COHEN and WOLF P.C.
ATTORNEYS AT LAW

**RACHEL A. SCHWARTZMAN**

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4110
E-Mail: rschwartzman@cohenandwolf.com

May 14, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

**Re: Notice of Exempt Modification**
**Verizon Wireless/T-Mobile Equipment Upgrade**
**Site ID CT11041D**
**53 Dayton Road, Waterford, CT**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Verizon Wireless owns the existing lattice telecommunications tower and related facility at 53 Dayton Road, Waterford, CT (-72.13940/41.377739). T-Mobile intends to replace six (6) existing antennas with six (6) new antennas and related equipment at this existing telecommunications facility in Waterford ("Waterford Facility"). Please accept this letter as notification, pursuant to R.C.S.A. §16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the first selectman, Daniel M. Steward, and the property owner, Verizon Wireless.

The existing Waterford Facility consists of a 180-foot lattice tower.[1] T-Mobile plans to replace six (6) existing antennas on T-arms with six (6) new antennas on T-arms at a centerline of 164 feet. T-Mobile will also add three (3) remote radio units (RRUs) mounted behind some of the new antennas at the 164-foot centerline and reuse existing spare fiber cables. (See the plans dated February 26, 2015 attached hereto as **Exhibit A**). The existing Waterford Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated April 22, 2015, and attached hereto as **Exhibit B**.

[1] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for approval of this structure, it does reference this structure in connection with a notices of intent captioned EM-OCI-152-990728, TS-AT&T-152-010426, EM-T-MOBILE-152-030617, EM-VER-152-041007, EM-CING-132-134-152-165-166-070726, EM-WTFD-152-080627, TS-METROPCS-152-090107, EM-T-MOBILE-152-090204, EM-VER-152-120622, EM-T-MOBILE-152-120702, EM-CING-152-121114, EM-VER-152-130214, EM-VER-152-150305.

The planned modifications to the Waterford Facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modification will not increase the height of the tower. T-Mobile's existing antennas are at a centerline of 164 feet; the replacement antennas will be installed at the same 164-foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet LE-1 of Exhibit A. T-Mobile's equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas and equipment will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated April 27, 2015, T-Mobile's operations would add 4.83% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 46.48% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit C.**

For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Waterford Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, T-Mobile shall commence construction approximately sixty days from the receipt of the Council's decision.

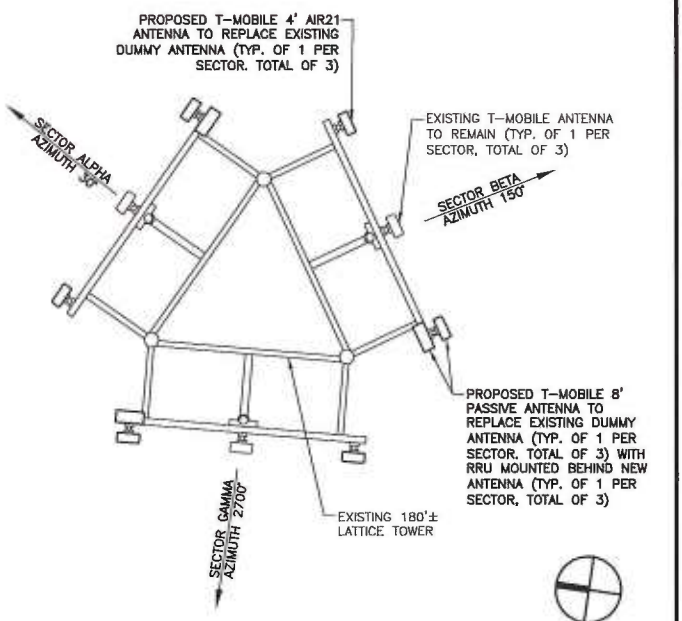
Sincerely,

Rachel Schwartzman

Rachel A. Schwartzman, Esq.

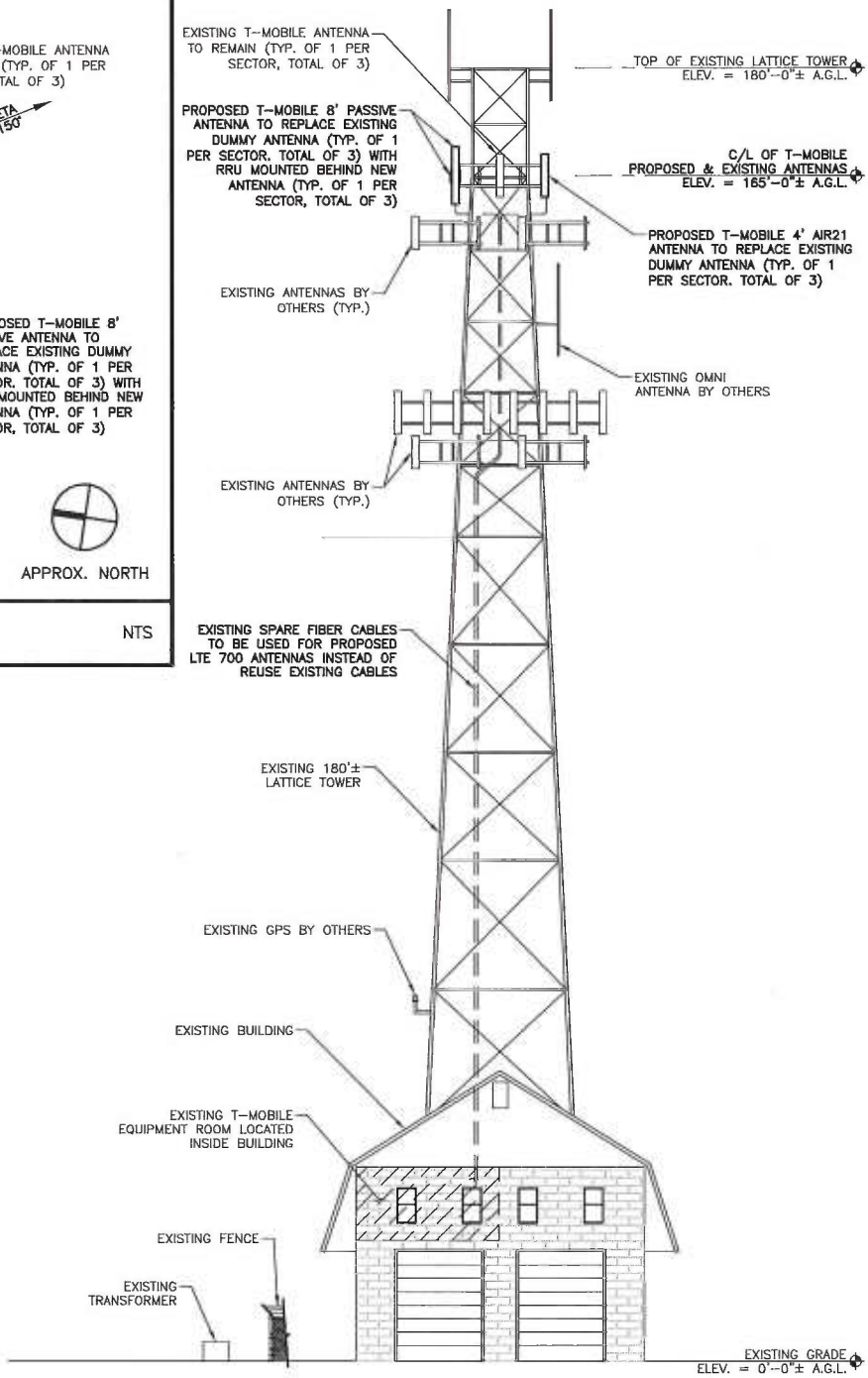
cc: Town of Waterford, First Selectman Daniel M. Steward
Verizon Wireless
Jamie Ford, EBI Consulting

# EXHIBIT A




## ANTENNA CONFIGURATION

NTS




CONFIGURATION

**702CU**

**NOTE:**
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

## TOWER ELEVATION

SCALE: 1" = 25'-0"


PREPARED BY:
EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com
EBI JOB NO.: 8115000084

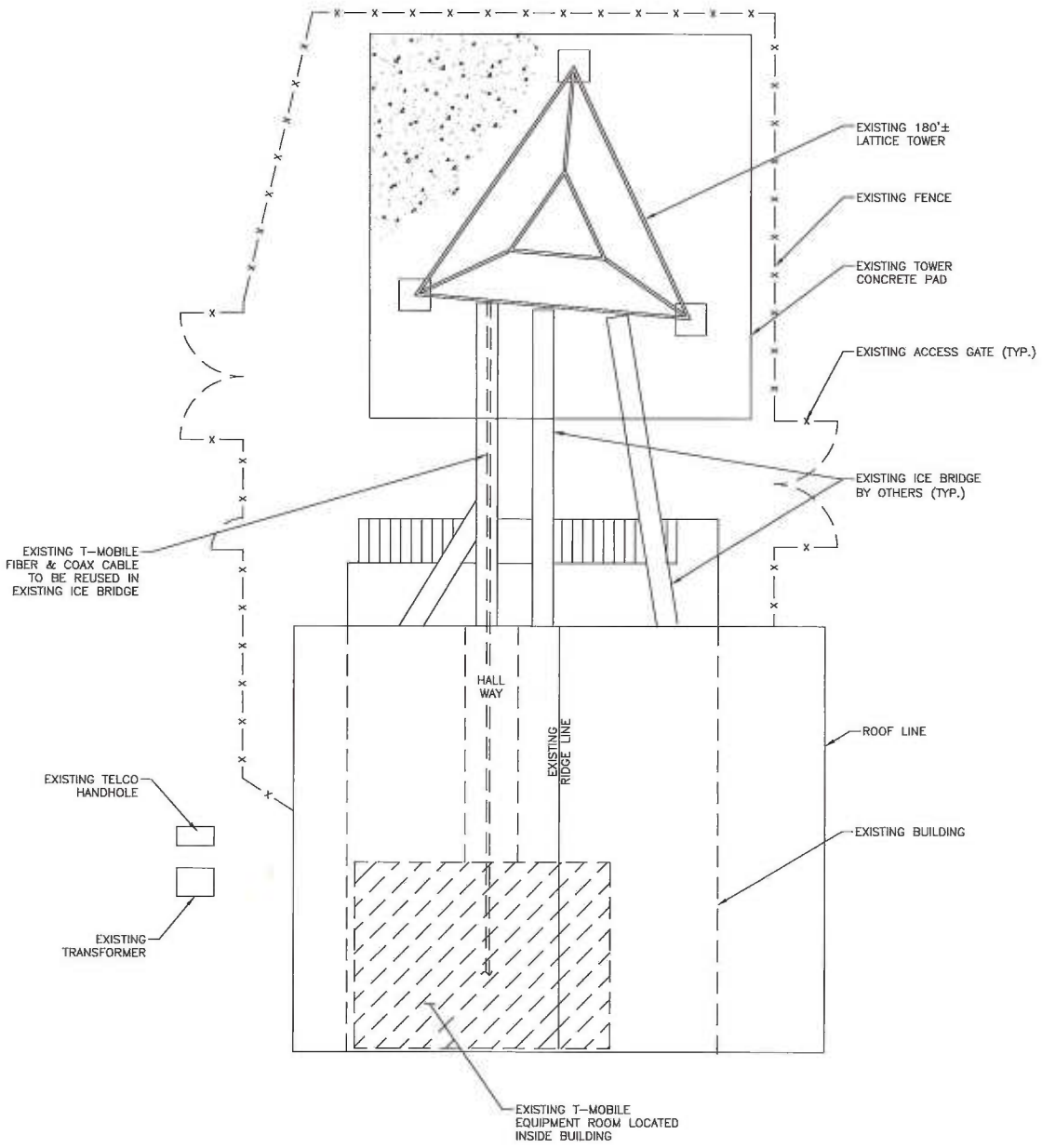
CLIENT:
T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100


SITE INFO:
CT11041D
WATERFORD/
I-95/X82
53 DAYTON ROAD
WATERFORD, CT 06385

| SUBMITTALS | | | |
|---|---|---|---|
| NO. | DATE | DESCRIPTION | BY |
| A | 02/26/15 | FOR REVIEW | LF |
| | | | |
| | | | |
| | | | |

DRAWN BY: LF
CHECKED BY: BB
DATE: 02/26/15

SHEET NO: LE-2




CONFIGURATION

**702CU**

APPROX. NORTH

NOTE:
ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

# SITE PLAN

SCALE: 1/16" = 1'-0"


PREPARED BY:
EBI Consulting
environmental | engineering | due diligence
21 B Street | Burlington, MA 01803
Tel: (781) 273-2500 | Fax: (781) 273-3311
www.ebiconsulting.com

EBI JOB NO.:
8115000084

CLIENT:
T-Mobile Northeast, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860.692.7100


SITE INFO:
CT11041D
WATERFORD/
I-95/X82
53 DAYTON ROAD
WATERFORD, CT 06385

| SUBMITTALS | | | |
|---|---|---|---|
| NO. | DATE | DESCRIPTION | BY |
| A | 02/26/15 | FOR REVIEW | LF |
| | | | |
| | | | |
| | | | |

DRAWN BY: LF
CHECKED BY: BB
DATE: 02/26/15

SHEET NO:
LE-1

# EXHIBIT B

CENTEK engineering

Centered on Solutions℠

# Structural Analysis Report

*180-ft Existing ROHN Lattice Tower*

*Proposed T-Mobile*
*Antenna Upgrade*

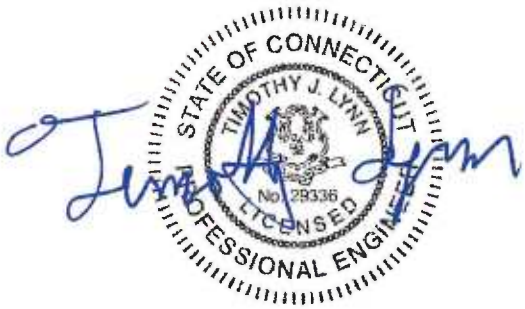
*T-Mobile Site Ref: CT11041D*

*Verizon Site Ref: Waterford*

*53 Dayton Road*
*Waterford, CT*

*Centek Project No. 15049.002*

*Date: April 22, 2015*




***Prepared for:***

*T-Mobile USA*
*35 Griffin Road*
*Bloomfield, CT 06002*

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

# 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 T-Mobile 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. 15001.009 dated February 6, 2015. 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, a tower mapping report prepared by Eastern Communications dated March 30, 2015 and a T-Mobile 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.

T-Mobile proposes the removal of six (6) panel antennas and the installation of six (6) panel antennas and thee (3) remote radio heads mounted on the existing T-Arms. 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 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).

- AT&T (Existing):
  Antennas: Six (6) Powerwave 7770 panel antennas, two (2) Andrew SBNH-1D6565C panel antennas, one (1) KMW AM-X-CD-17-65-00T 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).

- VERIZON (Existing/Reserved):

Antennas: Six (6) Antel LPA-80063-6CF panel antennas, six (6) Antel BXA-70063-6CF panel antennas, six (6) LPA-171063-12CF panel antennas, three (3) Alcatel-Lucent RRH-2x40-07U remote radio heads, three (3) Alcatel-Lucent RRH-2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH-2x60-AWS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z main distribution boxes mounted to three (3) existing 14-ft boom gates with a RAD center elevation of 135-ft above existing grade.
Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.

- 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).
- 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).
- T-Mobile (Existing to Remain):
  Antennas: Three (3) Ericsson AIR21 B2A/B4P panel antennas and three (3) RFS ATMAA1412D-1A20 TMA's mounted to three (3) 10-ft T-Arms with a RAD center elevation of 164-ft above grade level.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable (face mounted).
- T-Mobile (Existing to Remove):
  Antennas: Six (6) EMS RR90-17-02DP panel antennas mounted to three (3) 10-ft T-Arms with a RAD center elevation of 164-ft above grade level.
- **T-Mobile (Proposed):**
  **Antennas: Three (3) Ericsson AIR21 B4A/B12P panel antennas, three (3) Andrew LNX-6515DS panel antennas and three (3) Ericsson RRUS-11 remote radio heads mounted to three (3) 10-ft T-Arms with a RAD center elevation of 164-ft above grade level.**

## 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 shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

## Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

| | | |
|---|---|---|
| Basic Wind Speed: | New London; v = 85 mph (fastest mile) | *[Section 16 of TIA/EIA-222-F-96]* |
| | Waterford; v = 115 mph (3 second gust) equivalent to v = 95 mph (fastest mile) | *[Appendix K of the 2005 CT Building Code Supplement]* |
| | *Appendix-K wind speed controls.* | |
| Load Cases: | Load Case 1; 95 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses. | *[Section 2.3.16 of TIA/EIA-222-F-96]* |
| | Load Case 2; 82 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 82 mph wind speed velocity represents 75% of the wind pressure generated by the 95 mph wind speed. | *[Section 2.3.16 of TIA/EIA-222-F-96]* |
| | Load Case 3; Seismic – not checked | *[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type* |

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

## Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same 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 **78.3%** of its total capacity.

| Tower Section | Elevation | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Leg (T9) | 0'-0"-20'-0" | 57.1% | **PASS** |
| Diagonal (T7) | 40'-0"-60'-0" | 76.1% | **PASS** |
| Horizontal (T4) | 100'-0"-120'-0" | 78.3% | **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 | **83 kips** |
| | Compression | **82 kips** |
| | Moment | **8686 kip-ft** |
| Leg | Shear | **50 kips** |
| | Uplift | **365 kips** |
| | Compression | **420 kips** |

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

| Tower Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Anchor Bolts | Tension | 33.6% | **PASS** |

- The foundation was found to be within allowable limits.

| Tower Reactions | Original Tower Reactions | Proposed Reactions | Result |
|---|---|---|---|
| Leg Compression | 732.9 kips | 420 kips | **PASS** |
| Leg Uplift | 621.3 kips | 365 kips | **PASS** |
| Base Shear | 141.8 kips | 83 kips | **PASS** |
| Overturning Moment | 14472.6 kip-ft | 8686 kip-ft | **PASS** |

## 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 T-Mobile. 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

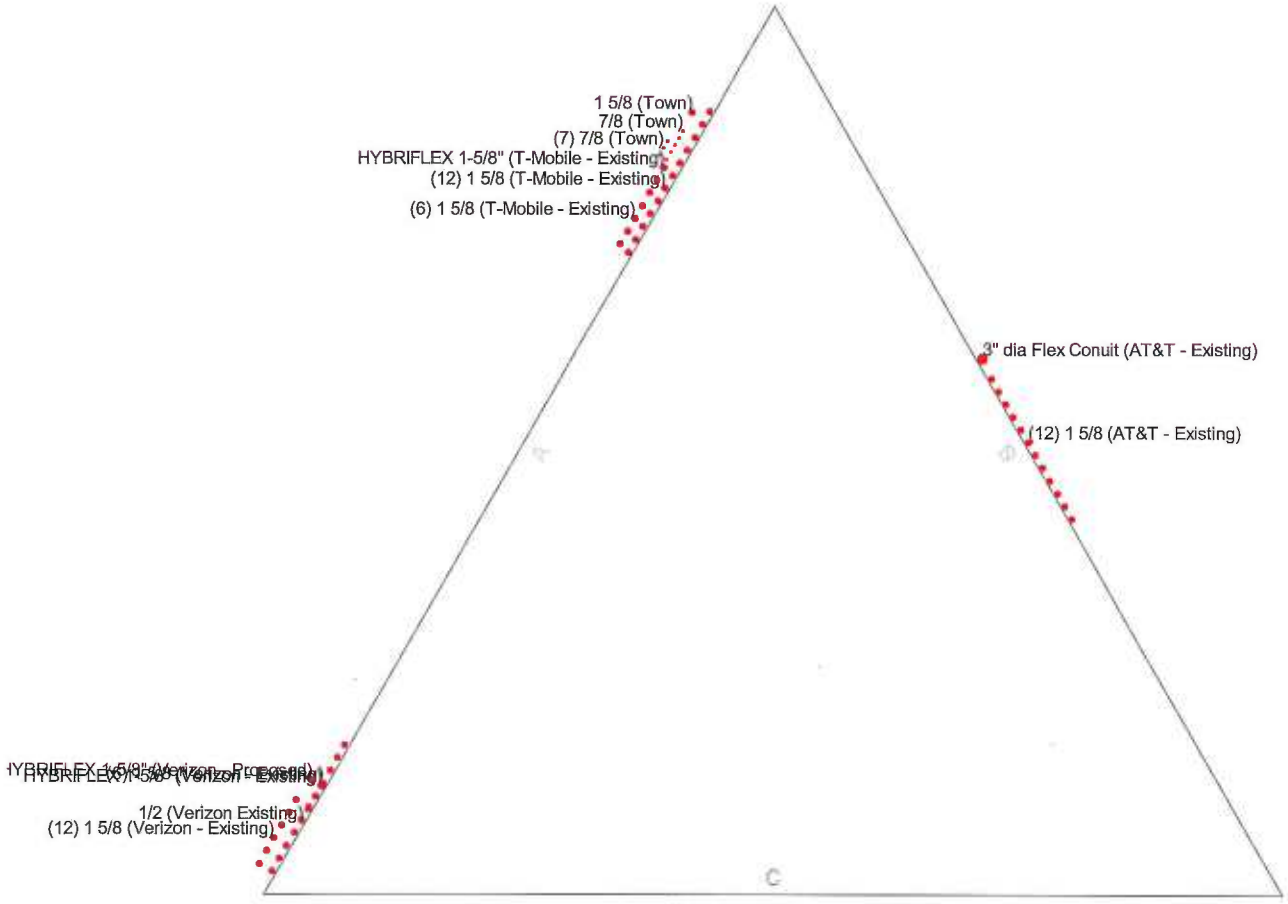
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

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.

