Gate (3) (Verizon - Existing)	135
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) 7770.00 (ATT - Existing)	157	800-10504 (MetroPCS - Existing)	126.5
(2) LGP21401 TMA (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP21401 TMA (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP13519 Diplexer (ATT - Existing)	157	10-ft T-Frame (MetroPCS - Existing)	125
(2) LGP13519 Diplexer (ATT - Existing)	157	GPS (Verizon - Existing)	51
		1' Standoff Pipe (Verizon - Existing)	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36M-42	42 ksi	60 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft.
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 53.5%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 363 K
SHEAR: 45 K

UPLIFT: -321 K
SHEAR: 42 K

AXIAL 168 K
SHEAR 21 K *MOMENT 2349 kip-ft*

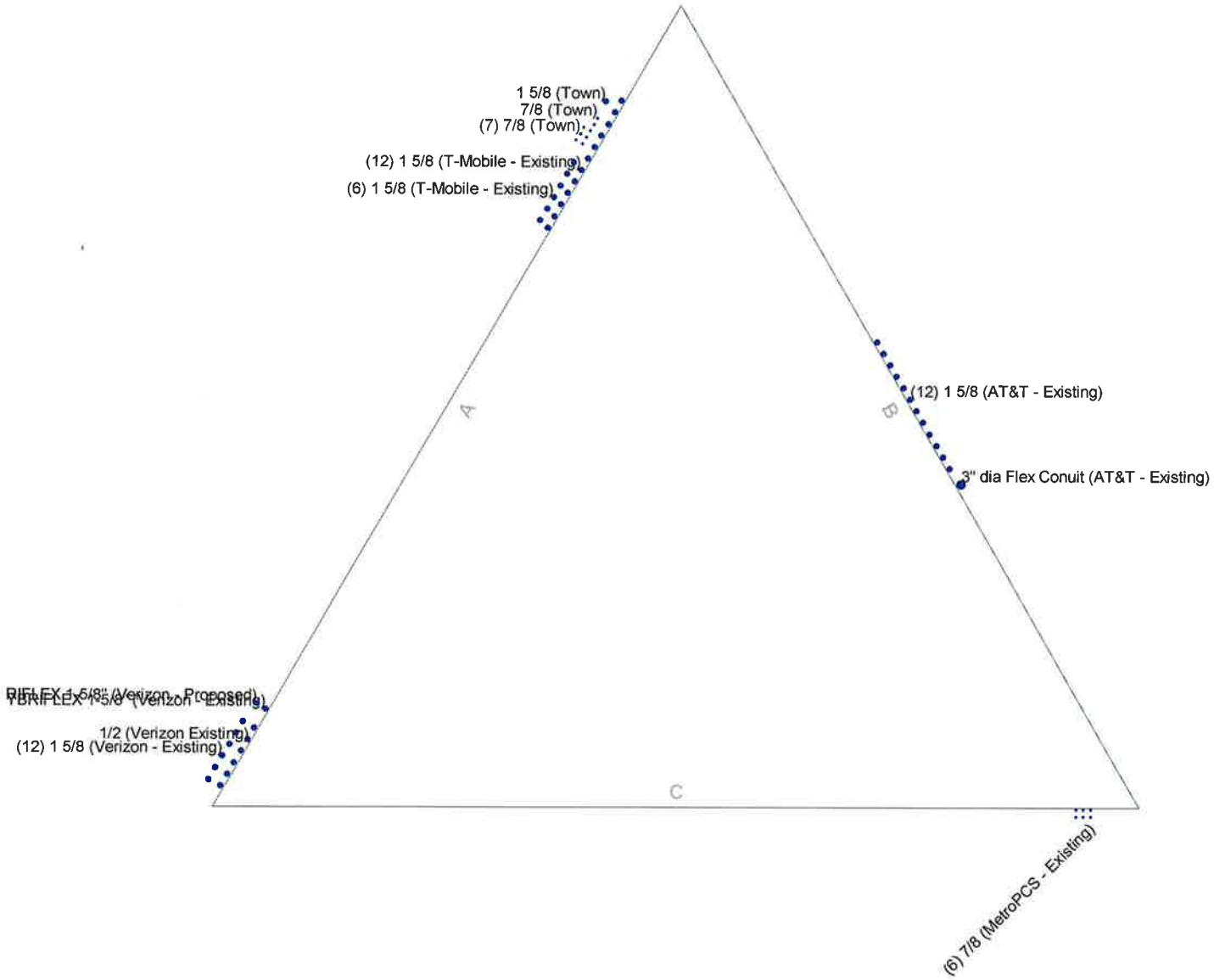
TORQUE 19 kip-ft
50 mph WIND - 0.7500 in ICE
AXIAL 69 K
SHEAR 74 K *MOMENT 7497 kip-ft*

TORQUE 69 kip-ft
REACTIONS - 105 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	15001.009 - Waterford
Project:	180' Lattice Tower - 53 Dayton Road Waterford, CT
Client: Verizon Wireless	Drawn by: TJL / Appd:
Code: TIA-222-G	Date: 10/07/16 / Scale: NTS
Path:	Dwg No. E-1

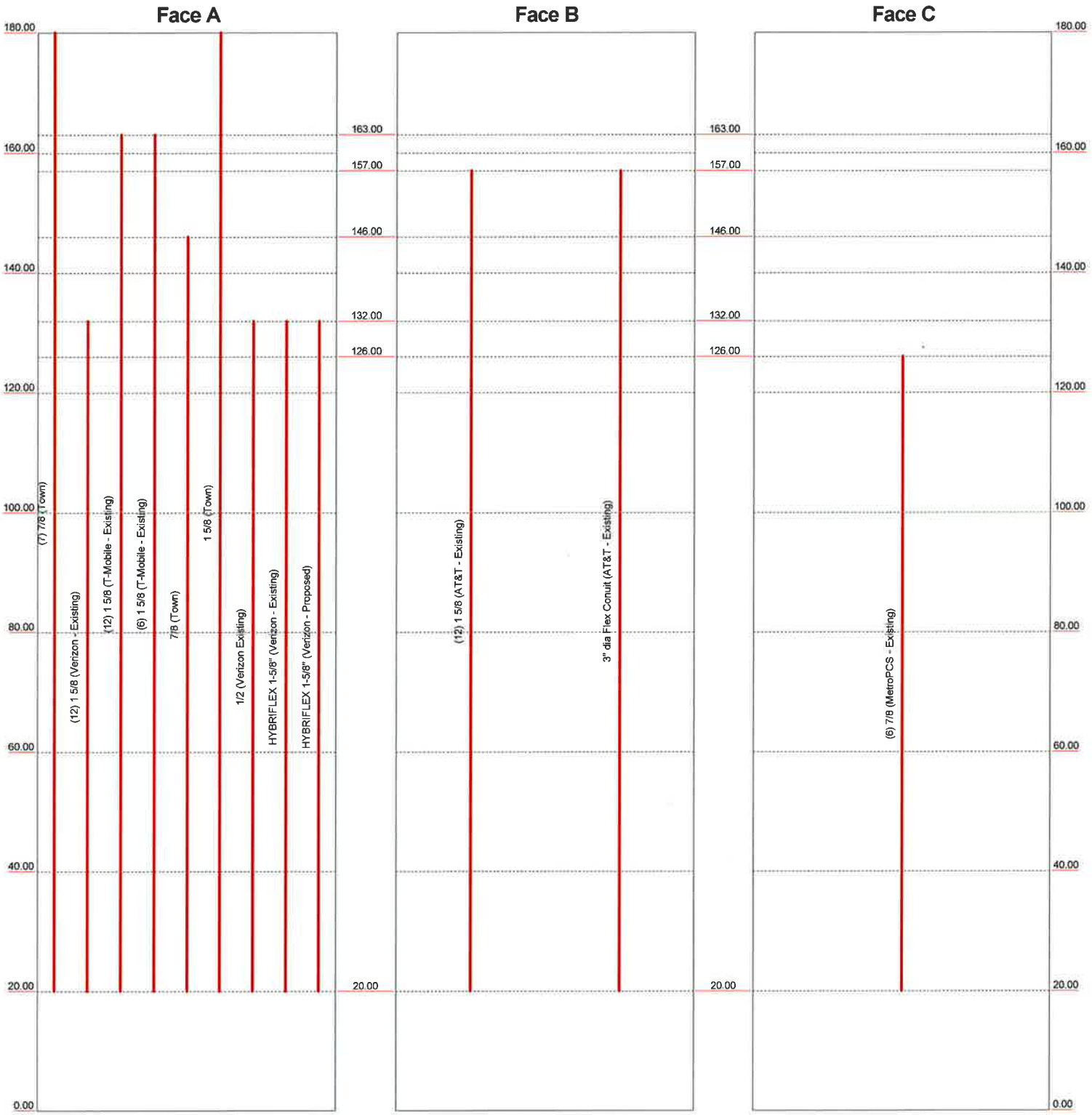
Round Flat App In Face App Out Face



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***15001.009 - Waterford***		
	Project: ***180' Lattice Tower - 53 Dayton Road Waterford,***		
	Client: Verizon Wireless	Drawn by: TJL	App'd:
	Code: TIA-222-G	Date: 10/07/16	Scale: NTS
	Path:		Dwg No. E-7

0' - 180'

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



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Project:	***180' Lattice Tower - 53 Dayton Road Waterford,***		
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 10/07/16	Scale: NTS	
Path:		Dwg No. E-7	

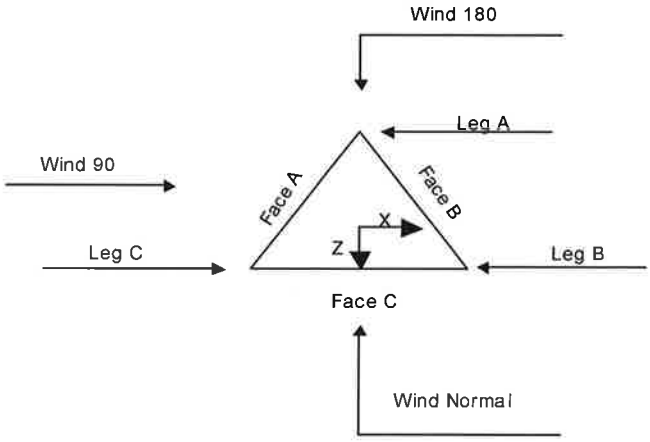
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.54 ft at the top and 25.48 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 105 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 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.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Use TIA-222-G 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-160.00			8.54	1	20.00
T2	160.00-140.00			8.63	1	20.00
T3	140.00-120.00			8.71	1	20.00
T4	120.00-100.00			10.79	1	20.00
T5	100.00-80.00			12.93	1	20.00
T6	80.00-60.00			15.33	1	20.00
T7	60.00-40.00			17.83	1	20.00
T8	40.00-20.00			20.48	1	20.00
T9	20.00-0.00			22.98	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-160.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T2	160.00-140.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	140.00-120.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-80.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T8	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T9	20.00-0.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-160.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A36M-42 (42 ksi)
T2 160.00-140.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T3 140.00-120.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T4 120.00-100.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)
T5 100.00-80.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T6 80.00-60.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T7 60.00-40.00	Pipe	ROHN 10 EH	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A36M-42 (42 ksi)
T8 40.00-20.00	Pipe	ROHN 12 EH	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A36M-42 (42 ksi)
T9 20.00-0.00	Pipe	ROHN 12 EH	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A36M-42 (42 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-160.00	Pipe	ROHN 1.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T2 160.00-140.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T3 140.00-120.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T4 120.00-100.00	Pipe	ROHN 2 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T5 100.00-80.00	Pipe	ROHN 2 X-STR	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T6 80.00-60.00	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T7 60.00-40.00	Pipe	ROHN 2.5 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T8 40.00-20.00	Pipe	ROHN 3 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)
T9 20.00-0.00	Pipe	ROHN 3 STD	A36M-42 (42 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 X-STR	A572-50 (50 ksi)
T6 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A36 (36 ksi)
T7 60.00-40.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A36 (36 ksi)
T8 40.00-20.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A36 (36 ksi)
T9 20.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 180.00-160.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T2 160.00-140.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T3 140.00-120.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T4 120.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T5 100.00-80.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A572-50 (50 ksi)
T6 80.00-60.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A572-50 (50 ksi)
T7 60.00-40.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A572-50 (50 ksi)
T8 40.00-20.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 20.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X / Y	K Brace Diags X / Y	Single Diags X / Y	Girts X / Y	Horiz. X / Y	Sec. Horiz. X / Y	Inner Brace X / Y
T1 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1] *Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.3750 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 160.00-140.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.3750 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 140.00-120.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 120.00-100.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 100.00-80.00	Flange	1.0000 A325N	12	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T6 80.00-60.00	Flange	1.0000 A325N	12	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T7 60.00-40.00	Flange	1.0000 A325N	16	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T8 40.00-20.00	Flange	1.0000 A325N	16	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0
T9 20.00-0.00	Flange	1.0000 A354-BC	24	0.7500 A325N	3	0.7500 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.7500 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8	B	No	Ar (CaAa)	157.00 - 20.00	0.0000	0	12	12	1.9800	1.9800		1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(AT&T - Existing) 7/8	A	No	Ar (CaAa)	180.00 - 20.00	4.0000	0.33	7	4	1.1100	1.1100		0.54
(Town) 1 5/8	A	No	Ar (CaAa)	132.00 - 20.00	0.0000	-0.44	12	6	1.9800	1.9800		1.04
(Verizon - Existing) 7/8	C	No	Ar (CaAa)	126.00 - 20.00	0.0000	-0.44	6	3	1.1100	1.1100		0.54
(MetroPCS - Existing) 1 5/8	A	No	Ar (CaAa)	163.00 - 20.00	0.0000	0.3	12	12	1.9800	1.9800		1.04
(T-Mobile - Existing) 1 5/8	A	No	Ar (CaAa)	163.00 - 20.00	3.0000	0.26	6	6	1.9800	1.9800		1.04
(T-Mobile - Existing) 7/8	A	No	Ar (CaAa)	146.00 - 20.00	4.0000	0.35	1	1	1.1100	1.1100		0.54
(Town) 1 5/8	A	No	Ar (CaAa)	180.00 - 20.00	4.0000	0.37	1	1	1.9800	1.9800		1.04
(Town) 1/2	A	No	Ar (CaAa)	132.00 - 20.00	0.0000	-0.42	1	1	0.5800	0.5800		0.25
(Verizon Existing) HYBRIFLEX 1-5/8"	A	No	Ar (CaAa)	132.00 - 20.00	0.0000	-0.38	1	1	1.9800	1.9800		1.90
(Verizon - Existing) HYBRIFLEX 1-5/8"	A	No	Ar (CaAa)	132.00 - 20.00	3.0000	-0.38	1	1	1.9800	1.9800		1.90
(Verizon - Proposed) 3" dia Flex Conuit	B	No	Ar (CaAa)	157.00 - 20.00	0.0000	0.1	1	1	3.0000	3.0000		5.00
(AT&T - Existing)												

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180.00-160.00	A	0.000	0.000	30.192	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	0.000	0.000	91.446	0.000	0.47
		B	0.000	0.000	45.492	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	0.000	0.000	126.960	0.000	0.68
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	3.996	0.000	0.02
T4	120.00-100.00	A	0.000	0.000	149.600	0.000	0.81
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	13.320	0.000	0.06
T5	100.00-80.00	A	0.000	0.000	149.600	0.000	0.81
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	13.320	0.000	0.06
T6	80.00-60.00	A	0.000	0.000	149.600	0.000	0.81

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
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	13.320	0.000	0.06
T7	60.00-40.00	A	0.000	0.000	149.600	0.000	0.81
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	13.320	0.000	0.06
T8	40.00-20.00	A	0.000	0.000	149.600	0.000	0.81
		B	0.000	0.000	53.520	0.000	0.35
		C	0.000	0.000	13.320	0.000	0.06
T9	20.00-0.00	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	0.00

