Robinson+Cole

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Also admitted in Massachusetts

April 9, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
6 Progress Avenue, Seymour, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 140-foot level on an existing 280-foot self-supporting lattice tower at 6 Progress Avenue in Seymour (the "Property"). The tower and underlying property are owned by EDMAC LLC. The Council approved Cellco's use of this tower in 2010. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model LNX-6514DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 140-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to W. Kurt Miller, First Selectman of the Town of Seymour. A copy of this letter is also being sent to EDMAC LLC, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 140-foot level on the tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table with Cellco's modified facility is included in Attachment 2.

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

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
W. Kurt Miller, Seymour First Selectman
EDMAC LLC
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

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

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 15.7	0 ° | 15.9
	5 ° | 15.7	5 ° | 15.8
	10 ° | 15.3	10 ° | 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

* 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®

Product Specifications

LNX-6514DS-VTM

Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	14.2 kg | 31.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4	0 ° | 18.4	0 ° | 18.7
	3 ° | 18.7	3 ° | 18.7	3 ° | 18.9
	6 ° | 18.4	6 ° | 18.5	6 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* 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® quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

HBXX-6517DS-VTM

Mechanical Specifications

Color	Light gray
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	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1903.0 mm | 74.9 in
Width	305.0 mm | 12.0 in
Net Weight	19.5 kg | 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
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.

PCS RF MODULES
RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

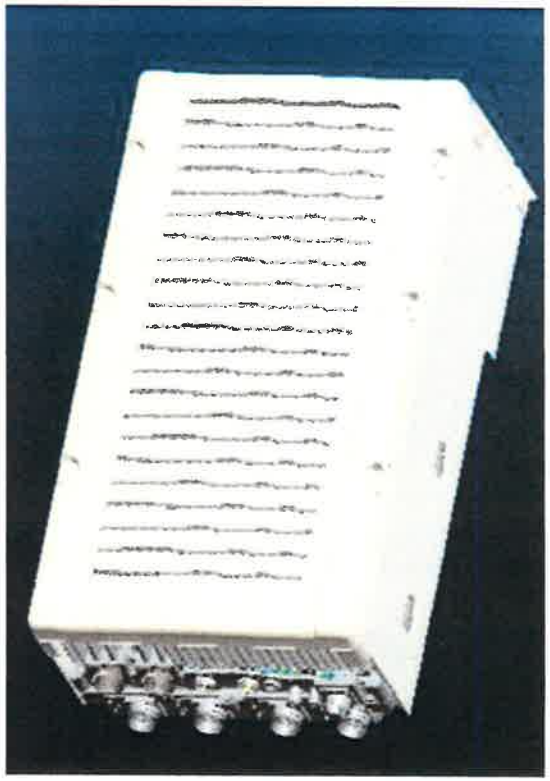
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

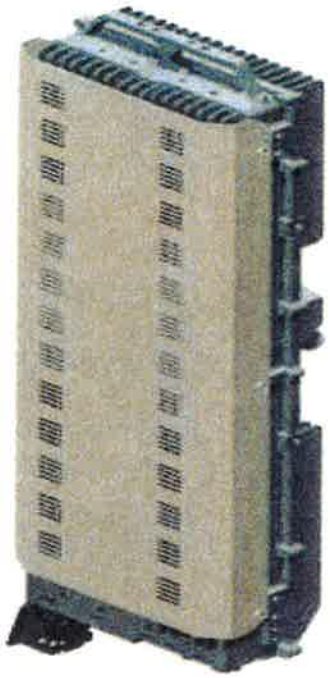
	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental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



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

ALCATEL-LUCENT
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.

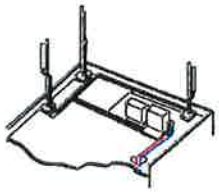
EASY INSTALLATION

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.

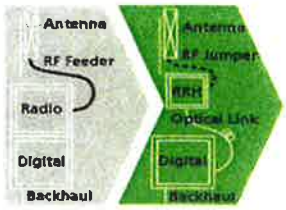
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

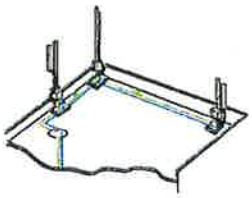
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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.

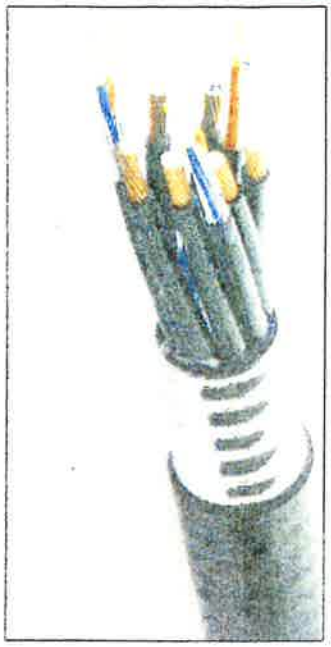


Figure 1: HYBRIFLEX Series

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)

