10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 5, 2017

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

Kyle Richers
10 Industrial Ave
Mahwah, NJ 07430
908-447-4716
krichers@transcendwireless.com

Notice of Exempt Modification
130 Vernon Road, Bolton, CT 06043
Latitude- 41.802648
Longitude- -72.441213

Dear Ms. Bachman,

T-Mobile currently maintains (4) existing antennas at the 130' level of the existing 150' guyed tower located at 130 Vernon Road in Bolton, CT. The tower and property is owned by Mountaintop Enterprises, Inc. T-Mobile intends to maintain the same antenna configuration as existing, but install (2) new Tower Mounted Amplifiers and (4) 1-5/8" coax cables.

This facility was approved by the Town of Bolton on September 4, 2001. A copy of this approval is attached. This approval did not come with conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-73, for construction that 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 Robert Morra, First Selectman of the Town of Bolton, as well as the tower and property owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels ox more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard,

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading with certain modifications.

For the foregoing reason, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. 16-50j-72(b)(2).

Sincerely,

Kyle Richers

Kyle Richers

10 Industrial Ave, Suite 3

Mahwah, New Jersey 07430

908-447-4716

krichers@transcendwireless.com

Attachments:

CC: The Honorable Robert R. Morra, First Selectman, Town of Bolton

Jim Rupert, Zoning Enforcement Officer, Town of Bolton

Mountaintop Enterprises, Inc. – as property and tower owner

TOWN OF BOLTON

222 Bolton Center Rd, Bolton, CT 06043

LAND USE DEPARTMENT PERMIT APPLICATION

15-21-9

PLEASE CONTACT THE LAND USE DEPARTMENT AT 649-8066 TO SCHEDULE INSPECTIONS OR FOR FINAL INSPECTION UPON COMPLETION TO ISSUE CERTIFICATE

1. PERMIT TYPE -- BUILDING ✓ ELECTRICAL_____ PLUMBING_____ HEATING_____
2. ADDRESS OF WORK 130 Vernon Road ZONE_____
3. PROPERTY OWNER Mountaintop Enterprises Inc.
   ADDRESS PO Box 9219, Bolton, CT 06043 TELEPHONE # 860 647 7772
4. APPLICANT Milton R. Hathaway
   ADDRESS PO Box 9219, Bolton, CT 06043 TELEPHONE # 860 647 7772

I hereby agree to conform to all the requirements of the Laws of the State of CT, the Ordinances of the Town of Bolton, all stipulations of this application, and to notify the Building Official of any alteration in the plans or specifications of the building for which this permit is asked. And agree that this building is to be located the proper distance from all street lines, side yard lines and required distances from all other zones and is located in a zone in which this building and its use is allowed. This permit expires one (1) year from date of approval.

Milton R Hathaway 8-31-01
APPLICANT DATE

Proof of Workers Compensation Coverage
I as owner or sole proprietor claim exemption and intend to not act as a general contractor or principal employer._____

Ronald Barbara 9/4/01 n/a
PERMIT APPROVED - DATE PLAN APPROVED - DATE
BUILDING OFFICIAL HEALTH DISTRICT/SANITARIAN

5. OTHER REQUIRED PERMIT APPLICATION(S) - TYPE Town of Bolton Zoning Permit
6. FLOODPLAIN: N ✓ Y DESCRIPTION
7. FEE SCHEDULE

ESTIMATED VALUE OF ALL WORK $ 90,000

Estimated Value	Fee
$ 1 - 1000	$20
each additional $1000 or fraction thereof	$12

(standard fees)

[redacted]

----- DRIVEWAY PERMIT FEE: $30
----- RETURNABLE DRIVEWAY PERMIT BOND: $1,000.00

SEP - 4 2001

TOTAL PERMIT FEE $ 1,088.00

150'

map

Property Information

Property ID	09013012-02-3
Location	130 VERNON RD
Owner	MOUNTAINTOP ENTERPRISES INC

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

130 VERNON RD

Location	130 VERNON RD	**Assessment**	$391,370
Mblu	02/ / 3/ /	**Appraisal**	$739,300
Owner	MOUNTAINTOP ENTERPRISES INC	**PID**	1982
		Building Count	1

Current Value

Appraisal	
Valuation Year	**Total**
2013	$739,300
Assessment	
Valuation Year	**Total**
2013	$391,370

Owner of Record

Owner	MOUNTAINTOP ENTERPRISES INC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	PO BOX 9219 BOLTON, CT 06043	**Book & Page**	166/656
		Sale Date	10/01/2014
		Instrument	24

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MOUNTAINTOP ENTERPRISES INC			166/656	24	10/01/2014

Building Information

Building 1 : Section 1

Year Built:	1980
Living Area:	2032
Building Percent Good:	76

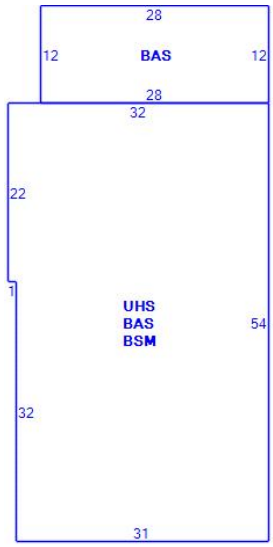
Building Attributes	
Field	**Description**
STYLE	Equipment Garage
Stories:	1.5
Occupancy	1.00

Exterior Wall 1	Board & Batten
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Minimum
Interior Floor 2	
Heating Fuel	None
Heating Type	None
% Central Air	0
Frame Type	WOOD FRAME
Fin. Bsmt. Area	

Building Photo

(PhotoHandler.ashx?pid=1982&bid=1982)

Building Layout



Building Sub-Areas			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	2032	2032
BSM	Basement	1696	0
UHS	Unfinished Half Story	1696	0
		5424	2032

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Land Line Valuation

Zone	R-3	**Size (Acres)**	30.3
		Depth	
		Assessed Value	$343,470
		Appraised Value	$670,800

Outbuildings

Outbuildings					Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Bldg #**
SHD1	Shed	FR	Frame	192.00 S.F.	1
SHD1	Shed	FR	Frame	200.00 S.F.	1
BRN1	1 Story Barn	FR	Frame	4000.00 S.F.	1
CELL	Cell Tower			150.00 FEET	1
CELL	Cell Tower			200.00 FEET	1
SHD1	Shed	FR	Frame	400.00 S.F.	1

Valuation History

Appraisal	
Valuation Year	**Total**
2014	$739,300
2013	$692,200

Assessment	
Valuation Year	**Total**
2014	$391,370
2013	$385,790

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: CT11180C

Bolton Ct.._1
130 Vernon Road
Bolton, CT 06043

September 30, 2016

EBI Project Number: 6216004445

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	13.52 %

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

EBI Consulting
environmental | engineering | due diligence

September 30, 2016

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

Emissions Analysis for Site: **CT11180C – Bolton Ct._1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **130 Vernon Road, Bolton, 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 approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (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 **130 Vernon Road, Bolton, 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 UMTS 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 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

3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

4) 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.

5) For the following calculations the sample point was the top of a 6-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.

6) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope SBNH-1D65C** for 700 MHz and 2100 MHz (AWS) channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope SBNH-1D65C** has a maximum gain of **15.1 dBd** at its main lobe at 1900 MHz and a maximum gain of **13.6 dBd** at its main lobe at 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.

7) The antenna mounting height centerline of the proposed antennas is **130 feet** above ground level (AGL).

8) 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.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B
Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	130	Height (AGL):	130
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A1 MPE%	1.64	Antenna B1 MPE%	1.64
Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope SBNH-1D65C	Make / Model:	Commscope SBNH-1D65C
Gain:	13.6 dBd	Gain:	13.6 dBd
Height (AGL):	130	Height (AGL):	130
Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	687.26	ERP (W):	687.26
Antenna A2 MPE%	0.34	Antenna B2 MPE%	0.34

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.98 %**
AT&T	1.31 %
Verizon Wireless	2.71 %
Sprint	0.74 %
Nextel	0.32 %
Bolton Radio Station	0.00 %
Commsite Internat'l	0.04 %
Metrocall	0.12 %
Pagemart	2.30 %
AirTouch	0.63
Conn. Radio	0.23
Eversource	3.14
Site Total MPE %:	**13.52 %**

T-Mobile Sector A Total:	1.98 %
T-Mobile Sector B Total:	1.98 %
T-Mobile Sector C Total:	1.98 %
Site Total:	13.52 %

T-Mobile _per sector	**# Channels**	**Watts ERP (Per Channel)**	**Height (feet)**	**Total Power Density ($\mu W/cm^2$)**	**Frequency (MHz)**	**Allowable MPE ($\mu W/cm^2$)**	**Calculated % MPE**
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	130	10.92	AWS - 2100 MHz	1000	1.09%
T-Mobile PCS - 1950 MHz UMTS	2	1,167.14	130	5.46	PCS - 1950 MHz	1000	0.55%
T-Mobile 700 MHz LTE	1	687.26	130	1.61	700 MHz	467	0.34%
						Total:	**1.98%**

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 A:	1.98 %
Sector B:	1.98 %
T-Mobile Per Sector Maximum:	1.98 %
Site Total:	13.52 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.52%** 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.

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

150' Existing Guyed Lattice Tower

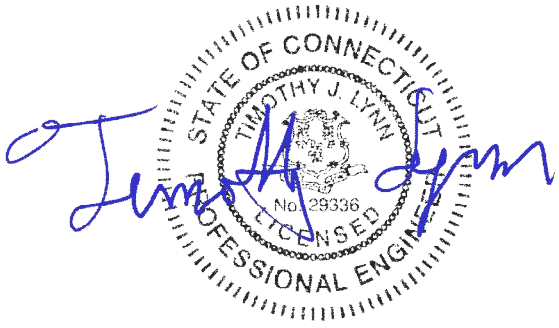
Proposed T-Mobile
Antenna Upgrade

T-Mobile Site Ref: CT11180C

130 Vernon Road
Bolton, CT 06043

Centek Project No. 17012.45

Date: April 20, 2017



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 guyed lattice tower located in Bolton, CT.

The host tower is a 150-ft, three legged, guyed lattice tower. The original tower design documents were unavailable for use in this report. The tower geometry, structure member sizes and foundation information were obtained from a previous structural report prepared by AECOM job no. TWM-007 dated September 20, 2016.

Antenna and appurtenance information were obtained from the aforementioned structural report and a T-Mobile RF data sheet.

The tower consists of eight (8) straight and one (1) tapered base vertical sections consisting of solid round legs steel grade of ASTM A572-50. Diagonal and horizontal lateral support bracing consists of solid round steel grade of ASTM A572-50. The vertical tower sections are connected by bolted sleeves with the diagonal and horizontal bracing to legs consisting of welded connections. The width of the tower face is 3.75-ft throughout its length.

Antenna and Appurtenance Summary

The existing and proposed loads considered in the analysis consist of the following:

- SPRINT (EXISTING/RESERVED):
  Antennas: Three (3) RFS APXVSPP18 panel antennas, three (3) RFS APXVTM14 panel antennas, three (3) 800MHz RRHs, three (3) 1900MHz RRHs and three (3) TD-RRH8x20-25 remote radio heads mounted on three (3) 12-ft T-frames with a RAD center elevation of 148-ft above grade.
  Cables: Three (3) 1-1/4" ∅ fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Two (2) Ericsson AIR21 panel antennas, two (2) Andrew SBNH-1D65C and two (2) Ericsson RRUS-11 remote radio units mounted on two (2) 12-ft T-frames with a RAD center elevation of 130-ft above grade.
  Cables: Two (2) 1-1/4" ∅ fiber cables running on a leg/face of the existing tower as specified in Section 3 of this report
- **T-MOBILE (PROPOSED):**
  Antennas: Two (2) Twin AWS TMAs mounted on two (2) 12-ft T-frames with a RAD center elevation of 130-ft above grade.
  Cables: Four (4) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report

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 routed as specified in Section 3 of this report.

Analysis

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

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

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

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Tolland County; v = 95-105 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Bolton; v = 97 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

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

Tower Capacity

- 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 **57.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T3)	100'-0"-120'-0"	27.6%	**PASS**
Diagonal (T9)	0'-0"-5'-0"	38.1%	**PASS**
Bottom Girt (T8)	5'-0"-20'-0"	40.1%	**PASS**
Guy C @ 210-ft radius (T2)	138-ft	57.1%	**PASS**

Foundations and Anchorage

The existing tower base foundation consists of a 2.5-ft diameter x 2.25-ft long reinforced concrete pier on a 7-ft square x 1.25-ft thick reinforced concrete pad bearing directly on the existing sub grade. Additionally, guy wire loading is transferred to three (3) concrete support blocks anchored to rock with (2) 1-3/8" diameter rock anchors per block. The sub-grade conditions used as the basis for the foundation analysis were derived from the aforementioned structural report.

- The worst case tower base and guy anchor reactions developed from the governing Load Case 1 were used in the verification of the anchorage foundations:

Tower Guy Reactions	
Vector	**Inner**
Horizontal (In Plane of GW)	29 kips
Horizontal (Out of Plane of GW)	1 kips
Vertical	18 kips
Resultant Force at end of Guy Wire	34 kips
Tower Base Reactions	
Vector	**Proposed Reaction**
Horizontal Shear	1.0 kips
Axial Compression	114.0 kips

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinf. Conc. Anchor Block w/ Rock Anchors	Steel Strength	1.0	3.9	**PASS**
	Bond Strength	1.0	10.9	**PASS**
		Ultimate Bearing	**Proposed**	
Base Foundation	Bearing	8.0 ksf	2.55 ksf	**PASS**

Note 1: FS denotes 'Factor of Safety'.

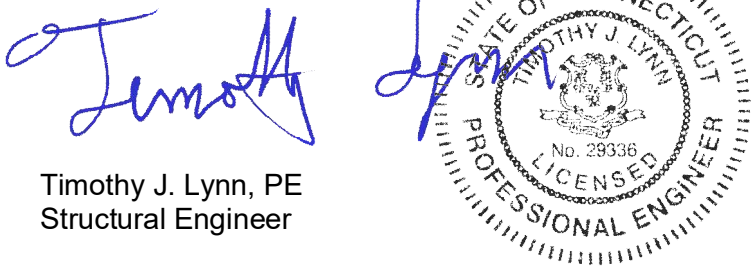
Conclusion

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

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 ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

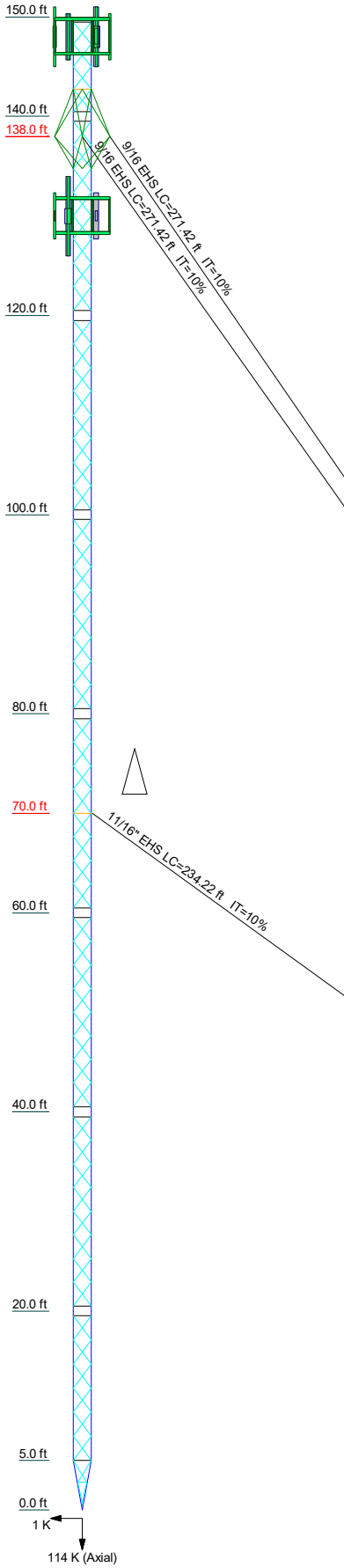
tnxTower Features:

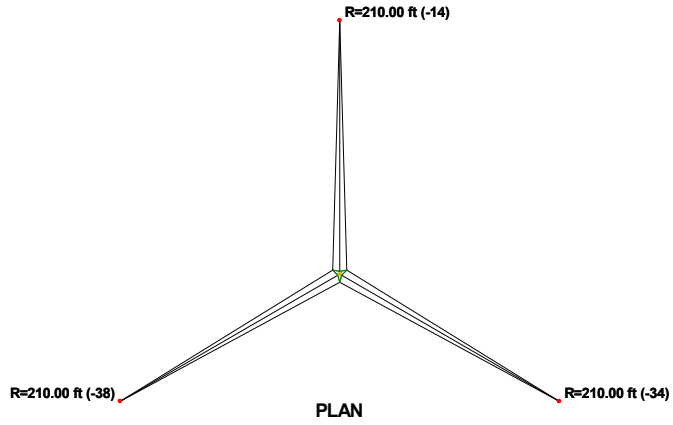
- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). 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.

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs		SR 2			SR 2 1/4			SR 2 1/2	
Leg Grade				A572-50					
Diagonals				SR 3/4					
Diagonal Grade				A572-50					
Top Girts				SR 3/4					N.A.
Bottom Girts				SR 3/4					
Horizontals				N.A.					4x1/2
Top Guy Pull-Offs			N.A.		SR 1 1/4		N.A.		
Face Width (ft)						48 @ 2.375		6 @ 2.41667	
# Panels @ (ft)	4 @ 2.25								A
Weight (K)	0.6	2.1	1.0	1.2	1.2	1.2	1.2	1.0	0.4

3.75

9.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 (Sprint)	148	TD-RRH8x20-25 (Sprint)	148
APXVSPP18-C-A20 (Sprint)	148	PiROD 12' T-Frame (Sprint)	148
APXVSPP18-C-A20 (Sprint)	148	PiROD 12' T-Frame (Sprint)	148
APXVTM14 (Sprint)	148	PiROD 12' T-Frame (Sprint)	148
APXVTM14 (Sprint)	148	AIR21 B4A/B2P (T-Mobile)	130
APXVTM14 (Sprint)	148	AIR21 B4A/B2P (T-Mobile)	130
FD-RRH 2x50 800 (Sprint)	148	SBNH-1D65C (T-Mobile)	130
FD-RRH 2x50 800 (Sprint)	148	SBNH-1D65C (T-Mobile)	130
FD-RRH 2x50 800 (Sprint)	148	RRUS-11 (T-Mobile)	130
FD-RRH 4x45 1900 (Sprint)	148	RRUS-11 (T-Mobile)	130
FD-RRH 4x45 1900 (Sprint)	148	TMA 12"x6"x4" (T-Mobile - Proposed)	130
FD-RRH 4x45 1900 (Sprint)	148	TMA 12"x6"x4" (T-Mobile - Proposed)	130
TD-RRH8x20-25 (Sprint)	148	PiROD 12' T-Frame (T-Mobile)	130
TD-RRH8x20-25 (Sprint)	148	PiROD 12' T-Frame (T-Mobile)	130

SYMBOL LIST

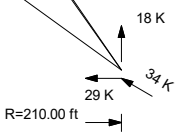
MARK	SIZE	MARK	SIZE
A	2 @ 2.25		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 57.1%