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
T1	180.00-160.00	A	1.767	0.000	0.000	72.326	0.000	1.18
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	160.00-140.00	A	1.745	0.000	0.000	234.590	0.000	3.76
		B		0.000	0.000	115.870	0.000	1.96
		C		0.000	0.000	0.000	0.000	0.00
T3	140.00-120.00	A	1.720	0.000	0.000	298.576	0.000	5.16
		B		0.000	0.000	136.081	0.000	2.28
		C		0.000	0.000	8.441	0.000	0.14
T4	120.00-100.00	A	1.692	0.000	0.000	336.099	0.000	5.98
		B		0.000	0.000	135.810	0.000	2.25
		C		0.000	0.000	27.938	0.000	0.45
T5	100.00-80.00	A	1.658	0.000	0.000	334.596	0.000	5.89
		B		0.000	0.000	135.490	0.000	2.22
		C		0.000	0.000	27.703	0.000	0.45
T6	80.00-60.00	A	1.617	0.000	0.000	332.756	0.000	5.79
		B		0.000	0.000	135.099	0.000	2.18
		C		0.000	0.000	27.415	0.000	0.44
T7	60.00-40.00	A	1.564	0.000	0.000	330.366	0.000	5.65
		B		0.000	0.000	134.591	0.000	2.13
		C		0.000	0.000	27.041	0.000	0.43
T8	40.00-20.00	A	1.486	0.000	0.000	326.890	0.000	5.46
		B		0.000	0.000	133.852	0.000	2.05
		C		0.000	0.000	26.496	0.000	0.41
T9	20.00-0.00	A	1.331	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	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-160.00	-1.6064	-5.6377	-1.1845	-4.2446
T2	160.00-140.00	0.1034	-6.5761	0.2586	-5.7229
T3	140.00-120.00	-1.5972	-4.7402	-0.7708	-4.8708
T4	120.00-100.00	-2.4423	-3.9087	-1.4394	-4.7062

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T5	100.00-80.00	-2.7674	-4.4791	-1.6569	-5.5550
T6	80.00-60.00	-3.0582	-4.9941	-1.8521	-6.3538
T7	60.00-40.00	-3.4566	-5.6846	-2.0768	-7.2887
T8	40.00-20.00	-3.6745	-6.0761	-2.2376	-8.0568
T9	20.00-0.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	7/8	160.00 - 180.00	0.6000	0.6000
T1	5	1 5/8	160.00 - 163.00	0.6000	0.6000
T1	6	1 5/8	160.00 - 163.00	0.6000	0.6000
T1	9	1 5/8	160.00 - 180.00	0.6000	0.6000
T2	1	1 5/8	140.00 - 157.00	0.6000	0.6000
T2	2	7/8	140.00 - 160.00	0.6000	0.6000
T2	5	1 5/8	140.00 - 160.00	0.6000	0.6000
T2	6	1 5/8	140.00 - 160.00	0.6000	0.6000
T2	8	7/8	140.00 - 146.00	0.6000	0.6000
T2	9	1 5/8	140.00 - 160.00	0.6000	0.6000
T2	14	3" dia Flex Conuit	140.00 - 157.00	0.6000	0.6000
T3	1	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	2	7/8	120.00 - 140.00	0.6000	0.6000
T3	3	1 5/8	120.00 - 132.00	0.6000	0.6000
T3	4	7/8	120.00 - 126.00	0.6000	0.6000
T3	5	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	6	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	8	7/8	120.00 - 140.00	0.6000	0.6000
T3	9	1 5/8	120.00 - 140.00	0.6000	0.6000
T3	10	1/2	120.00 - 132.00	0.6000	0.6000
T3	12	HYBRIFLEX 1-5/8"	120.00 - 132.00	0.6000	0.6000
T3	13	HYBRIFLEX 1-5/8"	120.00 - 132.00	0.6000	0.6000
T3	14	3" dia Flex Conuit	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			140.00		
T4	1	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	2	7/8	100.00 - 120.00	0.6000	0.6000
T4	3	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	4	7/8	100.00 - 120.00	0.6000	0.6000
T4	5	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	6	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	8	7/8	100.00 - 120.00	0.6000	0.6000
T4	9	1 5/8	100.00 - 120.00	0.6000	0.6000
T4	10	1/2	100.00 - 120.00	0.6000	0.6000
T4	12	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	13	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T4	14	3" dia Flex Conuit	100.00 - 120.00	0.6000	0.6000
T5	1	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	2	7/8	80.00 - 100.00	0.6000	0.6000
T5	3	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	4	7/8	80.00 - 100.00	0.6000	0.6000
T5	5	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	6	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	8	7/8	80.00 - 100.00	0.6000	0.6000
T5	9	1 5/8	80.00 - 100.00	0.6000	0.6000
T5	10	1/2	80.00 - 100.00	0.6000	0.6000
T5	12	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	13	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T5	14	3" dia Flex Conuit	80.00 - 100.00	0.6000	0.6000
T6	1	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	2	7/8	60.00 - 80.00	0.6000	0.6000
T6	3	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	4	7/8	60.00 - 80.00	0.6000	0.6000
T6	5	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	6	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	8	7/8	60.00 - 80.00	0.6000	0.6000
T6	9	1 5/8	60.00 - 80.00	0.6000	0.6000
T6	10	1/2	60.00 - 80.00	0.6000	0.6000
T6	12	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	13	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T6	14	3" dia Flex Conuit	60.00 - 80.00	0.6000	0.6000
T7	1	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	2	7/8	40.00 - 60.00	0.6000	0.6000
T7	3	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	4	7/8	40.00 - 60.00	0.6000	0.6000
T7	5	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	6	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	8	7/8	40.00 - 60.00	0.6000	0.6000
T7	9	1 5/8	40.00 - 60.00	0.6000	0.6000
T7	10	1/2	40.00 - 60.00	0.6000	0.6000
T7	12	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	13	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T7	14	3" dia Flex Conuit	40.00 - 60.00	0.6000	0.6000
T8	1	1 5/8	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	2	7/8	20.00 - 40.00	0.6000	0.6000
T8	3	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	4	7/8	20.00 - 40.00	0.6000	0.6000
T8	5	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	6	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	8	7/8	20.00 - 40.00	0.6000	0.6000
T8	9	1 5/8	20.00 - 40.00	0.6000	0.6000
T8	10	1/2	20.00 - 40.00	0.6000	0.6000
T8	12	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T8	13	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T8	14	3" dia Flex Conuit	20.00 - 40.00	0.6000	0.6000

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
15' 2.5" Dia omni (Town)	C	From Leg	3.00 0.00 7.50	0.0000	177.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	0.05 0.08 0.12
15' 2.5" Dia omni (Town)	C	From Leg	3.00 0.00 7.50	0.0000	177.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	0.05 0.08 0.12
Filter (Town)	C	From Leg	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	0.44 0.55 0.67	0.44 0.55 0.67	0.01 0.02 0.03
15' 2.5" Dia omni (Town)	C	From Leg	0.00 0.00 7.50	0.0000	180.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	0.05 0.08 0.12
15' 2.5" Dia omni (Town)	A	From Leg	0.00 0.00 7.50	0.0000	180.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	0.05 0.08 0.12
9-ft Omni (Town)	A	From Leg	6.00 0.00 4.50	0.0000	176.00	No Ice 1/2" Ice 1" Ice	2.25 3.18 4.11	2.25 3.18 4.11	0.03 0.05 0.07
8' x 3" Dia Omni (Town)	A	From Leg	6.00 0.00 -4.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice	2.40 3.19 3.67	2.40 3.19 3.67	0.03 0.04 0.07
15' 2.5" Dia omni (Town)	B	From Leg	0.00 0.00 7.50	0.0000	180.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	0.05 0.08 0.12
9-ft Omni (Town)	B	From Leg	6.00 0.00 4.50	0.0000	176.00	No Ice 1/2" Ice 1" Ice	2.25 3.18 4.11	2.25 3.18 4.11	0.03 0.05 0.07
Rohn 6' Side-Arm(1) (Town)	A	From Leg	3.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.14 0.21 0.28
Rohn 6' Side-Arm(1) (Town)	B	From Leg	3.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.14 0.21 0.28
Pirod 15' T-Frame Sector	C	From Leg	6.00	0.0000	177.00	No Ice	15.00	15.00	0.50

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
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Town)			0.00			1" Ice	26.20	26.20	0.80
APX16DWV-16DWV-S-E-A	A	From Leg	3.00	0.0000	163.00	No Ice	6.08	2.00	0.04
CU			0.00			1/2" Ice	6.44	2.33	0.07
(T-Mobile - Existing)			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP	A	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-02DP	A	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
APX16DWV-16DWV-S-E-A	B	From Leg	3.00	0.0000	163.00	No Ice	6.08	2.00	0.04
CU			0.00			1/2" Ice	6.44	2.33	0.07
(T-Mobile - Existing)			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP	B	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-02DP	B	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
APX16DWV-16DWV-S-E-A	C	From Leg	3.00	0.0000	163.00	No Ice	6.08	2.00	0.04
CU			0.00			1/2" Ice	6.44	2.33	0.07
(T-Mobile - Existing)			0.00			1" Ice	6.80	2.66	0.11
RR90-17-02DP	C	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			-5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-02DP	C	From Leg	3.00	0.0000	163.00	No Ice	4.36	1.97	0.02
(T-Mobile - Existing)			5.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
(2) 14"x8"x4" TMA	A	From Leg	3.00	0.0000	163.00	No Ice	0.93	0.48	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.06	0.58	0.05
			0.00			1" Ice	1.19	0.69	0.06
(2) 14"x8"x4" TMA	B	From Leg	3.00	0.0000	163.00	No Ice	0.93	0.48	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.06	0.58	0.05
			0.00			1" Ice	1.19	0.69	0.06
(2) 14"x8"x4" TMA	C	From Leg	3.00	0.0000	163.00	No Ice	0.93	0.48	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.06	0.58	0.05
			0.00			1" Ice	1.19	0.69	0.06
14"x9"x5" TMA	A	From Leg	3.00	0.0000	163.00	No Ice	1.05	0.59	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.18	0.69	0.05
			0.00			1" Ice	1.32	0.81	0.06
14"x9"x5" TMA	B	From Leg	3.00	0.0000	163.00	No Ice	1.05	0.59	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.18	0.69	0.05
			0.00			1" Ice	1.32	0.81	0.06
14"x9"x5" TMA	C	From Leg	3.00	0.0000	163.00	No Ice	1.05	0.59	0.04
(T-Mobile - Existing)			0.00			1/2" Ice	1.18	0.69	0.05
			0.00			1" Ice	1.32	0.81	0.06
Valmont 10' Wireless Frame	A	From Leg	3.00	0.0000	163.00	No Ice	30.70	30.70	0.71
(3)			0.00			1/2" Ice	42.00	42.00	0.86
(T-Mobile - Existing)			0.00			1" Ice	53.30	53.30	1.00
(2) 7770.00	A	From Leg	6.00	0.0000	157.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) 7770.00	B	From Leg	6.00	0.0000	157.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) 7770.00	C	From Leg	6.00	0.0000	157.00	No Ice	5.51	2.93	0.04

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
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) LGP21401 TMA	A	From Leg	6.00	0.0000	157.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	B	From Leg	6.00	0.0000	157.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	C	From Leg	6.00	0.0000	157.00	No Ice	0.82	0.35	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP13519 Diplexer	A	From Leg	6.00	0.0000	157.00	No Ice	0.23	0.16	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP13519 Diplexer	B	From Leg	6.00	0.0000	157.00	No Ice	0.23	0.16	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP13519 Diplexer	C	From Leg	6.00	0.0000	157.00	No Ice	0.23	0.16	0.01
(AT&T - Existing)			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
SBNH-1D6565C	A	From Leg	6.00	0.0000	157.00	No Ice	11.41	7.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	12.03	8.29	0.13
			0.00			1" Ice	12.65	8.89	0.20
SBNH-1D6565C	B	From Leg	6.00	0.0000	157.00	No Ice	11.41	7.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	12.03	8.29	0.13
			0.00			1" Ice	12.65	8.89	0.20
P65-17-XLH-RR	C	From Leg	6.00	0.0000	157.00	No Ice	11.47	6.80	0.06
(AT&T - Existing)			0.00			1/2" Ice	12.08	7.38	0.12
			0.00			1" Ice	12.71	7.98	0.19
(2) RRUS-11	A	From Leg	6.00	0.0000	157.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	B	From Leg	6.00	0.0000	157.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	C	From Leg	6.00	0.0000	157.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
DC6-48-60-18-8F Surge	A	From Leg	6.00	0.0000	157.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T - Existing)			0.00			1" Ice	2.29	2.29	0.06
Rohn 6'x14' Boom Gate (3)	A	From Leg	3.00	0.0000	157.00	No Ice	52.00	52.00	1.75
(AT&T - Existing)			0.00			1/2" Ice	61.90	61.90	2.19
			0.00			1" Ice	71.80	71.80	2.63
12' x 2" Dia Omni	C	From Leg	6.00	0.0000	146.00	No Ice	2.40	2.40	0.03
(Town)			0.00			1/2" Ice	3.63	3.63	0.05
			6.00			1" Ice	4.87	4.87	0.07
Rohn 6' Side-Arm(1)	C	From Leg	3.00	0.0000	142.00	No Ice	6.00	6.00	0.14
(Town)			0.00			1/2" Ice	8.50	8.50	0.21
			0.00			1" Ice	11.00	11.00	0.28
LNX-6512DS	A	From Leg	5.00	0.0000	135.00	No Ice	5.09	3.33	0.03
(Verizon - Proposed)			-6.00			1/2" Ice	5.42	3.63	0.06
			0.00			1" Ice	5.75	3.94	0.10
SBNHH-1D65B	A	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	A	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04

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
(Verizon - Proposed)			0.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
LNX-6512DS	B	From Leg	5.00	0.0000	135.00	No Ice	5.09	3.33	0.03
(Verizon - Proposed)			-6.00			1/2" Ice	5.42	3.63	0.06
			0.00			1" Ice	5.75	3.94	0.10
SBNHH-1D65B	B	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	B	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			0.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
LNX-6512DS	C	From Leg	5.00	0.0000	135.00	No Ice	5.09	3.33	0.03
(Verizon - Proposed)			-6.00			1/2" Ice	5.42	3.63	0.06
			0.00			1" Ice	5.75	3.94	0.10
SBNHH-1D65B	C	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
SBNHH-1D65B	C	From Leg	5.00	0.0000	135.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			0.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
RRH4x30-B13	A	From Leg	5.00	0.0000	135.00	No Ice	2.16	1.62	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	B	From Leg	5.00	0.0000	135.00	No Ice	2.16	1.62	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x30-B13	C	From Leg	5.00	0.0000	135.00	No Ice	2.16	1.62	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.35	1.79	0.08
			0.00			1" Ice	2.55	1.97	0.10
RRH4x45/2x90-AWS	A	From Leg	5.00	0.0000	135.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Leg	5.00	0.0000	135.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Leg	5.00	0.0000	135.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			4.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH2x60-PCS	A	From Leg	5.00	0.0000	135.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Leg	5.00	0.0000	135.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Leg	5.00	0.0000	135.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
DB-T1-6Z-8AB-0Z	A	From Leg	5.00	0.0000	135.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			4.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	B	From Leg	5.00	0.0000	135.00	No Ice	4.80	2.00	0.04
(Verizon - Proposed)			4.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Rohn 6'x14' Boom Gate (3)	A	From Leg	3.00	0.0000	135.00	No Ice	52.00	52.00	1.75
(Verizon - Existing)			0.00			1/2" Ice	61.90	61.90	2.19
			0.00			1" Ice	71.80	71.80	2.63
800-10504	A	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02

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
(MetroPCS - Existing)			-5.00			1/2" Ice	3.70	2.19	0.04
			0.00			1" Ice	4.05	2.52	0.06
800-10504	B	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02
(MetroPCS - Existing)			-5.00			1/2" Ice	3.70	2.19	0.04
			0.00			1" Ice	4.05	2.52	0.06
800-10504	C	From Leg	4.00	0.0000	126.50	No Ice	3.35	1.86	0.02
(MetroPCS - Existing)			-5.00			1/2" Ice	3.70	2.19	0.04
			0.00			1" Ice	4.05	2.52	0.06
10-ft T-Frame	A	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00			1" Ice	21.40	21.40	0.68
10-ft T-Frame	B	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00			1" Ice	21.40	21.40	0.68
10-ft T-Frame	C	From Leg	3.00	0.0000	125.00	No Ice	13.60	13.60	0.38
(MetroPCS - Existing)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00			1" Ice	21.40	21.40	0.68
1' Standoff Pipe	C	From Leg	0.50	0.0000	50.00	No Ice	0.16	0.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	0.23	0.23	0.01
			0.00			1" Ice	0.30	0.30	0.01
GPS	C	From Leg	1.00	0.0000	51.00	No Ice	1.00	1.00	0.01
(Verizon - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	170.00	1.415	34	177.533	A	0.000	24.700	11.667	47.23	30.192	0.000
180.00-160.00					B	0.000	24.700		47.23	0.000	0.000
					C	0.000	24.700		47.23	0.000	0.000
T2	150.00	1.378	33	180.900	A	0.000	30.876	15.000	48.58	91.446	0.000
160.00-140.00					B	0.000	30.876		48.58	45.492	0.000
					C	0.000	30.876		48.58	0.000	0.000
T3	130.00	1.337	32	204.284	A	0.000	35.378	18.577	52.51	126.960	0.000
140.00-120.00					B	0.000	35.378		52.51	53.520	0.000
					C	0.000	35.378		52.51	3.996	0.000
T4	110.00	1.291	31	248.257	A	0.000	41.062	22.125	53.88	149.600	0.000
120.00-100.00					B	0.000	41.062		53.88	53.520	0.000
					C	0.000	41.062		53.88	13.320	0.000
T5	90.00	1.238	30	297.001	A	0.000	47.713	28.819	60.40	149.600	0.000
100.00-80.00					B	0.000	47.713		60.40	53.520	0.000
					C	0.000	47.713		60.40	13.320	0.000
T6 80.00-60.00	70.00	1.174	28	349.552	A	0.000	57.781	35.927	62.18	149.600	0.000
					B	0.000	57.781		62.18	53.520	0.000
					C	0.000	57.781		62.18	13.320	0.000

