STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
A PETITION OF CELLCO PARTNERSHIP	:	SUB-PETITION NO. 1133
D/B/A VERIZON WIRELESS FOR A	:	8 GRAND STREET
DECLARATORY RULING FOR	:	EAST LYME, CT
APPROVAL OF AN ELIGIBLE FACILITY	:	
REQUEST FOR MODIFICATIONS TO AN	:	
EXISTING TELECOMMUNICATIONS	:	
TOWER AT 8 GRAND STREET, EAST	:	
LYME, CONNECTICUT	:	MAY 27, 2015

SUB-PETITION FOR DECLARATORY RULING:
ELIGIBLE FACILITIES REQUEST FOR MODIFICATIONS
THAT WILL NOT SUBSTANTIALLY CHANGE THE
PHYSICAL DIMENSIONS OF AN EXISTING TOWER

I. Introduction

Pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C. § 1455(a) ("Section 6409(a)") and the October 21, 2014 Report and Order (FCC-14-533) issued by the Federal Communications Commission ("FCC") (the "FCC Order"), Cellco Partnership d/b/a Verizon Wireless ("Cellco") hereby petitions the Connecticut Siting Council (the "Council") for a declaratory ruling ("Sub-Petition") that the proposed modifications to the existing East Lyme Fire Department ("ELFD") tower at 8 Grand Street in East Lyme, Connecticut (the "Property") constitutes an Eligible Facilities Request ("EFR") under the FCC Order. Cellco has designated this site as its Niantic SC1 Facility.

II. Factual Background

The ELFD maintains a guyed-lattice tower on the roof of its building at the Property. *See* Attachment 1 – Site Vicinity Map, Site Schematic (Aerial Photograph) and Site Photograph. The existing tower extends to a height of 89 feet above ground level ("AGL") and is used by the

ELFD as a part of its emergency service communications system.[1] As the Council is aware, Cellco is licensed to provide wireless telecommunications services in the 850 MHz, 1900 MHz, 700 MHz and 2100 MHz frequency ranges in East Lyme and throughout the State of Connecticut. Cellco intends to deploy wireless service in its 2100 MHz frequency at the Niantic SC1 Facility.

III. Proposed Niantic SC1 Facility

Cellco intends to install two (2) (Model HBX-4517DS1-VTM) 2100 MHz antennas and two (2) remote radio heads ("RRHs") (Model ALU RRH2x60-AWS) at a height of 40 feet AGL on the existing ELFD tower. Cellco will also install two small equipment cabinets on a concrete pad on the northerly side of the ELFD building. The equipment cabinets will be surrounded by an 8-foot tall security fence. Power and telephone service will extend from the existing service at the Property. Project Plans for the Niantic SC1 Facility are included in Attachment 2. Specifications for Cellco's antennas, RRHs and antenna cable are included in Attachment 3. Cellco has performed a Structural Analysis Report, and confirmed that, with certain reinforcements, the ELFD tower can accommodate Cellco's proposed modifications. A copy of the April 29, 2015 Structural Analysis Report is included in Attachment 4.

IV. Discussion

A. The Proposed Modification Will Not Cause a Substantial Change to the Physical Dimensions of the Existing Tower or Base Station

Section 6409(a) provides, in relevant part, that "a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or

[1] An antenna at the top of the ELFD tower extends to a height of 99.1 feet AGL.

base station." Pursuant to the FCC Order, the proposed modification does not substantially change the physical dimensions of the tower or base station if the following criteria are satisfied.

1. *The proposed modified facility will not increase the height of the tower by more than ten (10) percent or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty (20) feet, whichever is greater.* Cellco proposes to install its antennas and RRHs at a height of 40 feet AGL. The existing tower extends to an overall height of 89 feet AGL.

2. *The proposed facility will not protrude from the edge of the tower more than twenty (20) feet.* Cellco's proposed antennas will protrude approximately 12 to 18 inches from the face of the existing tower.

3. *The proposed facility does not involve installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets.* Cellco intends to install two (2) equipment cabinets to house its radio equipment.

4. *The proposed facility does not entail any excavation or deployment outside the current site of the base station.* All of Cellco's site improvements will occur within the limits of the 0.52-acre Property.

5. *The proposed facility does not defeat the existing concealment elements of the base station.* None of the existing antennas on the ELFD tower are concealed in any fashion. Cellco's antennas will, likewise, not be concealed.

6. *The proposed facility complies with conditions associated with the prior approval of construction or modification of the base station.* Cellco is not aware of any conditions associated with the ELFD tower that would affect its proposed small cell facility installation.

B. FCC Compliance

Radio frequency ("RF") emissions from the proposed Niantic SC1 Facility will be far below the standards adopted by the FCC. Included in Attachment 5 is a worst-case RF emissions calculation for Cellco's proposed small cell facility.

C. Notice to the Town, Property Owner and Abutting Landowners

On May 27, 2015, a copy of this Sub-Petition was sent to the East Lyme's First Selectman Mark C. Nickerson. The Town of East Lyme owns the Property. *See* Attachment 6.

A copy of this Sub-Petition was also sent to each owner of land that abuts the Property. A sample abutter's cover letter and a list of those abutting landowners who were sent notice and a copy of the Sub-Petition is included in Attachment 7.

V. Conclusion

Based on the information provided above, Cellco respectfully submits that the proposed modification of the existing base station at the Property constitutes an "eligible facilities request" under Section 6409(a) and the FCC Order.

Respectfully submitted,

CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS

By _____

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597
(860) 275-8200
Its Attorneys

ATTACHMENT 1

Legend

- Proposed Verizon Wireless Small Cell Facility
- Surrounding Verizon Wireless Facilities
- Municipal Boundary

Site Vicinity Map

Proposed Small Cell Installation
Niantic SC 1 CT
8 Grand Street
Niantic, Connecticut

Base Map Source: ESRI World Imagery (Microsoft, 3/28/2011)
Map Scale: 1 inch = 3,000 feet
Map Date: April 2015

3,000 1,500 0 3,000
Feet

Legend

Approximate Subject Property

Site Schematic

Proposed Small Cell Installation
Niantic SC 1 CT
8 Grand Street
Niantic, Connecticut

verizon wireless

N
W E
S

150 75 0 150 Feet

ALL-POINTS

Map Notes:
Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 150 feet
Map Date: April 2015


GRAND ST
NIANTIC FIRE
CHIEF

ATTACHMENT 2

Cellco Partnership

d.b.a. verizon wireless

WIRELESS COMMUNICATIONS FACILITY

NIANTIC SC 1

8 GRAND STREET

NIANTIC, CT 06357

SITE DIRECTIONS

FROM: 99 EAST RIVER DRIVE, EAST HARTFORD, CONNECTICUT **TO:** 8 GRAND STREET, NIANTIC, CT 06357

1. Head northeast on E River Dr	335 ft
2. Turn left onto the CT-2 E ramp to Norwich	0.2 mi
3. Merge onto I-84 E	374 ft
4. Take exit 55 for CT-2 E toward Norwich/New London/I-84 E	0.4 mi
5. Continue onto CT-2 E	23.4 mi
6. Keep right at the fork to continue on CT-11 S, follow signs for Connecticut 11S /New London	7.4 mi
7. Continue onto Exit 4 (signs for CT-82/Salem/Hadlyme)	0.2 mi
8. Turn left onto CT-82 E	1.2 mi
9. At the traffic circle, take the 1st exit onto CT-85 S	4.3 mi
10. Turn right onto CT-161 S	8.0 mi
11. Turn left onto Grand St. destination will be on the left.	

GENERAL NOTES

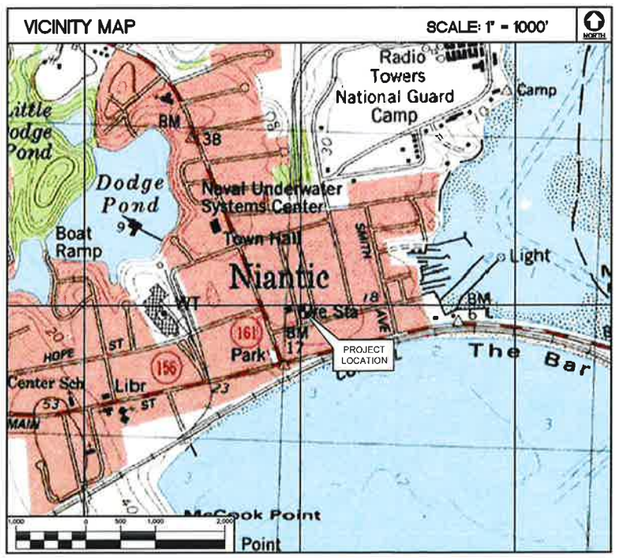
1. PROPOSED ANTENNA LOCATIONS AND HEIGHTS PROVIDED BY CELLCO PARTNERSHIP.

PROJECT SCOPE

1. THE PROPOSED SCOPE OF WORK GENERALLY INCLUDES THE INSTALLATION OF PROPOSED CELLCO PARTNERSHIP EQUIPMENT CABINETS (TYP. OF 2) MOUNTED AT GRADE WITHIN 8'x8' PROPOSED LEASE AREA WITH 8' TALL VINYL FENCE AT PERIMETER.
2. A TOTAL OF TWO (2) PANEL ANTENNAS ARE PROPOSED TO BE MOUNTED TO 89.0' TALL EXISTING LATTICE GUY TOWER WITH AN ANTENNA CENTERLINE ELEVATION OF 40.0' A.G.L.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED FROM EXISTING/PROPOSED ELECTRICAL AND TELCO DEMARCS TO PROPOSED EQUIPMENT CABINET LOCATION.
4. THE PROPOSED WIRELESS FACILITY INSTALLATION WILL BE DESIGNED IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

SITE NAME:	NIANTIC SC 1
SITE ADDRESS:	8 GRAND STREET NIANTIC, CT 06357
CELLCO PARTNERSHIP/TENANT:	CELLCO PARTNERSHIP d.b.a. VERIZON WIRELESS 99 EAST RIVER DRIVE EAST HARTFORD, CT 06108
VERIZON SITE ACQUISITION CONTACT:	JAMES SMITH CELLCO PARTNERSHIP (860) 608-0026
LEGAL/REGULATORY COUNSEL:	KENNETH C. BALDWIN, ESQ. ROBINSON & COLE LLP (860) 257-8345
SITE COORDINATES:	LATITUDE: 41°-19'-30.399" N LONGITUDE: 72°-11'-30.117" W GROUND ELEVATION: ±24.5' AMSL COORDINATES AND GROUND ELEVATION REFERENCED FROM FAA 1-A SURVEY CERTIFICATION AS PREPARED FOR VERIZON WIRELESS, BY MARTINEZ COUCH AND ASSOCIATES L.L.C., DATED MARCH 23, 2015, REVISED APRIL 21, 2015.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV. NO.
T-1	TITLE SHEET	1
C-1	ABUTTERS MAP	1
C-2	ROOF / PART. SITE PLAN, ELEVATION AND ANTENNA CONFIG.	1

PROFESSIONAL ENGINEER SEAL

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	04/22/15	DMD	CFC	ISSUED FOR CSC
0	04/08/15	DRA	DMD	ISSUED FOR CSC-CLIENT REVIEW

Cellco Partnership d.b.a. verizon wireless

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

Cellco Partnership d/b/a Verizon Wireless

WIRELESS COMMUNICATIONS FACILITY

NIANTIC SC 1

8 GRAND STREET
NIANTIC, CT 06357

DATE: 04/08/15
SCALE: AS NOTED
JOB NO. 14298.000

TITLE SHEET

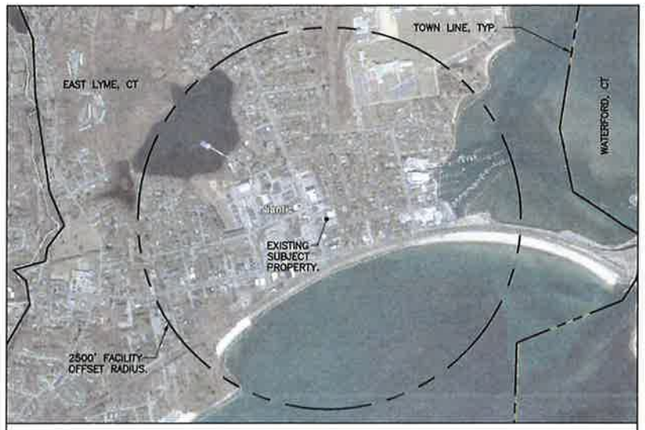
T-1

Sheet No. 1 of 3

1 C-1 ABUTTERS MAP
SCALE: 1" = 30'

APPROXIMATE NORTH

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.



MUNICIPALITY NOTIFICATION LIMIT MAP

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	04/22/15	DMD	CFC	ISSUED FOR CSC
0	04/08/15	DMA	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. Verizon Wireless

CENTEK engineering
Centered on Solutions℠
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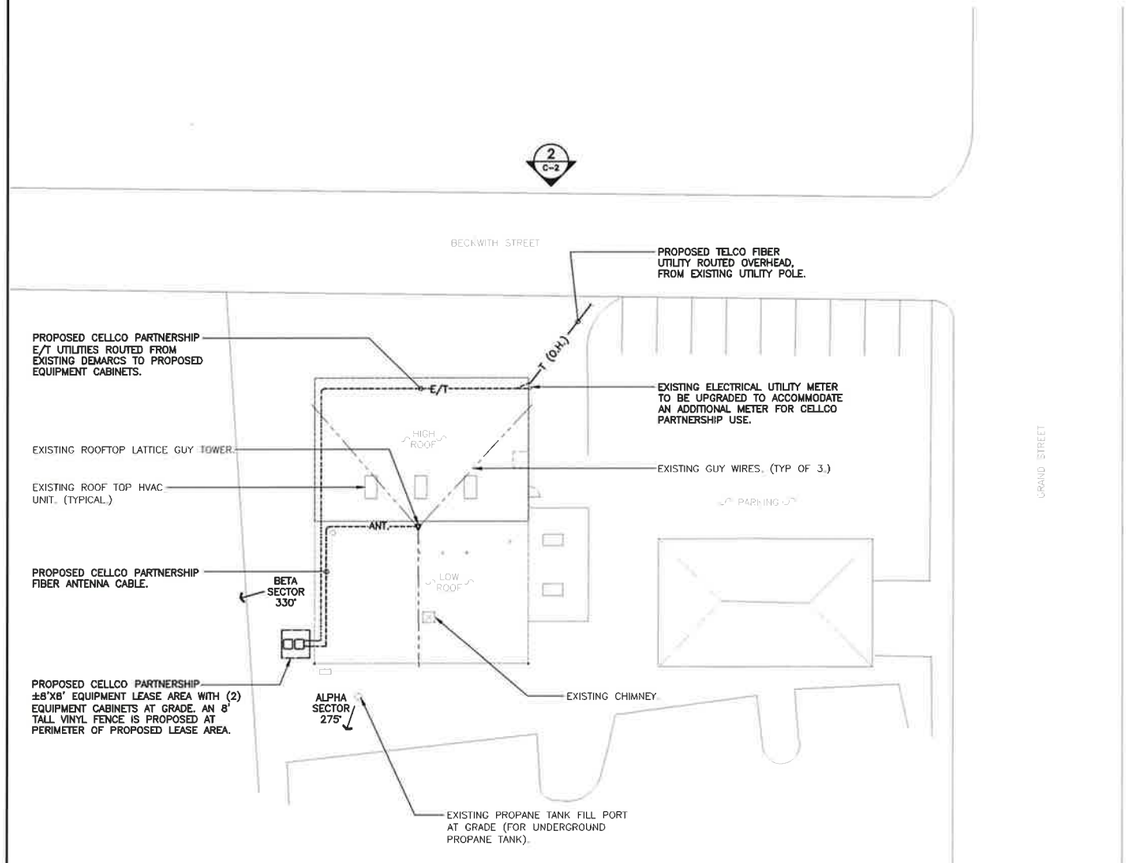
WIRELESS COMMUNICATIONS FACILITY
NIANTIC SC 1
8 GRAND STREET
NIANTIC, CT 06357

DATE: 04/08/15
SCALE: AS NOTED
JOB NO. 14298.000

ABUTTERS MAP

C-1

Sheet No. 2 of 3



1 C-2 **ROOF/PARTIAL SITE PLAN**
SCALE: 1" = 20'

APPROXIMATE NORTH

GRAPHIC SCALE
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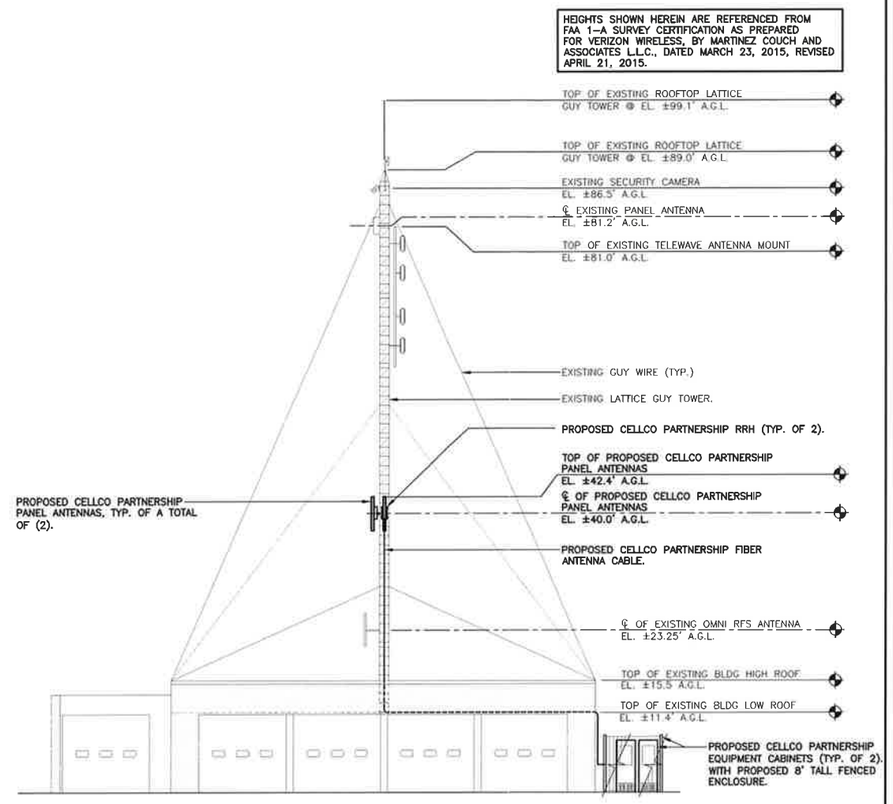
(IN FEET)
1 inch = 20 ft.



2 C-2 **EAST ELEVATION**
SCALE: 1" = 10'

GRAPHIC SCALE
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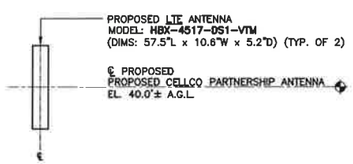
(IN FEET)
1 inch = 10 ft.



RRH/DISTRIBUTION BOX MOUNTING NOTE

- AWS RRH (MODEL: ALU RRH2x60-AWS (DIMS: 36.7" L x 10.6" W x 5.8" D) (TYP. OF 2)

ANTENNA AND RRH MOUNTED TO EXISTING LATTICE GUY TOWER ADJACENT TO PROPOSED ANTENNA LOCATIONS.

3 C-2 **TYP. ANTENNA MOUNTING CONFIGURATION**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	04/22/15	DMD	CFC	ISSUED FOR CSC
0	04/08/15	DRA	DMD	ISSUED FOR CSC-CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

Cellco Partnership d.b.a. verizonwireless

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WIRELESS COMMUNICATIONS FACILITY

NIANTIC SC 1

8 GRAND STREET
NIANTIC, CT 06357

DATE: 04/08/15
SCALE: AS NOTED
JOB NO. 14288.000

ROOF / PART. SITE PLAN, ELEVATION & ANTENNA CONFIG.

C-2

Sheet No. 3 of 3

ATTACHMENT 3

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBX-4517DS1-VTM

Andrew® Antenna, 1710–2170 MHz, 45° horizontal beamwidth, RET compatible. Ideal for high gain corridor coverage or capacity optimization.

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2170**
Gain, dBi	19.2	19.3	19.4
Beamwidth, Horizontal, degrees	45	45	43
Beamwidth, Vertical, degrees	6.6	6.2	5.9
Beam Tilt, degrees	0–10	0–10	0–10
USLS, dB	15	15	15
Front-to-Back Ratio at 180°, dB	32	31	30
CPR at Boresight, dB	24	23	21
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	300	300	300
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2170**
Gain by all Beam Tilts, average, dBi	18.9	19.0	19.3
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.4	±0.6
Gain by Beam Tilt, average, dBi	0 ° | 18.8	0 ° | 18.7	0 ° | 19.2
	5 ° | 19.0	5 ° | 19.1	5 ° | 19.5
	10 ° | 18.8	10 ° | 18.9	10 ° | 19.1
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.2	±3.1
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.2	±0.4
USLS, dB	15	16	16
Front-to-Back Total Power at 180° ± 30°, dB	30	30	29
CPR at Boresight, dB	24	23	22

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

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2170 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

Product Specifications

HBX-4517DS1-VTM

Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	466.0 N @ 150 km/h 104.8 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	132.0 mm | 5.2 in
Length	1461.0 mm | 57.5 in
Width	269.0 mm | 10.6 in
Net Weight	12.3 kg | 27.1 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBX-4517DS1-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

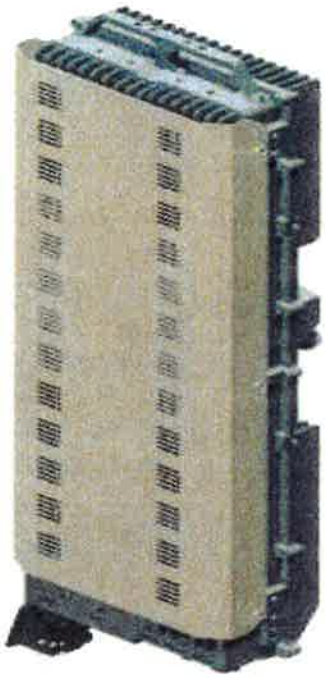
Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

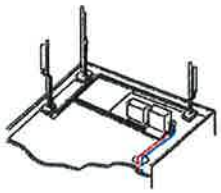
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

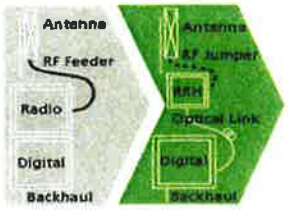
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

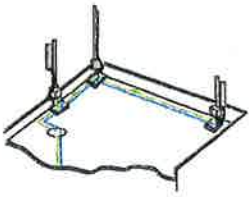
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

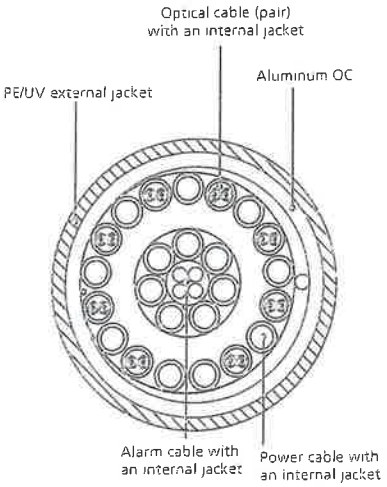


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 4

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

80-ft Existing ROHN Guyed Lattice Tower

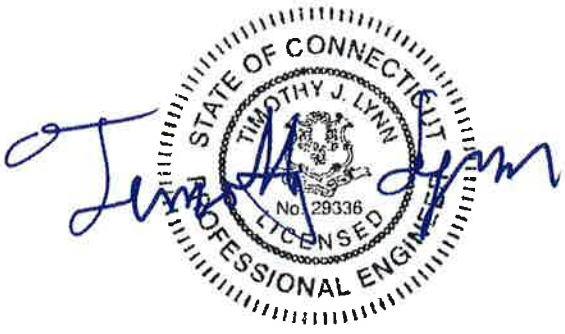
Proposed Verizon Wireless
Antenna Installation

Verizon Site Ref: Niantic SC1

8 Grand Street
Niantic, CT

CENTEK Project No. 14298.000

~~Date: December 11, 2014~~
Rev 1: April 29, 2015



Prepared for:

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

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

Table of Contents

SECTION 5 – REFERENCE MATERIALS

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by Verizon Wireless on the existing roof top mounted guyed lattice tower located in Niantic, Connecticut.

The host tower is a 80-ft, three legged, Model 45G guyed lattice tower originally designed and manufactured by UNR-ROHN. The tower geometry and structure member size information were obtained from the manufactures design information and field verification by Centek personnel on November 14, 2014.

Antenna and appurtenance inventory were obtained from a tower mapping report prepared by Eastern Communications dated November 14, 2014, information provided by the tower owner and a Verizon RF data sheet.

The tower consists of eight (8) vertical sections consisting of solid round legs conforming to ASTM A572-50. Diagonal and horizontal lateral support bracing consists of solid round members conforming to ASTM A36. The tower sections are connected by bolted sleeve connections. The diagonal and horizontal bracing is connected to the legs by welded connections. The width of the tower face is 1.396-ft at the top and bottom, with tapered top section.

Verizon proposes the installation of two (2) panel antennas and two (2) remote radio heads leg mounted. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- TOWN (Existing):
  Antenna: One (1) DB586-Y whip antenna pipe mounted to the top of the existing tower with an elevation of ±93-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: One (1) Motorola PTP49400 pipe mounted to the top of the existing tower with an elevation of ±92-ft above grade level.
  Coax Cable: One (1) CAT5e cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: One (1) Camera leg mounted to the existing tower with an elevation of ±85-ft above grade level.
  Coax Cable: One (1) CAT5e cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: One (1) Motorola 5440AP leg mounted to the existing tower with an elevation of ±82.17-ft above grade level.
  Coax Cable: One (1) CAT5e cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- TOWN (Existing):
  Antenna: One (1) Motorola PTP49400 leg mounted to the existing tower with an elevation of ±78.5-ft above grade level.
  Coax Cable: One (1) CAT5e cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: One (1) Telewave ANT150D6 dipole leg mounted to the existing tower with an elevation of ±71-ft above grade level.
  Coax Cable: One (1)1/2" ∅ coax cable cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- TOWN (Existing):
  Antenna: One (1) Pulse Larsen BSA150C ground plane antenna mounted on a standoff to the existing tower with an elevation of ±33-ft above grade level.
- TOWN (Existing):
  Antenna: One (1) RFS BA1012-1 whip antenna mounted on a standoff to the existing tower with an elevation of ±23-ft above grade level.
  Coax Cable: One (1)1/2" ∅ coax cable cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (PROPOSED):**
  Antennas: Two (2) Andrew HBX-4517DS1 panel antennas and two (2) Alcatel-Lucent RRH2x60-AWS Remote Radio Heads leg mounted to the tower with a RAD center elevation of 40-ft above grade level.
  Coax Cables: One (1) 1-5/8" ∅ Hybriflex fiber line running on a leg 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 shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

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

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

Tower Loading

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

Basic Wind Speed:	New London; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	East Lyme (Niantic); v = 120 mph (3 second gust) equivalent to v = 100 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix-K wind speed controls.	
Load Cases:	Load Case 1; 100 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 87 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 87 mph wind speed velocity represents 75% of the wind pressure generated by the 100 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

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

Tower Capacity

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

- Calculated stresses **were not found to be within allowable limits**. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **137.4%** of its total capacity.

Tower Section	Elevation (AGL)	Stress Ratio (percentage of capacity)	Result
Leg (T8)	21'-0"-31'-0"	93.1%	**PASS**
Diagonal (T8)	21'-0"-31'-0"	137.4%	**FAIL**
Guy C @ 39.5-ft radius (T2)	84'-0"	78.1%	**PASS**

- Calculated stresses **with the reinforcements outlined in the conclusion of this report were found to be within allowable limits**. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **90.5%** of its total capacity.

Tower Section	Elevation (AGL)	Stress Ratio (percentage of capacity)	Result
Leg (T8)	21'-0"-31'-0"	81.1%	**PASS**
Diagonal (T5)	51'-0"-61'-0"	90.5%	**PASS**
Guy C @ 39.5-ft radius (T5)	55'-4"	77.1%	**PASS**

Guy Anchorage

The existing guy wires are connected to the host building façade at three (3) locations on anchor stub frames. The properties used in the analysis of the existing anchor connections were obtained from field verification conducted by Centek personnel on November 14, 2014.

- The worst case tower base and guy anchor reactions developed from the governing Load Case 2 were used in the verification of the anchorage foundations:

Tower Guy Reactions	
Vector	**Proposed Reactions Guy Anchor C at Radius of 39.5-ft** [2]
Horizontal (In Plane of GW)	**8 kips**
Horizontal (Out of Plane of GW)	**0 kips**
Vertical	**8 kips**
Resultant Force at end of Guy Wire	**11 kips**
Tower Base Reactions	
Vector	**Proposed Reaction**
Horizontal Shear	**0 kips**
Axial Compression	**17 kips**

| *Note 2: Obtained from tnxTower Analysis Load Case No. 2*

- The guy wire anchorage to the existing building **was not found to be within allowable limits**.

Component	**Design Limit**	**Stress Ratio (percentage of capacity)**	**Result**
Anchor Plate	Bearing Strength @ Bolt Hole	50.6%	**PASS**
Anchor Stub Frame – Vertical HSS	Bending	147.0%	**FAIL**
Connection to Host Building – Thru Bolts	Combined Tension and Shear	109.5%	**FAIL**

- The guy wire anchorage to the existing building **with the replacement attachment frames outlined in the conclusion of this report were found to be within allowable limits**.

Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Plate	Plate to Stub Weld	29.6%	**PASS**
Anchor Stub Frame – Vertical HSS	Bending	66.7%	**PASS**
Connection to Host Building – Thru Bolts	Combined Tension and Shear	50.3%	**PASS**

Conclusion

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

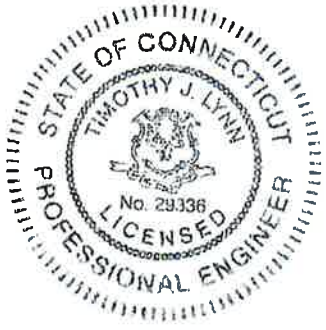
- Installation of one (1) 30-ft piece of unistrut mounted to each tower face (typ. of 3)
- Replacement of the existing guy anchor connections to the host building (typ. of 3).