# Feedline Plan

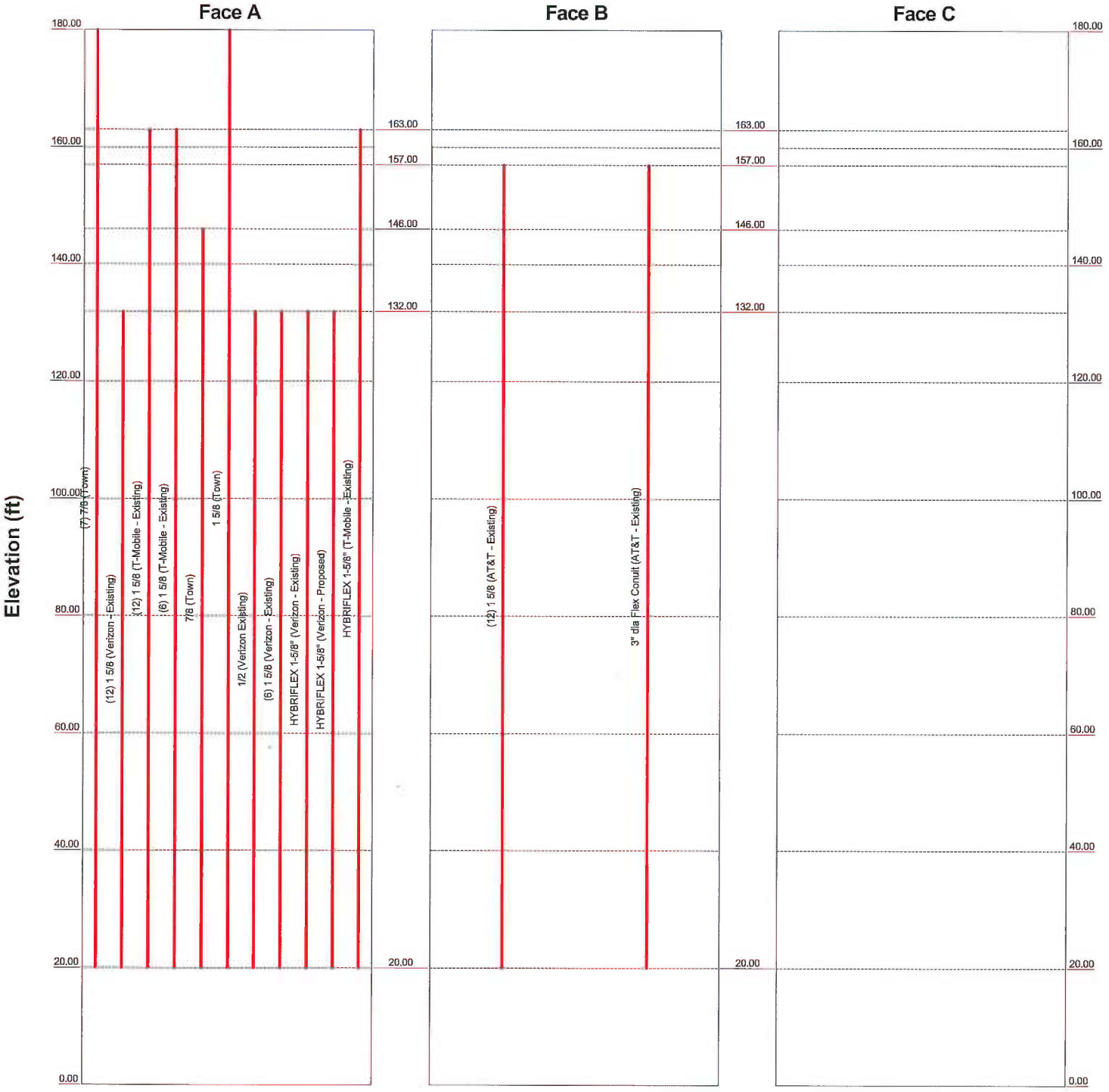
_____ Round _____ Flat _____ App In Face _____ App Out Face




| | | | |
|---|---|---|---|
| **Centek Engineering Inc.**<br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | Job: **15049.002 - CT11041D** | | |
| | Project: ***180' Lattice Tower - 53 Dayton Road Waterford, CT*** | | |
| | Client: T-Mobile | Drawn by: TJL | App'd: |
| | Code: TIA/EIA-222-F | Date: 04/22/15 | Scale: NTS |
| | Path: J:\Jobs\15049\002-CT11041D\4_Structural\Backup Documentation\CAD\ERI Files\180' Lattice Tower Waterford, CT.eri | | Dwg No. E-7 |

# Feedline Distribution Chart
## 0' - 180'

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




| | | | |
|---|---|---|---|
| **Centek Engineering Inc.**<br>63-2 North Branford Rd.<br>Branford, CT 06405<br>Phone: (203) 488-0580<br>FAX: (203) 488-8587 | Job: ***15049.002 - CT11041D*** | | |
| | Project: ***180' Lattice Tower - 53 Dayton Road Waterford, CT*** | | |
| | Client: T-Mobile | Drawn by: TJL | App'd: |
| | Code: TIA/EIA-222-F | Date: 04/22/15 | Scale: NTS |
| | Path: J:\Jobs\15000\W.002 - CT11041D\04 Structural\Backup Documentation\CatcatER Files\180' Lattice Tower, Waterford, CT.er | | Dwg No. E-7 |

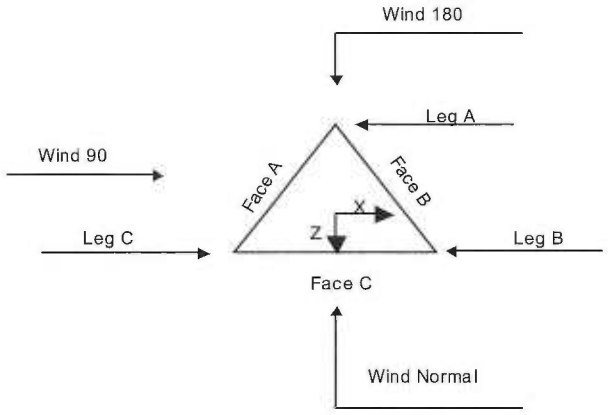
## Tower Input Data

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/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 95 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 82 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 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 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

| | | |
|---|---|---|
| Consider Moments - Legs | Distribute Leg Loads As Uniform | Treat Feedline Bundles As Cylinder |
| Consider Moments - Horizontals | Assume Legs Pinned | Use ASCE 10 X-Brace Ly Rules |
| Consider Moments - Diagonals | √ Assume Rigid Index Plate | √ Calculate Redundant Bracing Forces |
| Use Moment Magnification | √ Use Clear Spans For Wind Area | Ignore Redundant Members in FEA |
| √ Use Code Stress Ratios | √ Use Clear Spans For KL/r | SR Leg Bolts Resist Compression |
| √ Use Code Safety Factors - Guys | √ Retension Guys To Initial Tension | √ All Leg Panels Have Same Allowable |
| Escalate Ice | Bypass Mast Stability Checks | Offset Girt At Foundation |
| Always Use Max Kz | √ Use Azimuth Dish Coefficients | √ Consider Feedline Torque |
| Use Special Wind Profile | √ Project Wind Area of Appurt. | Include Angle Block Shear Check |
| √ Include Bolts In Member Capacity | √ Autocalc Torque Arm Areas | Poles |
| Leg Bolts Are At Top Of Section | SR Members Have Cut Ends | Include Shear-Torsion Interaction |
| √ Secondary Horizontal Braces Leg | √ Sort Capacity Reports By Component | Always Use Sub-Critical Flow |
| Use Diamond Inner Bracing (4 Sided) | √ Triangulate Diamond Inner Bracing | Use Top Mounted Sockets |
| Add IBC .6D+W Combination | | |




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

## Tower Section Geometry *(cont'd)*

| Tower Elevation<br>ft | Calc K Single Angles | Calc K Solid Rounds | K Factors[1]<br>Legs | X Brace Diags<br>X<br>Y | K Brace Diags<br>X<br>Y | Single Diags<br>X<br>Y | Girts<br>X<br>Y | Horiz.<br>X<br>Y | Sec. Horiz.<br>X<br>Y | Inner Brace<br>X<br>Y |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 180.00-160.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T2 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 160.00-140.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T3 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 140.00-120.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T4 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 120.00-100.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T5 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100.00-80.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T6 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 80.00-60.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T7 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 60.00-40.00 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T8 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 40.00-20.00 | | | | 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 | Yes | Ar (CfAe) | 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 (Town) | A | Yes | Ar (CfAe) | 180.00 - 20.00 | 4.0000 | 0.33 | 7 | 4 | 1.1100 | 1.1100 | | 0.54 |
| 1 5/8 (Verizon - Existing) | A | Yes | Ar (CfAe) | 132.00 - 20.00 | 0.0000 | -0.44 | 12 | 6 | 1.9800 | 1.9800 | | 1.04 |
| 1 5/8 (T-Mobile - Existing) | A | Yes | Ar (CfAe) | 163.00 - 20.00 | 0.0000 | 0.3 | 12 | 12 | 1.9800 | 1.9800 | | 1.04 |
| 1 5/8 (T-Mobile - Existing) | A | Yes | Ar (CfAe) | 163.00 - 20.00 | 3.0000 | 0.26 | 6 | 6 | 1.9800 | 1.9800 | | 1.04 |
| 7/8 (Town) | A | Yes | Ar (CfAe) | 146.00 - 20.00 | 4.0000 | 0.35 | 1 | 1 | 1.1100 | 1.1100 | | 0.54 |
| 1 5/8 (Town) | A | Yes | Ar (CfAe) | 180.00 - 20.00 | 4.0000 | 0.37 | 1 | 1 | 1.9800 | 1.9800 | | 1.04 |
| 1/2 (Verizon Existing) | A | Yes | Ar (CfAe) | 132.00 - 20.00 | 0.0000 | -0.42 | 1 | 1 | 0.5800 | 0.5800 | | 0.25 |
| 1 5/8 (Verizon - Existing) | A | Yes | Ar (CfAe) | 132.00 - 20.00 | 0.0000 | -0.37 | 6 | 6 | 1.9800 | 1.9800 | | 1.04 |
| HYBRIFLEX 1-5/8" (Verizon - Existing) | A | Yes | Ar (CfAe) | 132.00 - 20.00 | 0.0000 | -0.38 | 1 | 1 | 0.0000 | 1.9800 | | 1.90 |
| HYBRIFLEX 1-5/8" (Verizon - Proposed) | A | Yes | Ar (CfAe) | 132.00 - 20.00 | 3.0000 | -0.38 | 1 | 1 | 0.0000 | 1.9800 | | 1.90 |
| 3" dia Flex Conuit (AT&T - Existing) | B | Yes | Ar (CfAe) | 157.00 - 20.00 | 0.0000 | -0.1 | 1 | 1 | 3.0000 | 3.0000 | | 5.00 |
| HYBRIFLEX 1-5/8" (T-Mobile - Existing) | A | Yes | Ar (CfAe) | 163.00 - 20.00 | 3.0000 | 0.31 | 1 | 1 | 1.9800 | 1.9800 | | 1.90 |

## 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 | 20.105 | 0.000 | 0.000 | 0.000 | 0.16 |
| | | 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 | 73.955 | 0.000 | 0.000 | 0.000 | 0.51 |
| | | B | 37.910 | 0.000 | 0.000 | 0.000 | 0.30 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T3 | 140.00-120.00 | A | 103.550 | 0.000 | 0.000 | 0.000 | 0.79 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T4 | 120.00-100.00 | A | 122.417 | 0.000 | 0.000 | 0.000 | 0.97 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |

| 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 |
|---|---|---|---|---|---|---|---|
| T5 | 100.00-80.00 | A | 122.417 | 0.000 | 0.000 | 0.000 | 0.97 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T6 | 80.00-60.00 | A | 122.417 | 0.000 | 0.000 | 0.000 | 0.97 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T7 | 60.00-40.00 | A | 122.417 | 0.000 | 0.000 | 0.000 | 0.97 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T8 | 40.00-20.00 | A | 122.417 | 0.000 | 0.000 | 0.000 | 0.97 |
| | | B | 44.600 | 0.000 | 0.000 | 0.000 | 0.35 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| 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 | 0.500 | 33.188 | 0.000 | 0.000 | 0.000 | 0.41 |
| | | 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 | 0.500 | 114.455 | 0.000 | 0.000 | 0.000 | 1.26 |
| | | B | | 56.327 | 0.000 | 0.000 | 0.000 | 0.64 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T3 | 140.00-120.00 | A | 0.500 | 160.217 | 0.000 | 0.000 | 0.000 | 1.93 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T4 | 120.00-100.00 | A | 0.500 | 189.083 | 0.000 | 0.000 | 0.000 | 2.36 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T5 | 100.00-80.00 | A | 0.500 | 189.083 | 0.000 | 0.000 | 0.000 | 2.36 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T6 | 80.00-60.00 | A | 0.500 | 189.083 | 0.000 | 0.000 | 0.000 | 2.36 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T7 | 60.00-40.00 | A | 0.500 | 189.083 | 0.000 | 0.000 | 0.000 | 2.36 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T8 | 40.00-20.00 | A | 0.500 | 189.083 | 0.000 | 0.000 | 0.000 | 2.36 |
| | | B | | 66.267 | 0.000 | 0.000 | 0.000 | 0.76 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| T9 | 20.00-0.00 | A | 0.500 | 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 Shielding

| Section | Elevation ft | Face | $A_R$ $ft^2$ | $A_R$ Ice $ft^2$ | $A_F$ $ft^2$ | $A_F$ Ice $ft^2$ |
|---|---|---|---|---|---|---|

| Section | Elevation | Face | $A_R$ | $A_R$ Ice | $A_F$ | $A_F$ Ice |
|---|---|---|---|---|---|---|
| | ft | | $ft^2$ | $ft^2$ | $ft^2$ | $ft^2$ |
| T1 | 180.00-160.00 | A | 1.579 | 3.786 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T2 | 160.00-140.00 | A | 7.066 | 14.987 | 0.000 | 0.000 |
| | | B | 3.622 | 7.376 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T3 | 140.00-120.00 | A | 9.250 | 19.638 | 0.000 | 0.000 |
| | | B | 3.984 | 8.122 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T4 | 120.00-100.00 | A | 10.154 | 21.551 | 0.000 | 0.000 |
| | | B | 3.700 | 7.553 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T5 | 100.00-80.00 | A | 8.447 | 17.281 | 0.000 | 0.000 |
| | | B | 3.077 | 6.056 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T6 | 80.00-60.00 | A | 8.410 | 16.983 | 0.000 | 0.000 |
| | | B | 3.064 | 5.952 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T7 | 60.00-40.00 | A | 8.007 | 16.183 | 0.000 | 0.000 |
| | | B | 2.917 | 5.672 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T8 | 40.00-20.00 | A | 9.047 | 17.664 | 0.000 | 0.000 |
| | | B | 3.296 | 6.191 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |
| T9 | 20.00-0.00 | A | 0.000 | 0.000 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 |

## Feed Line Center of Pressure

| Section | Elevation | $CP_X$ | $CP_Z$ | $CP_X$ Ice | $CP_Z$ Ice |
|---|---|---|---|---|---|
| | ft | in | in | in | in |
| T1 | 180.00-160.00 | -2.5641 | -9.0339 | -2.8894 | -10.1605 |
| T2 | 160.00-140.00 | 0.2265 | -17.7741 | 0.0454 | -18.9667 |
| T3 | 140.00-120.00 | -5.1188 | -14.3121 | -5.6634 | -15.4000 |
| T4 | 120.00-100.00 | -9.2095 | -13.5484 | -10.1032 | -14.6998 |
| T5 | 100.00-80.00 | -10.1805 | -15.0628 | -11.4994 | -16.8303 |
| T6 | 80.00-60.00 | -10.7455 | -15.9705 | -12.3881 | -18.2151 |
| T7 | 60.00-40.00 | -12.0924 | -18.0360 | -13.9452 | -20.5794 |
| T8 | 40.00-20.00 | -12.1221 | -18.1296 | -14.3039 | -21.1680 |
| T9 | 20.00-0.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral<br>Vert | Azimuth Adjustment | Placement | $C_AA_A$ Front | $C_AA_A$ Side | Weight |
|---|---|---|---|---|---|---|---|---|
| | | | ft<br>ft<br>ft | ° | ft | $ft^2$ | $ft^2$ | K |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft<br>Vert ft<br>ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|
| 15' 2.5" Dia omni | C | From Leg | 3.00 | 0.0000 | 177.00 | No Ice | 3.75 | 3.75 | 0.05 |
| (Town) | | | 0.00 | | | 1/2" Ice | 5.28 | 5.28 | 0.08 |
| | | | 7.50 | | | | | | |
| 15' 2.5" Dia omni | C | From Leg | 3.00 | 0.0000 | 177.00 | No Ice | 3.75 | 3.75 | 0.05 |
| (Town) | | | 0.00 | | | 1/2" Ice | 5.28 | 5.28 | 0.08 |
| | | | 7.50 | | | | | | |
| Filter | C | From Leg | 3.00 | 0.0000 | 177.00 | No Ice | 0.44 | 0.44 | 0.01 |
| (Town) | | | 0.00 | | | 1/2" Ice | 0.55 | 0.55 | 0.02 |
| | | | 0.00 | | | | | | |
| 15' 2.5" Dia omni | C | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 3.75 | 3.75 | 0.05 |
| (Town) | | | 0.00 | | | 1/2" Ice | 5.28 | 5.28 | 0.08 |
| | | | 7.50 | | | | | | |
| 15' 2.5" Dia omni | A | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 3.75 | 3.75 | 0.05 |
| (Town) | | | 0.00 | | | 1/2" Ice | 5.28 | 5.28 | 0.08 |
| | | | 7.50 | | | | | | |
| 9-ft Omni | A | From Leg | 6.00 | 0.0000 | 176.00 | No Ice | 2.25 | 2.25 | 0.03 |
| (Town) | | | 0.00 | | | 1/2" Ice | 3.18 | 3.18 | 0.05 |
| | | | 4.50 | | | | | | |
| 8' x 3" Dia Omni | A | From Leg | 6.00 | 0.0000 | 176.00 | No Ice | 2.40 | 2.40 | 0.03 |
| (Town) | | | 0.00 | | | 1/2" Ice | 3.19 | 3.19 | 0.04 |
| | | | -4.00 | | | | | | |
| 15' 2.5" Dia omni | B | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 3.75 | 3.75 | 0.05 |
| (Town) | | | 0.00 | | | 1/2" Ice | 5.28 | 5.28 | 0.08 |
| | | | 7.50 | | | | | | |
| 9-ft Omni | B | From Leg | 6.00 | 0.0000 | 176.00 | No Ice | 2.25 | 2.25 | 0.03 |
| (Town) | | | 0.00 | | | 1/2" Ice | 3.18 | 3.18 | 0.05 |
| | | | 4.50 | | | | | | |
| Rohn 6' Side-Arm(1) | A | From Leg | 3.00 | 0.0000 | 178.00 | No Ice | 10.60 | 10.60 | 0.14 |
| (Town) | | | 0.00 | | | 1/2" Ice | 15.40 | 15.40 | 0.21 |
| | | | 0.00 | | | | | | |
| Rohn 6' Side-Arm(1) | B | From Leg | 3.00 | 0.0000 | 178.00 | No Ice | 10.60 | 10.60 | 0.14 |
| (Town) | | | 0.00 | | | 1/2" Ice | 15.40 | 15.40 | 0.21 |
| | | | 0.00 | | | | | | |
| Pirod 15' T-Frame Sector | C | From Leg | 6.00 | 0.0000 | 177.00 | No Ice | 15.00 | 15.00 | 0.50 |
| Mount (1) | | | 0.00 | | | 1/2" Ice | 20.60 | 20.60 | 0.65 |
| (Town) | | | 0.00 | | | | | | |
| AIR21 B4A B12P B5P | A | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.50 | 8.90 | 0.15 |
| (T-Mobile - Proposed) | | | -6.00 | | | 1/2" Ice | 12.12 | 9.49 | 0.22 |
| | | | 0.00 | | | | | | |
| AIR21 B2A/B4P | A | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 6.53 | 4.36 | 0.08 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 6.98 | 4.77 | 0.12 |
| | | | 0.00 | | | | | | |
| LNX-6515DS | A | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.45 | 7.70 | 0.06 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 12.06 | 8.29 | 0.12 |
| | | | 0.00 | | | | | | |
| AIR21 B4A B12P B5P | B | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.50 | 8.90 | 0.15 |
| (T-Mobile - Proposed) | | | -6.00 | | | 1/2" Ice | 12.12 | 9.49 | 0.22 |
| | | | 0.00 | | | | | | |
| AIR21 B2A/B4P | B | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 6.53 | 4.36 | 0.08 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 6.98 | 4.77 | 0.12 |
| | | | 0.00 | | | | | | |
| LNX-6515DS | B | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.45 | 7.70 | 0.06 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 12.06 | 8.29 | 0.12 |
| | | | 0.00 | | | | | | |
| AIR21 B4A B12P B5P | C | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.50 | 8.90 | 0.15 |
| (T-Mobile - Proposed) | | | -6.00 | | | 1/2" Ice | 12.12 | 9.49 | 0.22 |
| | | | 0.00 | | | | | | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| AIR21 B2A/B4P | C | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 6.53 | 4.36 | 0.08 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 6.98 | 4.77 | 0.12 |
| | | | 0.00 | | | | | | |
| LNX-6515DS | C | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 11.45 | 7.70 | 0.06 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 12.06 | 8.29 | 0.12 |
| | | | 0.00 | | | | | | |
| ATMAA1412D-1A20 TMA | A | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 1.17 | 0.47 | 0.01 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 1.31 | 0.57 | 0.02 |
| | | | 0.00 | | | | | | |
| ATMAA1412D-1A20 TMA | B | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 1.17 | 0.47 | 0.01 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 1.31 | 0.57 | 0.02 |
| | | | 0.00 | | | | | | |
| ATMAA1412D-1A20 TMA | C | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 1.17 | 0.47 | 0.01 |
| (T-Mobile - Existing) | | | -2.00 | | | 1/2" Ice | 1.31 | 0.57 | 0.02 |
| | | | 0.00 | | | | | | |
| RRUS-11 | A | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| RRUS-11 | B | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| RRUS-11 | C | From Leg | 3.00 | 0.0000 | 164.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (T-Mobile - Proposed) | | | 2.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| Valmont 10' Wireless Frame | A | From Leg | 3.00 | 0.0000 | 164.00 | 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 | | | | | | |
| (2) 7770.00 | A | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 5.88 | 2.93 | 0.04 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | | | |
| (2) 7770.00 | B | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 5.88 | 2.93 | 0.04 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | | | |
| (2) 7770.00 | C | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 5.88 | 2.93 | 0.04 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 6.31 | 3.27 | 0.07 |
| | | | 0.00 | | | | | | |
| (2) LGP21401 TMA | A | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.95 | 0.37 | 0.02 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 1.09 | 0.48 | 0.02 |
| | | | 0.00 | | | | | | |
| (2) LGP21401 TMA | B | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.95 | 0.37 | 0.02 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 1.09 | 0.48 | 0.02 |
| | | | 0.00 | | | | | | |
| (2) LGP21401 TMA | C | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.95 | 0.37 | 0.02 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 1.09 | 0.48 | 0.02 |
| | | | 0.00 | | | | | | |
| (2) LGP13519 Diplexer | A | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.27 | 0.18 | 0.01 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 0.34 | 0.25 | 0.01 |
| | | | 0.00 | | | | | | |
| (2) LGP13519 Diplexer | B | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.27 | 0.18 | 0.01 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 0.34 | 0.25 | 0.01 |
| | | | 0.00 | | | | | | |
| (2) LGP13519 Diplexer | C | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 0.27 | 0.18 | 0.01 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 0.34 | 0.25 | 0.01 |
| | | | 0.00 | | | | | | |
| 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 | | | | | | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | |
| AM-X-CD-17-65-00T-RET | C | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 11.31 | 6.80 | 0.06 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 11.93 | 7.38 | 0.12 |
| | | | 0.00 | | | | | | |
| (2) RRUS-11 | A | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| (2) RRUS-11 | B | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| (2) RRUS-11 | C | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 2.99 | 1.25 | 0.05 |
| (AT&T - Existing) | | | 0.00 | | | 1/2" Ice | 3.23 | 1.41 | 0.07 |
| | | | 0.00 | | | | | | |
| DC6-48-60-18-8F Surge | A | From Leg | 6.00 | 0.0000 | 157.00 | No Ice | 2.23 | 2.23 | 0.02 |
| Arrestor | | | 0.00 | | | 1/2" Ice | 2.45 | 2.45 | 0.04 |
| (AT&T - Existing) | | | 0.00 | | | | | | |
| 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 | | | | | | |
| 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 | | | | | | |
| Rohn 6' Side-Arm(1) | C | From Leg | 3.00 | 0.0000 | 142.00 | No Ice | 10.60 | 10.60 | 0.14 |
| (Town) | | | 0.00 | | | 1/2" Ice | 15.40 | 15.40 | 0.21 |
| | | | 0.00 | | | | | | |
| 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' 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 | | | | | | |
| 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 | | | | | | |
| LPA-80063-6CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | -6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |
| LPA-171063-12CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | -4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | -2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | 2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| LPA-171063-12CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| LPA-80063-6CF | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | 6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |
| LPA-80063-6CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | -6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| LPA-171063-12CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | -4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | -2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | 2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| LPA-171063-12CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| LPA-80063-6CF | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | 6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |
| LPA-80063-6CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | -6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |
| LPA-171063-12CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | -4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | -2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| BXA-70063/6CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 7.73 | 4.16 | 0.01 |
| (Verizon - Reserved) | | | 2.00 | | | 1/2" Ice | 8.27 | 4.60 | 0.05 |
| | | | 0.00 | | | | | | |
| LPA-171063-12CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.99 | 6.05 | 0.01 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 6.46 | 6.52 | 0.06 |
| | | | 0.00 | | | | | | |
| LPA-80063-6CF | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 10.31 | 9.01 | 0.03 |
| (Verizon - Reserved) | | | 6.00 | | | 1/2" Ice | 10.87 | 9.55 | 0.10 |
| | | | 0.00 | | | | | | |
| RRH2x40-07-U | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.25 | 1.23 | 0.05 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | | | | |
| RRH2x40-07-U | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.25 | 1.23 | 0.05 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | | | | |
| RRH2x40-07-U | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.25 | 1.23 | 0.05 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.45 | 1.39 | 0.07 |
| | | | 0.00 | | | | | | |
| RRH2x60-AWS | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 3.78 | 2.07 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 4.09 | 2.35 | 0.08 |
| | | | 0.00 | | | | | | |
| RRH2x60-AWS | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 3.78 | 2.07 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 4.09 | 2.35 | 0.08 |
| | | | 0.00 | | | | | | |
| RRH2x60-AWS | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 3.78 | 2.07 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 4.09 | 2.35 | 0.08 |
| | | | 0.00 | | | | | | |
| RRH2x60-PCS | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.51 | 1.55 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.73 | 1.74 | 0.07 |
| | | | 0.00 | | | | | | |
| RRH2x60-PCS | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.51 | 1.55 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.73 | 1.74 | 0.07 |
| | | | 0.00 | | | | | | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral ft<br>Vert ft<br>ft | Azimuth Adjustment ° | Placement ft | | $C_AA_A$ Front $ft^2$ | $C_AA_A$ Side $ft^2$ | Weight K |
|---|---|---|---|---|---|---|---|---|---|
| RRH2x60-PCS | C | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 2.51 | 1.55 | 0.06 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 2.73 | 1.74 | 0.07 |
| | | | 0.00 | | | | | | |
| DB-T1-6Z-8AB-0Z | A | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.60 | 2.33 | 0.04 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 5.92 | 2.56 | 0.08 |
| | | | 0.00 | | | | | | |
| DB-T1-6Z-8AB-0Z | B | From Leg | 5.00 | 0.0000 | 135.00 | No Ice | 5.60 | 2.33 | 0.04 |
| (Verizon - Reserved) | | | 4.00 | | | 1/2" Ice | 5.92 | 2.56 | 0.08 |
| | | | 0.00 | | | | | | |