Section Elevation ft	z ft	K_Z	q_z psf	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
T7 60.00-40.00	50.00	1.094	26	401.056	A	0.000	60.059	35.938	59.84	149.600	0.000
					B	0.000	60.059		59.84	53.520	0.000
					C	0.000	60.059		59.84	13.320	0.000
T8 40.00-20.00	30.00	0.982	24	455.891	A	0.000	73.405	42.611	58.05	149.600	0.000
					B	0.000	73.405		58.05	53.520	0.000
					C	0.000	73.405		58.05	13.320	0.000
T9 20.00-0.00	10.00	0.85	20	505.891	A	0.000	76.126	42.611	55.97	0.000	0.000
					B	0.000	76.126		55.97	0.000	0.000
					C	0.000	76.126		55.97	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	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
T1 180.00-160.00	170.00	1.415	8	1.7672	183.424	A	0.000	57.340	23.448	40.89	72.326	0.000
						B	0.000	57.340		40.89	0.000	0.000
						C	0.000	57.340		40.89	0.000	0.000
T2 160.00-140.00	150.00	1.378	7	1.7452	186.717	A	0.000	63.047	26.635	42.25	234.590	0.000
						B	0.000	63.047		42.25	115.870	0.000
						C	0.000	63.047		42.25	0.000	0.000
T3 140.00-120.00	130.00	1.337	7	1.7204	210.027	A	0.000	68.318	30.067	44.01	298.576	0.000
						B	0.000	68.318		44.01	136.081	0.000
						C	0.000	68.318		44.01	8.441	0.000
T4 120.00-100.00	110.00	1.291	7	1.6919	253.905	A	0.000	76.266	33.426	43.83	336.099	0.000
						B	0.000	76.266		43.83	135.810	0.000
						C	0.000	76.266		43.83	27.938	0.000
T5 100.00-80.00	90.00	1.238	7	1.6583	302.538	A	0.000	78.991	39.901	50.51	334.596	0.000
						B	0.000	78.991		50.51	135.490	0.000
						C	0.000	78.991		50.51	27.703	0.000
T6 80.00-60.00	70.00	1.174	6	1.6171	354.953	A	0.000	90.243	46.736	51.79	332.756	0.000
						B	0.000	90.243		51.79	135.099	0.000
						C	0.000	90.243		51.79	27.415	0.000
T7 60.00-40.00	50.00	1.094	6	1.5636	406.280	A	0.000	93.705	46.393	49.51	330.366	0.000
						B	0.000	93.705		49.51	134.591	0.000
						C	0.000	93.705		49.51	27.041	0.000
T8 40.00-20.00	30.00	0.982	5	1.4858	460.854	A	0.000	107.458	52.541	48.89	326.890	0.000
						B	0.000	107.458		48.89	133.852	0.000
						C	0.000	107.458		48.89	26.496	0.000
T9 20.00-0.00	10.00	0.85	5	1.3312	510.337	A	0.000	108.582	51.508	47.44	0.000	0.000
						B	0.000	108.582		47.44	0.000	0.000
						C	0.000	108.582		47.44	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	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
T1	170.00	1.415	11	177.533	A	0.000	24.700	11.667	47.23	30.192	0.000
180.00-160.00					B	0.000	24.700		47.23	0.000	0.000
					C	0.000	24.700		47.23	0.000	0.000
T2	150.00	1.378	11	180.900	A	0.000	30.876	15.000	48.58	91.446	0.000
160.00-140.00					B	0.000	30.876		48.58	45.492	0.000
					C	0.000	30.876		48.58	0.000	0.000
T3	130.00	1.337	10	204.284	A	0.000	35.378	18.577	52.51	126.960	0.000
140.00-120.00					B	0.000	35.378		52.51	53.520	0.000
					C	0.000	35.378		52.51	3.996	0.000
T4	110.00	1.291	10	248.257	A	0.000	41.062	22.125	53.88	149.600	0.000
120.00-100.00					B	0.000	41.062		53.88	53.520	0.000
					C	0.000	41.062		53.88	13.320	0.000
T5	90.00	1.238	10	297.001	A	0.000	47.713	28.819	60.40	149.600	0.000
100.00-80.00					B	0.000	47.713		60.40	53.520	0.000
					C	0.000	47.713		60.40	13.320	0.000
T6 80.00-60.00	70.00	1.174	9	349.552	A	0.000	57.781	35.927	62.18	149.600	0.000
					B	0.000	57.781		62.18	53.520	0.000
					C	0.000	57.781		62.18	13.320	0.000
T7 60.00-40.00	50.00	1.094	9	401.056	A	0.000	60.059	35.938	59.84	149.600	0.000
					B	0.000	60.059		59.84	53.520	0.000
					C	0.000	60.059		59.84	13.320	0.000
T8 40.00-20.00	30.00	0.982	8	455.891	A	0.000	73.405	42.611	58.05	149.600	0.000
					B	0.000	73.405		58.05	53.520	0.000
					C	0.000	73.405		58.05	13.320	0.000
T9 20.00-0.00	10.00	0.85	7	505.891	A	0.000	76.126	42.611	55.97	0.000	0.000
					B	0.000	76.126		55.97	0.000	0.000
					C	0.000	76.126		55.97	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 psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	34	1	1	13.745	1.64	81.91	C
180.00-160.00			B	0.139	2.812		1	1	13.745			
			C	0.139	2.812		1	1	13.745			
T2	0.77	1.83	A	0.171	2.697	33	1	1	16.662	3.57	178.62	C
160.00-140.00			B	0.171	2.697		1	1	16.662			
			C	0.171	2.697		1	1	16.662			
T3	1.05	2.50	A	0.173	2.688	32	1	1	18.209	4.35	217.69	C
140.00-120.00			B	0.173	2.688		1	1	18.209			
			C	0.173	2.688		1	1	18.209			
T4	1.23	3.13	A	0.165	2.716	31	1	1	20.221	4.87	243.27	C
120.00-100.00			B	0.165	2.716		1	1	20.221			
			C	0.165	2.716		1	1	20.221			
T5	1.23	4.62	A	0.161	2.733	30	1	1	22.841	4.85	242.68	C
100.00-80.00			B	0.161	2.733		1	1	22.841			
			C	0.161	2.733		1	1	22.841			
T6	1.23	5.62	A	0.165	2.716	28	1	1	27.692	4.91	245.49	C
80.00-60.00			B	0.165	2.716		1	1	27.692			
			C	0.165	2.716		1	1	27.692			
T7	1.23	5.88	A	0.15	2.772	26	1	1	28.730	4.67	233.65	C
60.00-40.00			B	0.15	2.772		1	1	28.730			
			C	0.15	2.772		1	1	28.730			
T8	1.23	7.52	A	0.161	2.731	24	1	1	35.366	4.54	226.80	C
40.00-20.00			B	0.161	2.731		1	1	35.366			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.161	2.731		1	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	20	1	1	36.849	1.77	88.45	C
			B	0.15	2.77		1	1	36.849			
			C	0.15	2.77		1	1	36.849			
Sum Weight:	8.11	40.16						OTM	3083.48 kip-ft	35.17		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	34	0.825	1	13.745	1.64	81.91	C
180.00-160.00			B	0.139	2.812		0.825	1	13.745			
			C	0.139	2.812		0.825	1	13.745			
T2	0.77	1.83	A	0.171	2.697	33	0.825	1	16.662	3.57	178.62	C
160.00-140.00			B	0.171	2.697		0.825	1	16.662			
			C	0.171	2.697		0.825	1	16.662			
T3	1.05	2.50	A	0.173	2.688	32	0.825	1	18.209	4.35	217.69	C
140.00-120.00			B	0.173	2.688		0.825	1	18.209			
			C	0.173	2.688		0.825	1	18.209			
T4	1.23	3.13	A	0.165	2.716	31	0.825	1	20.221	4.87	243.27	C
120.00-100.00			B	0.165	2.716		0.825	1	20.221			
			C	0.165	2.716		0.825	1	20.221			
T5	1.23	4.62	A	0.161	2.733	30	0.825	1	22.841	4.85	242.68	C
100.00-80.00			B	0.161	2.733		0.825	1	22.841			
			C	0.161	2.733		0.825	1	22.841			
T6	1.23	5.62	A	0.165	2.716	28	0.825	1	27.692	4.91	245.49	C
80.00-60.00			B	0.165	2.716		0.825	1	27.692			
			C	0.165	2.716		0.825	1	27.692			
T7	1.23	5.88	A	0.15	2.772	26	0.825	1	28.730	4.67	233.65	C
60.00-40.00			B	0.15	2.772		0.825	1	28.730			
			C	0.15	2.772		0.825	1	28.730			
T8	1.23	7.52	A	0.161	2.731	24	0.825	1	35.366	4.54	226.80	C
40.00-20.00			B	0.161	2.731		0.825	1	35.366			
			C	0.161	2.731		0.825	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	20	0.825	1	36.849	1.77	88.45	C
			B	0.15	2.77		0.825	1	36.849			
			C	0.15	2.77		0.825	1	36.849			
Sum Weight:	8.11	40.16						OTM	3083.48 kip-ft	35.17		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	34	0.8	1	13.745	1.64	81.91	C
180.00-160.00			B	0.139	2.812		0.8	1	13.745			
			C	0.139	2.812		0.8	1	13.745			
T2	0.77	1.83	A	0.171	2.697	33	0.8	1	16.662	3.57	178.62	C
160.00-140.00			B	0.171	2.697		0.8	1	16.662			
			C	0.171	2.697		0.8	1	16.662			
T3	1.05	2.50	A	0.173	2.688	32	0.8	1	18.209	4.35	217.69	C
140.00-120.00			B	0.173	2.688		0.8	1	18.209			
			C	0.173	2.688		0.8	1	18.209			
T4	1.23	3.13	A	0.165	2.716	31	0.8	1	20.221	4.87	243.27	C
120.00-100.00			B	0.165	2.716		0.8	1	20.221			
			C	0.165	2.716		0.8	1	20.221			
T5	1.23	4.62	A	0.161	2.733	30	0.8	1	22.841	4.85	242.68	C
100.00-80.00			B	0.161	2.733		0.8	1	22.841			
			C	0.161	2.733		0.8	1	22.841			
T6	1.23	5.62	A	0.165	2.716	28	0.8	1	27.692	4.91	245.49	C
80.00-60.00			B	0.165	2.716		0.8	1	27.692			
			C	0.165	2.716		0.8	1	27.692			
T7	1.23	5.88	A	0.15	2.772	26	0.8	1	28.730	4.67	233.65	C
60.00-40.00			B	0.15	2.772		0.8	1	28.730			
			C	0.15	2.772		0.8	1	28.730			
T8	1.23	7.52	A	0.161	2.731	24	0.8	1	35.366	4.54	226.80	C
40.00-20.00			B	0.161	2.731		0.8	1	35.366			
			C	0.161	2.731		0.8	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	20	0.8	1	36.849	1.77	88.45	C
			B	0.15	2.77		0.8	1	36.849			
			C	0.15	2.77		0.8	1	36.849			
Sum Weight:	8.11	40.16						OTM	3083.48 kip-ft	35.17		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	34	0.85	1	13.745	1.64	81.91	C
180.00-160.00			B	0.139	2.812		0.85	1	13.745			
			C	0.139	2.812		0.85	1	13.745			
T2	0.77	1.83	A	0.171	2.697	33	0.85	1	16.662	3.57	178.62	C
160.00-140.00			B	0.171	2.697		0.85	1	16.662			
			C	0.171	2.697		0.85	1	16.662			
T3	1.05	2.50	A	0.173	2.688	32	0.85	1	18.209	4.35	217.69	C
140.00-120.00			B	0.173	2.688		0.85	1	18.209			
			C	0.173	2.688		0.85	1	18.209			
T4	1.23	3.13	A	0.165	2.716	31	0.85	1	20.221	4.87	243.27	C
120.00-100.00			B	0.165	2.716		0.85	1	20.221			
			C	0.165	2.716		0.85	1	20.221			
T5	1.23	4.62	A	0.161	2.733	30	0.85	1	22.841	4.85	242.68	C
100.00-80.00			B	0.161	2.733		0.85	1	22.841			
			C	0.161	2.733		0.85	1	22.841			
T6	1.23	5.62	A	0.165	2.716	28	0.85	1	27.692	4.91	245.49	C
80.00-60.00			B	0.165	2.716		0.85	1	27.692			
			C	0.165	2.716		0.85	1	27.692			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T7	1.23	5.88	A	0.15	2.772	26	0.85	1	28.730	4.67	233.65	C
60.00-40.00			B	0.15	2.772		0.85	1	28.730			
			C	0.15	2.772		0.85	1	28.730			
T8	1.23	7.52	A	0.161	2.731	24	0.85	1	35.366	4.54	226.80	C
40.00-20.00			B	0.161	2.731		0.85	1	35.366			
			C	0.161	2.731		0.85	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	20	0.85	1	36.849	1.77	88.45	C
			B	0.15	2.77		0.85	1	36.849			
			C	0.15	2.77		0.85	1	36.849			
Sum Weight:	8.11	40.16						OTM	3083.48 kip-ft	35.17		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.18	4.20	A	0.313	2.263	8	1	1	34.573	0.80	39.80	C
180.00-160.00			B	0.313	2.263		1	1	34.573			
			C	0.313	2.263		1	1	34.573			
T2	5.72	5.10	A	0.338	2.201	7	1	1	38.556	1.88	94.05	C
160.00-140.00			B	0.338	2.201		1	1	38.556			
			C	0.338	2.201		1	1	38.556			
T3	7.57	6.01	A	0.325	2.231	7	1	1	41.482	2.22	110.83	C
140.00-120.00			B	0.325	2.231		1	1	41.482			
			C	0.325	2.231		1	1	41.482			
T4	8.68	7.05	A	0.3	2.295	7	1	1	45.686	2.42	120.84	C
120.00-100.00			B	0.3	2.295		1	1	45.686			
			C	0.3	2.295		1	1	45.686			
T5	8.56	8.46	A	0.261	2.405	7	1	1	46.431	2.35	117.43	C
100.00-80.00			B	0.261	2.405		1	1	46.431			
			C	0.261	2.405		1	1	46.431			
T6	8.40	10.03	A	0.254	2.425	6	1	1	52.887	2.31	115.47	C
80.00-60.00			B	0.254	2.425		1	1	52.887			
			C	0.254	2.425		1	1	52.887			
T7	8.20	10.49	A	0.231	2.497	6	1	1	54.397	2.18	109.00	C
60.00-40.00			B	0.231	2.497		1	1	54.397			
			C	0.231	2.497		1	1	54.397			
T8	7.92	12.75	A	0.233	2.489	5	1	1	62.441	2.03	101.68	C
40.00-20.00			B	0.233	2.489		1	1	62.441			
			C	0.233	2.489		1	1	62.441			
T9 20.00-0.00	0.00	12.69	A	0.213	2.554	5	1	1	62.634	0.63	31.44	C
			B	0.213	2.554		1	1	62.634			
			C	0.213	2.554		1	1	62.634			
Sum Weight:	56.23	76.79						OTM	1520.80 kip-ft	16.81		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.18	4.20	A	0.313	2.263	8	0.825	1	34.573	0.80	39.80	C
180.00-160.00			B	0.313	2.263		0.825	1	34.573			
			C	0.313	2.263		0.825	1	34.573			
T2	5.72	5.10	A	0.338	2.201	7	0.825	1	38.556	1.88	94.05	C
160.00-140.00			B	0.338	2.201		0.825	1	38.556			
			C	0.338	2.201		0.825	1	38.556			
T3	7.57	6.01	A	0.325	2.231	7	0.825	1	41.482	2.22	110.83	C
140.00-120.00			B	0.325	2.231		0.825	1	41.482			
			C	0.325	2.231		0.825	1	41.482			
T4	8.68	7.05	A	0.3	2.295	7	0.825	1	45.686	2.42	120.84	C
120.00-100.00			B	0.3	2.295		0.825	1	45.686			
			C	0.3	2.295		0.825	1	45.686			
T5	8.56	8.46	A	0.261	2.405	7	0.825	1	46.431	2.35	117.43	C
100.00-80.00			B	0.261	2.405		0.825	1	46.431			
			C	0.261	2.405		0.825	1	46.431			
T6	8.40	10.03	A	0.254	2.425	6	0.825	1	52.887	2.31	115.47	C
80.00-60.00			B	0.254	2.425		0.825	1	52.887			
			C	0.254	2.425		0.825	1	52.887			
T7	8.20	10.49	A	0.231	2.497	6	0.825	1	54.397	2.18	109.00	C
60.00-40.00			B	0.231	2.497		0.825	1	54.397			
			C	0.231	2.497		0.825	1	54.397			
T8	7.92	12.75	A	0.233	2.489	5	0.825	1	62.441	2.03	101.68	C
40.00-20.00			B	0.233	2.489		0.825	1	62.441			
			C	0.233	2.489		0.825	1	62.441			
T9 20.00-0.00	0.00	12.69	A	0.213	2.554	5	0.825	1	62.634	0.63	31.44	C
			B	0.213	2.554		0.825	1	62.634			
			C	0.213	2.554		0.825	1	62.634			
Sum Weight:	56.23	76.79						OTM	1520.80 kip-ft	16.81		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.18	4.20	A	0.313	2.263	8	0.8	1	34.573	0.80	39.80	C
180.00-160.00			B	0.313	2.263		0.8	1	34.573			
			C	0.313	2.263		0.8	1	34.573			
T2	5.72	5.10	A	0.338	2.201	7	0.8	1	38.556	1.88	94.05	C
160.00-140.00			B	0.338	2.201		0.8	1	38.556			
			C	0.338	2.201		0.8	1	38.556			
T3	7.57	6.01	A	0.325	2.231	7	0.8	1	41.482	2.22	110.83	C
140.00-120.00			B	0.325	2.231		0.8	1	41.482			
			C	0.325	2.231		0.8	1	41.482			
T4	8.68	7.05	A	0.3	2.295	7	0.8	1	45.686	2.42	120.84	C
120.00-100.00			B	0.3	2.295		0.8	1	45.686			
			C	0.3	2.295		0.8	1	45.686			
T5	8.56	8.46	A	0.261	2.405	7	0.8	1	46.431	2.35	117.43	C
100.00-80.00			B	0.261	2.405		0.8	1	46.431			
			C	0.261	2.405		0.8	1	46.431			
T6	8.40	10.03	A	0.254	2.425	6	0.8	1	52.887	2.31	115.47	C
80.00-60.00			B	0.254	2.425		0.8	1	52.887			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.254	2.425		0.8	1	52.887			
T7	8.20	10.49	A	0.231	2.497	6	0.8	1	54.397	2.18	109.00	C
60.00-40.00			B	0.231	2.497		0.8	1	54.397			
			C	0.231	2.497		0.8	1	54.397			
T8	7.92	12.75	A	0.233	2.489	5	0.8	1	62.441	2.03	101.68	C
40.00-20.00			B	0.233	2.489		0.8	1	62.441			
			C	0.233	2.489		0.8	1	62.441			
T9 20.00-0.00	0.00	12.69	A	0.213	2.554	5	0.8	1	62.634	0.63	31.44	C
			B	0.213	2.554		0.8	1	62.634			
			C	0.213	2.554		0.8	1	62.634			
Sum Weight:	56.23	76.79						OTM	1520.80 kip-ft	16.81		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.18	4.20	A	0.313	2.263	8	0.85	1	34.573	0.80	39.80	C
180.00-160.00			B	0.313	2.263		0.85	1	34.573			
			C	0.313	2.263		0.85	1	34.573			
T2	5.72	5.10	A	0.338	2.201	7	0.85	1	38.556	1.88	94.05	C
160.00-140.00			B	0.338	2.201		0.85	1	38.556			
			C	0.338	2.201		0.85	1	38.556			
T3	7.57	6.01	A	0.325	2.231	7	0.85	1	41.482	2.22	110.83	C
140.00-120.00			B	0.325	2.231		0.85	1	41.482			
			C	0.325	2.231		0.85	1	41.482			
T4	8.68	7.05	A	0.3	2.295	7	0.85	1	45.686	2.42	120.84	C
120.00-100.00			B	0.3	2.295		0.85	1	45.686			
			C	0.3	2.295		0.85	1	45.686			
T5	8.56	8.46	A	0.261	2.405	7	0.85	1	46.431	2.35	117.43	C
100.00-80.00			B	0.261	2.405		0.85	1	46.431			
			C	0.261	2.405		0.85	1	46.431			
T6	8.40	10.03	A	0.254	2.425	6	0.85	1	52.887	2.31	115.47	C
80.00-60.00			B	0.254	2.425		0.85	1	52.887			
			C	0.254	2.425		0.85	1	52.887			
T7	8.20	10.49	A	0.231	2.497	6	0.85	1	54.397	2.18	109.00	C
60.00-40.00			B	0.231	2.497		0.85	1	54.397			
			C	0.231	2.497		0.85	1	54.397			
T8	7.92	12.75	A	0.233	2.489	5	0.85	1	62.441	2.03	101.68	C
40.00-20.00			B	0.233	2.489		0.85	1	62.441			
			C	0.233	2.489		0.85	1	62.441			
T9 20.00-0.00	0.00	12.69	A	0.213	2.554	5	0.85	1	62.634	0.63	31.44	C
			B	0.213	2.554		0.85	1	62.634			
			C	0.213	2.554		0.85	1	62.634			
Sum Weight:	56.23	76.79						OTM	1520.80 kip-ft	16.81		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	11	1	1	13.745	0.53	26.75	C
180.00-160.00			B	0.139	2.812		1	1	13.745			
			C	0.139	2.812		1	1	13.745			
T2	0.77	1.83	A	0.171	2.697	11	1	1	16.662	1.17	58.33	C
160.00-140.00			B	0.171	2.697		1	1	16.662			
			C	0.171	2.697		1	1	16.662			
T3	1.05	2.50	A	0.173	2.688	10	1	1	18.209	1.42	71.08	C
140.00-120.00			B	0.173	2.688		1	1	18.209			
			C	0.173	2.688		1	1	18.209			
T4	1.23	3.13	A	0.165	2.716	10	1	1	20.221	1.59	79.44	C
120.00-100.00			B	0.165	2.716		1	1	20.221			
			C	0.165	2.716		1	1	20.221			
T5	1.23	4.62	A	0.161	2.733	10	1	1	22.841	1.58	79.24	C
100.00-80.00			B	0.161	2.733		1	1	22.841			
			C	0.161	2.733		1	1	22.841			
T6	1.23	5.62	A	0.165	2.716	9	1	1	27.692	1.60	80.16	C
80.00-60.00			B	0.165	2.716		1	1	27.692			
			C	0.165	2.716		1	1	27.692			
T7	1.23	5.88	A	0.15	2.772	9	1	1	28.730	1.53	76.29	C
60.00-40.00			B	0.15	2.772		1	1	28.730			
			C	0.15	2.772		1	1	28.730			
T8	1.23	7.52	A	0.161	2.731	8	1	1	35.366	1.48	74.06	C
40.00-20.00			B	0.161	2.731		1	1	35.366			
			C	0.161	2.731		1	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	7	1	1	36.849	0.58	28.88	C
			B	0.15	2.77		1	1	36.849			
			C	0.15	2.77		1	1	36.849			
Sum Weight:	8.11	40.16						OTM	1006.85 kip-ft	11.48		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	11	0.825	1	13.745	0.53	26.75	C
180.00-160.00			B	0.139	2.812		0.825	1	13.745			
			C	0.139	2.812		0.825	1	13.745			
T2	0.77	1.83	A	0.171	2.697	11	0.825	1	16.662	1.17	58.33	C
160.00-140.00			B	0.171	2.697		0.825	1	16.662			
			C	0.171	2.697		0.825	1	16.662			
T3	1.05	2.50	A	0.173	2.688	10	0.825	1	18.209	1.42	71.08	C
140.00-120.00			B	0.173	2.688		0.825	1	18.209			
			C	0.173	2.688		0.825	1	18.209			
T4	1.23	3.13	A	0.165	2.716	10	0.825	1	20.221	1.59	79.44	C
120.00-100.00			B	0.165	2.716		0.825	1	20.221			
			C	0.165	2.716		0.825	1	20.221			
T5	1.23	4.62	A	0.161	2.733	10	0.825	1	22.841	1.58	79.24	C
100.00-80.00			B	0.161	2.733		0.825	1	22.841			
			C	0.161	2.733		0.825	1	22.841			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	1.23	5.62	A	0.165	2.716	9	0.825	1	27.692	1.60	80.16	C
80.00-60.00			B	0.165	2.716		0.825	1	27.692			
			C	0.165	2.716		0.825	1	27.692			
T7	1.23	5.88	A	0.15	2.772	9	0.825	1	28.730	1.53	76.29	C
60.00-40.00			B	0.15	2.772		0.825	1	28.730			
			C	0.15	2.772		0.825	1	28.730			
T8	1.23	7.52	A	0.161	2.731	8	0.825	1	35.366	1.48	74.06	C
40.00-20.00			B	0.161	2.731		0.825	1	35.366			
			C	0.161	2.731		0.825	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	7	0.825	1	36.849	0.58	28.88	C
			B	0.15	2.77		0.825	1	36.849			
			C	0.15	2.77		0.825	1	36.849			
Sum Weight:	8.11	40.16						OTM	1006.85 kip-ft	11.48		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	11	0.8	1	13.745	0.53	26.75	C
180.00-160.00			B	0.139	2.812		0.8	1	13.745			
			C	0.139	2.812		0.8	1	13.745			
T2	0.77	1.83	A	0.171	2.697	11	0.8	1	16.662	1.17	58.33	C
160.00-140.00			B	0.171	2.697		0.8	1	16.662			
			C	0.171	2.697		0.8	1	16.662			
T3	1.05	2.50	A	0.173	2.688	10	0.8	1	18.209	1.42	71.08	C
140.00-120.00			B	0.173	2.688		0.8	1	18.209			
			C	0.173	2.688		0.8	1	18.209			
T4	1.23	3.13	A	0.165	2.716	10	0.8	1	20.221	1.59	79.44	C
120.00-100.00			B	0.165	2.716		0.8	1	20.221			
			C	0.165	2.716		0.8	1	20.221			
T5	1.23	4.62	A	0.161	2.733	10	0.8	1	22.841	1.58	79.24	C
100.00-80.00			B	0.161	2.733		0.8	1	22.841			
			C	0.161	2.733		0.8	1	22.841			
T6	1.23	5.62	A	0.165	2.716	9	0.8	1	27.692	1.60	80.16	C
80.00-60.00			B	0.165	2.716		0.8	1	27.692			
			C	0.165	2.716		0.8	1	27.692			
T7	1.23	5.88	A	0.15	2.772	9	0.8	1	28.730	1.53	76.29	C
60.00-40.00			B	0.15	2.772		0.8	1	28.730			
			C	0.15	2.772		0.8	1	28.730			
T8	1.23	7.52	A	0.161	2.731	8	0.8	1	35.366	1.48	74.06	C
40.00-20.00			B	0.161	2.731		0.8	1	35.366			
			C	0.161	2.731		0.8	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	7	0.8	1	36.849	0.58	28.88	C
			B	0.15	2.77		0.8	1	36.849			
			C	0.15	2.77		0.8	1	36.849			
Sum Weight:	8.11	40.16						OTM	1006.85 kip-ft	11.48		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.15	1.25	A	0.139	2.812	11	0.85	1	13.745	0.53	26.75	C
180.00-160.00			B	0.139	2.812		0.85	1	13.745			
			C	0.139	2.812		0.85	1	13.745			
T2	0.77	1.83	A	0.171	2.697	11	0.85	1	16.662	1.17	58.33	C
160.00-140.00			B	0.171	2.697		0.85	1	16.662			
			C	0.171	2.697		0.85	1	16.662			
T3	1.05	2.50	A	0.173	2.688	10	0.85	1	18.209	1.42	71.08	C
140.00-120.00			B	0.173	2.688		0.85	1	18.209			
			C	0.173	2.688		0.85	1	18.209			
T4	1.23	3.13	A	0.165	2.716	10	0.85	1	20.221	1.59	79.44	C
120.00-100.00			B	0.165	2.716		0.85	1	20.221			
			C	0.165	2.716		0.85	1	20.221			
T5	1.23	4.62	A	0.161	2.733	10	0.85	1	22.841	1.58	79.24	C
100.00-80.00			B	0.161	2.733		0.85	1	22.841			
			C	0.161	2.733		0.85	1	22.841			
T6	1.23	5.62	A	0.165	2.716	9	0.85	1	27.692	1.60	80.16	C
80.00-60.00			B	0.165	2.716		0.85	1	27.692			
			C	0.165	2.716		0.85	1	27.692			
T7	1.23	5.88	A	0.15	2.772	9	0.85	1	28.730	1.53	76.29	C
60.00-40.00			B	0.15	2.772		0.85	1	28.730			
			C	0.15	2.772		0.85	1	28.730			
T8	1.23	7.52	A	0.161	2.731	8	0.85	1	35.366	1.48	74.06	C
40.00-20.00			B	0.161	2.731		0.85	1	35.366			
			C	0.161	2.731		0.85	1	35.366			
T9 20.00-0.00	0.00	7.82	A	0.15	2.77	7	0.85	1	36.849	0.58	28.88	C
			B	0.15	2.77		0.85	1	36.849			
			C	0.15	2.77		0.85	1	36.849			
Sum Weight:	8.11	40.16						OTM	1006.85 kip-ft	11.48		