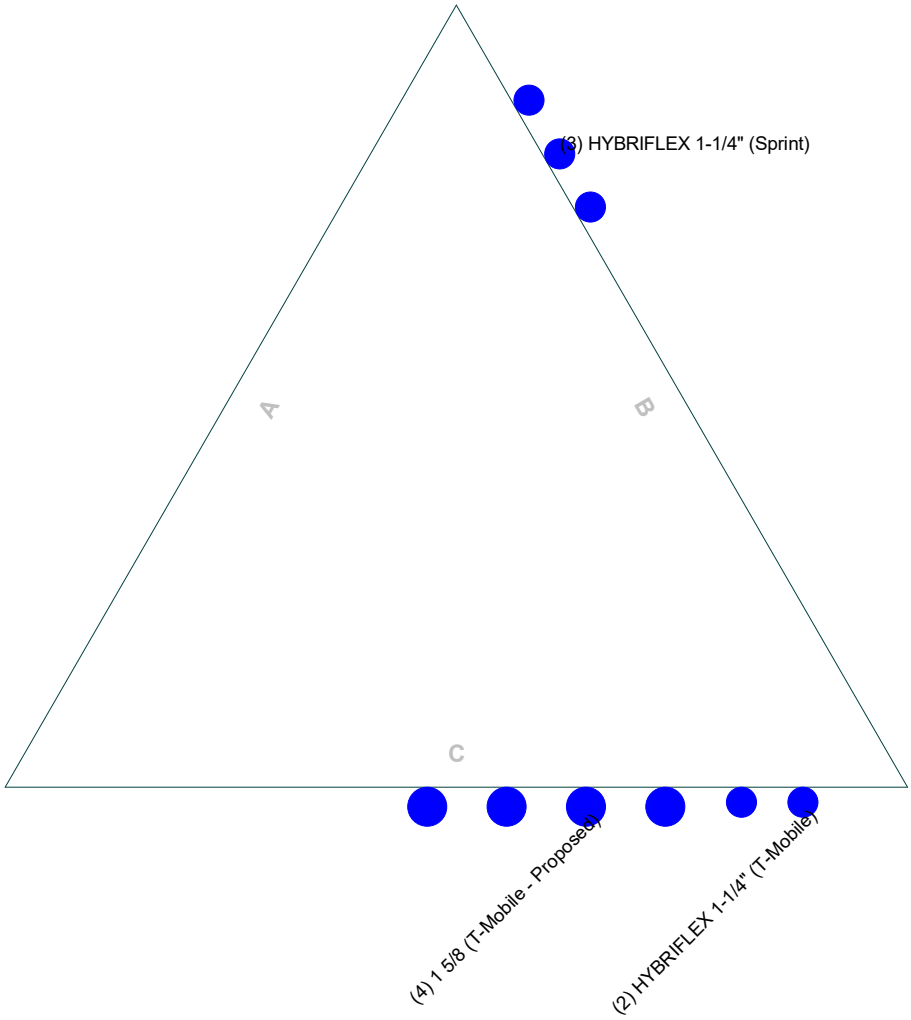
ALL REACTIONS ARE FACTORED

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

Job: ***17012.45 - CT11180C***		
Project: ***150' Guyed Tower - 130 Vernon Road Bolton, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Cal\cs\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



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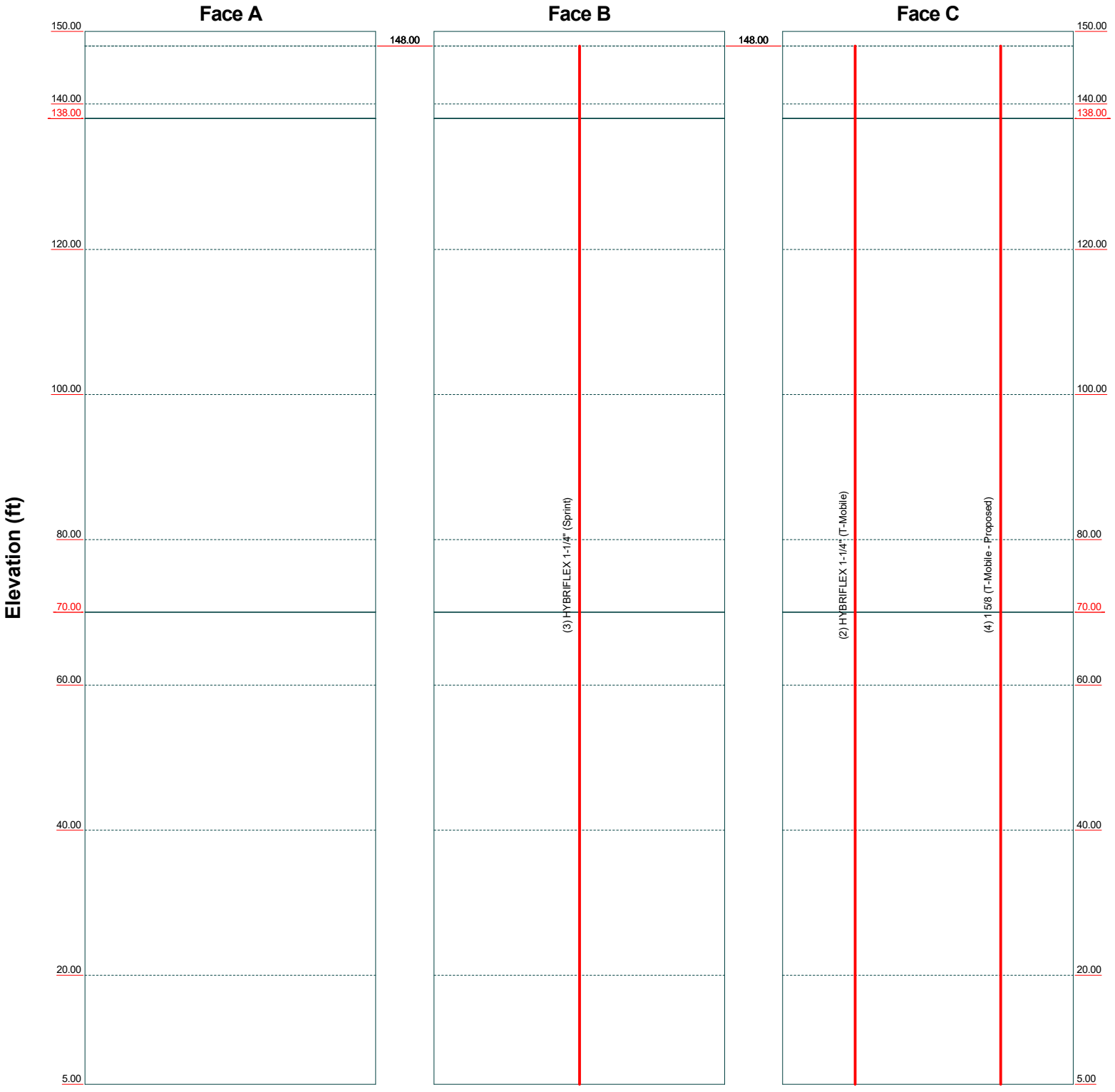
Path: J:\Jobs\1701200.WI\45_CT11180C\DS_Structural\Backup Documentation\Cal cs\ER\150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-7

Feed Line Distribution Chart
5' - 150'

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



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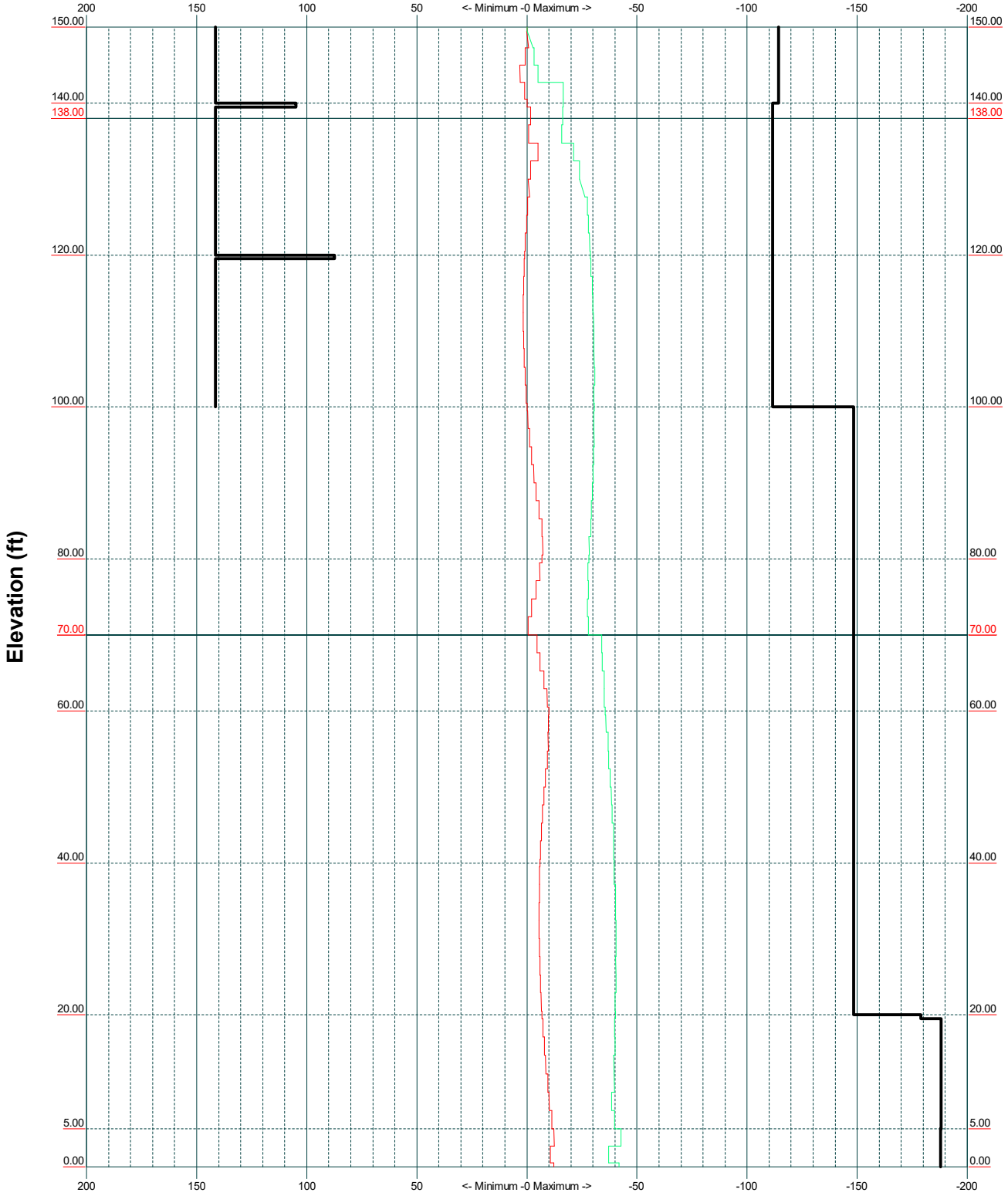
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Cal cs\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-7

TIA-222-G - 97 mph/50 mph 1.0000 in Ice Exposure C

Leg Capacity ——— **Leg Compression (K)**



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Job: ***17012.45 - CT11180C***		
Project: ***150' Guyed Tower - 130 Vernon Road Bolton, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Cal\c\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-3

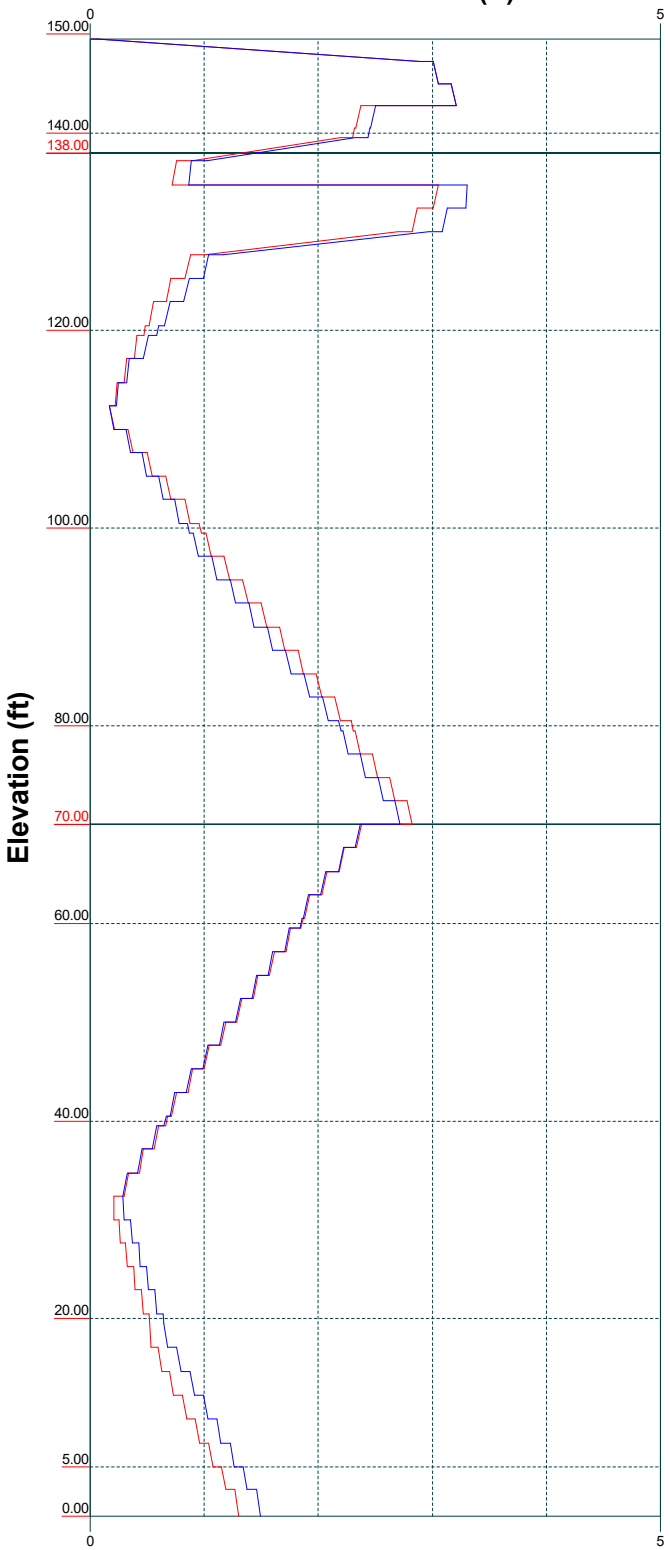
TIA-222-G - 97 mph/50 mph 1.0000 in Ice Exposure C

Vx Vz

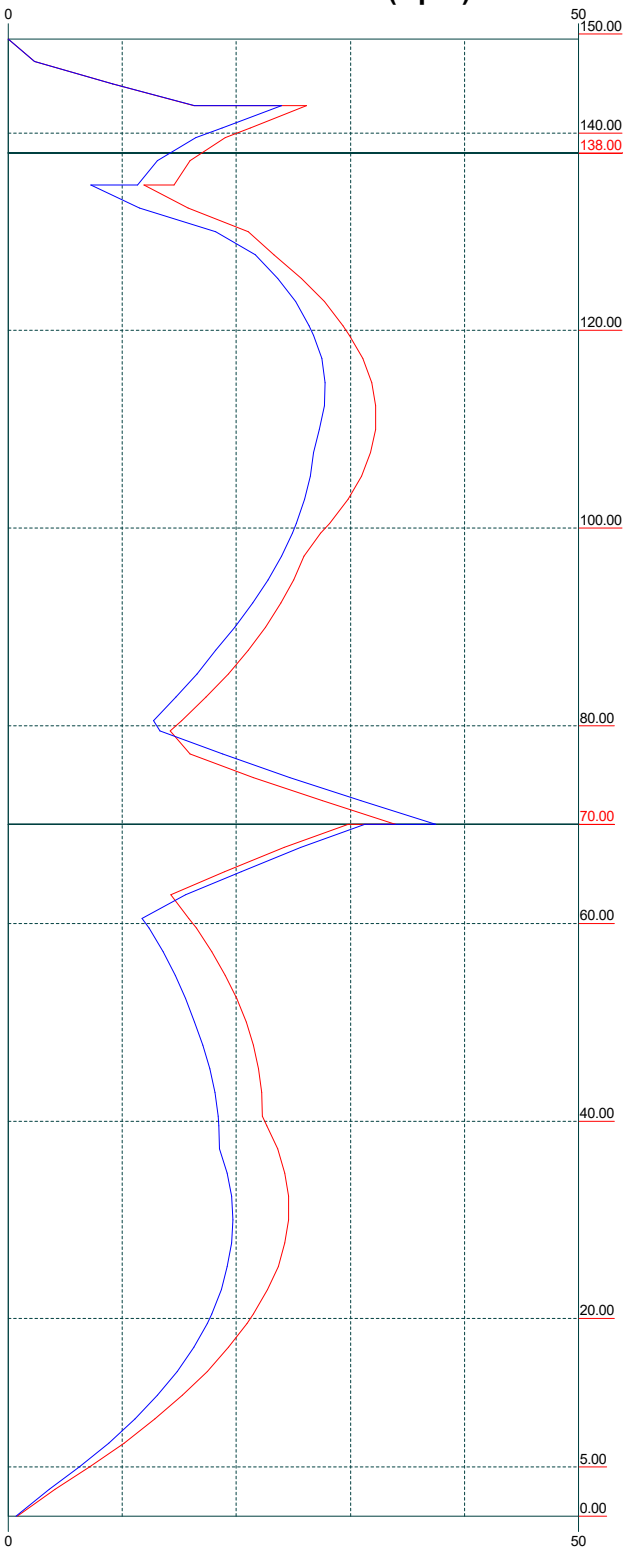
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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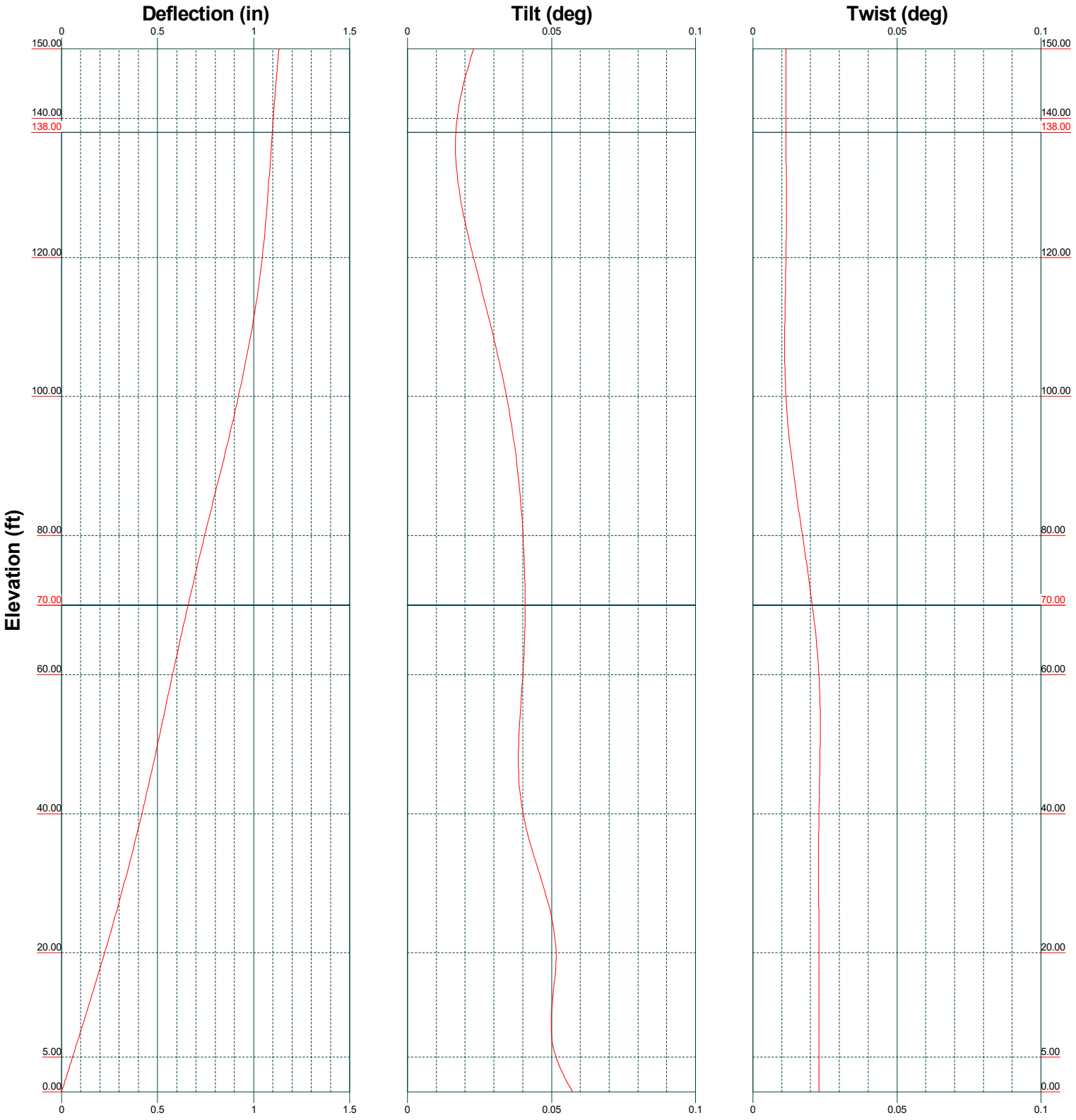
Job: ***17012.45 - CT11180C***		
Project: ***150' Guyed Tower - 130 Vernon Road Bolton, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.W\45_CT11180C\05_Structural\Backup Documentation\Cat\ce\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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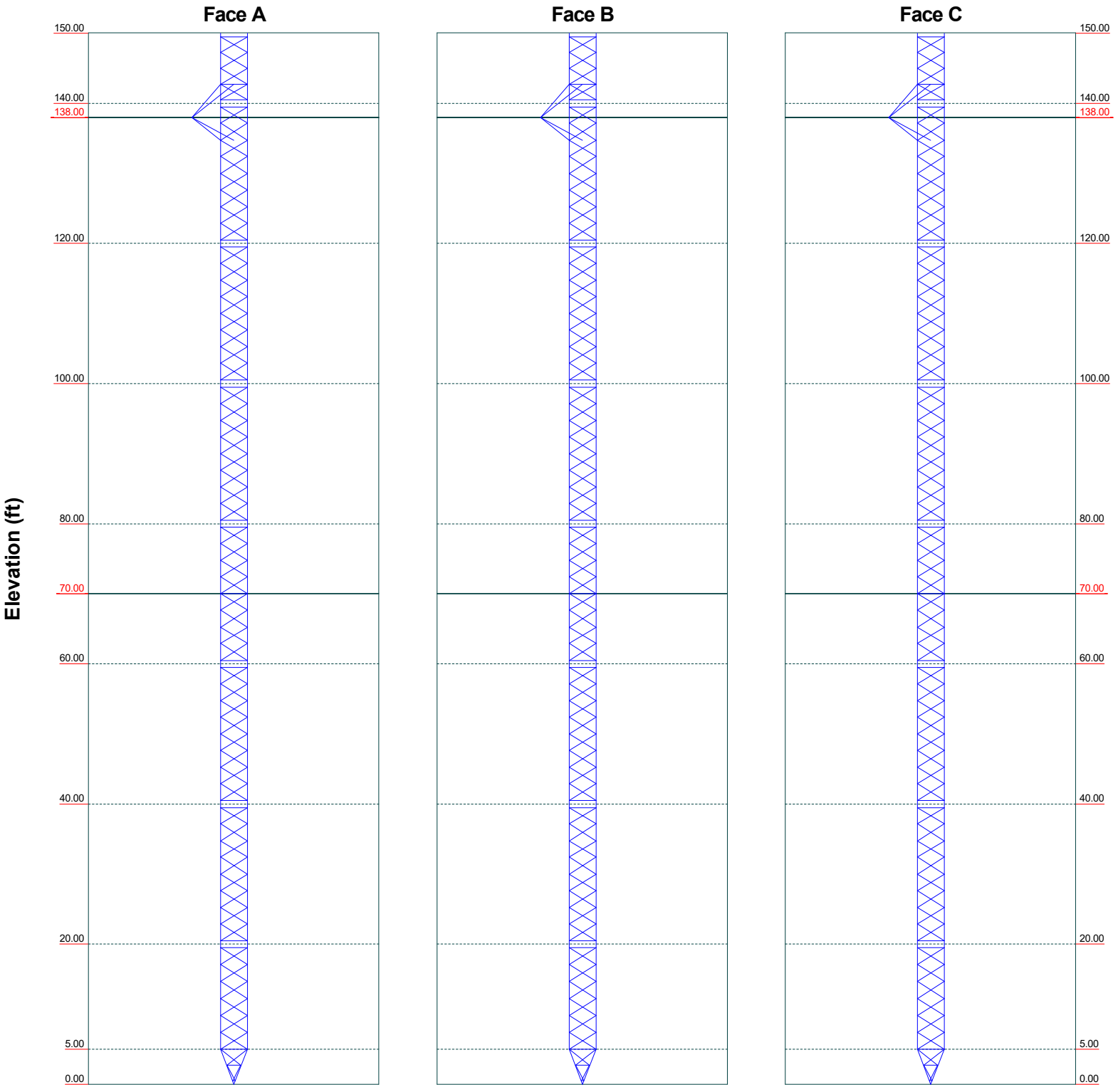
Job: ***17012.45 - CT11180C***		
Project: ***150' Guyed Tower - 130 Vernon Road Bolton, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Calcs\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-5