Detail drawings for the proposed reinforcements will be provided at the construction document phase of the project.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

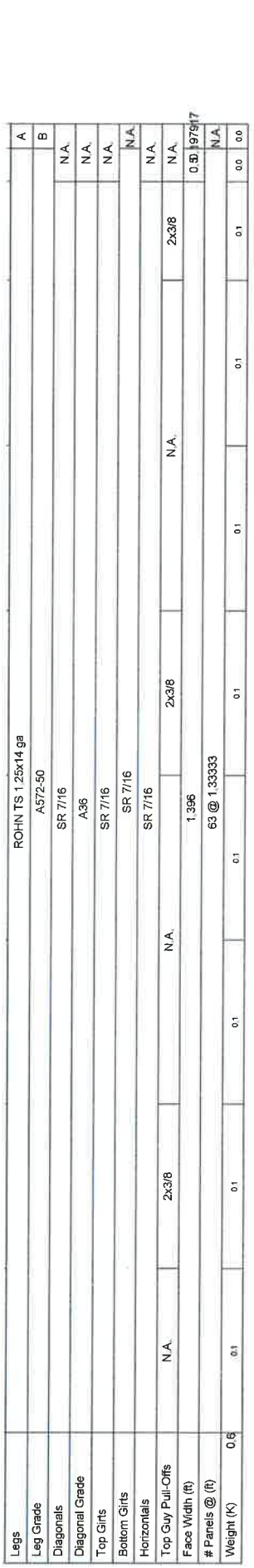
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

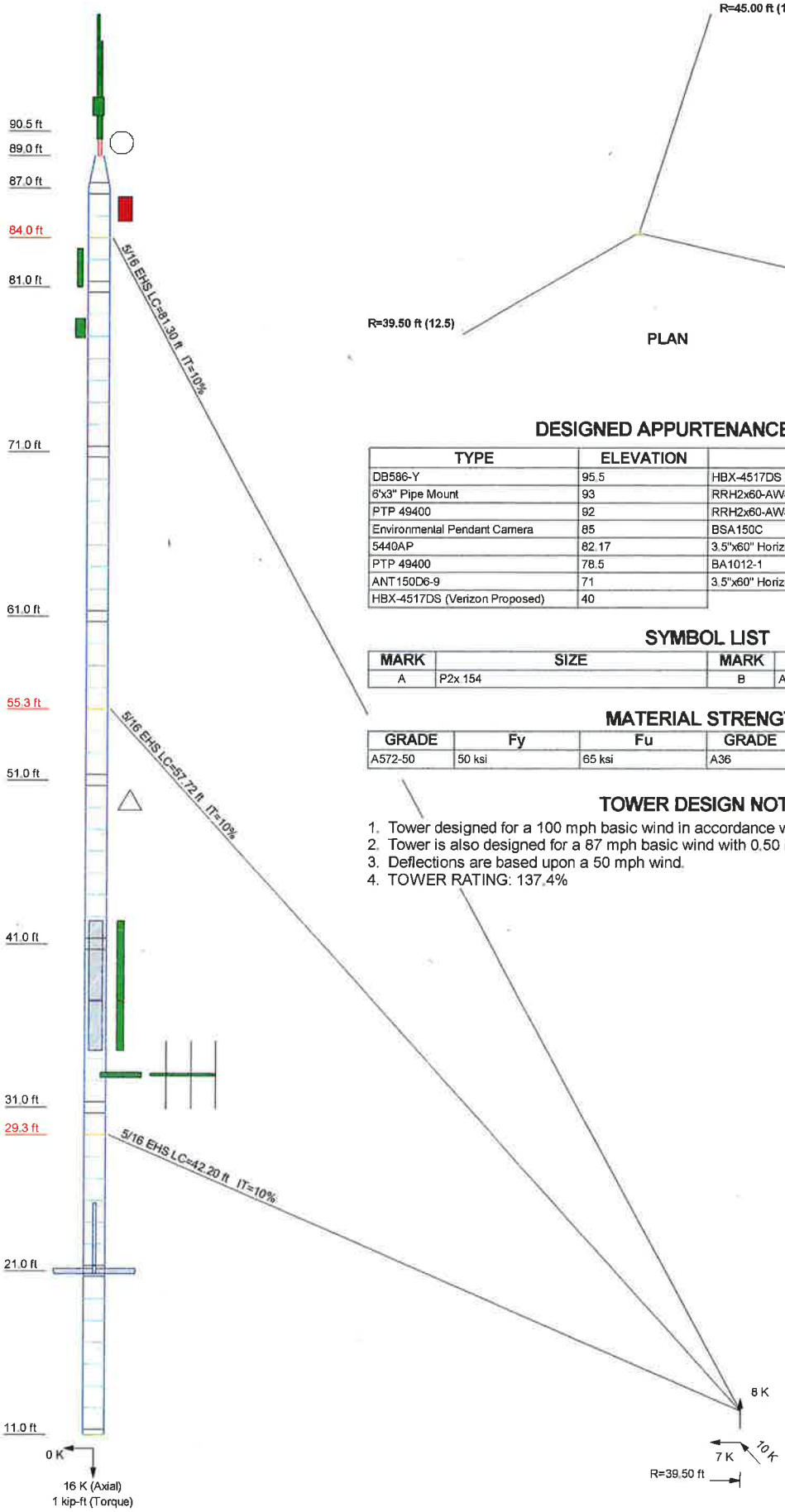
tnxTower Features:

- 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 3

EXISTING TOWER & ATTACHMENT ANLAYSIS





PLAN

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB586-Y	95.5	HBX-4517DS (Verizon Proposed)	40
6'x3" Pipe Mount	93	RRH2x60-AWS (Verizon Proposed)	36
PTP 49400	92	RRH2x60-AWS (Verizon Proposed)	36
Environmental Pendant Camera	85	BSA150C	33
5440AP	82.17	3.5"x60" Horizontal Pipe	33
PTP 49400	78.5	BA1012-1	23
ANT150D6-9	71	3.5"x60" Horizontal Pipe	21
HBX-4517DS (Verizon Proposed)	40		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154	B	A53-B-35

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 100 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 87 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 137.4%

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

Job:	*14298.000 - Niantic SC1*
Project:	*80-ft ROHN 45G Tower - 8 Grand St., Niantic, C*
Client: Verizon Wireless	Drawn by: TJL / App'd:
Code: TIA/EIA-222-F	Date: 04/29/15 / Scale: N
Path:	Dwg No.

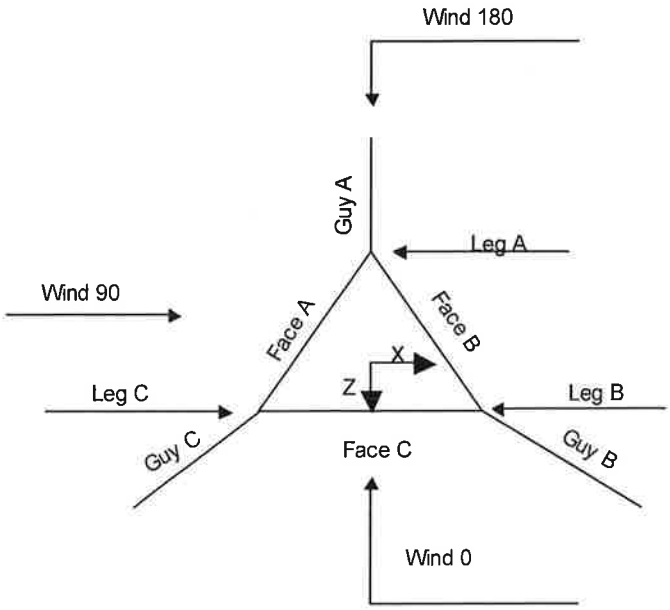
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 90.50 ft above the ground line.
The base of the tower is set at an elevation of 11.00 ft above the ground line.
The face width of the tower is 0.50 ft at the top and 1.40 ft at the base.
An index plate is provided at the 3x guyed -tower connection.
There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 100 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 87 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.0664.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Corner & Starmount Guyed Tower

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	90.50-89.00	1.50	P2x.154	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 90.50-89.00				1	1	1		

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	89.00-87.00			0.50	1	2.00

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T2	87.00-81.00			1.40	1	6.00
T3	81.00-71.00			1.40	1	10.00
T4	71.00-61.00			1.40	1	10.00
T5	61.00-51.00			1.40	1	10.00
T6	51.00-41.00			1.40	1	10.00
T7	41.00-31.00			1.40	1	10.00
T8	31.00-21.00			1.40	1	10.00
T9	21.00-11.00			1.40	1	10.00

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	89.00-87.00	1.33	X Brace	No	Yes	4.0000	4.0000
T2	87.00-81.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T3	81.00-71.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T4	71.00-61.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T5	61.00-51.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T6	51.00-41.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T7	41.00-31.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T8	31.00-21.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T9	21.00-11.00	1.33	Z Brace	No	Yes	4.0000	4.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 89.00-87.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T2 87.00-81.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 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 89.00-87.00	Solid Round		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T2 87.00-81.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 87.00-81.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 89.00-87.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 87.00-81.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 81.00-71.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 71.00-61.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 61.00-51.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 51.00-41.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 41.00-31.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 31.00-21.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 21.00-11.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
89.00-87.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
87.00-81.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
81.00-71.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
71.00-61.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
61.00-51.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
51.00-41.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
41.00-31.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
31.00-21.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
21.00-11.00				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 89.00-87.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 87.00-81.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 81.00-71.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 71.00-61.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 61.00-51.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 51.00-41.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 41.00-31.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 31.00-21.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 21.00-11.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 %
84	EHS	A	5/16	1.12	10%	21000	0.205	80.00	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	80.28	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	81.23	39.50	1.0000	12.50	100%
55.3333	EHS	A	5/16	1.12	10%	21000	0.205	58.32	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	58.70	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	57.67	39.50	1.0000	12.50	100%
29.3333	EHS	A	5/16	1.12	10%	21000	0.205	45.81	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	46.29	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	42.16	39.50	1.0000	12.50	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
84	Corner						
55.3333	Corner						
29.3333	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
84.00	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
55.33	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8
29.33	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8

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
84	0.02	0.02	0.02		0.58 1.3 sec/pulse	0.59 1.3 sec/pulse	0.60 1.3 sec/pulse	
55.3333	0.01	0.01	0.01		0.31 1.0 sec/pulse	0.31 1.0 sec/pulse	0.30 1.0 sec/pulse	
29.3333	0.01	0.01	0.01		0.19 0.8 sec/pulse	0.20 0.8 sec/pulse	0.16 0.7 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
84	No	No			1	1	1	1
55.3333	No	No			1	1	1	1
29.3333	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
84	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
55.3333	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
29.3333	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	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
84	A	50.63	29	22	0.5000
	B	50.63	29	22	0.5000
	C	48.25	29	21	0.5000
55.3333	A	36.29	26	20	0.5000
	B	36.29	26	20	0.5000
	C	33.92	26	19	0.5000
29.3333	A	23.29	26	19	0.5000
	B	23.29	26	19	0.5000
	C	20.92	26	19	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
84	A	56.4690	1.13 1.12	0.19	0.95	-0.59	-0.76	-0.16	0.00
	B	56.1718	1.13 1.12	0.61	0.94	0.13	0.38	0.16	-0.66
	C	61.5788	1.13 1.12	-0.47	1.00	0.26	0.40	-0.01	0.70
			Sum:	**0.34**	2.89	**-0.20**	**0.02**	**-0.01**	**0.04**
55.3333	A	40.7276	1.13 1.12	0.26	0.74	-0.81	-0.60	-0.21	0.00
	B	40.4095	1.13 1.12	0.84	0.73	0.18	0.30	0.21	-0.51
	C	47.9064	1.13 1.12	-0.66	0.84	0.37	0.34	-0.01	0.59
			Sum:	**0.44**	2.31	**-0.27**	**0.04**	**-0.01**	**0.07**
29.3333	A	15.2790	1.12 1.12	0.33	0.30	-1.03	-0.24	-0.27	0.00
	B	15.1161	1.12 1.12	1.06	0.30	0.23	0.12	0.27	-0.21
	C	23.5108	1.12 1.12	-0.90	0.45	0.50	0.18	-0.01	0.32
			Sum:	**0.49**	1.05	**-0.30**	**0.06**	**-0.01**	**0.11**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
84	A	56.4690	1.57 1.53	0.26	1.32	-0.81	-1.06	-0.21	0.00
	B	56.1718	1.57 1.53	0.84	1.32	0.18	0.53	0.22	-0.92
	C	61.5788	1.57 1.52	-0.64	1.39	0.36	0.56	-0.01	0.97
			Sum:	**0.47**	4.03	**-0.28**	**0.03**	**-0.01**	**0.05**

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
55.3333	A	40.7276	1.56 1.53	0.36	1.03	-1.12	-0.83	-0.29	0.00
	B	40.4095	1.56 1.54	1.15	1.02	0.25	0.41	0.29	-0.71
	C	47.9064	1.56 1.53	-0.91	1.17	0.50	0.47	-0.01	0.81
			Sum:	**0.61**	3.22	**-0.37**	**0.05**	**-0.01**	**0.10**
29.3333	A	15.2790	1.55 1.54	0.46	0.42	-1.42	-0.34	-0.37	0.00
	B	15.1161	1.55 1.54	1.46	0.42	0.31	0.17	0.37	-0.29
	C	23.5108	1.55 1.54	-1.24	0.63	0.69	0.25	-0.02	0.44
			Sum:	**0.68**	1.47	**-0.42**	**0.08**	**-0.02**	**0.15**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
84	A	56.4690	1.13 1.12	0.19	0.95	-0.59	-0.76	-0.16	0.00
	B	56.1718	1.13 1.12	0.61	0.94	0.13	0.38	0.16	-0.66
	C	61.5788	1.13 1.12	-0.47	1.00	0.26	0.40	-0.01	0.70
			Sum:	**0.34**	2.89	**-0.20**	**0.02**	**-0.01**	**0.04**
55.3333	A	40.7276	1.13 1.12	0.26	0.74	-0.81	-0.60	-0.21	0.00
	B	40.4095	1.13 1.12	0.84	0.73	0.18	0.30	0.21	-0.51
	C	47.9064	1.13 1.12	-0.66	0.84	0.37	0.34	-0.01	0.59
			Sum:	**0.44**	2.31	**-0.27**	**0.04**	**-0.01**	**0.07**
29.3333	A	15.2790	1.12 1.12	0.33	0.30	-1.03	-0.24	-0.27	0.00
	B	15.1161	1.12 1.12	1.06	0.30	0.23	0.12	0.27	-0.21
	C	23.5108	1.12 1.12	-0.90	0.45	0.50	0.18	-0.01	0.32
			Sum:	**0.49**	1.05	**-0.30**	**0.06**	**-0.01**	**0.11**

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
84	A	44.23	66.75	1.268	0.51	1.219	0.54	1.169	0.56	1.120	0.58	1.071	0.61	1.021	0.64	0.972	0.67
	B	44.73	66.75	1.270	0.52	1.220	0.54	1.170	0.56	1.120	0.59	1.070	0.61	1.020	0.64	0.970	0.68
	C	38.69	71.50	1.230	0.55	1.193	0.56	1.157	0.58	1.120	0.60	1.083	0.62	1.047	0.64	1.010	0.67
55.3333	A	44.23	38.08	1.399	0.25	1.306	0.27	1.213	0.29	1.120	0.31	1.027	0.34	0.935	0.37	0.843	0.41
	B	44.73	38.08	1.402	0.25	1.308	0.27	1.214	0.29	1.120	0.31	1.026	0.34	0.933	0.38	0.840	0.42
	C	38.69	42.83	1.339	0.25	1.266	0.27	1.193	0.28	1.120	0.30	1.047	0.32	0.975	0.35	0.902	0.38
29.3333	A	44.23	12.08	1.572	0.14	1.421	0.15	1.271	0.17	1.120	0.19	0.970	0.22	0.820	0.26	0.672	0.32
	B	44.73	12.08	1.573	0.14	1.422	0.15	1.271	0.17	1.120	0.20	0.970	0.23	0.820	0.27	0.672	0.33
	C	38.69	16.83	1.529	0.12	1.393	0.13	1.256	0.14	1.120	0.16	0.984	0.18	0.849	0.21	0.714	0.25

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
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	87.00 - 11.00	0.0000	0.46	1	1	1.0900	1.0900		0.33
Cat5e	B	Yes	Ar (CfAe)	87.00 - 11.00	0.0000	0.44	2	1	0.0000	0.3600		0.06
Cat5e	B	Yes	Ar (CfAe)	81.00 - 11.00	0.0000	0.42	2	1	0.0000	0.3600		0.06
LDF4P-50A (1/2 FOAM)	C	Yes	Ar (CfAe)	71.00 - 11.00	0.0000	-0.46	2	2	0.0000	0.6300		0.15
HYBRIFLEX 1-5/8" (Verizon Proposed)	A	Yes	Ar (CfAe)	36.00 - 11.00	0.0000	0.44	1	1	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.50-89.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T1	89.00-87.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	87.00-81.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.725	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	81.00-71.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
T4	71.00-61.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T5	61.00-51.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T6	51.00-41.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T7	41.00-31.00	A	0.825	0.000	0.000	0.000	0.01
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	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
T8	31.00-21.00	A	1.650	0.000	0.000	0.000	0.02
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T9	21.00-11.00	A	1.650	0.000	0.000	0.000	0.02
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.50-89.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T1	89.00-87.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	87.00-81.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		1.725	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
T3	81.00-71.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.00
T4	71.00-61.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T5	61.00-51.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T6	51.00-41.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T7	41.00-31.00	A	0.500	1.242	0.000	0.000	0.000	0.02
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T8	31.00-21.00	A	0.500	2.483	0.000	0.000	0.000	0.03
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T9	21.00-11.00	A	0.500	2.483	0.000	0.000	0.000	0.03
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
L1	90.50-89.00		0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000
T1	89.00-87.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T2	87.00-81.00	A	0.000	0.000	0.000	0.000
		B	0.046	0.387	0.020	0.048
		C	0.000	0.000	0.000	0.000
T3	81.00-71.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	71.00-61.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T5	61.00-51.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.882	0.025	0.067
		C	0.068	0.415	0.018	0.031
T6	51.00-41.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T7	41.00-31.00	A	0.053	0.263	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T8	31.00-21.00	A	0.106	0.547	0.028	0.041
		B	0.097	0.882	0.025	0.067
		C	0.068	0.415	0.018	0.031
T9	21.00-11.00	A	0.106	0.526	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	90.50-89.00	0.0000	0.0000	0.0000	0.0000
T1	89.00-87.00	0.0000	0.0000	0.0000	0.0000
T2	87.00-81.00	0.8486	0.3959	0.7784	0.3626
T3	81.00-71.00	1.1597	0.5343	1.1567	0.5293
T4	71.00-61.00	1.7369	0.9413	1.1258	0.5237
T5	61.00-51.00	1.6183	0.8771	1.0408	0.4814
T6	51.00-41.00	1.7369	0.9413	1.1258	0.5237
T7	41.00-31.00	1.5362	0.2781	1.0288	0.1405
T8	31.00-21.00	1.2778	-0.2861	0.8711	-0.2096
T9	21.00-11.00	1.3600	-0.3045	0.9390	-0.2139

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
6'x3" Pipe Mount	C	None		0.0000	93.00	No Ice	1.77	1.77	0.03
						1/2" Ice	2.13	2.13	0.05

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
DB586-Y	C	From Leg	0.00 0.00 0.00	0.0000	95.50	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	0.01 0.02
PTP 49400	C	From Leg	0.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.02 0.03
5440AP	C	From Leg	0.50 0.00 0.00	0.0000	82.17	No Ice 1/2" Ice	2.31 2.55	3.07 3.34	0.02 0.04
PTP 49400	C	From Leg	0.50 0.00 0.00	0.0000	78.50	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.02 0.03
Environmental Pendant Camera	B	From Leg	1.00 0.00 0.00	0.0000	85.00	No Ice 1/2" Ice	0.50 0.61	0.50 0.61	0.01 0.02
ANT150D6-9	A	From Leg	2.00 0.00 0.00	0.0000	71.00	No Ice 1/2" Ice	4.00 4.60	4.00 4.60	0.03 0.03
BSA150C	B	From Leg	3.00 0.00 0.00	0.0000	33.00	No Ice 1/2" Ice	0.45 0.55	0.45 0.55	0.01 0.01
3.5"x60" Horizontal Pipe	B	From Leg	1.00 0.00 0.00	0.0000	33.00	No Ice 1/2" Ice	1.33 1.69	1.33 1.69	0.08 0.18
BA1012-1	A	From Leg	3.00 0.00 0.00	0.0000	23.00	No Ice 1/2" Ice	0.53 0.98	0.53 0.98	0.05 0.05
3.5"x60" Horizontal Pipe	A	From Leg	1.00 0.00 0.00	0.0000	21.00	No Ice 1/2" Ice	1.33 1.69	1.33 1.69	0.08 0.18
HBX-4517DS (Verizon Proposed)	A	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice	5.93 6.37	3.19 3.55	0.03 0.06
HBX-4517DS (Verizon Proposed)	B	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice	5.93 6.37	3.19 3.55	0.03 0.06
RRH2x60-AWS (Verizon Proposed)	A	From Leg	1.00 0.00 0.00	0.0000	36.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
RRH2x60-AWS (Verizon Proposed)	B	From Leg	1.00 0.00 0.00	0.0000	36.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08

Tower Pressures - No Ice

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	34	0.297	A	0.000	0.297	0.297	100.00	0.000	0.000
					B	0.000	0.297		100.00	0.000	0.000
					C	0.000	0.297		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	34	2.109	A	0.000	0.472	0.430	91.18	0.000	0.000
					B	0.000	0.472		91.18	0.000	0.000
					C	0.000	0.472		91.18	0.000	0.000
T2 87.00-81.00	84.00	1.306	33	9.001	A	0.215	1.746	1.250	63.73	0.000	0.000
					B	0.195	2.425		47.71	0.000	0.000
					C	0.215	1.746		63.73	0.000	0.000
T3 81.00-71.00	76.00	1.269	32	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	2.916		71.44	0.000	0.000
T4 71.00-61.00	66.00	1.219	31	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T5 61.00-51.00	56.00	1.163	30	15.002	A	0.215	2.916	2.083	66.53	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T6 51.00-41.00	46.00	1.1	28	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T7 41.00-31.00	36.00	1.025	26	15.002	A	0.000	3.688	2.083	56.49	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T8 31.00-21.00	26.00	1	26	15.002	A	0.188	4.460	2.083	44.83	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T9 21.00-11.00	16.00	1	26	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000

Tower Pressure - With Ice

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	26	0.5000	0.422	A	0.000	0.422	0.422	100.00	0.000	0.000
						B	0.000	0.422		100.00	0.000	0.000
						C	0.000	0.422		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	25	0.5000	2.280	A	0.000	0.912	0.775	84.99	0.000	0.000
						B	0.000	0.912		84.99	0.000	0.000
						C	0.000	0.912		84.99	0.000	0.000
T2 87.00-81.00	84.00	1.306	25	0.5000	9.501	A	0.215	3.987	2.250	53.54	0.000	0.000
						B	0.167	5.326		40.96	0.000	0.000
						C	0.215	3.987		53.54	0.000	0.000
T3 81.00-71.00	76.00	1.269	24	0.5000	15.835	A	0.000	6.486	3.750	57.82	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.000	6.486		57.82	0.000	0.000
T4 71.00-61.00	66.00	1.219	23	0.5000	15.835	A	0.000	6.486	3.750	57.82	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T5 61.00-51.00	56.00	1.163	22	0.5000	15.835	A	0.215	6.594	3.750	55.07	0.000	0.000
						B	0.148	9.720		38.00	0.000	0.000

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
						C	0.709	7.537		45.47	0.000	0.000
T6 51.00-41.00	46.00	1.1	21	0.5000	15.835	A	0.000	6.486	3.750	57.82	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T7 41.00-31.00	36.00	1.025	20	0.5000	15.835	A	0.000	7.465	3.750	50.24	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T8 31.00-21.00	26.00	1	19	0.5000	15.835	A	0.174	8.530	3.750	43.08	0.000	0.000
						B	0.148	9.720		38.00	0.000	0.000
						C	0.709	7.537		45.47	0.000	0.000
T9 21.00-11.00	16.00	1	19	0.5000	15.835	A	0.000	8.443	3.750	44.41	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000

Tower Pressure - Service

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	9	0.297	A	0.000	0.297	0.297	100.00	0.000	0.000
					B	0.000	0.297		100.00	0.000	0.000
					C	0.000	0.297		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	8	2.109	A	0.000	0.472	0.430	91.18	0.000	0.000
					B	0.000	0.472		91.18	0.000	0.000
					C	0.000	0.472		91.18	0.000	0.000
T2 87.00-81.00	84.00	1.306	8	9.001	A	0.215	1.746	1.250	63.73	0.000	0.000
					B	0.195	2.425		47.71	0.000	0.000
					C	0.215	1.746		63.73	0.000	0.000
T3 81.00-71.00	76.00	1.269	8	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	2.916		71.44	0.000	0.000
T4 71.00-61.00	66.00	1.219	8	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T5 61.00-51.00	56.00	1.163	7	15.002	A	0.215	2.916	2.083	66.53	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T6 51.00-41.00	46.00	1.1	7	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T7 41.00-31.00	36.00	1.025	7	15.002	A	0.000	3.688	2.083	56.49	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T8 31.00-21.00	26.00	1	6	15.002	A	0.188	4.460	2.083	44.83	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T9 21.00-11.00	16.00	1	6	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	1	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	1	1	0.281			
			C	0.224	2.519	0.596	1	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	1	1	1.253	0.15	25.67	B
87.00-81.00			B	0.291	2.32	0.613	1	1	1.682			
			C	0.218	2.537	0.594	1	1	1.253			
T3	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.194	2.615	0.589	1	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	1	1	1.942	0.23	23.03	B
61.00-51.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T6	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	1	1	2.216	0.19	19.11	B
41.00-31.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	1	1	2.948	0.20	20.23	A
31.00-21.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T9	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
Sum Weight:	0.11	0.57								1.68		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.8	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	0.8	1	0.281			
			C	0.224	2.519	0.596	0.8	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.8	1	1.210	0.15	25.08	B
87.00-81.00			B	0.291	2.32	0.613	0.8	1	1.643			
			C	0.218	2.537	0.594	0.8	1	1.210			
T3	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.194	2.615	0.589	0.8	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T5	0.01	0.08	A	0.209	2.567	0.592	0.8	1	1.899	0.23	22.72	B
61.00-51.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T6	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	0.8	1	2.216	0.19	19.11	B
41.00-31.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.8	1	2.911	0.20	19.97	A
31.00-21.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T9	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
Sum Weight:	0.11	0.57								1.67		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.85	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	0.85	1	0.281			
			C	0.224	2.519	0.596	0.85	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.85	1	1.221	0.15	25.22	B
87.00-81.00			B	0.291	2.32	0.613	0.85	1	1.653			
			C	0.218	2.537	0.594	0.85	1	1.221			
T3	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.194	2.615	0.589	0.85	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.85	1	1.910	0.23	22.80	B
61.00-51.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T6	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	0.85	1	2.216	0.19	19.11	B
41.00-31.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.85	1	2.920	0.20	20.04	A
31.00-21.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T9	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
Sum Weight:	0.11	0.57								1.67		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	1	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	1	1	0.594			
			C	0.4	2.064	0.651	1	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	1	1	2.886	0.22	36.90	B
87.00-81.00			B	0.578	1.819	0.74	1	1	4.111			
			C	0.442	1.986	0.67	1	1	2.886			
T3	0.04	0.14	A	0.41	2.045	0.656	1	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.41	2.045	0.656	1	1	4.252			
T4	0.05	0.14	A	0.41	2.045	0.656	1	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T5	0.05	0.16	A	0.43	2.008	0.664	1	1	4.595	0.36	35.96	B
61.00-51.00			B	0.623	1.791	0.768	1	1	7.614			
			C	0.521	1.874	0.708	1	1	6.048			
T6	0.05	0.14	A	0.41	2.045	0.656	1	1	4.252	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T7	0.07	0.14	A	0.471	1.94	0.683	1	1	5.101	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T8	0.08	0.16	A	0.55	1.844	0.724	1	1	6.351	0.31	30.92	B
31.00-21.00			B	0.623	1.791	0.768	1	1	7.614			
			C	0.521	1.874	0.708	1	1	6.048			
T9	0.08	0.14	A	0.533	1.861	0.715	1	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
Sum Weight:	0.43	1.16								2.62		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	0.8	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	0.8	1	0.594			
			C	0.4	2.064	0.651	0.8	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	0.8	1	2.843	0.22	36.60	B
87.00-81.00			B	0.578	1.819	0.74	0.8	1	4.077			
			C	0.442	1.986	0.67	0.8	1	2.843			
T3	0.04	0.14	A	0.41	2.045	0.656	0.8	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.41	2.045	0.656	0.8	1	4.252			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T4	0.05	0.14	A	0.41	2.045	0.656	0.8	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T5	0.05	0.16	A	0.43	2.008	0.664	0.8	1	4.552	0.36	35.82	B
61.00-51.00			B	0.623	1.791	0.768	0.8	1	7.584			
			C	0.521	1.874	0.708	0.8	1	5.906			
T6	0.05	0.14	A	0.41	2.045	0.656	0.8	1	4.252	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T7	0.07	0.14	A	0.471	1.94	0.683	0.8	1	5.101	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T8	0.08	0.16	A	0.55	1.844	0.724	0.8	1	6.316	0.31	30.80	B
31.00-21.00			B	0.623	1.791	0.768	0.8	1	7.584			
			C	0.521	1.874	0.708	0.8	1	5.906			
T9	0.08	0.14	A	0.533	1.861	0.715	0.8	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
Sum Weight:	0.43	1.16								2.61		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	0.85	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	0.85	1	0.594			
			C	0.4	2.064	0.651	0.85	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	0.85	1	2.854	0.22	36.67	B
87.00-81.00			B	0.578	1.819	0.74	0.85	1	4.086			
			C	0.442	1.986	0.67	0.85	1	2.854			
T3	0.04	0.14	A	0.41	2.045	0.656	0.85	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.41	2.045	0.656	0.85	1	4.252			
T4	0.05	0.14	A	0.41	2.045	0.656	0.85	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T5	0.05	0.16	A	0.43	2.008	0.664	0.85	1	4.563	0.36	35.86	B
61.00-51.00			B	0.623	1.791	0.768	0.85	1	7.592			
			C	0.521	1.874	0.708	0.85	1	5.941			
T6	0.05	0.14	A	0.41	2.045	0.656	0.85	1	4.252	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T7	0.07	0.14	A	0.471	1.94	0.683	0.85	1	5.101	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T8	0.08	0.16	A	0.55	1.844	0.724	0.85	1	6.325	0.31	30.83	B
31.00-21.00			B	0.623	1.791	0.768	0.85	1	7.592			
			C	0.521	1.874	0.708	0.85	1	5.941			
T9	0.08	0.14	A	0.533	1.861	0.715	0.85	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	0.43	1.16								2.61		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	1	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	1	1	0.281			
			C	0.224	2.519	0.596	1	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	1	1	1.253	0.04	6.42	B
87.00-81.00			B	0.291	2.32	0.613	1	1	1.682			
			C	0.218	2.537	0.594	1	1	1.253			
T3	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.194	2.615	0.589	1	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	1	1	1.942	0.06	5.76	B
61.00-51.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T6	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	1	1	2.216	0.05	4.78	B
41.00-31.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	1	1	2.948	0.05	5.06	A
31.00-21.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T9	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
Sum Weight:	0.11	0.57								0.42		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.8	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	0.8	1	0.281			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.224	2.519	0.596	0.8	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.8	1	1.210	0.04	6.27	B
87.00-81.00			B	0.291	2.32	0.613	0.8	1	1.643			
			C	0.218	2.537	0.594	0.8	1	1.210			
T3	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.194	2.615	0.589	0.8	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.8	1	1.899	0.06	5.68	B
61.00-51.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T6	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	0.8	1	2.216	0.05	4.78	B
41.00-31.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.8	1	2.911	0.05	4.99	A
31.00-21.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T9	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
Sum Weight:	0.11	0.57								0.42		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.85	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	0.85	1	0.281			
			C	0.224	2.519	0.596	0.85	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.85	1	1.221	0.04	6.31	B
87.00-81.00			B	0.291	2.32	0.613	0.85	1	1.653			
			C	0.218	2.537	0.594	0.85	1	1.221			
T3	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.194	2.615	0.589	0.85	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.85	1	1.910	0.06	5.70	B
61.00-51.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T6	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T7	0.02	0.07	A	0.246	2.45	0.601	0.85	1	2.216	0.05	4.78	B
41.00-31.00			B	0.288	2.327	0.612	0.85	1	2.650			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.26	2.408	0.604	0.85	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.85	1	2.920	0.05	5.01	A
31.00-21.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T9	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
Sum Weight:	0.11	0.57								0.42		