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	21.15					
Bracing Weight	19.01					
Total Member Self-Weight	40.16			-48.52	13.12	
Total Weight	57.49			-48.52	13.12	
Wind 0 deg - No Ice		-0.02	-46.26	-4804.19	15.24	-12.05
Wind 30 deg - No Ice		23.11	-40.06	-4165.99	-2361.65	-31.86
Wind 45 deg - No Ice		32.69	-32.70	-3409.78	-3346.41	-38.82
Wind 60 deg - No Ice		40.04	-23.12	-2424.52	-4102.23	-43.14
Wind 90 deg - No Ice		46.24	0.02	-46.40	-4740.10	-42.85
Wind 120 deg - No Ice		40.06	23.15	2331.15	-4104.35	-31.08
Wind 135 deg - No Ice		32.71	32.73	3315.75	-3349.42	-21.78
Wind 150 deg - No Ice		23.14	40.07	4071.07	-2365.33	-10.99
Wind 180 deg - No Ice		0.02	46.26	4707.15	10.99	12.05
Wind 210 deg - No Ice		-23.11	40.06	4068.95	2387.89	31.86

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 225 deg - No Ice		-32.69	32.70	3312.74	3372.65	38.82
Wind 240 deg - No Ice		-40.04	23.12	2327.48	4128.46	43.14
Wind 270 deg - No Ice		-46.24	-0.02	-50.64	4766.33	42.85
Wind 300 deg - No Ice		-40.06	-23.15	-2428.19	4130.59	31.08
Wind 315 deg - No Ice		-32.71	-32.73	-3412.79	3375.65	21.78
Wind 330 deg - No Ice		-23.14	-40.07	-4168.11	2391.56	10.99
Member Ice	36.63					
Total Weight Ice	156.40			-190.77	72.45	
Wind 0 deg - Ice		-0.00	-21.17	-2376.55	73.01	-4.93
Wind 30 deg - Ice		10.58	-18.33	-2083.43	-1019.63	-13.87
Wind 45 deg - Ice		14.96	-14.97	-1735.96	-1472.28	-17.06
Wind 60 deg - Ice		18.33	-10.58	-1283.18	-1819.65	-19.09
Wind 90 deg - Ice		21.16	0.00	-190.22	-2112.68	-19.19
Wind 120 deg - Ice		18.33	10.59	902.60	-1820.21	-14.15
Wind 135 deg - Ice		14.97	14.97	1355.20	-1473.06	-10.08
Wind 150 deg - Ice		10.59	18.34	1702.44	-1020.59	-5.32
Wind 180 deg - Ice		0.00	21.17	1995.00	71.90	4.93
Wind 210 deg - Ice		-10.58	18.33	1701.89	1164.54	13.87
Wind 225 deg - Ice		-14.96	14.97	1354.41	1617.18	17.06
Wind 240 deg - Ice		-18.33	10.58	901.64	1964.56	19.09
Wind 270 deg - Ice		-21.16	-0.00	-191.33	2257.59	19.19
Wind 300 deg - Ice		-18.33	-10.59	-1284.14	1965.11	14.15
Wind 315 deg - Ice		-14.97	-14.97	-1736.74	1617.97	10.08
Wind 330 deg - Ice		-10.59	-18.34	-2083.98	1165.50	5.32
Total Weight	57.49			-48.52	13.12	
Wind 0 deg - Service		-0.01	-15.11	-1584.47	5.91	-3.93
Wind 30 deg - Service		7.55	-13.08	-1376.08	-770.21	-10.40
Wind 45 deg - Service		10.67	-10.68	-1129.16	-1091.77	-12.68
Wind 60 deg - Service		13.07	-7.55	-807.44	-1338.56	-14.09
Wind 90 deg - Service		15.10	0.01	-30.91	-1546.85	-13.99
Wind 120 deg - Service		13.08	7.56	745.44	-1339.26	-10.15
Wind 135 deg - Service		10.68	10.69	1066.94	-1092.75	-7.11
Wind 150 deg - Service		7.55	13.09	1313.57	-771.41	-3.59
Wind 180 deg - Service		0.01	15.11	1521.27	4.53	3.93
Wind 210 deg - Service		-7.55	13.08	1312.88	780.66	10.40
Wind 225 deg - Service		-10.67	10.68	1065.96	1102.21	12.68
Wind 240 deg - Service		-13.07	7.55	744.24	1349.01	14.09
Wind 270 deg - Service		-15.10	-0.01	-32.29	1557.29	13.99
Wind 300 deg - Service		-13.08	-7.56	-808.64	1349.70	10.15
Wind 315 deg - Service		-10.68	-10.69	-1130.14	1103.19	7.11
Wind 330 deg - Service		-7.55	-13.09	-1376.77	781.86	3.59