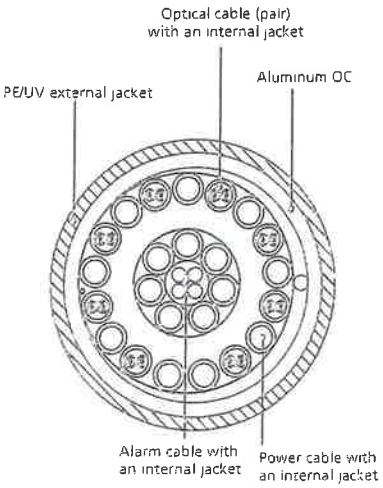


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Woodbridge N (Seymour)								
Tower Height: Verizon @ 280ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Mike Gardella	12	110	280	0.0061	1980	1.0000	0.63%	
*Town	12	80	235	0.0063	155	0.2000	3.13%	
*AT&T UMTS	2	565	160	0.0159	880	0.5867	2.71%	
*AT&T UMTS	2	1077	160	0.0303	1900	1.0000	3.03%	
*AT&T GSM	1	283	160	0.0040	880	0.5867	0.68%	
*AT&T GSM	4	646	160	0.0363	1900	1.0000	3.63%	
*AT&T LTE	1	1313	160	0.0184	734	0.4893	3.77%	
*T-Mobile PCS	6	584	247	0.0207	1900	1.0000	2.07%	
*T-Mobile LTE	1	445	247	0.0026	700	0.4667	0.56%	
*Sprint CDMA/LTE	3	693	170	0.0259	1900	1.0000	2.59%	
*Sprint CDMA/LTE	1	390	170	0.0049	850	0.5667	0.86%	
*Sprint CDMA/LTE	2	693	170	0.0172	2500	1.0000	1.72%	
Verizon PCS	**7**	**390**	**140**	**0.0501**	**1970**	**1.0000**	**5.01%**	
Verizon Cellular	**9**	**331**	**140**	**0.0547**	**869**	**0.5793**	**9.43%**	
Verizon AWS	**1**	**2812**	**140**	**0.0516**	**2145**	**1.0000**	**5.16%**	
Verizon 700	**1**	**677**	**140**	**0.0124**	**746**	**0.4970**	**2.50%**	
								47.45%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

280' Existing PiROD Lattice Tower

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Woodbridge North

6 Progress Lane
Seymour, CT

CENTEK Project No. 15001.024

Date: March 4, 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

Introduction

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

The host tower is a 280-ft, three legged, lattice tower originally designed and manufactured by PiROD eng. file no. A-116966 dated 4/21/200. The tower geometry, structure member sizes and foundation information were taken from the original design documents. Reinforcement information was obtained from the tower reanalysis report prepared by PiROD dated June 20, 2002.

Antenna and appurtenance inventory were taken from a previous structural analysis report prepared by PiROD job no. 185135-2-1 dated October 23, 2013, a previous structural analysis report prepared by Atlantis Group dated September 8, 2014, visual verification from grade by Centek personnel on March 4, 2015 and a Verizon RF data sheet.

The tower consists of fifteen (15) vertical sections consisting of steel truss legs conforming to ASTM A572 Gr. 50 and lateral bracing conforming to ASTM A36. The vertical tower sections are connected by bolted flange plates with the diagonal and horizontal bracing to pipe legs consisting of bolted connections. The width of the tower face is 5-ft at the top and 28-ft at the bottom.

Verizon Wireless proposes the removal of nine (9) panel antennas and the installation of nine (9) panel antennas, six (6) remote radio heads and one (1) distribution box mounted on the existing T-Frames. 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:

- EMAC (Existing):
  Antenna: One (1) DB420-A dipole antenna and one (1) DB586-XC omni-directional whip antenna mounted on a 9-arm halo with an elevation of ±280-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- T-Mobile (Existing/Reserved):
  Antenna: Three (3) EMS RR90-17-02DP panel antennas, three (3) Andrew LNX-6515DS panel antennas and three (3) TMA's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±250-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- EMAC (Existing):
  Antenna: One (1) DB420-A dipole antenna and one (1) DB225-2-F dipole antenna mounted on a 9-arm halo with an elevation of ±235-ft above grade level.
  Coax Cable: Two (2) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±200-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±190-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- Future Carrier (Reserved):
  Antenna: Nine (9) Decibel DB980H120E-M panel antennas mounted on three (3) 10-ft T-Frames with a RAD center elevation of ±180-ft above grade level.
  Coax Cable: Nine (9) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- Sprint (Existing):
  Antenna: Three (3) RFS APXVSPP18 panel antennas, three (3) RFS APXVTM14 panel antennas, three (3) 800 MHZ RRH's, three (3) 1900 MHZ RRH's and three (3) TD-RRH8x20-25 RRH's mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±170-ft above grade level.
  Coax Cable: Three (3) 1-5/8" ∅ coax cables and one (1) 1-/4" ∅ fiber cable running on a leg of the existing tower as specified in Section 3 of this report.
- AT&T (Existing/Reserved):
  Antenna: Six (6) Powerwave 7770 panel antennas, three (3) KMW AM-X-CD-16-65-00T panel antennas, twelve (12) Powerwave LGP21401TMA's and six (6) Powerwave 7020 RETs mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±160-ft above grade level.
  Coax Cable: Six (6) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted with an elevation of 160-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running leg of the existing tower as specified in Section 3 of this report.
- MetroPCS (Reserved):
  Antenna: Three (3) RFS APX18-206517DS panel antennas leg mounted with a RAD center elevation of ±150-ft above grade level.
  Coax Cable: Six (6) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Antennas: Three (3) Andrew LNX-6514DS panel antennas and six (6) RFS FD9R6004/2C-3L diplexers mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing to Remove):
  Antennas: Six (6) Antel LPA-80063-6CF and three (3) Antel BXA-171063-12BF panel antennas mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.

- **VERIZON (Proposed):**
  Antennas: Three (3) Andrew LNX-6514DS panel antennas, six (6) Andrew HBXX-6517DS panel antennas, three (3) Alcatel-Lucent RRH2x60-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on three (3) 12-ft T-Frames with a RAD center elevation of ±140-ft above grade level.
  Coax Cables: One (1) 1-5/8" Ø fiber cable 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 should be routed as specified in section 3 of this report.

Analysis

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

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

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

Tower Loading

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

Basic Wind Speed:	New Haven; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Seymour; v = 105 mph (3 second gust) equivalent to v = 85 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F and Appendix-K wind speeds are equal.	
Load Cases:	Load Case 1; 85 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; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

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

Tower Capacity

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

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **77.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T13)	40'-0"-60'-0"	74.8%	**PASS**
Diagonal (T6)	180'-0"-200'-0"	77.5%	**PASS**
Mid Girt (T6)	180'-0"-200'-0"	46.9%	**PASS**

Foundation and Anchors

The existing foundation consists of three (3) 5-ft square x 3.25-ft long reinforced concrete piers on a 38.5-ft square x 3.25-ft thick reinforced concrete pad bearing directly on existing sub grade. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned PiROD design documents. Tower legs are connected to the foundation by means of (6) 2"Ø, ASTM A687 anchor bolts per leg, embedded into the concrete foundation structure.