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	0.25			
Bracing Weight	0.32			
Total Member Self-Weight	0.57			
Guy Weight	0.11			
Total Weight	1.32			
Wind 0 deg - No Ice		-0.02	-2.77	0.43
Wind 90 deg - No Ice		2.73	0.02	-0.47
Wind 180 deg - No Ice		0.02	2.76	-0.43
Member Ice	0.59			
Guy Ice	0.27			
Total Weight Ice	2.90			
Wind 0 deg - Ice		-0.02	-3.55	0.43
Wind 90 deg - Ice		3.53	0.02	-0.43
Wind 180 deg - Ice		0.02	3.55	-0.43
Total Weight	1.32			
Wind 0 deg - Service		-0.01	-0.69	0.11
Wind 90 deg - Service		0.68	0.01	-0.12
Wind 180 deg - Service		0.01	0.69	-0.11

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 90 deg - No Ice+Guy
4	Dead+Wind 180 deg - No Ice+Guy
5	Dead+Ice+Temp+Guy
6	Dead+Wind 0 deg+Ice+Temp+Guy
7	Dead+Wind 90 deg+Ice+Temp+Guy
8	Dead+Wind 180 deg+Ice+Temp+Guy
9	Dead+Wind 0 deg - Service+Guy
10	Dead+Wind 90 deg - Service+Guy
11	Dead+Wind 180 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	90.5 - 89	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-0.10	0.00	-0.00
			Max. Mx	3	-0.06	-0.77	0.11
			Max. My	4	-0.06	0.05	-0.68
			Max. Vy	3	0.19	-0.77	0.11
			Max. Vx	4	0.17	0.05	-0.68
			Max. Torque	8			-0.01
T1	89 - 87	Leg	Max Tension	3	1.02	-0.09	-0.03
			Max. Compression	2	-0.98	-0.03	-0.00
			Max. Mx	2	-0.98	0.12	0.01
			Max. My	3	-0.19	0.02	0.10
			Max. Vy	3	-0.12	0.01	0.01
			Max. Vx	3	0.08	0.02	0.10
		Bottom Girt	Max Tension	7	0.07	-0.00	-0.00
			Max. Compression	2	-0.09	0.00	-0.00
			Max. Mx	6	0.02	0.01	-0.00
			Max. My	6	0.00	-0.00	-0.00
			Max. Vy	6	0.01	-0.00	0.00
			Max. Vx	6	-0.01	-0.00	-0.00
T2	87 - 81	Leg	Max Tension	3	1.28	-0.01	0.00
			Max. Compression	6	-3.56	0.00	0.00
			Max. Mx	3	-0.87	0.05	0.02
			Max. My	6	-0.91	-0.00	-0.06
			Max. Vy	3	0.12	0.01	-0.00
			Max. Vx	8	-0.18	-0.00	-0.06
		Diagonal	Max Tension	2	0.37	0.00	0.00
			Max. Compression	8	-0.74	0.00	0.00
			Max. Mx	6	-0.45	0.00	0.00
			Max. My	6	-0.04	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	0.53	0.00	0.00
			Max. Compression	2	-0.22	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.18	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	6	0.10	0.00	0.00
			Max. Compression	8	-0.08	0.00	0.00
			Max. Mx	5	0.00	0.00	0.00
			Max. My	6	0.10	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.30	0.00	0.00
			Max. Compression	3	-0.12	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	-0.10	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Guy A	Bottom Tension	8	3.60		
			Top Tension	8	3.64		
			Top Cable Vert	8	3.09		
			Top Cable Norm	8	1.93		
			Top Cable Tan	8	0.01		
			Bot Cable Vert	8	-2.93		
			Bot Cable Norm	8	2.08		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Bot Cable Tan	8	0.06		
		Guy B	Bottom Tension	6	3.20		
			Top Tension	6	3.24		
			Top Cable Vert	6	2.71		
			Top Cable Norm	6	1.78		
			Top Cable Tan	6	0.09		
			Bot Cable Vert	6	-2.63		
			Bot Cable Norm	6	1.82		
			Bot Cable Tan	6	0.17		
		Guy C	Bottom Tension	6	4.32		
			Top Tension	6	4.37		
			Top Cable Vert	6	3.87		
			Top Cable Norm	6	2.04		
			Top Cable Tan	6	0.07		
			Bot Cable Vert	6	-3.76		
			Bot Cable Norm	6	2.14		
			Bot Cable Tan	6	0.16		
		Top Guy Pull-Off	Max Tension	6	1.25	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	0.11	0.00	0.00
			Max. My	6	0.39	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T3	81 - 71	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-4.16	0.00	0.01
			Max. Mx	7	-1.82	0.05	-0.00
			Max. My	8	-2.33	0.00	0.06
			Max. Vy	7	-0.11	0.00	-0.00
			Max. Vx	8	-0.18	-0.00	-0.00
		Diagonal	Max Tension	3	0.24	0.00	0.00
			Max. Compression	8	-0.64	0.00	0.00
			Max. Mx	6	-0.02	0.00	0.00
			Max. My	6	-0.20	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	0.38	0.00	0.00
			Max. Compression	3	-0.11	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	0.19	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	8	0.21	0.00	0.00
			Max. Compression	3	-0.13	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	-0.01	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	0.14	0.00	0.00
			Max. Compression	7	-0.04	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.14	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T4	71 - 61	Leg	Max Tension	3	0.02	-0.01	0.01
			Max. Compression	6	-4.80	-0.00	0.00
			Max. Mx	7	-2.13	0.12	-0.00
			Max. My	8	-2.77	-0.00	0.09
			Max. Vy	7	0.38	-0.00	-0.00
			Max. Vx	8	0.27	-0.00	-0.00
		Diagonal	Max Tension	6	0.53	0.00	0.00
			Max. Compression	7	-0.97	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	6	0.31	0.00	0.00
			Max. My	6	-0.07	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	7	0.63	0.00	0.00
			Max. Compression	6	-0.34	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.33	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.32	0.00	0.00
			Max. Compression	6	-0.10	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.16	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	0.46	0.00	0.00
			Max. Compression	8	-0.16	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.37	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T5	61 - 51	Leg	Max Tension	7	2.51	-0.01	-0.00
			Max. Compression	6	-8.29	-0.00	0.01
			Max. Mx	7	-2.13	-0.13	0.00
			Max. My	8	-4.13	-0.04	-0.13
			Max. Vy	7	0.38	-0.13	0.00
			Max. Vx	8	-0.38	-0.04	-0.13
		Diagonal	Max Tension	6	0.58	0.00	0.00
			Max. Compression	7	-1.41	0.00	0.00
			Max. Mx	6	0.58	0.00	0.00
			Max. My	6	0.03	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	7	0.87	0.00	0.00
			Max. Compression	6	-0.39	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	0.56	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.49	0.00	0.00
			Max. Compression	6	-0.32	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.25	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.55	0.00	0.00
			Max. Compression	2	-0.25	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.24	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Guy A	Bottom Tension	8	3.36		
			Top Tension	8	3.39		
			Top Cable Vert	8	2.25		
			Top Cable Norm	8	2.54		
			Top Cable Tan	8	0.00		
			Bot Cable Vert	8	-2.15		
			Bot Cable Norm	8	2.59		
			Bot Cable Tan	8	0.04		
		Guy B	Bottom Tension	6	2.95		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Tension	6	2.98		
			Top Cable Vert	6	1.95		
			Top Cable Norm	6	2.25		
			Top Cable Tan	6	0.06		
			Bot Cable Vert	6	-1.89		
			Bot Cable Norm	6	2.27		
			Bot Cable Tan	6	0.11		
		Guy C	Bottom Tension	6	3.83		
			Top Tension	6	3.86		
			Top Cable Vert	6	2.89		
			Top Cable Norm	6	2.57		
			Top Cable Tan	6	0.05		
			Bot Cable Vert	6	-2.81		
			Bot Cable Norm	6	2.61		
			Bot Cable Tan	6	0.09		
		Top Guy Pull-Off	Max Tension	8	1.55	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	0.17	0.00	0.00
			Max. My	6	0.57	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T6	51 - 41	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-6.95	0.01	-0.04
			Max. Mx	7	-1.68	0.09	0.06
			Max. My	8	-3.22	0.04	0.12
			Max. Vy	7	-0.28	-0.00	-0.00
			Max. Vx	8	-0.38	-0.00	-0.00
		Diagonal	Max Tension	2	0.53	0.00	0.00
			Max. Compression	7	-1.36	0.00	0.00
			Max. Mx	6	-0.25	0.00	0.00
			Max. My	6	0.06	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	0.82	0.00	0.00
			Max. Compression	2	-0.33	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	0.12	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.49	0.00	0.00
			Max. Compression	2	-0.15	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. My	6	-0.15	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.41	0.00	0.00
			Max. Compression	2	-0.16	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.11	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T7	41 - 31	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-8.54	-0.08	-0.08
			Max. Mx	7	-1.86	0.15	0.01
			Max. My	8	-4.54	-0.07	0.19
			Max. Vy	7	0.47	-0.01	-0.00
			Max. Vx	8	0.59	-0.00	-0.00
		Diagonal	Max Tension	2	1.45	0.00	0.00
			Max. Compression	8	-2.16	0.00	0.00
			Max. Mx	6	0.52	0.00	0.00
			Max. My	6	0.22	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.29	0.00	0.00
			Max. Compression	2	-0.85	0.00	0.00
			Max. Mx	5	0.06	0.00	0.00
			Max. My	6	0.15	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	8	0.37	0.00	0.00
			Max. Compression	2	-0.11	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. My	6	-0.07	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.73	0.00	0.00
			Max. Compression	2	-0.46	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.44	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T8	31 - 21	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-9.83	0.00	0.01
			Max. Mx	8	-4.53	0.19	-0.02
			Max. My	8	-6.03	0.07	-0.20
			Max. Vy	8	0.56	-0.00	0.00
			Max. Vx	8	0.59	0.07	-0.20
		Diagonal	Max Tension	6	1.56	0.00	0.00
			Max. Compression	8	-2.18	0.00	0.00
			Max. Mx	6	1.46	0.00	0.00
			Max. My	6	0.69	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.32	0.00	0.00
			Max. Compression	6	-0.96	0.00	0.00
			Max. Mx	5	0.06	0.00	0.00
			Max. My	6	0.17	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.84	0.00	0.00
			Max. Compression	6	-0.61	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.61	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.81	0.00	0.00
			Max. Compression	6	-0.62	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	-0.32	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Guy A	Bottom Tension	8	2.55		
			Top Tension	8	2.56		
			Top Cable Vert	8	0.69		
			Top Cable Norm	8	2.46		
			Top Cable Tan	8	0.00		
			Bot Cable Vert	8	-0.65		
			Bot Cable Norm	8	2.47		
			Bot Cable Tan	8	0.01		
		Guy B	Bottom Tension	6	2.19		
			Top Tension	6	2.20		
			Top Cable Vert	6	0.59		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Norm	6	2.12		
			Top Cable Tan	6	0.06		
			Bot Cable Vert	6	-0.55		
			Bot Cable Norm	6	2.12		
			Bot Cable Tan	6	0.07		
		Guy C	Bottom Tension	6	2.57		
			Top Tension	6	2.58		
			Top Cable Vert	6	1.05		
			Top Cable Norm	6	2.36		
			Top Cable Tan	6	0.05		
			Bot Cable Vert	6	-1.00		
			Bot Cable Norm	6	2.37		
			Bot Cable Tan	6	0.05		
		Top Guy Pull-Off	Max Tension	8	2.09	0.00	0.00
			Max. Compression	2	-0.40	0.00	0.00
			Max. Mx	5	0.30	0.00	0.00
			Max. My	6	-0.27	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T9	21 - 11	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-7.37	-0.03	0.01
			Max. Mx	8	-3.63	-0.19	0.02
			Max. My	8	-2.97	0.10	0.19
			Max. Vy	8	0.56	-0.19	0.02
			Max. Vx	8	0.58	0.06	-0.16
		Diagonal	Max Tension	6	1.49	0.00	0.00
			Max. Compression	8	-2.08	0.00	0.00
			Max. Mx	6	0.82	0.00	0.00
			Max. My	6	1.14	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.27	0.00	0.00
			Max. Compression	6	-0.91	0.00	0.00
			Max. Mx	5	0.11	0.00	0.00
			Max. My	6	0.13	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.78	0.00	0.00
			Max. Compression	6	-0.50	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	-0.26	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.54	0.00	0.00
			Max. Compression	2	-0.29	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
		Base Beam	Max Tension	8	0.15	-3.98	0.42
			Max. Compression	6	-0.07	0.02	-0.01
			Max. Mx	6	-5.36	-4.30	-0.26
			Max. My	8	-4.91	-3.99	0.48
			Max. Vy	6	-5.36	-4.30	-0.26
			Max. Vx	8	0.59	-3.99	0.48

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Guy C @ 39.5 ft Elev 12.5 ft Azimuth 241 deg	Max. Vert	11	-2.47	-2.28	1.24
	Max. H_x	11	-2.47	-2.28	1.24
	Max. H_z	6	-7.56	-6.07	3.71
	Min. Vert	6	-7.56	-6.07	3.71
	Min. H_x	7	-7.27	-6.13	3.23
	Min. H_z	11	-2.47	-2.28	1.24
Guy B @ 45.5 ft Elev 17.25 ft Azimuth 102 deg	Max. Vert	3	-0.33	0.40	0.10
	Max. H_x	6	-5.07	6.00	1.64
	Max. H_z	6	-5.07	6.00	1.64
	Min. Vert	6	-5.07	6.00	1.64
	Min. H_x	3	-0.33	0.40	0.10
	Min. H_z	8	-1.38	1.83	0.09
Guy A @ 45 ft Elev 17.25 ft Azimuth 18 deg	Max. Vert	2	-0.24	0.08	-0.19
	Max. H_x	8	-5.73	2.10	-6.82
	Max. H_z	2	-0.24	0.08	-0.19
	Min. Vert	8	-5.73	2.10	-6.82
	Min. H_x	2	-0.24	0.08	-0.19
	Min. H_z	8	-5.73	2.10	-6.82
Mast	Max. Vert	6	16.07	-0.02	-0.11
	Max. H_x	8	14.75	0.11	-0.10
	Max. H_z	7	13.85	-0.03	0.07
	Max. M_x	1	0.00	-0.00	-0.01
	Max. M_z	1	0.00	-0.00	-0.01
	Max. Torsion	8	1.32	0.11	-0.10
	Min. Vert	9	6.48	-0.00	0.01
	Min. H_x	3	8.61	-0.04	0.03
	Min. H_z	6	16.07	-0.02	-0.11
	Min. M_x	1	0.00	-0.00	-0.01
	Min. M_z	1	0.00	-0.00	-0.01
	Min. Torsion	2	-0.81	-0.01	-0.04

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	6.53	0.00	0.01	0.00	0.00	-0.08
Dead+Wind 0 deg - No Ice+Guy	10.08	0.01	0.04	0.00	0.00	0.81
Dead+Wind 90 deg - No Ice+Guy	8.61	0.04	-0.03	0.00	0.00	-0.86
Dead+Wind 180 deg - No Ice+Guy	8.78	-0.04	0.08	0.00	0.00	-1.10
Dead+Ice+Temp+Guy	8.91	-0.00	0.02	0.00	0.00	-0.11
Dead+Wind 0 deg+Ice+Temp+Guy	16.07	0.02	0.11	0.00	0.00	0.77
Dead+Wind 90 deg+Ice+Temp+Guy	13.85	0.03	-0.07	0.00	0.00	-1.04
Dead+Wind 180 deg+Ice+Temp+Guy	14.75	-0.11	0.10	0.00	0.00	-1.32
Dead+Wind 0 deg -	6.48	0.00	-0.01	0.00	0.00	0.19

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
Service+Guy						
Dead+Wind 90 deg - Service+Guy	6.48	0.03	0.01	0.00	0.00	-0.27
Dead+Wind 180 deg - Service+Guy	6.72	0.00	0.03	0.00	0.00	-0.34

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	-1.32	0.00	0.00	1.32	0.00	0.020%
2	-0.05	-1.32	-3.17	0.05	1.32	3.17	0.015%
3	3.08	-1.30	0.06	-3.08	1.30	-0.06	0.005%
4	0.05	-1.33	3.16	-0.05	1.33	-3.16	0.002%
5	0.00	-2.90	0.00	0.00	2.90	0.00	0.014%
6	-0.11	-2.89	-4.84	0.10	2.89	4.84	0.032%
7	4.61	-2.82	0.14	-4.61	2.82	-0.15	0.009%
8	0.11	-2.90	4.83	-0.11	2.90	-4.83	0.026%
9	-0.01	-1.32	-0.79	0.01	1.32	0.79	0.021%
10	0.77	-1.32	0.02	-0.77	1.32	-0.02	0.016%
11	0.01	-1.32	0.79	-0.01	1.32	-0.79	0.006%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	15	0.00000001	0.00008184
2	Yes	32	0.00000001	0.00007234
3	Yes	29	0.00000001	0.00009334
4	Yes	23	0.00000001	0.00008499
5	Yes	15	0.00000001	0.00009029
6	Yes	34	0.00000001	0.00007638
7	Yes	33	0.00000001	0.00007863
8	Yes	27	0.00000001	0.00007983
9	Yes	16	0.00000001	0.00007999
10	Yes	12	0.00000001	0.00006245
11	Yes	12	0.00000001	0.00009392

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90.5 - 89	0.973	9	0.1863	2.1989
T1	89 - 87	0.932	9	0.0870	2.2000
T2	87 - 81	0.924	9	0.0382	2.2253
T3	81 - 71	0.883	9	0.0375	2.2015
T4	71 - 61	0.773	9	0.0714	2.1020

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	61 - 51	0.602	9	0.0740	1.9879
T6	51 - 41	0.493	9	0.0330	1.7958
T7	41 - 31	0.425	9	0.0491	1.5033
T8	31 - 21	0.285	9	0.0692	1.1096
T9	21 - 11	0.145	9	0.0690	0.5565

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
95.50	DB586-Y	9	0.973	0.1863	2.1989	24963
93.00	6'x3" Pipe Mount	9	0.973	0.1863	2.1989	24963
92.00	PTP 49400	9	0.973	0.1863	2.1989	24963
85.00	Environmental Pendant Camera	9	0.918	0.0283	2.2343	56943
84.00	Guy	9	0.911	0.0281	2.2304	10664
82.17	5440AP	9	0.895	0.0328	2.2144	15011
78.50	PTP 49400	9	0.859	0.0475	2.1749	63411
71.00	ANT150D6-9	9	0.773	0.0714	2.1020	12830
55.33	Guy	9	0.529	0.0488	1.8914	13409
40.00	HBX-4517DS	9	0.414	0.0520	1.4697	11644
36.00	RRH2x60-AWS	9	0.361	0.0619	1.3253	24910
33.00	BSA150C	9	0.315	0.0670	1.2018	72393
29.33	Guy	9	0.260	0.0702	1.0259	30776
23.00	BA1012-1	9	0.173	0.0696	0.6719	199093
21.00	3.5"x60" Horizontal Pipe	9	0.145	0.0690	0.5565	92917

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90.5 - 89	13.392	6	1.4814	6.4674
T1	89 - 87	12.980	6	1.1519	6.4707
T2	87 - 81	12.596	6	0.9847	6.5350
T3	81 - 71	11.388	6	0.9866	6.5019
T4	71 - 61	9.161	6	1.1506	6.3072
T5	61 - 51	6.639	6	1.1522	6.0503
T6	51 - 41	4.517	6	0.8502	5.5519
T7	41 - 31	2.924	6	0.7270	4.7631
T8	31 - 21	1.480	6	0.5685	3.6217
T9	21 - 11	0.602	8	0.3303	1.8175

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
95.50	DB586-Y	6	13.392	1.4814	6.4674	5776

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
93.00	6'x3" Pipe Mount	6	13.392	1.4814	6.4674	5776
92.00	PTP 49400	6	13.392	1.4814	6.4674	5776
85.00	Environmental Pendant Camera	6	12.222	0.9463	6.5630	12953
84.00	Guy	6	12.021	0.9461	6.5575	2966
82.17	5440AP	6	11.638	0.9664	6.5273	3579
78.50	PTP 49400	6	10.853	1.0316	6.4498	7713
71.00	ANT150D6-9	6	9.161	1.1506	6.3072	2692
55.33	Guy	6	5.359	0.9845	5.8041	1876
40.00	HBX-4517DS	6	2.770	0.7167	4.6713	4031
36.00	RRH2x60-AWS	6	2.160	0.6622	4.2678	3539
33.00	BSA150C	6	1.734	0.6090	3.9047	1975
29.33	Guy	6	1.292	0.5320	3.3570	1738
23.00	BA1012-1	6	0.740	0.3798	2.1985	3516
21.00	3.5"x60" Horizontal Pipe	8	0.602	0.3303	1.8175	4932

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	87	Top Guy Pull-Off@84	A325N	0.6250	1	1.25	6.44	0.195 ✔	1.333	Bolt Shear
T5	61	Top Guy Pull-Off@55.3333	A325N	0.6250	1	1.55	6.44	0.241 ✔	1.333	Bolt Shear
T8	31	Top Guy Pull-Off@29.3333	A325N	0.6250	1	2.09	6.44	0.324 ✔	1.333	Bolt Shear

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
T2	84.00 (A) (379)	5/16 EHS	1.12	11.20	3.64	5.60	2.000	3.075 ✔
	84.00 (B) (378)	5/16 EHS	1.12	11.20	3.24	5.60	2.000	3.452 ✔
	84.00 (C) (374)	5/16 EHS	1.12	11.20	4.37	5.60	2.000	2.562 ✔
T5	55.33 (A) (385)	5/16 EHS	1.12	11.20	3.39	5.60	2.000	3.307 ✔
	55.33 (B) (384)	5/16 EHS	1.12	11.20	2.98	5.60	2.000	3.764 ✔
	55.33 (C) (380)	5/16 EHS	1.12	11.20	3.86	5.60	2.000	2.900 ✔
T8	29.33 (A) (391)	5/16 EHS	1.12	11.20	2.56	5.60	2.000	4.377 ✔
	29.33 (B) (390)	5/16 EHS	1.12	11.20	2.20	5.60	2.000	5.086 ✔
	29.33 (C) (386)	5/16 EHS	1.12	11.20	2.58	5.60	2.000	4.339 ✔

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	90.5 - 89 (1)	P2x.154	1.50	1.50	22.9	19.873	1.0745	-0.06	21.35	0.003

Pole Bending Design Data

Section No.	Elevation	Size	Actual M_x	Actual f_{bx}	Allow. F_{bx}	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y	Actual f_{by}	Allow. F_{by}	Ratio $\frac{f_{by}}{F_{by}}$
	ft		kip-ft	ksi	ksi		kip-ft	ksi	ksi	
L1	90.5 - 89 (1)	P2x.154	0.77	-16.547	23.100	0.716	0.00	0.000	23.100	0.000

Pole Interaction Design Data

Section No.	Elevation	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft							
L1	90.5 - 89 (1)	P2x.154	0.003	0.716	0.000	0.719 ✔	1.066	H1-3 ✔

Leg Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	Mast Stability Index	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft			ksi	in^2	K	K	
T1	89 - 87	ROHN TS 1.25x14 ga	2.07	1.72	49.9 K=1.00	1.00	24.360	0.3043	-0.98	7.41	0.132
T2	87 - 81	ROHN TS 1.25x14 ga	6.00	1.33	38.7 K=1.00	0.97	25.299	0.3043	-3.56	7.70	0.462
T3	81 - 71	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.548	0.3043	-4.16	7.77	0.535
T4	71 - 61	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.501	0.3043	-4.80	7.76	0.619
T5	61 - 51	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.562	0.3043	-8.29	7.78	1.065
T6	51 - 41	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.99	25.681	0.3043	-6.95	7.81	0.890
T7	41 - 31	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.99	25.716	0.3043	-8.54	7.83	1.091
T8	31 - 21	ROHN TS 1.25x14	10.00	1.33	38.7	1.00	26.016	0.3043	-9.83	7.92	1.241

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	21 - 11	ga ROHN TS 1.25x14 ga	10.00	1.33	K=1.00 38.7 K=1.00	1.00	26.016	0.3043	-7.37	7.92	0.931

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	ROHN TS 1.25x14 ga	0.12	-16.665	33.000	0.505	0.00	0.000	33.000	0.000
T2	87 - 81	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T3	81 - 71	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T4	71 - 61	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T5	61 - 51	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T6	51 - 41	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T7	41 - 31	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T8	31 - 21	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T9	21 - 11	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	ROHN TS 1.25x14 ga	0.132	0.505	0.000	0.637 ✔	1.333	H1-3 ✔
T2	87 - 81	ROHN TS 1.25x14 ga	0.462	0.000	0.000	0.462 ✔	1.333	H1-3 ✔
T3	81 - 71	ROHN TS 1.25x14 ga	0.535	0.000	0.000	0.535 ✔	1.333	H1-3 ✔
T4	71 - 61	ROHN TS 1.25x14 ga	0.619	0.000	0.000	0.619 ✔	1.333	H1-3 ✔
T5	61 - 51	ROHN TS 1.25x14 ga	1.065	0.000	0.000	1.065 ✔	1.333	H1-3 ✔
T6	51 - 41	ROHN TS 1.25x14 ga	0.890	0.000	0.000	0.890 ✔	1.333	H1-3 ✔
T7	41 - 31	ROHN TS 1.25x14 ga	1.091	0.000	0.000	1.091 ✔	1.333	H1-3 ✔
T8	31 - 21	ROHN TS 1.25x14 ga	1.241	0.000	0.000	1.241 ✔	1.333	H1-3 ✔
T9	21 - 11	ROHN TS 1.25x14 ga	0.931	0.000	0.000	0.931 ✔	1.333	H1-3 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.74	1.19	0.624 ✓
T3	81 - 71	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.64	1.19	0.533 ✓
T4	71 - 61	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.97	1.19	0.809 ✓
T5	61 - 51	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-1.41	1.19	1.181 ✓
T6	51 - 41	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-1.36	1.19	1.142 ✓
T7	41 - 31	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-2.16	1.19	1.813 ✗
T8	31 - 21	H1-3 (1.81 CR) - 240 7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-2.18	1.19	1.831 ✗
T9	21 - 11	H1-3 (1.83 CR) - 324 7/16 H1-3 (1.74 CR) - 373	1.93	1.79	137.2 K=0.70	7.934	0.1503	-2.08	1.19	1.743 ✗

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.22	1.97	0.110 ✓
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.11	1.97	0.057 ✓
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.34	1.97	0.171 ✓
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.39	1.97	0.201 ✓
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.33	1.97	0.169 ✓
T7	41 - 31	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.85	1.97	0.432 ✓
T8	31 - 21	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.96	1.97	0.487 ✓
T9	21 - 11	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.91	1.97	0.462 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.08	1.97	0.043 ✔
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.13	1.97	0.064 ✔
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.10	1.97	0.052 ✔
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.32	1.97	0.161 ✔
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.15	1.97	0.077 ✔
T7	41 - 31	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.11	1.97	0.057 ✔
T8	31 - 21	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.61	1.97	0.310 ✔
T9	21 - 11	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.50	1.97	0.253 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	7/16	1.25	1.14	125.3 K=0.70	21.600	0.1503	0.00	2.18	0.000
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.12	1.97	0.059
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.04	1.97	0.020
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.16	1.97	0.083
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.25	1.97	0.125
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.16	1.97	0.082
T7	41 - 31	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.46	1.97	0.235
T8	31 - 21	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.62	1.97	0.313
T9	21 - 11	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.29	1.97	0.150

Bottom Girt Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	7/16	0.01	-9.651	27.000	0.357	0.00	0.000	27.000	0.000
T2	87 - 81	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T3	81 - 71	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T4	71 - 61	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T5	61 - 51	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T6	51 - 41	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T7	41 - 31	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T8	31 - 21	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T9	21 - 11	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000

Bottom Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	7/16	0.000	0.357	0.000	0.357 ✔	1.333	H1-3 ✔
T2	87 - 81	7/16	0.059	0.000	0.000	0.059 ✔	1.333	H1-3 ✔
T3	81 - 71	7/16	0.020	0.000	0.000	0.020 ✔	1.333	H1-3 ✔
T4	71 - 61	7/16	0.083	0.000	0.000	0.083 ✔	1.333	H1-3 ✔
T5	61 - 51	7/16	0.125	0.000	0.000	0.125 ✔	1.333	H1-3 ✔
T6	51 - 41	7/16	0.082	0.000	0.000	0.082 ✔	1.333	H1-3 ✔
T7	41 - 31	7/16	0.235	0.000	0.000	0.235 ✔	1.333	H1-3 ✔
T8	31 - 21	7/16	0.313	0.000	0.000	0.313 ✔	1.333	H1-3 ✔
T9	21 - 11	7/16	0.150	0.000	0.000	0.150 ✔	1.333	H1-3 ✔

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T8	31 - 21	2x3/8	1.40	1.29	143.2 K=1.00	7.282	0.7500	-0.40	5.46	0.073 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	ROHN TS 1.25x14 ga	2.07	1.72	49.9	30.000	0.3043	1.02	9.13	0.112
T2	87 - 81	ROHN TS 1.25x14 ga	6.00	1.33	38.7	30.000	0.3043	1.28	9.13	0.140
T4	71 - 61	ROHN TS 1.25x14 ga	10.00	1.33	38.7	30.000	0.3043	0.02	9.13	0.002
T5	61 - 51	ROHN TS 1.25x14 ga	10.00	1.33	38.7	30.000	0.3043	2.51	9.13	0.275

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	ROHN TS 1.25x14 ga	0.09	13.555	33.000	0.411	0.00	0.000	33.000	0.000
T2	87 - 81	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T4	71 - 61	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T5	61 - 51	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	ROHN TS 1.25x14 ga	0.112	0.411	0.000	0.523 ✔	1.333	H2-1 ✔
T2	87 - 81	ROHN TS 1.25x14 ga	0.140	0.000	0.000	0.140 ✔	1.333	H2-1 ✔
T4	71 - 61	ROHN TS 1.25x14 ga	0.002	0.000	0.000	0.002 ✔	1.333	H2-1 ✔
T5	61 - 51	ROHN TS 1.25x14 ga	0.275	0.000	0.000	0.275 ✔	1.333	H2-1 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.93	1.79	196.0	21.600	0.1503	0.37	3.25	0.114 ✔
T3	81 - 71	7/16	1.93	1.79	196.0	21.600	0.1503	0.24	3.25	0.073 ✔
T4	71 - 61	7/16	1.93	1.79	196.0	21.600	0.1503	0.53	3.25	0.163 ✔
T5	61 - 51	7/16	1.93	1.79	196.0	21.600	0.1503	0.58	3.25	0.178 ✔
T6	51 - 41	7/16	1.93	1.79	196.0	21.600	0.1503	0.53	3.25	0.164 ✔
T7	41 - 31	7/16	1.93	1.79	196.0	21.600	0.1503	1.45	3.25	0.448