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice

Comb. No.	Description
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	29	5.35	-0.20	-0.25
			Max. Compression	2	-7.69	1.36	0.03
			Max. Mx	8	3.94	-1.36	0.87
			Max. My	26	-2.10	-0.00	-2.33
			Max. Vy	18	0.74	-1.36	-0.04
			Max. Vx	26	1.27	-0.00	-2.33
		Diagonal	Max Tension	5	3.92	0.00	0.00
			Max. Compression	4	-3.99	0.00	0.00
			Max. Mx	50	0.73	0.06	0.00
			Max. My	8	-0.17	0.00	0.00
			Max. Vy	50	0.03	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	4	2.16	-0.01	-0.00
			Max. Compression	21	-2.13	0.00	0.00
			Max. Mx	48	0.12	-0.03	-0.00
			Max. My	28	-0.38	-0.01	-0.00
			Max. Vy	48	-0.03	-0.03	-0.00
			Max. Vx	28	0.00	-0.01	-0.00
		Top Girt	Max Tension	18	0.81	-0.01	0.00
			Max. Compression	2	-0.81	-0.01	-0.00
			Max. Mx	48	-0.06	-0.03	-0.00
			Max. My	18	-0.13	-0.01	-0.00
			Max. Vy	48	-0.03	-0.03	-0.00
			Max. Vx	2	-0.00	-0.01	0.00
		Inner Bracing	Max Tension	2	0.01	0.00	0.00
			Max. Compression	2	-0.01	0.00	0.00
			Max. Mx	34	-0.00	-0.03	0.00
			Max. My	35	0.00	0.00	-0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T2	160 - 140	Leg	Max Tension	29	32.77	-0.63	-0.25
			Max. Compression	2	-40.16	0.61	0.12
			Max. Mx	18	7.97	1.75	-0.04
			Max. My	10	-2.26	0.00	-3.19
			Max. Vy	18	-1.06	-1.36	-0.04
			Max. Vx	10	1.88	0.00	2.33
		Diagonal	Max Tension	6	13.07	0.00	0.00
			Max. Compression	6	-13.17	0.00	0.00
			Max. Mx	50	2.99	0.07	0.00
			Max. My	8	-2.79	0.00	0.00
			Max. Vy	50	0.04	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	6	7.25	-0.01	0.00
			Max. Compression	22	-7.20	-0.02	-0.00
			Max. Mx	48	0.38	-0.06	-0.01
			Max. My	8	-2.90	-0.03	-0.02
			Max. Vy	48	-0.04	-0.06	-0.01
			Max. Vx	8	0.00	-0.03	-0.02
		Top Girt	Max Tension	8	5.31	-0.01	0.01
			Max. Compression	24	-5.26	-0.02	-0.01
			Max. Mx	48	-0.50	-0.04	-0.00
			Max. My	8	-2.62	-0.02	-0.02
			Max. Vy	48	-0.04	-0.04	-0.00
			Max. Vx	28	0.00	-0.02	-0.02
		Inner Bracing	Max Tension	24	0.09	0.00	0.00
			Max. Compression	24	-0.09	0.00	0.00
			Max. Mx	34	-0.00	-0.03	0.00
			Max. My	35	0.02	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T3	140 - 120	Leg	Max Tension	29	75.63	-0.43	0.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-89.05	0.60	0.00
			Max. Mx	18	38.13	1.49	0.04
			Max. My	10	-10.64	-0.09	-2.41
			Max. Vy	18	1.55	-1.07	0.04
			Max. Vx	26	2.31	-0.08	-1.41
		Diagonal	Max Tension	22	16.08	0.00	0.00
			Max. Compression	22	-16.21	0.00	0.00
			Max. Mx	50	3.18	0.10	0.00
			Max. My	8	-4.35	0.00	0.00
			Max. Vy	50	-0.04	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	7	10.10	-0.01	0.01
			Max. Compression	22	-10.32	-0.02	-0.01
			Max. Mx	48	0.70	-0.06	-0.01
			Max. My	18	-0.73	-0.04	-0.02
			Max. Vy	48	-0.04	-0.06	-0.01
			Max. Vx	18	0.01	-0.04	-0.02
		Top Girt	Max Tension	9	7.54	-0.00	0.01
			Max. Compression	24	-7.94	-0.03	-0.01
			Max. Mx	48	-1.42	-0.05	-0.01
			Max. My	12	3.02	0.01	0.02
			Max. Vy	48	-0.04	-0.05	-0.01
			Max. Vx	12	-0.00	0.01	0.02
		Inner Bracing	Max Tension	24	0.14	0.00	0.00
			Max. Compression	24	-0.14	0.00	0.00
			Max. Mx	34	-0.00	-0.04	0.00
			Max. My	35	-0.00	0.00	-0.00
			Max. Vy	34	0.03	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
T4	120 - 100	Leg	Max Tension	29	123.33	-0.39	0.03
			Max. Compression	2	-139.63	1.57	0.08
			Max. Mx	28	122.01	-1.59	-0.31
			Max. My	26	-12.73	0.00	-1.89
			Max. Vy	18	0.26	-1.56	-0.09
			Max. Vx	10	-0.32	-0.00	1.88
		Diagonal	Max Tension	22	15.90	0.00	0.00
			Max. Compression	22	-16.04	0.00	0.00
			Max. Mx	50	3.26	0.12	0.00
			Max. My	8	-4.46	0.00	0.00
			Max. Vy	50	-0.05	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	7	10.60	-0.01	0.01
			Max. Compression	22	-10.80	-0.03	-0.01
			Max. Mx	48	0.90	-0.07	-0.01
			Max. My	18	-1.19	-0.04	-0.02
			Max. Vy	48	-0.05	-0.07	-0.01
			Max. Vx	18	0.00	-0.04	-0.02
		Top Girt	Max Tension	7	10.34	-0.01	0.01
			Max. Compression	22	-10.57	-0.02	-0.01
			Max. Mx	48	-0.98	-0.06	-0.01
			Max. My	18	-0.04	-0.04	-0.02
			Max. Vy	48	-0.05	-0.06	-0.01
			Max. Vx	18	0.00	-0.04	-0.02
		Inner Bracing	Max Tension	22	0.18	0.00	0.00
			Max. Compression	22	-0.18	0.00	0.00
			Max. Mx	34	-0.01	-0.05	0.00
			Max. My	35	-0.00	0.00	-0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
T5	100 - 80	Leg	Max Tension	29	159.30	-1.18	0.00
			Max. Compression	2	-178.81	1.43	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	28	137.18	-1.59	-0.31
			Max. My	26	-12.87	0.00	-1.89
			Max. Vy	18	-0.19	-1.56	-0.09
			Max. Vx	10	0.23	-0.00	1.88
		Diagonal	Max Tension	22	18.70	0.00	0.00
			Max. Compression	22	-18.97	0.00	0.00
			Max. Mx	50	3.96	0.28	0.00
			Max. My	8	-4.62	0.00	0.00
			Max. Vy	50	-0.09	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	7	11.07	-0.02	0.00
			Max. Compression	22	-11.33	-0.05	-0.00
			Max. Mx	48	1.09	-0.10	-0.00
			Max. My	18	-1.56	-0.06	-0.02
			Max. Vy	48	-0.06	-0.10	-0.00
			Max. Vx	18	0.00	-0.06	-0.02
		Top Girt	Max Tension	7	10.77	-0.02	0.00
			Max. Compression	22	-11.16	-0.04	-0.00
			Max. Mx	48	-1.10	-0.09	-0.00
			Max. My	18	-0.36	-0.06	-0.02
			Max. Vy	48	-0.06	-0.09	-0.00
			Max. Vx	18	0.00	-0.06	-0.02
		Inner Bracing	Max Tension	22	0.19	0.00	0.00
			Max. Compression	22	-0.19	0.00	0.00
			Max. Mx	34	-0.01	-0.07	0.00
			Max. My	35	-0.01	0.00	-0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
T6	80 - 60	Leg	Max Tension	29	198.55	-2.04	-0.04
			Max. Compression	2	-222.47	2.23	0.01
			Max. Mx	28	195.72	-2.27	-0.06
			Max. My	32	-10.19	-0.06	2.14
			Max. Vy	18	0.23	-2.01	-0.02
			Max. Vx	26	0.24	-0.02	-2.13
		Diagonal	Max Tension	22	17.68	0.00	0.00
			Max. Compression	22	-18.05	0.00	0.00
			Max. Mx	50	3.90	0.34	0.00
			Max. My	8	-3.77	0.00	0.00
			Max. Vy	50	-0.10	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	7	11.85	-0.04	0.01
			Max. Compression	22	-12.06	-0.07	-0.01
			Max. Mx	48	1.30	-0.15	-0.01
			Max. My	18	-1.97	-0.09	-0.03
			Max. Vy	48	-0.08	-0.15	-0.01
			Max. Vx	18	0.00	-0.09	-0.03
		Top Girt	Max Tension	7	11.32	-0.03	0.01
			Max. Compression	22	-11.58	-0.06	-0.01
			Max. Mx	48	-0.98	-0.14	-0.01
			Max. My	18	-0.30	-0.09	-0.03
			Max. Vy	48	-0.08	-0.14	-0.01
			Max. Vx	18	0.00	-0.09	-0.03
		Inner Bracing	Max Tension	22	0.20	0.00	0.00
			Max. Compression	22	-0.20	0.00	0.00
			Max. Mx	34	-0.01	-0.12	0.00
			Max. My	35	-0.01	0.00	-0.00
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T7	60 - 40	Leg	Max Tension	29	235.23	-1.86	0.00
			Max. Compression	2	-263.91	2.57	0.08
			Max. Mx	28	231.67	-2.66	-0.22

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	26	-19.22	-0.04	-3.15
			Max. Vy	18	0.25	-2.66	-0.09
			Max. Vx	10	-0.31	-0.05	3.14
		Diagonal	Max Tension	20	17.11	0.00	0.00
			Max. Compression	20	-17.51	0.00	0.00
			Max. Mx	50	3.70	0.40	0.00
			Max. My	8	-3.26	0.00	0.00
			Max. Vy	50	-0.11	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	20	12.26	0.00	0.00
			Max. Compression	22	-12.38	-0.09	-0.01
			Max. Mx	48	1.52	-0.19	-0.01
			Max. My	18	-2.36	-0.11	-0.02
			Max. Vy	48	-0.09	-0.19	-0.01
			Max. Vx	18	0.00	-0.11	-0.02
		Top Girt	Max Tension	7	11.95	-0.05	0.01
			Max. Compression	22	-12.22	-0.08	-0.01
			Max. Mx	48	-0.98	-0.17	-0.01
			Max. My	18	-0.43	-0.10	-0.02
			Max. Vy	48	-0.09	-0.17	-0.01
			Max. Vx	18	0.00	-0.10	-0.02
		Inner Bracing	Max Tension	22	0.21	0.00	0.00
			Max. Compression	22	-0.21	0.00	0.00
			Max. Mx	34	-0.01	-0.18	0.00
			Max. My	35	0.05	0.00	-0.00
			Max. Vy	34	-0.07	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
T8	40 - 20	Leg	Max Tension	29	270.19	-2.95	0.01
			Max. Compression	2	-304.48	2.60	-0.01
			Max. Mx	28	266.35	-2.97	0.00
			Max. My	26	-19.79	-0.04	-3.15
			Max. Vy	18	-0.21	-2.91	-0.00
			Max. Vx	10	0.22	-0.05	3.14
		Diagonal	Max Tension	21	18.28	0.00	0.00
			Max. Compression	20	-18.91	0.00	0.00
			Max. Mx	50	3.99	0.55	0.00
			Max. My	8	-3.00	0.00	0.00
			Max. Vy	50	-0.14	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
		Horizontal	Max Tension	20	14.03	0.00	0.00
			Max. Compression	23	-13.93	-0.11	-0.01
			Max. Mx	48	1.74	-0.29	-0.01
			Max. My	18	-2.74	-0.18	-0.04
			Max. Vy	48	-0.13	-0.29	-0.01
			Max. Vx	18	0.00	-0.18	-0.04
		Top Girt	Max Tension	20	13.52	-0.12	-0.00
			Max. Compression	23	-13.46	-0.10	-0.01
			Max. Mx	48	-0.50	-0.26	-0.01
			Max. My	18	0.23	-0.16	-0.04
			Max. Vy	48	-0.12	-0.26	-0.01
			Max. Vx	18	0.00	-0.16	-0.04
		Inner Bracing	Max Tension	23	0.23	0.00	0.00
			Max. Compression	23	-0.23	0.00	0.00
			Max. Mx	34	-0.02	-0.27	0.00
			Max. My	28	0.20	0.00	0.00
			Max. Vy	34	-0.10	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
T9	20 - 0	Leg	Max Tension	29	305.07	-3.78	-0.01
			Max. Compression	2	-344.99	0.00	-0.00
			Max. Mx	35	-149.29	6.05	-0.04
			Max. My	32	-19.97	-0.12	3.51

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	35	-0.63	-0.18	-0.04
			Max. Vx	32	0.48	-0.12	3.51
		Diagonal	Max Tension	21	18.31	0.00	0.00
			Max. Compression	20	-18.98	0.00	0.00
			Max. Mx	44	4.93	0.61	0.00
			Max. My	24	1.83	0.00	-0.00
			Max. Vy	44	-0.15	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	20	14.59	0.00	0.00
			Max. Compression	21	-14.39	-0.13	-0.00
			Max. Mx	48	1.92	-0.27	-0.01
			Max. My	18	-3.13	-0.20	-0.03
			Max. Vy	48	-0.12	-0.27	-0.01
			Max. Vx	18	0.00	-0.20	-0.03
		Top Girt	Max Tension	20	14.40	-0.15	-0.00
			Max. Compression	21	-14.22	-0.12	-0.00
			Max. Mx	48	-0.86	-0.30	-0.01
			Max. My	18	0.10	-0.19	-0.03
			Max. Vy	48	-0.12	-0.30	-0.01
			Max. Vx	18	0.00	-0.19	-0.03
		Inner Bracing	Max Tension	21	0.25	0.00	0.00
			Max. Compression	21	-0.25	0.00	0.00
			Max. Mx	34	-0.02	-0.31	0.00
			Max. My	28	0.21	0.00	0.00
			Max. Vy	34	0.10	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	359.03	38.17	-23.87
	Max. H_x	24	359.03	38.17	-23.87
	Max. H_z	7	-308.38	-33.27	22.75
	Min. Vert	9	-319.86	-35.30	22.19
	Min. H_x	9	-319.86	-35.30	22.19
	Min. H_z	22	347.56	36.20	-24.37
Leg B	Max. Vert	12	358.06	-38.40	-23.49
	Max. H_x	29	-321.05	35.56	21.83
	Max. H_z	31	-309.61	33.62	22.24
	Min. Vert	29	-321.05	35.56	21.83
	Min. H_x	12	358.06	-38.40	-23.49
	Min. H_z	14	346.61	-36.52	-23.84
Leg A	Max. Vert	2	362.64	-0.44	45.08
	Max. H_x	27	19.39	7.80	1.62
	Max. H_z	2	362.64	-0.44	45.08
	Min. Vert	19	-317.60	0.44	-41.65
	Min. H_x	10	25.50	-7.82	2.12
	Min. H_z	19	-317.60	0.44	-41.65