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

Reactions	Vector	Proposed Base Reactions
Base	Shear	**84 kips**
	Compression	**168 kips**
	Moment	**12593 kip-ft**
Leg	Shear	**56 kips**
	Uplift	**456 kips**
	Compression	**575 kips**

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	35.4%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Mat	OM[2]	2.0	2.06	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: OM denotes Overturning Moment.

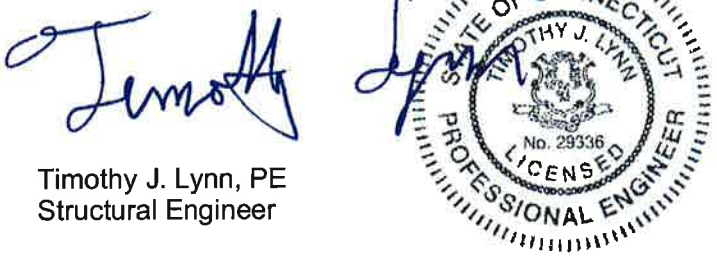
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

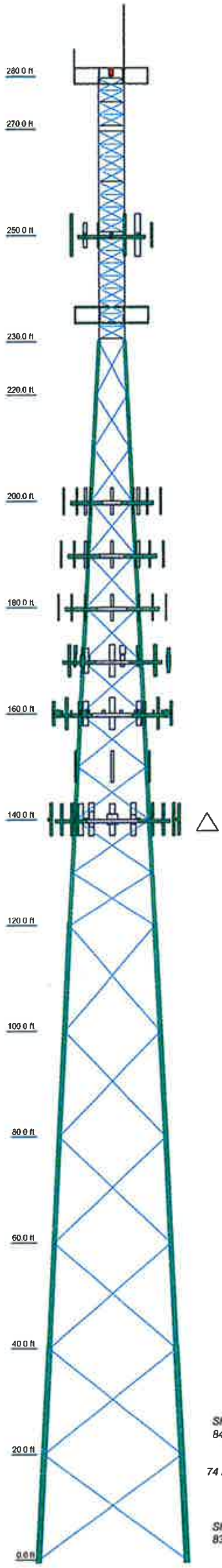
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

TnxTower Features:

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15
Legs	SR 1 3/4	SR 2	SR 2 1/2	Pirod 105245	Pirod 105218		Pirod 105219	Pirod 105220		Pirod 112743		Pirod 112744		Pirod 112745	Pirod 1`2740
Leg Grade	A572-50														
Diagonals	SR 7/8		SR 1	A	L3x3x3/16		L3x3x5/16	L3 1/2x3 1/2x5/16		2L3 1/2x3 1/2x5/16					
Diagonal Grade	A572-50			A36											
Top Girts	SR 1		SR 1 1/4	N.A.		L3x3x3/16	L4x4x1/4	L3 1/2x3 1/2x5/16		N.A.					
Mid Girts	SR 1			N.A.		L3x3x3/16	L4x4x1/4	N.A.							
Bottom Girts	SR 1		SR 1 1/4	N.A.											
Horizontals	SR 7/8			N.A.											
Face Width (ft) 2[illegible]	5				6	8	10	12	14	16	18	20	22	24	26
# Panels @ (ft)	4 @ 2.25	16 @ 2.375		11 @ 10						6 @ 20					
Weight (K) 75.2	[illegible]	[illegible]	[illegible]	[illegible]	2.0	[illegible]	4.4	6.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9.2	[illegible]



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon Lighting (EMAC)	280	Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170
15' Lighting Rod (EMAC)	280	Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170
DB420-A (EMAC)	280	7770.00 (ATI Existing)	160
DB586-XC (EMAC)	280	AM-X-CD-16-65-00T-RET(72") (ATI Existing)	160
9 Arm Halo Mount (EMAC)	280	7770.00 (ATI Reserved)	160
RR90-17-02DP (T-Mobile Existing)	250	(4) LPG21401 TMA (ATI Existing)	160
LNX-6515DS (T-Mobile Existing)	250	(2) 7020 Dual Band RET (ATI Existing)	160
RR90-17-02DP (T-Mobile Existing)	250	7770.00 (ATI Existing)	160
LNX-6515DS (T-Mobile Existing)	250	AM-X-CD-16-65-00T-RET(72") (ATI Existing)	160
RR90-17-02DP (T-Mobile Existing)	250	7770.00 (ATI Reserved)	160
LNX-6515DS (T-Mobile Existing)	250	(4) LPG21401 TMA (ATI Existing)	160
TMA 10"x8"x3" (T-Mobile Existing)	250	(2) 7020 Dual Band RET (ATI Existing)	160
TMA 10"x8"x3" (T-Mobile Existing)	250	7770.00 (ATI Existing)	160
TMA 10"x8"x3" (T-Mobile Existing)	250	AM-X-CD-16-65-00T-RET(72") (ATI Existing)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	7770.00 (ATI Reserved)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	(4) LPG21401 TMA (ATI Existing)	160
Pirod 15' T-Frame Sector Mount (1) (T-Mobile Existing)	250	(2) 7020 Dual Band RET (ATI Existing)	160
		(2) RRUS-11 (ATI Existing)	160
DB420-A (EMAC)	245	(2) RRUS-11 (ATI Existing)	160
DB225-2-F (EMAC)	235	(2) RRUS-11 (ATI Existing)	160
9 Arm Halo Mount (EMAC)	235	DC6-48-60-18-8F Surge Arrestor (ATI Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (ATI Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (ATI Existing)	160
(3) DB980H120E-M (Future)	200	Pirod 15' T-Frame Sector Mount (1) (ATI Existing)	160
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
10-ft T-Frame (Future)	200	APXV18-206517S (MetroPCS Reserved)	150
(3) DB980H120E-M (Future)	190	LNX-6514DS-VTM (Verizon Proposed)	140
(3) DB980H120E-M (Future)	190	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	190	LNX-6514DS-VTM (Verizon Existing)	140
10-ft T-Frame (Future)	190	HBXX-6517DS (Verizon Proposed)	140
10-ft T-Frame (Future)	190	LNX-6514DS-VTM (Verizon Proposed)	140
10-ft T-Frame (Future)	190	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	180	LNX-6514DS-VTM (Verizon Existing)	140
(3) DB980H120E-M (Future)	180	HBXX-6517DS (Verizon Proposed)	140
(3) DB980H120E-M (Future)	180	LNX-6514DS-VTM (Verizon Proposed)	140
10-ft T-Frame (Future)	180	HBXX-6517DS (Verizon Proposed)	140
10-ft T-Frame (Future)	180	LNX-6514DS-VTM (Verizon Existing)	140
10-ft T-Frame (Future)	180	HBXX-6517DS (Verizon Proposed)	140
APXVSPP18-C-A20 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVTM14 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVSPP18-C-A20 (Sprint Existing)	170	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	140
APXVTM14 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
APXVSPP18-C-A20 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
APXVTM14 (Sprint Existing)	170	RRH2x60-AWS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 2x50 800 (Sprint Existing)	170	RRH2x60-PCS (Verizon Proposed)	140
FD-RRH 4x40 1900 (Sprint Existing)	170	DB-T1-6Z-8AB-0Z (Verizon Proposed)	140
FD-RRH 4x40 1900 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
FD-RRH 4x40 1900 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
TD-RRH8x20-25 (Sprint Existing)	170	Pirod 12' T-Frame Sector Mount (1) (Verizon Existing)	140
TD-RRH8x20-25 (Sprint Existing)	170		
TD-RRH8x20-25 (Sprint Existing)	170		
Pirod 15' T-Frame Sector Mount (1) (Sprint Existing)	170		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16		