## Tower Pressures - No Ice

$G_H = 1.121$

| 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 | 1.597 | 37 | 177.533 | A | 0.000 | 43.226 | 11.667 | 26.99 | 0.000 | 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 | 1.541 | 36 | 180.900 | A | 0.000 | 97.766 | 15.000 | 15.34 | 0.000 | 0.000 |
| 160.00-140.00 | | | | | B | 0.000 | 65.164 | | 23.02 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 30.876 | | 48.58 | 0.000 | 0.000 |
| T3 | 130.00 | 1.48 | 34 | 204.284 | A | 0.000 | 129.678 | 18.577 | 14.33 | 0.000 | 0.000 |
| 140.00-120.00 | | | | | B | 0.000 | 75.994 | | 24.44 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 35.378 | | 52.51 | 0.000 | 0.000 |
| T4 | 110.00 | 1.411 | 33 | 248.257 | A | 0.000 | 153.324 | 22.125 | 14.43 | 0.000 | 0.000 |
| 120.00-100.00 | | | | | B | 0.000 | 81.962 | | 26.99 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 41.062 | | 53.88 | 0.000 | 0.000 |
| T5 | 90.00 | 1.332 | 31 | 297.001 | A | 0.000 | 161.683 | 28.819 | 17.82 | 0.000 | 0.000 |
| 100.00-80.00 | | | | | B | 0.000 | 89.236 | | 32.30 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 47.713 | | 60.40 | 0.000 | 0.000 |
| T6 80.00-60.00 | 70.00 | 1.24 | 29 | 349.552 | A | 0.000 | 171.787 | 35.927 | 20.91 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 99.317 | | 36.17 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 57.781 | | 62.18 | 0.000 | 0.000 |
| T7 60.00-40.00 | 50.00 | 1.126 | 26 | 401.056 | A | 0.000 | 174.469 | 35.938 | 20.60 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 101.742 | | 35.32 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 60.059 | | 59.84 | 0.000 | 0.000 |
| T8 40.00-20.00 | 30.00 | 1 | 23 | 455.891 | A | 0.000 | 186.775 | 42.611 | 22.81 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 114.709 | | 37.15 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 73.405 | | 58.05 | 0.000 | 0.000 |
| T9 20.00-0.00 | 10.00 | 1 | 23 | 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

$G_H = 1.121$

| 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 | 1.597 | 28 | 0.5000 | 179.200 | A | 0.000 | 63.337 | 15.000 | 23.68 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 33.935 | | 44.20 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 33.935 | | 44.20 | 0.000 | 0.000 |
| T2 160.00-140.00 | 150.00 | 1.541 | 27 | 0.5000 | 182.567 | A | 0.000 | 139.561 | 18.333 | 13.14 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 89.044 | | 20.59 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 40.093 | | 45.73 | 0.000 | 0.000 |
| T3 140.00-120.00 | 130.00 | 1.48 | 26 | 0.5000 | 205.953 | A | 0.000 | 185.530 | 21.916 | 11.81 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 103.096 | | 21.26 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 44.951 | | 48.76 | 0.000 | 0.000 |
| T4 120.00-100.00 | 110.00 | 1.411 | 24 | 0.5000 | 249.927 | A | 0.000 | 218.998 | 25.465 | 11.63 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 110.180 | | 23.11 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 51.466 | | 49.48 | 0.000 | 0.000 |
| T5 100.00-80.00 | 90.00 | 1.332 | 23 | 0.5000 | 298.671 | A | 0.000 | 228.946 | 32.160 | 14.05 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 117.354 | | 27.40 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 57.144 | | 56.28 | 0.000 | 0.000 |
| T6 80.00-60.00 | 70.00 | 1.24 | 21 | 0.5000 | 351.222 | A | 0.000 | 239.918 | 39.269 | 16.37 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 128.133 | | 30.65 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 67.818 | | 57.90 | 0.000 | 0.000 |
| T7 60.00-40.00 | 50.00 | 1.126 | 20 | 0.5000 | 402.726 | A | 0.000 | 243.718 | 39.281 | 16.12 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 131.413 | | 29.89 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 70.818 | | 55.47 | 0.000 | 0.000 |
| T8 40.00-20.00 | 30.00 | 1 | 17 | 0.5000 | 457.561 | A | 0.000 | 256.284 | 45.953 | 17.93 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 144.941 | | 31.70 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 84.865 | | 54.15 | 0.000 | 0.000 |
| T9 20.00-0.00 | 10.00 | 1 | 17 | 0.5000 | 507.561 | A | 0.000 | 88.317 | 45.953 | 52.03 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 88.317 | | 52.03 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 88.317 | | 52.03 | 0.000 | 0.000 |

## Tower Pressure - Service

$G_H = 1.121$

| 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 180.00-160.00 | 170.00 | 1.597 | 10 | 177.533 | A | 0.000 | 43.226 | 11.667 | 26.99 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 24.700 | | 47.23 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 24.700 | | 47.23 | 0.000 | 0.000 |
| T2 160.00-140.00 | 150.00 | 1.541 | 10 | 180.900 | A | 0.000 | 97.766 | 15.000 | 15.34 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 65.164 | | 23.02 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 30.876 | | 48.58 | 0.000 | 0.000 |
| T3 140.00-120.00 | 130.00 | 1.48 | 9 | 204.284 | A | 0.000 | 129.678 | 18.577 | 14.33 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 75.994 | | 24.44 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 35.378 | | 52.51 | 0.000 | 0.000 |
| T4 120.00-100.00 | 110.00 | 1.411 | 9 | 248.257 | A | 0.000 | 153.324 | 22.125 | 14.43 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 81.962 | | 26.99 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 41.062 | | 53.88 | 0.000 | 0.000 |
| T5 100.00-80.00 | 90.00 | 1.332 | 9 | 297.001 | A | 0.000 | 161.683 | 28.819 | 17.82 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 89.236 | | 32.30 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 47.713 | | 60.40 | 0.000 | 0.000 |
| T6 80.00-60.00 | 70.00 | 1.24 | 8 | 349.552 | A | 0.000 | 171.787 | 35.927 | 20.91 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 99.317 | | 36.17 | 0.000 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | C | 0.000 | 57.781 | | 62.18 | 0.000 | 0.000 |
| T7 60.00-40.00 | 50.00 | 1.126 | 7 | 401.056 | A | 0.000 | 174.469 | 35.938 | 20.60 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 101.742 | | 35.32 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 60.059 | | 59.84 | 0.000 | 0.000 |
| T8 40.00-20.00 | 30.00 | 1 | 6 | 455.891 | A | 0.000 | 186.775 | 42.611 | 22.81 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 114.709 | | 37.15 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 73.405 | | 58.05 | 0.000 | 0.000 |
| T9 20.00-0.00 | 10.00 | 1 | 6 | 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 | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 1 | 1 | 25.946 | 2.64 | 131.87 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 1 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 1 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 1 | 1 | 70.289 | 5.20 | 259.93 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 1 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 1 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 1 | 1 | 100.567 | 6.88 | 344.19 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 1 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 1 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 1 | 1 | 117.221 | 7.68 | 384.12 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 1 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 1 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 1 | 1 | 116.596 | 7.44 | 371.82 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 1 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 1 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 1 | 1 | 119.079 | 7.31 | 365.34 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 1 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 1 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 1 | 1 | 116.286 | 6.78 | 338.90 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 1 | 1 | 61.332 | | | |
| | | | C | 0.15 | 2.772 | 0.581 | 1 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 1 | 1 | 122.450 | 6.49 | 324.26 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 1 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 1 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | 3.18 | 158.77 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 4714.06 kip-ft | 53.58 | | |

## Tower Forces - No Ice - Wind 45 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.825 | 1 | 25.946 | 2.64 | 131.87 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.825 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.825 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.825 | 1 | 70.289 | 5.20 | 259.93 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.825 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.825 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.825 | 1 | 100.567 | 6.88 | 344.19 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.825 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.825 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.825 | 1 | 117.221 | 7.68 | 384.12 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.825 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.825 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.825 | 1 | 116.596 | 7.44 | 371.82 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.825 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.825 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.825 | 1 | 119.079 | 7.31 | 365.34 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.825 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.825 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.825 | 1 | 116.286 | 6.78 | 338.90 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.825 | 1 | 61.332 | | | |
| | | | C | 0.15 | 2.772 | 0.581 | 0.825 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.825 | 1 | 122.450 | 6.49 | 324.26 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.825 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.825 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | 3.18 | 158.77 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 4714.06 kip-ft | 53.58 | | |

## Tower Forces - No Ice - Wind 60 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.8 | 1 | 25.946 | 2.64 | 131.87 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.8 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.8 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.8 | 1 | 70.289 | 5.20 | 259.93 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.8 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.8 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.8 | 1 | 100.567 | 6.88 | 344.19 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.8 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.8 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.8 | 1 | 117.221 | 7.68 | 384.12 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.8 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.8 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.8 | 1 | 116.596 | 7.44 | 371.82 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.8 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.8 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.8 | 1 | 119.079 | 7.31 | 365.34 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.8 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.8 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.8 | 1 | 116.286 | 6.78 | 338.90 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.8 | 1 | 61.332 | | | |

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | 0.15 | 2.772 | 0.581 | 0.8 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.8 | 1 | 122.450 | 6.49 | 324.26 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.8 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.8 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | 3.18 | 158.77 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 4714.06 kip-ft | 53.58 | | |

## Tower Forces - No Ice - Wind 90 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.85 | 1 | 25.946 | 2.64 | 131.87 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.85 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.85 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.85 | 1 | 70.289 | 5.20 | 259.93 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.85 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.85 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.85 | 1 | 100.567 | 6.88 | 344.19 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.85 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.85 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.85 | 1 | 117.221 | 7.68 | 384.12 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.85 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.85 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.85 | 1 | 116.596 | 7.44 | 371.82 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.85 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.85 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.85 | 1 | 119.079 | 7.31 | 365.34 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.85 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.85 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.85 | 1 | 116.286 | 6.78 | 338.90 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.85 | 1 | 61.332 | | | |
| | | | C | 0.15 | 2.772 | 0.581 | 0.85 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.85 | 1 | 122.450 | 6.49 | 324.26 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.85 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.85 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | 3.18 | 158.77 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 4714.06 kip-ft | 53.58 | | |

## Tower Forces - With Ice - Wind Normal To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.41 | 1.84 | A | 0.353 | 2.164 | 0.634 | 1 | 1 | 40.137 | 2.69 | 134.71 | A |
| 180.00-160.00 | | | B | 0.189 | 2.632 | 0.588 | 1 | 1 | 19.964 | | | |
| | | | C | 0.189 | 2.632 | 0.588 | 1 | 1 | 19.964 | | | |
| T2 | 1.90 | 2.52 | A | 0.764 | 1.794 | 0.868 | 1 | 1 | 121.142 | 6.51 | 325.29 | A |
| 160.00-140.00 | | | B | 0.488 | 1.916 | 0.691 | 1 | 1 | 61.558 | | | |
| | | | C | 0.22 | 2.532 | 0.595 | 1 | 1 | 23.839 | | | |
| T3 | 2.68 | 3.27 | A | 0.901 | 1.925 | 0.984 | 1 | 1 | 182.537 | 10.10 | 504.92 | A |
| 140.00-120.00 | | | B | 0.501 | 1.899 | 0.698 | 1 | 1 | 71.940 | | | |
| | | | C | 0.218 | 2.536 | 0.594 | 1 | 1 | 26.714 | | | |
| T4 | 3.11 | 4.01 | A | 0.876 | 1.892 | 0.962 | 1 | 1 | 210.586 | 10.92 | 545.84 | A |
| 120.00-100.00 | | | B | 0.441 | 1.989 | 0.669 | 1 | 1 | 73.723 | | | |
| | | | C | 0.206 | 2.576 | 0.592 | 1 | 1 | 30.448 | | | |
| T5 | 3.11 | 5.54 | A | 0.767 | 1.795 | 0.87 | 1 | 1 | 199.109 | 9.25 | 462.31 | A |
| 100.00-80.00 | | | B | 0.393 | 2.078 | 0.649 | 1 | 1 | 76.132 | | | |
| | | | C | 0.191 | 2.625 | 0.589 | 1 | 1 | 33.639 | | | |
| T6 | 3.11 | 6.73 | A | 0.683 | 1.776 | 0.808 | 1 | 1 | 193.848 | 8.29 | 414.45 | A |
| 80.00-60.00 | | | B | 0.365 | 2.138 | 0.638 | 1 | 1 | 81.733 | | | |
| | | | C | 0.193 | 2.619 | 0.589 | 1 | 1 | 39.946 | | | |
| T7 | 3.11 | 7.09 | A | 0.605 | 1.801 | 0.757 | 1 | 1 | 184.441 | 7.26 | 363.22 | A |
| 60.00-40.00 | | | B | 0.326 | 2.228 | 0.624 | 1 | 1 | 82.042 | | | |
| | | | C | 0.176 | 2.679 | 0.586 | 1 | 1 | 41.483 | | | |
| T8 | 3.11 | 9.00 | A | 0.56 | 1.834 | 0.73 | 1 | 1 | 187.087 | 6.66 | 333.23 | A |
| 40.00-20.00 | | | B | 0.317 | 2.252 | 0.621 | 1 | 1 | 90.033 | | | |
| | | | C | 0.185 | 2.645 | 0.588 | 1 | 1 | 49.862 | | | |
| T9 20.00-0.00 | 0.00 | 9.40 | A | 0.174 | 2.685 | 0.585 | 1 | 1 | 51.704 | 2.70 | 134.82 | C |
| | | | B | 0.174 | 2.685 | 0.585 | 1 | 1 | 51.704 | | | |
| | | | C | 0.174 | 2.685 | 0.585 | 1 | 1 | 51.704 | | | |
| Sum Weight: | 20.57 | 49.38 | | | | | | OTM | 5950.02 kip-ft | 64.38 | | |

## Tower Forces - With Ice - Wind 45 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.41 | 1.84 | A | 0.353 | 2.164 | 0.634 | 0.825 | 1 | 40.137 | 2.69 | 134.71 | A |
| 180.00-160.00 | | | B | 0.189 | 2.632 | 0.588 | 0.825 | 1 | 19.964 | | | |
| | | | C | 0.189 | 2.632 | 0.588 | 0.825 | 1 | 19.964 | | | |
| T2 | 1.90 | 2.52 | A | 0.764 | 1.794 | 0.868 | 0.825 | 1 | 121.142 | 6.51 | 325.29 | A |
| 160.00-140.00 | | | B | 0.488 | 1.916 | 0.691 | 0.825 | 1 | 61.558 | | | |
| | | | C | 0.22 | 2.532 | 0.595 | 0.825 | 1 | 23.839 | | | |
| T3 | 2.68 | 3.27 | A | 0.901 | 1.925 | 0.984 | 0.825 | 1 | 182.537 | 10.10 | 504.92 | A |
| 140.00-120.00 | | | B | 0.501 | 1.899 | 0.698 | 0.825 | 1 | 71.940 | | | |
| | | | C | 0.218 | 2.536 | 0.594 | 0.825 | 1 | 26.714 | | | |
| T4 | 3.11 | 4.01 | A | 0.876 | 1.892 | 0.962 | 0.825 | 1 | 210.586 | 10.92 | 545.84 | A |
| 120.00-100.00 | | | B | 0.441 | 1.989 | 0.669 | 0.825 | 1 | 73.723 | | | |
| | | | C | 0.206 | 2.576 | 0.592 | 0.825 | 1 | 30.448 | | | |
| T5 | 3.11 | 5.54 | A | 0.767 | 1.795 | 0.87 | 0.825 | 1 | 199.109 | 9.25 | 462.31 | A |
| 100.00-80.00 | | | B | 0.393 | 2.078 | 0.649 | 0.825 | 1 | 76.132 | | | |
| | | | C | 0.191 | 2.625 | 0.589 | 0.825 | 1 | 33.639 | | | |
| T6 | 3.11 | 6.73 | A | 0.683 | 1.776 | 0.808 | 0.825 | 1 | 193.848 | 8.29 | 414.45 | A |
| 80.00-60.00 | | | B | 0.365 | 2.138 | 0.638 | 0.825 | 1 | 81.733 | | | |
| | | | C | 0.193 | 2.619 | 0.589 | 0.825 | 1 | 39.946 | | | |
| T7 | 3.11 | 7.09 | A | 0.605 | 1.801 | 0.757 | 0.825 | 1 | 184.441 | 7.26 | 363.22 | A |
| 60.00-40.00 | | | B | 0.326 | 2.228 | 0.624 | 0.825 | 1 | 82.042 | | | |

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | 0.176 | 2.679 | 0.586 | 0.825 | 1 | 41.483 | | | |
| T8 | 3.11 | 9.00 | A | 0.56 | 1.834 | 0.73 | 0.825 | 1 | 187.087 | 6.66 | 333.23 | A |
| 40.00-20.00 | | | B | 0.317 | 2.252 | 0.621 | 0.825 | 1 | 90.033 | | | |
| | | | C | 0.185 | 2.645 | 0.588 | 0.825 | 1 | 49.862 | | | |
| T9 20.00-0.00 | 0.00 | 9.40 | A | 0.174 | 2.685 | 0.585 | 0.825 | 1 | 51.704 | 2.70 | 134.82 | C |
| | | | B | 0.174 | 2.685 | 0.585 | 0.825 | 1 | 51.704 | | | |
| | | | C | 0.174 | 2.685 | 0.585 | 0.825 | 1 | 51.704 | | | |
| Sum Weight: | 20.57 | 49.38 | | | | | | OTM | 5950.02 kip-ft | 64.38 | | |

## Tower Forces - With Ice - Wind 60 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.41 | 1.84 | A | 0.353 | 2.164 | 0.634 | 0.8 | 1 | 40.137 | 2.69 | 134.71 | A |
| 180.00-160.00 | | | B | 0.189 | 2.632 | 0.588 | 0.8 | 1 | 19.964 | | | |
| | | | C | 0.189 | 2.632 | 0.588 | 0.8 | 1 | 19.964 | | | |
| T2 | 1.90 | 2.52 | A | 0.764 | 1.794 | 0.868 | 0.8 | 1 | 121.142 | 6.51 | 325.29 | A |
| 160.00-140.00 | | | B | 0.488 | 1.916 | 0.691 | 0.8 | 1 | 61.558 | | | |
| | | | C | 0.22 | 2.532 | 0.595 | 0.8 | 1 | 23.839 | | | |
| T3 | 2.68 | 3.27 | A | 0.901 | 1.925 | 0.984 | 0.8 | 1 | 182.537 | 10.10 | 504.92 | A |
| 140.00-120.00 | | | B | 0.501 | 1.899 | 0.698 | 0.8 | 1 | 71.940 | | | |
| | | | C | 0.218 | 2.536 | 0.594 | 0.8 | 1 | 26.714 | | | |
| T4 | 3.11 | 4.01 | A | 0.876 | 1.892 | 0.962 | 0.8 | 1 | 210.586 | 10.92 | 545.84 | A |
| 120.00-100.00 | | | B | 0.441 | 1.989 | 0.669 | 0.8 | 1 | 73.723 | | | |
| | | | C | 0.206 | 2.576 | 0.592 | 0.8 | 1 | 30.448 | | | |
| T5 | 3.11 | 5.54 | A | 0.767 | 1.795 | 0.87 | 0.8 | 1 | 199.109 | 9.25 | 462.31 | A |
| 100.00-80.00 | | | B | 0.393 | 2.078 | 0.649 | 0.8 | 1 | 76.132 | | | |
| | | | C | 0.191 | 2.625 | 0.589 | 0.8 | 1 | 33.639 | | | |
| T6 | 3.11 | 6.73 | A | 0.683 | 1.776 | 0.808 | 0.8 | 1 | 193.848 | 8.29 | 414.45 | A |
| 80.00-60.00 | | | B | 0.365 | 2.138 | 0.638 | 0.8 | 1 | 81.733 | | | |
| | | | C | 0.193 | 2.619 | 0.589 | 0.8 | 1 | 39.946 | | | |
| T7 | 3.11 | 7.09 | A | 0.605 | 1.801 | 0.757 | 0.8 | 1 | 184.441 | 7.26 | 363.22 | A |
| 60.00-40.00 | | | B | 0.326 | 2.228 | 0.624 | 0.8 | 1 | 82.042 | | | |
| | | | C | 0.176 | 2.679 | 0.586 | 0.8 | 1 | 41.483 | | | |
| T8 | 3.11 | 9.00 | A | 0.56 | 1.834 | 0.73 | 0.8 | 1 | 187.087 | 6.66 | 333.23 | A |
| 40.00-20.00 | | | B | 0.317 | 2.252 | 0.621 | 0.8 | 1 | 90.033 | | | |
| | | | C | 0.185 | 2.645 | 0.588 | 0.8 | 1 | 49.862 | | | |
| T9 20.00-0.00 | 0.00 | 9.40 | A | 0.174 | 2.685 | 0.585 | 0.8 | 1 | 51.704 | 2.70 | 134.82 | C |
| | | | B | 0.174 | 2.685 | 0.585 | 0.8 | 1 | 51.704 | | | |
| | | | C | 0.174 | 2.685 | 0.585 | 0.8 | 1 | 51.704 | | | |
| Sum Weight: | 20.57 | 49.38 | | | | | | OTM | 5950.02 kip-ft | 64.38 | | |