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T8	31 - 21	H1-3 (1.81 CR) - 240 7/16	1.93	1.79	196.0	21.600	0.1503	1.56	3.25	0.480 ✔
T9	21 - 11	H1-3 (1.79 CR) - 289 7/16	1.93	1.79	196.0	21.600	0.1503	1.49	3.25	0.460 ✔
		H1-3 (1.74 CR) - 373								

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.53	3.25	0.164 ✔
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.38	3.25	0.117 ✔
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.63	3.25	0.194 ✔
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.87	3.25	0.269 ✔
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.82	3.25	0.253 ✔
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	1.29	3.25	0.397 ✔
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	1.32	3.25	0.407 ✔
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	1.27	3.25	0.390 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.10	3.25	0.030 ✔
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.21	3.25	0.064 ✔
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.32	3.25	0.098 ✔
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.49	3.25	0.152 ✔
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.49	3.25	0.152 ✔
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	0.37	3.25	0.114

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	0.84	3.25	0.258
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	0.78	3.25	0.239

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	7/16	1.25	1.14	125.3	21.600	0.1503	0.02	3.25	0.005
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.30	3.25	0.094
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.14	3.25	0.043
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.46	3.25	0.142
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.55	3.25	0.169
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.41	3.25	0.126
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	0.73	3.25	0.226
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	0.81	3.25	0.249
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	0.54	3.25	0.167

Bottom Girt Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	7/16	0.01	9.651	27.000	0.357	0.00	0.000	27.000	0.000
T2	87 - 81	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T3	81 - 71	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T4	71 - 61	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T5	61 - 51	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T6	51 - 41	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T7	41 - 31	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T8	31 - 21	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T9	21 - 11	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000

Bottom Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	7/16	0.005	0.357	0.000	0.363	1.333	H2-1
T2	87 - 81	7/16	0.094	0.000	0.000	0.094	1.333	H2-1
T3	81 - 71	7/16	0.043	0.000	0.000	0.043	1.333	H2-1

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T4	71 - 61	7/16	0.142	0.000	0.000	0.142 ✓	1.333	H2-1 ✓
T5	61 - 51	7/16	0.169	0.000	0.000	0.169 ✓	1.333	H2-1 ✓
T6	51 - 41	7/16	0.126	0.000	0.000	0.126 ✓	1.333	H2-1 ✓
T7	41 - 31	7/16	0.226	0.000	0.000	0.226 ✓	1.333	H2-1 ✓
T8	31 - 21	7/16	0.249	0.000	0.000	0.249 ✓	1.333	H2-1 ✓
T9	21 - 11	7/16	0.167	0.000	0.000	0.167 ✓	1.333	H2-1 ✓

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	2x3/8	1.40	1.29	143.2	29.000	0.3516	1.25	10.20	0.123 ✓
T5	61 - 51	2x3/8	1.40	1.29	143.2	29.000	0.3516	1.55	10.20	0.153 ✓
T8	31 - 21	2x3/8	1.40	1.29	143.2	29.000	0.3516	2.09	10.20	0.205 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	90.5 - 89	Pole	P2x.154	1	-0.06	22.77	67.4	Pass
T1	89 - 87	Leg	ROHN TS 1.25x14 ga	4	-0.98	9.88	47.8	Pass
T2	87 - 81	Leg	ROHN TS 1.25x14 ga	8	-3.56	10.26	34.7	Pass
T3	81 - 71	Leg	ROHN TS 1.25x14 ga	40	-4.16	10.36	40.2	Pass
T4	71 - 61	Leg	ROHN TS 1.25x14 ga	88	-4.80	10.34	46.4	Pass
T5	61 - 51	Leg	ROHN TS 1.25x14 ga	136	-8.29	10.37	79.9	Pass
T6	51 - 41	Leg	ROHN TS 1.25x14 ga	184	-6.95	10.42	66.8	Pass
T7	41 - 31	Leg	ROHN TS 1.25x14 ga	232	-8.54	10.43	81.9	Pass
T8	31 - 21	Leg	ROHN TS 1.25x14 ga	280	-9.83	10.55	93.1	Pass
T9	21 - 11	Leg	ROHN TS 1.25x14 ga	328	-7.37	10.55	69.8	Pass
T2	87 - 81	Diagonal	7/16	19	-0.74	1.59	46.8	Pass
T3	81 - 71	Diagonal	7/16	85	-0.64	1.59	40.0	Pass
T4	71 - 61	Diagonal	7/16	97	-0.97	1.59	60.7	Pass
T5	61 - 51	Diagonal	7/16	143	-1.41	1.59	88.6	Pass
T6	51 - 41	Diagonal	7/16	227	-1.36	1.59	85.7	Pass
T7	41 - 31	Diagonal	7/16	240	-2.16	1.59	136.0	Fail ✗
T8	31 - 21	Diagonal	7/16	324	-2.18	1.59	137.4	Fail ✗
T9	21 - 11	Diagonal	7/16	373	-2.08	1.59	130.7	Fail ✗

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T2	87 - 81	Horizontal	7/16	22	0.53	4.33	12.3	Pass
T3	81 - 71	Horizontal	7/16	82	0.38	4.33	8.7	Pass
T4	71 - 61	Horizontal	7/16	100	0.63	4.33	14.6	Pass
T5	61 - 51	Horizontal	7/16	146	0.87	4.33	20.2	Pass
T6	51 - 41	Horizontal	7/16	226	0.82	4.33	19.0	Pass
T7	41 - 31	Horizontal	7/16	243	-0.85	2.62	32.4	Pass
T8	31 - 21	Horizontal	7/16	292	-0.96	2.62	36.5	Pass
T9	21 - 11	Horizontal	7/16	370	-0.91	2.62	34.6	Pass
T2	87 - 81	Top Girt	7/16	13	-0.08	2.62	3.2	Pass
T3	81 - 71	Top Girt	7/16	43	-0.13	2.62	4.8	Pass
T4	71 - 61	Top Girt	7/16	91	0.32	4.33	7.3	Pass
T5	61 - 51	Top Girt	7/16	138	-0.32	2.62	12.1	Pass
T6	51 - 41	Top Girt	7/16	185	0.49	4.33	11.4	Pass
T7	41 - 31	Top Girt	7/16	235	0.37	4.33	8.5	Pass
T8	31 - 21	Top Girt	7/16	282	-0.61	2.62	23.2	Pass
T9	21 - 11	Top Girt	7/16	331	-0.50	2.62	19.0	Pass
T1	89 - 87	Bottom Girt	7/16	6	0.02	4.33	27.2	Pass
T2	87 - 81	Bottom Girt	7/16	16	0.30	4.33	7.0	Pass
T3	81 - 71	Bottom Girt	7/16	46	0.14	4.33	3.2	Pass
T4	71 - 61	Bottom Girt	7/16	93	0.46	4.33	10.6	Pass
T5	61 - 51	Bottom Girt	7/16	142	0.55	4.33	12.7	Pass
T6	51 - 41	Bottom Girt	7/16	190	0.41	4.33	9.5	Pass
T7	41 - 31	Bottom Girt	7/16	237	-0.46	2.62	17.6	Pass
T8	31 - 21	Bottom Girt	7/16	286	-0.62	2.62	23.5	Pass
T9	21 - 11	Bottom Girt	7/16	332	0.54	4.33	12.5	Pass
T2	87 - 81	Guy A@84 (18 deg)	5/16	379	3.64	5.60	65.0	Pass
T5	61 - 51	Guy A@55.3333 (18 deg)	5/16	385	3.39	5.60	60.5	Pass
T8	31 - 21	Guy A@29.3333 (18 deg)	5/16	391	2.56	5.60	45.7	Pass
T2	87 - 81	Guy B@84 (18 deg)	5/16	378	3.24	5.60	57.9	Pass
T5	61 - 51	Guy B@55.3333 (18 deg)	5/16	384	2.98	5.60	53.1	Pass
T8	31 - 21	Guy B@29.3333 (18 deg)	5/16	390	2.20	5.60	39.3	Pass
T2	87 - 81	Guy C@84 (-18 deg)	5/16	374	4.37	5.60	78.1	Pass
T5	61 - 51	Guy C@55.3333 (-18 deg)	5/16	380	3.86	5.60	69.0	Pass
T8	31 - 21	Guy C@29.3333 (-18 deg)	5/16	386	2.58	5.60	46.1	Pass
T2	87 - 81	Top Guy Pull-Off@84	2x3/8	375	1.25	13.59	9.2	Pass
T5	61 - 51	Top Guy Pull-Off@55.3333	2x3/8	383	1.55	13.59	11.4	Pass
T8	31 - 21	Top Guy Pull-Off@29.3333	2x3/8	389	2.09	13.59	15.4	Pass

Summary

Pole (L1)	67.4	Pass
Leg (T8)	93.1	Pass
Diagonal (T8)	137.4	Fail ✗
Horizontal (T8)	36.5	Pass
Top Girt (T8)	23.2	Pass
Bottom Girt (T1)	27.2	Pass
Guy A (T2)	65.0	Pass
Guy B (T2)	57.9	Pass
Guy C (T2)	78.1	Pass
Top Guy	15.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Pull-Off (T8) Bolt Checks	24.3	Pass
						RATING =	**137.4**	**Fail** X

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Subject:	Guy Anchor Plate Anlaysis
Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 1: 4/29/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Guy Anchor Plate Analysis:

(Anchor Plate #1)

Input Data:

Tower Reactions:

Tension Force =	Tension := 7·kips	(Input From tnxTower)
Shear Force =	Shear := 8·kips	(Input From tnxTower)
Resultant Force =	Resultant := 10·kips	(Input From tnxTower)
Max Force in One Cable =	Max := 4.4·kips	(Input From tnxTower)

Base Plate Data:

Use ASTM A36

Plate Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Plate Tensile Stress =	$F_u := 58 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 0.5 \cdot in$	(User Input)
Base Plate Width =	$W_{bp} := 8 \cdot in$	(User Input)
Hole Size =	$Hole_d := 0.5 \cdot in$	(User Input)
Number of Holes =	$Hole_N := 3$	(User Input)
Hole Edge Distance =	$Hole_{edg} := 0.75 \cdot in$	(User Input)

Weld Data:

Filler Metal Classification Strength =	$F_{EXX} := 70 \cdot ksi$	(User Input)
Weld Size (in sixteenths of an inch) =	$D_{weld} := 4 \cdot in$	(User Input)
Weld Length =	$l_{weld} := 11 \cdot in$	(User Input)

Calculated Data:

Hole Clear Distance =	$l_c := Hole_{edg} - \frac{1}{2} \cdot Hole_d = 0.5 \cdot in$
Plate Gross Area =	$A_g := W_{bp} \cdot t_{bp} = 4 \cdot in^2$
Plate Net Area =	$A_n := \left(W_{bp} - Hole_d \cdot Hole_N\right) \cdot t_{bp} = 3.25 \cdot in^2$
Plate Gross Area Subject to Shear =	$A_{gv} := \left(W_{bp} - Hole_{edg}\right) \cdot t_{bp} = 3.625 \cdot in^2$
Plate Net Area Subject to Shear =	$A_{nv} := \left[W_{bp} - Hole_{edg} - Hole_d \cdot \left(Hole_N - 0.5\right)\right] \cdot t_{bp} = 3 \cdot in^2$
Plate Net Area Subject to Tension =	$A_{nt} := \left(Hole_{edg} - Hole_d \cdot \frac{1}{2}\right) \cdot t_{bp} = 0.25 \cdot in^2$

Design Checks:

Check Tensile Yielding:

Safety Factor = $\Omega := 1.67$

Nominal Strength = $R_n := F_y \cdot A_g = 144 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 86.2 \cdot kips$

$\frac{Tension}{R_a} = 8.1 \cdot \%$

Tensile Yielding = $Tensile\_Yielding := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Yielding = "OK"

Check Tensile Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := F_u \cdot A_n = 188.5 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 94.3 \cdot kips$

$\frac{Tension}{R_a} = 7.4 \cdot \%$

Tensile Rupture = $Tensile\_Rupture := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Rupture = "OK"

Check Shear Yielding:

Safety Factor = $\Omega := 1.5$

Nominal Strength = $R_n := 0.6 \cdot F_y \cdot A_g = 86.4 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 57.6 \cdot kips$

$\frac{Shear}{R_a} = 13.9 \cdot \%$

Shear Yielding = $Shear\_Yielding := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Yielding = "OK"

Check Shear Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 0.6 \cdot F_u \cdot A_n = 113.1 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 56.5 \cdot kips$

$\frac{Shear}{R_a} = 14.1 \cdot \%$

Shear Rupture = $Shear\_Rupture := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Rupture = "OK"

Check Block Shear:

Safety Factor = $\Omega := 2$

Stress Distribution Reduction Factor = $U_{bs} := 1.0$

Nominal Strength =

$$R_n := \begin{cases} \left(0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{if } 0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt} \le 0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt} \\ \left(0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{otherwise} \end{cases} = 92.8 \cdot kips$$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 46.4 \cdot kips$

$\frac{Resultant}{R_a} = 21.6 \cdot \%$

Block Shear = $Block\_Shear := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Block_Shear = "OK"

Check Bearing Strength:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 1.2 \cdot l_c \cdot t_{bp} \cdot F_u = 17.4 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 8.7 \cdot kips$

$\frac{Max}{R_a} = 50.6 \cdot \%$

Bearing Strength = $Bearing\_Strength := if\left(\frac{Max}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Bearing_Strength = "OK"

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Subject:	Guy Anchor Plate Anlaysis
Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 1: 4/29/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Check Weld:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 0.6 \cdot F_{EXX} \cdot \left(\frac{\sqrt{2}}{2}\right) \cdot \left(\frac{D_{weld}}{16}\right) \cdot l_{weld} = 81.7 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 40.8 \cdot kips$

$\frac{Resultant}{R_a} = 24.5 \cdot \%$

Weld Strength = $Weld\_Strength := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Weld_Strength = "OK"

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Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 1: 4/29/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Input Data:

(Anchor Plate #2 & 3)

Tower Reactions:

Tension Force =	Tension := 7·kips	(Input From tnxTower)
Shear Force =	Shear := 8·kips	(Input From tnxTower)
Resultant Force =	Resultant := 10·kips	(Input From tnxTower)
Max Force in One Cable =	Max := 4.4·kips	(Input From tnxTower)

Base Plate Data:

Use ASTM A36

Plate Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Plate Tensile Stress =	$F_u := 58 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 0.4 \cdot in$	(User Input)
Base Plate Width =	$W_{bp} := 8 \cdot in$	(User Input)
Hole Size =	$Hole_d := 0.5 \cdot in$	(User Input)
Number of Holes =	$Hole_N := 3$	(User Input)
Hole Edge Distance =	$Hole_{edg} := 1.0 \cdot in$	(User Input)

Weld Data:

Filler Metal Classification Strength =	$F_{EXX} := 70 \cdot ksi$	(User Input)
Weld Size (in sixteenths of an inch) =	$D_{weld} := 4 \cdot in$	(User Input)
Weld Length =	$l_{weld} := 10 \cdot in$	(User Input)

Calculated Data:

Hole Clear Distance =	$l_c := Hole_{edg} - \frac{1}{2} \cdot Hole_d = 0.75 \cdot in$
Plate Gross Area =	$A_g := W_{bp} \cdot t_{bp} = 3.2 \cdot in^2$
Plate Net Area =	$A_n := \left(W_{bp} - Hole_d \cdot Hole_N\right) \cdot t_{bp} = 2.6 \cdot in^2$
Plate Gross Area Subject to Shear =	$A_{gv} := \left(W_{bp} - Hole_{edg}\right) \cdot t_{bp} = 2.8 \cdot in^2$
Plate Net Area Subject to Shear =	$A_{nv} := \left[W_{bp} - Hole_{edg} - Hole_d \cdot \left(Hole_N - 0.5\right)\right] \cdot t_{bp} = 2.3 \cdot in^2$
Plate Net Area Subject to Tension =	$A_{nt} := \left(Hole_{edg} - Hole_d \cdot \frac{1}{2}\right) \cdot t_{bp} = 0.3 \cdot in^2$

Design Checks:

Check Tensile Yielding:

Safety Factor = $\Omega := 1.67$

Nominal Strength = $R_n := F_y \cdot A_g = 115.2 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 69 \cdot kips$

$\frac{Tension}{R_a} = 10.1 \cdot \%$

Tensile Yielding = $Tensile\_Yielding := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Yielding = "OK"

Check Tensile Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := F_u \cdot A_n = 150.8 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 75.4 \cdot kips$

$\frac{Tension}{R_a} = 9.3 \cdot \%$

Tensile Rupture = $Tensile\_Rupture := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Rupture = "OK"

Check Shear Yielding:

Safety Factor = $\Omega := 1.5$

Nominal Strength = $R_n := 0.6 \cdot F_y \cdot A_g = 69.1 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 46.1 \cdot kips$

$\frac{Shear}{R_a} = 17.4 \cdot \%$

Shear Yielding = $Shear\_Yielding := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Yielding = "OK"

Check Shear Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 0.6 \cdot F_u \cdot A_n = 90.5 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 45.2 \cdot kips$

$\frac{Shear}{R_a} = 17.7 \cdot \%$

Shear Rupture = $Shear\_Rupture := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Rupture = "OK"

Check Block Shear:

Safety Factor = $\Omega := 2$

Stress Distribution Reduction Factor = $U_{bs} := 1.0$

Nominal Strength =

$$R_n := \begin{cases} \left(0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{if } 0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt} \le 0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt} \\ \left(0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{otherwise} \end{cases} = 77.9 \cdot kips$$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 38.9 \cdot kips$

$\frac{Resultant}{R_a} = 25.7 \cdot \%$

Block Shear = $Block\_Shear := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Block_Shear = "OK"

Check Bearing Strength:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 1.2 \cdot l_c \cdot t_{bp} \cdot F_u = 20.9 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 10.4 \cdot kips$

$\frac{Max}{R_a} = 42.1 \cdot \%$

Bearing Strength = $Bearing\_Strength := if\left(\frac{Max}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Bearing_Strength = "OK"

Check Weld:

Safety Factor = $\Omega := 2$

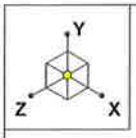
Nominal Strength = $R_n := 0.6 \cdot F_{EXX} \cdot \left(\frac{\sqrt{2}}{2}\right) \cdot \left(\frac{D_{weld}}{16}\right) \cdot l_{weld} = 74.2 \cdot kips$

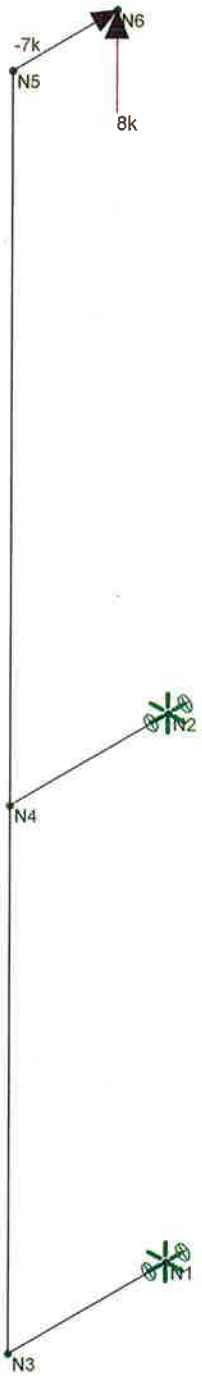
Allowable Strength = $R_a := \frac{R_n}{\Omega} = 37.1 \cdot kips$

$\frac{Resultant}{R_a} = 26.9 \cdot \%$

Weld Strength = $Weld\_Strength := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

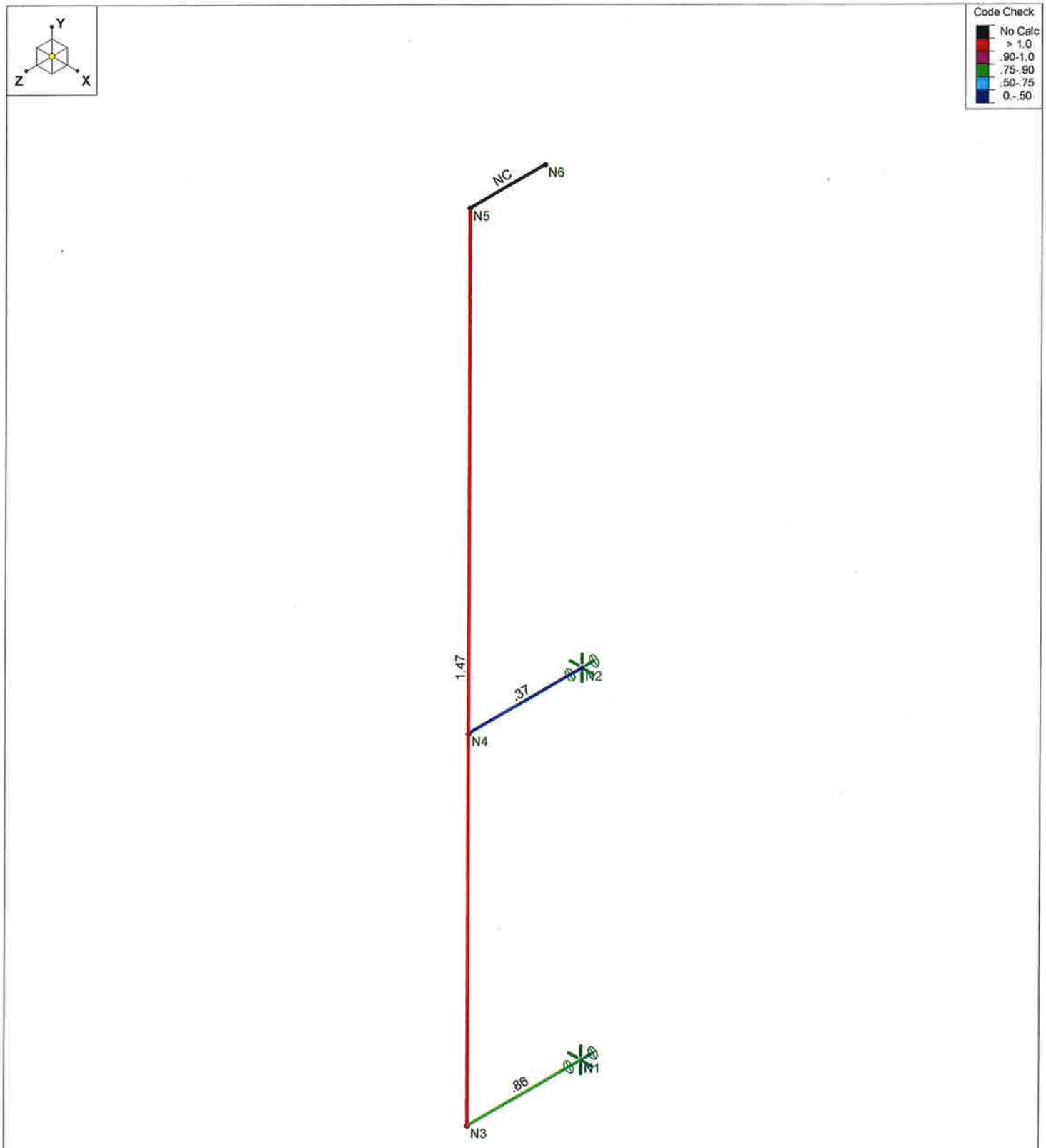
Weld_Strength = "OK"





Loads: BLC 2, Tower Reactions

Centek Engineering		
TJL	Niantic SC1	Apr 29, 2015 at 10:17 AM
14298.000	Tower Reactions Applied to Anchor Frame	Attachment to Building - Existing.r3d



Centek Engineering		
TJL	Niantic SC1	Apr 29, 2015 at 10:20 AM
14298.000	Unity Check	Attachment to Building - Existing.r3d

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	0	4.221	16.921	0	0	NC
2	1	N1	0	-12.169	-9.921	0	0	NC
3	1	Totals:	0	-7.948	7			
4	1	COG (ft):	X: 0	Y: 3.513	Z: .168			

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Subject:	Connection to Building
Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 1: 4/29/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Connection to Building:

Input Data:

Reactions @ Bottom:

Tension Force = $Tension := 9.9 \cdot kips$ (Input From Risa3D)

Shear Force = $Shear := 12.2 \cdot kips$ (Input From Risa3D)

Bolt Data:

Use ASTM A307

Bolt Diamter = $d_b := 0.625 \cdot in$

Number of Bolts = $n_b := 4$

Allowable Shear = $V_{all} := 4.14 \cdot kips$

Allowable Tension = $T_{all} := 6.9 \cdot kips$

Design Checks:

Check Combined Tension and Shear:

Tension per Bolt = $T_b := \frac{Tension}{n_b} = 2.475 \cdot kips$

Shear per Bolt = $V_b := \frac{Shear}{n_b} = 3.05 \cdot kips$

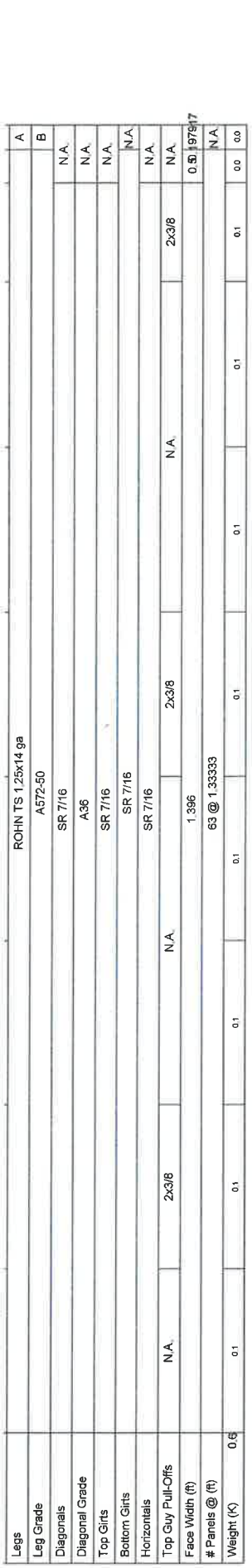
$$\frac{T_b}{T_{all}} + \frac{V_b}{V_{all}} = 109.5 \cdot \%$$

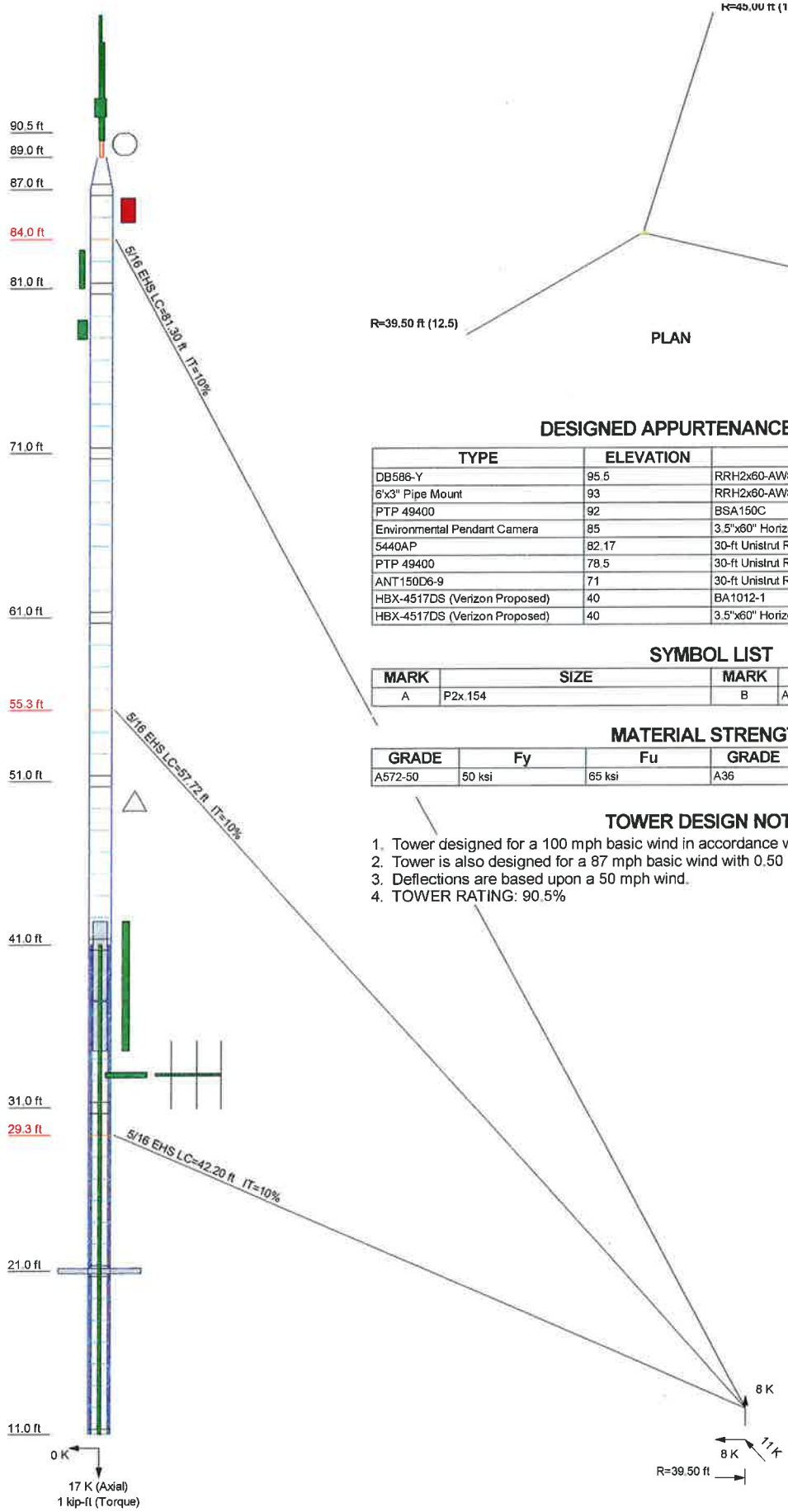
Bolt Check = $Bolt\_Check := if\left(\frac{T_b}{T_{all}} + \frac{V_b}{V_{all}} \le 1.00, "OK", "Overstressed"\right)$

$Bolt\_Check = "Overstressed"$

SECTION 4

REINFORCED TOWER & ATTACHMENT ANLAYSIS





PLAN

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB586-Y	95.5	RRH2x60-AWS (Verizon Proposed)	36
6'x3" Pipe Mount	93	RRH2x60-AWS (Verizon Proposed)	36
PTP 49400	92	BSA150C	33
Environmental Pendant Camera	85	3.5"x60" Horizontal Pipe	33
5440AP	82.17	30-ft Unistrut Reinforcement	26
PTP 49400	78.5	30-ft Unistrut Reinforcement	26
ANT150D6-9	71	30-ft Unistrut Reinforcement	26
HBX-4517DS (Verizon Proposed)	40	BA1012-1	23
HBX-4517DS (Verizon Proposed)	40	3.5"x60" Horizontal Pipe	21

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154	B	A53-B-35

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 100 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 87 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 90.5%

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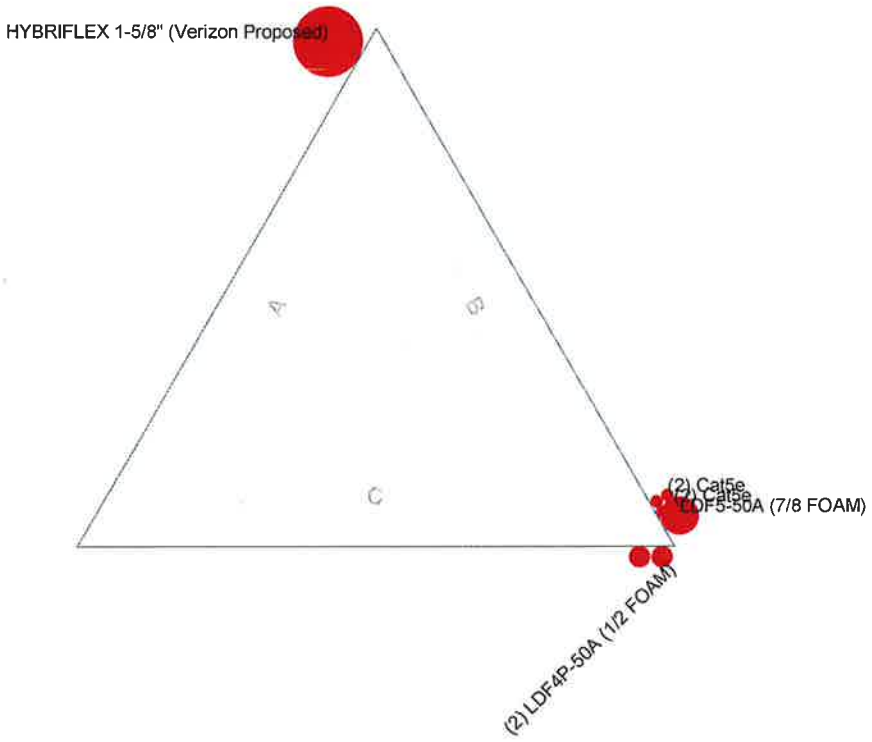
Job: 14298.000 - Niantic SC1			
Project: 80-ft ROHN 45G Tower - 8 Grand St., Niantic,			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 04/29/15	Scale: N	
Path:		Dwg No.	