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	57.49	0.00	0.00	-48.59	13.13	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	68.99	-0.03	-74.02	-7494.69	19.16	-19.36
0.9 Dead+1.6 Wind 0 deg - No Ice	51.74	-0.03	-74.02	-7476.50	15.22	-19.34
1.2 Dead+1.6 Wind 30 deg - No Ice	68.99	36.97	-64.09	-6496.78	-3697.52	-51.20
0.9 Dead+1.6 Wind 30 deg - No Ice	51.74	36.97	-64.09	-6479.06	-3699.66	-51.15
1.2 Dead+1.6 Wind 45 deg - No Ice	68.99	52.30	-52.32	-5314.35	-5237.39	-62.39
0.9 Dead+1.6 Wind 45 deg - No Ice	51.74	52.30	-52.32	-5297.19	-5238.78	-62.32
1.2 Dead+1.6 Wind 60 deg - No Ice	68.99	64.06	-36.98	-3773.75	-6419.27	-69.33
0.9 Dead+1.6 Wind 60 deg - No Ice	51.74	64.06	-36.98	-3757.32	-6420.10	-69.25
1.2 Dead+1.6 Wind 90 deg - No Ice	68.99	73.98	0.03	-55.18	-7416.78	-68.89
0.9 Dead+1.6 Wind 90 deg - No Ice	51.74	73.99	0.03	-40.53	-7417.13	-68.81
1.2 Dead+1.6 Wind 120 deg - No Ice	68.99	64.09	37.03	3662.54	-6422.73	-49.99
0.9 Dead+1.6 Wind 120 deg - No Ice	51.74	64.09	37.03	3675.42	-6423.57	-49.93
1.2 Dead+1.6 Wind 135 deg - No Ice	68.99	52.33	52.36	5202.15	-5242.26	-35.03
0.9 Dead+1.6 Wind 135 deg - No Ice	51.74	52.34	52.36	5214.29	-5243.67	-34.99
1.2 Dead+1.6 Wind 150 deg - No Ice	68.99	37.02	64.11	6383.24	-3703.44	-17.68
0.9 Dead+1.6 Wind 150 deg - No Ice	51.74	37.02	64.12	6394.81	-3705.60	-17.66
1.2 Dead+1.6 Wind 180 deg - No Ice	68.99	0.03	74.02	7377.85	12.45	19.36
0.9 Dead+1.6 Wind 180 deg - No Ice	51.74	0.03	74.02	7388.94	8.49	19.34
1.2 Dead+1.6 Wind 210 deg - No Ice	68.99	-36.97	64.09	6379.86	3729.24	51.21
0.9 Dead+1.6 Wind 210 deg - No Ice	51.74	-36.97	64.09	6391.42	3723.47	51.15
1.2 Dead+1.6 Wind 225 deg - No Ice	68.99	-52.30	52.32	5197.37	5269.11	62.39
0.9 Dead+1.6 Wind 225 deg - No Ice	51.74	-52.30	52.32	5209.50	5262.60	62.32
1.2 Dead+1.6 Wind 240 deg - No Ice	68.99	-64.06	36.98	3656.71	6450.96	69.33
0.9 Dead+1.6 Wind 240 deg - No Ice	51.74	-64.06	36.99	3669.57	6443.88	69.25
1.2 Dead+1.6 Wind 270 deg - No Ice	68.99	-73.98	-0.03	-61.89	7448.35	68.89
0.9 Dead+1.6 Wind 270 deg - No Ice	51.74	-73.99	-0.03	-47.26	7440.79	68.81
1.2 Dead+1.6 Wind 300 deg - No Ice	68.99	-64.09	-37.03	-3779.54	6454.20	49.99
0.9 Dead+1.6 Wind 300 deg - No Ice	51.74	-64.09	-37.03	-3763.13	6447.13	49.93
1.2 Dead+1.6 Wind 315 deg - No Ice	68.99	-52.33	-52.36	-5319.07	5273.72	35.03
0.9 Dead+1.6 Wind 315 deg - No Ice	51.74	-52.34	-52.36	-5301.93	5267.23	34.98

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+1.6 Wind 330 deg - No Ice	68.99	-37.02	-64.11	-6500.11	3734.94	17.68
0.9 Dead+1.6 Wind 330 deg - No Ice	51.74	-37.02	-64.12	-6482.40	3729.19	17.66
1.2 Dead+1.0 Ice+1.0 Temp	167.90	0.00	0.00	-201.73	75.43	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	167.90	-0.00	-21.16	-2337.78	76.04	-5.01
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	167.90	10.58	-18.33	-2051.38	-991.69	-14.07
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	167.90	14.96	-14.96	-1711.86	-1434.00	-17.30
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	167.90	18.32	-10.58	-1269.44	-1773.46	-19.35
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	167.90	21.16	0.01	-201.47	-2059.79	-19.45
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	167.90	18.33	10.59	866.37	-1773.98	-14.34
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	167.90	14.97	14.97	1308.62	-1434.74	-10.21
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	167.90	10.58	18.33	1647.94	-992.59	-5.39
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	167.90	0.00	21.17	1933.82	75.00	5.01
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	167.90	-10.58	18.33	1647.42	1142.73	14.07
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	167.90	-14.96	14.96	1307.89	1585.05	17.30
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	167.90	-18.32	10.58	865.47	1924.50	19.35
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	167.90	-21.16	-0.00	-202.50	2210.83	19.45
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	167.90	-18.33	-10.59	-1270.33	1925.01	14.34
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	167.90	-14.97	-14.97	-1712.59	1585.77	10.21
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	167.90	-10.58	-18.33	-2051.90	1143.62	5.39
Dead+Wind 0 deg - Service	57.49	-0.01	-15.11	-1565.78	13.83	-3.95
Dead+Wind 30 deg - Service	57.49	7.54	-13.08	-1362.17	-744.43	-10.44
Dead+Wind 45 deg - Service	57.49	10.67	-10.68	-1120.92	-1058.57	-12.72
Dead+Wind 60 deg - Service	57.49	13.07	-7.55	-806.61	-1299.67	-14.14
Dead+Wind 90 deg - Service	57.49	15.10	0.01	-47.97	-1503.25	-14.05
Dead+Wind 120 deg - Service	57.49	13.08	7.56	710.50	-1300.41	-10.20
Dead+Wind 135 deg - Service	57.49	10.68	10.69	1024.60	-1059.57	-7.14
Dead+Wind 150 deg - Service	57.49	7.55	13.08	1265.56	-745.63	-3.61
Dead+Wind 180 deg - Service	57.49	0.01	15.11	1468.47	12.46	3.95
Dead+Wind 210 deg - Service	57.49	-7.54	13.08	1264.87	770.73	10.44
Dead+Wind 225 deg - Service	57.49	-10.67	10.68	1023.63	1084.90	12.73
Dead+Wind 240 deg - Service	57.49	-13.07	7.55	709.32	1326.03	14.14
Dead+Wind 270 deg - Service	57.49	-15.10	-0.01	-49.37	1529.47	14.04
Dead+Wind 300 deg - Service	57.49	-13.08	-7.56	-807.79	1326.65	10.19
Dead+Wind 315 deg - Service	57.49	-10.68	-10.69	-1121.91	1085.86	7.14
Dead+Wind 330 deg - Service	57.49	-7.55	-13.08	-1362.87	771.93	3.60

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-57.49	0.00	-0.00	57.49	-0.00	0.000%
2	-0.03	-68.99	-74.02	0.03	68.99	74.02	0.006%
3	-0.03	-51.74	-74.02	0.03	51.74	74.02	0.005%
4	36.97	-68.99	-64.09	-36.97	68.99	64.09	0.006%
5	36.97	-51.74	-64.09	-36.97	51.74	64.09	0.005%
6	52.30	-68.99	-52.32	-52.30	68.99	52.32	0.006%
7	52.30	-51.74	-52.32	-52.30	51.74	52.32	0.005%
8	64.06	-68.99	-36.99	-64.06	68.99	36.98	0.006%
9	64.06	-51.74	-36.99	-64.06	51.74	36.98	0.005%
10	73.99	-68.99	0.03	-73.98	68.99	-0.03	0.006%
11	73.99	-51.74	0.03	-73.99	51.74	-0.03	0.005%
12	64.09	-68.99	37.04	-64.09	68.99	-37.03	0.005%
13	64.09	-51.74	37.04	-64.09	51.74	-37.03	0.005%
14	52.34	-68.99	52.36	-52.33	68.99	-52.36	0.005%
15	52.34	-51.74	52.36	-52.34	51.74	-52.36	0.005%
16	37.02	-68.99	64.12	-37.02	68.99	-64.11	0.005%
17	37.02	-51.74	64.12	-37.02	51.74	-64.12	0.005%
18	0.03	-68.99	74.02	-0.03	68.99	-74.02	0.005%
19	0.03	-51.74	74.02	-0.03	51.74	-74.02	0.005%
20	-36.97	-68.99	64.09	36.97	68.99	-64.09	0.005%
21	-36.97	-51.74	64.09	36.97	51.74	-64.09	0.005%
22	-52.30	-68.99	52.32	52.30	68.99	-52.32	0.006%
23	-52.30	-51.74	52.32	52.30	51.74	-52.32	0.005%
24	-64.06	-68.99	36.99	64.06	68.99	-36.98	0.006%
25	-64.06	-51.74	36.99	64.06	51.74	-36.99	0.005%
26	-73.99	-68.99	-0.03	73.98	68.99	0.03	0.006%
27	-73.99	-51.74	-0.03	73.99	51.74	0.03	0.005%
28	-64.09	-68.99	-37.04	64.09	68.99	37.03	0.006%
29	-64.09	-51.74	-37.04	64.09	51.74	37.03	0.005%
30	-52.34	-68.99	-52.36	52.33	68.99	52.36	0.006%
31	-52.34	-51.74	-52.36	52.34	51.74	52.36	0.005%
32	-37.02	-68.99	-64.12	37.02	68.99	64.11	0.006%
33	-37.02	-51.74	-64.12	37.02	51.74	64.12	0.005%
34	0.00	-167.90	0.00	-0.00	167.90	-0.00	0.001%
35	-0.00	-167.90	-21.17	0.00	167.90	21.16	0.003%
36	10.58	-167.90	-18.33	-10.58	167.90	18.33	0.003%
37	14.96	-167.90	-14.97	-14.96	167.90	14.96	0.003%
38	18.33	-167.90	-10.58	-18.32	167.90	10.58	0.003%
39	21.16	-167.90	0.00	-21.16	167.90	-0.01	0.003%
40	18.33	-167.90	10.59	-18.33	167.90	-10.59	0.002%
41	14.97	-167.90	14.97	-14.97	167.90	-14.97	0.002%
42	10.59	-167.90	18.34	-10.58	167.90	-18.33	0.002%
43	0.00	-167.90	21.17	-0.00	167.90	-21.17	0.002%
44	-10.58	-167.90	18.33	10.58	167.90	-18.33	0.002%
45	-14.96	-167.90	14.97	14.96	167.90	-14.96	0.002%
46	-18.33	-167.90	10.58	18.32	167.90	-10.58	0.003%
47	-21.16	-167.90	-0.00	21.16	167.90	0.00	0.003%
48	-18.33	-167.90	-10.59	18.33	167.90	10.59	0.003%
49	-14.97	-167.90	-14.97	14.97	167.90	14.97	0.003%
50	-10.59	-167.90	-18.34	10.58	167.90	18.33	0.003%
51	-0.01	-57.49	-15.11	0.01	57.49	15.11	0.002%
52	7.55	-57.49	-13.08	-7.54	57.49	13.08	0.002%
53	10.67	-57.49	-10.68	-10.67	57.49	10.68	0.002%
54	13.07	-57.49	-7.55	-13.07	57.49	7.55	0.002%
55	15.10	-57.49	0.01	-15.10	57.49	-0.01	0.002%
56	13.08	-57.49	7.56	-13.08	57.49	-7.56	0.002%
57	10.68	-57.49	10.69	-10.68	57.49	-10.69	0.001%
58	7.55	-57.49	13.09	-7.55	57.49	-13.08	0.001%
59	0.01	-57.49	15.11	-0.01	57.49	-15.11	0.001%
60	-7.55	-57.49	13.08	7.54	57.49	-13.08	0.001%
61	-10.67	-57.49	10.68	10.67	57.49	-10.68	0.002%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
62	-13.07	-57.49	7.55	13.07	57.49	-7.55	0.002%
63	-15.10	-57.49	-0.01	15.10	57.49	0.01	0.002%
64	-13.08	-57.49	-7.56	13.08	57.49	7.56	0.002%
65	-10.68	-57.49	-10.69	10.68	57.49	10.69	0.002%
66	-7.55	-57.49	-13.09	7.55	57.49	13.08	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00005240
2	Yes	6	0.00000001	0.00037837
3	Yes	6	0.00000001	0.00028305
4	Yes	6	0.00000001	0.00038544
5	Yes	6	0.00000001	0.00028884
6	Yes	6	0.00000001	0.00039014
7	Yes	6	0.00000001	0.00029276
8	Yes	6	0.00000001	0.00039348
9	Yes	6	0.00000001	0.00029552
10	Yes	6	0.00000001	0.00039234
11	Yes	6	0.00000001	0.00029457
12	Yes	6	0.00000001	0.00038349
13	Yes	6	0.00000001	0.00028768
14	Yes	6	0.00000001	0.00037923
15	Yes	6	0.00000001	0.00028463
16	Yes	6	0.00000001	0.00037652
17	Yes	6	0.00000001	0.00028289
18	Yes	6	0.00000001	0.00037683
19	Yes	6	0.00000001	0.00028348
20	Yes	6	0.00000001	0.00038278
21	Yes	6	0.00000001	0.00028755
22	Yes	6	0.00000001	0.00038651
23	Yes	6	0.00000001	0.00029007
24	Yes	6	0.00000001	0.00038981
25	Yes	6	0.00000001	0.00029239
26	Yes	6	0.00000001	0.00039257
27	Yes	6	0.00000001	0.00029454
28	Yes	6	0.00000001	0.00038828
29	Yes	6	0.00000001	0.00029136
30	Yes	6	0.00000001	0.00038436
31	Yes	6	0.00000001	0.00028823
32	Yes	6	0.00000001	0.00038061
33	Yes	6	0.00000001	0.00028511
34	Yes	6	0.00000001	0.00024577
35	Yes	6	0.00000001	0.00087434
36	Yes	6	0.00000001	0.00086909
37	Yes	6	0.00000001	0.00086222
38	Yes	6	0.00000001	0.00085066
39	Yes	6	0.00000001	0.00080924
40	Yes	6	0.00000001	0.00074759
41	Yes	6	0.00000001	0.00071737
42	Yes	6	0.00000001	0.00069527
43	Yes	6	0.00000001	0.00069391
44	Yes	6	0.00000001	0.00074380
45	Yes	6	0.00000001	0.00077536
46	Yes	6	0.00000001	0.00080470

47	Yes	6	0.00000001	0.00084749
48	Yes	6	0.00000001	0.00086799
49	Yes	6	0.00000001	0.00087227
50	Yes	6	0.00000001	0.00087423
51	Yes	6	0.00000001	0.00030410
52	Yes	6	0.00000001	0.00030701
53	Yes	6	0.00000001	0.00030860
54	Yes	6	0.00000001	0.00030918
55	Yes	6	0.00000001	0.00030610
56	Yes	6	0.00000001	0.00029608
57	Yes	6	0.00000001	0.00029074
58	Yes	6	0.00000001	0.00028667
59	Yes	6	0.00000001	0.00028561
60	Yes	6	0.00000001	0.00029364
61	Yes	6	0.00000001	0.00029895
62	Yes	6	0.00000001	0.00030369
63	Yes	6	0.00000001	0.00030854
64	Yes	6	0.00000001	0.00030756
65	Yes	6	0.00000001	0.00030619
66	Yes	6	0.00000001	0.00030476

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.090	51	0.1069	0.0821
T2	160 - 140	1.638	51	0.1047	0.0821
T3	140 - 120	1.215	51	0.0882	0.0639
T4	120 - 100	0.866	51	0.0700	0.0409
T5	100 - 80	0.586	51	0.0528	0.0240
T6	80 - 60	0.381	66	0.0400	0.0156
T7	60 - 40	0.223	66	0.0294	0.0099
T8	40 - 20	0.109	66	0.0185	0.0055
T9	20 - 0	0.037	58	0.0093	0.0025