Stress Distribution Chart
0' - 150'

> 100% | 90%-100% | 75%-90% | 50%-75% | < 50% Overstress



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Job: ***17012.45 - CT11180C***		
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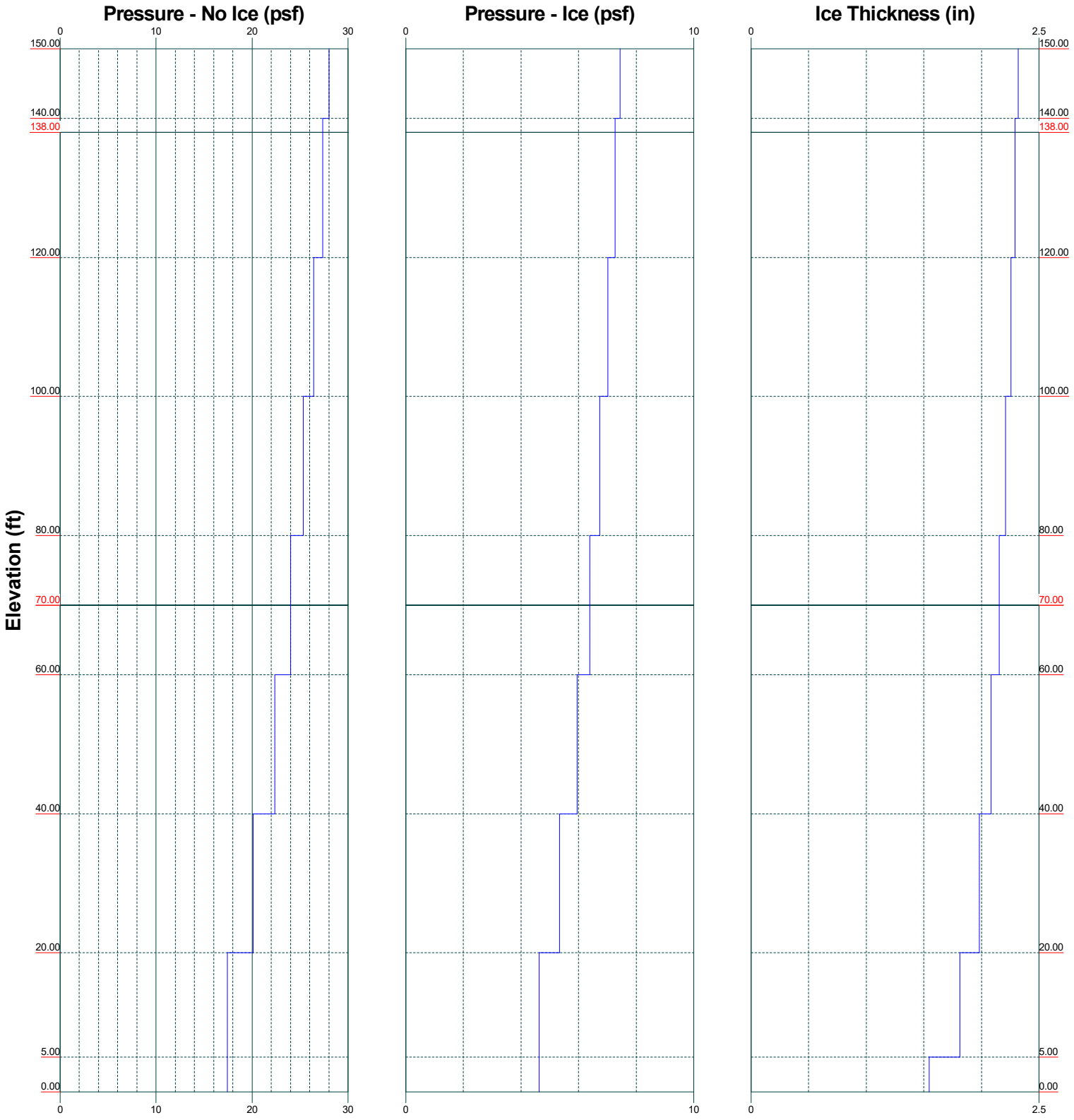
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Cat\c\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-8

Wind Pressures and Ice Thickness

TIA-222-G - 97 mph/50 mph 1.0000 in Ice Exposure C



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Job: ***17012.45 - CT11180C***		
Project: ***150' Guyed Tower - 130 Vernon Road Bolton, CT***		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 04/20/17	Scale: NTS
Path: J:\Jobs\1701200.WI\45_CT11180C\05_Structural\Backup Documentation\Calcs\ER150-ft Guyed Tower - Bolton, CT.eri		Dwg No. E-9

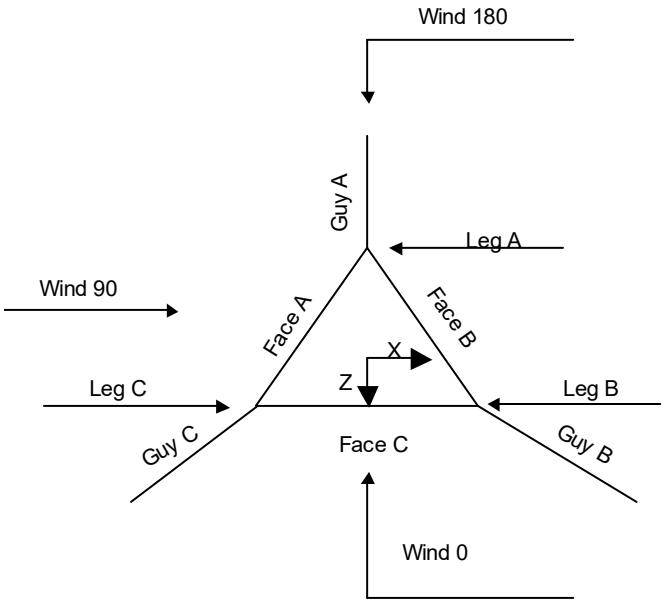
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 150.00 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 3.75 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

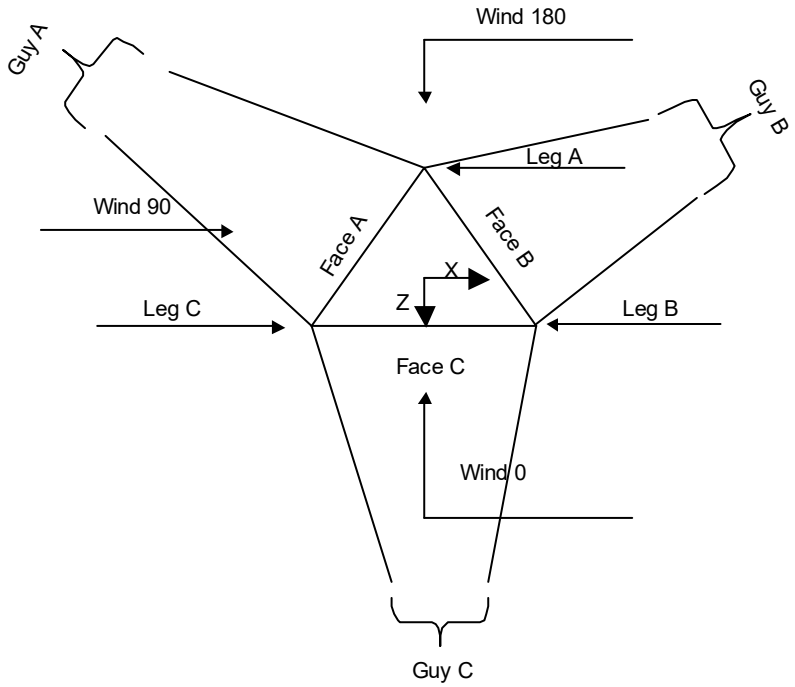
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys	√	Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
√	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
√	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	150.00-140.00			3.75	1	10.00
T2	140.00-120.00			3.75	1	20.00
T3	120.00-100.00			3.75	1	20.00
T4	100.00-80.00			3.75	1	20.00
T5	80.00-60.00			3.75	1	20.00
T6	60.00-40.00			3.75	1	20.00
T7	40.00-20.00			3.75	1	20.00
T8	20.00-5.00			3.75	1	15.00
T9	5.00-0.00			3.75	1	5.00

Tower Section Geometry *(cont'd)*

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
T1	150.00-140.00	2.25	X Brace	No	Steps	6.0000	6.0000
T2	140.00-120.00	2.38	X Brace	No	Steps	6.0000	6.0000
T3	120.00-100.00	2.38	X Brace	No	Steps	6.0000	6.0000
T4	100.00-80.00	2.38	X Brace	No	Steps	6.0000	6.0000
T5	80.00-60.00	2.38	X Brace	No	Steps	6.0000	6.0000
T6	60.00-40.00	2.38	X Brace	No	Steps	6.0000	6.0000
T7	40.00-20.00	2.38	X Brace	No	Steps	6.0000	6.0000
T8	20.00-5.00	2.42	X Brace	No	Steps	6.0000	0.0000
T9	5.00-0.00	2.25	X Brace	No	Yes	0.0000	6.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.00-0.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 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 150.00-140.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	3/4	A572-50	Solid Round	3/4	A572-50

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T8 20.00-5.00	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)
T9 5.00-0.00	Solid Round		A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 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
T9 5.00-0.00	None	Solid Round		A572-50 (50 ksi)	Flat Bar	4x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 20.00-5.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 5.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

K Factors[1]

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
150.00-140.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T8 20.00-5.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 5.00-0.00	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	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-140.00														
T2	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
140.00-120.00														
T3	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
120.00-100.00														
T4	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-80.00														
T5 80.00-60.00	0.0000	0.75	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 60.00-40.00	0.0000	0.75	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 40.00-20.00	0.0000	0.75	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 20.00-5.00	0.0000	0.75	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 5.00-0.00	0.0000	0.75	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 150.00-140.00	Sleeve SS	0.0000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T2 140.00-120.00	Sleeve SS	0.6250 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T3 120.00-100.00	Sleeve SS	0.6250 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T4 100.00-80.00	Sleeve SS	0.7500 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T5 80.00-60.00	Sleeve SS	0.7500 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T6 60.00-40.00	Sleeve SS	0.7500 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T7 40.00-20.00	Sleeve SS	0.7500 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T8 20.00-5.00	Sleeve SS	0.7500 A325N	5	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0
T9 5.00-0.00	Sleeve SS	0.0000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325X	0	0.5000 A325N	0	0.6250 A325X	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
138	EHS	A	9/16	3.50	10%	21000	0.671	256.30	210.00	0.0000	-14.00	100%
		B	9/16	3.50	10%	21000	0.671	268.63	210.00	0.0000	-34.00	100%
		C	9/16	3.50	10%	21000	0.671	271.20	210.00	0.0000	-38.00	100%
70	EHS	A	11/16"	5.00	10%	19000	1.000	223.97	210.00	0.0000	-14.00	100%
		B	11/16"	5.00	10%	19000	1.000	232.20	210.00	0.0000	-34.00	100%
		C	11/16"	5.00	10%	19000	1.000	234.02	210.00	0.0000	-38.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
138	Torque Arm	12.00	30.0000	Wing	A36 (36 ksi)	Double Angle	2L3x3x5/16
70	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
138.00	A572-50 (50 ksi)	Solid Round			No	A572-50 (50 ksi)	Solid Round	1 1/4
70.00	A572-50 (50 ksi)	Solid Round			Yes	A572-50 (50 ksi)	Solid Round	1 1/4

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
138	0.17	0.18	0.18		6.21 4.3 sec/pulse	6.81 4.5 sec/pulse	6.94 4.5 sec/pulse	
70	0.22	0.23	0.23		4.98 3.9 sec/pulse	5.34 4.0 sec/pulse	5.42 4.0 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
138	No	No	1	1	1	1	1	1
70	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
138	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
70	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
138	A	62.00	23	6	2.1302
	B	52.00	23	6	2.0930
	C	50.00	22	6	2.0849

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
70	A	28.00	20	5	1.9674
	B	18.00	18	5	1.8824
	C	16.00	18	5	1.8603

Guy-Tensioning Information

				Temperature At Time Of Tensioning													
				0 F		20 F		40 F		60 F		80 F		100 F		120 F	
Guy Elevation ft		H ft	V ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft	Initial Tension K	Intercept ft
138	A	206.62	152.00	4.437	4.91	4.118	5.29	3.805	5.72	3.500	6.21	3.205	6.78	2.922	7.42	2.654	8.16
	B	206.62	172.00	4.351	5.49	4.062	5.88	3.778	6.32	3.500	6.81	3.231	7.37	2.971	8.00	2.724	8.72
	C	206.62	176.00	4.335	5.62	4.051	6.01	3.772	6.45	3.500	6.94	3.235	7.50	2.981	8.13	2.737	8.84
70	A	207.83	84.00	6.644	3.75	6.083	4.10	5.533	4.50	5.000	4.98	4.488	5.54	4.005	6.21	3.559	6.98
	B	207.83	104.00	6.527	4.10	6.006	4.45	5.496	4.86	5.000	5.34	4.523	5.90	4.070	6.55	3.647	7.30
	C	207.83	108.00	6.503	4.18	5.990	4.53	5.488	4.95	5.000	5.42	4.530	5.98	4.083	6.63	3.666	7.37

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
HYBRIFLEX 1-1/4" (Sprint)	B	No	Ar (CaAa)	148.00 - 0.00	0.0000	-0.3	3	3	1.5400	1.5400		1.30
HYBRIFLEX 1-1/4" (T-Mobile)	C	No	Ar (CaAa)	148.00 - 0.00	0.0000	-0.35	2	2	1.5400	1.5400		1.30
1 5/8 (T-Mobile - Proposed)	C	No	Ar (CaAa)	148.00 - 0.00	0.0000	-0.1	4	4	1.9800	1.9800		1.04

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	150.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	3.696	0.000	0.03
		C	0.000	0.000	8.800	0.000	0.05
T2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T3	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T4	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T5	80.00-60.00	A	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
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T6	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T7	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	9.240	0.000	0.08
		C	0.000	0.000	22.000	0.000	0.14
T8	20.00-5.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	6.930	0.000	0.06
		C	0.000	0.000	16.500	0.000	0.10
T9	5.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	2.310	0.000	0.02
		C	0.000	0.000	5.500	0.000	0.03

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	150.00-140.00	A	2.319	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	13.799	0.000	0.23
		C		0.000	0.000	30.777	0.000	0.51
T2	140.00-120.00	A	2.294	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	34.327	0.000	0.56
		C		0.000	0.000	76.606	0.000	1.26
T3	120.00-100.00	A	2.256	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	34.073	0.000	0.55
		C		0.000	0.000	76.100	0.000	1.24
T4	100.00-80.00	A	2.211	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	33.773	0.000	0.54
		C		0.000	0.000	75.504	0.000	1.21
T5	80.00-60.00	A	2.156	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	33.405	0.000	0.52
		C		0.000	0.000	74.775	0.000	1.18
T6	60.00-40.00	A	2.085	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	32.929	0.000	0.51
		C		0.000	0.000	73.828	0.000	1.15
T7	40.00-20.00	A	1.981	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	32.237	0.000	0.48
		C		0.000	0.000	72.452	0.000	1.09
T8	20.00-5.00	A	1.815	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	23.351	0.000	0.33
		C		0.000	0.000	52.694	0.000	0.76
T9	5.00-0.00	A	1.545	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	7.339	0.000	0.10
		C		0.000	0.000	16.679	0.000	0.22

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	150.00-140.00	1.0642	0.6631	0.2703	0.1901

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T2	140.00-120.00	1.1887	0.7407	0.3866	0.2718
T3	120.00-100.00	1.1887	0.7407	0.3948	0.2776
T4	100.00-80.00	1.1629	0.7246	0.3995	0.2808
T5	80.00-60.00	1.1514	0.7174	0.3938	0.2769
T6	60.00-40.00	1.1629	0.7246	0.4271	0.3003
T7	40.00-20.00	1.1629	0.7246	0.4503	0.3166
T8	20.00-5.00	1.1332	0.7061	0.4723	0.3321
T9	5.00-0.00	0.8277	0.9574	0.2480	0.3114