Round Flat App In Face App Out Face



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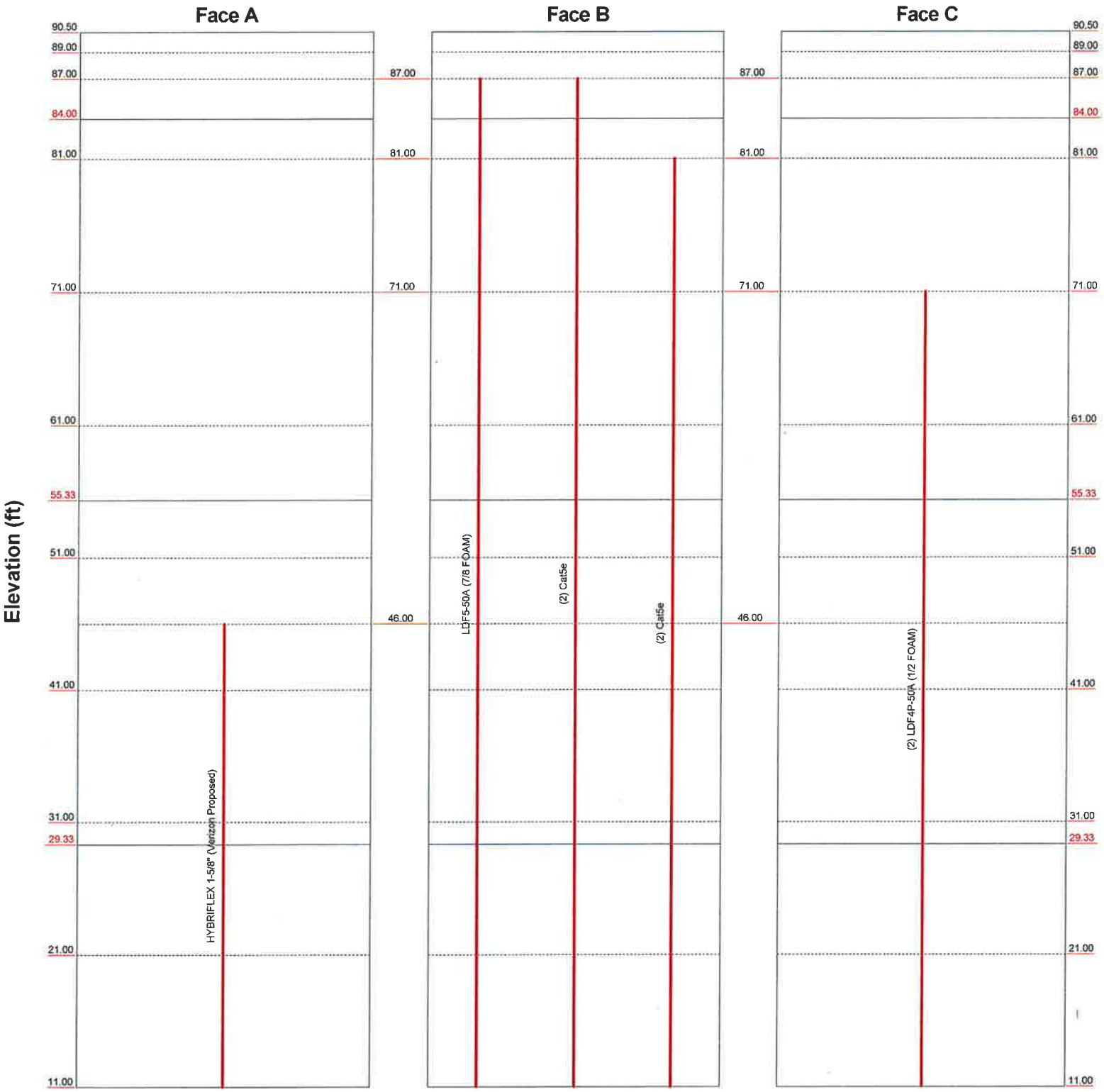
Job:	***14298.000 - Niantic SC1***		
Project:	***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 04/29/15	Scale: N
Path:			Dwg No.

11' - 90'6"

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



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Project: 80-ft ROHN 45G Tower - 8 Grand St., Niantic,			
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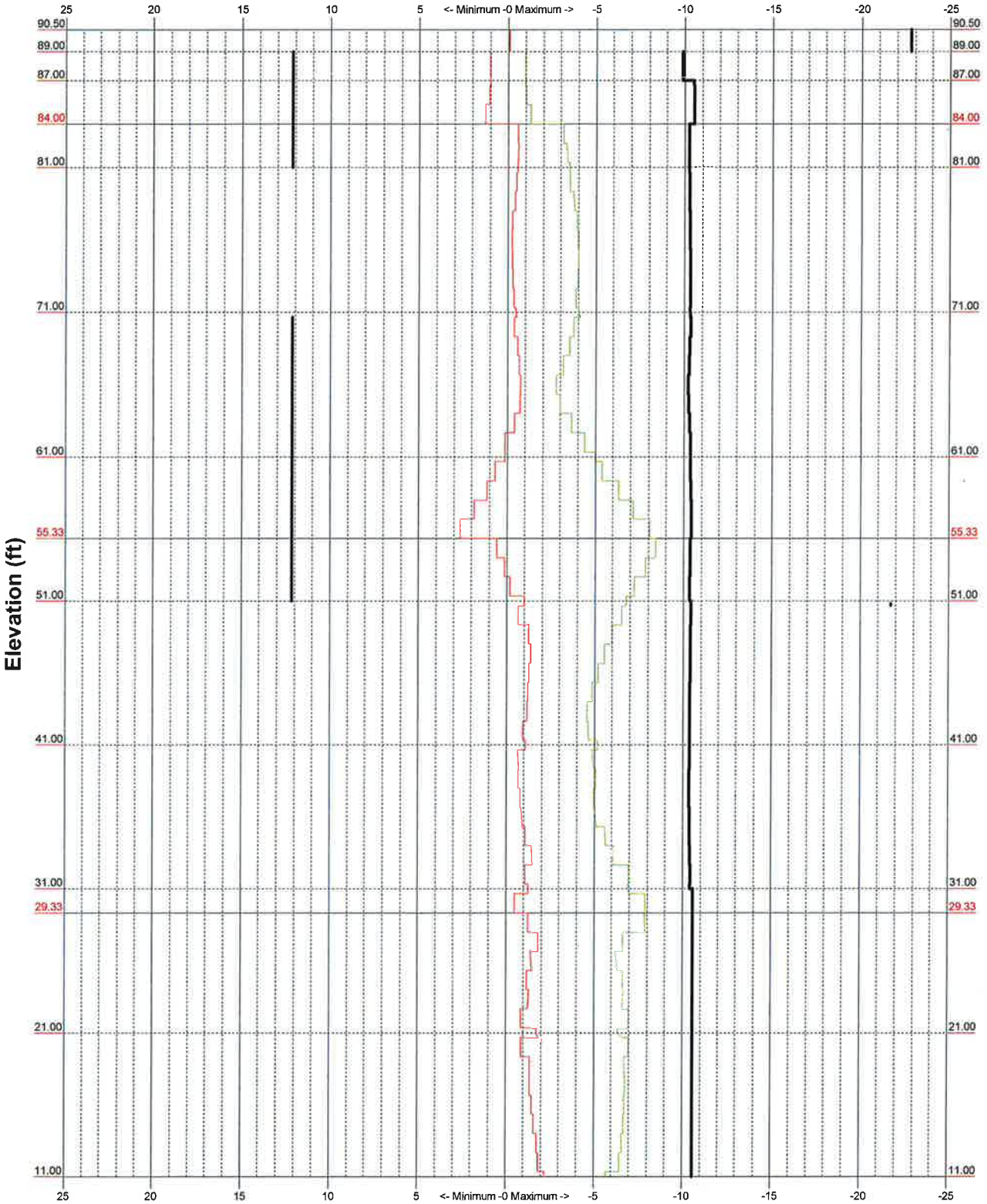
Code: TIA/EIA-222-F	Date: 04/29/15	Scale: N	
Path:		Dwg No.	

TIA/EIA-222-F - 100 mph/87 mph 0.5000 in Ice

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



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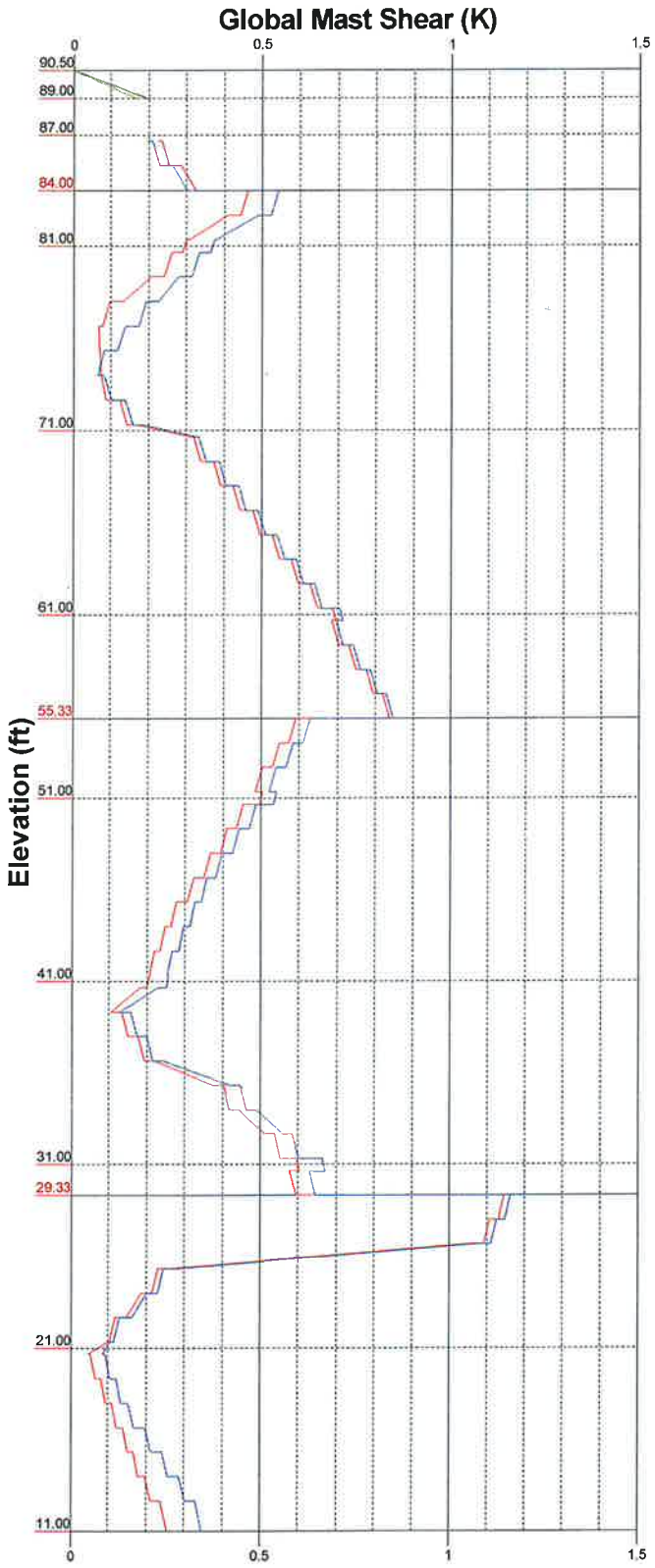
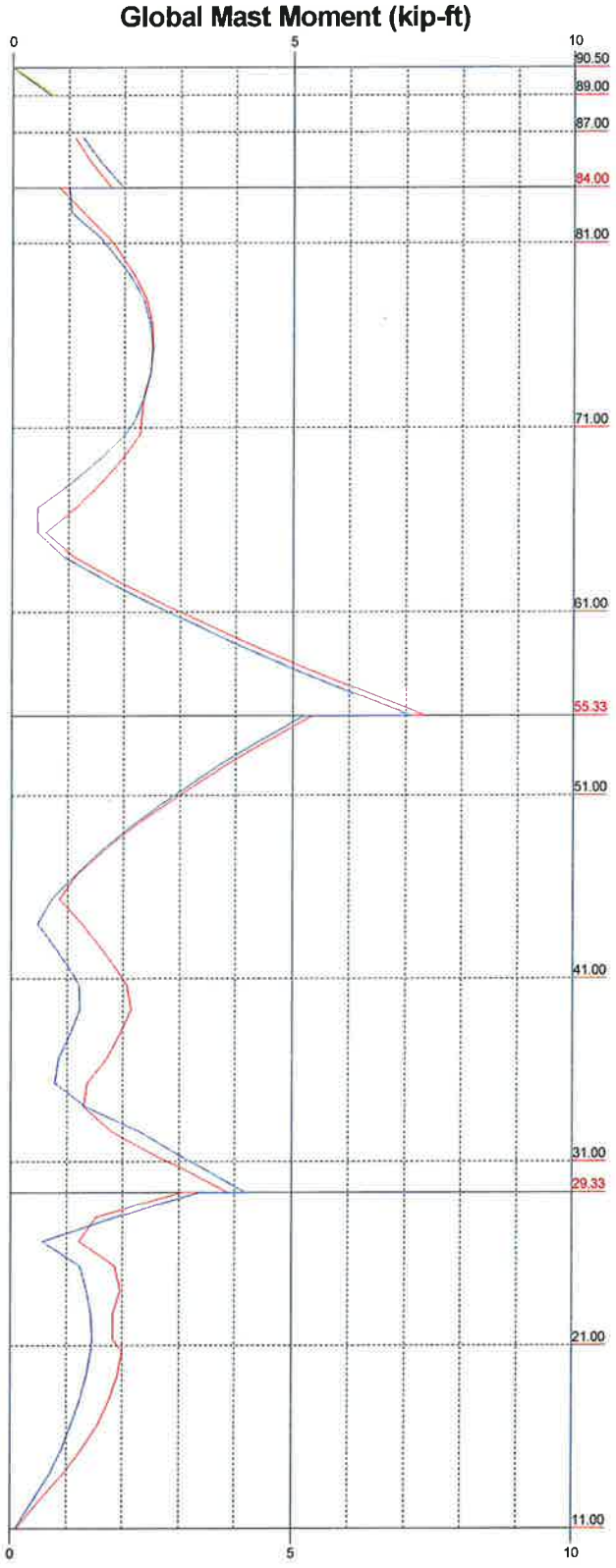
Project: ***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 04/29/15	Scale: N
Path:		Dwg No.

Vx Vz



Mx Mz



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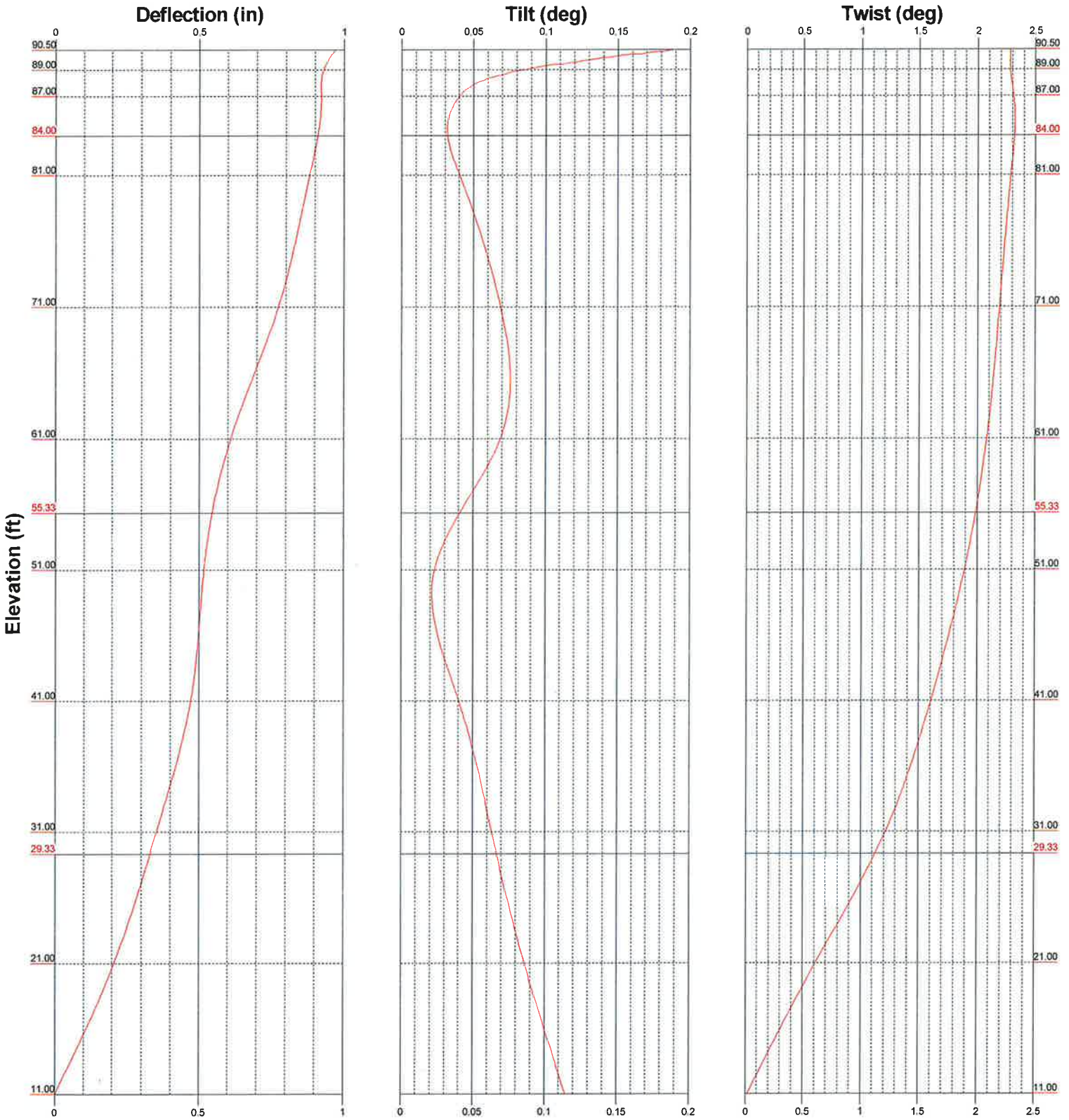
Job:	***14298.000 - Niantic SC1***		
Project:	***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 04/29/15	Scale: N
Path:			Dwg No.

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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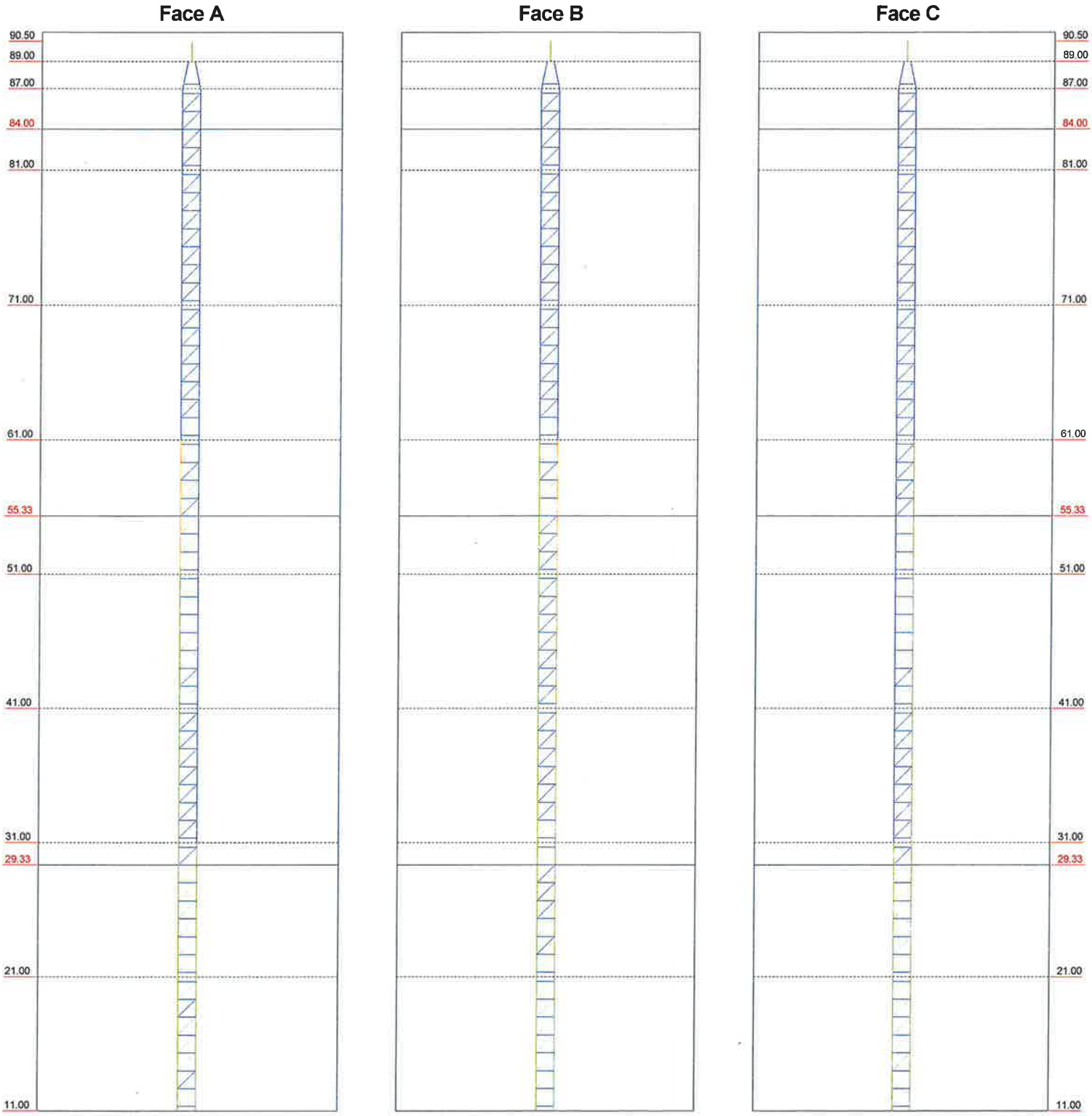
Job:	***14298.000 - Niantic SC1***		
Project:	***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 04/29/15	Scale: N
Path:			Dwg No.

11' - 90'6"

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



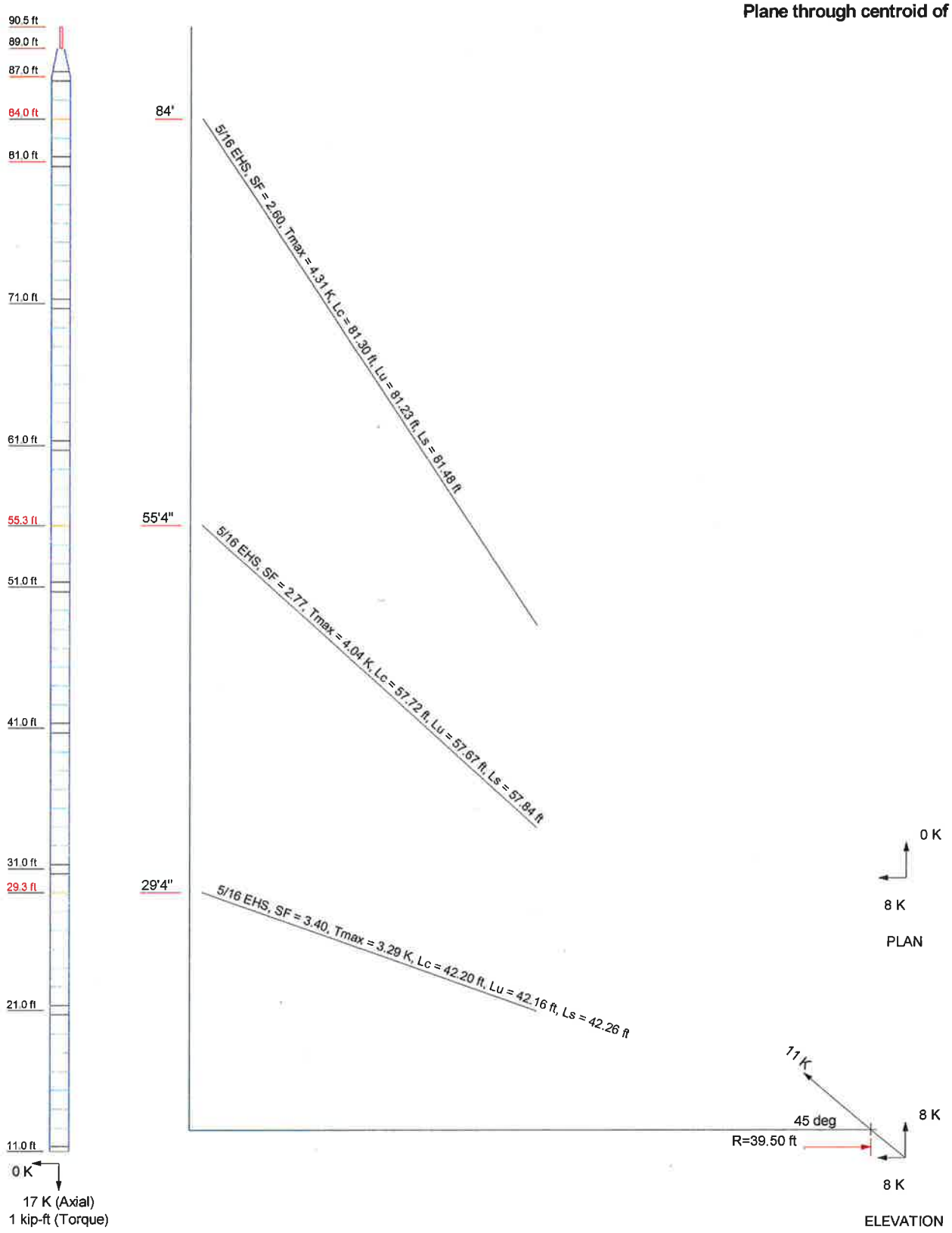
Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***14298.000 - Niantic SC1***		
Project:	***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 04/29/15	Scale: N
Path:			Dwg No.