## Tower Forces - With Ice - Wind 90 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.41 | 1.84 | A | 0.353 | 2.164 | 0.634 | 0.85 | 1 | 40.137 | 2.69 | 134.71 | A |
| 180.00-160.00 | | | B | 0.189 | 2.632 | 0.588 | 0.85 | 1 | 19.964 | | | |
| | | | C | 0.189 | 2.632 | 0.588 | 0.85 | 1 | 19.964 | | | |
| T2 | 1.90 | 2.52 | A | 0.764 | 1.794 | 0.868 | 0.85 | 1 | 121.142 | 6.51 | 325.29 | A |
| 160.00-140.00 | | | B | 0.488 | 1.916 | 0.691 | 0.85 | 1 | 61.558 | | | |
| | | | C | 0.22 | 2.532 | 0.595 | 0.85 | 1 | 23.839 | | | |
| T3 | 2.68 | 3.27 | A | 0.901 | 1.925 | 0.984 | 0.85 | 1 | 182.537 | 10.10 | 504.92 | A |
| 140.00-120.00 | | | B | 0.501 | 1.899 | 0.698 | 0.85 | 1 | 71.940 | | | |
| | | | C | 0.218 | 2.536 | 0.594 | 0.85 | 1 | 26.714 | | | |
| T4 | 3.11 | 4.01 | A | 0.876 | 1.892 | 0.962 | 0.85 | 1 | 210.586 | 10.92 | 545.84 | A |
| 120.00-100.00 | | | B | 0.441 | 1.989 | 0.669 | 0.85 | 1 | 73.723 | | | |
| | | | C | 0.206 | 2.576 | 0.592 | 0.85 | 1 | 30.448 | | | |
| T5 | 3.11 | 5.54 | A | 0.767 | 1.795 | 0.87 | 0.85 | 1 | 199.109 | 9.25 | 462.31 | A |
| 100.00-80.00 | | | B | 0.393 | 2.078 | 0.649 | 0.85 | 1 | 76.132 | | | |
| | | | C | 0.191 | 2.625 | 0.589 | 0.85 | 1 | 33.639 | | | |
| T6 | 3.11 | 6.73 | A | 0.683 | 1.776 | 0.808 | 0.85 | 1 | 193.848 | 8.29 | 414.45 | A |
| 80.00-60.00 | | | B | 0.365 | 2.138 | 0.638 | 0.85 | 1 | 81.733 | | | |
| | | | C | 0.193 | 2.619 | 0.589 | 0.85 | 1 | 39.946 | | | |
| T7 | 3.11 | 7.09 | A | 0.605 | 1.801 | 0.757 | 0.85 | 1 | 184.441 | 7.26 | 363.22 | A |
| 60.00-40.00 | | | B | 0.326 | 2.228 | 0.624 | 0.85 | 1 | 82.042 | | | |
| | | | C | 0.176 | 2.679 | 0.586 | 0.85 | 1 | 41.483 | | | |
| T8 | 3.11 | 9.00 | A | 0.56 | 1.834 | 0.73 | 0.85 | 1 | 187.087 | 6.66 | 333.23 | A |
| 40.00-20.00 | | | B | 0.317 | 2.252 | 0.621 | 0.85 | 1 | 90.033 | | | |
| | | | C | 0.185 | 2.645 | 0.588 | 0.85 | 1 | 49.862 | | | |
| T9 20.00-0.00 | 0.00 | 9.40 | A | 0.174 | 2.685 | 0.585 | 0.85 | 1 | 51.704 | 2.70 | 134.82 | C |
| | | | B | 0.174 | 2.685 | 0.585 | 0.85 | 1 | 51.704 | | | |
| | | | C | 0.174 | 2.685 | 0.585 | 0.85 | 1 | 51.704 | | | |
| Sum Weight: | 20.57 | 49.38 | | | | | | OTM | 5950.02 kip-ft | 64.38 | | |

## Tower Forces - Service - Wind Normal To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 1 | 1 | 25.946 | 0.73 | 36.53 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 1 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 1 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 1 | 1 | 70.289 | 1.44 | 72.00 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 1 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 1 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 1 | 1 | 100.567 | 1.91 | 95.34 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 1 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 1 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 1 | 1 | 117.221 | 2.13 | 106.40 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 1 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 1 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 1 | 1 | 116.596 | 2.06 | 103.00 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 1 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 1 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 1 | 1 | 119.079 | 2.02 | 101.20 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 1 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 1 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 1 | 1 | 116.286 | 1.88 | 93.88 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 1 | 1 | 61.332 | | | |

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | 0.15 | 2.772 | 0.581 | 1 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 1 | 1 | 122.450 | 1.80 | 89.82 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 1 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 1 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | 0.88 | 43.98 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 1 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 1305.83 kip-ft | 14.84 | | |

## Tower Forces - Service - Wind 45 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.825 | 1 | 25.946 | 0.73 | 36.53 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.825 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.825 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.825 | 1 | 70.289 | 1.44 | 72.00 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.825 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.825 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.825 | 1 | 100.567 | 1.91 | 95.34 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.825 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.825 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.825 | 1 | 117.221 | 2.13 | 106.40 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.825 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.825 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.825 | 1 | 116.596 | 2.06 | 103.00 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.825 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.825 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.825 | 1 | 119.079 | 2.02 | 101.20 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.825 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.825 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.825 | 1 | 116.286 | 1.88 | 93.88 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.825 | 1 | 61.332 | | | |
| | | | C | 0.15 | 2.772 | 0.581 | 0.825 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.825 | 1 | 122.450 | 1.80 | 89.82 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.825 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.825 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | 0.88 | 43.98 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.825 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 1305.83 kip-ft | 14.84 | | |

## Tower Forces - Service - Wind 60 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.8 | 1 | 25.946 | 0.73 | 36.53 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.8 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.8 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.8 | 1 | 70.289 | 1.44 | 72.00 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.8 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.8 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.8 | 1 | 100.567 | 1.91 | 95.34 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.8 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.8 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.8 | 1 | 117.221 | 2.13 | 106.40 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.8 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.8 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.8 | 1 | 116.596 | 2.06 | 103.00 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.8 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.8 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.8 | 1 | 119.079 | 2.02 | 101.20 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.8 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.8 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.8 | 1 | 116.286 | 1.88 | 93.88 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.8 | 1 | 61.332 | | | |
| | | | C | 0.15 | 2.772 | 0.581 | 0.8 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.8 | 1 | 122.450 | 1.80 | 89.82 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.8 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.8 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | 0.88 | 43.98 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.8 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 1305.83 kip-ft | 14.84 | | |

## Tower Forces - Service - Wind 90 To Face

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 0.16 | 1.25 | A | 0.243 | 2.457 | 0.6 | 0.85 | 1 | 25.946 | 0.73 | 36.53 | A |
| 180.00-160.00 | | | B | 0.139 | 2.812 | 0.58 | 0.85 | 1 | 14.323 | | | |
| | | | C | 0.139 | 2.812 | 0.58 | 0.85 | 1 | 14.323 | | | |
| T2 | 0.81 | 1.83 | A | 0.54 | 1.853 | 0.719 | 0.85 | 1 | 70.289 | 1.44 | 72.00 | A |
| 160.00-140.00 | | | B | 0.36 | 2.148 | 0.636 | 0.85 | 1 | 41.456 | | | |
| | | | C | 0.171 | 2.697 | 0.585 | 0.85 | 1 | 18.058 | | | |
| T3 | 1.14 | 2.50 | A | 0.635 | 1.787 | 0.776 | 0.85 | 1 | 100.567 | 1.91 | 95.34 | A |
| 140.00-120.00 | | | B | 0.372 | 2.122 | 0.641 | 0.85 | 1 | 48.680 | | | |
| | | | C | 0.173 | 2.688 | 0.585 | 0.85 | 1 | 20.707 | | | |
| T4 | 1.32 | 3.13 | A | 0.618 | 1.794 | 0.765 | 0.85 | 1 | 117.221 | 2.13 | 106.40 | A |
| 120.00-100.00 | | | B | 0.33 | 2.219 | 0.626 | 0.85 | 1 | 51.275 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.85 | 1 | 23.978 | | | |
| T5 | 1.32 | 4.62 | A | 0.544 | 1.849 | 0.721 | 0.85 | 1 | 116.596 | 2.06 | 103.00 | A |
| 100.00-80.00 | | | B | 0.3 | 2.295 | 0.616 | 0.85 | 1 | 54.973 | | | |
| | | | C | 0.161 | 2.733 | 0.583 | 0.85 | 1 | 27.825 | | | |
| T6 | 1.32 | 5.62 | A | 0.491 | 1.911 | 0.693 | 0.85 | 1 | 119.079 | 2.02 | 101.20 | A |
| 80.00-60.00 | | | B | 0.284 | 2.339 | 0.611 | 0.85 | 1 | 60.700 | | | |
| | | | C | 0.165 | 2.716 | 0.584 | 0.85 | 1 | 33.740 | | | |
| T7 | 1.32 | 5.88 | A | 0.435 | 1.999 | 0.667 | 0.85 | 1 | 116.286 | 1.88 | 93.88 | A |
| 60.00-40.00 | | | B | 0.254 | 2.426 | 0.603 | 0.85 | 1 | 61.332 | | | |

| Section Elevation ft | Add Weight K | Self Weight K | Face | e | $C_F$ | $R_R$ | $D_F$ | $D_R$ | $A_E$ ft² | F K | w plf | Ctrl. Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C | 0.15 | 2.772 | 0.581 | 0.85 | 1 | 34.921 | | | |
| T8 | 1.32 | 7.52 | A | 0.41 | 2.045 | 0.656 | 0.85 | 1 | 122.450 | 1.80 | 89.82 | A |
| 40.00-20.00 | | | B | 0.252 | 2.433 | 0.602 | 0.85 | 1 | 69.088 | | | |
| | | | C | 0.161 | 2.731 | 0.583 | 0.85 | 1 | 42.811 | | | |
| T9 20.00-0.00 | 0.00 | 7.82 | A | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | 0.88 | 43.98 | C |
| | | | B | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | | | |
| | | | C | 0.15 | 2.77 | 0.582 | 0.85 | 1 | 44.271 | | | |
| Sum Weight: | 8.73 | 40.16 | | | | | | OTM | 1305.83 kip-ft | 14.84 | | |

## 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 | | | -51.65 | 21.95 | |
| Total Weight | 57.26 | | | -51.65 | 21.95 | |
| Wind 0 deg - No Ice | | -0.04 | -74.74 | -7991.75 | 27.15 | -42.41 |
| Wind 30 deg - No Ice | | 37.31 | -64.71 | -6925.38 | -3940.60 | -89.89 |
| Wind 45 deg - No Ice | | 52.79 | -52.82 | -5662.48 | -5584.63 | -105.16 |
| Wind 60 deg - No Ice | | 64.67 | -37.34 | -4017.20 | -6846.58 | -113.28 |
| Wind 90 deg - No Ice | | 74.70 | 0.04 | -46.46 | -7912.15 | -106.31 |
| Wind 120 deg - No Ice | | 64.71 | 37.41 | 3922.90 | -6851.78 | -70.86 |
| Wind 135 deg - No Ice | | 52.85 | 52.88 | 5566.52 | -5591.98 | -45.18 |
| Wind 150 deg - No Ice | | 37.38 | 64.75 | 6827.27 | -3949.60 | -16.43 |
| Wind 180 deg - No Ice | | 0.04 | 74.74 | 7888.45 | 16.76 | 42.41 |
| Wind 210 deg - No Ice | | -37.31 | 64.71 | 6822.08 | 3984.50 | 89.89 |
| Wind 225 deg - No Ice | | -52.79 | 52.82 | 5559.17 | 5628.54 | 105.16 |
| Wind 240 deg - No Ice | | -64.67 | 37.34 | 3913.90 | 6890.49 | 113.28 |
| Wind 270 deg - No Ice | | -74.70 | -0.04 | -56.85 | 7956.05 | 106.31 |
| Wind 300 deg - No Ice | | -64.71 | -37.41 | -4026.20 | 6895.68 | 70.86 |
| Wind 315 deg - No Ice | | -52.85 | -52.88 | -5669.82 | 5635.88 | 45.18 |
| Wind 330 deg - No Ice | | -37.38 | -64.75 | -6930.58 | 3993.50 | 16.43 |
| Member Ice | 9.22 | | | | | |
| Total Weight Ice | 82.26 | | | -87.22 | 48.21 | |
| Wind 0 deg - Ice | | -0.03 | -82.90 | -8879.12 | 52.25 | -55.97 |
| Wind 30 deg - Ice | | 41.41 | -71.78 | -7699.21 | -4341.91 | -111.30 |
| Wind 45 deg - Ice | | 58.57 | -58.60 | -6301.17 | -6162.44 | -128.42 |
| Wind 60 deg - Ice | | 71.75 | -41.42 | -4479.67 | -7559.74 | -136.80 |
| Wind 90 deg - Ice | | 82.87 | 0.03 | -83.18 | -8739.02 | -125.65 |
| Wind 120 deg - Ice | | 71.78 | 41.48 | 4312.23 | -7563.77 | -80.83 |
| Wind 135 deg - Ice | | 58.62 | 58.64 | 6132.45 | -6168.16 | -49.27 |
| Wind 150 deg - Ice | | 41.46 | 71.81 | 7528.81 | -4348.90 | -14.35 |
| Wind 180 deg - Ice | | 0.03 | 82.90 | 8704.68 | 44.17 | 55.97 |
| Wind 210 deg - Ice | | -41.41 | 71.78 | 7524.77 | 4438.33 | 111.30 |
| Wind 225 deg - Ice | | -58.57 | 58.60 | 6126.73 | 6258.87 | 128.42 |
| Wind 240 deg - Ice | | -71.75 | 41.42 | 4305.23 | 7656.16 | 136.80 |
| Wind 270 deg - Ice | | -82.87 | -0.03 | -91.26 | 8835.44 | 125.65 |
| Wind 300 deg - Ice | | -71.78 | -41.48 | -4486.66 | 7660.20 | 80.83 |
| Wind 315 deg - Ice | | -58.62 | -58.64 | -6306.88 | 6264.58 | 49.27 |
| Wind 330 deg - Ice | | -41.46 | -71.81 | -7703.24 | 4445.33 | 14.35 |
| Total Weight | 57.26 | | | -51.65 | 21.95 | |
| Wind 0 deg - Service | | -0.01 | -20.70 | -2231.07 | 6.66 | -11.75 |

| 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 30 deg - Service | | 10.34 | -17.92 | -1935.68 | -1092.44 | -24.90 |
| Wind 45 deg - Service | | 14.62 | -14.63 | -1585.84 | -1547.85 | -29.13 |
| Wind 60 deg - Service | | 17.91 | -10.34 | -1130.09 | -1897.42 | -31.38 |
| Wind 90 deg - Service | | 20.69 | 0.01 | -30.16 | -2192.59 | -29.45 |
| Wind 120 deg - Service | | 17.92 | 10.36 | 1069.38 | -1898.86 | -19.63 |
| Wind 135 deg - Service | | 14.64 | 14.65 | 1524.68 | -1549.88 | -12.52 |
| Wind 150 deg - Service | | 10.36 | 17.94 | 1873.92 | -1094.93 | -4.55 |
| Wind 180 deg - Service | | 0.01 | 20.70 | 2167.88 | 3.78 | 11.75 |
| Wind 210 deg - Service | | -10.34 | 17.92 | 1872.48 | 1102.88 | 24.90 |
| Wind 225 deg - Service | | -14.62 | 14.63 | 1522.65 | 1558.29 | 29.13 |
| Wind 240 deg - Service | | -17.91 | 10.34 | 1066.89 | 1907.86 | 31.38 |
| Wind 270 deg - Service | | -20.69 | -0.01 | -33.04 | 2203.03 | 29.45 |
| Wind 300 deg - Service | | -17.92 | -10.36 | -1132.58 | 1909.30 | 19.63 |
| Wind 315 deg - Service | | -14.64 | -14.65 | -1587.88 | 1560.33 | 12.52 |
| Wind 330 deg - Service | | -10.36 | -17.94 | -1937.12 | 1105.37 | 4.55 |

## Load Combinations

| Comb. No. | Description |
|---|---|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 45 deg - No Ice |
| 5 | Dead+Wind 60 deg - No Ice |
| 6 | Dead+Wind 90 deg - No Ice |
| 7 | Dead+Wind 120 deg - No Ice |
| 8 | Dead+Wind 135 deg - No Ice |
| 9 | Dead+Wind 150 deg - No Ice |
| 10 | Dead+Wind 180 deg - No Ice |
| 11 | Dead+Wind 210 deg - No Ice |
| 12 | Dead+Wind 225 deg - No Ice |
| 13 | Dead+Wind 240 deg - No Ice |
| 14 | Dead+Wind 270 deg - No Ice |
| 15 | Dead+Wind 300 deg - No Ice |
| 16 | Dead+Wind 315 deg - No Ice |
| 17 | Dead+Wind 330 deg - No Ice |
| 18 | Dead+Ice+Temp |
| 19 | Dead+Wind 0 deg+Ice+Temp |
| 20 | Dead+Wind 30 deg+Ice+Temp |
| 21 | Dead+Wind 45 deg+Ice+Temp |
| 22 | Dead+Wind 60 deg+Ice+Temp |
| 23 | Dead+Wind 90 deg+Ice+Temp |
| 24 | Dead+Wind 120 deg+Ice+Temp |
| 25 | Dead+Wind 135 deg+Ice+Temp |
| 26 | Dead+Wind 150 deg+Ice+Temp |
| 27 | Dead+Wind 180 deg+Ice+Temp |
| 28 | Dead+Wind 210 deg+Ice+Temp |
| 29 | Dead+Wind 225 deg+Ice+Temp |
| 30 | Dead+Wind 240 deg+Ice+Temp |
| 31 | Dead+Wind 270 deg+Ice+Temp |
| 32 | Dead+Wind 300 deg+Ice+Temp |
| 33 | Dead+Wind 315 deg+Ice+Temp |
| 34 | Dead+Wind 330 deg+Ice+Temp |
| 35 | Dead+Wind 0 deg - Service |
| 36 | Dead+Wind 30 deg - Service |

| Comb. No. | Description |
|---|---|
| 37 | Dead+Wind 45 deg - Service |
| 38 | Dead+Wind 60 deg - Service |
| 39 | Dead+Wind 90 deg - Service |
| 40 | Dead+Wind 120 deg - Service |
| 41 | Dead+Wind 135 deg - Service |
| 42 | Dead+Wind 150 deg - Service |
| 43 | Dead+Wind 180 deg - Service |
| 44 | Dead+Wind 210 deg - Service |
| 45 | Dead+Wind 225 deg - Service |
| 46 | Dead+Wind 240 deg - Service |
| 47 | Dead+Wind 270 deg - Service |
| 48 | Dead+Wind 300 deg - Service |
| 49 | Dead+Wind 315 deg - Service |
| 50 | Dead+Wind 330 deg - Service |