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	HYBRIFLEX 1-1/4"	140.00 - 148.00	0.6000	0.2784
T1	2	HYBRIFLEX 1-1/4"	140.00 - 148.00	0.6000	0.2784
T1	3	1 5/8	140.00 - 148.00	0.6000	0.2784
T2	1	HYBRIFLEX 1-1/4"	120.00 - 140.00	0.6000	0.3564
T2	2	HYBRIFLEX 1-1/4"	120.00 - 140.00	0.6000	0.3564
T2	3	1 5/8	120.00 - 140.00	0.6000	0.3564
T3	1	HYBRIFLEX 1-1/4"	100.00 - 120.00	0.6000	0.3640
T3	2	HYBRIFLEX 1-1/4"	100.00 - 120.00	0.6000	0.3640
T3	3	1 5/8	100.00 - 120.00	0.6000	0.3640
T4	1	HYBRIFLEX 1-1/4"	80.00 - 100.00	0.6000	0.3684
T4	2	HYBRIFLEX 1-1/4"	80.00 - 100.00	0.6000	0.3684
T4	3	1 5/8	80.00 - 100.00	0.6000	0.3684
T5	1	HYBRIFLEX 1-1/4"	60.00 - 80.00	0.6000	0.3601
T5	2	HYBRIFLEX 1-1/4"	60.00 - 80.00	0.6000	0.3601
T5	3	1 5/8	60.00 - 80.00	0.6000	0.3601
T6	1	HYBRIFLEX 1-1/4"	40.00 - 60.00	0.6000	0.3934
T6	2	HYBRIFLEX 1-1/4"	40.00 - 60.00	0.6000	0.3934
T6	3	1 5/8	40.00 - 60.00	0.6000	0.3934
T7	1	HYBRIFLEX 1-1/4"	20.00 - 40.00	0.6000	0.4142
T7	2	HYBRIFLEX 1-1/4"	20.00 - 40.00	0.6000	0.4142
T7	3	1 5/8	20.00 - 40.00	0.6000	0.4142
T8	1	HYBRIFLEX 1-1/4"	5.00 - 20.00	0.6000	0.4310
T8	2	HYBRIFLEX 1-1/4"	5.00 - 20.00	0.6000	0.4310
T8	3	1 5/8	5.00 - 20.00	0.6000	0.4310
T9	1	HYBRIFLEX 1-1/4"	0.00 - 5.00	0.6000	0.1711
T9	2	HYBRIFLEX 1-1/4"	0.00 - 5.00	0.6000	0.1711
T9	3	1 5/8	0.00 - 5.00	0.6000	0.1711

Discrete Tower Loads

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
APXVSPP18-C-A20 (Sprint)	A	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.28 5.74 6.20	0.06 0.11 0.16
APXVSPP18-C-A20 (Sprint)	B	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.28 5.74 6.20	0.06 0.11 0.16
APXVSPP18-C-A20 (Sprint)	C	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	8.02 8.48 8.94	5.28 5.74 6.20	0.06 0.11 0.16
APXVTM14 (Sprint)	A	From Leg	3.00 -3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.34 6.72 7.10	3.61 3.97 4.33	0.06 0.10 0.14
APXVTM14 (Sprint)	B	From Leg	3.00 -3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.34 6.72 7.10	3.61 3.97 4.33	0.06 0.10 0.14
APXVTM14 (Sprint)	C	From Leg	3.00 -3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	6.34 6.72 7.10	3.61 3.97 4.33	0.06 0.10 0.14
FD-RRH 2x50 800 (Sprint)	A	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
FD-RRH 2x50 800 (Sprint)	B	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
FD-RRH 2x50 800 (Sprint)	C	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
FD-RRH 4x45 1900 (Sprint)	A	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
FD-RRH 4x45 1900 (Sprint)	B	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
FD-RRH 4x45 1900 (Sprint)	C	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	2.32 2.52 2.74	2.38 2.59 2.80	0.06 0.08 0.11
TD-RRH8x20-25 (Sprint)	A	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25 (Sprint)	B	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25 (Sprint)	C	From Leg	3.00 3.00 0.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
PiROD 12' T-Frame (Sprint)	A	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice	12.20 17.60 23.00	12.20 17.60 23.00	0.36 0.49 0.62
PiROD 12' T-Frame (Sprint)	B	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice	12.20 17.60 23.00	12.20 17.60 23.00	0.36 0.49 0.62
PiROD 12' T-Frame (Sprint)	C	None		0.0000	148.00	No Ice 1/2" Ice 1" Ice	12.20 17.60 23.00	12.20 17.60 23.00	0.36 0.49 0.62

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 B4A/B2P	A	From Leg	3.00	0.0000	130.00	No Ice	6.05	4.36	0.08
(T-Mobile)			3.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B4A/B2P	C	From Leg	3.00	0.0000	130.00	No Ice	6.05	4.36	0.08
(T-Mobile)			3.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
SBNH-1D65C	A	From Leg	3.00	0.0000	130.00	No Ice	11.46	7.71	0.05
(T-Mobile)			-3.00			1/2" Ice	12.08	8.30	0.12
			0.00			1" Ice	12.70	8.90	0.19
SBNH-1D65C	C	From Leg	3.00	0.0000	130.00	No Ice	11.46	7.71	0.05
(T-Mobile)			-3.00			1/2" Ice	12.08	8.30	0.12
			0.00			1" Ice	12.70	8.90	0.19
RRUS-11	A	From Leg	3.00	0.0000	130.00	No Ice	2.57	1.07	0.05
(T-Mobile)			-3.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Leg	3.00	0.0000	130.00	No Ice	2.57	1.07	0.05
(T-Mobile)			-3.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
TMA 12"x6"x4"	A	From Leg	3.00	0.0000	130.00	No Ice	0.60	0.41	0.02
(T-Mobile - Proposed)			3.00			1/2" Ice	0.70	0.50	0.02
			0.00			1" Ice	0.81	0.59	0.03
TMA 12"x6"x4"	C	From Leg	3.00	0.0000	130.00	No Ice	0.60	0.41	0.02
(T-Mobile - Proposed)			3.00			1/2" Ice	0.70	0.50	0.02
			0.00			1" Ice	0.81	0.59	0.03
PiROD 12' T-Frame	A	None		0.0000	130.00	No Ice	12.20	12.20	0.36
(T-Mobile)						1/2" Ice	17.60	17.60	0.49
						1" Ice	23.00	23.00	0.62
PiROD 12' T-Frame	C	None		0.0000	130.00	No Ice	12.20	12.20	0.36
(T-Mobile)						1/2" Ice	17.60	17.60	0.49
						1" Ice	23.00	23.00	0.62

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1	145.00	1.369	28	39.167	A	0.000	6.244	3.333	53.39	0.000	0.000
150.00-140.00					B	0.000	6.244		53.39	3.696	0.000
					C	0.000	6.244		53.39	8.800	0.000
T2	130.00	1.337	27	78.333	A	0.000	11.356	6.667	58.71	0.000	0.000
140.00-120.00					B	0.000	11.356		58.71	9.240	0.000
					C	0.000	11.356		58.71	22.000	0.000
T3	110.00	1.291	26	78.333	A	0.000	11.356	6.667	58.71	0.000	0.000
120.00-100.00					B	0.000	11.356		58.71	9.240	0.000
					C	0.000	11.356		58.71	22.000	0.000
T4	90.00	1.238	25	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
100.00-80.00					B	0.000	12.162		61.67	9.240	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	12.162		61.67	22.000	0.000
T5 80.00-60.00	70.00	1.174	24	78.750	A	0.000	12.533	7.500	59.84	0.000	0.000
					B	0.000	12.533		59.84	9.240	0.000
					C	0.000	12.533		59.84	22.000	0.000
T6 60.00-40.00	50.00	1.094	22	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
					B	0.000	12.162		61.67	9.240	0.000
					C	0.000	12.162		61.67	22.000	0.000
T7 40.00-20.00	30.00	0.982	20	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
					B	0.000	12.162		61.67	9.240	0.000
					C	0.000	12.162		61.67	22.000	0.000
T8 20.00-5.00	12.50	0.85	17	59.375	A	0.000	9.853	6.250	63.43	0.000	0.000
					B	0.000	9.853		63.43	6.930	0.000
					C	0.000	9.853		63.43	16.500	0.000
T9 5.00-0.00	2.50	0.85	17	10.488	A	0.618	2.985	2.270	63.00	0.000	0.000
					B	0.618	2.985		63.00	2.310	0.000
					C	0.618	2.985		63.00	5.500	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	145.00	1.369	7	2.3191	43.032	A	0.000	31.051	11.064	35.63	0.000	0.000
150.00-140.00						B	0.000	31.051		35.63	13.799	0.000
						C	0.000	31.051		35.63	30.777	0.000
T2	130.00	1.337	7	2.2939	85.980	A	0.000	55.334	21.959	39.68	0.000	0.000
140.00-120.00						B	0.000	55.334		39.68	34.327	0.000
						C	0.000	55.334		39.68	76.606	0.000
T3	110.00	1.291	7	2.2559	85.853	A	0.000	54.606	21.706	39.75	0.000	0.000
120.00-100.00						B	0.000	54.606		39.75	34.073	0.000
						C	0.000	54.606		39.75	76.100	0.000
T4 100.00-80.00	90.00	1.238	7	2.2111	86.120	A	0.000	54.392	22.240	40.89	0.000	0.000
						B	0.000	54.392		40.89	33.773	0.000
						C	0.000	54.392		40.89	75.504	0.000
T5 80.00-60.00	70.00	1.174	6	2.1562	85.937	A	0.000	54.995	21.875	39.78	0.000	0.000
						B	0.000	54.995		39.78	33.405	0.000
						C	0.000	54.995		39.78	74.775	0.000
T6 60.00-40.00	50.00	1.094	6	2.0849	85.700	A	0.000	51.981	21.399	41.17	0.000	0.000
						B	0.000	51.981		41.17	32.929	0.000
						C	0.000	51.981		41.17	73.828	0.000
T7 40.00-20.00	30.00	0.982	5	1.9810	85.353	A	0.000	49.998	20.707	41.42	0.000	0.000
						B	0.000	49.998		41.42	32.237	0.000
						C	0.000	49.998		41.42	72.452	0.000
T8 20.00-5.00	12.50	0.85	5	1.8150	63.912	A	0.000	36.365	15.325	42.14	0.000	0.000
						B	0.000	36.365		42.14	23.351	0.000
						C	0.000	36.365		42.14	52.694	0.000
T9 5.00-0.00	2.50	0.85	5	1.5452	11.863	A	0.618	9.215	5.077	51.63	0.000	0.000
						B	0.618	9.215		51.63	7.339	0.000
						C	0.618	9.215		51.63	16.679	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	145.00	1.369	11	39.167	A	0.000	6.244	3.333	53.39	0.000	0.000
150.00-140.00					B	0.000	6.244		53.39	3.696	0.000
					C	0.000	6.244		53.39	8.800	0.000
T2	130.00	1.337	10	78.333	A	0.000	11.356	6.667	58.71	0.000	0.000
140.00-120.00					B	0.000	11.356		58.71	9.240	0.000
					C	0.000	11.356		58.71	22.000	0.000
T3	110.00	1.291	10	78.333	A	0.000	11.356	6.667	58.71	0.000	0.000
120.00-100.00					B	0.000	11.356		58.71	9.240	0.000
					C	0.000	11.356		58.71	22.000	0.000
T4	90.00	1.238	10	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
100.00-80.00					B	0.000	12.162		61.67	9.240	0.000
					C	0.000	12.162		61.67	22.000	0.000
T5 80.00-60.00	70.00	1.174	9	78.750	A	0.000	12.533	7.500	59.84	0.000	0.000
					B	0.000	12.533		59.84	9.240	0.000
					C	0.000	12.533		59.84	22.000	0.000
T6 60.00-40.00	50.00	1.094	9	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
					B	0.000	12.162		61.67	9.240	0.000
					C	0.000	12.162		61.67	22.000	0.000
T7 40.00-20.00	30.00	0.982	8	78.750	A	0.000	12.162	7.500	61.67	0.000	0.000
					B	0.000	12.162		61.67	9.240	0.000
					C	0.000	12.162		61.67	22.000	0.000
T8 20.00-5.00	12.50	0.85	7	59.375	A	0.000	9.853	6.250	63.43	0.000	0.000
					B	0.000	9.853		63.43	6.930	0.000
					C	0.000	9.853		63.43	16.500	0.000
T9 5.00-0.00	2.50	0.85	7	10.488	A	0.618	2.985	2.270	63.00	0.000	0.000
					B	0.618	2.985		63.00	2.310	0.000
					C	0.618	2.985		63.00	5.500	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	28	1	1	3.550	0.41	41.00	C
150.00-140.00			B	0.159	2.737		1	1	3.550			
			C	0.159	2.737		1	1	3.550			
T2	0.21	1.00	A	0.145	2.79	27	1	1	6.439	0.85	42.72	C
140.00-120.00		TA 1.07	B	0.145	2.79		1	1	6.439			
			C	0.145	2.79		1	1	6.439			
T3	0.21	1.00	A	0.145	2.79	26	1	1	6.439	0.82	41.25	C
120.00-100.00			B	0.145	2.79		1	1	6.439			
			C	0.145	2.79		1	1	6.439			
T4	0.21	1.17	A	0.154	2.755	25	1	1	6.908	0.81	40.69	C
100.00-80.00			B	0.154	2.755		1	1	6.908			
			C	0.154	2.755		1	1	6.908			
T5	0.21	1.21	A	0.159	2.738	24	1	1	7.126	0.78	39.08	C
80.00-60.00			B	0.159	2.738		1	1	7.126			
			C	0.159	2.738		1	1	7.126			
T6	0.21	1.17	A	0.154	2.755	22	1	1	6.908	0.72	35.95	C
60.00-40.00			B	0.154	2.755		1	1	6.908			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.154	2.755		1	1	6.908			
T7	0.21	1.17	A	0.154	2.755	20	1	1	6.908	0.65	32.29	C
40.00-20.00			B	0.154	2.755		1	1	6.908			
			C	0.154	2.755		1	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	17	1	1	5.610	0.43	28.88	C
			B	0.166	2.714		1	1	5.610			
			C	0.166	2.714		1	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	17	1	1	2.450	0.15	29.71	C
			B	0.344	2.187		1	1	2.450			
			C	0.344	2.187		1	1	2.450			
Sum Weight:	1.58	9.73								5.63		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	28	0.825	1	3.550	0.41	41.00	C
150.00-140.00			B	0.159	2.737		0.825	1	3.550			
			C	0.159	2.737		0.825	1	3.550			
T2	0.21	1.00	A	0.145	2.79	27	0.825	1	6.439	0.85	42.72	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.825	1	6.439			
			C	0.145	2.79		0.825	1	6.439			
T3	0.21	1.00	A	0.145	2.79	26	0.825	1	6.439	0.82	41.25	C
120.00-100.00			B	0.145	2.79		0.825	1	6.439			
			C	0.145	2.79		0.825	1	6.439			
T4	0.21	1.17	A	0.154	2.755	25	0.825	1	6.908	0.81	40.69	C
100.00-80.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T5	0.21	1.21	A	0.159	2.738	24	0.825	1	7.126	0.78	39.08	C
80.00-60.00			B	0.159	2.738		0.825	1	7.126			
			C	0.159	2.738		0.825	1	7.126			
T6	0.21	1.17	A	0.154	2.755	22	0.825	1	6.908	0.72	35.95	C
60.00-40.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T7	0.21	1.17	A	0.154	2.755	20	0.825	1	6.908	0.65	32.29	C
40.00-20.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	17	0.825	1	5.610	0.43	28.88	C
			B	0.166	2.714		0.825	1	5.610			
			C	0.166	2.714		0.825	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	17	0.825	1	2.342	0.15	29.01	C
			B	0.344	2.187		0.825	1	2.342			
			C	0.344	2.187		0.825	1	2.342			
Sum Weight:	1.58	9.73								5.63		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	28	0.8	1	3.550	0.41	41.00	C
150.00-140.00			B	0.159	2.737		0.8	1	3.550			
			C	0.159	2.737		0.8	1	3.550			
T2	0.21	1.00	A	0.145	2.79	27	0.8	1	6.439	0.85	42.72	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.8	1	6.439			
			C	0.145	2.79		0.8	1	6.439			
T3	0.21	1.00	A	0.145	2.79	26	0.8	1	6.439	0.82	41.25	C
120.00-100.00			B	0.145	2.79		0.8	1	6.439			
			C	0.145	2.79		0.8	1	6.439			
T4	0.21	1.17	A	0.154	2.755	25	0.8	1	6.908	0.81	40.69	C
100.00-80.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T5	0.21	1.21	A	0.159	2.738	24	0.8	1	7.126	0.78	39.08	C
80.00-60.00			B	0.159	2.738		0.8	1	7.126			
			C	0.159	2.738		0.8	1	7.126			
T6	0.21	1.17	A	0.154	2.755	22	0.8	1	6.908	0.72	35.95	C
60.00-40.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T7	0.21	1.17	A	0.154	2.755	20	0.8	1	6.908	0.65	32.29	C
40.00-20.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	17	0.8	1	5.610	0.43	28.88	C
			B	0.166	2.714		0.8	1	5.610			
			C	0.166	2.714		0.8	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	17	0.8	1	2.326	0.14	28.91	C
			B	0.344	2.187		0.8	1	2.326			
			C	0.344	2.187		0.8	1	2.326			
Sum Weight:	1.58	9.73								5.63		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	28	0.85	1	3.550	0.41	41.00	C
150.00-140.00			B	0.159	2.737		0.85	1	3.550			
			C	0.159	2.737		0.85	1	3.550			
T2	0.21	1.00	A	0.145	2.79	27	0.85	1	6.439	0.85	42.72	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.85	1	6.439			
			C	0.145	2.79		0.85	1	6.439			
T3	0.21	1.00	A	0.145	2.79	26	0.85	1	6.439	0.82	41.25	C
120.00-100.00			B	0.145	2.79		0.85	1	6.439			
			C	0.145	2.79		0.85	1	6.439			
T4	0.21	1.17	A	0.154	2.755	25	0.85	1	6.908	0.81	40.69	C
100.00-80.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T5	0.21	1.21	A	0.159	2.738	24	0.85	1	7.126	0.78	39.08	C
80.00-60.00			B	0.159	2.738		0.85	1	7.126			
			C	0.159	2.738		0.85	1	7.126			
T6	0.21	1.17	A	0.154	2.755	22	0.85	1	6.908	0.72	35.95	C
60.00-40.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T7	0.21	1.17	A	0.154	2.755	20	0.85	1	6.908	0.65	32.29	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
40.00-20.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	17	0.85	1	5.610	0.43	28.88	C
			B	0.166	2.714		0.85	1	5.610			
			C	0.166	2.714		0.85	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	17	0.85	1	2.357	0.15	29.11	C
			B	0.344	2.187		0.85	1	2.357			
			C	0.344	2.187		0.85	1	2.357			
Sum Weight:	1.58	9.73								5.63		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.73	2.15	A	0.722	1.779	7	1	1	25.666	0.37	36.75	C
150.00-140.00			B	0.722	1.779		1	1	25.666			
			C	0.722	1.779		1	1	25.666			
T2	1.81	3.73	A	0.644	1.783	7	1	1	42.725	0.72	35.79	C
140.00-120.00		TA 3.12	B	0.644	1.783		1	1	42.725			
			C	0.644	1.783		1	1	42.725			
T3	1.78	3.65	A	0.636	1.786	7	1	1	41.889	0.69	34.31	C
120.00-100.00			B	0.636	1.786		1	1	41.889			
			C	0.636	1.786		1	1	41.889			
T4	1.75	3.77	A	0.632	1.788	7	1	1	41.564	0.66	32.79	C
100.00-80.00			B	0.632	1.788		1	1	41.564			
			C	0.632	1.788		1	1	41.564			
T5	1.71	3.81	A	0.64	1.785	6	1	1	42.330	0.62	31.08	C
80.00-60.00			B	0.64	1.785		1	1	42.330			
			C	0.64	1.785		1	1	42.330			
T6	1.65	3.53	A	0.607	1.8	6	1	1	38.878	0.57	28.32	C
60.00-40.00			B	0.607	1.8		1	1	38.878			
			C	0.607	1.8		1	1	38.878			
T7	1.57	3.34	A	0.586	1.814	5	1	1	36.741	0.50	24.98	C
40.00-20.00			B	0.586	1.814		1	1	36.741			
			C	0.586	1.814		1	1	36.741			
T8 20.00-5.00	1.09	2.50	A	0.569	1.827	5	1	1	26.348	0.32	21.20	C
			B	0.569	1.827		1	1	26.348			
			C	0.569	1.827		1	1	26.348			
T9 5.00-0.00	0.32	0.73	A	0.829	1.84	5	1	1	8.987	0.08	16.23	C
			B	0.829	1.84		1	1	8.987			
			C	0.829	1.84		1	1	8.987			
Sum Weight:	12.42	30.33								4.51		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.73	2.15	A	0.722	1.779	7	0.825	1	25.666	0.37	36.75	C
150.00-140.00			B	0.722	1.779		0.825	1	25.666			
			C	0.722	1.779		0.825	1	25.666			
T2	1.81	3.73	A	0.644	1.783	7	0.825	1	42.725	0.72	35.79	C
140.00-120.00		TA 3.12	B	0.644	1.783		0.825	1	42.725			
			C	0.644	1.783		0.825	1	42.725			
T3	1.78	3.65	A	0.636	1.786	7	0.825	1	41.889	0.69	34.31	C
120.00-100.00			B	0.636	1.786		0.825	1	41.889			
			C	0.636	1.786		0.825	1	41.889			
T4	1.75	3.77	A	0.632	1.788	7	0.825	1	41.564	0.66	32.79	C
100.00-80.00			B	0.632	1.788		0.825	1	41.564			
			C	0.632	1.788		0.825	1	41.564			
T5	1.71	3.81	A	0.64	1.785	6	0.825	1	42.330	0.62	31.08	C
80.00-60.00			B	0.64	1.785		0.825	1	42.330			
			C	0.64	1.785		0.825	1	42.330			
T6	1.65	3.53	A	0.607	1.8	6	0.825	1	38.878	0.57	28.32	C
60.00-40.00			B	0.607	1.8		0.825	1	38.878			
			C	0.607	1.8		0.825	1	38.878			
T7	1.57	3.34	A	0.586	1.814	5	0.825	1	36.741	0.50	24.98	C
40.00-20.00			B	0.586	1.814		0.825	1	36.741			
			C	0.586	1.814		0.825	1	36.741			
T8 20.00-5.00	1.09	2.50	A	0.569	1.827	5	0.825	1	26.348	0.32	21.20	C
			B	0.569	1.827		0.825	1	26.348			
			C	0.569	1.827		0.825	1	26.348			
T9 5.00-0.00	0.32	0.73	A	0.829	1.84	5	0.825	1	8.879	0.08	16.07	C
			B	0.829	1.84		0.825	1	8.879			
			C	0.829	1.84		0.825	1	8.879			
Sum Weight:	12.42	30.33								4.51		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.73	2.15	A	0.722	1.779	7	0.8	1	25.666	0.37	36.75	C
150.00-140.00			B	0.722	1.779		0.8	1	25.666			
			C	0.722	1.779		0.8	1	25.666			
T2	1.81	3.73	A	0.644	1.783	7	0.8	1	42.725	0.72	35.79	C
140.00-120.00		TA 3.12	B	0.644	1.783		0.8	1	42.725			
			C	0.644	1.783		0.8	1	42.725			
T3	1.78	3.65	A	0.636	1.786	7	0.8	1	41.889	0.69	34.31	C
120.00-100.00			B	0.636	1.786		0.8	1	41.889			
			C	0.636	1.786		0.8	1	41.889			
T4	1.75	3.77	A	0.632	1.788	7	0.8	1	41.564	0.66	32.79	C
100.00-80.00			B	0.632	1.788		0.8	1	41.564			
			C	0.632	1.788		0.8	1	41.564			
T5	1.71	3.81	A	0.64	1.785	6	0.8	1	42.330	0.62	31.08	C
80.00-60.00			B	0.64	1.785		0.8	1	42.330			
			C	0.64	1.785		0.8	1	42.330			
T6	1.65	3.53	A	0.607	1.8	6	0.8	1	38.878	0.57	28.32	C
60.00-40.00			B	0.607	1.8		0.8	1	38.878			
			C	0.607	1.8		0.8	1	38.878			
T7	1.57	3.34	A	0.586	1.814	5	0.8	1	36.741	0.50	24.98	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
40.00-20.00			B	0.586	1.814		0.8	1	36.741			
			C	0.586	1.814		0.8	1	36.741			
T8 20.00-5.00	1.09	2.50	A	0.569	1.827	5	0.8	1	26.348	0.32	21.20	C
			B	0.569	1.827		0.8	1	26.348			
			C	0.569	1.827		0.8	1	26.348			
T9 5.00-0.00	0.32	0.73	A	0.829	1.84	5	0.8	1	8.864	0.08	16.05	C
			B	0.829	1.84		0.8	1	8.864			
			C	0.829	1.84		0.8	1	8.864			
Sum Weight:	12.42	30.33								4.51		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.73	2.15	A	0.722	1.779	7	0.85	1	25.666	0.37	36.75	C
150.00-140.00			B	0.722	1.779		0.85	1	25.666			
			C	0.722	1.779		0.85	1	25.666			
T2	1.81	3.73	A	0.644	1.783	7	0.85	1	42.725	0.72	35.79	C
140.00-120.00		TA 3.12	B	0.644	1.783		0.85	1	42.725			
			C	0.644	1.783		0.85	1	42.725			
T3	1.78	3.65	A	0.636	1.786	7	0.85	1	41.889	0.69	34.31	C
120.00-100.00			B	0.636	1.786		0.85	1	41.889			
			C	0.636	1.786		0.85	1	41.889			
T4	1.75	3.77	A	0.632	1.788	7	0.85	1	41.564	0.66	32.79	C
100.00-80.00			B	0.632	1.788		0.85	1	41.564			
			C	0.632	1.788		0.85	1	41.564			
T5	1.71	3.81	A	0.64	1.785	6	0.85	1	42.330	0.62	31.08	C
80.00-60.00			B	0.64	1.785		0.85	1	42.330			
			C	0.64	1.785		0.85	1	42.330			
T6	1.65	3.53	A	0.607	1.8	6	0.85	1	38.878	0.57	28.32	C
60.00-40.00			B	0.607	1.8		0.85	1	38.878			
			C	0.607	1.8		0.85	1	38.878			
T7	1.57	3.34	A	0.586	1.814	5	0.85	1	36.741	0.50	24.98	C
40.00-20.00			B	0.586	1.814		0.85	1	36.741			
			C	0.586	1.814		0.85	1	36.741			
T8 20.00-5.00	1.09	2.50	A	0.569	1.827	5	0.85	1	26.348	0.32	21.20	C
			B	0.569	1.827		0.85	1	26.348			
			C	0.569	1.827		0.85	1	26.348			
T9 5.00-0.00	0.32	0.73	A	0.829	1.84	5	0.85	1	8.894	0.08	16.10	C
			B	0.829	1.84		0.85	1	8.894			
			C	0.829	1.84		0.85	1	8.894			
Sum Weight:	12.42	30.33								4.51		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	11	1	1	3.550	0.16	15.69	C
150.00-140.00			B	0.159	2.737		1	1	3.550			
			C	0.159	2.737		1	1	3.550			
T2	0.21	1.00	A	0.145	2.79	10	1	1	6.439	0.33	16.35	C
140.00-120.00		TA 1.07	B	0.145	2.79		1	1	6.439			
			C	0.145	2.79		1	1	6.439			
T3	0.21	1.00	A	0.145	2.79	10	1	1	6.439	0.32	15.78	C
120.00-100.00			B	0.145	2.79		1	1	6.439			
			C	0.145	2.79		1	1	6.439			
T4	0.21	1.17	A	0.154	2.755	10	1	1	6.908	0.31	15.57	C
100.00-80.00			B	0.154	2.755		1	1	6.908			
			C	0.154	2.755		1	1	6.908			
T5	0.21	1.21	A	0.159	2.738	9	1	1	7.126	0.30	14.95	C
80.00-60.00			B	0.159	2.738		1	1	7.126			
			C	0.159	2.738		1	1	7.126			
T6	0.21	1.17	A	0.154	2.755	9	1	1	6.908	0.28	13.76	C
60.00-40.00			B	0.154	2.755		1	1	6.908			
			C	0.154	2.755		1	1	6.908			
T7	0.21	1.17	A	0.154	2.755	8	1	1	6.908	0.25	12.35	C
40.00-20.00			B	0.154	2.755		1	1	6.908			
			C	0.154	2.755		1	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	7	1	1	5.610	0.17	11.05	C
			B	0.166	2.714		1	1	5.610			
			C	0.166	2.714		1	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	7	1	1	2.450	0.06	11.37	C
			B	0.344	2.187		1	1	2.450			
			C	0.344	2.187		1	1	2.450			
Sum Weight:	1.58	9.73								2.15		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	11	0.825	1	3.550	0.16	15.69	C
150.00-140.00			B	0.159	2.737		0.825	1	3.550			
			C	0.159	2.737		0.825	1	3.550			
T2	0.21	1.00	A	0.145	2.79	10	0.825	1	6.439	0.33	16.35	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.825	1	6.439			
			C	0.145	2.79		0.825	1	6.439			
T3	0.21	1.00	A	0.145	2.79	10	0.825	1	6.439	0.32	15.78	C
120.00-100.00			B	0.145	2.79		0.825	1	6.439			
			C	0.145	2.79		0.825	1	6.439			
T4	0.21	1.17	A	0.154	2.755	10	0.825	1	6.908	0.31	15.57	C
100.00-80.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T5	0.21	1.21	A	0.159	2.738	9	0.825	1	7.126	0.30	14.95	C
80.00-60.00			B	0.159	2.738		0.825	1	7.126			
			C	0.159	2.738		0.825	1	7.126			
T6	0.21	1.17	A	0.154	2.755	9	0.825	1	6.908	0.28	13.76	C
60.00-40.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T7	0.21	1.17	A	0.154	2.755	8	0.825	1	6.908	0.25	12.35	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
40.00-20.00			B	0.154	2.755		0.825	1	6.908			
			C	0.154	2.755		0.825	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	7	0.825	1	5.610	0.17	11.05	C
			B	0.166	2.714		0.825	1	5.610			
			C	0.166	2.714		0.825	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	7	0.825	1	2.342	0.06	11.10	C
			B	0.344	2.187		0.825	1	2.342			
			C	0.344	2.187		0.825	1	2.342			
Sum Weight:	1.58	9.73								2.15		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	11	0.8	1	3.550	0.16	15.69	C
150.00-140.00			B	0.159	2.737		0.8	1	3.550			
			C	0.159	2.737		0.8	1	3.550			
T2	0.21	1.00	A	0.145	2.79	10	0.8	1	6.439	0.33	16.35	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.8	1	6.439			
			C	0.145	2.79		0.8	1	6.439			
T3	0.21	1.00	A	0.145	2.79	10	0.8	1	6.439	0.32	15.78	C
120.00-100.00			B	0.145	2.79		0.8	1	6.439			
			C	0.145	2.79		0.8	1	6.439			
T4	0.21	1.17	A	0.154	2.755	10	0.8	1	6.908	0.31	15.57	C
100.00-80.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T5	0.21	1.21	A	0.159	2.738	9	0.8	1	7.126	0.30	14.95	C
80.00-60.00			B	0.159	2.738		0.8	1	7.126			
			C	0.159	2.738		0.8	1	7.126			
T6	0.21	1.17	A	0.154	2.755	9	0.8	1	6.908	0.28	13.76	C
60.00-40.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T7	0.21	1.17	A	0.154	2.755	8	0.8	1	6.908	0.25	12.35	C
40.00-20.00			B	0.154	2.755		0.8	1	6.908			
			C	0.154	2.755		0.8	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	7	0.8	1	5.610	0.17	11.05	C
			B	0.166	2.714		0.8	1	5.610			
			C	0.166	2.714		0.8	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	7	0.8	1	2.326	0.06	11.06	C
			B	0.344	2.187		0.8	1	2.326			
			C	0.344	2.187		0.8	1	2.326			
Sum Weight:	1.58	9.73								2.15		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.09	0.56	A	0.159	2.737	11	0.85	1	3.550	0.16	15.69	C
150.00-140.00			B	0.159	2.737		0.85	1	3.550			
			C	0.159	2.737		0.85	1	3.550			
T2	0.21	1.00	A	0.145	2.79	10	0.85	1	6.439	0.33	16.35	C
140.00-120.00		TA 1.07	B	0.145	2.79		0.85	1	6.439			
			C	0.145	2.79		0.85	1	6.439			
T3	0.21	1.00	A	0.145	2.79	10	0.85	1	6.439	0.32	15.78	C
120.00-100.00			B	0.145	2.79		0.85	1	6.439			
			C	0.145	2.79		0.85	1	6.439			
T4	0.21	1.17	A	0.154	2.755	10	0.85	1	6.908	0.31	15.57	C
100.00-80.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T5	0.21	1.21	A	0.159	2.738	9	0.85	1	7.126	0.30	14.95	C
80.00-60.00			B	0.159	2.738		0.85	1	7.126			
			C	0.159	2.738		0.85	1	7.126			
T6	0.21	1.17	A	0.154	2.755	9	0.85	1	6.908	0.28	13.76	C
60.00-40.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T7	0.21	1.17	A	0.154	2.755	8	0.85	1	6.908	0.25	12.35	C
40.00-20.00			B	0.154	2.755		0.85	1	6.908			
			C	0.154	2.755		0.85	1	6.908			
T8 20.00-5.00	0.16	1.03	A	0.166	2.714	7	0.85	1	5.610	0.17	11.05	C
			B	0.166	2.714		0.85	1	5.610			
			C	0.166	2.714		0.85	1	5.610			
T9 5.00-0.00	0.05	0.37	A	0.344	2.187	7	0.85	1	2.357	0.06	11.14	C
			B	0.344	2.187		0.85	1	2.357			
			C	0.344	2.187		0.85	1	2.357			
Sum Weight:	1.58	9.73								2.15		