Guy Tensions and Tower Reactions

TIA/EIA-222-F - 100 mph/87 mph 0.5000 in Ice

Maximum Values
Anchor 'C'@39.5 ft Azimuth 241 deg Elev 12.5 ft
Plane through centroid of tower



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Job:	***14298.000 - Niantic SC1***		
Project:	***80-ft ROHN 45G Tower - 8 Grand St., Niantic,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 04/29/15	Scale: N
Path:			Dwg No.

tnxTower	Job	Page
	14298.000 - Niantic SC1	1 of 43
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 80-ft ROHN 45G Tower - 8 Grand St., Niantic, CT	Date 10:04:37 04/29/15
	Client Verizon Wireless	Designed by TJL

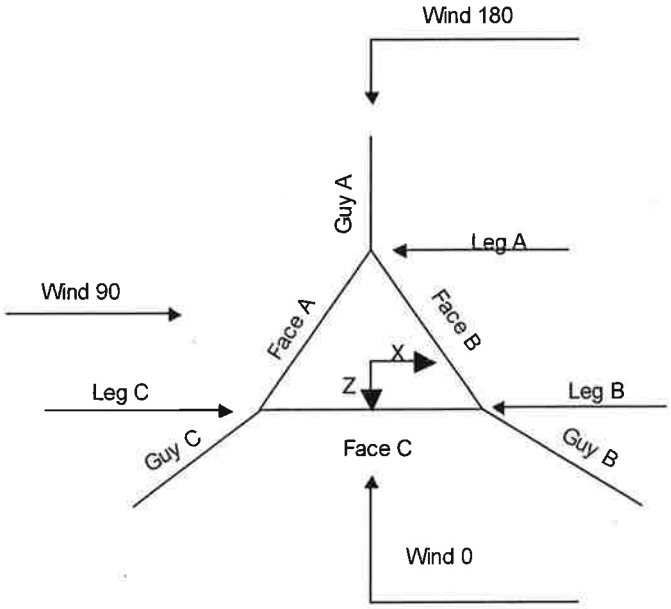
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 90.50 ft above the ground line.
The base of the tower is set at an elevation of 11.00 ft above the ground line.
The face width of the tower is 0.50 ft at the top and 1.40 ft at the base.
An index plate is provided at the 3x guyed -tower connection.
There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 100 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 87 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.0664.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Corner & Starmount Guyed Tower

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	90.50-89.00	1.50	P2x.154	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 90.50-89.00				1	1	1		

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	89.00-87.00			0.50	1	2.00

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T2	87.00-81.00			1.40	1	6.00
T3	81.00-71.00			1.40	1	10.00
T4	71.00-61.00			1.40	1	10.00
T5	61.00-51.00			1.40	1	10.00
T6	51.00-41.00			1.40	1	10.00
T7	41.00-31.00			1.40	1	10.00
T8	31.00-21.00			1.40	1	10.00
T9	21.00-11.00			1.40	1	10.00

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	89.00-87.00	1.33	X Brace	No	Yes	4.0000	4.0000
T2	87.00-81.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T3	81.00-71.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T4	71.00-61.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T5	61.00-51.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T6	51.00-41.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T7	41.00-31.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T8	31.00-21.00	1.33	Z Brace	No	Yes	4.0000	4.0000
T9	21.00-11.00	1.33	Z Brace	No	Yes	4.0000	4.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 89.00-87.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T2 87.00-81.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	Pipe	ROHN TS 1.25x14 ga	A572-50 (50 ksi)	Solid Round	7/16	A36 (36 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 89.00-87.00	Solid Round		A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T2 87.00-81.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	Solid Round	7/16	A36 (36 ksi)	Solid Round	7/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 87.00-81.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T3 81.00-71.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T4 71.00-61.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T5 61.00-51.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T6 51.00-41.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T7 41.00-31.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T8 31.00-21.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	A36 (36 ksi)
T9 21.00-11.00	None	Solid Round		A572-50 (50 ksi)	Solid Round	7/16	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
T1 89.00-87.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 87.00-81.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 81.00-71.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 71.00-61.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 61.00-51.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 51.00-41.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 41.00-31.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 31.00-21.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 21.00-11.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
89.00-87.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
87.00-81.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
81.00-71.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
71.00-61.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
61.00-51.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
51.00-41.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	0.5	0.5	0.5	1	1
41.00-31.00				1	1	0.5	0.5	0.5	1	1
T8	Yes	Yes	1	1	1	0.5	0.5	0.5	1	1
31.00-21.00				1	1	0.5	0.5	0.5	1	1
T9	Yes	Yes	1	1	1	0.5	0.5	0.5	1	1
21.00-11.00				1	1	0.5	0.5	0.5	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 89.00-87.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T2 87.00-81.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 81.00-71.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 71.00-61.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 61.00-51.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 51.00-41.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 41.00-31.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 31.00-21.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 21.00-11.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

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 %
84	EHS	A	5/16	1.12	10%	21000	0.205	80.00	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	80.28	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	81.23	39.50	1.0000	12.50	100%
55.3333	EHS	A	5/16	1.12	10%	21000	0.205	58.32	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	58.70	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	57.67	39.50	1.0000	12.50	100%
29.3333	EHS	A	5/16	1.12	10%	21000	0.205	45.81	45.00	18.0000	17.25	100%
		B	5/16	1.12	10%	21000	0.205	46.29	45.50	-18.0000	17.25	100%
		C	5/16	1.12	10%	21000	0.205	42.16	39.50	1.0000	12.50	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
84	Corner						
55.3333	Corner						
29.3333	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
84.00	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
55.33	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8
29.33	A572-50 (50 ksi)	Solid Round			Yes	A36 (36 ksi)	Flat Bar	2x3/8

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
84	0.02	0.02	0.02		0.58 1.3 sec/pulse	0.59 1.3 sec/pulse	0.60 1.3 sec/pulse	
55.3333	0.01	0.01	0.01		0.31 1.0 sec/pulse	0.31 1.0 sec/pulse	0.30 1.0 sec/pulse	
29.3333	0.01	0.01	0.01		0.19 0.8 sec/pulse	0.20 0.8 sec/pulse	0.16 0.7 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
84	No	No			1	1	1	1
55.3333	No	No			1	1	1	1
29.3333	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
84	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
55.3333	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
29.3333	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	1	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
84	A	50.63	29	22	0.5000
	B	50.63	29	22	0.5000
	C	48.25	29	21	0.5000
55.3333	A	36.29	26	20	0.5000
	B	36.29	26	20	0.5000
	C	33.92	26	19	0.5000
29.3333	A	23.29	26	19	0.5000
	B	23.29	26	19	0.5000
	C	20.92	26	19	0.5000

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
84	A	56.4690	1.13 1.12	0.19	0.95	-0.59	-0.76	-0.16	0.00
	B	56.1718	1.13 1.12	0.61	0.94	0.13	0.38	0.16	-0.66
	C	61.5788	1.13 1.12	-0.47	1.00	0.26	0.40	-0.01	0.70
			Sum:	**0.34**	2.89	**-0.20**	**0.02**	**-0.01**	**0.04**
55.3333	A	40.7276	1.13 1.12	0.26	0.74	-0.81	-0.60	-0.21	0.00
	B	40.4095	1.13 1.12	0.84	0.73	0.18	0.30	0.21	-0.51
	C	47.9064	1.13 1.12	-0.66	0.84	0.37	0.34	-0.01	0.59
			Sum:	**0.44**	2.31	**-0.27**	**0.04**	**-0.01**	**0.07**
29.3333	A	15.2790	1.12 1.12	0.33	0.30	-1.03	-0.24	-0.27	0.00
	B	15.1161	1.12 1.12	1.06	0.30	0.23	0.12	0.27	-0.21
	C	23.5108	1.12 1.12	-0.90	0.45	0.50	0.18	-0.01	0.32
			Sum:	**0.49**	1.05	**-0.30**	**0.06**	**-0.01**	**0.11**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
84	A	56.4690	1.57 1.53	0.26	1.32	-0.81	-1.06	-0.21	0.00
	B	56.1718	1.57 1.53	0.84	1.32	0.18	0.53	0.22	-0.92
	C	61.5788	1.57 1.52	-0.64	1.39	0.36	0.56	-0.01	0.97
			Sum:	**0.47**	4.03	**-0.28**	**0.03**	**-0.01**	**0.05**

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
55.3333	A	40.7276	1.56 1.53	0.36	1.03	-1.12	-0.83	-0.29	0.00
	B	40.4095	1.56 1.54	1.15	1.02	0.25	0.41	0.29	-0.71
	C	47.9064	1.56 1.53	-0.91	1.17	0.50	0.47	-0.01	0.81
			Sum:	**0.61**	3.22	**-0.37**	**0.05**	**-0.01**	**0.10**
29.3333	A	15.2790	1.55 1.54	0.46	0.42	-1.42	-0.34	-0.37	0.00
	B	15.1161	1.55 1.54	1.46	0.42	0.31	0.17	0.37	-0.29
	C	23.5108	1.55 1.54	-1.24	0.63	0.69	0.25	-0.02	0.44
			Sum:	**0.68**	1.47	**-0.42**	**0.08**	**-0.02**	**0.15**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom K	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		K	K	K	kip-ft	kip-ft	kip-ft
84	A	56.4690	1.13 1.12	0.19	0.95	-0.59	-0.76	-0.16	0.00
	B	56.1718	1.13 1.12	0.61	0.94	0.13	0.38	0.16	-0.66
	C	61.5788	1.13 1.12	-0.47	1.00	0.26	0.40	-0.01	0.70
			Sum:	**0.34**	2.89	**-0.20**	**0.02**	**-0.01**	**0.04**
55.3333	A	40.7276	1.13 1.12	0.26	0.74	-0.81	-0.60	-0.21	0.00
	B	40.4095	1.13 1.12	0.84	0.73	0.18	0.30	0.21	-0.51
	C	47.9064	1.13 1.12	-0.66	0.84	0.37	0.34	-0.01	0.59
			Sum:	**0.44**	2.31	**-0.27**	**0.04**	**-0.01**	**0.07**
29.3333	A	15.2790	1.12 1.12	0.33	0.30	-1.03	-0.24	-0.27	0.00
	B	15.1161	1.12 1.12	1.06	0.30	0.23	0.12	0.27	-0.21
	C	23.5108	1.12 1.12	-0.90	0.45	0.50	0.18	-0.01	0.32
			Sum:	**0.49**	1.05	**-0.30**	**0.06**	**-0.01**	**0.11**

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
84	A	44.23	66.75	1.268	0.51	1.219	0.54	1.169	0.56	1.120	0.58	1.071	0.61	1.021	0.64	0.972	0.67
	B	44.73	66.75	1.270	0.52	1.220	0.54	1.170	0.56	1.120	0.59	1.070	0.61	1.020	0.64	0.970	0.68
	C	38.69	71.50	1.230	0.55	1.193	0.56	1.157	0.58	1.120	0.60	1.083	0.62	1.047	0.64	1.010	0.67
55.3333	A	44.23	38.08	1.399	0.25	1.306	0.27	1.213	0.29	1.120	0.31	1.027	0.34	0.935	0.37	0.843	0.41
	B	44.73	38.08	1.402	0.25	1.308	0.27	1.214	0.29	1.120	0.31	1.026	0.34	0.933	0.38	0.840	0.42
	C	38.69	42.83	1.339	0.25	1.266	0.27	1.193	0.28	1.120	0.30	1.047	0.32	0.975	0.35	0.902	0.38
29.3333	A	44.23	12.08	1.572	0.14	1.421	0.15	1.271	0.17	1.120	0.19	0.970	0.22	0.820	0.26	0.672	0.32
	B	44.73	12.08	1.573	0.14	1.422	0.15	1.271	0.17	1.120	0.20	0.970	0.23	0.820	0.27	0.672	0.33
	C	38.69	16.83	1.529	0.12	1.393	0.13	1.256	0.14	1.120	0.16	0.984	0.18	0.849	0.21	0.714	0.25

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
LDF5-50A (7/8 FOAM)	B	Yes	Ar (CfAe)	87.00 - 11.00	0.0000	0.46	1	1	1.0900	1.0900		0.33
Cat5e	B	Yes	Ar (CfAe)	87.00 - 11.00	0.0000	0.44	2	1	0.0000	0.3600		0.06
Cat5e	B	Yes	Ar (CfAe)	81.00 - 11.00	0.0000	0.42	2	1	0.0000	0.3600		0.06
LDF4P-50A (1/2 FOAM)	C	Yes	Ar (CfAe)	71.00 - 11.00	0.0000	-0.46	2	2	0.0000	0.6300		0.15
HYBRIFLEX 1-5/8" (Verizon Proposed)	A	Yes	Ar (CfAe)	46.00 - 11.00	0.0000	0.44	1	1	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.50-89.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T1	89.00-87.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	87.00-81.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.725	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	81.00-71.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.00
T4	71.00-61.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T5	61.00-51.00	A	0.000	0.000	0.000	0.000	0.00
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T6	51.00-41.00	A	0.825	0.000	0.000	0.000	0.01
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T7	41.00-31.00	A	1.650	0.000	0.000	0.000	0.02
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	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
T8	31.00-21.00	A	1.650	0.000	0.000	0.000	0.02
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00
T9	21.00-11.00	A	1.650	0.000	0.000	0.000	0.02
		B	1.508	0.000	0.000	0.000	0.01
		C	1.050	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.50-89.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T1	89.00-87.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	87.00-81.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		1.725	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
T3	81.00-71.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.00
T4	71.00-61.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T5	61.00-51.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T6	51.00-41.00	A	0.500	1.242	0.000	0.000	0.000	0.02
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T7	41.00-31.00	A	0.500	2.483	0.000	0.000	0.000	0.03
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T8	31.00-21.00	A	0.500	2.483	0.000	0.000	0.000	0.03
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01
T9	21.00-11.00	A	0.500	2.483	0.000	0.000	0.000	0.03
		B		4.008	0.000	0.000	0.000	0.04
		C		1.358	0.525	0.000	0.000	0.01

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
L1	90.50-89.00		0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000
T1	89.00-87.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T2	87.00-81.00	A	0.000	0.000	0.000	0.000
		B	0.046	0.387	0.020	0.048
		C	0.000	0.000	0.000	0.000
T3	81.00-71.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	71.00-61.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T5	61.00-51.00	A	0.000	0.000	0.000	0.000
		B	0.097	0.882	0.025	0.067
		C	0.068	0.415	0.018	0.031
T6	51.00-41.00	A	0.053	0.263	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T7	41.00-31.00	A	0.106	0.526	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000
T8	31.00-21.00	A	0.106	0.547	0.028	0.041
		B	0.097	0.882	0.025	0.067
		C	0.068	0.415	0.018	0.031
T9	21.00-11.00	A	0.106	0.526	0.000	0.000
		B	0.097	0.849	0.000	0.000
		C	0.068	0.399	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	90.50-89.00	0.0000	0.0000	0.0000	0.0000
T1	89.00-87.00	0.0000	0.0000	0.0000	0.0000
T2	87.00-81.00	0.8486	0.3959	0.7784	0.3626
T3	81.00-71.00	1.1597	0.5343	1.1567	0.5293
T4	71.00-61.00	1.7369	0.9413	1.1258	0.5237
T5	61.00-51.00	1.6183	0.8771	1.0408	0.4814
T6	51.00-41.00	1.5362	0.2781	1.0288	0.1405
T7	41.00-31.00	1.3600	-0.3045	0.9390	-0.2139
T8	31.00-21.00	1.2778	-0.2861	0.8711	-0.2096
T9	21.00-11.00	1.3600	-0.3045	0.9390	-0.2139

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
6'x3" Pipe Mount	C	None		0.0000	93.00	No Ice	1.77	1.77	0.03
						1/2" Ice	2.13	2.13	0.05

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
DB586-Y	C	From Leg	0.00 0.00 0.00	0.0000	95.50	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	0.01 0.02
PTP 49400	C	From Leg	0.00 0.00 0.00	0.0000	92.00	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.02 0.03
5440AP	C	From Leg	0.50 0.00 0.00	0.0000	82.17	No Ice 1/2" Ice	2.31 2.55	3.07 3.34	0.02 0.04
PTP 49400	C	From Leg	0.50 0.00 0.00	0.0000	78.50	No Ice 1/2" Ice	2.04 2.24	0.53 0.65	0.02 0.03
Environmental Pendant Camera	B	From Leg	1.00 0.00 0.00	0.0000	85.00	No Ice 1/2" Ice	0.50 0.61	0.50 0.61	0.01 0.02
ANT150D6-9	A	From Leg	2.00 0.00 0.00	0.0000	71.00	No Ice 1/2" Ice	4.00 4.60	4.00 4.60	0.03 0.03
BSA150C	B	From Leg	3.00 0.00 0.00	0.0000	33.00	No Ice 1/2" Ice	0.45 0.55	0.45 0.55	0.01 0.01
3.5"x60" Horizontal Pipe	B	From Leg	1.00 0.00 0.00	0.0000	33.00	No Ice 1/2" Ice	1.33 1.69	1.33 1.69	0.08 0.18
BA1012-1	A	From Leg	3.00 0.00 0.00	0.0000	23.00	No Ice 1/2" Ice	0.53 0.98	0.53 0.98	0.05 0.05
3.5"x60" Horizontal Pipe	A	From Leg	1.00 0.00 0.00	0.0000	21.00	No Ice 1/2" Ice	1.33 1.69	1.33 1.69	0.08 0.18
HBX-4517DS (Verizon Proposed)	A	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice	5.93 6.37	3.19 3.55	0.03 0.06
HBX-4517DS (Verizon Proposed)	B	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice	5.93 6.37	3.19 3.55	0.03 0.06
RRH2x60-AWS (Verizon Proposed)	A	From Leg	1.00 0.00 0.00	0.0000	36.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
RRH2x60-AWS (Verizon Proposed)	B	From Leg	1.00 0.00 0.00	0.0000	36.00	No Ice 1/2" Ice	3.78 4.09	2.07 2.35	0.06 0.08
30-ft Unistrut Reinforcement	A	From Face	0.25 0.00 0.00	0.0000	26.00	No Ice 1/2" Ice	8.13 11.48	8.13 11.48	0.06 0.11
30-ft Unistrut Reinforcement	B	From Face	0.25 0.00 0.00	0.0000	26.00	No Ice 1/2" Ice	8.13 11.48	8.13 11.48	0.06 0.11
30-ft Unistrut Reinforcement	C	From Face	0.25 0.00 0.00	0.0000	26.00	No Ice 1/2" Ice	8.13 11.48	8.13 11.48	0.06 0.11

Tower Pressures - No Ice

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	34	0.297	A	0.000	0.297	0.297	100.00	0.000	0.000
					B	0.000	0.297		100.00	0.000	0.000
					C	0.000	0.297		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	34	2.109	A	0.000	0.472	0.430	91.18	0.000	0.000
					B	0.000	0.472		91.18	0.000	0.000
					C	0.000	0.472		91.18	0.000	0.000
T2 87.00-81.00	84.00	1.306	33	9.001	A	0.215	1.746	1.250	63.73	0.000	0.000
					B	0.195	2.425		47.71	0.000	0.000
					C	0.215	1.746		63.73	0.000	0.000
T3 81.00-71.00	76.00	1.269	32	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	2.916		71.44	0.000	0.000
T4 71.00-61.00	66.00	1.219	31	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T5 61.00-51.00	56.00	1.163	30	15.002	A	0.215	2.916	2.083	66.53	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T6 51.00-41.00	46.00	1.1	28	15.002	A	0.000	3.688	2.083	56.49	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T7 41.00-31.00	36.00	1.025	26	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T8 31.00-21.00	26.00	1	26	15.002	A	0.188	4.460	2.083	44.83	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T9 21.00-11.00	16.00	1	26	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000

Tower Pressure - With Ice

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	26	0.5000	0.422	A	0.000	0.422	0.422	100.00	0.000	0.000
						B	0.000	0.422		100.00	0.000	0.000
						C	0.000	0.422		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	25	0.5000	2.280	A	0.000	0.912	0.775	84.99	0.000	0.000
						B	0.000	0.912		84.99	0.000	0.000
						C	0.000	0.912		84.99	0.000	0.000
T2 87.00-81.00	84.00	1.306	25	0.5000	9.501	A	0.215	3.987	2.250	53.54	0.000	0.000
						B	0.167	5.326		40.96	0.000	0.000
						C	0.215	3.987		53.54	0.000	0.000
T3 81.00-71.00	76.00	1.269	24	0.5000	15.835	A	0.000	6.486	3.750	57.82	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.000	6.486		57.82	0.000	0.000

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
T4 71.00-61.00	66.00	1.219	23	0.5000	15.835	A	0.000	6.486	3.750	57.82	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T5 61.00-51.00	56.00	1.163	22	0.5000	15.835	A	0.215	6.594	3.750	55.07	0.000	0.000
						B	0.148	9.720		38.00	0.000	0.000
						C	0.709	7.537		45.47	0.000	0.000
T6 51.00-41.00	46.00	1.1	21	0.5000	15.835	A	0.000	7.465	3.750	50.24	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T7 41.00-31.00	36.00	1.025	20	0.5000	15.835	A	0.000	8.443	3.750	44.41	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000
T8 31.00-21.00	26.00	1	19	0.5000	15.835	A	0.174	8.530	3.750	43.08	0.000	0.000
						B	0.148	9.720		38.00	0.000	0.000
						C	0.709	7.537		45.47	0.000	0.000
T9 21.00-11.00	16.00	1	19	0.5000	15.835	A	0.000	8.443	3.750	44.41	0.000	0.000
						B	0.000	9.645		38.88	0.000	0.000
						C	0.525	7.445		47.05	0.000	0.000

Tower Pressure - Service

G_H = 1.181 (base tower), 1.181 (upper structure)

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
L1 90.50-89.00	89.75	1.331	9	0.297	A	0.000	0.297	0.297	100.00	0.000	0.000
					B	0.000	0.297		100.00	0.000	0.000
					C	0.000	0.297		100.00	0.000	0.000
T1 89.00-87.00	88.00	1.323	8	2.109	A	0.000	0.472	0.430	91.18	0.000	0.000
					B	0.000	0.472		91.18	0.000	0.000
					C	0.000	0.472		91.18	0.000	0.000
T2 87.00-81.00	84.00	1.306	8	9.001	A	0.215	1.746	1.250	63.73	0.000	0.000
					B	0.195	2.425		47.71	0.000	0.000
					C	0.215	1.746		63.73	0.000	0.000
T3 81.00-71.00	76.00	1.269	8	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	2.916		71.44	0.000	0.000
T4 71.00-61.00	66.00	1.219	8	15.002	A	0.000	2.916	2.083	71.44	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T5 61.00-51.00	56.00	1.163	7	15.002	A	0.215	2.916	2.083	66.53	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T6 51.00-41.00	46.00	1.1	7	15.002	A	0.000	3.688	2.083	56.49	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T7 41.00-31.00	36.00	1.025	7	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000
T8 31.00-21.00	26.00	1	6	15.002	A	0.188	4.460	2.083	44.83	0.000	0.000
					B	0.190	4.327		46.12	0.000	0.000
					C	0.198	3.898		50.86	0.000	0.000
T9 21.00-11.00	16.00	1	6	15.002	A	0.000	4.460	2.083	46.72	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	0.000	4.327		48.15	0.000	0.000
					C	0.000	3.898		53.44	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	1	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	1	1	0.281			
			C	0.224	2.519	0.596	1	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	1	1	1.253	0.15	25.67	B
87.00-81.00			B	0.291	2.32	0.613	1	1	1.682			
			C	0.218	2.537	0.594	1	1	1.253			
T3	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.194	2.615	0.589	1	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	1	1	1.942	0.23	23.03	B
61.00-51.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T6	0.02	0.07	A	0.246	2.45	0.601	1	1	2.216	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.20	19.58	A
41.00-31.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	1	1	2.948	0.20	20.23	A
31.00-21.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T9	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
Sum Weight:	0.13	0.57								1.68		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.8	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	0.8	1	0.281			
			C	0.224	2.519	0.596	0.8	1	0.281			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T2	0.00	0.05	A	0.218	2.537	0.594	0.8	1	1.210	0.15	25.08	B
87.00-81.00			B	0.291	2.32	0.613	0.8	1	1.643			
			C	0.218	2.537	0.594	0.8	1	1.210			
T3	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.194	2.615	0.589	0.8	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.8	1	1.899	0.23	22.72	B
61.00-51.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T6	0.02	0.07	A	0.246	2.45	0.601	0.8	1	2.216	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.20	19.58	A
41.00-31.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.8	1	2.911	0.20	19.97	A
31.00-21.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T9	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
Sum Weight:	0.13	0.57								1.68		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.01	9.55	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.85	1	0.281	0.03	14.16	C
89.00-87.00			B	0.224	2.519	0.596	0.85	1	0.281			
			C	0.224	2.519	0.596	0.85	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.85	1	1.221	0.15	25.22	B
87.00-81.00			B	0.291	2.32	0.613	0.85	1	1.653			
			C	0.218	2.537	0.594	0.85	1	1.221			
T3	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.24	23.66	B
81.00-71.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.194	2.615	0.589	0.85	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.23	22.72	B
71.00-61.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.85	1	1.910	0.23	22.80	B
61.00-51.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T6	0.02	0.07	A	0.246	2.45	0.601	0.85	1	2.216	0.20	20.50	B
51.00-41.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.20	19.58	A
41.00-31.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T8	0.03	0.08	A	0.31	2.27	0.619	0.85	1	2.920	0.20	20.04	A
31.00-21.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T9	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.19	19.10	A
21.00-11.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
Sum Weight:	0.13	0.57								1.68		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	1	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	1	1	0.594			
			C	0.4	2.064	0.651	1	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	1	1	2.886	0.22	36.90	B
87.00-81.00			B	0.578	1.819	0.74	1	1	4.111			
			C	0.442	1.986	0.67	1	1	2.886			
T3	0.04	0.14	A	0.41	2.045	0.656	1	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.41	2.045	0.656	1	1	4.252			
T4	0.05	0.14	A	0.41	2.045	0.656	1	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T5	0.05	0.16	A	0.43	2.008	0.664	1	1	4.595	0.36	35.96	B
61.00-51.00			B	0.623	1.791	0.768	1	1	7.614			
			C	0.521	1.874	0.708	1	1	6.048			
T6	0.07	0.14	A	0.471	1.94	0.683	1	1	5.101	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T7	0.08	0.14	A	0.533	1.861	0.715	1	1	6.037	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
T8	0.08	0.16	A	0.55	1.844	0.724	1	1	6.351	0.31	30.92	B
31.00-21.00			B	0.623	1.791	0.768	1	1	7.614			
			C	0.521	1.874	0.708	1	1	6.048			
T9	0.08	0.14	A	0.533	1.861	0.715	1	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	1	1	7.323			
			C	0.503	1.896	0.699	1	1	5.731			
Sum Weight:	0.47	1.16								2.62		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	0.8	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	0.8	1	0.594			
			C	0.4	2.064	0.651	0.8	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	0.8	1	2.843	0.22	36.60	B
87.00-81.00			B	0.578	1.819	0.74	0.8	1	4.077			
			C	0.442	1.986	0.67	0.8	1	2.843			
T3	0.04	0.14	A	0.41	2.045	0.656	0.8	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.41	2.045	0.656	0.8	1	4.252			
T4	0.05	0.14	A	0.41	2.045	0.656	0.8	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T5	0.05	0.16	A	0.43	2.008	0.664	0.8	1	4.552	0.36	35.82	B
61.00-51.00			B	0.623	1.791	0.768	0.8	1	7.584			
			C	0.521	1.874	0.708	0.8	1	5.906			
T6	0.07	0.14	A	0.471	1.94	0.683	0.8	1	5.101	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T7	0.08	0.14	A	0.533	1.861	0.715	0.8	1	6.037	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
T8	0.08	0.16	A	0.55	1.844	0.724	0.8	1	6.316	0.31	30.80	B
31.00-21.00			B	0.623	1.791	0.768	0.8	1	7.584			
			C	0.521	1.874	0.708	0.8	1	5.906			
T9	0.08	0.14	A	0.533	1.861	0.715	0.8	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	0.8	1	7.323			
			C	0.503	1.896	0.699	0.8	1	5.626			
Sum Weight:	0.47	1.16								2.61		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.422	0.02	10.18	C
90.50-89.00			B	1	1.2	1	1	1	0.422			
			C	1	1.2	1	1	1	0.422			
T1	0.00	0.02	A	0.4	2.064	0.651	0.85	1	0.594	0.04	18.39	C
89.00-87.00			B	0.4	2.064	0.651	0.85	1	0.594			
			C	0.4	2.064	0.651	0.85	1	0.594			
T2	0.01	0.10	A	0.442	1.986	0.67	0.85	1	2.854	0.22	36.67	B
87.00-81.00			B	0.578	1.819	0.74	0.85	1	4.086			
			C	0.442	1.986	0.67	0.85	1	2.854			
T3	0.04	0.14	A	0.41	2.045	0.656	0.85	1	4.252	0.38	37.89	B
81.00-71.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.41	2.045	0.656	0.85	1	4.252			
T4	0.05	0.14	A	0.41	2.045	0.656	0.85	1	4.252	0.36	36.40	B
71.00-61.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T5	0.05	0.16	A	0.43	2.008	0.664	0.85	1	4.563	0.36	35.86	B
61.00-51.00			B	0.623	1.791	0.768	0.85	1	7.592			
			C	0.521	1.874	0.708	0.85	1	5.941			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T6	0.07	0.14	A	0.471	1.94	0.683	0.85	1	5.101	0.33	32.83	B
51.00-41.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T7	0.08	0.14	A	0.533	1.861	0.715	0.85	1	6.037	0.31	30.61	B
41.00-31.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
T8	0.08	0.16	A	0.55	1.844	0.724	0.85	1	6.325	0.31	30.83	B
31.00-21.00			B	0.623	1.791	0.768	0.85	1	7.592			
			C	0.521	1.874	0.708	0.85	1	5.941			
T9	0.08	0.14	A	0.533	1.861	0.715	0.85	1	6.037	0.30	29.86	B
21.00-11.00			B	0.609	1.799	0.759	0.85	1	7.323			
			C	0.503	1.896	0.699	0.85	1	5.652			
Sum Weight:	0.47	1.16								2.61		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	1	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	1	1	0.281			
			C	0.224	2.519	0.596	1	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	1	1	1.253	0.04	6.42	B
87.00-81.00			B	0.291	2.32	0.613	1	1	1.682			
			C	0.218	2.537	0.594	1	1	1.253			
T3	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.194	2.615	0.589	1	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	1	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	1	1	1.942	0.06	5.76	B
61.00-51.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T6	0.02	0.07	A	0.246	2.45	0.601	1	1	2.216	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.05	4.89	A
41.00-31.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	1	1	2.948	0.05	5.06	A
31.00-21.00			B	0.301	2.293	0.616	1	1	2.857			
			C	0.273	2.37	0.608	1	1	2.568			
T9	0.03	0.07	A	0.297	2.303	0.615	1	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	1	1	2.650			
			C	0.26	2.408	0.604	1	1	2.356			
Sum Weight:	0.13	0.57								0.42		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.8	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	0.8	1	0.281			
			C	0.224	2.519	0.596	0.8	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.8	1	1.210	0.04	6.27	B
87.00-81.00			B	0.291	2.32	0.613	0.8	1	1.643			
			C	0.218	2.537	0.594	0.8	1	1.210			
T3	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.194	2.615	0.589	0.8	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.8	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T5	0.01	0.08	A	0.209	2.567	0.592	0.8	1	1.899	0.06	5.68	B
61.00-51.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T6	0.02	0.07	A	0.246	2.45	0.601	0.8	1	2.216	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.05	4.89	A
41.00-31.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.8	1	2.911	0.05	4.99	A
31.00-21.00			B	0.301	2.293	0.616	0.8	1	2.819			
			C	0.273	2.37	0.608	0.8	1	2.529			
T9	0.03	0.07	A	0.297	2.303	0.615	0.8	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	0.8	1	2.650			
			C	0.26	2.408	0.604	0.8	1	2.356			
Sum Weight:	0.13	0.57								0.42		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.01	A	1	1.2	1	1	1	0.297	0.00	2.39	C
90.50-89.00			B	1	1.2	1	1	1	0.297			
			C	1	1.2	1	1	1	0.297			
T1	0.00	0.01	A	0.224	2.519	0.596	0.85	1	0.281	0.01	3.54	C
89.00-87.00			B	0.224	2.519	0.596	0.85	1	0.281			
			C	0.224	2.519	0.596	0.85	1	0.281			
T2	0.00	0.05	A	0.218	2.537	0.594	0.85	1	1.221	0.04	6.31	B
87.00-81.00			B	0.291	2.32	0.613	0.85	1	1.653			
			C	0.218	2.537	0.594	0.85	1	1.221			
T3	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.06	5.91	B
81.00-71.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.194	2.615	0.589	0.85	1	1.718			
T4	0.01	0.07	A	0.194	2.615	0.589	0.85	1	1.718	0.06	5.68	B
71.00-61.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T5	0.01	0.08	A	0.209	2.567	0.592	0.85	1	1.910	0.06	5.70	B
61.00-51.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T6	0.02	0.07	A	0.246	2.45	0.601	0.85	1	2.216	0.05	5.12	B
51.00-41.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T7	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.05	4.89	A
41.00-31.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
T8	0.03	0.08	A	0.31	2.27	0.619	0.85	1	2.920	0.05	5.01	A
31.00-21.00			B	0.301	2.293	0.616	0.85	1	2.828			
			C	0.273	2.37	0.608	0.85	1	2.538			
T9	0.03	0.07	A	0.297	2.303	0.615	0.85	1	2.743	0.05	4.77	A
21.00-11.00			B	0.288	2.327	0.612	0.85	1	2.650			
			C	0.26	2.408	0.604	0.85	1	2.356			
Sum Weight:	0.13	0.57								0.42		

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	0.25			
Bracing Weight	0.32			
Total Member Self-Weight	0.57			
Guy Weight	0.11			
Total Weight	1.52			
Wind 0 deg - No Ice		-0.02	-3.51	0.42
Wind 90 deg - No Ice		3.48	0.02	-0.49
Wind 180 deg - No Ice		0.02	3.50	-0.42
Member Ice	0.59			
Guy Ice	0.27			
Total Weight Ice	3.25			
Wind 0 deg - Ice		-0.02	-4.33	0.42
Wind 90 deg - Ice		4.31	0.02	-0.45
Wind 180 deg - Ice		0.02	4.33	-0.42
Total Weight	1.52			
Wind 0 deg - Service		-0.01	-0.88	0.11
Wind 90 deg - Service		0.87	0.01	-0.12
Wind 180 deg - Service		0.01	0.87	-0.11

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice+Guy
3	Dead+Wind 90 deg - No Ice+Guy
4	Dead+Wind 180 deg - No Ice+Guy