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 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 77.5%

MAX. CORNER REACTIONS AT BASE:
DOWN: 575 K
UPLIFT: -456 K
SHEAR: 56 K

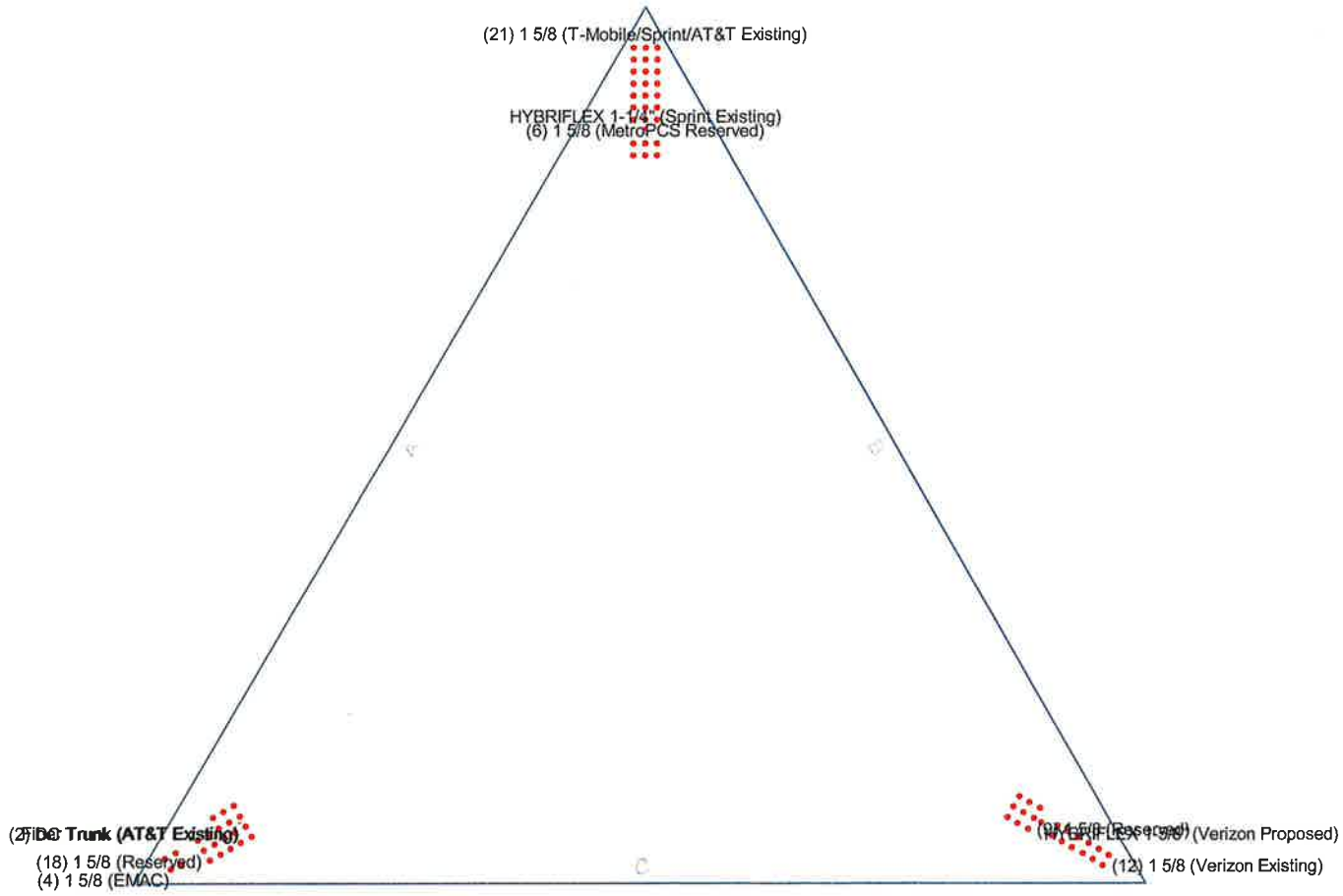
AXIAL 168 K
SHEAR 84 K
MOMENT 12593 kip-ft
TORQUE 13 kip-ft
74 mph WIND - 0.5000 in ICE

AXIAL 110 K
SHEAR 83 K
MOMENT 12233 kip-ft
TORQUE 11 kip-ft
REACTIONS - 85 mph WIND

Centek Engineering Inc.	Job: 15001.024 - Woodbridge North		
63-2 North Branford Rd.	Project: 280' PiROD Lattice Tower - 6 Progress Lane, Seymour, CT		
Branford, CT 06405	Client: Verizon Wireless	Drawn by: TJL	App'd:
Phone: (203) 488-0580	Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS
FAX: (203) 488-8587	Path: [illegible]		Dwg No. E-1