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Leg Weight	5.88			
Bracing Weight	3.85			
Total Member Self-Weight	9.73			
Guy Weight	1.76			
Total Weight	16.19			
Wind 0 deg - No Ice		0.06	-9.24	-0.79
Wind 30 deg - No Ice		4.64	-8.03	-0.66
Wind 45 deg - No Ice		6.53	-6.57	-0.53
Wind 60 deg - No Ice		7.97	-4.67	-0.36
Wind 90 deg - No Ice		9.17	-0.06	0.05
Wind 120 deg - No Ice		7.92	4.57	0.44
Wind 135 deg - No Ice		6.45	6.49	0.59
Wind 150 deg - No Ice		4.54	7.97	0.71
Wind 180 deg - No Ice		-0.06	9.24	0.79
Wind 210 deg - No Ice		-4.64	8.03	0.66
Wind 225 deg - No Ice		-6.53	6.57	0.53
Wind 240 deg - No Ice		-7.98	4.67	0.36
Wind 270 deg - No Ice		-9.17	0.06	-0.05
Wind 300 deg - No Ice		-7.91	-4.57	-0.44

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Torques kip-ft
Wind 315 deg - No Ice		-6.45	-6.49	-0.59
Wind 330 deg - No Ice		-4.54	-7.97	-0.71
Member Ice	20.60			
Guy Ice	15.05			
Total Weight Ice	70.15			
Wind 0 deg - Ice		0.02	-6.37	-0.34
Wind 30 deg - Ice		3.19	-5.52	-0.31
Wind 45 deg - Ice		4.50	-4.51	-0.26
Wind 60 deg - Ice		5.50	-3.20	-0.19
Wind 90 deg - Ice		6.35	-0.02	-0.02
Wind 120 deg - Ice		5.49	3.17	0.15
Wind 135 deg - Ice		4.48	4.49	0.22
Wind 150 deg - Ice		3.16	5.50	0.28
Wind 180 deg - Ice		-0.02	6.36	0.34
Wind 210 deg - Ice		-3.19	5.52	0.31
Wind 225 deg - Ice		-4.50	4.51	0.26
Wind 240 deg - Ice		-5.50	3.20	0.19
Wind 270 deg - Ice		-6.35	0.02	0.02
Wind 300 deg - Ice		-5.49	-3.17	-0.15
Wind 315 deg - Ice		-4.48	-4.49	-0.22
Wind 330 deg - Ice		-3.16	-5.50	-0.28
Total Weight	16.19			
Wind 0 deg - Service		0.02	-3.54	-0.30
Wind 30 deg - Service		1.77	-3.07	-0.25
Wind 45 deg - Service		2.50	-2.52	-0.20
Wind 60 deg - Service		3.05	-1.79	-0.14
Wind 90 deg - Service		3.51	-0.02	0.02
Wind 120 deg - Service		3.03	1.75	0.17
Wind 135 deg - Service		2.47	2.48	0.23
Wind 150 deg - Service		1.74	3.05	0.27
Wind 180 deg - Service		-0.02	3.53	0.30
Wind 210 deg - Service		-1.77	3.07	0.25
Wind 225 deg - Service		-2.50	2.52	0.20
Wind 240 deg - Service		-3.05	1.79	0.14
Wind 270 deg - Service		-3.51	0.02	-0.02
Wind 300 deg - Service		-3.03	-1.75	-0.17
Wind 315 deg - Service		-2.47	-2.48	-0.23
Wind 330 deg - Service		-1.74	-3.05	-0.27

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 45 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 135 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy

Comb. No.	Description
12	1.2 Dead+1.6 Wind 225 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
14	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
15	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
16	1.2 Dead+1.6 Wind 315 deg - No Ice+1.0 Guy
17	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
18	1.2 Dead+1.0 Ice+1.0 Temp+Guy
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
28	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
29	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp+1.0 Guy
30	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
31	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
32	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
33	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp+1.0 Guy
34	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
35	Dead+Wind 0 deg - Service+Guy
36	Dead+Wind 30 deg - Service+Guy
37	Dead+Wind 45 deg - Service+Guy
38	Dead+Wind 60 deg - Service+Guy
39	Dead+Wind 90 deg - Service+Guy
40	Dead+Wind 120 deg - Service+Guy
41	Dead+Wind 135 deg - Service+Guy
42	Dead+Wind 150 deg - Service+Guy
43	Dead+Wind 180 deg - Service+Guy
44	Dead+Wind 210 deg - Service+Guy
45	Dead+Wind 225 deg - Service+Guy
46	Dead+Wind 240 deg - Service+Guy
47	Dead+Wind 270 deg - Service+Guy
48	Dead+Wind 300 deg - Service+Guy
49	Dead+Wind 315 deg - Service+Guy
50	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	150 - 140	Leg	Max Tension	5	3.17	0.02	-0.01
			Max. Compression	24	-16.63	-0.24	-0.10
			Max. Mx	6	-0.62	-0.51	0.11
			Max. My	2	-10.87	-0.01	0.58
			Max. Vy	5	-0.98	-0.49	0.30
			Max. Vx	2	1.09	-0.01	0.58
		Diagonal	Max Tension	8	1.33	0.00	0.00
			Max. Compression	8	-1.35	0.00	0.00
			Max. Mx	22	-0.04	-0.01	0.00
			Max. My	4	-1.33	-0.00	0.00
			Max. Vy	27	0.01	-0.01	0.00
			Max. Vx	4	0.00	0.00	0.00
		Top Girt	Max Tension	15	0.04	0.00	0.00
			Max. Compression	7	-0.08	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	29	-0.07	0.02	0.00
			Max. Vy	29	0.02	0.00	0.00
		Bottom Girt	Max Tension	2	0.43	0.00	0.00
			Max. Compression	5	-0.30	0.00	0.00
			Max. Mx	29	0.31	0.02	0.00
			Max. Vy	29	0.02	0.00	0.00
		Top Guy Pull-Off	Max Tension	10	4.48	0.00	0.00
			Max. Compression	2	-2.82	0.00	0.00
			Max. Mx	29	0.32	0.03	0.00
			Max. My	17	0.79	0.00	-0.00
			Max. Vy	29	-0.03	0.00	0.00
			Max. Vx	17	0.00	0.00	0.00
T2	140 - 120	Leg	Max Tension	2	1.00	0.06	0.11
			Max. Compression	22	-28.88	0.03	-0.02
			Max. Mx	5	-2.87	0.48	-0.29
			Max. My	10	-1.72	0.00	0.51
			Max. Vy	5	-0.97	-0.01	0.01
			Max. Vx	2	1.09	-0.00	0.04
		Diagonal	Max Tension	17	2.14	0.00	0.00
			Max. Compression	9	-2.48	0.00	0.00
			Max. Mx	19	-1.28	-0.01	0.00
			Max. My	2	-1.74	0.00	0.02
			Max. Vy	19	0.01	-0.01	-0.00
			Max. Vx	2	0.01	0.00	0.00
		Top Girt	Max Tension	5	0.90	0.00	0.00
			Max. Compression	2	-1.06	0.00	0.00
			Max. Mx	29	-0.63	0.02	0.00
			Max. Vy	29	-0.02	0.00	0.00
		Bottom Girt	Max Tension	24	0.22	0.00	0.00
			Max. Compression	10	-0.10	0.00	0.00
			Max. Mx	29	0.21	0.02	0.00
			Max. Vy	29	-0.02	0.00	0.00
		Guy A	Bottom Tension	27	10.16		
			Top Tension	27	11.33		
			Top Cable Vert	27	7.43		
			Top Cable Norm	27	8.55		
			Top Cable Tan	27	0.01		
			Bot Cable Vert	27	-5.28		
			Bot Cable Norm	27	8.69		
			Bot Cable Tan	27	0.01		
		Guy B	Bottom Tension	32	10.59		
			Top Tension	32	11.87		
			Top Cable Vert	32	8.27		
			Top Cable Norm	32	8.51		
			Top Cable Tan	32	0.01		
			Bot Cable Vert	32	-6.06		
			Bot Cable Norm	32	8.68		
			Bot Cable Tan	32	0.00		
		Guy C	Bottom Tension	22	10.69		
			Top Tension	22	11.99		
			Top Cable Vert	22	8.45		
			Top Cable Norm	22	8.51		
			Top Cable Tan	22	0.01		
			Bot Cable Vert	22	-6.23		
			Bot Cable Norm	22	8.69		
			Bot Cable Tan	22	0.00		
		Torque Arm Top	Max Tension	27	10.46	0.00	0.00
			Max. Compression	7	-0.13	0.00	0.00
			Max. Mx	23	7.69	0.22	0.00
			Max. My	17	0.86	0.00	-0.00
			Max. Vy	23	-0.12	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	17	0.00	0.00	0.00
		Torque Arm Bottom	Max Tension	3	4.07	0.00	0.00
			Max. Compression	4	-7.30	0.00	0.00
			Max. Mx	24	-4.52	0.20	0.00
			Max. My	26	-5.81	0.00	-0.00
			Max. Vy	24	0.12	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T3	120 - 100	Leg	Max Tension	2	1.61	-0.00	-0.01
			Max. Compression	22	-30.80	-0.05	0.03
			Max. Mx	6	-15.12	0.15	-0.04
			Max. My	3	-15.18	0.08	-0.17
			Max. Vy	6	0.33	-0.04	-0.01
			Max. Vx	3	-0.39	0.00	0.03
		Diagonal	Max Tension	3	0.55	0.00	0.00
			Max. Compression	3	-0.65	0.00	0.00
			Max. Mx	20	-0.15	-0.01	0.00
			Max. My	3	-0.65	-0.00	-0.00
			Max. Vy	20	0.01	-0.01	0.00
			Max. Vx	3	-0.00	0.00	0.00
		Top Girt	Max Tension	27	0.16	0.00	0.00
			Max. Compression	2	-0.04	0.00	0.00
			Max. Mx	29	0.01	0.02	0.00
			Max. Vy	29	-0.02	0.00	0.00
		Bottom Girt	Max Tension	5	0.18	0.00	0.00
			Max. Compression	12	-0.07	0.00	0.00
			Max. Mx	25	0.13	0.02	0.00
			Max. Vy	25	-0.02	0.00	0.00
T4	100 - 80	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-30.67	-0.03	0.03
			Max. Mx	6	-7.02	0.42	-0.07
			Max. My	10	-7.79	-0.03	0.44
			Max. Vy	6	0.83	0.01	-0.00
			Max. Vx	10	0.86	-0.00	0.01
		Diagonal	Max Tension	3	1.19	0.00	0.00
			Max. Compression	3	-1.30	0.00	0.00
			Max. Mx	19	-0.10	-0.01	0.00
			Max. My	3	-1.29	-0.00	-0.00
			Max. Vy	19	0.01	-0.01	0.00
			Max. Vx	3	-0.00	0.00	0.00
		Top Girt	Max Tension	12	0.23	0.00	0.00
			Max. Compression	5	-0.16	0.00	0.00
			Max. Mx	25	0.17	0.02	0.00
			Max. Vy	25	-0.02	0.00	0.00
		Bottom Girt	Max Tension	5	0.43	0.00	0.00
			Max. Compression	13	-0.29	0.00	0.00
			Max. Mx	31	0.29	0.02	0.00
			Max. My	34	0.14	0.00	-0.00
			Max. Vy	31	-0.02	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
T5	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-35.62	0.04	-0.03
			Max. Mx	6	-13.04	-0.42	-0.07
			Max. My	10	-5.82	0.03	-0.42
			Max. Vy	6	0.83	-0.41	0.06
			Max. Vx	10	0.86	0.03	-0.42
		Diagonal	Max Tension	3	1.28	0.00	0.00
			Max. Compression	3	-1.38	0.00	0.00
			Max. Mx	25	0.09	-0.01	-0.00
			Max. My	3	-1.38	-0.00	-0.00
			Max. Vy	25	0.01	-0.01	-0.00
			Max. Vx	3	-0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	13	0.40	0.00	0.00
			Max. Compression	5	-0.30	0.00	0.00
			Max. Mx	31	-0.02	0.02	0.00
			Max. My	34	0.13	0.00	-0.00
			Max. Vy	31	-0.02	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Bottom Girt	Max Tension	13	0.36	0.00	0.00
			Max. Compression	10	-0.21	0.00	0.00
			Max. Mx	31	0.09	0.02	0.00
			Max. My	34	0.20	0.00	-0.00
			Max. Vy	31	-0.02	0.00	0.00
			Max. Vx	34	0.00	0.00	0.00
		Guy A	Bottom Tension	27	11.88		
			Top Tension	27	12.50		
			Top Cable Vert	27	5.42		
			Top Cable Norm	27	11.26		
			Top Cable Tan	27	0.00		
			Bot Cable Vert	27	-3.70		
			Bot Cable Norm	27	11.29		
			Bot Cable Tan	27	0.00		
		Guy B	Bottom Tension	32	12.27		
			Top Tension	32	12.99		
			Top Cable Vert	32	6.48		
			Top Cable Norm	32	11.25		
			Top Cable Tan	32	0.00		
			Bot Cable Vert	32	-4.80		
			Bot Cable Norm	32	11.29		
			Bot Cable Tan	32	0.00		
		Guy C	Bottom Tension	22	12.44		
			Top Tension	22	13.18		
			Top Cable Vert	22	6.73		
			Top Cable Norm	22	11.33		
			Top Cable Tan	22	0.00		
			Bot Cable Vert	22	-5.06		
			Bot Cable Norm	22	11.37		
			Bot Cable Tan	22	0.00		
		Top Guy Pull-Off	Max Tension	19	5.91	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	31	4.73	0.02	0.00
			Max. My	3	2.75	0.00	-0.00
			Max. Vy	31	0.03	0.00	0.00
			Max. Vx	3	0.00	0.00	0.00
T6	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-39.71	0.05	-0.03
			Max. Mx	6	-11.48	0.36	-0.03
			Max. My	10	-10.19	0.02	0.37
			Max. Vy	6	-0.69	0.01	-0.01
			Max. Vx	10	-0.73	-0.00	0.01
		Diagonal	Max Tension	6	0.85	0.00	0.00
			Max. Compression	6	-0.99	0.00	0.00
			Max. Mx	20	-0.09	-0.01	0.00
			Max. My	6	-0.99	-0.00	-0.00
			Max. Vy	20	0.01	-0.01	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.36	0.00	0.00
			Max. Compression	12	-0.22	0.00	0.00
			Max. Mx	31	0.24	0.02	0.00
			Max. My	20	0.13	0.00	-0.00
			Max. Vy	31	0.02	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
		Bottom Girt	Max Tension	24	0.23	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-0.05	0.00	0.00
			Max. Mx	29	0.22	0.02	0.00
			Max. My	20	0.21	0.00	-0.00
			Max. Vy	29	0.02	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
T7	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-40.56	-0.07	0.04
			Max. Mx	6	-17.95	0.15	-0.01
			Max. My	10	-18.27	0.01	0.15
			Max. Vy	14	0.25	0.01	-0.01
			Max. Vx	10	-0.25	-0.00	0.03
		Diagonal	Max Tension	34	0.31	0.00	0.00
			Max. Compression	34	-0.47	0.00	0.00
			Max. Mx	20	-0.24	-0.01	0.00
			Max. My	6	-0.39	-0.00	-0.00
			Max. Vy	19	0.01	-0.01	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Top Girt	Max Tension	19	0.20	0.00	0.00
			Max. Compression	14	-0.01	0.00	0.00
			Max. Mx	29	0.17	0.01	0.00
			Max. My	20	0.14	0.00	-0.00
			Max. Vy	29	-0.02	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Bottom Girt	Max Tension	32	0.26	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	0.16	0.01	0.00
			Max. My	20	0.22	0.00	-0.00
			Max. Vy	25	-0.02	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
T8	20 - 5	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	22	-40.24	-0.04	0.04
			Max. Mx	20	-39.91	-0.46	0.27
			Max. My	26	-39.36	0.00	-0.53
			Max. Vy	20	0.35	-0.46	0.27
			Max. Vx	26	0.40	0.00	-0.53
		Diagonal	Max Tension	34	1.42	0.00	0.00
			Max. Compression	34	-0.97	0.00	0.00
			Max. Mx	20	-0.72	-0.01	0.00
			Max. My	21	-0.47	-0.01	0.00
			Max. Vy	19	0.01	-0.01	-0.00
			Max. Vx	21	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.29	0.00	0.00
			Max. Compression	15	-0.02	0.00	0.00
			Max. Mx	25	0.26	0.01	0.00
			Max. My	20	0.16	0.00	-0.00
			Max. Vy	25	-0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	7.97	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	7.87	0.01	0.00
			Max. My	20	7.75	0.00	-0.00
			Max. Vy	25	-0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
T9	5 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-42.80	-0.34	0.00
			Max. Mx	20	-42.75	0.53	0.00
			Max. My	17	-13.90	0.07	0.03
			Max. Vy	19	1.23	-0.45	-0.00
			Max. Vx	3	-0.08	-0.17	0.01
		Diagonal	Max Tension	20	0.61	0.00	0.00
			Max. Compression	19	-2.88	-0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	0.60	-0.01	-0.00
			Max. My	19	0.57	-0.01	0.00
			Max. Vy	23	0.01	0.00	0.00
			Max. Vx	23	-0.00	0.00	0.00
		Horizontal	Max Tension	19	0.25	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	0.23	0.01	0.00
			Max. My	20	0.21	0.00	0.00
			Max. Vy	25	-0.02	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
		Bottom Girt	Max Tension	19	1.36	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	1.33	0.00	0.00
			Max. Vy	25	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	19	114.07	0.05	0.68
	Max. H_x	14	43.55	1.18	0.06
	Max. H_z	2	42.33	0.01	1.38
	Max. M_x	1	0.00	0.00	0.02
	Max. M_z	1	0.00	0.00	0.02
	Max. Torsion	1	0.00	0.00	0.02
	Min. Vert	1	35.17	0.00	0.02
	Min. H_x	6	43.68	-1.18	0.04
	Min. H_z	10	43.84	-0.01	-1.20
	Min. M_x	1	0.00	0.00	0.02
	Min. M_z	1	0.00	0.00	0.02
	Min. Torsion	1	0.00	0.00	0.02
Guy C @ 210 ft Elev -38 ft Azimuth 240 deg	Max. Vert	13	-1.43	-1.94	1.12
	Max. H_x	13	-1.43	-1.94	1.12
	Max. H_z	21	-17.42	-24.70	14.43
	Min. Vert	22	-17.51	-24.87	14.37
	Min. H_x	22	-17.51	-24.87	14.37
	Min. H_z	13	-1.43	-1.94	1.12
Guy B @ 210 ft Elev -34 ft Azimuth 120 deg	Max. Vert	7	-1.35	1.91	1.11
	Max. H_x	32	-16.92	24.80	14.33
	Max. H_z	33	-16.83	24.62	14.39
	Min. Vert	32	-16.92	24.80	14.33
	Min. H_x	7	-1.35	1.91	1.11
	Min. H_z	7	-1.35	1.91	1.11
Guy A @ 210 ft Elev -14 ft Azimuth 0 deg	Max. Vert	2	-0.78	-0.00	-1.81
	Max. H_x	31	-11.63	0.89	-23.82
	Max. H_z	2	-0.78	-0.00	-1.81
	Min. Vert	27	-14.25	-0.00	-28.64
	Min. H_x	23	-11.61	-0.89	-23.79
	Min. H_z	27	-14.25	-0.00	-28.64

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	35.17	-0.00	-0.02	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	42.33	-0.01	-1.38	0.00	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	44.12	0.60	-1.03	0.00	0.00	0.00
1.2 Dead+1.6 Wind 45 deg - No Ice+1.0 Guy	44.67	0.84	-0.83	0.00	0.00	0.00
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	44.81	1.02	-0.61	0.00	0.00	0.00
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	43.68	1.18	-0.04	0.00	0.00	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	41.80	1.14	0.65	0.00	0.00	0.00
1.2 Dead+1.6 Wind 135 deg - No Ice+1.0 Guy	42.31	0.89	0.87	0.00	0.00	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	43.04	0.59	1.04	0.00	0.00	0.00
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	43.84	0.01	1.20	0.00	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	43.09	-0.57	1.03	0.00	0.00	0.00
1.2 Dead+1.6 Wind 225 deg - No Ice+1.0 Guy	42.35	-0.87	0.86	0.00	0.00	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	41.85	-1.12	0.62	0.00	0.00	0.00
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	43.55	-1.18	-0.06	0.00	0.00	0.00
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	44.59	-1.04	-0.63	0.00	0.00	0.00
1.2 Dead+1.6 Wind 315 deg - No Ice+1.0 Guy	44.44	-0.86	-0.86	0.00	0.00	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	43.93	-0.62	-1.05	0.00	0.00	0.00
1.2 Dead+1.0 Ice+1.0 Temp+Guy	112.04	-0.04	-0.02	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	114.07	-0.05	-0.68	0.00	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	113.43	0.21	-0.58	0.00	0.00	0.00
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.98	0.33	-0.46	0.00	0.00	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.74	0.44	-0.30	0.00	0.00	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	113.00	0.57	0.04	0.00	0.00	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	113.27	0.53	0.31	0.00	0.00	0.00
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.97	0.45	0.41	0.00	0.00	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.48	0.32	0.48	0.00	0.00	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	111.86	-0.04	0.54	0.00	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.40	-0.41	0.48	0.00	0.00	0.00

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
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.85	-0.53	0.41	0.00	0.00	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	113.11	-0.62	0.31	0.00	0.00	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.83	-0.66	0.03	0.00	0.00	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.59	-0.53	-0.31	0.00	0.00	0.00
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp+1.0 Guy	112.86	-0.42	-0.47	0.00	0.00	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	113.34	-0.30	-0.59	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	35.59	-0.01	-0.36	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	35.50	0.15	-0.31	0.00	0.00	0.00
Dead+Wind 45 deg - Service+Guy	35.45	0.22	-0.25	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	35.42	0.28	-0.17	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	35.43	0.33	-0.00	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	35.45	0.29	0.16	0.00	0.00	0.00
Dead+Wind 135 deg - Service+Guy	35.41	0.24	0.22	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	35.34	0.17	0.27	0.00	0.00	0.00
Dead+Wind 180 deg - Service+Guy	35.28	-0.00	0.31	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	35.33	-0.18	0.27	0.00	0.00	0.00
Dead+Wind 225 deg - Service+Guy	35.39	-0.25	0.22	0.00	0.00	0.00
Dead+Wind 240 deg - Service+Guy	35.43	-0.30	0.15	0.00	0.00	0.00
Dead+Wind 270 deg - Service+Guy	35.40	-0.34	-0.01	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	35.40	-0.28	-0.18	0.00	0.00	0.00
Dead+Wind 315 deg - Service+Guy	35.43	-0.23	-0.25	0.00	0.00	0.00
Dead+Wind 330 deg - Service+Guy	35.49	-0.16	-0.31	0.00	0.00	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-16.19	0.00	-0.00	16.19	-0.00	0.004%
2	0.10	-19.33	-17.02	-0.10	19.33	17.00	0.074%
3	8.55	-19.12	-14.78	-8.56	19.12	14.77	0.065%
4	12.07	-18.97	-12.09	-12.08	18.97	12.08	0.076%
5	14.76	-18.91	-8.59	-14.77	18.91	8.58	0.063%
6	16.99	-19.09	-0.10	-16.98	19.09	0.11	0.081%
7	14.67	-19.27	8.42	-14.65	19.27	-8.41	0.084%
8	11.93	-19.20	11.95	-11.92	19.20	-11.94	0.043%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
9	8.38	-19.05	14.68	-8.36	19.05	-14.67	0.075%
10	-0.10	-18.83	17.02	0.10	18.83	-17.03	0.040%
11	-8.55	-19.04	14.78	8.54	19.04	-14.78	0.075%
12	-12.07	-19.19	12.09	12.05	19.19	-12.09	0.088%
13	-14.76	-19.26	8.59	14.74	19.26	-8.58	0.084%
14	-16.99	-19.08	0.10	16.98	19.08	-0.08	0.076%
15	-14.66	-18.90	-8.42	14.68	18.90	8.41	0.061%
16	-11.93	-18.97	-11.95	11.94	18.96	11.93	0.071%
17	-8.38	-19.12	-14.68	8.39	19.12	14.66	0.061%
18	0.00	-73.03	0.00	0.00	73.03	-0.00	0.005%
19	0.03	-73.34	-9.31	-0.03	73.34	9.29	0.019%
20	4.70	-73.07	-8.07	-4.70	73.07	8.06	0.014%
21	6.66	-72.88	-6.59	-6.66	72.88	6.58	0.020%
22	8.17	-72.80	-4.67	-8.16	72.80	4.66	0.025%
23	9.42	-73.04	-0.02	-9.41	73.04	0.02	0.018%
24	8.14	-73.28	4.63	-8.13	73.28	-4.62	0.009%
25	6.62	-73.19	6.55	-6.62	73.19	-6.54	0.009%
26	4.65	-73.00	8.03	-4.64	73.00	-8.03	0.014%
27	-0.03	-72.72	9.31	0.03	72.72	-9.30	0.010%
28	-4.70	-72.99	8.07	4.69	72.99	-8.07	0.010%
29	-6.66	-73.18	6.59	6.65	73.18	-6.59	0.014%
30	-8.17	-73.27	4.67	8.16	73.27	-4.67	0.015%
31	-9.42	-73.03	0.02	9.41	73.03	-0.02	0.014%
32	-8.14	-72.79	-4.63	8.14	72.79	4.62	0.014%
33	-6.62	-72.88	-6.55	6.63	72.88	6.53	0.021%
34	-4.65	-73.07	-8.03	4.65	73.07	8.02	0.015%
35	0.02	-16.25	-4.07	-0.02	16.25	4.06	0.045%
36	2.05	-16.20	-3.53	-2.05	16.20	3.53	0.033%
37	2.89	-16.17	-2.89	-2.89	16.17	2.88	0.047%
38	3.53	-16.15	-2.05	-3.54	16.15	2.05	0.062%
39	4.06	-16.20	-0.02	-4.06	16.20	0.03	0.034%
40	3.51	-16.24	2.01	-3.50	16.24	-2.01	0.029%
41	2.85	-16.22	2.86	-2.85	16.22	-2.86	0.027%
42	2.00	-16.19	3.51	-2.00	16.19	-3.51	0.022%
43	-0.02	-16.13	4.07	0.03	16.13	-4.07	0.027%
44	-2.05	-16.18	3.53	2.04	16.18	-3.53	0.040%
45	-2.89	-16.22	2.89	2.88	16.22	-2.89	0.025%
46	-3.53	-16.24	2.05	3.53	16.24	-2.05	0.026%
47	-4.06	-16.19	0.02	4.06	16.19	-0.01	0.057%
48	-3.51	-16.15	-2.01	3.51	16.15	2.00	0.069%
49	-2.85	-16.17	-2.86	2.86	16.17	2.85	0.049%
50	-2.00	-16.20	-3.51	2.01	16.20	3.50	0.034%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00008194
2	Yes	14	0.00141443	0.00084363
3	Yes	14	0.00099155	0.00088402
4	Yes	13	0.00105882	0.00099220
5	Yes	11	0.00074525	0.00089925
6	Yes	13	0.00116782	0.00112495
7	Yes	13	0.00146554	0.00115152
8	Yes	14	0.00075206	0.00065583
9	Yes	13	0.00121587	0.00107471