Comb. No.	Description
5	Dead+Ice+Temp+Guy
6	Dead+Wind 0 deg+Ice+Temp+Guy
7	Dead+Wind 90 deg+Ice+Temp+Guy
8	Dead+Wind 180 deg+Ice+Temp+Guy
9	Dead+Wind 0 deg - Service+Guy
10	Dead+Wind 90 deg - Service+Guy
11	Dead+Wind 180 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	90.5 - 89	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-0.10	0.00	-0.00
			Max. Mx	3	-0.06	-0.76	0.11
			Max. My	4	-0.06	0.05	-0.68
			Max. Vy	3	0.19	-0.76	0.11
			Max. Vx	4	0.17	0.05	-0.68
			Max. Torque	8			-0.01
T1	89 - 87	Leg	Max Tension	3	1.03	-0.09	-0.03
			Max. Compression	2	-0.98	-0.04	-0.00
			Max. Mx	2	-0.97	0.12	0.01
			Max. My	3	-0.19	0.02	0.10
			Max. Vy	3	-0.12	0.01	0.01
			Max. Vx	3	0.08	0.02	0.10
		Bottom Girt	Max Tension	7	0.07	-0.00	-0.00
			Max. Compression	2	-0.09	0.00	-0.00
			Max. Mx	6	0.02	0.01	-0.00
			Max. My	6	-0.00	-0.00	-0.00
			Max. Vy	6	0.01	-0.00	0.00
			Max. Vx	6	-0.01	-0.00	-0.00
T2	87 - 81	Leg	Max Tension	3	1.28	-0.01	0.01
			Max. Compression	6	-3.49	0.00	0.00
			Max. Mx	3	-0.87	0.05	0.02
			Max. My	6	-0.91	-0.00	-0.06
			Max. Vy	3	0.12	0.01	-0.00
			Max. Vx	8	-0.17	-0.00	-0.06
		Diagonal	Max Tension	2	0.35	0.00	0.00
			Max. Compression	8	-0.71	0.00	0.00
			Max. Mx	7	0.21	0.00	0.00
			Max. My	6	-0.05	0.00	-0.00
			Max. Vy	7	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	0.51	0.00	0.00
			Max. Compression	2	-0.20	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.18	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	6	0.10	0.00	0.00
			Max. Compression	8	-0.08	0.00	0.00
			Max. Mx	5	0.00	0.00	0.00
			Max. My	6	0.10	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.29	0.00	0.00
			Max. Compression	3	-0.12	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	6	-0.09	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Guy A	Bottom Tension	8	3.57		
			Top Tension	8	3.61		
			Top Cable Vert	8	3.06		
			Top Cable Norm	8	1.92		
			Top Cable Tan	8	0.01		
			Bot Cable Vert	8	-2.91		
			Bot Cable Norm	8	2.07		
			Bot Cable Tan	8	0.06		
		Guy B	Bottom Tension	6	3.15		
			Top Tension	6	3.19		
			Top Cable Vert	6	2.67		
			Top Cable Norm	6	1.75		
			Top Cable Tan	6	0.09		
			Bot Cable Vert	6	-2.59		
			Bot Cable Norm	6	1.79		
			Bot Cable Tan	6	0.17		
		Guy C	Bottom Tension	6	4.27		
			Top Tension	6	4.31		
			Top Cable Vert	6	3.82		
			Top Cable Norm	6	2.01		
			Top Cable Tan	6	0.07		
			Bot Cable Vert	6	-3.71		
			Bot Cable Norm	6	2.11		
			Bot Cable Tan	6	0.16		
		Top Guy Pull-Off	Max Tension	6	1.24	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	0.11	0.00	0.00
			Max. My	6	0.39	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T3	81 - 71	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-4.01	0.00	0.01
			Max. Mx	7	-1.79	0.05	-0.00
			Max. My	8	-2.33	-0.00	0.05
			Max. Vy	7	-0.11	0.00	-0.00
			Max. Vx	8	-0.17	-0.00	-0.00
		Diagonal	Max Tension	3	0.25	0.00	0.00
			Max. Compression	8	-0.60	0.00	0.00
			Max. Mx	7	0.13	0.00	0.00
			Max. My	6	-0.22	0.00	-0.00
			Max. Vy	7	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	0.36	0.00	0.00
			Max. Compression	3	-0.12	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	0.20	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	8	0.20	0.00	0.00
			Max. Compression	3	-0.13	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	-0.00	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	6	0.15	0.00	0.00
			Max. Compression	7	-0.05	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.15	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T4	71 - 61	Leg	Max Tension	3	0.13	0.02	-0.04
			Max. Compression	6	-4.97	-0.00	0.00
			Max. Mx	7	-2.10	0.12	-0.00
			Max. My	8	-2.92	-0.00	0.09
			Max. Vy	7	0.37	-0.00	-0.00
			Max. Vx	8	0.27	-0.00	-0.00
		Diagonal	Max Tension	6	0.52	0.00	0.00
			Max. Compression	7	-0.95	0.00	0.00
			Max. Mx	7	0.03	0.00	0.00
			Max. My	6	-0.09	0.00	-0.00
			Max. Vy	7	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	7	0.62	0.00	0.00
			Max. Compression	6	-0.33	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.34	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.31	0.00	0.00
			Max. Compression	6	-0.10	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.17	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	7	0.46	0.00	0.00
			Max. Compression	8	-0.17	0.00	0.00
			Max. Mx	5	0.03	0.00	0.00
			Max. My	6	0.38	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T5	61 - 51	Leg	Max Tension	7	2.63	-0.01	-0.00
			Max. Compression	6	-8.41	0.00	0.01
			Max. Mx	7	-2.10	-0.13	0.00
			Max. My	8	-4.29	-0.05	-0.13
			Max. Vy	7	0.37	-0.13	0.00
			Max. Vx	8	-0.39	-0.05	-0.13
		Diagonal	Max Tension	2	0.64	0.00	0.00
			Max. Compression	7	-1.44	0.00	0.00
			Max. Mx	6	0.57	0.00	0.00
			Max. My	6	0.02	0.00	-0.00
			Max. Vy	6	0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	7	0.90	0.00	0.00
			Max. Compression	6	-0.39	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	0.58	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.49	0.00	0.00
			Max. Compression	6	-0.31	0.00	0.00
			Max. Mx	5	0.01	0.00	0.00
			Max. My	6	0.26	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.56	0.00	0.00
			Max. Compression	2	-0.29	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.29	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	6	0.00	0.00	0.00
		Guy A	Bottom Tension	8	3.44		
			Top Tension	8	3.46		
			Top Cable Vert	8	2.29		
			Top Cable Norm	8	2.59		
			Top Cable Tan	8	0.00		
			Bot Cable Vert	8	-2.20		
			Bot Cable Norm	8	2.64		
			Bot Cable Tan	8	0.04		
		Guy B	Bottom Tension	6	3.12		
			Top Tension	6	3.15		
			Top Cable Vert	6	2.06		
			Top Cable Norm	6	2.38		
			Top Cable Tan	6	0.06		
			Bot Cable Vert	6	-2.00		
			Bot Cable Norm	6	2.40		
			Bot Cable Tan	6	0.12		
		Guy C	Bottom Tension	6	4.01		
			Top Tension	6	4.04		
			Top Cable Vert	6	3.02		
			Top Cable Norm	6	2.68		
			Top Cable Tan	6	0.05		
			Bot Cable Vert	6	-2.94		
			Bot Cable Norm	6	2.73		
			Bot Cable Tan	6	0.10		
		Top Guy Pull-Off	Max Tension	6	1.60	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	5	0.18	0.00	0.00
			Max. My	6	0.58	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T6	51 - 41	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-6.78	0.01	-0.06
			Max. Mx	7	-1.64	0.09	0.07
			Max. My	8	-3.38	0.04	0.13
			Max. Vy	7	-0.29	-0.00	0.00
			Max. Vx	8	-0.39	-0.00	-0.00
		Diagonal	Max Tension	2	0.62	0.00	0.00
			Max. Compression	7	-1.39	0.00	0.00
			Max. Mx	6	-0.39	0.00	0.00
			Max. My	6	0.06	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	7	0.83	0.00	0.00
			Max. Compression	2	-0.38	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	0.12	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	7	0.51	0.00	0.00
			Max. Compression	2	-0.17	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. My	6	-0.16	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.42	0.00	0.00
			Max. Compression	2	-0.20	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.14	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T7	41 - 31	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-6.95	-0.07	-0.07
			Max. Mx	7	-2.45	0.15	0.01
			Max. My	8	-3.88	-0.07	0.19
			Max. Vy	7	0.47	-0.00	-0.00
			Max. Vx	8	0.57	0.00	-0.00
		Diagonal	Max Tension	2	1.36	0.00	0.00
			Max. Compression	8	-2.09	0.00	0.00
			Max. Mx	6	1.32	0.00	0.00
			Max. My	6	0.22	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.24	0.00	0.00
			Max. Compression	2	-0.79	0.00	0.00
			Max. Mx	5	0.06	0.00	0.00
			Max. My	6	0.12	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	8	0.38	0.00	0.00
			Max. Compression	2	-0.13	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. My	6	-0.08	0.00	-0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.70	0.00	0.00
			Max. Compression	2	-0.44	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.41	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T8	31 - 21	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-7.87	-0.02	-0.00
			Max. Mx	8	-4.83	0.22	0.01
			Max. My	8	-5.32	0.07	-0.19
			Max. Vy	8	0.65	0.00	0.01
			Max. Vx	8	0.57	0.07	-0.19
		Diagonal	Max Tension	6	1.90	0.00	0.00
			Max. Compression	8	-2.46	0.00	0.00
			Max. Mx	6	1.14	0.00	0.00
			Max. My	6	0.70	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.73	0.00	0.00
			Max. Compression	6	-1.33	0.00	0.00
			Max. Mx	5	0.06	0.00	0.00
			Max. My	6	0.14	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.82	0.00	0.00
			Max. Compression	6	-0.56	0.00	0.00
			Max. Mx	5	0.04	0.00	0.00
			Max. My	6	-0.56	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.79	0.00	0.00
			Max. Compression	6	-0.51	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	-0.44	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Guy A	Bottom Tension	8	3.18		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Tension	8	3.19		
			Top Cable Vert	8	0.86		
			Top Cable Norm	8	3.07		
			Top Cable Tan	8	0.00		
			Bot Cable Vert	8	-0.81		
			Bot Cable Norm	8	3.07		
			Bot Cable Tan	8	0.02		
		Guy B	Bottom Tension	6	2.79		
			Top Tension	6	2.79		
			Top Cable Vert	6	0.75		
			Top Cable Norm	6	2.69		
			Top Cable Tan	6	0.05		
			Bot Cable Vert	6	-0.71		
			Bot Cable Norm	6	2.69		
			Bot Cable Tan	6	0.08		
		Guy C	Bottom Tension	6	3.28		
			Top Tension	6	3.29		
			Top Cable Vert	6	1.33		
			Top Cable Norm	6	3.01		
			Top Cable Tan	6	0.04		
			Bot Cable Vert	6	-1.28		
			Bot Cable Norm	6	3.02		
			Bot Cable Tan	6	0.06		
		Top Guy Pull-Off	Max Tension	8	2.50	0.00	0.00
			Max. Compression	2	-0.21	0.00	0.00
			Max. Mx	5	0.30	0.00	0.00
			Max. My	6	-0.06	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
T9	21 - 11	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	6	-6.98	0.01	-0.02
			Max. Mx	8	-6.67	-0.22	-0.00
			Max. My	8	-5.05	0.05	-0.20
			Max. Vy	8	0.65	-0.22	-0.00
			Max. Vx	8	0.72	0.05	-0.20
		Diagonal	Max Tension	2	1.37	0.00	0.00
			Max. Compression	8	-2.23	0.00	0.00
			Max. Mx	6	1.14	0.00	0.00
			Max. My	6	1.24	0.00	-0.00
			Max. Vy	6	-0.00	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Horizontal	Max Tension	8	1.40	0.00	0.00
			Max. Compression	2	-0.86	0.00	0.00
			Max. Mx	5	0.11	0.00	0.00
			Max. My	6	0.12	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	8	0.82	0.00	0.00
			Max. Compression	2	-0.50	0.00	0.00
			Max. Mx	5	0.07	0.00	0.00
			Max. My	6	-0.43	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	8	0.61	0.00	0.00
			Max. Compression	2	-0.37	0.00	0.00
			Max. Mx	5	0.05	0.00	0.00
			Max. Vy	5	-0.00	0.00	0.00
		Base Beam	Max Tension	8	0.20	-4.13	0.57
			Max. Compression	2	-0.14	0.04	-0.01
			Max. Mx	6	-5.70	-4.56	-0.23
			Max. My	8	-5.05	-4.13	0.57

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	6	-5.70	-4.56	-0.23
			Max. Vx	8	0.70	-4.13	0.57

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Guy C @ 39.5 ft Elev 12.5 ft Azimuth 241 deg	Max. Vert	11	-2.45	-2.25	1.23
	Max. H_x	11	-2.45	-2.25	1.23
	Max. H_z	6	-7.93	-6.72	4.08
	Min. Vert	6	-7.93	-6.72	4.08
	Min. H_x	6	-7.93	-6.72	4.08
	Min. H_z	11	-2.45	-2.25	1.23
Guy B @ 45.5 ft Elev 17.25 ft Azimuth 102 deg	Max. Vert	3	-0.28	0.21	0.06
	Max. H_x	6	-5.29	6.65	1.79
	Max. H_z	6	-5.29	6.65	1.79
	Min. Vert	6	-5.29	6.65	1.79
	Min. H_x	3	-0.28	0.21	0.06
	Min. H_z	3	-0.28	0.21	0.06
Guy A @ 45 ft Elev 17.25 ft Azimuth 18 deg	Max. Vert	2	-0.23	0.07	-0.15
	Max. H_x	8	-5.92	2.29	-7.44
	Max. H_z	2	-0.23	0.07	-0.15
	Min. Vert	8	-5.92	2.29	-7.44
	Min. H_x	2	-0.23	0.07	-0.15
	Min. H_z	8	-5.92	2.29	-7.44
Mast	Max. Vert	6	16.98	-0.01	0.08
	Max. H_x	8	15.28	0.08	-0.25
	Max. H_z	2	10.85	0.00	0.16
	Max. M_x	1	0.00	-0.00	-0.01
	Max. M_z	1	0.00	-0.00	-0.01
	Max. Torsion	8	1.45	0.08	-0.25
	Min. Vert	9	6.67	-0.00	0.05
	Min. H_x	3	9.07	-0.20	0.00
	Min. H_z	8	15.28	0.08	-0.25
	Min. M_x	1	0.00	-0.00	-0.01
	Min. M_z	1	0.00	-0.00	-0.01
	Min. Torsion	2	-0.87	0.00	0.16

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	6.73	0.00	0.01	0.00	0.00	-0.08
Dead+Wind 0 deg - No Ice+Guy	10.85	-0.00	-0.16	0.00	0.00	0.87

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 90 deg - No Ice+Guy	9.07	0.20	-0.00	0.00	0.00	-0.96
Dead+Wind 180 deg - No Ice+Guy	9.13	-0.01	0.24	0.00	0.00	-1.23
Dead+Ice+Temp+Guy	9.25	-0.00	0.02	0.00	0.00	-0.11
Dead+Wind 0 deg+Ice+Temp+Guy	16.98	0.01	-0.08	0.00	0.00	0.83
Dead+Wind 90 deg+Ice+Temp+Guy	14.45	0.19	-0.05	0.00	0.00	-1.13
Dead+Wind 180 deg+Ice+Temp+Guy	15.28	-0.08	0.25	0.00	0.00	-1.45
Dead+Wind 0 deg - Service+Guy	6.67	0.00	-0.05	0.00	0.00	0.23
Dead+Wind 90 deg - Service+Guy	6.68	0.06	0.01	0.00	0.00	-0.30
Dead+Wind 180 deg - Service+Guy	6.92	0.00	0.07	0.00	0.00	-0.38

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	-1.52	0.00	0.00	1.52	0.00	0.018%
2	-0.05	-1.52	-3.92	0.05	1.52	3.91	0.070%
3	3.82	-1.50	0.06	-3.82	1.50	-0.06	0.024%
4	0.05	-1.52	3.91	-0.05	1.52	-3.91	0.010%
5	0.00	-3.25	0.00	0.00	3.25	0.00	0.013%
6	-0.11	-3.24	-5.62	0.10	3.24	5.62	0.041%
7	5.39	-3.18	0.14	-5.39	3.18	-0.15	0.010%
8	0.11	-3.25	5.61	-0.11	3.25	-5.61	0.034%
9	-0.01	-1.52	-0.98	0.01	1.52	0.98	0.024%
10	0.95	-1.52	0.02	-0.95	1.52	-0.02	0.015%
11	0.01	-1.52	0.98	-0.01	1.52	-0.98	0.023%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	15	0.00000001	0.00008197
2	Yes	31	0.00000001	0.00009507
3	Yes	29	0.00000001	0.00008858
4	Yes	23	0.00000001	0.00008103
5	Yes	15	0.00000001	0.00009049
6	Yes	34	0.00000001	0.00007089
7	Yes	33	0.00000001	0.00007497
8	Yes	27	0.00000001	0.00007858
9	Yes	16	0.00000001	0.00008382
10	Yes	13	0.00000001	0.00005589
11	Yes	12	0.00000001	0.00007380

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90.5 - 89	0.970	9	0.1867	2.2804
T1	89 - 87	0.929	9	0.0874	2.2815
T2	87 - 81	0.921	9	0.0380	2.3075
T3	81 - 71	0.881	9	0.0372	2.2857
T4	71 - 61	0.774	9	0.0695	2.1910
T5	61 - 51	0.610	9	0.0687	2.0817
T6	51 - 41	0.518	9	0.0243	1.8936
T7	41 - 31	0.473	9	0.0393	1.6045
T8	31 - 21	0.353	9	0.0620	1.2150
T9	21 - 11	0.208	9	0.0876	0.6157

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
95.50	DB586-Y	9	0.970	0.1867	2.2804	25017
93.00	6'x3" Pipe Mount	9	0.970	0.1867	2.2804	25017
92.00	PTP 49400	9	0.970	0.1867	2.2804	25017
85.00	Environmental Pendant Camera	9	0.915	0.0281	2.3173	57108
84.00	Guy	9	0.909	0.0279	2.3137	10678
82.17	5440AP	9	0.893	0.0326	2.2983	15112
78.50	PTP 49400	9	0.857	0.0470	2.2601	73750
71.00	ANT150D6-9	9	0.774	0.0695	2.1910	13285
55.33	Guy	9	0.546	0.0413	1.9878	12462
40.00	HBX-4517DS	9	0.465	0.0419	1.5721	11219
36.00	RRH2x60-AWS	9	0.421	0.0512	1.4325	20378
33.00	BSA150C	9	0.381	0.0576	1.3097	76053
29.33	Guy	9	0.331	0.0659	1.1267	49323
26.00	30-ft Unistrut Reinforcement	9	0.285	0.0743	0.9306	31224
23.00	BA1012-1	9	0.241	0.0823	0.7420	17049
21.00	3.5"x60" Horizontal Pipe	9	0.208	0.0876	0.6157	14986

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90.5 - 89	13.022	6	1.3765	6.6113
T1	89 - 87	12.643	6	1.0472	6.6146
T2	87 - 81	12.303	6	0.8805	6.6799
T3	81 - 71	11.226	6	0.8813	6.6545
T4	71 - 61	9.227	6	1.0375	6.4802
T5	61 - 51	6.956	6	1.0249	6.2439
T6	51 - 41	5.122	6	0.7145	5.7619
T7	41 - 31	3.783	6	0.6428	4.9855
T8	31 - 21	2.417	6	0.5954	3.8605
T9	21 - 11	1.271	6	0.5717	1.9536

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
95.50	DB586-Y	6	13.022	1.3765	6.6113	5775
93.00	6'x3" Pipe Mount	6	13.022	1.3765	6.6113	5775
92.00	PTP 49400	6	13.022	1.3765	6.6113	5775
85.00	Environmental Pendant Camera	6	11.972	0.8422	6.7098	13276
84.00	Guy	6	11.793	0.8419	6.7056	2997
82.17	5440AP	6	11.450	0.8616	6.6780	3666
78.50	PTP 49400	6	10.746	0.9249	6.6070	8430
71.00	ANT150D6-9	6	9.227	1.0375	6.4802	2829
55.33	Guy	6	5.837	0.8477	6.0084	1842
40.00	HBX-4517DS	6	3.648	0.6401	4.8969	3349
36.00	RRH2x60-AWS	6	3.090	0.6218	4.5073	7107
33.00	BSA150C	6	2.678	0.6052	4.1481	3375
29.33	Guy	6	2.214	0.5890	3.5860	3220
26.00	30-ft Unistrut Reinforcement	6	1.833	0.5804	2.9640	8595
23.00	BA1012-1	6	1.500	0.5751	2.3593	5190
21.00	3.5"x60" Horizontal Pipe	6	1.271	0.5717	1.9536	4318

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	87	Top Guy Pull-Off@84	A325N	0.6250	1	1.24	6.44	0.192 ✔	1.333	Bolt Shear
T5	61	Top Guy Pull-Off@55.3333	A325N	0.6250	1	1.60	6.44	0.248 ✔	1.333	Bolt Shear
T8	31	Top Guy Pull-Off@29.3333	A325N	0.6250	1	2.50	6.44	0.387 ✔	1.333	Bolt Shear

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
T2	84.00 (A) (379)	5/16 EHS	1.12	11.20	3.61	5.60	2.000	3.101 ✔
	84.00 (B) (378)	5/16 EHS	1.12	11.20	3.19	5.60	2.000	3.509 ✔

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
	84.00 (C) (374)	5/16 EHS	1.12	11.20	4.31	5.60	2.000	2.596 ✔
T5	55.33 (A) (385)	5/16 EHS	1.12	11.20	3.46	5.60	2.000	3.235 ✔
	55.33 (B) (384)	5/16 EHS	1.12	11.20	3.15	5.60	2.000	3.559 ✔
	55.33 (C) (380)	5/16 EHS	1.12	11.20	4.04	5.60	2.000	2.773 ✔
T8	29.33 (A) (391)	5/16 EHS	1.12	11.20	3.19	5.60	2.000	3.512 ✔
	29.33 (B) (390)	5/16 EHS	1.12	11.20	2.79	5.60	2.000	4.008 ✔
	29.33 (C) (386)	5/16 EHS	1.12	11.20	3.29	5.60	2.000	3.402 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	90.5 - 89 (1)	P2x.154	1.50	1.50	22.9	19.873	1.0745	-0.06	21.35	0.003

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	90.5 - 89 (1)	P2x.154	0.77	-16.547	23.100	0.716	0.00	0.000	23.100	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	90.5 - 89 (1)	P2x.154	0.003	0.716	0.000	0.719 ✔	1.066	H1-3 ✔

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	ROHN TS 1.25x14 ga	2.07	1.72	49.9 K=1.00	1.00	24.360	0.3043	-0.98	7.41	0.132
T2	87 - 81	ROHN TS 1.25x14 ga	6.00	1.33	38.7 K=1.00	0.97	25.287	0.3043	-3.49	7.69	0.454
T3	81 - 71	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.431	0.3043	-4.00	7.74	0.517
T4	71 - 61	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.520	0.3043	-4.97	7.77	0.641
T5	61 - 51	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.98	25.570	0.3043	-8.41	7.78	1.081
T6	51 - 41	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.99	25.674	0.3043	-6.78	7.81	0.867
T7	41 - 31	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	0.99	25.661	0.3043	-6.95	7.81	0.890
T8	31 - 21	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	1.00	26.016	0.3043	-7.87	7.92	0.994
T9	21 - 11	ROHN TS 1.25x14 ga	10.00	1.33	38.7 K=1.00	1.00	26.016	0.3043	-6.98	7.92	0.881

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	ROHN TS 1.25x14 ga	0.12	-16.912	33.000	0.512	0.00	0.000	33.000	0.000
T2	87 - 81	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T3	81 - 71	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T4	71 - 61	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T5	61 - 51	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T6	51 - 41	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T7	41 - 31	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T8	31 - 21	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T9	21 - 11	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	ROHN TS 1.25x14 ga	0.132	0.512	0.000	0.644 ✔	1.333	H1-3 ✔
T2	87 - 81	ROHN TS 1.25x14 ga	0.454	0.000	0.000	0.454 ✔	1.333	H1-3 ✔
T3	81 - 71	ROHN TS 1.25x14 ga	0.517	0.000	0.000	0.517 ✔	1.333	H1-3 ✔
T4	71 - 61	ROHN TS 1.25x14 ga	0.641	0.000	0.000	0.641 ✔	1.333	H1-3 ✔
T5	61 - 51	ROHN TS 1.25x14 ga	1.081	0.000	0.000	1.081	1.333	H1-3 ✔

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{bv}}{F_{bv}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T6	51 - 41	ROHN TS 1.25x14 ga	0.867	0.000	0.000	0.867 ✓	1.333	H1-3 ✓
T7	41 - 31	ROHN TS 1.25x14 ga	0.890	0.000	0.000	0.890 ✓	1.333	H1-3 ✓
T8	31 - 21	ROHN TS 1.25x14 ga	0.994	0.000	0.000	0.994 ✓	1.333	H1-3 ✓
T9	21 - 11	ROHN TS 1.25x14 ga	0.881	0.000	0.000	0.881 ✓	1.333	H1-3 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.71	1.19	0.597 ✓
T3	81 - 71	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.60	1.19	0.506 ✓
T4	71 - 61	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-0.95	1.19	0.800 ✓
T5	61 - 51	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-1.44	1.19	1.206 ✓
T6	51 - 41	7/16	1.93	1.79	137.2 K=0.70	7.934	0.1503	-1.39	1.19	1.168 ✓
T7	41 - 31	7/16	1.93	1.79	90.2 K=0.46	14.186	0.1503	-2.09	2.13	0.980 ✓
T8	31 - 21	7/16	1.93	1.79	90.2 K=0.46	14.186	0.1503	-2.46	2.13	1.154 ✓
T9	21 - 11	7/16	1.93	1.79	90.2 K=0.46	14.186	0.1503	-2.23	2.13	1.047 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.20	1.97	0.103 ✓
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.12	1.97	0.061 ✓
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.33	1.97	0.169 ✓
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.39	1.97	0.199 ✓
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.38	1.97	0.196 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T7	41 - 31	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.79	2.34	0.337 ✔
T8	31 - 21	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-1.33	2.34	0.569 ✔
T9	21 - 11	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.86	2.34	0.368 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.08	1.97	0.043 ✔
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.13	1.97	0.065 ✔
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.10	1.97	0.052 ✔
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.31	1.97	0.160 ✔
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.17	1.97	0.086 ✔
T7	41 - 31	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.13	2.34	0.056 ✔
T8	31 - 21	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.56	2.34	0.238 ✔
T9	21 - 11	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.50	2.34	0.212 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	7/16	1.25	1.14	125.3 K=0.70	21.600	0.1503	0.00	2.18	0.000
T2	87 - 81	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.12	1.97	0.060
T3	81 - 71	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.05	1.97	0.024
T4	71 - 61	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.17	1.97	0.089
T5	61 - 51	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.29	1.97	0.146
T6	51 - 41	7/16	1.40	1.29	99.2 K=0.70	13.077	0.1503	-0.20	1.97	0.101
T7	41 - 31	7/16	1.40	1.29	78.0 K=0.55	15.582	0.1503	-0.44	2.34	0.186
T8	31 - 21	7/16	1.40	1.29	78.0	15.582	0.1503	-0.51	2.34	0.217

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	21 - 11	7/16	1.40	1.29	K=0.55 78.0 K=0.55	15.582	0.1503	-0.37	2.34	0.157

Bottom Girt Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	7/16	0.01	-9.609	27.000	0.356	0.00	0.000	27.000	0.000
T2	87 - 81	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T3	81 - 71	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T4	71 - 61	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T5	61 - 51	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T6	51 - 41	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T7	41 - 31	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T8	31 - 21	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T9	21 - 11	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000

Bottom Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	7/16	0.000	0.356	0.000	0.356 ✔	1.333	H1-3 ✔
T2	87 - 81	7/16	0.060	0.000	0.000	0.060 ✔	1.333	H1-3 ✔
T3	81 - 71	7/16	0.024	0.000	0.000	0.024 ✔	1.333	H1-3 ✔
T4	71 - 61	7/16	0.089	0.000	0.000	0.089 ✔	1.333	H1-3 ✔
T5	61 - 51	7/16	0.146	0.000	0.000	0.146 ✔	1.333	H1-3 ✔
T6	51 - 41	7/16	0.101	0.000	0.000	0.101 ✔	1.333	H1-3 ✔
T7	41 - 31	7/16	0.186	0.000	0.000	0.186 ✔	1.333	H1-3 ✔
T8	31 - 21	7/16	0.217	0.000	0.000	0.217 ✔	1.333	H1-3 ✔
T9	21 - 11	7/16	0.157	0.000	0.000	0.157 ✔	1.333	H1-3 ✔

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T8	31 - 21	2x3/8	1.40	1.29	143.2 K=1.00	7.282	0.7500	-0.21	5.46	0.038 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	ROHN TS 1.25x14 ga	2.07	1.72	49.9	30.000	0.3043	1.03	9.13	0.112
T2	87 - 81	ROHN TS 1.25x14 ga	6.00	1.33	38.7	30.000	0.3043	1.28	9.13	0.140
T4	71 - 61	ROHN TS 1.25x14 ga	10.00	1.33	38.7	30.000	0.3043	0.13	9.13	0.014
T5	61 - 51	ROHN TS 1.25x14 ga	10.00	1.33	38.7	30.000	0.3043	2.63	9.13	0.288

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	ROHN TS 1.25x14 ga	0.09	13.412	33.000	0.406	0.00	0.000	33.000	0.000
T2	87 - 81	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T4	71 - 61	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000
T5	61 - 51	ROHN TS 1.25x14 ga	0.00	0.000	33.000	0.000	0.00	0.000	33.000	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	ROHN TS 1.25x14 ga	0.112	0.406	0.000	0.519 ✔	1.333	H2-1 ✔
T2	87 - 81	ROHN TS 1.25x14 ga	0.140	0.000	0.000	0.140 ✔	1.333	H2-1 ✔
T4	71 - 61	ROHN TS 1.25x14 ga	0.014	0.000	0.000	0.014 ✔	1.333	H2-1 ✔
T5	61 - 51	ROHN TS 1.25x14 ga	0.288	0.000	0.000	0.288 ✔	1.333	H2-1 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.93	1.79	196.0	21.600	0.1503	0.35	3.25	0.109 ✔
T3	81 - 71	7/16	1.93	1.79	196.0	21.600	0.1503	0.25	3.25	0.076 ✔
T4	71 - 61	7/16	1.93	1.79	196.0	21.600	0.1503	0.52	3.25	0.160 ✔
T5	61 - 51	7/16	1.93	1.79	196.0	21.600	0.1503	0.64	3.25	0.196 ✔
T6	51 - 41	7/16	1.93	1.79	196.0	21.600	0.1503	0.62	3.25	0.190 ✔
T7	41 - 31	7/16	1.93	1.79	196.0	21.600	0.1503	1.36	3.25	0.418 ✔
T8	31 - 21	7/16	1.93	1.79	196.0	21.600	0.1503	1.90	3.25	0.584 ✔
T9	21 - 11	7/16	1.93	1.79	196.0	21.600	0.1503	1.37	3.25	0.421 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.51	3.25	0.158 ✔
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.36	3.25	0.110 ✔
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.62	3.25	0.192 ✔
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.90	3.25	0.276 ✔
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.83	3.25	0.257 ✔
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	1.24	3.25	0.383 ✔
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	1.73	3.25	0.532 ✔
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	1.40	3.25	0.432 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.10	3.25	0.030 ✔
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.20	3.25	0.061

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.31	3.25	0.097
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.49	3.25	0.151
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.51	3.25	0.158
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	0.38	3.25	0.116
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	0.82	3.25	0.251
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	0.82	3.25	0.253