Feedline Plan

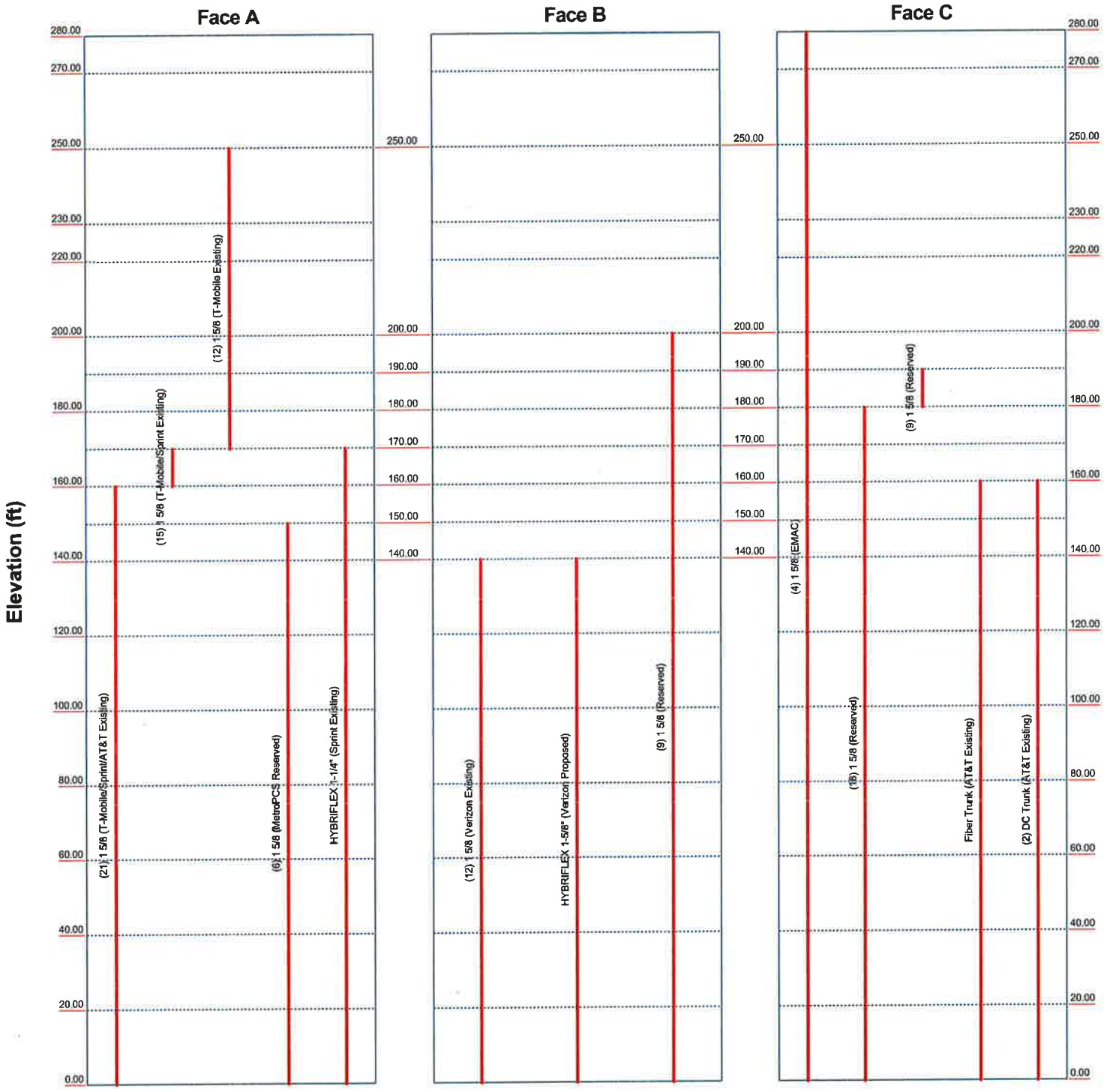
Round Flat App In Face App Out Face Truss-Leg



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: **15001.024 - Woodbridge North**		
	Project: **280' PiROD Lattice Tower - 6 Progress Lane, Seymour, CT**		
	Client: Verizon Wireless	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS
	Path:		Dwg No. E-7

Feedline Distribution Chart
0' - 280'

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



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

Job: 15001.024 - Woodbridge North			
Project: 280' PIROD Lattice Tower - 6 Progress Lane, Seymour, CT			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 03/04/15	Scale: NTS	
Path:		Dwg No. E-7	

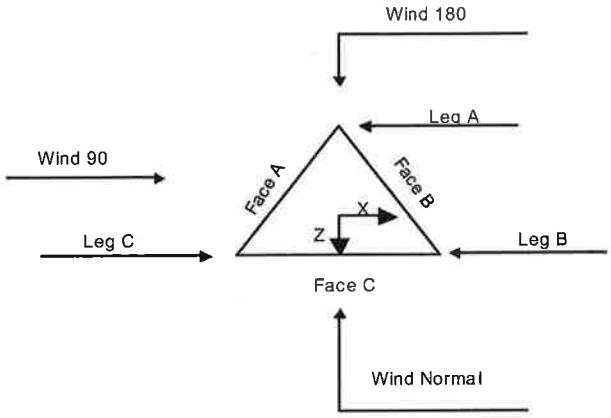
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 280.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 28.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	280.00-270.00			5.00	1	10.00
T2	270.00-250.00			5.00	1	20.00
T3	250.00-230.00			5.00	1	20.00
T4	230.00-220.00			5.00	1	10.00
T5	220.00-200.00			6.00	1	20.00
T6	200.00-180.00			8.00	1	20.00
T7	180.00-160.00			10.00	1	20.00
T8	160.00-140.00			12.00	1	20.00
T9	140.00-120.00			14.00	1	20.00
T10	120.00-100.00			16.00	1	20.00
T11	100.00-80.00			18.00	1	20.00
T12	80.00-60.00			20.00	1	20.00
T13	60.00-40.00			22.00	1	20.00
T14	40.00-20.00			24.00	1	20.00
T15	20.00-0.00			26.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in