10	Yes	11	0.00041267	0.00088770
11	Yes	13	0.00119043	0.00107182
12	Yes	13	0.00146869	0.00125059
13	Yes	13	0.00144068	0.00116620
14	Yes	13	0.00111243	0.00108167
15	Yes	11	0.00072376	0.00093045
16	Yes	13	0.00101302	0.00094715
17	Yes	14	0.00095427	0.00084131
18	Yes	12	0.00077891	0.00012132
19	Yes	13	0.00118438	0.00046265
20	Yes	13	0.00084048	0.00034202
21	Yes	12	0.00113213	0.00044331
22	Yes	11	0.00135268	0.00048946
23	Yes	11	0.00105627	0.00038917
24	Yes	13	0.00078775	0.00023091
25	Yes	13	0.00084788	0.00022180
26	Yes	12	0.00133222	0.00031781
27	Yes	11	0.00086087	0.00022920
28	Yes	12	0.00105257	0.00023334
29	Yes	12	0.00147929	0.00031918
30	Yes	12	0.00142559	0.00033927
31	Yes	11	0.00093423	0.00031204
32	Yes	12	0.00087557	0.00031932
33	Yes	12	0.00129748	0.00047347
34	Yes	13	0.00091724	0.00035361
35	Yes	9	0.00132280	0.00068038
36	Yes	9	0.00091803	0.00048599
37	Yes	8	0.00117217	0.00049475
38	Yes	6	0.00125698	0.00044932
39	Yes	8	0.00090340	0.00039935
40	Yes	9	0.00097786	0.00042104
41	Yes	9	0.00100097	0.00041089
42	Yes	9	0.00000001	0.00031700
43	Yes	6	0.00000001	0.00031904
44	Yes	8	0.00138700	0.00041983
45	Yes	9	0.00093130	0.00036754
46	Yes	9	0.00093841	0.00039675
47	Yes	7	0.00146982	0.00047278
48	Yes	6	0.00145747	0.00043866
49	Yes	8	0.00129932	0.00051668
50	Yes	9	0.00098726	0.00049588

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	1.132	38	0.0201	0.0129
T2	140 - 120	1.102	38	0.0181	0.0129
T3	120 - 100	1.045	38	0.0226	0.0141
T4	100 - 80	0.921	38	0.0363	0.0119
T5	80 - 60	0.745	38	0.0416	0.0156
T6	60 - 40	0.578	38	0.0379	0.0205
T7	40 - 20	0.418	38	0.0425	0.0234
T8	20 - 5	0.224	38	0.0504	0.0250
T9	5 - 0	0.057	38	0.0534	0.0255

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVSPP18-C-A20	38	1.125	0.0196	0.0129	170312
138.00	Guy	38	1.096	0.0179	0.0130	114750
130.00	AIR21 B4A/B2P	38	1.077	0.0188	0.0137	160650
70.00	Guy	38	0.659	0.0397	0.0183	178709

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	6.094	5	0.1454	0.1054
T2	140 - 120	5.811	5	0.1367	0.1056
T3	120 - 100	5.273	5	0.1579	0.1094
T4	100 - 80	4.498	5	0.2074	0.0986
T5	80 - 60	3.547	5	0.2197	0.0915
T6	60 - 40	2.681	5	0.1921	0.0992
T7	40 - 20	1.900	5	0.2013	0.1114
T8	20 - 5	1.003	5	0.2285	0.1182
T9	5 - 0	0.254	5	0.2398	0.1202

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVSPP18-C-A20	5	6.036	0.1432	0.1053	47809
138.00	Guy	5	5.758	0.1362	0.1060	33659
130.00	AIR21 B4A/B2P	5	5.553	0.1408	0.1083	45484
70.00	Guy	5	3.097	0.2057	0.0900	30872

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
T2	140	Leg	A325N	0.6250	5	3.29	24.85	0.133 ✓	1	Bolt DS
T3	120	Leg	A325N	0.6250	5	5.78	24.85	0.233 ✓	1	Bolt DS
T4	100	Leg	A325N	0.7500	5	6.13	35.78	0.171 ✓	1	Bolt DS
T5	80	Leg	A325N	0.7500	5	5.63	35.78	0.157 ✓	1	Bolt DS
T6	60	Leg	A325N	0.7500	5	7.13	35.78	0.199 ✓	1	Bolt DS
T7	40	Leg	A325N	0.7500	5	7.94	35.78	0.222 ✓	1	Bolt DS

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
T8	20	Leg	A325N	0.7500	5	8.05	35.78	0.225 ✔	1	Bolt DS

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
T2	138.00 (A) (457)	9/16 EHS	3.50	35.00	11.31	21.00	1.000	1.856 ✔
	138.00 (A) (458)	9/16 EHS	3.50	35.00	11.33	21.00	1.000	1.854 ✔
	138.00 (B) (451)	9/16 EHS	3.50	35.00	11.86	21.00	1.000	1.771 ✔
	138.00 (B) (452)	9/16 EHS	3.50	35.00	11.87	21.00	1.000	1.770 ✔
	138.00 (C) (442)	9/16 EHS	3.50	35.00	11.99	21.00	1.000	1.751 ✔
	138.00 (C) (443)	9/16 EHS	3.50	35.00	11.97	21.00	1.000	1.754 ✔
T5	70.00 (A) (468)	11/16" EHS	5.00	50.00	12.50	30.00	1.000	2.400 ✔
	70.00 (B) (467)	11/16" EHS	5.00	50.00	12.99	30.00	1.000	2.310 ✔
	70.00 (C) (463)	11/16" EHS	5.00	50.00	13.18	30.00	1.000	2.277 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u K	ϕP_n K	Ratio P_u / ϕP_n
T1	150 - 140	2	10.00	2.25	54.0 K=1.00	3.1416	1.00	-16.63	114.23	0.146 [1] ✔
T2	140 - 120	2	20.00	2.38	57.0 K=1.00	3.1416	1.00	-28.88	111.48	0.259 [1] ✔
T3	120 - 100	2	20.00	2.38	57.0 K=1.00	3.1416	1.00	-30.80	111.48	0.276 [1] ✔
T4	100 - 80	2 1/4	20.00	2.38	50.7 K=1.00	3.9761	1.00	-30.67	148.30	0.207 [1] ✔
T5	80 - 60	2 1/4	20.00	2.38	50.7 K=1.00	3.9761	1.00	-35.62	148.30	0.240 [1] ✔
T6	60 - 40	2 1/4	20.00	2.38	50.7 K=1.00	3.9761	1.00	-39.71	148.30	0.268 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	40 - 20	2 1/4	20.00	2.38	50.7 K=1.00	3.9761	1.00	-40.56	148.30	0.274 [1] ✓
T8	20 - 5	2 1/2	15.00	2.42	46.4 K=1.00	4.9087	1.00	-40.24	188.16	0.214 [1] ✓
T9	5 - 0	2 1/2	5.45	2.45	47.1 K=1.00	4.9087	1.00	-42.80	187.85	0.228 [1] ✓

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	4.37	2.09	120.4 K=0.90	0.4418	-1.35	6.89	0.196 [1] ✓
T2	140 - 120	3/4	4.44	2.12	122.2 K=0.90	0.4418	-2.48	6.69	0.371 [1] ✓
T3	120 - 100	3/4	4.44	2.12	122.2 K=0.90	0.4418	-0.65	6.69	0.098 [1] ✓
T4	100 - 80	3/4	4.44	2.11	121.4 K=0.90	0.4418	-1.30	6.77	0.192 [1] ✓
T5	80 - 60	3/4	4.44	2.11	121.4 K=0.90	0.4418	-1.38	6.77	0.205 [1] ✓
T6	60 - 40	3/4	4.44	2.11	121.4 K=0.90	0.4418	-0.99	6.77	0.147 [1] ✓
T7	40 - 20	3/4	4.44	2.11	121.4 K=0.90	0.4418	-0.47	6.77	0.069 [1] ✓
T8	20 - 5	3/4	4.46	2.11	121.3 K=0.90	0.4418	-0.97	6.78	0.143 [1] ✓
T9	5 - 0	3/4	2.60	2.00	115.0 K=0.90	0.4418	-2.88	7.54	0.381 [1] ✓

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	160.5 K=0.70	0.4418	-0.08	3.87	0.022 [1] ✓
T2	140 - 120	3/4	3.75	3.58	160.5 K=0.70	0.4418	-1.06	3.87	0.272 [1] ✓
T3	120 - 100	3/4	3.75	3.58	160.5 K=0.70	0.4418	-0.04	3.87	0.009 [1] ✓
T4	100 - 80	3/4	3.75	3.56	159.6	0.4418	-0.16	3.92	0.040 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	80 - 60	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.30	3.92	0.076 [1] ✔
T6	60 - 40	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.22	3.92	0.055 [1] ✔
T7	40 - 20	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.01	3.92	0.003 [1] ✔
T8	20 - 5	3/4	3.75	3.54	158.7 K=0.70	0.4418	-0.02	3.96	0.005 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	160.5 K=0.70	0.4418	-0.30	3.87	0.077 [1] ✔
T2	140 - 120	3/4	3.75	3.58	160.5 K=0.70	0.4418	-0.10	3.87	0.025 [1] ✔
T3	120 - 100	3/4	3.75	3.58	160.5 K=0.70	0.4418	-0.07	3.87	0.017 [1] ✔
T4	100 - 80	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.29	3.92	0.074 [1] ✔
T5	80 - 60	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.21	3.92	0.053 [1] ✔
T6	60 - 40	3/4	3.75	3.56	159.6 K=0.70	0.4418	-0.05	3.92	0.014 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1 1/4	3.75	3.58	137.6 K=1.00	1.2272	-2.82	14.64	0.192 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (445)	2L3x3x5/16	7.76	7.66	99.7 K=1.00	3.5500	-0.05	68.19	0.001 [1] ✔
T2	140 - 120 (460)	2L3x3x5/16	7.76	7.66	99.7 K=1.00	3.5500	-0.13	68.19	0.002 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (449)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-7.30	75.67	0.096 [1] ✔
T2	140 - 120 (450)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-6.68	75.67	0.088 [1] ✔
T2	140 - 120 (455)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-6.97	75.67	0.092 [1] ✔
T2	140 - 120 (456)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-7.06	75.67	0.093 [1] ✔
T2	140 - 120 (461)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-6.90	75.67	0.091 [1] ✔
T2	140 - 120 (462)	2L3x3x5/16	6.95	6.85	89.2 K=1.00	3.5500	-6.36	75.67	0.084 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	2	10.00	2.25	54.0	3.1416	3.17	141.37	0.022 [1] ✔
T2	140 - 120	2	20.00	2.38	57.0	3.1416	1.00	141.37	0.007 [1] ✔
T3	120 - 100	2	20.00	2.38	57.0	1.7942	1.00	87.47	0.011 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	4.37	2.09	133.7	0.4418	1.33	19.88	0.067 [1] ✔
T2	140 - 120	3/4	4.44	2.12	135.7	0.4418	2.14	19.88	0.108 [1] ✔
T3	120 - 100	3/4	4.44	2.12	135.7	0.4418	0.55	19.88	0.028 [1] ✔
T4	100 - 80	3/4	4.44	2.11	134.9	0.4418	1.19	19.88	0.060 [1] ✔
T5	80 - 60	3/4	4.44	2.11	134.9	0.4418	1.28	19.88	0.064 [1] ✔
T6	60 - 40	3/4	4.44	2.11	134.9	0.4418	0.85	19.88	0.043 [1] ✔
T7	40 - 20	3/4	4.44	2.11	134.9	0.4418	0.31	19.88	0.016 [1] ✔
T8	20 - 5	3/4	4.46	2.11	134.8	0.4418	1.42	19.88	0.072 [1] ✔
T9	5 - 0	3/4	3.71	2.19	139.9	0.4418	0.61	19.88	0.031 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	5 - 0	4x1/2	2.06	1.85	154.2	2.0000	0.25	64.80	0.004 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	229.3	0.4418	0.04	19.88	0.002 [1] ✔
T2	140 - 120	3/4	3.75	3.58	229.3	0.4418	0.90	19.88	0.045 [1] ✔
T3	120 - 100	3/4	3.75	3.58	229.3	0.4418	0.16	19.88	0.008 [1] ✔
T4	100 - 80	3/4	3.75	3.56	228.0	0.4418	0.23	19.88	0.011 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	80 - 60	3/4	3.75	3.56	228.0	0.4418	0.40	19.88	0.020 [1]
T6	60 - 40	3/4	3.75	3.56	228.0	0.4418	0.36	19.88	0.018 [1]
T7	40 - 20	3/4	3.75	3.56	228.0	0.4418	0.20	19.88	0.010 [1]
T8	20 - 5	3/4	3.75	3.54	226.7	0.4418	0.29	19.88	0.015 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	229.3	0.4418	0.43	19.88	0.022 [1]
T2	140 - 120	3/4	3.75	3.58	229.3	0.4418	0.22	19.88	0.011 [1]
T3	120 - 100	3/4	3.75	3.58	229.3	0.4418	0.18	19.88	0.009 [1]
T4	100 - 80	3/4	3.75	3.56	228.0	0.4418	0.43	19.88	0.021 [1]
T5	80 - 60	3/4	3.75	3.56	228.0	0.4418	0.36	19.88	0.018 [1]
T6	60 - 40	3/4	3.75	3.56	228.0	0.4418	0.23	19.88	0.012 [1]
T7	40 - 20	3/4	3.75	3.56	228.0	0.4418	0.26	19.88	0.013 [1]
T8	20 - 5	3/4	3.75	3.54	226.7	0.4418	7.97	19.88	0.401 [1]
T9	5 - 0	3/4	0.38	0.17	10.7	0.4418	1.36	19.88	0.068 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1 1/4	3.75	3.58	137.6	1.2272	4.48	55.22	0.081 [1]
T5	80 - 60	1 1/4	3.75	3.56	136.8	1.2272	5.91	55.22	0.107 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (444)	2L3x3x5/16	7.76	7.66	99.7	3.5500	10.46	115.02	0.091 [1]
T2	140 - 120 (445)	2L3x3x5/16	7.76	7.66	99.7	3.5500	9.67	115.02	0.084 [1]
T2	140 - 120 (453)	2L3x3x5/16	7.76	7.66	99.7	3.5500	10.27	115.02	0.089 [1]
T2	140 - 120 (454)	2L3x3x5/16	7.76	7.66	99.7	3.5500	10.39	115.02	0.090 [1]
T2	140 - 120 (459)	2L3x3x5/16	7.76	7.66	99.7	3.5500	10.35	115.02	0.090 [1]
T2	140 - 120 (460)	2L3x3x5/16	7.76	7.66	99.7	3.5500	9.67	115.02	0.084 [1]

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (449)	2L3x3x5/16	6.95	6.85	89.2	3.5500	3.98	115.02	0.035 [1]
T2	140 - 120 (450)	2L3x3x5/16	6.95	6.85	89.2	3.5500	4.07	115.02	0.035 [1]
T2	140 - 120 (455)	2L3x3x5/16	6.95	6.85	89.2	3.5500	3.74	115.02	0.033 [1]
T2	140 - 120 (456)	2L3x3x5/16	6.95	6.85	89.2	3.5500	3.72	115.02	0.032 [1]
T2	140 - 120 (461)	2L3x3x5/16	6.95	6.85	89.2	3.5500	3.75	115.02	0.033 [1]
T2	140 - 120 (462)	2L3x3x5/16	6.95	6.85	89.2	3.5500	3.79	115.02	0.033 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	150 - 140	Leg	2	2	-16.63	114.23	14.6	Pass
T2	140 - 120	Leg	2	34	-28.88	111.48	25.9	Pass
T3	120 - 100	Leg	2	91	-30.80	111.48	27.6	Pass
T4	100 - 80	Leg	2 1/4	148	-30.67	148.30	20.7	Pass
T5	80 - 60	Leg	2 1/4	205	-35.62	148.30	24.0	Pass
T6	60 - 40	Leg	2 1/4	262	-39.71	148.30	26.8	Pass
T7	40 - 20	Leg	2 1/4	319	-40.56	148.30	27.4	Pass
T8	20 - 5	Leg	2 1/2	376	-40.24	188.16	21.4 22.5 (b)	Pass
T9	5 - 0	Leg	2 1/2	422	-42.80	187.85	22.8	Pass
T1	150 - 140	Diagonal	3/4	24	-1.35	6.89	19.6	Pass
T2	140 - 120	Diagonal	3/4	77	-2.48	6.69	37.1	Pass
T3	120 - 100	Diagonal	3/4	104	-0.65	6.69	9.8	Pass
T4	100 - 80	Diagonal	3/4	161	-1.30	6.77	19.2	Pass
T5	80 - 60	Diagonal	3/4	260	-1.38	6.77	20.5	Pass
T6	60 - 40	Diagonal	3/4	313	-0.99	6.77	14.7	Pass
T7	40 - 20	Diagonal	3/4	331	-0.47	6.77	6.9	Pass
T8	20 - 5	Diagonal	3/4	394	-0.97	6.78	14.3	Pass
T9	5 - 0	Diagonal	3/4	427	-2.88	7.54	38.1	Pass
T9	5 - 0	Horizontal	4x1/2	433	0.25	64.80	0.4	Pass
T1	150 - 140	Top Girt	3/4	6	-0.08	3.87	2.2	Pass
T2	140 - 120	Top Girt	3/4	37	-1.06	3.87	27.2	Pass
T3	120 - 100	Top Girt	3/4	94	-0.04	3.87	0.9	Pass
T4	100 - 80	Top Girt	3/4	152	-0.16	3.92	4.0	Pass
T5	80 - 60	Top Girt	3/4	209	-0.30	3.92	7.6	Pass
T6	60 - 40	Top Girt	3/4	266	-0.22	3.92	5.5	Pass
T7	40 - 20	Top Girt	3/4	322	0.20	19.88	1.0	Pass
T8	20 - 5	Top Girt	3/4	379	0.29	19.88	1.5	Pass
T1	150 - 140	Bottom Girt	3/4	8	-0.30	3.87	7.7	Pass
T2	140 - 120	Bottom Girt	3/4	40	-0.10	3.87	2.5	Pass
T3	120 - 100	Bottom Girt	3/4	98	-0.07	3.87	1.7	Pass
T4	100 - 80	Bottom Girt	3/4	155	-0.29	3.92	7.4	Pass
T5	80 - 60	Bottom Girt	3/4	211	-0.21	3.92	5.3	Pass
T6	60 - 40	Bottom Girt	3/4	268	-0.05	3.92	1.4	Pass
T7	40 - 20	Bottom Girt	3/4	327	0.26	19.88	1.3	Pass
T8	20 - 5	Bottom Girt	3/4	382	7.97	19.88	40.1	Pass
T9	5 - 0	Bottom Girt	3/4	424	1.36	19.88	6.8	Pass
T2	140 - 120	Guy A@138	9/16	458	11.33	21.00	53.9	Pass
T5	80 - 60	Guy A@70	11/16"	468	12.50	30.00	41.7	Pass
T2	140 - 120	Guy B@138	9/16	452	11.87	21.00	56.5	Pass
T5	80 - 60	Guy B@70	11/16"	467	12.99	30.00	43.3	Pass
T2	140 - 120	Guy C@138	9/16	442	11.99	21.00	57.1	Pass
T5	80 - 60	Guy C@70	11/16"	463	13.18	30.00	43.9	Pass
T1	150 - 140	Top Guy Pull-Off@138	1 1/4	446	-2.82	14.64	19.2	Pass
T5	80 - 60	Top Guy Pull-Off@70	1 1/4	464	5.91	55.22	10.7	Pass
T2	140 - 120	Torque Arm Top@138	2L3x3x5/16	444	10.46	115.02	9.1	Pass
T2	140 - 120	Torque Arm Bottom@138	2L3x3x5/16	449	-7.30	75.67	9.6	Pass
							Summary	
						Leg (T3)	27.6	Pass
						Diagonal (T9)	38.1	Pass
						Horizontal (T9)	0.4	Pass
						Top Girt	27.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						(T2)		
						Bottom Girt (T8)	40.1	Pass
						Guy A (T2)	53.9	Pass
						Guy B (T2)	56.5	Pass
						Guy C (T2)	57.1	Pass
						Top Guy Pull-Off (T1)	19.2	Pass
						Torque Arm Top (T2)	9.1	Pass
						Torque Arm Bottom (T2)	9.6	Pass
						Bolt Checks	23.3	Pass
						RATING =	**57.1**	**Pass**