## Maximum Member Forces

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | Leg | Max Tension | 32 | 5.40 | -0.48 | -0.27 |
| | | | Max. Compression | 19 | -8.59 | 1.43 | 0.03 |
| | | | Max. Mx | 5 | 4.02 | -1.66 | 0.73 |
| | | | Max. My | 14 | -1.90 | -0.00 | -2.47 |
| | | | Max. Vy | 10 | 0.84 | -1.65 | -0.03 |
| | | | Max. Vx | 14 | 1.21 | -0.00 | -2.47 |
| | | Diagonal | Max Tension | 3 | 4.99 | 0.00 | 0.00 |
| | | | Max. Compression | 3 | -5.05 | 0.00 | 0.00 |
| | | | Max. Mx | 34 | 3.92 | 0.02 | 0.00 |
| | | | Max. My | 22 | -0.21 | 0.00 | 0.00 |
| | | | Max. Vy | 34 | 0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 4 | 2.85 | -0.01 | 0.00 |
| | | | Max. Compression | 12 | -2.81 | 0.00 | 0.00 |
| | | | Max. Mx | 32 | 0.10 | -0.02 | -0.01 |
| | | | Max. My | 15 | -0.51 | -0.01 | -0.01 |
| | | | Max. Vy | 32 | -0.01 | -0.02 | -0.01 |
| | | | Max. Vx | 15 | 0.00 | -0.01 | -0.01 |
| | | Top Girt | Max Tension | 27 | 0.81 | -0.01 | 0.00 |
| | | | Max. Compression | 19 | -0.81 | -0.01 | -0.00 |
| | | | Max. Mx | 32 | -0.28 | -0.01 | -0.00 |
| | | | Max. My | 27 | -0.24 | -0.01 | -0.00 |
| | | | Max. Vy | 32 | -0.01 | -0.01 | -0.00 |
| | | | Max. Vx | 19 | -0.00 | -0.01 | 0.00 |
| | | Inner Bracing | Max Tension | 19 | 0.01 | 0.00 | 0.00 |
| | | | Max. Compression | 19 | -0.01 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.00 | -0.01 | 0.00 |
| | | | Max. My | 19 | 0.00 | 0.00 | -0.00 |
| | | | Max. Vy | 18 | 0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 19 | 0.00 | 0.00 | 0.00 |
| T2 | 160 - 140 | Leg | Max Tension | 15 | 37.93 | -0.82 | -0.25 |
| | | | Max. Compression | 19 | -45.85 | 0.73 | 0.21 |
| | | | Max. Mx | 10 | 9.68 | 1.69 | -0.03 |
| | | | Max. My | 6 | -2.06 | 0.00 | -3.07 |
| | | | Max. Vy | 10 | -1.13 | -1.65 | -0.03 |
| | | | Max. Vx | 6 | 1.91 | 0.00 | 2.47 |
| | | Diagonal | Max Tension | 4 | 14.21 | 0.00 | 0.00 |
| | | | Max. Compression | 4 | -14.29 | 0.00 | 0.00 |
| | | | Max. Mx | 34 | 12.46 | 0.03 | 0.00 |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| | | | Max. My | 22 | -2.66 | 0.00 | 0.00 |
| | | | Max. Vy | 34 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 21 | 7.87 | -0.01 | 0.00 |
| | | | Max. Compression | 12 | -7.81 | -0.02 | -0.01 |
| | | | Max. Mx | 32 | 0.47 | -0.05 | -0.02 |
| | | | Max. My | 5 | -2.84 | -0.03 | -0.02 |
| | | | Max. Vy | 32 | -0.02 | -0.05 | -0.02 |
| | | | Max. Vx | 5 | 0.00 | -0.03 | -0.02 |
| | | Top Girt | Max Tension | 5 | 5.96 | -0.01 | 0.01 |
| | | | Max. Compression | 13 | -5.90 | -0.02 | -0.01 |
| | | | Max. Mx | 32 | -2.18 | -0.03 | -0.02 |
| | | | Max. My | 5 | -2.65 | -0.02 | -0.02 |
| | | | Max. Vy | 32 | -0.02 | -0.03 | -0.02 |
| | | | Max. Vx | 15 | 0.00 | -0.02 | -0.02 |
| | | Inner Bracing | Max Tension | 13 | 0.10 | 0.00 | 0.00 |
| | | | Max. Compression | 13 | -0.10 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.00 | -0.01 | 0.00 |
| | | | Max. My | 32 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | -0.00 | 0.00 | 0.00 |
| T3 | 140 - 120 | Leg | Max Tension | 15 | 87.44 | -0.10 | 0.01 |
| | | | Max. Compression | 19 | -101.83 | 0.43 | 0.04 |
| | | | Max. Mx | 10 | 46.70 | 2.27 | 0.04 |
| | | | Max. My | 6 | -9.15 | -0.08 | -3.16 |
| | | | Max. Vy | 10 | 2.35 | -1.64 | 0.04 |
| | | | Max. Vx | 14 | 3.06 | -0.06 | -1.90 |
| | | Diagonal | Max Tension | 29 | 18.73 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -18.87 | 0.00 | 0.00 |
| | | | Max. Mx | 34 | 15.69 | 0.05 | 0.00 |
| | | | Max. My | 22 | -4.85 | 0.00 | 0.00 |
| | | | Max. Vy | 34 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 21 | 11.54 | -0.02 | 0.01 |
| | | | Max. Compression | 29 | -11.83 | -0.03 | -0.01 |
| | | | Max. Mx | 32 | 1.01 | -0.05 | -0.02 |
| | | | Max. My | 10 | -1.22 | -0.04 | -0.03 |
| | | | Max. Vy | 32 | -0.02 | -0.05 | -0.02 |
| | | | Max. Vx | 27 | 0.01 | -0.04 | -0.03 |
| | | Top Girt | Max Tension | 22 | 8.39 | -0.01 | 0.01 |
| | | | Max. Compression | 30 | -8.95 | -0.03 | -0.01 |
| | | | Max. Mx | 32 | -3.98 | -0.04 | -0.02 |
| | | | Max. My | 24 | 3.47 | 0.01 | 0.02 |
| | | | Max. Vy | 32 | -0.02 | -0.04 | -0.02 |
| | | | Max. Vx | 24 | -0.01 | 0.01 | 0.02 |
| | | Inner Bracing | Max Tension | 30 | 0.16 | 0.00 | 0.00 |
| | | | Max. Compression | 30 | -0.16 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.00 | -0.01 | 0.00 |
| | | | Max. My | 32 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | 0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | -0.00 | 0.00 | 0.00 |
| T4 | 120 - 100 | Leg | Max Tension | 32 | 139.16 | -1.80 | -0.44 |
| | | | Max. Compression | 19 | -160.70 | 1.80 | 0.22 |
| | | | Max. Mx | 22 | 136.57 | -1.80 | 0.66 |
| | | | Max. My | 31 | -16.04 | 0.00 | -2.32 |
| | | | Max. Vy | 27 | 0.30 | -1.78 | -0.23 |
| | | | Max. Vx | 23 | -0.46 | -0.00 | 2.31 |
| | | Diagonal | Max Tension | 29 | 19.10 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -19.28 | 0.00 | 0.00 |
| | | | Max. Mx | 34 | 16.05 | 0.06 | 0.00 |
| | | | Max. My | 22 | -5.52 | 0.00 | 0.00 |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| | | | Max. Vy | 34 | -0.03 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 21 | 13.18 | -0.02 | 0.01 |
| | | | Max. Compression | 29 | -13.45 | -0.03 | -0.01 |
| | | | Max. Mx | 32 | 1.53 | -0.05 | -0.02 |
| | | | Max. My | 27 | -1.36 | -0.05 | -0.03 |
| | | | Max. Vy | 32 | -0.02 | -0.05 | -0.02 |
| | | | Max. Vx | 27 | 0.00 | -0.05 | -0.03 |
| | | Top Girt | Max Tension | 21 | 12.08 | -0.02 | 0.01 |
| | | | Max. Compression | 29 | -12.36 | -0.03 | -0.01 |
| | | | Max. Mx | 32 | -3.44 | -0.04 | -0.02 |
| | | | Max. My | 27 | 0.13 | -0.04 | -0.02 |
| | | | Max. Vy | 32 | -0.02 | -0.04 | -0.02 |
| | | | Max. Vx | 27 | 0.00 | -0.04 | -0.02 |
| | | Inner Bracing | Max Tension | 29 | 0.21 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.21 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.00 | -0.02 | 0.00 |
| | | | Max. My | 32 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | 0.00 | 0.00 | 0.00 |
| T5 | 100 - 80 | Leg | Max Tension | 32 | 182.21 | -1.29 | -0.06 |
| | | | Max. Compression | 19 | -208.28 | 1.60 | 0.12 |
| | | | Max. Mx | 22 | 154.65 | -1.80 | 0.66 |
| | | | Max. My | 31 | -16.35 | 0.00 | -2.32 |
| | | | Max. Vy | 27 | -0.19 | -1.78 | -0.23 |
| | | | Max. Vx | 22 | 0.34 | 0.89 | 2.12 |
| | | Diagonal | Max Tension | 29 | 23.92 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -24.22 | 0.00 | 0.00 |
| | | | Max. Mx | 20 | 22.83 | 0.15 | 0.00 |
| | | | Max. My | 22 | -6.78 | 0.00 | 0.00 |
| | | | Max. Vy | 20 | -0.05 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | 0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 21 | 14.25 | -0.04 | 0.01 |
| | | | Max. Compression | 29 | -14.61 | -0.05 | -0.01 |
| | | | Max. Mx | 32 | 1.97 | -0.07 | -0.02 |
| | | | Max. My | 27 | -1.80 | -0.07 | -0.02 |
| | | | Max. Vy | 32 | -0.03 | -0.07 | -0.02 |
| | | | Max. Vx | 27 | 0.00 | -0.07 | -0.02 |
| | | Top Girt | Max Tension | 21 | 13.75 | -0.03 | 0.01 |
| | | | Max. Compression | 29 | -14.27 | -0.05 | -0.01 |
| | | | Max. Mx | 32 | -3.88 | -0.07 | -0.02 |
| | | | Max. My | 27 | -0.01 | -0.07 | -0.02 |
| | | | Max. Vy | 32 | -0.03 | -0.07 | -0.02 |
| | | | Max. Vx | 27 | 0.00 | -0.07 | -0.02 |
| | | Inner Bracing | Max Tension | 29 | 0.25 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.25 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.00 | -0.02 | 0.00 |
| | | | Max. My | 32 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | 0.01 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | 0.00 | 0.00 | 0.00 |
| T6 | 80 - 60 | Leg | Max Tension | 32 | 229.23 | -2.33 | -0.08 |
| | | | Max. Compression | 19 | -261.30 | 2.55 | 0.05 |
| | | | Max. Mx | 32 | 228.98 | -2.57 | -0.11 |
| | | | Max. My | 31 | -19.78 | -0.01 | -2.50 |
| | | | Max. Vy | 10 | 0.21 | -2.17 | -0.05 |
| | | | Max. Vx | 31 | 0.29 | -0.01 | -2.50 |
| | | Diagonal | Max Tension | 29 | 22.92 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -23.30 | 0.00 | 0.00 |
| | | | Max. Mx | 20 | 22.28 | 0.19 | 0.00 |
| | | | Max. My | 22 | -6.19 | 0.00 | 0.00 |
| | | | Max. Vy | 20 | -0.06 | 0.00 | 0.00 |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 21 | 15.18 | -0.06 | 0.01 |
| | | | Max. Compression | 29 | -15.49 | -0.08 | -0.01 |
| | | | Max. Mx | 32 | 2.45 | -0.11 | -0.03 |
| | | | Max. My | 27 | -2.29 | -0.11 | -0.03 |
| | | | Max. Vy | 32 | -0.05 | -0.11 | -0.03 |
| | | | Max. Vx | 27 | 0.00 | -0.11 | -0.03 |
| | | Top Girt | Max Tension | 21 | 14.65 | -0.05 | 0.01 |
| | | | Max. Compression | 29 | -15.02 | -0.07 | -0.01 |
| | | | Max. Mx | 32 | -3.52 | -0.10 | -0.03 |
| | | | Max. My | 27 | 0.35 | -0.10 | -0.03 |
| | | | Max. Vy | 32 | -0.04 | -0.10 | -0.03 |
| | | | Max. Vx | 27 | 0.00 | -0.10 | -0.03 |
| | | Inner Bracing | Max Tension | 29 | 0.26 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.26 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.01 | -0.05 | 0.00 |
| | | | Max. My | 32 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | -0.00 | 0.00 | 0.00 |
| T7 | 60 - 40 | Leg | Max Tension | 32 | 271.93 | -2.13 | -0.01 |
| | | | Max. Compression | 19 | -310.44 | 2.92 | 0.23 |
| | | | Max. Mx | 22 | 267.42 | -3.04 | 0.61 |
| | | | Max. My | 31 | -24.40 | -0.06 | -3.80 |
| | | | Max. Vy | 27 | 0.23 | -3.03 | -0.25 |
| | | | Max. Vx | 23 | -0.36 | -0.06 | 3.77 |
| | | Diagonal | Max Tension | 29 | 21.89 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -22.35 | 0.00 | 0.00 |
| | | | Max. Mx | 20 | 20.97 | 0.23 | 0.00 |
| | | | Max. My | 22 | -5.76 | 0.00 | 0.00 |
| | | | Max. Vy | 20 | -0.07 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 28 | 15.31 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -15.57 | -0.10 | -0.01 |
| | | | Max. Mx | 32 | 2.91 | -0.12 | -0.03 |
| | | | Max. My | 27 | -2.74 | -0.12 | -0.03 |
| | | | Max. Vy | 32 | -0.05 | -0.12 | -0.03 |
| | | | Max. Vx | 27 | 0.00 | -0.12 | -0.03 |
| | | Top Girt | Max Tension | 21 | 15.21 | -0.07 | 0.01 |
| | | | Max. Compression | 29 | -15.60 | -0.09 | -0.01 |
| | | | Max. Mx | 32 | -3.46 | -0.12 | -0.03 |
| | | | Max. My | 24 | -1.01 | -0.05 | 0.03 |
| | | | Max. Vy | 32 | -0.05 | -0.12 | -0.03 |
| | | | Max. Vx | 27 | 0.00 | -0.11 | -0.03 |
| | | Inner Bracing | Max Tension | 29 | 0.27 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.27 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.01 | -0.07 | 0.00 |
| | | | Max. My | 32 | 0.21 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | 0.03 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | -0.00 | 0.00 | 0.00 |
| T8 | 40 - 20 | Leg | Max Tension | 32 | 310.99 | -3.31 | 0.00 |
| | | | Max. Compression | 19 | -356.88 | 2.08 | -0.03 |
| | | | Max. Mx | 32 | 310.62 | -4.03 | -0.03 |
| | | | Max. My | 31 | -25.18 | -0.06 | -3.80 |
| | | | Max. Vy | 24 | 0.22 | 3.38 | -0.07 |
| | | | Max. Vx | 22 | 0.26 | 1.43 | 3.39 |
| | | Diagonal | Max Tension | 29 | 22.33 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -23.00 | 0.00 | 0.00 |
| | | | Max. Mx | 20 | 21.87 | 0.33 | 0.00 |
| | | | Max. My | 22 | -5.52 | 0.00 | 0.00 |
| | | | Max. Vy | 20 | -0.09 | 0.00 | 0.00 |
| | | | Max. Vx | 22 | -0.00 | 0.00 | 0.00 |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|---|---|---|---|---|---|---|---|
| | | Horizontal | Max Tension | 28 | 17.02 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -16.90 | -0.17 | -0.01 |
| | | | Max. Mx | 32 | 3.34 | -0.20 | -0.04 |
| | | | Max. My | 27 | -3.18 | -0.20 | -0.04 |
| | | | Max. Vy | 32 | -0.07 | -0.20 | -0.04 |
| | | | Max. Vx | 27 | 0.00 | -0.20 | -0.04 |
| | | Top Girt | Max Tension | 28 | 16.61 | -0.14 | 0.00 |
| | | | Max. Compression | 29 | -16.69 | -0.15 | -0.01 |
| | | | Max. Mx | 32 | -2.53 | -0.19 | -0.04 |
| | | | Max. My | 27 | 1.33 | -0.18 | -0.04 |
| | | | Max. Vy | 32 | -0.07 | -0.19 | -0.04 |
| | | | Max. Vx | 27 | 0.00 | -0.18 | -0.04 |
| | | Inner Bracing | Max Tension | 29 | 0.29 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.29 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.01 | -0.13 | 0.00 |
| | | | Max. My | 32 | 0.23 | 0.00 | 0.00 |
| | | | Max. Vy | 18 | -0.05 | 0.00 | 0.00 |
| | | | Max. Vx | 32 | -0.00 | 0.00 | 0.00 |
| T9 | 20 - 0 | Leg | Max Tension | 32 | 348.61 | 0.62 | -0.01 |
| | | | Max. Compression | 19 | -401.36 | 0.00 | -0.00 |
| | | | Max. Mx | 19 | -379.81 | 9.31 | -0.05 |
| | | | Max. My | 34 | -25.09 | 4.94 | 4.04 |
| | | | Max. Vy | 19 | 1.02 | 9.31 | -0.05 |
| | | | Max. Vx | 34 | 0.52 | 4.94 | 4.04 |
| | | Diagonal | Max Tension | 28 | 21.82 | 0.00 | 0.00 |
| | | | Max. Compression | 28 | -22.60 | 0.00 | 0.00 |
| | | | Max. Mx | 21 | 21.02 | 0.39 | 0.00 |
| | | | Max. My | 30 | 3.89 | 0.00 | -0.00 |
| | | | Max. Vy | 21 | -0.10 | 0.00 | 0.00 |
| | | | Max. Vx | 30 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 28 | 17.79 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -16.38 | -0.14 | -0.01 |
| | | | Max. Mx | 15 | 3.28 | -0.18 | -0.03 |
| | | | Max. My | 27 | -3.61 | -0.17 | -0.04 |
| | | | Max. Vy | 32 | -0.07 | -0.17 | -0.04 |
| | | | Max. Vx | 27 | 0.00 | -0.17 | -0.04 |
| | | Top Girt | Max Tension | 28 | 16.73 | -0.17 | 0.00 |
| | | | Max. Compression | 29 | -17.50 | -0.18 | -0.01 |
| | | | Max. Mx | 32 | -2.94 | -0.21 | -0.04 |
| | | | Max. My | 24 | -1.49 | -0.12 | 0.04 |
| | | | Max. Vy | 32 | -0.08 | -0.21 | -0.04 |
| | | | Max. Vx | 24 | -0.00 | -0.12 | 0.04 |
| | | Inner Bracing | Max Tension | 29 | 0.30 | 0.00 | 0.00 |
| | | | Max. Compression | 29 | -0.30 | 0.00 | 0.00 |
| | | | Max. Mx | 18 | -0.01 | -0.16 | 0.00 |
| | | | Max. My | 24 | 0.26 | 0.00 | -0.00 |
| | | | Max. Vy | 18 | -0.05 | 0.00 | 0.00 |
| | | | Max. Vx | 24 | -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 | 30 | 416.02 | 41.98 | -27.83 |
| | Max. $H_x$ | 30 | 416.02 | 41.98 | -27.83 |
| | Max. $H_z$ | 21 | -348.10 | -36.72 | 26.63 |

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|---|---|---|---|---|---|
| | Min. Vert | 22 | -361.35 | -38.95 | 26.07 |
| | Min. $H_x$ | 22 | -361.35 | -38.95 | 26.07 |
| | Min. $H_z$ | 29 | 402.77 | 39.79 | -28.30 |
| Leg B | Max. Vert | 24 | 412.53 | -42.58 | -26.71 |
| | Max. $H_x$ | 32 | -365.45 | 39.67 | 25.03 |
| | Max. $H_z$ | 33 | -352.24 | 37.70 | 25.12 |
| | Min. Vert | 32 | -365.45 | 39.67 | 25.03 |
| | Min. $H_x$ | 24 | 412.53 | -42.58 | -26.71 |
| | Min. $H_z$ | 25 | 399.32 | -40.67 | -26.74 |
| Leg A | Max. Vert | 19 | 420.37 | -1.28 | 50.38 |
| | Max. $H_x$ | 31 | 31.57 | 9.53 | 2.00 |
| | Max. $H_z$ | 19 | 420.37 | -1.28 | 50.38 |
| | Min. Vert | 27 | -357.59 | 1.26 | -46.72 |
| | Min. $H_x$ | 23 | 31.22 | -9.61 | 1.97 |
| | Min. $H_z$ | 27 | -357.59 | 1.26 | -46.72 |

## Tower Mast Reaction Summary

| Load Combination | Vertical K | $Shear_x$ K | $Shear_z$ K | Overturning Moment, $M_x$ kip-ft | Overturning Moment, $M_z$ kip-ft | Torque kip-ft |
|---|---|---|---|---|---|---|
| Dead Only | 57.26 | 0.00 | 0.00 | -51.72 | 21.97 | 0.00 |
| Dead+Wind 0 deg - No Ice | 57.26 | -0.04 | -74.74 | -7823.35 | 27.20 | -42.51 |
| Dead+Wind 30 deg - No Ice | 57.26 | 37.31 | -64.70 | -6779.66 | -3856.31 | -90.13 |
| Dead+Wind 45 deg - No Ice | 57.26 | 52.79 | -52.82 | -5543.61 | -5465.47 | -105.44 |
| Dead+Wind 60 deg - No Ice | 57.26 | 64.66 | -37.33 | -3933.30 | -6700.69 | -113.58 |
| Dead+Wind 90 deg - No Ice | 57.26 | 74.69 | 0.04 | -46.86 | -7743.76 | -106.63 |
| Dead+Wind 120 deg - No Ice | 57.26 | 64.70 | 37.40 | 3838.31 | -6706.01 | -71.10 |
| Dead+Wind 135 deg - No Ice | 57.26 | 52.84 | 52.88 | 5447.10 | -5472.95 | -45.35 |
| Dead+Wind 150 deg - No Ice | 57.26 | 37.38 | 64.75 | 6681.12 | -3865.39 | -16.50 |
| Dead+Wind 180 deg - No Ice | 57.26 | 0.04 | 74.74 | 7719.77 | 16.91 | 42.51 |
| Dead+Wind 210 deg - No Ice | 57.26 | -37.31 | 64.70 | 6675.93 | 3900.57 | 90.12 |
| Dead+Wind 225 deg - No Ice | 57.26 | -52.79 | 52.82 | 5439.77 | 5509.73 | 105.45 |
| Dead+Wind 240 deg - No Ice | 57.26 | -64.66 | 37.33 | 3829.37 | 6744.89 | 113.59 |
| Dead+Wind 270 deg - No Ice | 57.26 | -74.69 | -0.04 | -57.12 | 7787.78 | 106.63 |
| Dead+Wind 300 deg - No Ice | 57.26 | -64.70 | -37.40 | -3942.14 | 6749.85 | 71.10 |
| Dead+Wind 315 deg - No Ice | 57.26 | -52.84 | -52.88 | -5550.82 | 5516.80 | 45.34 |
| Dead+Wind 330 deg - No Ice | 57.26 | -37.38 | -64.75 | -6784.75 | 3909.30 | 16.50 |
| Dead+Ice+Temp | 82.26 | 0.00 | 0.00 | -87.40 | 48.26 | 0.00 |
| Dead+Wind 0 deg+Ice+Temp | 82.26 | -0.03 | -82.89 | -8670.90 | 52.33 | -56.16 |
| Dead+Wind 30 deg+Ice+Temp | 82.26 | 41.40 | -71.77 | -7519.08 | -4237.65 | -111.68 |
| Dead+Wind 45 deg+Ice+Temp | 82.26 | 58.57 | -58.59 | -6154.27 | -6015.06 | -128.86 |
| Dead+Wind 60 deg+Ice+Temp | 82.26 | 71.74 | -41.42 | -4376.03 | -7379.29 | -137.28 |
| Dead+Wind 90 deg+Ice+Temp | 82.26 | 82.86 | 0.03 | -83.75 | -8530.57 | -126.10 |
| Dead+Wind 120 deg+Ice+Temp | 82.26 | 71.77 | 41.48 | 4207.42 | -7383.41 | -81.15 |
| Dead+Wind 135 deg+Ice+Temp | 82.26 | 58.61 | 58.64 | 5984.54 | -6020.85 | -49.48 |
| Dead+Wind 150 deg+Ice+Temp | 82.26 | 41.46 | 71.81 | 7347.85 | -4244.66 | -14.43 |
| Dead+Wind 180 deg+Ice+Temp | 82.26 | 0.03 | 82.89 | 8495.86 | 44.48 | 56.16 |
| Dead+Wind 210 deg+Ice+Temp | 82.26 | -41.40 | 71.77 | 7343.85 | 4334.63 | 111.68 |
| Dead+Wind 225 deg+Ice+Temp | 82.26 | -58.57 | 58.59 | 5978.93 | 6112.03 | 128.87 |
| Dead+Wind 240 deg+Ice+Temp | 82.26 | -71.74 | 41.42 | 4200.58 | 7476.18 | 137.28 |
| Dead+Wind 270 deg+Ice+Temp | 82.26 | -82.86 | -0.03 | -91.55 | 8627.24 | 126.10 |
| Dead+Wind 300 deg+Ice+Temp | 82.26 | -71.77 | -41.47 | -4382.73 | 7479.90 | 81.15 |
| Dead+Wind 315 deg+Ice+Temp | 82.26 | -58.61 | -58.64 | -6159.73 | 6117.34 | 49.48 |
| Dead+Wind 330 deg+Ice+Temp | 82.26 | -41.46 | -71.80 | -7522.93 | 4341.22 | 14.43 |
| Dead+Wind 0 deg - Service | 57.26 | -0.01 | -20.70 | -2204.59 | 23.43 | -11.78 |
| Dead+Wind 30 deg - Service | 57.26 | 10.34 | -17.92 | -1915.47 | -1052.36 | -24.97 |

| 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+Wind 45 deg - Service | 57.26 | 14.62 | -14.63 | -1573.03 | -1498.08 | -29.21 |
| Dead+Wind 60 deg - Service | 57.26 | 17.91 | -10.34 | -1126.97 | -1840.28 | -31.47 |
| Dead+Wind 90 deg - Service | 57.26 | 20.69 | 0.01 | -50.39 | -2129.20 | -29.54 |
| Dead+Wind 120 deg - Service | 57.26 | 17.92 | 10.36 | 1025.83 | -1841.71 | -19.69 |
| Dead+Wind 135 deg - Service | 57.26 | 14.64 | 14.65 | 1471.47 | -1500.14 | -12.56 |
| Dead+Wind 150 deg - Service | 57.26 | 10.35 | 17.94 | 1813.30 | -1054.84 | -4.57 |
| Dead+Wind 180 deg - Service | 57.26 | 0.01 | 20.70 | 2101.01 | 20.58 | 11.77 |
| Dead+Wind 210 deg - Service | 57.26 | -10.34 | 17.92 | 1811.87 | 1096.37 | 24.96 |
| Dead+Wind 225 deg - Service | 57.26 | -14.62 | 14.63 | 1469.45 | 1542.13 | 29.21 |
| Dead+Wind 240 deg - Service | 57.26 | -17.91 | 10.34 | 1023.37 | 1884.31 | 31.47 |
| Dead+Wind 270 deg - Service | 57.26 | -20.69 | -0.01 | -53.23 | 2173.20 | 29.53 |
| Dead+Wind 300 deg - Service | 57.26 | -17.92 | -10.36 | -1129.44 | 1885.70 | 19.69 |
| Dead+Wind 315 deg - Service | 57.26 | -14.64 | -14.65 | -1575.07 | 1544.13 | 12.56 |
| Dead+Wind 330 deg - Service | 57.26 | -10.35 | -17.93 | -1916.88 | 1098.83 | 4.57 |