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	15' 2.5" Dia omni	51	2.090	0.1069	0.0821	820720
178.00	Rohn 6' Side-Arm(1)	51	2.044	0.1070	0.0823	820720
177.00	15' 2.5" Dia omni	51	2.022	0.1071	0.0824	820720
176.00	9-ft Omni	51	1.999	0.1071	0.0826	820720
163.00	APX16DWV-16DWV-S-E-ACU	51	1.705	0.1059	0.0832	240016
157.00	(2) 7770.00	51	1.572	0.1030	0.0805	143629
146.00	12' x 2" Dia Omni	51	1.336	0.0940	0.0707	68613
142.00	Rohn 6' Side-Arm(1)	51	1.255	0.0902	0.0662	57783
135.00	LNX-6512DS	51	1.121	0.0835	0.0580	58045
126.50	800-10504	51	0.972	0.0758	0.0481	70034
125.00	10-ft T-Frame	51	0.947	0.0745	0.0464	72683
51.00	GPS	66	0.167	0.0244	0.0077	110411
50.00	1' Standoff Pipe	66	0.161	0.0238	0.0075	111273

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	9.520	2	0.4608	0.4029
T2	160 - 140	7.569	2	0.4502	0.4030
T3	140 - 120	5.705	2	0.3907	0.3133
T4	120 - 100	4.112	32	0.3187	0.2008
T5	100 - 80	2.801	32	0.2448	0.1176
T6	80 - 60	1.834	32	0.1871	0.0768
T7	60 - 40	1.082	32	0.1383	0.0485
T8	40 - 20	0.533	32	0.0874	0.0269
T9	20 - 0	0.182	16	0.0441	0.0123

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	15' 2.5" Dia omni	2	9.520	0.4608	0.4029	301706
178.00	Rohn 6' Side-Arm(1)	2	9.324	0.4609	0.4037	301706
177.00	15' 2.5" Dia omni	2	9.226	0.4609	0.4041	301706
176.00	9-ft Omni	2	9.128	0.4609	0.4053	301706
163.00	APX16DWV-16DWV-S-E-ACU	2	7.860	0.4546	0.4080	88609
157.00	(2) 7770.00	2	7.279	0.4442	0.3951	51793
146.00	12' x 2" Dia Omni	2	6.242	0.4118	0.3469	19252
142.00	Rohn 6' Side-Arm(1)	2	5.881	0.3978	0.3248	15795
135.00	LNX-6512DS	2	5.279	0.3730	0.2844	15437
126.50	800-10504	32	4.599	0.3426	0.2358	17941
125.00	10-ft T-Frame	32	4.484	0.3371	0.2274	18469
51.00	GPS	32	0.810	0.1151	0.0378	23500
50.00	1' Standoff Pipe	32	0.782	0.1125	0.0367	23651

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.8750	4	1.34	40.59	0.033 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.33	12.43	0.107 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.08	12.43	0.087 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.41	12.43	0.033 ✓	1	Bolt Shear
T2	160	Leg	A325N	1.0000	4	8.19	53.01	0.155 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	4.39	12.43	0.353 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.63	12.43	0.292 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	2.66	12.43	0.214 ✓	1	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T3	140	Leg	A325N	1.0000	6	12.61	53.01	0.238 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	5.40	12.43	0.435 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5.16	12.43	0.415 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	3.97	12.43	0.319 ✔	1	Bolt Shear
T4	120	Leg	A325N	1.0000	8	15.42	53.01	0.291 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	5.35	12.43	0.430 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5.40	12.43	0.435 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	5.29	12.43	0.425 ✔	1	Bolt Shear
T5	100	Leg	A325N	1.0000	12	13.27	53.01	0.250 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	6.32	17.89	0.353 ✔	1	Bolt Shear
		Horizontal	A325N	0.7500	2	5.67	17.89	0.317 ✔	1	Bolt Shear
		Top Girt	A325N	0.7500	2	5.58	17.89	0.312 ✔	1	Bolt Shear
T6	80	Leg	A325N	1.0000	12	16.55	53.01	0.312 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	6.02	17.89	0.336 ✔	1	Bolt Shear
		Horizontal	A325N	0.7500	2	6.03	17.89	0.337 ✔	1	Bolt Shear
		Top Girt	A325N	0.7500	2	5.79	17.89	0.324 ✔	1	Bolt Shear
T7	60	Leg	A325N	1.0000	16	14.70	53.01	0.277 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	5.84	17.89	0.326 ✔	1	Bolt Shear
		Horizontal	A325N	0.7500	2	6.19	17.89	0.346 ✔	1	Bolt Shear
		Top Girt	A325N	0.7500	2	6.11	17.89	0.341 ✔	1	Bolt Shear
T8	40	Leg	A325N	1.0000	16	16.89	53.01	0.319 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	6.30	17.89	0.352 ✔	1	Bolt Shear
		Horizontal	A325N	0.7500	2	7.01	17.89	0.392 ✔	1	Bolt Shear
		Top Girt	A325N	0.7500	2	6.76	17.89	0.378 ✔	1	Bolt Shear
T9	20	Leg	A354-BC	1.0000	24	12.71	55.22	0.230 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	6.33	17.89	0.354 ✔	1	Bolt Shear
		Horizontal	A325N	0.7500	2	7.29	17.89	0.408 ✔	1	Bolt Shear
		Top Girt	A325N	0.7500	2	7.20	17.89	0.402 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8 K=1.00	2.2285	-7.69	70.98	0.108 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	160 - 140	ROHN 4 STD	20.00	6.67	53.0 K=1.00	3.1741	-40.16	116.32	0.345 [1] ✔
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6 K=1.00	6.1120	-89.05	239.38	0.372 [1] ✔
T4	120 - 100	ROHN 6 EH	20.04	6.68	36.5 K=1.00	8.4049	-139.63	343.08	0.407 [1] ✔
T5	100 - 80	ROHN 8 EH	20.05	10.02	41.8 K=1.00	12.7627	-178.81	505.46	0.354 [1] ✔
T6	80 - 60	ROHN 10 EH	20.05	10.03	33.2 K=1.00	16.1007	-222.47	668.56	0.333 [1] ✔
T7	60 - 40	ROHN 10 EH	20.06	10.03	33.2 K=1.00	16.1007	-263.91	668.52	0.395 [1] ✔
T8	40 - 20	ROHN 12 EH	20.05	10.03	27.8 K=1.00	19.2423	-304.48	818.47	0.372 [1] ✔
T9	20 - 0	ROHN 12 EH	20.05	10.03	27.8 K=1.00	19.2423	-344.99	818.47	0.422 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0 K=1.00	1.0745	-3.99	17.53	0.228 [1] ✔
T2	160 - 140	ROHN 2.5 STD	7.96	7.62	96.5 K=1.00	1.7040	-13.17	36.35	0.362 [1] ✔
T3	140 - 120	ROHN 2.5 STD	8.58	8.21	104.0 K=1.00	1.7040	-16.21	33.15	0.489 [1] ✔
T4	120 - 100	ROHN 2.5 STD	9.29	8.89	112.6 K=1.00	1.7040	-15.46	29.55	0.523 [1] ✔
T5	100 - 80	ROHN 3 EH	12.60	12.01	126.9 K=1.00	3.0159	-18.49	42.33	0.437 [1] ✔
T6	80 - 60	ROHN 3 EH	13.40	12.73	134.4 K=1.00	3.0159	-18.05	37.71	0.479 [1] ✔
T7	60 - 40	ROHN 3 EH	14.32	13.69	144.6 K=1.00	3.0159	-17.43	32.59	0.535 [1] ✔
T8	40 - 20	ROHN 3.5 EH	15.24	14.53	133.5 K=1.00	3.6784	-18.91	46.65	0.405 [1] ✔
T9	20 - 0	ROHN 3.5 EH	16.20	15.52	142.6 K=1.00	3.6784	-18.87	40.88	0.462 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.1 K=1.00	0.7995	-2.13	22.51	0.094 [1] ✔
T2	160 - 140	ROHN 2 STD	8.68	4.15	63.3 K=1.00	1.0745	-7.20	36.06	0.200 [1] ✔
T3	140 - 120	ROHN 2 STD	10.10	4.82	73.4 K=1.00	1.0745	-10.32	32.60	0.317 [1] ✔
T4	120 - 100	ROHN 2 STD	12.22	5.83	88.9 K=1.00	1.0745	-10.79	27.13	0.398 [1] ✔
T5	100 - 80	ROHN 2 X-STR	14.13	6.71	105.0 K=1.00	1.4773	-11.33	29.70	0.382 [1] ✔
T6	80 - 60	ROHN 2.5 STD	16.58	7.84	99.3 K=1.00	1.7040	-12.06	32.84	0.367 [1] ✔
T7	60 - 40	ROHN 2.5 STD	19.16	9.13	115.6 K=1.00	1.7040	-12.38	27.31	0.453 [1] ✔
T8	40 - 20	ROHN 3 STD	21.73	10.33	106.6 K=1.00	2.2285	-13.93	39.71	0.351 [1] ✔
T9	20 - 0	ROHN 3 STD	24.23	11.58	119.5 K=1.00	2.2285	-14.39	34.06	0.423 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.12	79.5 K=1.00	0.7995	-0.81	20.50	0.039 [1] ✔
T2	160 - 140	ROHN 2 STD	8.63	4.17	63.6 K=1.00	1.0745	-5.26	31.69	0.166 [1] ✔
T3	140 - 120	ROHN 2 STD	8.71	4.17	63.5 K=1.00	1.0745	-7.94	31.70	0.250 [1] ✔
T4	120 - 100	ROHN 2 STD	10.79	5.16	78.7 K=1.00	1.0745	-10.57	27.76	0.381 [1] ✔
T5	100 - 80	ROHN 2 X-STR	12.93	6.19	96.9 K=1.00	1.4773	-11.16	31.37	0.356 [1] ✔
T6	80 - 60	ROHN 2.5 STD	15.33	7.31	92.5 K=1.00	1.7040	-11.58	38.07	0.304 [1] ✔
T7	60 - 40	ROHN 2.5 STD	17.83	8.47	107.2 K=1.00	1.7040	-12.22	31.78	0.384 [1] ✔
T8	40 - 20	ROHN 3 STD	20.48	9.79	101.0 K=1.00	2.2285	-13.46	45.03	0.299 [1] ✔
T9	20 - 0	ROHN 3 STD	22.98	10.96	113.0 K=1.00	2.2285	-14.22	38.44	0.370 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	4.27	4.27	128.9 K=1.00	0.4844	-0.01	6.59	0.002 [1] ✓
T2	160 - 140	L2x2x1/8	4.31	4.31	130.3 K=1.00	0.4844	-0.09	6.45	0.014 [1] ✓
T3	140 - 120	L2x2x1/8	4.35	4.35	131.5 K=1.00	0.4844	-0.14	6.33	0.022 [1] ✓
T4	120 - 100	L2x2x1/8	5.39	5.39	162.9 K=1.00	0.4844	-0.18	4.13	0.044 [1] ✓
T5	100 - 80	L2x2x1/8	6.47	6.47	195.1 K=1.00	0.4844	-0.19	2.87	0.067 [1] ✓
T6	80 - 60	L2 1/2x2 1/2x3/16	7.67	7.67	185.8 K=1.00	0.9020	-0.20	5.90	0.034 [1] ✓
T7	60 - 40	L3x3x3/16	8.92	8.92	179.5 K=1.00	1.0900	-0.21	7.64	0.028 [1] ✓
T8	40 - 20	L3 1/2x3 1/2x1/4	10.24	10.24	177.1 K=1.00	1.6900	-0.23	12.18	0.019 [1] ✓
T9	20 - 0	L3 1/2x3 1/2x1/4	11.49	11.49	198.7 K=1.00	1.6900	-0.25	9.67	0.025 [1] ✓

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 STD	20.00	6.67	68.8	2.2285	5.35	100.28	0.053 [1] ✓
T2	160 - 140	ROHN 4 STD	20.00	6.67	53.0	3.1741	32.77	142.83	0.229 [1] ✓
T3	140 - 120	ROHN 5 EH	20.04	6.68	43.6	6.1120	75.63	275.04	0.275 [1] ✓
T4	120 - 100	ROHN 6 EH	20.04	6.68	36.5	8.4049	123.33	378.22	0.326 [1] ✓
T5	100 - 80	ROHN 8 EH	20.05	10.02	41.8	12.7627	159.30	574.32	0.277 [1] ✓
T6	80 - 60	ROHN 10 EH	20.05	10.03	33.2	16.1007	198.55	724.53	0.274 [1] ✓
T7	60 - 40	ROHN 10 EH	20.06	10.03	33.2	16.1007	235.23	724.53	0.325 [1] ✓
T8	40 - 20	ROHN 12 EH	20.05	10.03	27.8	19.2423	270.19	865.90	0.312 [1] ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	20 - 0	ROHN 12 EH	20.05	10.03	27.8	19.2423	305.07	865.90	0.352 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 2 STD	7.94	7.67	117.0	1.0745	3.92	40.62	0.097 [1] ✔
T2	160 - 140	ROHN 2.5 STD	7.96	7.62	96.5	1.7040	13.07	64.41	0.203 [1] ✔
T3	140 - 120	ROHN 2.5 STD	8.58	8.21	104.0	1.7040	16.08	64.41	0.250 [1] ✔
T4	120 - 100	ROHN 2.5 STD	8.81	8.41	106.5	1.7040	15.90	64.41	0.247 [1] ✔
T5	100 - 80	ROHN 3 EH	12.25	11.66	123.1	3.0159	18.70	114.00	0.164 [1] ✔
T6	80 - 60	ROHN 3 EH	13.40	12.73	134.4	3.0159	17.68	114.00	0.155 [1] ✔
T7	60 - 40	ROHN 3 EH	13.85	13.23	139.7	3.0159	17.11	114.00	0.150 [1] ✔
T8	40 - 20	ROHN 3.5 EH	15.24	14.53	133.5	3.6784	18.28	139.04	0.132 [1] ✔
T9	20 - 0	ROHN 3.5 EH	15.71	15.04	138.1	3.6784	18.31	139.04	0.132 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.60	4.15	80.1	0.7995	2.16	35.98	0.060 [1] ✔
T2	160 - 140	ROHN 2 STD	8.68	4.15	63.3	1.0745	7.25	48.35	0.150 [1] ✔
T3	140 - 120	ROHN 2 STD	10.10	4.82	73.4	1.0745	10.10	48.35	0.209 [1] ✔
T4	120 - 100	ROHN 2 STD	11.50	5.48	83.5	1.0745	10.60	48.35	0.219 [1] ✔
T5	100 - 80	ROHN 2 X-STR	14.13	6.71	105.0	1.4773	11.07	66.48	0.167 [1] ✔
T6	80 - 60	ROHN 2.5 STD	16.58	7.84	99.3	1.7040	11.85	55.21	0.215 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	60 - 40	ROHN 2.5 STD	19.16	9.13	115.6	1.7040	12.26	55.21	0.222 [1]
T8	40 - 20	ROHN 3 STD	21.73	10.33	106.6	2.2285	14.03	72.20	0.194 [1]
T9	20 - 0	ROHN 3 STD	24.23	11.58	119.5	2.2285	14.59	72.20	0.202 [1]

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 1.5 STD	8.54	4.12	79.5	0.7995	0.81	30.22	0.027 [1]
T2	160 - 140	ROHN 2 STD	8.63	4.17	63.6	1.0745	5.31	40.62	0.131 [1]
T3	140 - 120	ROHN 2 STD	8.71	4.17	63.5	1.0745	7.54	40.62	0.186 [1]
T4	120 - 100	ROHN 2 STD	10.79	5.16	78.7	1.0745	10.34	40.62	0.255 [1]
T5	100 - 80	ROHN 2 X-STR	12.93	6.19	96.9	1.4773	10.77	55.84	0.193 [1]
T6	80 - 60	ROHN 2.5 STD	15.33	7.31	92.5	1.7040	11.32	64.41	0.176 [1]
T7	60 - 40	ROHN 2.5 STD	17.83	8.47	107.2	1.7040	11.95	64.41	0.186 [1]
T8	40 - 20	ROHN 3 STD	20.48	9.79	101.0	2.2285	13.52	84.24	0.160 [1]
T9	20 - 0	ROHN 3 STD	22.98	10.96	113.0	2.2285	14.40	84.24	0.171 [1]