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Subject:	Base Foundation Analysis
Location:	150-ft Guyed Lattice Tower Bolton, CT
Rev. 0: 4/20/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17012.45

Guyed Tower Base Foundation:

Input Data:

Tower Data

Shear Force =	Shear := 1·kip	(User Input from tnxTower)	
Axial Force =	Axial := 114·kip	(User Input from tnxTower)	
Tower Height =	$H_t := 150 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 3.0 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 2.25 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$D_p := 2.5 \cdot ft$	(User Input)	
Width of Pad =	$W_{pad} := 7 \cdot ft$	(User Input)	
Thickness of Pad =	$t_{pad} := 1.25 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 8000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Calculated Factors:

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if\left(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if\left(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 120 \cdot pcf$

Passive Pressure = $P_{top} := 0$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.08 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.54 \cdot ksf$

$A_p := D_p \cdot L_p = 5.625$

Soil Shear Resistance = $Sl_1 := P_{ave} \cdot A_p = 3.04 \cdot kip$

Weight of Concrete = $WT_c := \left(\frac{1}{4} \cdot \pi \cdot D_p^{\,2} \cdot L_p + W_{pad}^{\,2} \cdot t_{pad}\right) \cdot \gamma_c = 10.84 \cdot kip$

Total Weight = $WT_{tot} := WT_c + Axial = 124.84 \cdot kip$

Soil/Concrete Friction Resistance = $Sl_2 := \mu \cdot WT_{tot} = 56.18 \cdot kips$

Total Sliding Resistance = $Sl_{tot} := Sl_1 + Sl_2 = 59.22 \cdot kips$

Sliding Resistance Ratio = $Sliding\_Resistance_{ratio} := \frac{0.75 Sl_{tot}}{Shear} = 44.41$

$Sliding\_Resistance\_Check := if\left[\left(\frac{Shear}{0.75 Sl_{tot}} < 1.0\right), "Okay", "No\ Good"\right]$

$Sliding\_Resistance\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{W_{pad}^{\,2}} = 2.55 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < 0.6 q_s, "Okay", "No\ Good"\right)$

$Max\_Pressure\_Check = "Okay"$

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	FOUNDATION WITH ROCK ANCHORS
Location:	Bolton, CT
Rev. 0: 4/20/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17012.45

Rock Anchor Foundation Analysis:

Input Data:

Max Pier Reactions:

Uplift =	$Uplift := 18 \cdot kips$	*user input*
Shear =	$Shear := 29 \cdot kips$	*user input*

Rock Anchor Properties:

Number of Anchors =	$N_{anchor} := 2$	*user input*
Hole Diameter =	$hole_d := 3.00in$	*user input*
Ultimate Bond Stress Between Rock and Grout =	$\sigma_{bond} := 60 \cdot psi$	*user input*
Rock Anchor Ultimate Strength =	$F_u := 150.0ksi$	*user input*
Rock Anchor Yield Strength =	$F_y := 127.7ksi$	*user input*
Rock Anchor Diameter =	$d_{ra} := 1.375in$	*user input*
Threads per Inch =	$n := 6$	*user input*
	$\eta := 0.55$	*user input*

Rock Anchor Tension/Shear Check:

Net Area of Bolt = $A_n := \frac{\pi}{4}\cdot\left(d_{ra} - \frac{0.9743\cdot in}{n}\right)^2 = 1.155\cdot in^2$

Maximum Tensile Force = $T_{Max} := \frac{Uplift}{N_{anchor}} = 9\cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N_{anchor}} = 14.5\cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8\cdot F_u\cdot A_n = 138.586\cdot k$

Bolt Steel FS = $\frac{1}{\frac{T_{Max}+\frac{V_{Max}}{\eta}}{\Phi R_{nt}}} = 3.9$

Condition1 = $Condition1 := if\left[\frac{\left(T_{Max}+\frac{V_{Max}}{\eta}\right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

Rock Anchor Req'd Development Length in Rock:

Rock/Grout Bond Length Provided = $L_{bprov} := 29\cdot ft$

Required Rock/Grout Bond Length = $L_{breq} := \frac{T_{Max}}{0.5\pi\cdot hole_d\cdot\sigma_{bond}} = 2.65ft$

Anchor Bond FS = $\frac{L_{bprov}}{L_{breq}} = 10.9$

$Bond\_Length\_Check := if\left(\frac{L_{breq}}{L_{bprov}} \le 1.00, "OK", "Increase Length"\right)$

Bond_Length_Check = "OK"

RAN Template:	A&L Template:
701D_WU21	701D_WU21_2QP

CT11180C_0.1_L700

Section 1 - Site Information

Site ID: CT11180C
Status: Final
Version: 0.1
Project Type: L700
Approved: 3/23/2017 6:45:03 AM
Approved By: GSM1900\BAlter
Last Modified: 3/23/2017 6:45:03 AM
Last Modified By: GSM1900\BAlter

Site Name: Bolton Ct..._1
Site Class: Self Support Tower
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Mountaintop Enterprises Inc.

Latitude: 41.80264800
Longitude: -72.44121300
Address: 130 Vernon Rd.
City, State: Bolton, CT
Region: NORTHEAST

RAN Template: 701D_WU21			AL Template: 701D_WU21_2QP	
Sector Count: 2	Antenna Count: 4	Coax Line Count: 4	TMA Count: 2	RRU Count: 2

Section 2 - Existing Template Images

----- This section is intentionally blank. -----

Section 3 - Proposed Template Images

----- This section is intentionally blank. -----

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
701D_WU21	701D_WU21_2QP

CT11180C_0.1_L700

Section 5 - RAN Equipment

Existing RAN Equipment
----- This section is intentionally blank. -----

Proposed RAN Equipment		
Template: 701D_WU21		
Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment
Baseband	DUW30 (U2100); DUS41 (L2100, L700); DUW30 (U1900)	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length*
Multiplexer	XMU	
Radio	RU22 (x3) (U2100)	

RAN Scope of Work:

Replace existing S8000 GSM cabinet with 3106 cabinet. Upgrade 3106 to 6131. Swap existing Dual with AIR21 B4A/B2P and add 8ft B12 passive antenna. Add DUW30, DUS41. Add RRU B2 and B12. Add fibers. Remove GSM TMA.

RAN Template:	A&L Template:
701D_WU21	701D_WU21_2QP

CT11180C_0.1_L700

Section 6 - A&L Equipment

Existing Template: Custom
Proposed Template: 701D_WU21_2QP

Sector 1 (Proposed) view from behind				
Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		CommScope - SBNH-1D65C (Quad)	
Azimuth	30		30	
M. Tilt	0		0	
Height	180 (130')		180 (130')	
Ports	P1	P2	P3	P4
Active Tech.	U2100, L2100		U2100	L700
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				
E. Tilt	2		2	2
Cables	Fiber Jumper - 15 ft.		1-5/8" Coax - 200 ft. 1-5/8" Coax - 200 ft.	Fiber Jumper - 15 ft. Fiber Jumper - 15 ft.
TMAs			Generic Style 1B - Twin AWS	
Diplexers / Combiners				
Radio				RRUS11 B12
Sector Equipment				

Unconnected Equipment:

Scope of Work:

Interim integrate U2100/L2100 in mixed mode until full entitlement

RAN Template:	A&L Template:
701D_WU21	701D_WU21_2QP

CT11180C_0.1_L700

Sector 2 (Proposed) view from behind				
Coverage Type	A - Outdoor Macro			
Antenna	1		2	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)		CommScope - SBNH-1D65C (Quad)	
Azimuth	150		150	
M. Tilt	0		0	
Height	180 (130')		180 (130')	
Ports	P1	P2	P3	P4
Active Tech.	U2100, L2100		U2100	L700
Dark Tech.				
Restricted Tech.				
Decomm. Tech.				
E. Tilt	2		2	2
Cables	Fiber Jumper - 15 ft.		1-5/8" Coax - 200 ft. 1-5/8" Coax - 200 ft.	Fiber Jumper - 15 ft. Fiber Jumper - 15 ft.
TMAs			Generic Style 1B - Twin AWS	
Diplexers / Combiners				
Radio				RRUS11 B12
Sector Equipment				

Unconnected Equipment:

Scope of Work:

Interim integrate U2100/L2100 in mixed mode until full entitlement

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

BOLTON CT..._1

SITE ID: CT11180C - U1900

130 VERNON RD

BOLTON, CT 06043

T-MOBILE RF CONFIGURATION

701D_WU21_2QP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

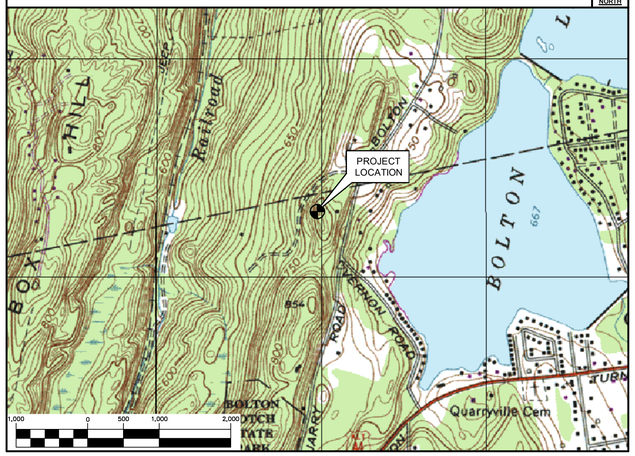
TO: 130 VERNON RD
BOLTON, CT 06043

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187	1.89 MI.
4.	TURN LEFT ONTO CT-305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT-305.	0.01 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD	2.37 MI.
7.	MERGE ONTO I-291 E via EXIT 35A TOWARD MANCHESTER	6.18 MI.
8.	TAKE THE EXIT TOWARD I-384/I-84 W/HARTFORD	0.35 MI.
9.	MERGE ONTO I-384 E via THE RAMP ON THE LEFT	8.85 MI.
10.	I-384 E BECOMES US-44 E/BOSTON TURNPIKE	0.90 MI.
11.	TURN LEFT ONTO VERNON RD	0.53 MI.
12.	130 VERNON RD IS ON THE LEFT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. INSTALL TWO (2) PROPOSED T-MOBILE TWIN AWS TOWER MOUNTED AMPLIFIERS (TMAS), (1) PER SECTOR, MOUNTED BEHIND POSITION 2 ANTENNAS.
   B. INSTALL (4) NEW T-MOBILE 1 5/8"ø COAX CABLES

PROJECT INFORMATION

SITE NAME:	BOLTON CT..._1
SITE ID:	CT11180C - U1900
SITE ADDRESS:	130 VERNON RD BOLTON, CT 06043
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	BRIAN PAUL (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (860) 550-5971
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-48'-07.36" N LONGITUDE: 72°-26'-28.15" W GROUND ELEVATION: 814'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/05/17	KAM/JR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

CENTEK engineering
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Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
BOLTON CT..._1
SITE ID: CT11180C - U1900
130 VERNON RD
BOLTON, CT 06043

DATE: 04/03/17
SCALE: AS NOTED
JOB NO. 17012.45

TITLE SHEET

T-1

Sheet No. 1 of 4

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95-105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	06/05/17	KAM/JR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

BOLTON CT..._1

SITE ID: CT11180C - U1900

130 VERNON RD

BOLTON, CT 06043

DATE:	04/03/17
SCALE:	AS NOTED
JOB NO.	17012.45

DESIGN BASIS AND SITE NOTES

N-1

Sheet No. 2 of 4

1 / C-1 **SITE LOCATION PLAN**
SCALE: 1" = 80'

APPROX. NORTH

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

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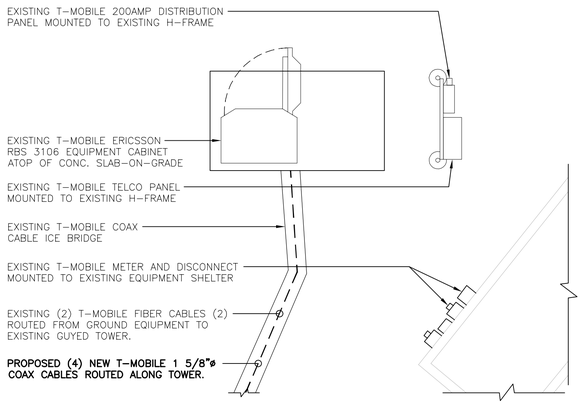
BOLTON CT...1
SITE ID: CT11180C – U1900
130 VERNON RD
BOLTON, CT 06043

DATE: 04/03/17
SCALE: AS NOTED
JOB NO. 17012.45

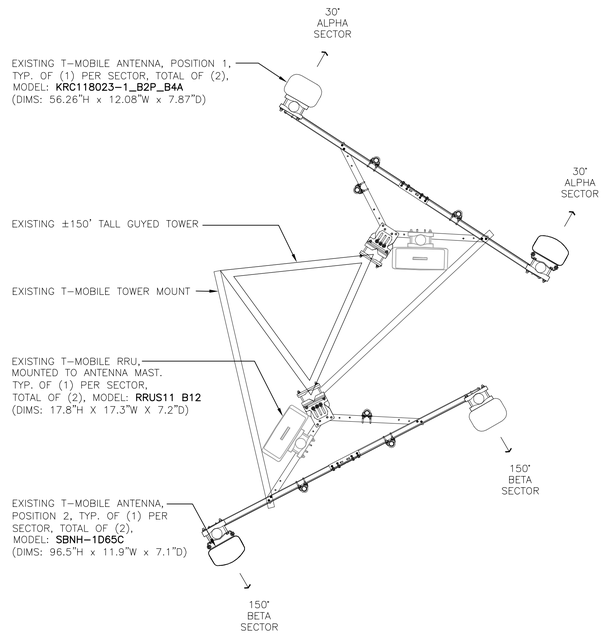
SITE LOCATION PLAN

C-1

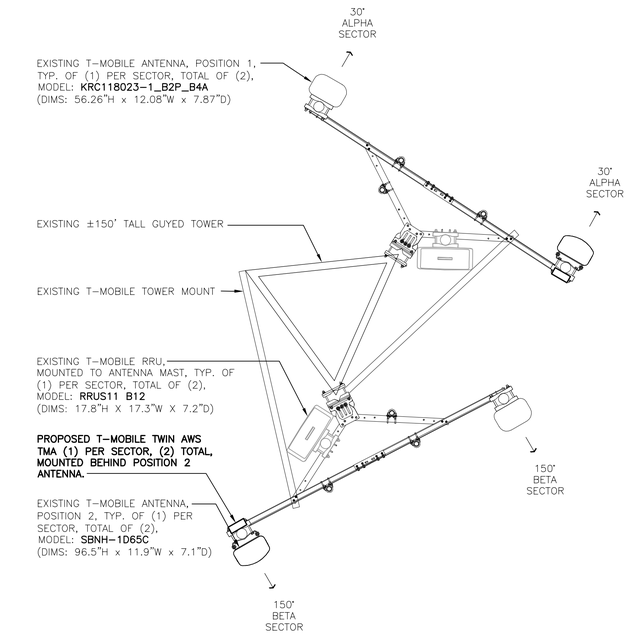
Sheet No. 3 of 4



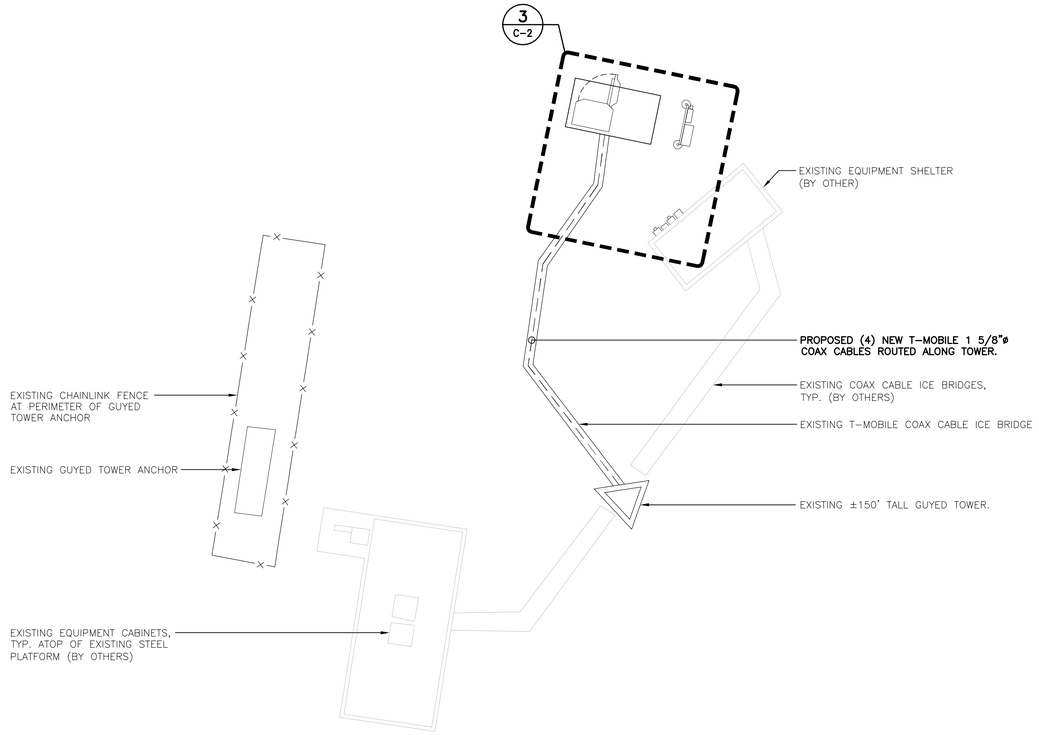
3 / C–2 **EQUIPMENT PLAN**
SCALE: 1/4" = 1'



4 / C–2 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' — **130' ELEVATION**



5 / C–2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' — **130' ELEVATION**



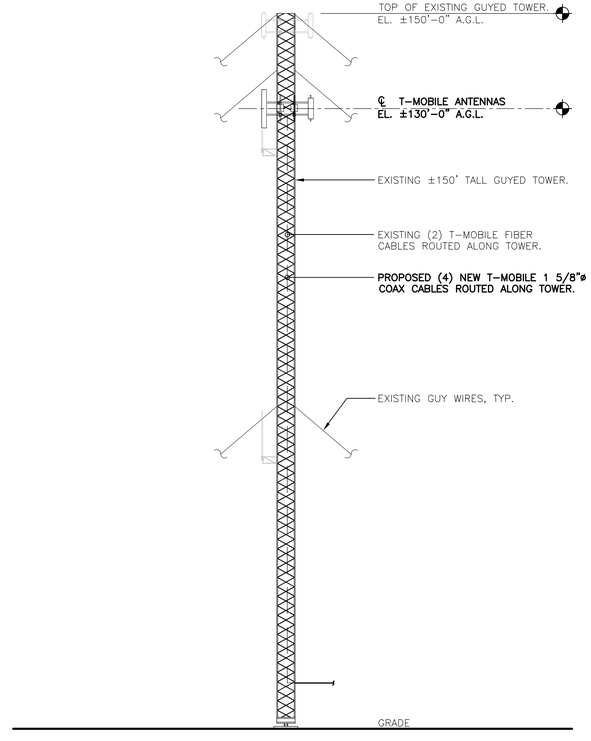
1 / C–2 **COMPOUND PLAN**
SCALE: 1" = 8'

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.

T–MOBILE RAN TEMPLATE: 701D_WU21_2QP
T–MOBILE RF CONFIGURATION: 701D_WU21

TOWER STRUCTURAL NOTE:

1. REFER TO STRUCTURAL EVALUATION LETTER PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 17012.45, DATED APRIL 20, 2017 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC. AND FINAL T–MOBILE RF DATA SHEET.



2 / C–2 **TOWER ELEVATION**
SCALE: 1" = 15'

GRAPHIC SCALE
15 0 7.5 15 30 60
(IN FEET)
1 inch = 15 ft.

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COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

Sheet No. 4 of 4