## Solution Summary

| | Sum of Applied Forces | | | Sum of Reactions | | | |
|---|---|---|---|---|---|---|---|
| Load Comb. | PX | PY | PZ | PX | PY | PZ | % Error |
| | K | K | K | K | K | K | |
| 1 | 0.00 | -57.26 | 0.00 | -0.00 | 57.26 | -0.00 | 0.000% |
| 2 | -0.04 | -57.26 | -74.74 | 0.04 | 57.26 | 74.74 | 0.005% |
| 3 | 37.31 | -57.26 | -64.71 | -37.31 | 57.26 | 64.70 | 0.006% |
| 4 | 52.79 | -57.26 | -52.82 | -52.79 | 57.26 | 52.82 | 0.006% |
| 5 | 64.67 | -57.26 | -37.34 | -64.66 | 57.26 | 37.33 | 0.006% |
| 6 | 74.70 | -57.26 | 0.04 | -74.69 | 57.26 | -0.04 | 0.006% |
| 7 | 64.71 | -57.26 | 37.41 | -64.70 | 57.26 | -37.40 | 0.005% |
| 8 | 52.85 | -57.26 | 52.88 | -52.84 | 57.26 | -52.88 | 0.005% |
| 9 | 37.38 | -57.26 | 64.75 | -37.38 | 57.26 | -64.75 | 0.005% |
| 10 | 0.04 | -57.26 | 74.74 | -0.04 | 57.26 | -74.74 | 0.005% |
| 11 | -37.31 | -57.26 | 64.71 | 37.31 | 57.26 | -64.70 | 0.005% |
| 12 | -52.79 | -57.26 | 52.82 | 52.79 | 57.26 | -52.82 | 0.005% |
| 13 | -64.67 | -57.26 | 37.34 | 64.66 | 57.26 | -37.33 | 0.006% |
| 14 | -74.70 | -57.26 | -0.04 | 74.69 | 57.26 | 0.04 | 0.006% |
| 15 | -64.71 | -57.26 | -37.41 | 64.70 | 57.26 | 37.40 | 0.006% |
| 16 | -52.85 | -57.26 | -52.88 | 52.84 | 57.26 | 52.88 | 0.006% |
| 17 | -37.38 | -57.26 | -64.75 | 37.38 | 57.26 | 64.75 | 0.005% |
| 18 | 0.00 | -82.26 | 0.00 | -0.00 | 82.26 | -0.00 | 0.000% |
| 19 | -0.03 | -82.26 | -82.90 | 0.03 | 82.26 | 82.89 | 0.007% |
| 20 | 41.41 | -82.26 | -71.78 | -41.40 | 82.26 | 71.77 | 0.007% |
| 21 | 58.57 | -82.26 | -58.60 | -58.57 | 82.26 | 58.59 | 0.007% |
| 22 | 71.75 | -82.26 | -41.42 | -71.74 | 82.26 | 41.42 | 0.007% |
| 23 | 82.87 | -82.26 | 0.03 | -82.86 | 82.26 | -0.03 | 0.007% |
| 24 | 71.78 | -82.26 | 41.48 | -71.77 | 82.26 | -41.48 | 0.007% |
| 25 | 58.62 | -82.26 | 58.64 | -58.61 | 82.26 | -58.64 | 0.007% |
| 26 | 41.46 | -82.26 | 71.81 | -41.46 | 82.26 | -71.81 | 0.007% |
| 27 | 0.03 | -82.26 | 82.90 | -0.03 | 82.26 | -82.89 | 0.007% |
| 28 | -41.41 | -82.26 | 71.78 | 41.40 | 82.26 | -71.77 | 0.007% |
| 29 | -58.57 | -82.26 | 58.60 | 58.57 | 82.26 | -58.59 | 0.007% |
| 30 | -71.75 | -82.26 | 41.42 | 71.74 | 82.26 | -41.42 | 0.007% |
| 31 | -82.87 | -82.26 | -0.03 | 82.86 | 82.26 | 0.03 | 0.007% |
| 32 | -71.78 | -82.26 | -41.48 | 71.77 | 82.26 | 41.47 | 0.007% |
| 33 | -58.62 | -82.26 | -58.64 | 58.61 | 82.26 | 58.64 | 0.007% |
| 34 | -41.46 | -82.26 | -71.81 | 41.46 | 82.26 | 71.80 | 0.007% |
| 35 | -0.01 | -57.26 | -20.70 | 0.01 | 57.26 | 20.70 | 0.002% |
| 36 | 10.34 | -57.26 | -17.92 | -10.34 | 57.26 | 17.92 | 0.002% |
| 37 | 14.62 | -57.26 | -14.63 | -14.62 | 57.26 | 14.63 | 0.002% |
| 38 | 17.91 | -57.26 | -10.34 | -17.91 | 57.26 | 10.34 | 0.002% |

| | Sum of Applied Forces | | | Sum of Reactions | | | |
|---|---|---|---|---|---|---|---|
| Load Comb. | PX K | PY K | PZ K | PX K | PY K | PZ K | % Error |
| 39 | 20.69 | -57.26 | 0.01 | -20.69 | 57.26 | -0.01 | 0.002% |
| 40 | 17.92 | -57.26 | 10.36 | -17.92 | 57.26 | -10.36 | 0.002% |
| 41 | 14.64 | -57.26 | 14.65 | -14.64 | 57.26 | -14.65 | 0.002% |
| 42 | 10.36 | -57.26 | 17.94 | -10.35 | 57.26 | -17.94 | 0.002% |
| 43 | 0.01 | -57.26 | 20.70 | -0.01 | 57.26 | -20.70 | 0.002% |
| 44 | -10.34 | -57.26 | 17.92 | 10.34 | 57.26 | -17.92 | 0.002% |
| 45 | -14.62 | -57.26 | 14.63 | 14.62 | 57.26 | -14.63 | 0.002% |
| 46 | -17.91 | -57.26 | 10.34 | 17.91 | 57.26 | -10.34 | 0.002% |
| 47 | -20.69 | -57.26 | -0.01 | 20.69 | 57.26 | 0.01 | 0.002% |
| 48 | -17.92 | -57.26 | -10.36 | 17.92 | 57.26 | 10.36 | 0.002% |
| 49 | -14.64 | -57.26 | -14.65 | 14.64 | 57.26 | 14.65 | 0.002% |
| 50 | -10.36 | -57.26 | -17.94 | 10.35 | 57.26 | 17.93 | 0.002% |

## Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|---|---|---|---|---|
| 1 | Yes | 6 | 0.00000001 | 0.00005735 |
| 2 | Yes | 6 | 0.00000001 | 0.00032183 |
| 3 | Yes | 6 | 0.00000001 | 0.00032929 |
| 4 | Yes | 6 | 0.00000001 | 0.00033414 |
| 5 | Yes | 6 | 0.00000001 | 0.00033754 |
| 6 | Yes | 6 | 0.00000001 | 0.00033626 |
| 7 | Yes | 6 | 0.00000001 | 0.00032745 |
| 8 | Yes | 6 | 0.00000001 | 0.00032347 |
| 9 | Yes | 6 | 0.00000001 | 0.00032115 |
| 10 | Yes | 6 | 0.00000001 | 0.00032213 |
| 11 | Yes | 6 | 0.00000001 | 0.00032804 |
| 12 | Yes | 6 | 0.00000001 | 0.00033143 |
| 13 | Yes | 6 | 0.00000001 | 0.00033426 |
| 14 | Yes | 6 | 0.00000001 | 0.00033597 |
| 15 | Yes | 6 | 0.00000001 | 0.00033119 |
| 16 | Yes | 6 | 0.00000001 | 0.00032730 |
| 17 | Yes | 6 | 0.00000001 | 0.00032369 |
| 18 | Yes | 6 | 0.00000001 | 0.00010234 |
| 19 | Yes | 6 | 0.00000001 | 0.00047367 |
| 20 | Yes | 6 | 0.00000001 | 0.00048453 |
| 21 | Yes | 6 | 0.00000001 | 0.00049110 |
| 22 | Yes | 6 | 0.00000001 | 0.00049548 |
| 23 | Yes | 6 | 0.00000001 | 0.00049262 |
| 24 | Yes | 6 | 0.00000001 | 0.00047913 |
| 25 | Yes | 6 | 0.00000001 | 0.00047291 |
| 26 | Yes | 6 | 0.00000001 | 0.00046930 |
| 27 | Yes | 6 | 0.00000001 | 0.00047127 |
| 28 | Yes | 6 | 0.00000001 | 0.00048128 |
| 29 | Yes | 6 | 0.00000001 | 0.00048661 |
| 30 | Yes | 6 | 0.00000001 | 0.00049072 |
| 31 | Yes | 6 | 0.00000001 | 0.00049228 |
| 32 | Yes | 6 | 0.00000001 | 0.00048501 |
| 33 | Yes | 6 | 0.00000001 | 0.00047967 |
| 34 | Yes | 6 | 0.00000001 | 0.00047505 |
| 35 | Yes | 6 | 0.00000001 | 0.00031830 |
| 36 | Yes | 6 | 0.00000001 | 0.00032328 |
| 37 | Yes | 6 | 0.00000001 | 0.00032605 |
| 38 | Yes | 6 | 0.00000001 | 0.00032807 |
| 39 | Yes | 6 | 0.00000001 | 0.00032585 |

| | | | | |
|---|---|---|---|---|
| 40 | Yes | 6 | 0.00000001 | 0.00031653 |
| 41 | Yes | 6 | 0.00000001 | 0.00031139 |
| 42 | Yes | 6 | 0.00000001 | 0.00030761 |
| 43 | Yes | 6 | 0.00000001 | 0.00030735 |
| 44 | Yes | 6 | 0.00000001 | 0.00031528 |
| 45 | Yes | 6 | 0.00000001 | 0.00032009 |
| 46 | Yes | 6 | 0.00000001 | 0.00032415 |
| 47 | Yes | 6 | 0.00000001 | 0.00032708 |
| 48 | Yes | 6 | 0.00000001 | 0.00032377 |
| 49 | Yes | 6 | 0.00000001 | 0.00032108 |
| 50 | Yes | 6 | 0.00000001 | 0.00031882 |

## Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| T1 | 180 - 160 | 3.009 | 50 | 0.1533 | 0.1326 |
| T2 | 160 - 140 | 2.360 | 50 | 0.1500 | 0.1310 |
| T3 | 140 - 120 | 1.749 | 50 | 0.1273 | 0.1052 |
| T4 | 120 - 100 | 1.240 | 50 | 0.1014 | 0.0719 |
| T5 | 100 - 80 | 0.833 | 50 | 0.0764 | 0.0461 |
| T6 | 80 - 60 | 0.538 | 50 | 0.0577 | 0.0319 |
| T7 | 60 - 40 | 0.312 | 50 | 0.0422 | 0.0211 |
| T8 | 40 - 20 | 0.150 | 50 | 0.0264 | 0.0120 |
| T9 | 20 - 0 | 0.050 | 42 | 0.0132 | 0.0056 |

## 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 | 50 | 3.009 | 0.1533 | 0.1326 | 694671 |
| 178.00 | Rohn 6' Side-Arm(1) | 50 | 2.943 | 0.1534 | 0.1330 | 694671 |
| 177.00 | 15' 2.5" Dia omni | 50 | 2.911 | 0.1535 | 0.1332 | 694671 |
| 176.00 | 9-ft Omni | 50 | 2.878 | 0.1536 | 0.1334 | 694671 |
| 164.00 | AIR21 B4A B12P B5P | 50 | 2.488 | 0.1520 | 0.1330 | 216866 |
| 157.00 | (2) 7770.00 | 50 | 2.264 | 0.1477 | 0.1286 | 114378 |
| 146.00 | 12' x 2" Dia Omni | 50 | 1.924 | 0.1353 | 0.1148 | 51040 |
| 142.00 | Rohn 6' Side-Arm(1) | 50 | 1.806 | 0.1299 | 0.1084 | 42642 |
| 135.00 | Rohn 6'x14' Boom Gate (3) | 50 | 1.612 | 0.1207 | 0.0967 | 41531 |
| 51.00 | GPS | 50 | 0.232 | 0.0350 | 0.0167 | 75380 |
| 50.00 | 1' Standoff Pipe | 50 | 0.223 | 0.0342 | 0.0163 | 76039 |

## Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| T1 | 180 - 160 | 11.034 | 34 | 0.5302 | 0.5305 |
| T2 | 160 - 140 | 8.787 | 34 | 0.5183 | 0.5150 |

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|---|---|---|---|---|---|
| T3 | 140 - 120 | 6.647 | 34 | 0.4507 | 0.4258 |
| T4 | 120 - 100 | 4.802 | 34 | 0.3701 | 0.3041 |
| T5 | 100 - 80 | 3.273 | 34 | 0.2861 | 0.1995 |
| T6 | 80 - 60 | 2.134 | 34 | 0.2196 | 0.1391 |
| T7 | 60 - 40 | 1.248 | 34 | 0.1625 | 0.0922 |
| T8 | 40 - 20 | 0.605 | 34 | 0.1027 | 0.0526 |
| T9 | 20 - 0 | 0.202 | 26 | 0.0517 | 0.0244 |

## 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 | 34 | 11.034 | 0.5302 | 0.5305 | 268271 |
| 178.00 | Rohn 6' Side-Arm(1) | 34 | 10.808 | 0.5304 | 0.5307 | 268271 |
| 177.00 | 15' 2.5" Dia omni | 34 | 10.695 | 0.5305 | 0.5307 | 268271 |
| 176.00 | 9-ft Omni | 34 | 10.582 | 0.5305 | 0.5307 | 268271 |
| 164.00 | AIR21 B4A B12P B5P | 34 | 9.233 | 0.5247 | 0.5231 | 83730 |
| 157.00 | (2) 7770.00 | 34 | 8.454 | 0.5114 | 0.5064 | 41748 |
| 146.00 | 12' x 2" Dia Omni | 34 | 7.265 | 0.4745 | 0.4589 | 17615 |
| 142.00 | Rohn 6' Side-Arm(1) | 34 | 6.850 | 0.4587 | 0.4372 | 14426 |
| 135.00 | Rohn 6'x14' Boom Gate (3) | 34 | 6.156 | 0.4307 | 0.3962 | 13716 |
| 51.00 | GPS | 34 | 0.929 | 0.1352 | 0.0731 | 19564 |
| 50.00 | 1' Standoff Pipe | 34 | 0.896 | 0.1322 | 0.0710 | 19688 |

## 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 | 1.35 | 26.45 | 0.051 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 1.68 | 6.44 | 0.261 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 1.42 | 6.44 | 0.221 ✓ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.6250 | 2 | 0.41 | 6.44 | 0.063 ✓ | 1.333 | Bolt Shear |
| T2 | 160 | Leg | A325N | 1.0000 | 4 | 9.48 | 34.56 | 0.274 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 4.76 | 6.44 | 0.740 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 3.94 | 6.44 | 0.611 ✓ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.6250 | 2 | 2.98 | 6.44 | 0.463 ✓ | 1.333 | Bolt Shear |
| T3 | 140 | Leg | A325N | 1.0000 | 6 | 14.57 | 34.56 | 0.422 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 6.29 | 6.44 | 0.977 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 5.92 | 6.44 | 0.918 ✓ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.6250 | 2 | 4.48 | 6.44 | 0.695 ✓ | 1.333 | Bolt Shear |
| T4 | 120 | Leg | A325N | 1.0000 | 8 | 17.40 | 34.56 | 0.503 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 6.43 | 6.44 | 0.998 ✓ | 1.333 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Horizontal | A325N | 0.6250 | 2 | 6.72 | 6.44 | 1.043 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.6250 | 2 | 6.18 | 6.44 | 0.959 ✔ | 1.333 | Bolt Shear |
| T5 | 100 | Leg | A325N | 1.0000 | 12 | 15.18 | 34.56 | 0.439 ✔ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 3 | 8.07 | 9.28 | 0.870 ✔ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.7500 | 2 | 7.31 | 9.28 | 0.787 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.7500 | 2 | 7.14 | 9.28 | 0.769 ✔ | 1.333 | Bolt Shear |
| T6 | 80 | Leg | A325N | 1.0000 | 12 | 19.10 | 34.56 | 0.553 ✔ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 3 | 7.77 | 9.28 | 0.837 ✔ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.7500 | 2 | 7.74 | 9.28 | 0.835 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.7500 | 2 | 7.51 | 9.28 | 0.810 ✔ | 1.333 | Bolt Shear |
| T7 | 60 | Leg | A325N | 1.0000 | 16 | 17.00 | 34.56 | 0.492 ✔ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 3 | 7.45 | 9.28 | 0.803 ✔ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.7500 | 2 | 7.79 | 9.28 | 0.839 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.7500 | 2 | 7.80 | 9.28 | 0.841 ✔ | 1.333 | Bolt Shear |
| T8 | 40 | Leg | A325N | 1.0000 | 16 | 19.44 | 34.56 | 0.562 ✔ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 3 | 7.67 | 9.28 | 0.826 ✔ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.7500 | 2 | 8.51 | 9.28 | 0.917 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.7500 | 2 | 8.34 | 9.28 | 0.899 ✔ | 1.333 | Bolt Shear |
| T9 | 20 | Leg | A354-BC | 1.0000 | 24 | 14.53 | 32.40 | 0.448 ✔ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.7500 | 3 | 7.53 | 9.28 | 0.812 ✔ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.7500 | 2 | 8.90 | 9.28 | 0.959 ✔ | 1.333 | Bolt Shear |
| | | Top Girt | A325N | 0.7500 | 2 | 8.75 | 9.28 | 0.943 ✔ | 1.333 | Bolt Shear |

## Compression Checks

## Leg Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio P / $P_a$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 3 STD | 20.00 | 6.67 | 68.8<br>K=1.00 | 21.168 | 2.2285 | -8.59 | 47.17 | 0.182 ✔ |
| T2 | 160 - 140 | ROHN 4 STD | 20.00 | 6.67 | 53.0<br>K=1.00 | 23.877 | 3.1741 | -45.85 | 75.79 | 0.605 ✔ |
| T3 | 140 - 120 | ROHN 5 EH | 20.04 | 6.68 | 43.6<br>K=1.00 | 25.320 | 6.1120 | -101.83 | 154.75 | 0.658 ✔ |
| T4 | 120 - 100 | ROHN 6 EH | 20.04 | 6.68 | 36.5<br>K=1.00 | 26.311 | 8.4049 | -160.70 | 221.14 | 0.727 ✔ |
| T5 | 100 - 80 | ROHN 8 EH | 20.05 | 10.02 | 41.8<br>K=1.00 | 25.578 | 12.7627 | -208.29 | 326.44 | 0.638 ✔ |

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T6 | 80 - 60 | ROHN 10 EH | 20.05 | 10.03 | 33.2<br>K=1.00 | 26.753 | 16.1007 | -261.30 | 430.75 | 0.607 ✓ |
| T7 | 60 - 40 | ROHN 10 EH | 20.06 | 10.03 | 33.2<br>K=1.00 | 26.752 | 16.1007 | -310.44 | 430.73 | 0.721 ✓ |
| T8 | 40 - 20 | ROHN 12 EH | 20.05 | 10.03 | 27.8<br>K=1.00 | 27.426 | 19.2423 | -356.88 | 527.73 | 0.676 ✓ |
| T9 | 20 - 0 | ROHN 12 EH | 20.05 | 10.03 | 27.8<br>K=1.00 | 27.426 | 19.2423 | -401.36 | 527.73 | 0.761 ✓ |

## Diagonal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 2 STD | 7.94 | 7.67 | 117.0<br>K=1.00 | 10.914 | 1.0745 | -5.05 | 11.73 | 0.431 ✓ |
| T2 | 160 - 140 | ROHN 2.5 STD | 7.96 | 7.62 | 96.5<br>K=1.00 | 14.505 | 1.7040 | -14.29 | 24.72 | 0.578 ✓ |
| T3 | 140 - 120 | ROHN 2.5 STD | 8.58 | 8.21 | 104.0<br>K=1.00 | 13.250 | 1.7040 | -18.63 | 22.58 | 0.825 ✓ |
| T4 | 120 - 100 | ROHN 2.5 STD | 9.29 | 8.89 | 112.6<br>K=1.00 | 11.718 | 1.7040 | -19.22 | 19.97 | 0.963 ✓ |
| T5 | 100 - 80 | ROHN 3 EH | 12.60 | 12.01 | 126.9<br>K=1.00 | 9.277 | 3.0159 | -23.81 | 27.98 | 0.851 ✓ |
| T6 | 80 - 60 | ROHN 3 EH | 13.40 | 12.73 | 134.4<br>K=1.00 | 8.264 | 3.0159 | -23.17 | 24.92 | 0.930 ✓ |
| T7 | 60 - 40 | ROHN 3 EH | 14.32 | 13.69 | 144.6<br>K=1.00 | 7.143 | 3.0159 | -21.84 | 21.54 | 1.014 ✓ |
| T8 | 40 - 20 | ROHN 3.5 EH | 15.24 | 14.53 | 133.5<br>K=1.00 | 8.383 | 3.6784 | -22.85 | 30.84 | 0.741 ✓ |
| T9 | 20 - 0 | ROHN 3.5 EH | 16.20 | 15.52 | 142.6<br>K=1.00 | 7.346 | 3.6784 | -22.17 | 27.02 | 0.820 ✓ |

## Horizontal Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.60 | 4.15 | 80.1<br>K=1.00 | 18.999 | 0.7995 | -2.81 | 15.19 | 0.185 ✓ |
| T2 | 160 - 140 | ROHN 2 STD | 8.68 | 4.15 | 63.3<br>K=1.00 | 22.141 | 1.0745 | -7.81 | 23.79 | 0.328 ✓ |
| T3 | 140 - 120 | ROHN 2 STD | 10.10 | 4.82 | 73.4<br>K=1.00 | 20.294 | 1.0745 | -11.78 | 21.81 | 0.540 ✓ |
| T4 | 120 - 100 | ROHN 2 STD | 12.22 | 5.83 | 88.9<br>K=1.00 | 17.170 | 1.0745 | -13.45 | 18.45 | 0.729 ✓ |
| T5 | 100 - 80 | ROHN 2 X-STR | 14.13 | 6.71 | 105.0 | 13.532 | 1.4773 | -14.61 | 19.99 | 0.731 |

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | K=1.00 | | | | | ✔ |
| T6 | 80 - 60 | ROHN 2.5 STD | 16.58 | 7.84 | 99.3<br>K=1.00 | 13.063 | 1.7040 | -15.49 | 22.26 | 0.696<br>✔ |
| T7 | 60 - 40 | ROHN 2.5 STD | 19.16 | 9.13 | 115.6<br>K=1.00 | 10.900 | 1.7040 | -15.57 | 18.57 | 0.838<br>✔ |
| T8 | 40 - 20 | ROHN 3 STD | 21.73 | 10.33 | 106.6<br>K=1.00 | 12.129 | 2.2285 | -16.90 | 27.03 | 0.625<br>✔ |
| T9 | 20 - 0 | ROHN 3 STD | 24.23 | 11.58 | 119.5<br>K=1.00 | 10.359 | 2.2285 | -16.38 | 23.09 | 0.709<br>✔ |