[1] $P_u / \phi P_n$ controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	4.27	4.27	81.8	0.4844	0.01	21.80	0.001 [1]
T2	160 - 140	L2x2x1/8	4.31	4.31	82.7	0.4844	0.09	21.80	0.004 [1]
T3	140 - 120	L2x2x1/8	4.35	4.35	83.5	0.4844	0.14	21.80	0.006 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	120 - 100	L2x2x1/8	5.39	5.39	103.4	0.4844	0.18	21.80	0.008 [1]
T5	100 - 80	L2x2x1/8	6.47	6.47	123.9	0.4844	0.19	21.80	0.009 [1]
T6	80 - 60	L2 1/2x2 1/2x3/16	7.67	7.67	118.2	0.9020	0.20	40.59	0.005 [1]
T7	60 - 40	L3x3x3/16	8.92	8.92	113.9	1.0900	0.21	49.05	0.004 [1]
T8	40 - 20	L3 1/2x3 1/2x1/4	10.24	10.24	112.7	1.6900	0.23	76.05	0.003 [1]
T9	20 - 0	L3 1/2x3 1/2x1/4	11.49	11.49	126.5	1.6900	0.25	76.05	0.003 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 STD	3	-7.69	70.98	10.8	Pass
T2	160 - 140	Leg	ROHN 4 STD	42	-40.16	116.32	34.5	Pass
T3	140 - 120	Leg	ROHN 5 EH	81	-89.05	239.38	37.2	Pass
T4	120 - 100	Leg	ROHN 6 EH	120	-139.63	343.08	40.7	Pass
T5	100 - 80	Leg	ROHN 8 EH	159	-178.81	505.46	35.4	Pass
T6	80 - 60	Leg	ROHN 10 EH	186	-222.47	668.56	33.3	Pass
T7	60 - 40	Leg	ROHN 10 EH	213	-263.91	668.52	39.5	Pass
T8	40 - 20	Leg	ROHN 12 EH	240	-304.48	818.47	37.2	Pass
T9	20 - 0	Leg	ROHN 12 EH	267	-344.99	818.47	42.2	Pass
T1	180 - 160	Diagonal	ROHN 2 STD	14	-3.99	17.53	22.8	Pass
T2	160 - 140	Diagonal	ROHN 2.5 STD	53	-13.17	36.35	36.2	Pass
T3	140 - 120	Diagonal	ROHN 2.5 STD	93	-16.21	33.15	48.9	Pass
T4	120 - 100	Diagonal	ROHN 2.5 STD	132	-15.46	29.55	52.3	Pass
T5	100 - 80	Diagonal	ROHN 3 EH	171	-18.49	42.33	43.7	Pass
T6	80 - 60	Diagonal	ROHN 3 EH	198	-18.05	37.71	47.9	Pass
T7	60 - 40	Diagonal	ROHN 3 EH	225	-17.43	32.59	53.5	Pass
T8	40 - 20	Diagonal	ROHN 3.5 EH	252	-18.91	46.65	40.5	Pass
T9	20 - 0	Diagonal	ROHN 3.5 EH	279	-18.87	40.88	46.2	Pass
T1	180 - 160	Horizontal	ROHN 1.5 STD	13	-2.13	22.51	9.4	Pass
T2	160 - 140	Horizontal	ROHN 2 STD	52	-7.20	36.06	20.0 29.2 (b)	Pass
T3	140 - 120	Horizontal	ROHN 2 STD	91	-10.32	32.60	31.7 41.5 (b)	Pass
T4	120 - 100	Horizontal	ROHN 2 STD	130	-10.79	27.13	39.8 43.5 (b)	Pass
T5	100 - 80	Horizontal	ROHN 2 X-STR	169	-11.33	29.70	38.2	Pass
T6	80 - 60	Horizontal	ROHN 2.5 STD	196	-12.06	32.84	36.7	Pass
T7	60 - 40	Horizontal	ROHN 2.5 STD	223	-12.38	27.31	45.3	Pass
T8	40 - 20	Horizontal	ROHN 3 STD	250	-13.93	39.71	35.1 39.2 (b)	Pass
T9	20 - 0	Horizontal	ROHN 3 STD	277	-14.39	34.06	42.3	Pass
T1	180 - 160	Top Girt	ROHN 1.5 STD	6	-0.81	20.50	3.9	Pass
T2	160 - 140	Top Girt	ROHN 2 STD	45	-5.26	31.69	16.6 21.4 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T3	140 - 120	Top Girt	ROHN 2 STD	84	-7.94	31.70	25.0	Pass
							31.9 (b)	
T4	120 - 100	Top Girt	ROHN 2 STD	123	-10.57	27.76	38.1	Pass
							42.5 (b)	
T5	100 - 80	Top Girt	ROHN 2 X-STR	162	-11.16	31.37	35.6	Pass
T6	80 - 60	Top Girt	ROHN 2.5 STD	189	-11.58	38.07	30.4	Pass
							32.4 (b)	
T7	60 - 40	Top Girt	ROHN 2.5 STD	216	-12.22	31.78	38.4	Pass
T8	40 - 20	Top Girt	ROHN 3 STD	243	-13.46	45.03	29.9	Pass
							37.8 (b)	
T9	20 - 0	Top Girt	ROHN 3 STD	270	-14.22	38.44	37.0	Pass
							40.2 (b)	
T1	180 - 160	Inner Bracing	L2x2x1/8	17	-0.00	6.50	0.4	Pass
T2	160 - 140	Inner Bracing	L2x2x1/8	77	-0.09	6.45	1.4	Pass
T3	140 - 120	Inner Bracing	L2x2x1/8	117	-0.14	6.33	2.2	Pass
T4	120 - 100	Inner Bracing	L2x2x1/8	155	-0.18	4.13	4.4	Pass
T5	100 - 80	Inner Bracing	L2x2x1/8	182	-0.19	2.87	6.7	Pass
T6	80 - 60	Inner Bracing	L2 1/2x2 1/2x3/16	209	-0.20	5.90	3.4	Pass
T7	60 - 40	Inner Bracing	L3x3x3/16	236	-0.21	7.64	2.8	Pass
T8	40 - 20	Inner Bracing	L3 1/2x3 1/2x1/4	264	-0.23	12.18	1.9	Pass
T9	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	290	-0.25	9.67	2.5	Pass
							Summary	
						Leg (T9)	42.2	Pass
						Diagonal (T7)	53.5	Pass
						Horizontal (T7)	45.3	Pass
						Top Girt (T4)	42.5	Pass
						Inner Bracing (T5)	6.7	Pass
						Bolt Checks	43.5	Pass
						RATING =	**53.5**	**Pass**

SITE NAME	Waterford CT	ECP - CELL #	2	135
LATITUDE	41-222-40.22 N	LONGITUDE	72-08-21.65 W	
Change RRH 2X40 700 to RRH 2X460 700 Change RRH 2X40 AWS to RRH 4X45 AWS Add RRH 2X60 PCS		SAVE BUTTON		
		STRUCTURE TYPE	Lattice	

700 Mhz - LTE Current Config	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	BXA-70063-6CF_2	SLCP 2X6015	SLCP 2X6015
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	0/0	4/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL	1 ALU RH_2X40 700	1 ALU RH_2X40 700	1 ALU RH_2X40 700
DIPLEXER - QTY / MODEL			
700 Mhz - LTE Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	eNodeB	eNodeB	eNodeB
ANTENNA TYPE	SBNHH-1D65B_04DT	SBNHH-1D65B_10DT	SBNHH-1D65B_10DT
QTY OF ANTENNAS PER FACE	0	0	0
ORIENTATION (DEG)	45	150	240
DOWN TILT (MECH/ELEC)	0/4	0/10	0/10
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL	1 ALU RH_2X60 700	1 ALU RH_2X60 700	1 ALU RH_2X60 700
DIPLEXER - QTY / MODEL			
850 Celluar - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LPA-80063-4CF	SC-E 6014 REV 2	SC-E 6014 REV 2
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	4/0	6/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
850 Celluar - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B
ANTENNA TYPE	LNX-6512DS-A1M	LNX-6512DS-A1M	LNX-6512DS-A1M
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	143	260
DOWN TILT (MECH/ELEC)	0/4	0/8	0/4
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH LTE CABLE			
1900 PCS - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	BXA-171063-8BF-2	BXA-171063-8BF-2	BXA-171063-8BF-2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	30	150	260
DOWN TILT (MECH/ELEC)	0/0	4/0	4/0
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
1900 PCS - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0B	PCS Modcell 4.0B	PCS Modcell 4.0B
ANTENNA TYPE	SBNHH-1D65B_02DT	SBNHH-1D65B_4DT	SBNHH-1D65B_02DT
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	45	150	240
DOWN TILT (MECH/ELEC)	0/2	0/4	0/4
RAD CTR (FT AGL)	134.8	134.8	134.8
TMA - QTY / MODEL			
RRH - QTY/MODEL	1 ALU RH_2X60-PCS	1 ALU RH_2X60-PCS	1 ALU RH_2X60-PCS
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			

AWS - LTE Current Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	BXA-171063-12BF_2		SACP 2X5516		BXA-171063-12BF_2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	30		150		260	
DOWN TILT (MECH/ELEC)	0/0		2/0		0/0	
RAD CTR (FT AGL)	134.8		134.8		134.8	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

AWS - LTE Future Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	SBNHH-1D65B_02DT		SBNHH-1D65B_4DT		SBNHH-1D65B_2DT	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	45		150		240	
DOWN TILT (MECH/ELEC)	0/2		0/4		0/2	
RAD CTR (FT AGL)	134.8		134.8		134.8	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_24X45-AWS	1	ALU RH_24X45-AWS	1	ALU RH_24X45-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	2		DB-T1-6Z-8AB-0Z			

NUMBER OF CABLE'S NEEDED						ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES			12	MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS			36	TOP JUMPER (FT)			0
Equipment Cable Ordering		MAIN CABLE	18	-	6	TOP JUMPER #	24	+	12
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES			1	FIBER LINE MODEL #			158-1-08U8-S8
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS			12	TOP JUMPER MODEL #			058-1-08U1-S1
Fiber Cable Ordering		FIBER CABLE	1	+	1	TOP JUMPER #	24	+	12

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - E	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-21	TX - 746-757	PCS (Watts)	60
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-17	RX - 776-787	LTE (Watts)	90
			AWS(Watts)	60

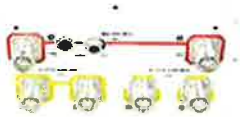
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/ WHITE	A8	1900	Tx2/Rx0	BLUE/ WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ ORANGE	A9	700	Tx2/Rx0	BLUE/ ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A5	1900	Tx4/Rx1	RED/RED/ WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Ray Paradis	Rob Hesselbach	RLP	12/26/2014
Revised By: Ray Paradis	Alejandro Restrepo	RLP	8/5/2016

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1710–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Product Specifications

SBNHH-1D65B

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1828.0 mm | 72.0 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

Product Specifications

ANDREW®
A CommScope Company

LNX-6512DS-T4M

DualPol® Antenna, 698–896 MHz, 65° horizontal beamwidth, fixed electrical tilt

- Continuous wideband operation
- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Patented DualPol® technology
- Ideal choice for site collocations and tough zoning restrictions

CHARACTERISTICS

General Specifications

Antenna Type	DualPol®
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Beamwidth, Horizontal, degrees	65	65
Gain, dBd	12.4	13.3
Gain, dBi	14.5	15.4
Beamwidth, Vertical, degrees	18.7	16.2
Beam Tilt, degrees	4	4
Upper Sidelobe Suppression (USLS), typical, dB	20	20
Front-to-Back Ratio at 180°, dB	30	32
Isolation, dB	30	30
VSWR | Return Loss, db	1.35:1 | 16.5	1.35:1 | 16.5
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150
Input Power, maximum, watts	500	500
Polarization	±45°	±45°
Impedance, ohms	50	50
Lightning Protection	dc Ground	dc Ground

Product Specifications

LNX-6512DS-T4M

ANDREW®
A CommScope Company

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	379.8 N @ 150 km/h 85.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1232.0 mm | 48.5 in
Width	301.0 mm | 11.9 in
Net Weight	12.8 kg | 28.2 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2002/95/EC	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)

INCLUDED PRODUCTS

MTG-L-STD
Downtilt Mounting Kit for panel Antennas

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

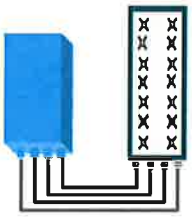
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

Alcatel·Lucent

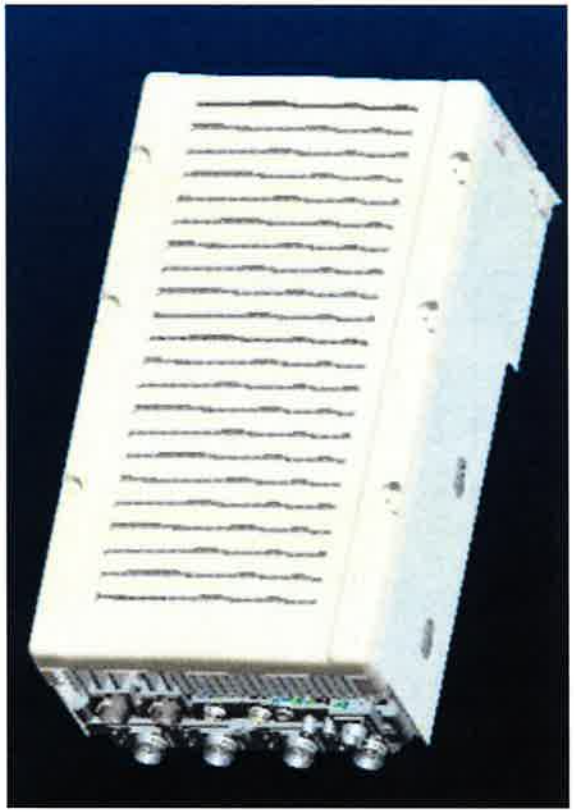
TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w)x 9.4" (d)**
Weight	55lb**



**- Includes solar shield but not mounting brackets (8 lbs.)

Alcatel·Lucent

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent	Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)	Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.

*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [L_{WAd}]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	

*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled

Power Reporting					
Power Input	-48V	No. Power Supplies	N/A (Customer provided power plant)	Number of Inputs per Power Supply	1
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)	Maximum Input (each power supply in Watts)	N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)	58W (to AISG port, 29V/2A)
Power Supply Connection Type	DC entry via Conduit Box	Power Supply Make & Model	N/A (Customer provided power plant)		
Input Protection	no input fuse	Input Protection Make & Model	N/A (Customer provided power plant)		
Redundancy Scheme	N/A				
Nominal Voltage	-48VDC	Maximum Voltage	-57V	Minimum Voltage	-38V
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)	*25)Max Current at Maximum Voltage	14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage	21.7A (add 1.5A if AISG port loaded 2A*29V)

Return completed forms to Engineering and Operations Support (EOS)

Richard.damiano@verizonwireless.com

Product Data Sheet DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

The RFS Distribution Box design comes with the option for pluggable over voltage protection (OVP) for up to 6 remote radios and the connection for 6 pairs of optical fiber with LC optical fiber cable management. There is a hybrid cable input with a jumper configuration for power and optical fiber to the remote radio heads (RRHs). A custom wall, a 2-inch pole, and an H-Frame mounting bracket are included. Both the compact and standard design are available with lightening protection.

Features/Benefits

- Designed to accommodate varying diameters of HYBRIFLEX™ (combined power and fiber optic) cables – up to 2 inches
- Supports Single- and Multi-Mode Optical fiber
- NEMA 4x rated enclosure – allows **flexibility for indoor or outdoor installation** on a roof or tower top
- Weatherproof enclosure and ports – **improves system reliability**
- Modular design – makes replacement or addition of OVP easy without removal of other components within the box
- Strikesorb OVP technology – protects equipment from damaging surges up to 60 kA on an 8/20 waveform and up to 5 kA on a 10/350 waveform (certain models only)
- Low residual voltage and high impedance – **ideally suited for RRH technology** – won't shut down the RRH the way spark gap technology does (certain models only)

Technical Specifications

Mechanical Specifications

Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum	
Fiber Connection Method	LC-LC Single- or Multi-mode duplex	
Environmental Rating	NEMA 4x	
Operating Temperature, °C (°F)	-40 to +80 (-40 to +176)	
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs	

Electrical Specifications

Nominal Operating Voltage	48 VDC	
Nominal Discharge Current (I_n) per UL 1449 3rd Ed	20 kA 8/20 µs	N/A
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs	N/A
Maximum Impulse (Lightning) Current (I_{imp}) per IEC 61643-1	5 kA 10/350 µs	N/A
Maximum Continuous Operating Voltage (U_c)	75 VDC	N/A
Voltage Protection Rating per UL1449 3rd Ed	400 V	N/A
Protection Class as per IEC 61643-1	Class 1	N/A
Strikesorb OVP Compliance	ANSI/UL 1449-3rd Ed	N/A
	IEEE C62.41	N/A
	NEMA LS-1	N/A
	IEC 61643-1	N/A
	IEC 61643-12	N/A
	EN 61643-11	N/A

* This data is provisional and subject to change.