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	280.00-270.00	2.25	X Brace	No	Steps	5.5000	6.5000
T2	270.00-250.00	2.38	X Brace	No	Steps	5.5000	6.5000
T3	250.00-230.00	2.38	X Brace	No	Steps	5.5000	6.5000
T4	230.00-220.00	10.00	X Brace	No	No	0.0000	0.0000
T5	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T6	200.00-180.00	10.00	X Brace	No	No	0.0000	0.0000
T7	180.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T8	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T9	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T10	120.00-100.00	20.00	X Brace	No	No	0.0000	0.0000
T11	100.00-80.00	20.00	X Brace	No	No	0.0000	0.0000
T12	80.00-60.00	20.00	X Brace	No	No	0.0000	0.0000
T13	60.00-40.00	20.00	X Brace	No	No	0.0000	0.0000
T14	40.00-20.00	20.00	X Brace	No	No	0.0000	0.0000
T15	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 280.00-270.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 270.00-250.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 250.00-230.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 230.00-220.00	Truss Leg	Pirod 105245	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 220.00-200.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T6 200.00-180.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T7 180.00-160.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T8 160.00-140.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 140.00-120.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 120.00-100.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 100.00-80.00	Truss Leg	Pirod 112743	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T12 80.00-60.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T13 60.00-40.00	Truss Leg	Pirod 112744	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T14 40.00-20.00	Truss Leg	Pirod 112745	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	A36 (36 ksi)
T15 20.00-0.00	Truss Leg	Pirod 112740	A572-50 (50 ksi)	Double Angle	2L3 1/2x3 1/2x5/16	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 280.00-270.00	Solid Round	1	A570-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T2 270.00-250.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 250.00-230.00	Solid Round	1 1/4	A572-50 (50 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)
T6 200.00-180.00	Single Angle	L3x3x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T7 180.00-160.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T8 160.00-140.00	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 280.00-270.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 270.00-250.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 250.00-230.00	None	Single Angle		A36 (36 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T6 200.00-180.00	1	Single Angle	L3x3x3/16	A36 (36 ksi)	Pipe		A572-50 (50 ksi)
T7 180.00-160.00	1	Single Angle	L4x4x1/4	A36 (36 ksi)	Pipe		A572-50 (50 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 280.00-270.00	0.00	0.0000	A36 (36 ksi)	1	1	1	30.0000	30.0000
T2 270.00-250.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 250.00-230.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 230.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6	0.00	0.0000	A36	1	1	1	36.0000	36.0000

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
200.00-180.00			(36 ksi)					
T7	0.00	0.0000	A36	1	1	1	36.0000	36.0000
180.00-160.00			(36 ksi)					
T8	0.00	0.0000	A36	1	1	1	36.0000	36.0000
160.00-140.00			(36 ksi)					
T9	0.00	0.0000	A36	1	1	1	36.0000	36.0000
140.00-120.00			(36 ksi)					
T10	0.00	0.0000	A36	1	1	1	36.0000	36.0000
120.00-100.00			(36 ksi)					
T11	0.00	0.0000	A36	1	1	1	36.0000	36.0000
100.00-80.00			(36 ksi)					
T12	0.00	0.0000	A36	1	1	1	36.0000	36.0000
80.00-60.00			(36 ksi)					
T13	0.00	0.0000	A36	1	1	1	36.0000	36.0000
60.00-40.00			(36 ksi)					
T14	0.00	0.0000	A36	1	1	1	36.0000	36.0000
40.00-20.00			(36 ksi)					
T15 20.00-0.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					

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
280.00-270.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
270.00-250.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
250.00-230.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
230.00-220.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T14	Yes	Yes	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	K Factors[1] 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
40.00-20.00				1	1	1	1	1	1	1
T15	Yes	Yes	1	1	1	1	1	1	1	1
20.00-0.00				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	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4 230.00-220.00	1	1	1	1	0.5	0.85
T5 220.00-200.00	1	1	1	1	0.5	0.85
T6 200.00-180.00	1	1	1	1	0.5	0.85
T7 180.00-160.00	1	1	1	1	0.5	0.85
T8 160.00-140.00	1	1	1	1	0.5	0.85
T9 140.00-120.00	1	1	1	1	0.5	0.85
T10 120.00-100.00	1	1	1	1	0.5	0.85
T11 100.00-80.00	1	1	1	1	0.5	0.85
T12 80.00-60.00	1	1	1	1	0.5	0.85
T13 60.00-40.00	1	1	1	1	0.5	0.85
T14 40.00-20.00	1	1	1	1	0.5	0.85
T15 20.00-0.00	1	1	1	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg: Net Width Deduct in	U	Diagonal: Net Width Deduct in	U	Top Girt: Net Width Deduct in	U	Bottom Girt: Net Width Deduct in	U	Mid Girt: Net Width Deduct in	U	Long Horizontal: Net Width Deduct in	U	Short Horizontal: Net Width Deduct in	U
T1 280.00-270.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	1	0.0000	0.75