## Top Girt Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.54 | 4.12 | 79.5<br>K=1.00 | 17.139 | 0.7995 | -0.81 | 13.70 | 0.059<br>✔ |
| T2 | 160 - 140 | ROHN 2 STD | 8.63 | 4.17 | 63.6<br>K=1.00 | 19.331 | 1.0745 | -5.90 | 20.77 | 0.284<br>✔ |
| T3 | 140 - 120 | ROHN 2 STD | 8.71 | 4.17 | 63.5<br>K=1.00 | 19.334 | 1.0745 | -8.95 | 20.78 | 0.431<br>✔ |
| T4 | 120 - 100 | ROHN 2 STD | 10.79 | 5.16 | 78.7<br>K=1.00 | 17.251 | 1.0745 | -12.36 | 18.54 | 0.667<br>✔ |
| T5 | 100 - 80 | ROHN 2 X-STR | 12.93 | 6.19 | 96.9<br>K=1.00 | 14.443 | 1.4773 | -14.27 | 21.34 | 0.669<br>✔ |
| T6 | 80 - 60 | ROHN 2.5 STD | 15.33 | 7.31 | 92.5<br>K=1.00 | 15.149 | 1.7040 | -15.02 | 25.81 | 0.582<br>✔ |
| T7 | 60 - 40 | ROHN 2.5 STD | 17.83 | 8.47 | 107.2<br>K=1.00 | 12.683 | 1.7040 | -15.60 | 21.61 | 0.722<br>✔ |
| T8 | 40 - 20 | ROHN 3 STD | 20.48 | 9.79 | 101.0<br>K=1.00 | 13.762 | 2.2285 | -16.69 | 30.67 | 0.544<br>✔ |
| T9 | 20 - 0 | ROHN 3 STD | 22.98 | 10.96 | 113.0<br>K=1.00 | 11.647 | 2.2285 | -17.50 | 25.96 | 0.674<br>✔ |

## Inner Bracing Design Data (Compression)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | L2x2x1/8 | 4.27 | 4.27 | 128.9<br>K=1.00 | 8.989 | 0.4844 | -0.01 | 4.35 | 0.003<br>✔ |
| T2 | 160 - 140 | L2x2x1/8 | 4.31 | 4.31 | 130.3<br>K=1.00 | 8.802 | 0.4844 | -0.10 | 4.26 | 0.024<br>✔ |
| T3 | 140 - 120 | L2x2x1/8 | 4.35 | 4.35 | 131.5<br>K=1.00 | 8.641 | 0.4844 | -0.16 | 4.19 | 0.037<br>✔ |
| T4 | 120 - 100 | L2x2x1/8 | 5.39 | 5.39 | 162.9<br>K=1.00 | 5.631 | 0.4844 | -0.21 | 2.73 | 0.078<br>✔ |

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T5 | 100 - 80 | L2x2x1/8 | 6.47 | 6.47 | 195.1<br>K=1.00 | 3.921 | 0.4844 | -0.25 | 1.90 | 0.130 ✔ |
| T6 | 80 - 60 | L2 1/2x2 1/2x3/16 | 7.67 | 7.67 | 185.8<br>K=1.00 | 4.325 | 0.9020 | -0.26 | 3.90 | 0.067 ✔ |
| T7 | 60 - 40 | L3x3x3/16 | 8.92 | 8.92 | 179.5<br>K=1.00 | 4.635 | 1.0900 | -0.27 | 5.05 | 0.053 ✔ |
| T8 | 40 - 20 | L3 1/2x3 1/2x1/4 | 10.24 | 10.24 | 177.1<br>K=1.00 | 4.763 | 1.6900 | -0.29 | 8.05 | 0.036 ✔ |
| T9 | 20 - 0 | L3 1/2x3 1/2x1/4 | 11.49 | 11.49 | 198.7<br>K=1.00 | 3.783 | 1.6900 | -0.30 | 6.39 | 0.047 ✔ |

## Tension Checks

## Leg Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 3 STD | 20.00 | 6.67 | 68.8 | 30.000 | 2.2285 | 5.40 | 66.85 | 0.081 ✔ |
| T2 | 160 - 140 | ROHN 4 STD | 20.00 | 6.67 | 53.0 | 30.000 | 3.1741 | 37.93 | 95.22 | 0.398 ✔ |
| T3 | 140 - 120 | ROHN 5 EH | 20.04 | 6.68 | 43.6 | 30.000 | 6.1120 | 87.44 | 183.36 | 0.477 ✔ |
| T4 | 120 - 100 | ROHN 6 EH | 20.04 | 6.68 | 36.5 | 30.000 | 8.4049 | 139.16 | 252.15 | 0.552 ✔ |
| T5 | 100 - 80 | ROHN 8 EH | 20.05 | 10.02 | 41.8 | 30.000 | 12.7627 | 182.21 | 382.88 | 0.476 ✔ |
| T6 | 80 - 60 | ROHN 10 EH | 20.05 | 10.03 | 33.2 | 30.000 | 16.1007 | 229.23 | 483.02 | 0.475 ✔ |
| T7 | 60 - 40 | ROHN 10 EH | 20.06 | 10.03 | 33.2 | 30.000 | 16.1007 | 271.93 | 483.02 | 0.563 ✔ |
| T8 | 40 - 20 | ROHN 12 EH | 20.05 | 10.03 | 27.8 | 30.000 | 19.2423 | 310.99 | 577.27 | 0.539 ✔ |
| T9 | 20 - 0 | ROHN 12 EH | 20.05 | 10.03 | 27.8 | 30.000 | 19.2423 | 348.61 | 577.27 | 0.604 ✔ |

## Diagonal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 2 STD | 7.94 | 7.67 | 117.0 | 25.200 | 1.0745 | 4.99 | 27.08 | 0.184 ✔ |
| T2 | 160 - 140 | ROHN 2.5 STD | 7.96 | 7.62 | 96.5 | 25.200 | 1.7040 | 14.21 | 42.94 | 0.331 |

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T3 | 140 - 120 | ROHN 2.5 STD | 8.36 | 8.00 | 101.3 | 25.200 | 1.7040 | 18.73 | 42.94 | 0.436 ✔ |
| T4 | 120 - 100 | ROHN 2.5 STD | 9.04 | 8.65 | 109.5 | 25.200 | 1.7040 | 19.10 | 42.94 | 0.445 ✔ |
| T5 | 100 - 80 | ROHN 3 EH | 12.25 | 11.66 | 123.1 | 25.200 | 3.0159 | 23.92 | 76.00 | 0.315 ✔ |
| T6 | 80 - 60 | ROHN 3 EH | 12.99 | 12.32 | 130.1 | 25.200 | 3.0159 | 22.92 | 76.00 | 0.302 ✔ |
| T7 | 60 - 40 | ROHN 3 EH | 13.85 | 13.23 | 139.7 | 25.200 | 3.0159 | 21.89 | 76.00 | 0.288 ✔ |
| T8 | 40 - 20 | ROHN 3.5 EH | 14.77 | 14.07 | 129.2 | 25.200 | 3.6784 | 22.33 | 92.70 | 0.241 ✔ |
| T9 | 20 - 0 | ROHN 3.5 EH | 15.71 | 15.04 | 138.1 | 25.200 | 3.6784 | 21.82 | 92.70 | 0.235 ✔ |

## Horizontal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.60 | 4.15 | 80.1 | 30.000 | 0.7995 | 2.85 | 23.98 | 0.119 ✔ |
| T2 | 160 - 140 | ROHN 2 STD | 8.68 | 4.15 | 63.3 | 30.000 | 1.0745 | 7.87 | 32.24 | 0.244 ✔ |
| T3 | 140 - 120 | ROHN 2 STD | 10.10 | 4.82 | 73.4 | 30.000 | 1.0745 | 11.54 | 32.24 | 0.358 ✔ |
| T4 | 120 - 100 | ROHN 2 STD | 12.22 | 5.83 | 88.9 | 30.000 | 1.0745 | 13.18 | 32.24 | 0.409 ✔ |
| T5 | 100 - 80 | ROHN 2 X-STR | 14.13 | 6.71 | 105.0 | 30.000 | 1.4773 | 14.25 | 44.32 | 0.322 ✔ |
| T6 | 80 - 60 | ROHN 2.5 STD | 16.58 | 7.84 | 99.3 | 21.600 | 1.7040 | 15.18 | 36.81 | 0.412 ✔ |
| T7 | 60 - 40 | ROHN 2.5 STD | 19.16 | 9.13 | 115.6 | 21.600 | 1.7040 | 15.31 | 36.81 | 0.416 ✔ |
| T8 | 40 - 20 | ROHN 3 STD | 21.73 | 10.33 | 106.6 | 21.600 | 2.2285 | 17.02 | 48.13 | 0.354 ✔ |
| T9 | 20 - 0 | ROHN 3 STD | 24.23 | 11.58 | 119.5 | 21.600 | 2.2285 | 17.79 | 48.13 | 0.370 ✔ |

## Top Girt Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.54 | 4.12 | 79.5 | 25.200 | 0.7995 | 0.81 | 20.15 | 0.040 ✔ |

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T2 | 160 - 140 | ROHN 2 STD | 8.63 | 4.17 | 63.6 | 25.200 | 1.0745 | 5.96 | 27.08 | 0.220 ✓ |
| T3 | 140 - 120 | ROHN 2 STD | 8.71 | 4.17 | 63.5 | 25.200 | 1.0745 | 8.39 | 27.08 | 0.310 ✓ |
| T4 | 120 - 100 | ROHN 2 STD | 10.79 | 5.16 | 78.7 | 25.200 | 1.0745 | 12.08 | 27.08 | 0.446 ✓ |
| T5 | 100 - 80 | ROHN 2 X-STR | 12.93 | 6.19 | 96.9 | 25.200 | 1.4773 | 13.75 | 37.23 | 0.369 ✓ |
| T6 | 80 - 60 | ROHN 2.5 STD | 15.33 | 7.31 | 92.5 | 25.200 | 1.7040 | 14.65 | 42.94 | 0.341 ✓ |
| T7 | 60 - 40 | ROHN 2.5 STD | 17.83 | 8.47 | 107.2 | 25.200 | 1.7040 | 15.21 | 42.94 | 0.354 ✓ |
| T8 | 40 - 20 | ROHN 3 STD | 20.48 | 9.79 | 101.0 | 25.200 | 2.2285 | 16.61 | 56.16 | 0.296 ✓ |
| T9 | 20 - 0 | ROHN 3 STD | 22.98 | 10.96 | 113.0 | 25.200 | 2.2285 | 16.73 | 56.16 | 0.298 ✓ |

## Inner Bracing Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | $L_u$ ft | Kl/r | $F_a$ ksi | A $in^2$ | Actual P K | Allow. $P_a$ K | Ratio $\frac{P}{P_a}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | L2x2x1/8 | 4.27 | 4.27 | 81.8 | 30.000 | 0.4844 | 0.01 | 14.53 | 0.001 ✓ |
| T2 | 160 - 140 | L2x2x1/8 | 4.31 | 4.31 | 82.7 | 30.000 | 0.4844 | 0.10 | 14.53 | 0.007 ✓ |
| T3 | 140 - 120 | L2x2x1/8 | 4.35 | 4.35 | 83.5 | 30.000 | 0.4844 | 0.16 | 14.53 | 0.011 ✓ |
| T4 | 120 - 100 | L2x2x1/8 | 5.39 | 5.39 | 103.4 | 30.000 | 0.4844 | 0.21 | 14.53 | 0.015 ✓ |
| T5 | 100 - 80 | L2x2x1/8 | 6.47 | 6.47 | 123.9 | 30.000 | 0.4844 | 0.25 | 14.53 | 0.017 ✓ |
| T6 | 80 - 60 | L2 1/2x2 1/2x3/16 | 7.67 | 7.67 | 118.2 | 30.000 | 0.9020 | 0.26 | 27.06 | 0.010 ✓ |
| T7 | 60 - 40 | L3x3x3/16 | 8.92 | 8.92 | 113.9 | 30.000 | 1.0900 | 0.27 | 32.70 | 0.008 ✓ |
| T8 | 40 - 20 | L3 1/2x3 1/2x1/4 | 10.24 | 10.24 | 112.7 | 30.000 | 1.6900 | 0.29 | 50.70 | 0.006 ✓ |
| T9 | 20 - 0 | L3 1/2x3 1/2x1/4 | 11.49 | 11.49 | 126.5 | 30.000 | 1.6900 | 0.30 | 50.70 | 0.006 ✓ |

## Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $SF*P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| T1 | 180 - 160 | Leg | ROHN 3 STD | 3 | -8.59 | 62.88 | 13.7 | Pass |
| T2 | 160 - 140 | Leg | ROHN 4 STD | 42 | -45.85 | 101.02 | 45.4 | Pass |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $SF*P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| T3 | 140 - 120 | Leg | ROHN 5 EH | 81 | -101.83 | 206.29 | 49.4 | Pass |
| T4 | 120 - 100 | Leg | ROHN 6 EH | 120 | -160.70 | 294.78 | 54.5 | Pass |
| T5 | 100 - 80 | Leg | ROHN 8 EH | 159 | -208.29 | 435.15 | 47.9 | Pass |
| T6 | 80 - 60 | Leg | ROHN 10 EH | 186 | -261.30 | 574.19 | 45.5 | Pass |
| T7 | 60 - 40 | Leg | ROHN 10 EH | 213 | -310.44 | 574.16 | 54.1 | Pass |
| T8 | 40 - 20 | Leg | ROHN 12 EH | 240 | -356.88 | 703.47 | 50.7 | Pass |
| T9 | 20 - 0 | Leg | ROHN 12 EH | 267 | -401.36 | 703.47 | 57.1 | Pass |
| T1 | 180 - 160 | Diagonal | ROHN 2 STD | 14 | -5.05 | 15.63 | 32.3 | Pass |
| T2 | 160 - 140 | Diagonal | ROHN 2.5 STD | 53 | -14.29 | 32.95 | 43.4 | Pass |
| | | | | | | | 55.5 (b) | |
| T3 | 140 - 120 | Diagonal | ROHN 2.5 STD | 93 | -18.63 | 30.10 | 61.9 | Pass |
| | | | | | | | 73.3 (b) | |
| T4 | 120 - 100 | Diagonal | ROHN 2.5 STD | 132 | -19.22 | 26.62 | 72.2 | Pass |
| | | | | | | | 74.8 (b) | |
| T5 | 100 - 80 | Diagonal | ROHN 3 EH | 171 | -23.81 | 37.30 | 63.8 | Pass |
| | | | | | | | 65.3 (b) | |
| T6 | 80 - 60 | Diagonal | ROHN 3 EH | 198 | -23.17 | 33.22 | 69.7 | Pass |
| T7 | 60 - 40 | Diagonal | ROHN 3 EH | 225 | -21.84 | 28.72 | 76.1 | Pass |
| T8 | 40 - 20 | Diagonal | ROHN 3.5 EH | 252 | -22.85 | 41.11 | 55.6 | Pass |
| | | | | | | | 62.0 (b) | |
| T9 | 20 - 0 | Diagonal | ROHN 3.5 EH | 279 | -22.17 | 36.02 | 61.5 | Pass |
| T1 | 180 - 160 | Horizontal | ROHN 1.5 STD | 13 | -2.81 | 20.25 | 13.9 | Pass |
| | | | | | | | 16.6 (b) | |
| T2 | 160 - 140 | Horizontal | ROHN 2 STD | 52 | -7.81 | 31.71 | 24.6 | Pass |
| | | | | | | | 45.8 (b) | |
| T3 | 140 - 120 | Horizontal | ROHN 2 STD | 91 | -11.78 | 29.07 | 40.5 | Pass |
| | | | | | | | 68.9 (b) | |
| T4 | 120 - 100 | Horizontal | ROHN 2 STD | 130 | -13.45 | 24.59 | 54.7 | Pass |
| | | | | | | | 78.3 (b) | |
| T5 | 100 - 80 | Horizontal | ROHN 2 X-STR | 169 | -14.61 | 26.65 | 54.8 | Pass |
| | | | | | | | 59.1 (b) | |
| T6 | 80 - 60 | Horizontal | ROHN 2.5 STD | 196 | -15.49 | 29.67 | 52.2 | Pass |
| | | | | | | | 62.6 (b) | |
| T7 | 60 - 40 | Horizontal | ROHN 2.5 STD | 223 | -15.57 | 24.76 | 62.9 | Pass |
| | | | | | | | 63.0 (b) | |
| T8 | 40 - 20 | Horizontal | ROHN 3 STD | 250 | -16.90 | 36.03 | 46.9 | Pass |
| | | | | | | | 68.8 (b) | |
| T9 | 20 - 0 | Horizontal | ROHN 3 STD | 277 | -16.38 | 30.77 | 53.2 | Pass |
| | | | | | | | 71.9 (b) | |
| T1 | 180 - 160 | Top Girt | ROHN 1.5 STD | 6 | -0.81 | 18.26 | 4.4 | Pass |
| | | | | | | | 4.7 (b) | |
| T2 | 160 - 140 | Top Girt | ROHN 2 STD | 45 | -5.90 | 27.69 | 21.3 | Pass |
| | | | | | | | 34.7 (b) | |
| T3 | 140 - 120 | Top Girt | ROHN 2 STD | 84 | -8.95 | 27.69 | 32.3 | Pass |
| | | | | | | | 52.1 (b) | |
| T4 | 120 - 100 | Top Girt | ROHN 2 STD | 123 | -12.36 | 24.71 | 50.0 | Pass |
| | | | | | | | 72.0 (b) | |
| T5 | 100 - 80 | Top Girt | ROHN 2 X-STR | 162 | -14.27 | 28.44 | 50.2 | Pass |
| | | | | | | | 57.7 (b) | |
| T6 | 80 - 60 | Top Girt | ROHN 2.5 STD | 189 | -15.02 | 34.41 | 43.7 | Pass |
| | | | | | | | 60.7 (b) | |
| T7 | 60 - 40 | Top Girt | ROHN 2.5 STD | 216 | -15.60 | 28.81 | 54.1 | Pass |
| | | | | | | | 63.1 (b) | |
| T8 | 40 - 20 | Top Girt | ROHN 3 STD | 243 | -16.69 | 40.88 | 40.8 | Pass |
| | | | | | | | 67.5 (b) | |
| T9 | 20 - 0 | Top Girt | ROHN 3 STD | 270 | -17.50 | 34.60 | 50.6 | Pass |
| | | | | | | | 70.7 (b) | |
| T1 | 180 - 160 | Inner Bracing | L2x2x1/8 | 38 | -0.01 | 5.80 | 0.2 | Pass |
| T2 | 160 - 140 | Inner Bracing | L2x2x1/8 | 77 | -0.10 | 5.68 | 1.8 | Pass |
| T3 | 140 - 120 | Inner Bracing | L2x2x1/8 | 116 | -0.16 | 5.58 | 2.8 | Pass |
| T4 | 120 - 100 | Inner Bracing | L2x2x1/8 | 155 | -0.21 | 3.64 | 5.9 | Pass |

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | $SF*P_{allow}$ K | % Capacity | Pass Fail |
|---|---|---|---|---|---|---|---|---|
| T5 | 100 - 80 | Inner Bracing | L2x2x1/8 | 183 | -0.25 | 2.53 | 9.8 | Pass |
| T6 | 80 - 60 | Inner Bracing | L2 1/2x2 1/2x3/16 | 209 | -0.26 | 5.20 | 5.0 | Pass |
| T7 | 60 - 40 | Inner Bracing | L3x3x3/16 | 236 | -0.27 | 6.73 | 4.0 | Pass |
| T8 | 40 - 20 | Inner Bracing | L3 1/2x3 1/2x1/4 | 263 | -0.29 | 10.73 | 2.7 | Pass |
| T9 | 20 - 0 | Inner Bracing | L3 1/2x3 1/2x1/4 | 291 | -0.30 | 8.52 | 3.6 | Pass |
| | | | | | | | Summary | |
| | | | | | | Leg (T9) | 57.1 | Pass |
| | | | | | | Diagonal (T7) | 76.1 | Pass |
| | | | | | | Horizontal (T4) | 78.3 | Pass |
| | | | | | | Top Girt (T4) | 72.0 | Pass |
| | | | | | | Inner Bracing (T5) | 9.8 | Pass |
| | | | | | | Bolt Checks | 78.3 | Pass |
| | | | | | | **RATING =** | **78.3** | **Pass** |

Program Version 6.0.0.8 - 9/7/2011 File:J:/Jobs/1504900.WI/002 - CT11041D/04_Structural/Backup Documentation/Calcs/ERI Files/180' Lattice Tower, Waterford, Ct.eri

# Network Modernization RFDS v3.0

| | | | |
|---|---|---|---|
| Site ID | CT11041D | Latitude | 41.37774 |
| | | Longitude | -72.13940 |
| Site Name | Waterford/ I-95/ X82 | Site Type | Structure (Non-Building) |
| Address | 53 Dayton Road, Waterford, CT 06385 | Site Class | Self Support Tower |
| Market | Connecticut | Landlord | Tower Co. |

| Configuration |
|---|
| 702CU |

| Approvals | |
|---|---|
| Market RF | |
| Market Development | |

| | |
|---|---|
| RFDS Revision | |
| RFDS Final | X |

Date: 10/10/2013

Work Order #:

NOC#: (888) 218-6664

## Site Information

| Existing Configuration | | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | Cabinet # | 1 | 2 | 3 | 4 |
| UMTS | GSM/UMTS/LTE | GSM | | Technology | UMTS | GSM/UMTS/LTE | GSM | |
| 3106 | 6102 | S8000 | | Cabinet type | 3106 | 6102 | S8000 | |
| | | | | CBU | | | | |
| | 2 | | | DUW30 | | 2 | | |
| | 1 | | | DUL20 | | | | |
| | 1 | | | DUG20 | | 1 | | |
| | | | | DUS41 | | 1 | | |
| | | | | RBS6601 | | | | |
| | | | | dTRU/TRX | | | | |
| | | | | RU22 B4 | | | | |
| | | | | RUS01 B2 | | | | |
| | 6 | | | RUS01 B4 | | 6 | | |

- [ ] Relocate cabinet
- [ ] Add cabinet
- [ ] Swap cabinet
- [ ] Remove cabinet
- [ ] Make cabinet dark

**Scope of Work**

Swap DUL with DUS41

## ALPHA - Scope of Work

| | | | | |
|---|---|---|---|---|
| | Add new mount | x | Add RRU | Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna. |
| | Relocate antenna | | Swap existing RRU | |
| | Add antenna | | Remove RRU | |
| x | Swap antenna | | Consolidate coax cables | |
| | Remove antenna | | Add coax cables | |
| | Add TMA | | Add fiber cables | |
| | Swap TMA | | Add hybrid combiner | |
| | Remove TMA | | Add filter combiner | |

## BETA - Scope of Work

| | | | | |
|---|---|---|---|---|
| | Add new mount | x | Add RRU | Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna. |
| | Relocate antenna | | Swap existing RRU | |
| | Add antenna | | Remove RRU | |
| x | Swap antenna | | Consolidate coax cables | |
| | Remove antenna | | Add coax cables | |
| | Add TMA | | Add fiber cables | |
| | Swap TMA | | Add hybrid combiner | |
| | Remove TMA | | Add filter combiner | |

## GAMMA - Scope of Work

| | | | | |
|---|---|---|---|---|
| | Add new mount | x | Add RRU | Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna. |
| | Relocate antenna | | Swap existing RRU | |
| | Add antenna | | Remove RRU | |
| x | Swap antenna | | Consolidate coax cables | |
| | Remove antenna | | Add coax cables | |
| | Add TMA | | Add fiber cables | |
| | Swap TMA | | Add hybrid combiner | |
| | Remove TMA | | Add filter combiner | |

## DELTA - Scope of Work

| | | | | |
|---|---|---|---|---|
| | Add new mount | | Add RRU | |
| | Relocate antenna | | Swap existing RRU | |
| | Add antenna | | Remove RRU | |
| | Swap antenna | | Consolidate coax cables | |
| | Remove antenna | | Add coax cables | |
| | Add TMA | | Add fiber cables | |
| | Swap TMA | | Add hybrid combiner | |
| | Remove TMA | | Add filter combiner | |

# Network Modernization RFDS v3.0

T-Mobile

| | | | |
|---|---|---|---|
| **Site ID** | **CT11041D** | **Latitude** | 41.37774 |
| | | **Longitude** | -72.13940 |
| **Site Name** | Waterford/ I-95/ X82 | **Site Type** | Structure (Non-Building) |
| **Address** | 53 Dayton Road, Waterford, CT 06385 | **Site Class** | Self Support Tower |
| **Market** | Connecticut | **Landlord** | Tower Co. |

**Configuration**

**702CU**

| Approvals | |
|---|---|
| Market RF | |
| Market Development | |

| | |
|---|---|
| RFDS Revision | |
| RFDS Final | X |

**Date** 10/10/2013

## ALPHA (view from behind)

| Existing Configuration | | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| X | X | X | | Mount | X | X | X | |
| | GSM/UMTS B2 A Quad pole AIR21 B2A/B4P Ericsson 165 30 Yes 2 0 / UMTS/LTE B4 A P Yes 2 2 | Dual pole RR90_17_02DP EMS | | Technology / Band / Active/Passive / Ant. Type / Ant. Model / Ant. Vendor / Ant. Height / Azimuth / RET deployed / E-Tilt / M-Tilt | LTE B4 A Quad pole AIR21 B4A/B12P-8 Ericsson 165 30 Yes 3 0 | GSM/UMTS B2 A Quad pole AIR21 B2A/B4P Ericsson 165 30 Yes 2 0 / UMTS B4 P Yes 2 2 | LTE B12 P Dual pole LNX-6515DS-VTM Commscope 167 30 Yes 2 0 | |
| | 1 dd B4 | | | TMA # / TMA Type | | 1 dd B4 | | |
| | 2 (LMU) 1-5/8" / 2 1-5/8" 223 | | | RRU # / RRU Type / Used Coax # / Coax Type / Coax Length (ft) | | 2 (LMU) 1-5/8" / 2 1-5/8" 223 | 1 RUS11_B | |
| | 2 | | | Fiber (CPRI) # | 2 | 2 | 2 | |
| | | | | Splitter # / Combiner # / Combiner Type | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | X | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| | Remove TMA | | Add filter combiner |

**Scope of work**

Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna.