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	89 - 87	7/16	1.25	1.14	125.3	21.600	0.1503	0.02	3.25	0.005
T2	87 - 81	7/16	1.40	1.29	141.7	21.600	0.1503	0.29	3.25	0.089
T3	81 - 71	7/16	1.40	1.29	141.7	21.600	0.1503	0.15	3.25	0.046
T4	71 - 61	7/16	1.40	1.29	141.7	21.600	0.1503	0.46	3.25	0.140
T5	61 - 51	7/16	1.40	1.29	141.7	21.600	0.1503	0.56	3.25	0.171
T6	51 - 41	7/16	1.40	1.29	141.7	21.600	0.1503	0.42	3.25	0.129
T7	41 - 31	7/16	1.40	1.29	141.7	21.600	0.1503	0.70	3.25	0.216
T8	31 - 21	7/16	1.40	1.29	141.7	21.600	0.1503	0.79	3.25	0.244
T9	21 - 11	7/16	1.40	1.29	141.7	21.600	0.1503	0.61	3.25	0.189

Bottom Girt Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	89 - 87	7/16	0.01	9.609	27.000	0.356	0.00	0.000	27.000	0.000
T2	87 - 81	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T3	81 - 71	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T4	71 - 61	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T5	61 - 51	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T6	51 - 41	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T7	41 - 31	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T8	31 - 21	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000
T9	21 - 11	7/16	0.00	0.000	27.000	0.000	0.00	0.000	27.000	0.000

Bottom Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio P / P_a	Ratio f_{bx} / F_{bx}	Ratio f_{by} / F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	89 - 87	7/16	0.005	0.356	0.000	0.361 ✔	1.333	H2-1 ✔
T2	87 - 81	7/16	0.089	0.000	0.000	0.089 ✔	1.333	H2-1 ✔
T3	81 - 71	7/16	0.046	0.000	0.000	0.046 ✔	1.333	H2-1 ✔
T4	71 - 61	7/16	0.140	0.000	0.000	0.140 ✔	1.333	H2-1 ✔
T5	61 - 51	7/16	0.171	0.000	0.000	0.171 ✔	1.333	H2-1 ✔
T6	51 - 41	7/16	0.129	0.000	0.000	0.129 ✔	1.333	H2-1 ✔
T7	41 - 31	7/16	0.216	0.000	0.000	0.216 ✔	1.333	H2-1 ✔
T8	31 - 21	7/16	0.244	0.000	0.000	0.244 ✔	1.333	H2-1 ✔
T9	21 - 11	7/16	0.189	0.000	0.000	0.189 ✔	1.333	H2-1 ✔

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T2	87 - 81	2x3/8	1.40	1.29	143.2	29.000	0.3516	1.24	10.20	0.121 ✔
T5	61 - 51	2x3/8	1.40	1.29	143.2	29.000	0.3516	1.60	10.20	0.156 ✔
T8	31 - 21	2x3/8	1.40	1.29	143.2	29.000	0.3516	2.50	10.20	0.245 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	90.5 - 89	Pole	P2x.154	1	-0.06	22.77	67.4	Pass
T1	89 - 87	Leg	ROHN TS 1.25x14 ga	4	-0.98	9.88	48.3	Pass
T2	87 - 81	Leg	ROHN TS 1.25x14 ga	8	-3.49	10.26	34.1	Pass
T3	81 - 71	Leg	ROHN TS 1.25x14 ga	38	-4.00	10.32	38.8	Pass
T4	71 - 61	Leg	ROHN TS 1.25x14 ga	88	-4.97	10.35	48.1	Pass
T5	61 - 51	Leg	ROHN TS 1.25x14 ga	136	-8.41	10.37	81.1	Pass
T6	51 - 41	Leg	ROHN TS 1.25x14 ga	184	-6.78	10.41	65.1	Pass
T7	41 - 31	Leg	ROHN TS 1.25x14 ga	232	-6.95	10.41	66.8	Pass
T8	31 - 21	Leg	ROHN TS 1.25x14 ga	280	-7.87	10.55	74.5	Pass
T9	21 - 11	Leg	ROHN TS 1.25x14 ga	327	-6.98	10.55	66.1	Pass
T2	87 - 81	Diagonal	7/16	19	-0.71	1.59	44.8	Pass
T3	81 - 71	Diagonal	7/16	85	-0.60	1.59	38.0	Pass
T4	71 - 61	Diagonal	7/16	97	-0.95	1.59	60.0	Pass
T5	61 - 51	Diagonal	7/16	143	-1.44	1.59	90.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T6	51 - 41	Diagonal	7/16	227	-1.39	1.59	87.6	Pass
T7	41 - 31	Diagonal	7/16	240	-2.09	2.84	73.5	Pass
T8	31 - 21	Diagonal	7/16	313	-2.46	2.84	86.6	Pass
T9	21 - 11	Diagonal	7/16	372	-2.23	2.84	78.5	Pass
T2	87 - 81	Horizontal	7/16	22	0.51	4.33	11.9	Pass
T3	81 - 71	Horizontal	7/16	82	0.36	4.33	8.3	Pass
T4	71 - 61	Horizontal	7/16	100	0.62	4.33	14.4	Pass
T5	61 - 51	Horizontal	7/16	146	0.90	4.33	20.7	Pass
T6	51 - 41	Horizontal	7/16	224	0.83	4.33	19.3	Pass
T7	41 - 31	Horizontal	7/16	243	1.24	4.33	28.7	Pass
T8	31 - 21	Horizontal	7/16	316	-1.33	3.12	42.7	Pass
T9	21 - 11	Horizontal	7/16	339	1.40	4.33	32.4	Pass
T2	87 - 81	Top Girt	7/16	13	-0.08	2.62	3.2	Pass
T3	81 - 71	Top Girt	7/16	43	-0.13	2.62	4.9	Pass
T4	71 - 61	Top Girt	7/16	91	0.31	4.33	7.3	Pass
T5	61 - 51	Top Girt	7/16	138	-0.31	2.62	12.0	Pass
T6	51 - 41	Top Girt	7/16	185	0.51	4.33	11.8	Pass
T7	41 - 31	Top Girt	7/16	233	0.38	4.33	8.7	Pass
T8	31 - 21	Top Girt	7/16	282	0.82	4.33	18.9	Pass
T9	21 - 11	Top Girt	7/16	330	0.82	4.33	19.0	Pass
T1	89 - 87	Bottom Girt	7/16	6	0.02	4.33	27.1	Pass
T2	87 - 81	Bottom Girt	7/16	16	0.29	4.33	6.7	Pass
T3	81 - 71	Bottom Girt	7/16	46	0.15	4.33	3.5	Pass
T4	71 - 61	Bottom Girt	7/16	93	0.46	4.33	10.5	Pass
T5	61 - 51	Bottom Girt	7/16	142	0.56	4.33	12.9	Pass
T6	51 - 41	Bottom Girt	7/16	190	0.42	4.33	9.7	Pass
T7	41 - 31	Bottom Girt	7/16	237	0.70	4.33	16.2	Pass
T8	31 - 21	Bottom Girt	7/16	286	0.79	4.33	18.3	Pass
T9	21 - 11	Bottom Girt	7/16	332	0.61	4.33	14.1	Pass
T2	87 - 81	Guy A@84 (18 deg)	5/16	379	3.61	5.60	64.5	Pass
T5	61 - 51	Guy A@55.3333 (18 deg)	5/16	385	3.46	5.60	61.8	Pass
T8	31 - 21	Guy A@29.3333 (18 deg)	5/16	391	3.19	5.60	56.9	Pass
T2	87 - 81	Guy B@84 (18 deg)	5/16	378	3.19	5.60	57.0	Pass
T5	61 - 51	Guy B@55.3333 (18 deg)	5/16	384	3.15	5.60	56.2	Pass
T8	31 - 21	Guy B@29.3333 (18 deg)	5/16	390	2.79	5.60	49.9	Pass
T2	87 - 81	Guy C@84 (-18 deg)	5/16	374	4.31	5.60	77.1	Pass
T5	61 - 51	Guy C@55.3333 (-18 deg)	5/16	380	4.04	5.60	72.1	Pass
T8	31 - 21	Guy C@29.3333 (-18 deg)	5/16	386	3.29	5.60	58.8	Pass
T2	87 - 81	Top Guy Pull-Off@84	2x3/8	375	1.24	13.59	9.1 14.4 (b)	Pass
T5	61 - 51	Top Guy Pull-Off@55.3333	2x3/8	381	1.60	13.59	11.7 18.6 (b)	Pass
T8	31 - 21	Top Guy Pull-Off@29.3333	2x3/8	389	2.50	13.59	18.4 29.1 (b)	Pass
						Summary		
						Pole (L1)	67.4	Pass
						Leg (T5)	81.1	Pass
						Diagonal (T5)	90.5	Pass
						Horizontal (T8)	42.7	Pass
						Top Girt (T9)	19.0	Pass
						Bottom Girt (T1)	27.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Guy A (T2)	64.5	Pass
						Guy B (T2)	57.0	Pass
						Guy C (T2)	77.1	Pass
						Top Guy Pull-Off (T8)	29.1	Pass
						Bolt Checks	29.1	Pass
						RATING =	**90.5**	**Pass**

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Subject:	Guy Anchor Plate Anlaysis
Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 1: 4/29/15	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Guy Anchor Plate Analysis:

Input Data:

Tower Reactions:

Tension Force =	$Tension := 8 \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 8 \cdot kips$	(Input From tnxTower)
Resultant Force =	$Resultant := 11 \cdot kips$	(Input From tnxTower)
Max Force in One Cable =	$Max := 4.3 \cdot kips$	(Input From tnxTower)

Base Plate Data:

Use ASTM A36

Plate Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Plate Tensile Stress =	$F_u := 58 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 0.625 \cdot in$	(User Input)
Base Plate Width =	$W_{bp} := 8 \cdot in$	(User Input)
Hole Size =	$Hole_d := 0.5 \cdot in$	(User Input)
Number of Holes =	$Hole_N := 3$	(User Input)
Hole Edge Distance =	$Hole_{edg} := 1 \cdot in$	(User Input)

Weld Data:

Filler Metal Classification Strength =	$F_{EXX} := 70 \cdot ksi$	(User Input)
Weld Size (in sixteenths of an inch) =	$D_{weld} := 4 \cdot in$	(User Input)
Weld Length =	$l_{weld} := 10 \cdot in$	(User Input)

Calculated Data:

Hole Clear Distance =	$l_c := Hole_{edg} - \frac{1}{2} \cdot Hole_d = 0.75 \cdot in$
Plate Gross Area =	$A_g := W_{bp} \cdot t_{bp} = 5 \cdot in^2$
Plate Net Area =	$A_n := \left(W_{bp} - Hole_d \cdot Hole_N\right) \cdot t_{bp} = 4.063 \cdot in^2$
Plate Gross Area Subject to Shear =	$A_{gv} := \left(W_{bp} - Hole_{edg}\right) \cdot t_{bp} = 4.375 \cdot in^2$
Plate Net Area Subject to Shear =	$A_{nv} := \left[W_{bp} - Hole_{edg} - Hole_d \cdot \left(Hole_N - 0.5\right)\right] \cdot t_{bp} = 3.594 \cdot in^2$
Plate Net Area Subject to Tension =	$A_{nt} := \left(Hole_{edg} - Hole_d \cdot \frac{1}{2}\right) \cdot t_{bp} = 0.469 \cdot in^2$

Design Checks:

Check Tensile Yielding:

Safety Factor = $\Omega := 1.67$

Nominal Strength = $R_n := F_y \cdot A_g = 180 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 107.8 \cdot kips$

$\frac{Tension}{R_a} = 7.4 \cdot \%$

Tensile Yielding = $Tensile\_Yielding := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Yielding = "OK"

Check Tensile Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := F_u \cdot A_n = 235.6 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 117.8 \cdot kips$

$\frac{Tension}{R_a} = 6.8 \cdot \%$

Tensile Rupture = $Tensile\_Rupture := if\left(\frac{Tension}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Tensile_Rupture = "OK"

Check Shear Yielding:

Safety Factor = $\Omega := 1.5$

Nominal Strength = $R_n := 0.6 \cdot F_y \cdot A_g = 108 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 72 \cdot kips$

$\frac{Shear}{R_a} = 11.1 \cdot \%$

Shear Yielding = $Shear\_Yielding := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Yielding = "OK"

Check Shear Rupture:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 0.6 \cdot F_u \cdot A_n = 141.4 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 70.7 \cdot kips$

$\frac{Shear}{R_a} = 11.3 \cdot \%$

Shear Rupture = $Shear\_Rupture := if\left(\frac{Shear}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Shear_Rupture = "OK"

Check Block Shear:

Safety Factor = $\Omega := 2$

Stress Distribution Reduction Factor = $U_{bs} := 1.0$

Nominal Strength =

$$R_n := \begin{cases} \left(0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{if } 0.6 \cdot F_u \cdot A_{nv} + U_{bs} \cdot F_u \cdot A_{nt} \le 0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt} \\ \left(0.6 \cdot F_y \cdot A_{gv} + U_{bs} \cdot F_u \cdot A_{nt}\right) & \text{otherwise} \end{cases} = 121.7 \cdot kips$$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 60.8 \cdot kips$

$\frac{Resultant}{R_a} = 18.1 \cdot \%$

Block Shear = $Block\_Shear := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Block_Shear = "OK"

Check Bearing Strength:

Safety Factor = $\Omega := 2$

Nominal Strength = $R_n := 1.2 \cdot l_c \cdot t_{bp} \cdot F_u = 32.6 \cdot kips$

Allowable Strength = $R_a := \frac{R_n}{\Omega} = 16.3 \cdot kips$

$\frac{Max}{R_a} = 26.4 \cdot \%$

Bearing Strength = $Bearing\_Strength := if\left(\frac{Max}{R_a} \le 1.00, "OK", "Overstressed"\right)$

Bearing_Strength = "OK"

Check Weld:

Safety Factor = $\Omega := 2$

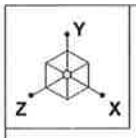
Nominal Strength = $R_n := 0.6 \cdot F_{EXX} \cdot \left(\frac{\sqrt{2}}{2}\right) \cdot \left(\frac{D_{weld}}{16}\right) \cdot l_{weld} = 74.2 \cdot kips$

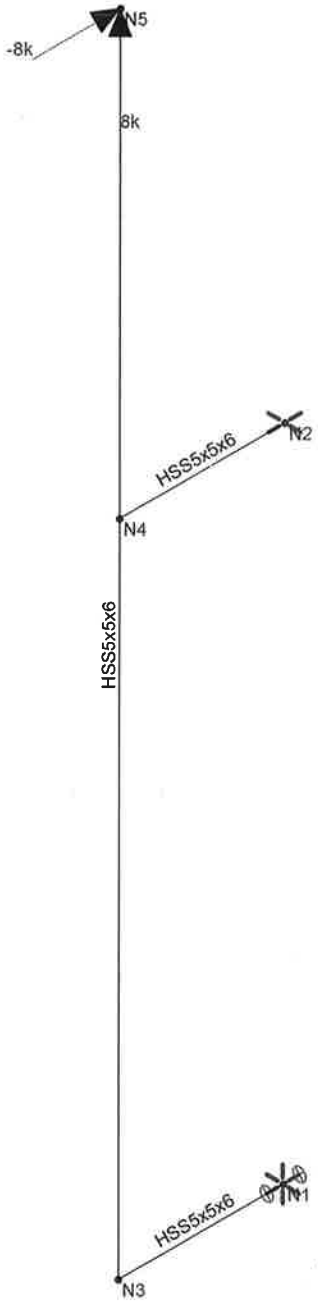
Allowable Strength = $R_a := \frac{R_n}{\Omega} = 37.1 \cdot kips$

$\frac{Resultant}{R_a} = 29.6 \cdot \%$

Weld Strength = $Weld\_Strength := if\left(\frac{Resultant}{R_a} \le 1.00, "OK", "Overstressed"\right)$

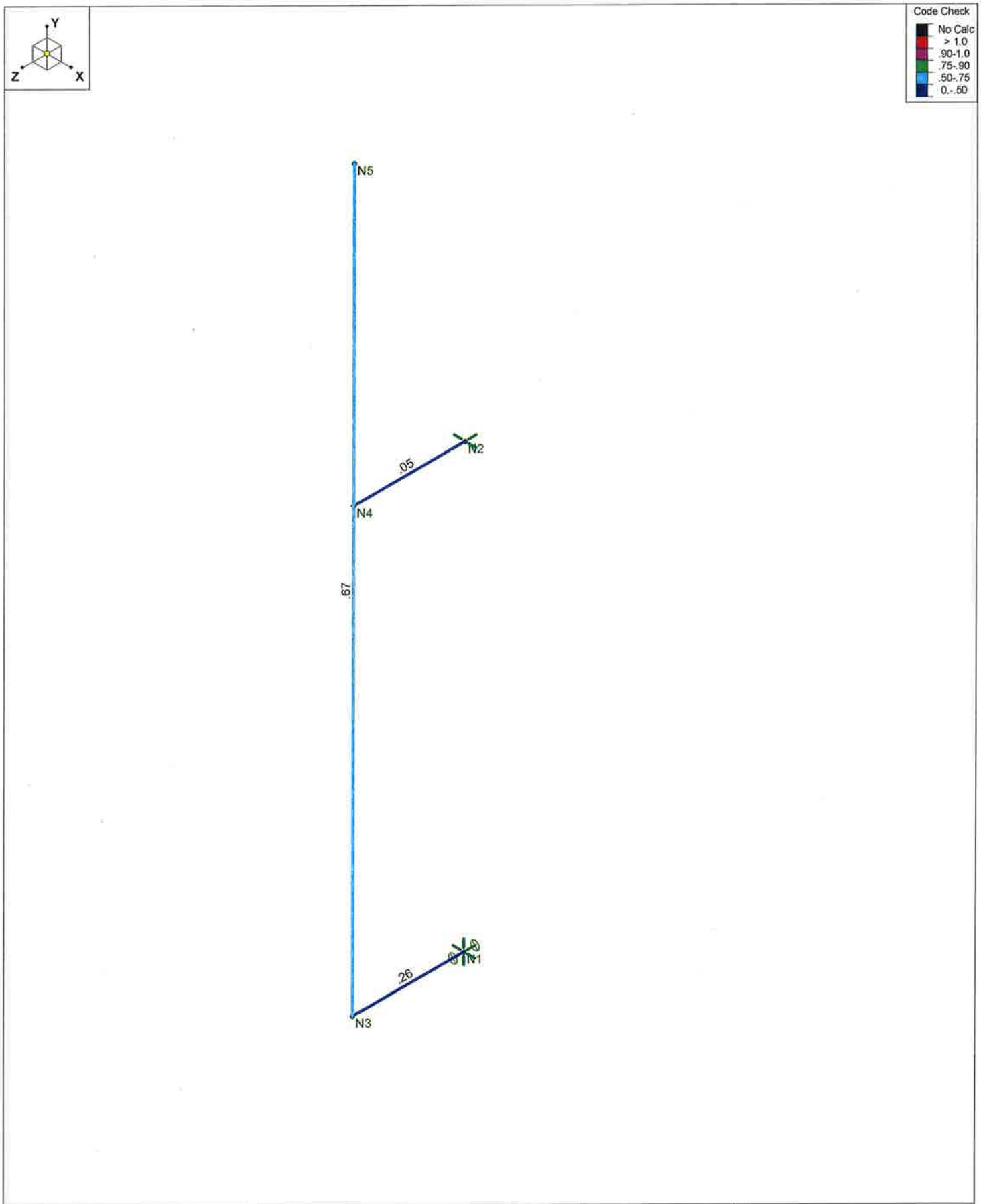
Weld_Strength = "OK"





Loads: BLC 2, Tower Reactions

Centek Engineering		
TJL	Niantic SC1	Dec 11, 2014 at 5:37 PM
14298.000	Tower Reactions Applied to Anchor Frame	Attachment to Building - Proposed.r3d



Centek Engineering		
TJL	Niantic SC1	Dec 11, 2014 at 5:38 PM
14298.000	Unity Check	Attachment to Building - Proposed.r3d

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	0	0	15.265	0	0	0
2	1	N1	0	-7.863	-7.265	0	0	NC
3	1	N3	LOCKED	NC	NC	NC	NC	NC
4	1	Totals:	0	-7.863	8			
5	1	COG (ft):	X: 0	Y: 5.047	Z: .752			

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Subject:	Connection to Building
Location:	80-ft Rohn 45G Tower Niantic, CT
Rev. 0: 12/11/14	Prepared by: T.J.L. Checked by: C.F.C. Job No. 14298.000

Connection to Building:

Input Data:

Reactions @ Bottom:

Tension Force = $Tension := 7.5 \cdot kips$ (Input From Risa3D)

Shear Force = $Shear := 8 \cdot kips$ (Input From Risa3D)

Bolt Data:

Use ASTM A307

Bolt Diamter = $d_b := 0.625 \cdot in$

Number of Bolts = $n_b := 6$

Allowable Shear = $V_{all} := 4.14 \cdot kips$

Allowable Tension = $T_{all} := 6.9 \cdot kips$

Design Checks:

Check Combined Tension and Shear:

Tension per Bolt = $T_b := \frac{Tension}{n_b} = 1.25 \cdot kips$

Shear per Bolt = $V_b := \frac{Shear}{n_b} = 1.333 \cdot kips$

$$\frac{T_b}{T_{all}} + \frac{V_b}{V_{all}} = 50.3 \cdot \%$$

Bolt Check = $Bolt\_Check := if\left(\frac{T_b}{T_{all}} + \frac{V_b}{V_{all}} \le 1.00, "OK", "Overstressed"\right)$

Bolt_Check = "OK"

Site Name	NIANTIC SC 1 CT	Site #	2 - 0759
Latitude	41.323847	Longitude	-72.191524
		GEL (Feet)	50

Remote BBU?	YES	Remote Site Name: Facilities populated				Site #	Facilities populated	
700 MHz LTE Site Info		ALPHA		BETA			GAMMA	
EQUIPMENT TYPE								
ANTENNA TYPE								
QUANTITY PER FACE								
ORIENTATION								
DOWN TILT (DEG.)								
RAD CTR (FT AGL)								
TOWER MOUNTED AMPS (QTY)								
DIPLEXER - QTY/MODEL								
RRH - QTY/MODEL								
SECTOR DISTRIBUTION BOX								
MAIN DISTRIBUTION BOX								
850 MHz Cellular Site Info		ALPHA		BETA			GAMMA	
EQUIPMENT TYPE								
ANTENNA TYPE								
QUANTITY PER FACE								
ORIENTATION								
DOWN TILT (DEG.)								
RAD CTR (FT AGL)								
TOWER MOUNTED AMPS (QTY)								
DIPLEXER - QTY/MODEL								
1900 MHz PCS Site Info		ALPHA		BETA			GAMMA	
EQUIPMENT TYPE								
ANTENNA TYPE								
QUANTITY PER FACE								
ORIENTATION								
DOWN TILT (DEG.)								
RAD CTR (FT AGL)								
TOWER MOUNTED AMPS (QTY)								
DIPLEXER - QTY/MODEL								
RRH - QTY/MODEL								
SECTOR DISTRIBUTION BOX								
2100 MHz LTE Site Info		ALPHA		BETA			GAMMA	
EQUIPMENT TYPE		2100 MHz Small Cell		2100 MHz Small Cell				
ANTENNA TYPE		HBX-4517-DS1-VTM		HBX-4517-DS1-VTM				
QUANTITY PER FACE		1		1				
ORIENTATION		275		330				
DOWN TILT (DEG.)		0		0				
RAD CTR (FT AGL)		40		40				
TOWER MOUNTED AMPS (QTY)		N/A		N/A				
DIPLEXER - QTY/MODEL								
RRH - QTY/MODEL		1	RRH 2X60 AWS	1	RRH 2X60 AWS			
SECTOR DISTRIBUTION BOX								
MAIN DISTRIBUTION BOX								

Coax Cable Ordering					
MAINLINE SIZE	1 5/8"	TOTAL # OF MAIN LINES	0	COAX LINE MODEL #	
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS	4	TOP JUMPER MODEL #	
Fiber Cable Ordering					
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES	1	FIBER LINE MODEL #	
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS		TOP JUMPER MODEL #	

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - Block	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-2155	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-1755	RX - 776-787	700 MHz / 2100 MHz (Watts)	60

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/ WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A12-B	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A4-A	800	Tx4/Rx1	RED/RED	A8-A	800	Tx5/Rx1	BLUE/BLUE	A12-A	800	Tx6/Rx1	GREEN/GREEN
F1-A	1700	Tx/Rx	RED/ BROWN	F1-B	1700	Tx/Rx	BLUE/BROWN	F1-C	1700	Tx/Rx	GREEN/BROWN
F1-D	1700	Tx/Rx	RED/RED/ BROWN	F1-E	1700	Tx/Rx	BLUE/BLUE/BROWN	F1-F	1700	Tx/Rx	GREEN/GREEN/BROWN

RF ENGINEER	RF MANAGER	RF INITIALS	DATE
Prepared By: Ray Paradis	Robert Hesselbach	RLP	12/5/2014

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBX-4517DS1-VTM

Andrew® Antenna, 1710–2170 MHz, 45° horizontal beamwidth, RET compatible. Ideal for high gain corridor coverage or capacity optimization.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2170
Gain, dBi	19.2	19.3	19.4
Beamwidth, Horizontal, degrees	45	45	43
Beamwidth, Vertical, degrees	6.6	6.2	5.9
Beam Tilt, degrees	0–10	0–10	0–10
USLS, dB	15	15	15
Front-to-Back Ratio at 180°, dB	32	31	30
CPR at Boresight, dB	24	23	21
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	300	300	300
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2170
Gain by all Beam Tilts, average, dBi	18.9	19.0	19.3
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.4	±0.6
Gain by Beam Tilt, average, dBi	0 ° | 18.8	0 ° | 18.7	0 ° | 19.2
	5 ° | 19.0	5 ° | 19.1	5 ° | 19.5
	10 ° | 18.8	10 ° | 18.9	10 ° | 19.1
Beamwidth, Horizontal Tolerance, degrees	±1.2	±1.2	±3.1
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.2	±0.4
USLS, dB	15	16	16
Front-to-Back Total Power at 180° ± 30°, dB	30	30	29
CPR at Boresight, dB	24	23	22

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

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2170 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray

Product Specifications

HBX-4517DS1-VTM

Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	466.0 N @ 150 km/h 104.8 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	132.0 mm | 5.2 in
Length	1464.0 mm | 57.6 in
Width	269.0 mm | 10.6 in
Net Weight	12.3 kg | 27.1 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBX-4517DS1-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.

A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

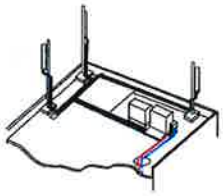
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

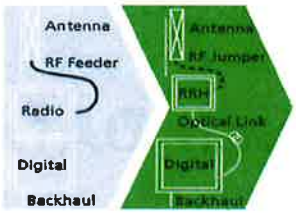
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

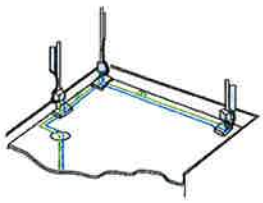
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

AT THE SPEED OF IDEAS™

Alcatel·Lucent

ATTACHMENT 5

Site Name: Niantic SC 1 , CT
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissable Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	15	0	0	40	0.0000	1.0	0.00%
VZW Cellular	869	9	0	0	40	0.0000	0.579333333	0.00%
VZW AWS	2145	1	1871	1871	40	0.4205	1.0	42.05%
VZW 700	746	1	0	0	40	0.0000	0.497333333	0.00%

Total Percentage of Maximum Permissible Exposure 42.05%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 6

Robinson + Cole

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

May 27, 2015

Via Certificate of Mailing

Mark C. Nickerson, First Selectman
Town of East Lyme
P.O. Box 519
108 Pennsylvania Avenue
Niantic, CT 06357

Re: **Proposed Installation of a Small Cell Telecommunications Facility at 8 Grand Street, East Lyme, Connecticut**

Dear Mr. Nickerson:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to install a new small cell wireless telecommunications facility at 8 Grand Street in East Lyme (the "Property"). The facility will consist of two (2) panel-type antennas and two (2) remote radio heads attached at the 40-foot level to the existing East Lyme Fire Department ("ELFD") tower. Equipment associated with Cellco's antennas will be located inside two (2) equipment cabinets installed on a concrete pad to the north of the ELFD building.

As presented in the Sub-Petition, the proposed small cell facility improvements at the Property constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review. Landowners whose property abuts the ELFD parcel were also sent a copy of this Sub-Petition.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the attached Sub-Petition.

Please contact me if you have any questions regarding this proposal.

Sincerely,

Kenneth C. Baldwin

Attachment

ATTACHMENT 7

KENNETH C. BALDWIN

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

Also admitted in Massachusetts

May 27, 2015

Via Certificate of Mailing

«Name_and_Address»

Re: **Sub-Petition for Declaratory Ruling Filed with the Connecticut Siting Council for the Installation of a Small Cell Telecommunications Facility at 8 Grand Street, East Lyme, Connecticut**

Dear «Salutation»:

This firm represents Cellco Partnership d/b/a Verizon Wireless ("Cellco"). Today, Cellco filed a Sub-Petition for Declaratory Ruling ("Sub-Petition") with the Connecticut Siting Council ("Council") seeking approval to install a new small cell wireless telecommunications facility at 8 Grand Street in East Lyme (the "Property"). The facility will consist of two (2) panel-type antennas and two (2) remote radio heads attached at the 40-foot level to the existing East Lyme Fire Department ("ELFD") tower. Equipment associated with Cellco's antennas will be located inside two (2) equipment cabinets installed on a concrete pad to the north of the ELFD building.

The facility improvements described above constitute an eligible facility request pursuant to Section 6409(a) of the Federal Middle Class Tax Relief and Job Creation Act of 2012 (47 U.S.C. § 1455(a)) and the October 21, 2014 Order of the Federal Communications Commission (FCC-14-533). A copy of the full Sub-Petition is attached for your review.

Pursuant to its decision in Petition No. 1133, comments or concerns regarding this proposal should be submitted to the Council within thirty (30) days of the date of the Sub-Petition.

This notice is being sent to you because you are listed as an owner of land that abuts the Property. If you have any questions regarding the Sub-Petition, the Council's process for reviewing the Sub-Petition or the details of the filing itself, please feel free to contact me at the number listed above. You may also contact the Council directly at 860-827-2935.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks

CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS

ABUTTERS LIST
MAP 12.1/LOT 18

6 & 8 GRAND STREET
NIANTIC, CONNECTICUT

	Map/Lot	Property Address	Owner and Mailing Address
1.	12.1/15	43 Pennsylvania Avenue	ARC CBELMCT 001 LLC c/o Ryan P.O. Box 460049 Houston, TX 77056
2.	12.1/16	33 Pennsylvania Avenue	Shoreline Branches LLC 231 Farmington Avenue Farmington, CT 06032
3.	12.1/17	25 Pennsylvania Avenue	Shoreline Branches LLC 231 Farmington Avenue Farmington, CT 06032
4.	12.1/70	21 Pennsylvania Avenue	Chelsea Groton Bank One Franklin Square Norwich, CT 06360
5.	12.1/69	7 Grand Street	Robert and Patricia Cutillo 7 Grand Street Niantic, CT 06357
6.	12.1/23	16 Grand Street	Randon C. and Linda Sturm 16 Grand Street Niantic, CT 06357
7.	12.1/68	11 Grand Street	Paschalis and Simela Tsiropoulos 1 Oswegatchie Hills Road Niantic, CT 06357