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
T2 270.00-250.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 250.00-230.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 230.00-220.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 220.00-200.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 200.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T11 100.00-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 60.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T14 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T15 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 280.00-270.00	Sleeve DS	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 270.00-250.00	Sleeve DS	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 250.00-230.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 230.00-220.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 220.00-200.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 200.00-180.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T7 180.00-160.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.6250 A325N	0	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0
T8 160.00-140.00	Flange	1.2500 A325N	6	1.2500 A325N	1	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T9 140.00-120.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 120.00-100.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 100.00-80.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T12 80.00-60.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T13 60.00-40.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T14 40.00-20.00	Flange	1.2500 A325N	12	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T15 20.00-0.00	Flange	2.0000 A687	6	1.0000 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Verizon Existing)	B	No	Ar (Leg)	140.00 - 0.00	0.0000	0.075	12	6	1.9800	1.9800		1.04
1 5/8 (EMAC)	C	No	Ar (Leg)	280.00 - 0.00	0.0000	0.045	4	2	1.9800	1.9800		1.04
HYBRIFLEX 1-5/8" (Verizon Proposed)	B	No	Ar (Leg)	140.00 - 0.00	0.0000	0.12	1	1	1.9800	1.9800		1.90
1 5/8 (Reserved)	C	No	Ar (Leg)	180.00 - 0.00	0.0000	0.1	18	5	1.9800	1.9800		1.04
1 5/8 (Reserved)	C	No	Ar (Leg)	190.00 - 180.00	0.0000	0.1	9	5	1.9800	1.9800		1.04
1 5/8 (Reserved)	B	No	Ar (Leg)	200.00 - 0.00	0.0000	0.14	9	3	1.9800	1.9800		1.04
1 5/8 (T-Mobile/Sprint/AT&T Existing)	A	No	Ar (Leg)	160.00 - 0.00	0.0000	0.075	21	7	1.9800	1.9800		1.04
1 5/8 (T-Mobile/Sprint Existing)	A	No	Ar (Leg)	170.00 - 160.00	0.0000	0.1	15	8	1.9800	1.9800		1.04
1 5/8 (T-Mobile Existing)	A	No	Ar (Leg)	250.00 - 170.00	0.0000	0.12	12	8	1.9800	1.9800		1.04
1 5/8 (MetroPCS Reserved)	A	No	Ar (Leg)	150.00 - 0.00	0.0000	0.14	6	2	1.9800	1.9800		1.04
HYBRIFLEX 1-1/4" (Sprint Existing)	A	No	Ar (Leg)	170.00 - 0.00	0.0000	0.12	1	1	1.5400	1.5400		1.30
Fiber Trunk (AT&T	C	No	Ar (Leg)	160.00 - 0.00	0.0000	0.12	1	1	0.4000	0.4000		1.00

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
Existing) DC Trunk (AT&T Existing)	C	No	Ar (Leg)	160.00 - 0.00	0.0000	0.12	2	2	0.4000	0.4000		0.11

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	280.00-270.00	A	3.300	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	3.300	0.000	0.000	0.000	0.04
T2	270.00-250.00	A	6.600	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T3	250.00-230.00	A	33.000	0.000	0.000	0.000	0.25
		B	26.400	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T4	230.00-220.00	A	16.500	0.000	0.000	0.000	0.12
		B	13.200	0.000	0.000	0.000	0.00
		C	3.300	0.000	0.000	0.000	0.04
T5	220.00-200.00	A	33.000	0.000	0.000	0.000	0.25
		B	26.400	0.000	0.000	0.000	0.00
		C	6.600	0.000	0.000	0.000	0.08
T6	200.00-180.00	A	41.250	0.000	0.000	0.000	0.25
		B	36.300	0.000	0.000	0.000	0.19
		C	24.750	0.000	0.000	0.000	0.18
T7	180.00-160.00	A	50.783	0.000	0.000	0.000	0.29
		B	37.583	0.000	0.000	0.000	0.19
		C	33.000	0.000	0.000	0.000	0.46
T8	160.00-140.00	A	54.067	0.000	0.000	0.000	0.53
		B	38.867	0.000	0.000	0.000	0.19
		C	35.000	0.000	0.000	0.000	0.48
T9	140.00-120.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T10	120.00-100.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T11	100.00-80.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T12	80.00-60.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T13	60.00-40.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T14	40.00-20.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48
T15	20.00-0.00	A	57.367	0.000	0.000	0.000	0.59
		B	65.267	0.000	0.000	0.000	0.47
		C	58.100	0.000	0.000	0.000	0.48

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	280.00-270.00	A	0.500	4.967	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		4.967	0.000	0.000	0.000	0.10
T2	270.00-250.00	A	0.500	9.933	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T3	250.00-230.00	A	0.500	49.667	0.000	0.000	0.000	0.61
		B		39.733	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T4	230.00-220.00	A	0.500	24.833	0.000	0.000	0.000	0.31
		B		19.867	0.000	0.000	0.000	0.00
		C		4.967	0.000	0.000	0.000	0.10
T5	220.00-200.00	A	0.500	49.667	0.000	0.000	0.000	0.61
		B		39.733	0.000	0.000	0.000	0.00
		C		9.933	0.000	0.000	0.000	0.20
T6	200.00-180.00	A	0.500	62.083	0.000	0.000	0.000	0.61
		B		54.633	0.000	0.000	0.000	0.46
		C		37.250	0.000	0.000	0.000	0.43
T7	180.00-160.00	A	0.500	76.617	0.000	0.000	0.000	0.72
		B		56.750	0.000	0.000	0.000	0.46
		C		49.667	0.000	0.000	0.000	1.12
T8	160.00-140.00	A	0.500	83.400	1.333	0.000	0.000	1.28
		B		58.867	0.000	0.000	0.000	0.46
		C		54.333	1.333	0.000	0.000	1.18
T9	140.00-120.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T10	120.00-100.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T11	100.00-80.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T12	80.00-60.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T13	60.00-40.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T14	40.00-20.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18
T15	20.00-0.00	A	0.500	88.367	1.333	0.000	0.000	1.43
		B		98.600	0.000	0.000	0.000	1.14
		C		89.100	1.333	0.000	0.000	1.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	280.00-270.00	-3.1462	1.8165	-2.6197	1.5125

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T2	270.00-250.00	-3.1659	1.8278	-2.6997	1.5587
T3	250.00-230.00	-1.5517	-5.2613	-1.4662	-4.9715
T4	230.00-220.00	-1.2007	-4.0713	-1.1575	-3.9249
T5	220.00-200.00	-1.4063	-4.7683	-1.4111	-4.7847
T6	200.00-180.00	-1.3364	-2.8058	-1.3504	-2.8352
T7	180.00-160.00	-2.9750	-2.4834	-3.0266	-2.5556
T8	160.00-140.00	-3.7712	-3.2543	-3.8900	-3.2819
T9	140.00-120.00	1.6210	-0.8709	1.5338	-0.8810
T10	120.00-100.00	1.8025	-0.9684	1.7170	-0.9863
T11	100.00-80.00	2.0034	-1.0763	1.9098	-1.0970
T12	80.00-60.00	2.1687	-1.1651	2.0729	-1.1907
T13	60.00-40.00	2.3568	-1.2662	2.2550	-1.2953
T14	40.00-20.00	2.4973	-1.3417	2.3944	-1.3754
T15	20.00-0.00	2.6759	-1.4376	2.5683	-1.4753