## BETA (view from behind)

| Existing Configuration | | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| X | X | X | | Mount | X | X | X | |
| | GSM/UMTS B2 A Quad pole AIR21 B2A/B4P Ericsson 165 150 Yes 2 0 / UMTS/LTE B4 A P Yes 2 4 | Dual pole RR90_17_02DP EMS | | Technology / Band / Active/Passive / Ant. Type / Ant. Model / Ant. Vendor / Ant. Height / Azimuth / RET deployed / E-Tilt / M-Tilt | LTE B4 A Quad pole AIR21 B4A/B12P-8 Ericsson 165 150 Yes 3 0 | GSM/UMTS B2 A Quad pole AIR21 B2A/B4P Ericsson 165 150 Yes 2 0 / UMTS B4 P Yes 2 4 | LTE B12 P Dual pole LNX-6515DS-VTM Commscope 167 30 Yes 2 0 | |
| | 1 dd B4 | | | TMA # / TMA Type | | 1 dd B4 | | |
| | 2 (LMU) 1-5/8" / 2 1-5/8" 218 | | | RRU # / RRU Type / Used Coax # / Coax Type / Coax Length (ft) | | 2 (LMU) 1-5/8" / 2 1-5/8" 218 | 1 RUS11_B | |
| | 2 | | | Fiber (CPRI) # | 2 | 2 | 2 | |
| | | | | Splitter # / Combiner # / Combiner Type | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | X | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| | Remove TMA | | Add filter combiner |

**Scope of work**

Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna.

# Network Modernization RFDS v3.0

| | | | |
|---|---|---|---|
| Site ID | CT11041D | Latitude | 41.37774 |
| | | Longitude | -72.13940 |
| Site Name | Waterford/ I-95/ X82 | Site Type | Structure (Non-Building) |
| Address | 53 Dayton Road, Waterford, CT 06385 | Site Class | Self Support Tower |
| Market | Connecticut | Landlord | Tower Co. |

| Configuration |
|---|
| 702CU |

| Approvals | |
|---|---|
| Market RF | |
| Market Development | |

| | |
|---|---|
| RFDS Revision | |
| RFDS Final | X |

Date: 10/10/2013

## GAMMA (view from behind)

| | Existing Configuration | | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|---|
| | X | X | X | | X | X | X | |
| Technology | | GSM/UMTS / UMTS/LTE | | | LTE | GSM/UMTS / UMTS | LTE | |
| Band | | B2 / B4 | | | B4 | B2 / B4 | B12 | |
| Active/Passive | | A / P | | | A | A / P | P | |
| Ant. Type | Dual pole | Quad pole | Dual pole | | Quad pole | Quad pole | Dual pole | |
| Ant. Model | RR90_17_02DP | AIR21 B2A/B4P | RR90_17_02DP | | AIR21 B4A/B12P-8 | AIR21 B2A/B4P | LNX-6515DS-VTM | |
| Ant. Vendor | EMS | Ericsson | EMS | | Ericsson | Ericsson | Commscope | |
| Ant. Height | | 165 | | | 165 | 165 | 167 | |
| Azimuth | | 270 | | | 270 | 270 | 270 | |
| RET deployed | | Yes / Yes | | | Yes | Yes / Yes | Yes | |
| E-Tilt | | 2 / 5 | | | 3 | 2 / 5 | 2 | |
| M-Tilt | | 0 / 0 | | | 0 | 0 / 0 | 0 | |
| TMA # | | 1 | | | | 1 | | |
| TMA Type | | dd B4 | | | | dd B4 | | |
| RRU # | | | | | | | 1 | |
| RRU Type | | | | | | | RUS11_B | |
| Used Coax # | | 2 (LMU) / 2 | | | | 2 (LMU) / 2 | | |
| Coax Type | | 1-5/8" / 1-5/8" | | | | 1-5/8" / 1-5/8" | | |
| Coax Length (ft) | | 226 | | | | 226 | | |
| Fiber (CPRI) # | | 2 | | | 2 | 2 | 2 | |
| Splitter # | | | | | | | | |
| Combiner # | | | | | | | | |
| Combiner Type | | | | | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | X | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| | Remove TMA | | Add filter combiner |

**Scope of work**

Swap a dummy antenna with L700 passive antenna. Add RRUS at antenna. Use spare fiber for LTE 700.Swap a dummy with B4 LTE antenna.

## DELTA (view from behind)

| | Existing Configuration | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| Technology | | | | | | | | |
| Band | | | | | | | | |
| Active/Passive | | | | | | | | |
| Ant. Type | | | | | | | | |
| Ant. Model | | | | | | | | |
| Ant. Vendor | | | | | | | | |
| Ant. Height | | | | | | | | |
| Azimuth | | | | | | | | |
| RET deployed | | | | | | | | |
| E-Tilt | | | | | | | | |
| M-Tilt | | | | | | | | |
| TMA # | | | | | | | | |
| TMA Type | | | | | | | | |
| RRU # | | | | | | | | |
| RRU Type | | | | | | | | |
| Used Coax # | | | | | | | | |
| Coax Type | | | | | | | | |
| Coax Length (ft) | | | | | | | | |
| Fiber (CPRI) # | | | | | | | | |
| Splitter # | | | | | | | | |
| Combiner # | | | | | | | | |
| Combiner Type | | | | | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| | Swap antenna | | Consolidate coax cables |
| | Remove antenna | | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| | Remove TMA | | Add filter combiner |

**Scope of work**

# Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

## LNX-6515DS-VTM

**Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible**

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- Exceptional horizontal pattern roll-off and strong front-to-back ratio
- Extended bandwidth allows one antenna to serve multiple frequency allocations
- Great solution to maximize network coverage and capacity
- The RF connectors are designed for IP67 rating and the radome for IP56 rating
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

## Electrical Specifications

| **Frequency Band, MHz** | **698–806** | **806–896** |
|---|---|---|
| Gain by all Beam Tilts, average, dBi | 16.6 | 16.9 |
| Gain by all Beam Tilts Tolerance, dB | ±0.4 | ±0.3 |
| Gain by Beam Tilt, average, dBi | 0 ° \| 16.6<br>4 ° \| 16.6<br>8 ° \| 16.4 | 0 ° \| 17.0<br>4 ° \| 17.0<br>8 ° \| 16.8 |
| Beamwidth, Horizontal, degrees | 65 | 64 |
| Beamwidth, Horizontal Tolerance, degrees | ±1 | ±0.9 |
| Beamwidth, Vertical, degrees | 9.7 | 8.6 |
| Beamwidth, Vertical Tolerance, degrees | ±0.6 | ±0.4 |
| Beam Tilt, degrees | 0–8 | 0–8 |
| USLS, dB | 18 | 18 |
| Front-to-Back Total Power at 180° ± 30°, dB | 25 | 23 |
| CPR at Boresight, dB | 24 | 27 |
| CPR at Sector, dB | 15 | 13 |
| Isolation, dB | 30 | 30 |
| VSWR \| Return Loss, dB | 1.4 \| 15.6 | 1.4 \| 15.6 |
| PIM, 3rd Order, 2 x 20 W, dBc | -153 | -153 |
| Input Power per Port, maximum, watts | 400 | 400 |
| Polarization | ±45° | ±45° |
| Impedance | 50 ohm | 50 ohm |

## General Specifications

| | |
|---|---|
| Antenna Brand | Andrew® |
| Antenna Type | DualPol® |
| Band | Single band |
| Brand | DualPol® \| Teletilt® |
| Operating Frequency Band | 698 – 896 MHz |
| Number of Ports, all types | 2 |

## Mechanical Specifications

| | |
|---|---|
| Color | Light gray |
| Lightning Protection | dc Ground |
| Radiator Material | Aluminum |

# Product Specifications

LNX-6515DS-VTM

| | |
|---|---|
| Radome Material | Fiberglass, UV resistant |
| RF Connector Interface | 7-16 DIN Female |
| RF Connector Location | Bottom |
| RF Connector Quantity, total | 2 |
| Wind Loading, maximum | 878.0 N @ 150 km/h<br>197.4 lbf @ 150 km/h |
| Wind Speed, maximum | 241.0 km/h \| 149.8 mph |

## Dimensions

| | |
|---|---|
| Depth | 181.0 mm \| 7.1 in |
| Length | 2449.0 mm \| 96.4 in |
| Width | 301.0 mm \| 11.9 in |
| Net Weight | 22.8 kg \| 50.3 lb |

## Remote Electrical Tilt (RET) Information

| | |
|---|---|
| Model with Factory Installed AISG 1.1 Actuator | LNX-6515DS-R2M |
| Model with Factory Installed AISG 2.0 Actuator | LNX-6515DS-A1M |
| 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

DB380-3 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Used for wide panel antennas. Includes three clamp sets.

DB5083D — Downtilt Mounting Kit for 2.4"-4.5" (60-115 mm) OD round members. Consists of two DB5083 heavy-duty, galvanized steel downtilt mounting brackets. This kit is compatible with the DB380-3 pipe mount for panel antennas with three mounting points.

Table 7 AIR Unit Dimensions

| AIR Unit Type | Height (A) | Width (B) | Depth (C) | Distance between mounting brackets (D) | Depth including mounting bracket s (E) | Distance between stud holes on mounting brackets (F) | Distance between lower mounting bracket and the lower end of the AIR unit (G) |
|---|---|---|---|---|---|---|---|
| AIR 11 B8A B20P | 1982 mm | 307 mm | 200 mm | 1017 mm | 239 mm | 110 mm | 484 mm |
| AIR 11 B20A B8P | 1982 mm | 307 mm | 200 mm | 1017 mm | 239 mm | 110 mm | 484 mm |
| AIR 21 B1A B3P | 1427 mm | 307 mm | 200 mm | 1017 mm | 241 mm | 110 mm | 243 mm |
| AIR 21 B2A B4P | 1427 mm | 307 mm | 200 mm | 1017 mm | 241 mm | 110 mm | 243 mm |
| AIR 21 B4A B2P | 1427 mm | 307 mm | 200 mm | 1017 mm | 241 mm | 110 mm | 243 mm |
| AIR 21 B4A B12P B5P | 2432 mm | 307 mm | 222 mm | 1017 mm | 264 mm | 110 mm | 708 mm |

Table 8 lists the weight of the AIR unit with and without installation kit.

Table 8 AIR Unit Weight with and without Installation Kit

| AIR Unit Type | Weight without Installation Kit | Weight with Single Unit Pole Installation Kit, 55-115 mm | Weight with Single Unit Pole Installation Kit, 110-220 mm | Weight with Single Unit Wall Installation Kit | Weight with Triple Unit Pole Installation Kit, 114.3 mm (1) | Weight with Triple Unit Pole Installation Kit, 139.7 mm (1) | Weight with Down Tilt Installation Kit and Single Unit Pole Clamp, 110-220 mm |
|---|---|---|---|---|---|---|---|
| AIR 11 B8A B20P | 39.5 kg | 43.9 kg | 47.2 kg | 42.8 kg | 49.7 kg | 49.7 kg | N/A (2) |
| AIR 11 B20A B8P | 39.5 kg | 43.9 kg | 47.2 kg | 42.8 kg | 49.7 kg | 49.7 kg | N/A (2) |
| AIR 21 B1A B3P | 41.0 kg | 45.4 kg | 48.7 kg | 44.3 kg | 51.2 kg | 51.2 kg | 55.6 kg |
| AIR 21 B2A B4P | 41.5 kg | 45.9 kg | 49.2 kg | 44.8 kg | 51.7 kg | 51.7 kg | 56.1 kg |
| AIR 21 B4A B2P | 41.0 kg | 45.4 kg | 48.7 kg | 44.3 kg | 51.2 kg | 51.2 kg | 55.6 kg |
| AIR 21 B4A B12P B5P | 57.0 kg | 61.4 kg | 64.7 kg | 60.3 kg | 67.2 kg | 67.2 kg | N/A (2) |

*(1) Weight includes one AIR unit and the triple unit pole installation kit. After hoisting and installing, two more AIR units can be installed on the triple unit pole installation kit.*
*(2) Not Applicable.*

The color of the radome is gray, and the color of the rear and side solar shields are light gray.

## 3.4 Space Requirements

This section describes the space requirements for installing the AIR unit. A complete installation description is found in *Installing Antenna Integrated Radio Units*.

# RRUS 11

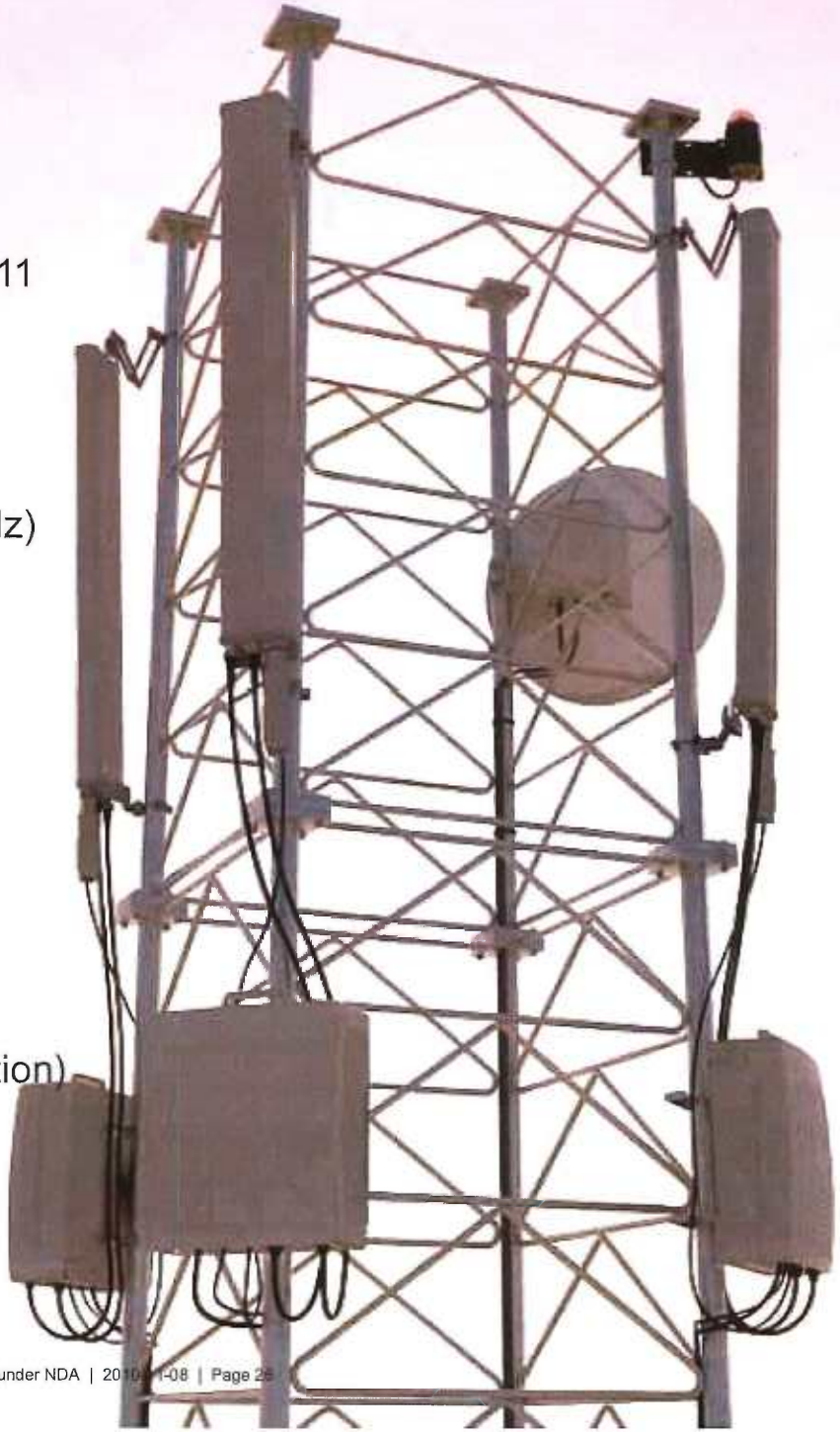
**Frequency (AT&T)**
- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

**RF Characteristics**
- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

**RET/TMA Support**
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

**Environmental**
- ✓ Self Convection
- ✓ Temperature -40 to 131 F

**Power**
- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
  - Recommended: 25 A
- ✓ Power Consumption:
  - Typical 200 Watts
  - Max 310 Watts
  - Excl. RET and TMA load



# RRUS 11 Mechanics

Wall and pole mounting brackets
- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:
- Above >= 16 in.
- Below >= 12 in.
- Side >= 0 mm

DC connector
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector
- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight
- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8" x 17.3" x 7.2" incl. sun shield

# EXHIBIT C

EBI Consulting
environmental | engineering | due diligence

# RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
# EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11041D

Waterford / I-95 / X82
53 Dayton Road
Waterford, CT 06385

**April 27, 2015**

**EBI Project Number: 6215001623**

| Site Compliance Summary | |
|---|---|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general public allowable limit: | 46.48 % |

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

April 27, 2015

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11041D – Waterford / I-95 / X82**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **53 Dayton Road, Waterford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **53 Dayton Road, Waterford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antennas used in this modeling are the **Ericsson AIR21 B2A/B4P** and the **Ericsson AIR21 B4A/B12P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B2A/B4P** and the **Ericsson AIR21 B4A/B12P** have a maximum gain of **15.9 dBd** at its main lobe for 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe for 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antenna mounting height centerlines of the proposed antennas is **164 feet** above ground level (AGL).

9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

EBI Consulting
environmental | engineering | due diligence

## T-Mobile Site Inventory and Power Data

| Sector: | A | Sector: | B | Sector: | C |
|---|---|---|---|---|---|
| Antenna #: | **1** | Antenna #: | **1** | Antenna #: | **1** |
| Make / Model: | Ericsson AIR21 B4A/B12P□ | Make / Model: | Ericsson AIR21 B4A/B12P□ | Make / Model: | Ericsson AIR21 B4A/B12P□ |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 164 | Height (AGL): | 164 | Height (AGL): | 164 |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count | 2 | Channel Count | 2 | # PCS Channels: | 2 |
| Total TX Power: | 120 | Total TX Power: | 120 | # AWS Channels: | 120 |
| ERP (W): | 4,668.54 | ERP (W): | 4,668.54 | ERP (W): | 4,668.54 |
| Antenna A1 MPE% | 0.67 | Antenna B1 MPE% | 0.67 | Antenna C1 MPE% | 0.67 |
| Antenna #: | **2** | Antenna #: | **2** | Antenna #: | **2** |
| Make / Model: | Ericsson AIR21 B2A/B4P□ | Make / Model: | Ericsson AIR21 B2A/B4P□ | Make / Model: | Ericsson AIR21 B2A/B4P□ |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 164 | Height (AGL): | 164 | Height (AGL): | 164 |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count | 4 | Channel Count | 4 | Channel Count | 4 |
| Total TX Power: | 120 | Total TX Power: | 120 | Total TX Power: | 120 |
| ERP (W): | 4,668.54 | ERP (W): | 4,668.54 | ERP (W): | 4,668.54 |
| Antenna A2 MPE% | 0.67 | Antenna B2 MPE% | 0.67 | Antenna C2 MPE% | 0.67 |
| Antenna #: | **3** | Antenna #: | **3** | Antenna #: | **3** |
| Make / Model: | Commscope LNX-6515DS-VTM | Make / Model: | Commscope LNX-6515DS-VTM | Make / Model: | Commscope LNX-6515DS-VTM |
| Gain: | 14.6 dBd | Gain: | 14.6 dBd | Gain: | 14.6 dBd |
| Height (AGL): | 164 | Height (AGL): | 164 | Height (AGL): | 164 |
| Frequency Bands | 700 MHz | Frequency Bands | 700 MHz | Frequency Bands | 700 MHz |
| Channel Count | 1 | Channel Count | 1 | Channel Count | 1 |
| Total TX Power: | 30 | Total TX Power: | 30 | Total TX Power: | 30 |
| ERP (W): | 865.21 | ERP (W): | 865.21 | ERP (W): | 865.21 |
| Antenna A3 MPE% | 0.27 | Antenna B3 MPE% | 0.27 | Antenna C3 MPE% | 0.27 |

| **Site Composite MPE%** | |
|---|---|
| **Carrier** | **MPE%** |
| T-Mobile | **4.83** |
| AT&T | 13.91 % |
| Verizon Wireless | 20.62 % |
| MetroPCS | 5.02 % |
| Public Safety | 2.10 % |
| **Site Total MPE %:** | **46.48 %** |

| | |
|---|---|
| T-Mobile Sector 1 Total: | 1.61 % |
| T-Mobile Sector 2 Total: | 1.61 % |
| T-Mobile Sector 3 Total: | 1.61 % |
| | |
| Site Total: | 46.48 % |

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## Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

| T-Mobile Sector | Power Density Value (%) |
|---|---|
| Sector 1: | 1.61 % |
| Sector 2: | 1.61 % |
| Sector 3 : | 1.61 % |
| T-Mobile Total: | 4.83 % |
| | |
| Site Total: | 46.48 % |
| | |
| Site Compliance Status: | **COMPLIANT** |

The anticipated composite MPE value for this site assuming all carriers present is **46.48%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

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