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
Flash Beacon Lighting (EMAC)	B	None			0.0000	280.00	No Ice	2.70	2.70	0.05
							1/2" Ice	3.10	3.10	0.07
15' Lighting Rod (EMAC)	B	From Leg	0.00	6.00	0.0000	280.00	No Ice	4.50	4.50	0.05
			0.00				1/2" Ice	6.03	6.03	0.08
DB420-A (EMAC)	B	From Centroid-Face	8.00	9.50	0.0000	280.00	No Ice	3.33	3.33	0.03
			0.00				1/2" Ice	5.99	5.99	0.04
DB586-XC (EMAC)	A	From Centroid-Face	8.00	3.00	0.0000	280.00	No Ice	1.01	1.01	0.01
			0.00				1/2" Ice	1.28	1.28	0.02
9 Arm Halo Mount (EMAC)	A	None			0.0000	280.00	No Ice	62.60	62.60	3.60
							1/2" Ice	80.40	80.40	4.80
RR90-17-02DP (T-Mobile Existing)	A	From Leg	3.00	0.00	0.0000	250.00	No Ice	4.36	1.97	0.02
			-5.00				1/2" Ice	4.77	2.31	0.04
LNX-6515DS (T-Mobile Existing)	A	From Leg	3.00	0.00	0.0000	250.00	No Ice	11.45	7.70	0.06
			5.00				1/2" Ice	12.06	8.29	0.12
RR90-17-02DP (T-Mobile Existing)	B	From Leg	3.00	0.00	0.0000	250.00	No Ice	4.36	1.97	0.02
			-5.00				1/2" Ice	4.77	2.31	0.04
LNX-6515DS (T-Mobile Existing)	B	From Leg	3.00	0.00	0.0000	250.00	No Ice	11.45	7.70	0.06
			5.00				1/2" Ice	12.06	8.29	0.12
RR90-17-02DP (T-Mobile Existing)	C	From Leg	3.00	0.00	0.0000	250.00	No Ice	4.36	1.97	0.02
			-5.00				1/2" Ice	4.77	2.31	0.04
LNX-6515DS (T-Mobile Existing)	C	From Leg	3.00	0.00	0.0000	250.00	No Ice	11.45	7.70	0.06
			5.00				1/2" Ice	12.06	8.29	0.12
TMA 10"x8"x3"	A	From Leg	3.00	0.00	0.0000	250.00	No Ice	0.78	0.29	0.02

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
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
TMA 10"x8"x3"	B	From Leg	3.00	0.0000	250.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
TMA 10"x8"x3"	C	From Leg	3.00	0.0000	250.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
Pirod 15' T-Frame Sector	A	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	1.00	0.0000	250.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(T-Mobile Existing)			0.00						
DB420-A	B	From	8.00	0.0000	245.00	No Ice	3.33	3.33	0.03
(EMAC)		Centroid-Fa	0.00			1/2" Ice	5.99	5.99	0.04
		ce	9.00						
DB225-2-F	A	From	8.00	0.0000	235.00	No Ice	1.36	1.36	0.05
(EMAC)		Centroid-Fa	0.00			1/2" Ice	2.45	2.45	0.07
		ce	0.00						
9 Arm Halo Mount	A	None		0.0000	235.00	No Ice	62.60	62.60	3.60
(EMAC)						1/2" Ice	80.40	80.40	4.80
(3) DB980H120E-M	A	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	B	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	C	From Leg	3.00	0.0000	200.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
10-ft T-Frame	A	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	B	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	C	From Leg	1.00	0.0000	200.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
(3) DB980H120E-M	A	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	B	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	C	From Leg	3.00	0.0000	190.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
10-ft T-Frame	A	From Leg	1.00	0.0000	190.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	B	From Leg	1.00	0.0000	190.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53

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
			0.00						
10-ft T-Frame	C	From Leg	1.00	0.0000	190.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
(3) DB980H120E-M	A	From Leg	3.00	0.0000	180.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	B	From Leg	3.00	0.0000	180.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
(3) DB980H120E-M	C	From Leg	3.00	0.0000	180.00	No Ice	3.75	2.17	0.01
(Future)			0.00			1/2" Ice	4.13	2.53	0.03
			0.00						
10-ft T-Frame	A	From Leg	1.00	0.0000	180.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	B	From Leg	1.00	0.0000	180.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
10-ft T-Frame	C	From Leg	1.00	0.0000	180.00	No Ice	13.60	13.60	0.38
(Future)			0.00			1/2" Ice	17.50	17.50	0.53
			0.00						
APXVSPP18-C-A20	A	From Leg	3.00	0.0000	170.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVTM14	A	From Leg	3.00	0.0000	170.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			-5.00			1/2" Ice	7.35	3.97	0.10
			0.00						
APXVSPP18-C-A20	B	From Leg	3.00	0.0000	170.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVTM14	B	From Leg	3.00	0.0000	170.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			-5.00			1/2" Ice	7.35	3.97	0.10
			0.00						
APXVSPP18-C-A20	C	From Leg	3.00	0.0000	170.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVTM14	C	From Leg	3.00	0.0000	170.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			-5.00			1/2" Ice	7.35	3.97	0.10
			0.00						
FD-RRH 2x50 800	A	From Leg	0.50	0.0000	170.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			2.00			1/2" Ice	2.61	2.46	0.09
			2.00						
FD-RRH 2x50 800	B	From Leg	0.50	0.0000	170.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			2.00			1/2" Ice	2.61	2.46	0.09
			2.00						
FD-RRH 2x50 800	C	From Leg	0.50	0.0000	170.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			2.00			1/2" Ice	2.61	2.46	0.09
			2.00						
FD-RRH 4x40 1900	A	From Leg	0.50	0.0000	170.00	No Ice	2.61	2.71	0.06
(Sprint Existing)			2.00			1/2" Ice	2.84	2.95	0.08
			0.00						
FD-RRH 4x40 1900	B	From Leg	0.50	0.0000	170.00	No Ice	2.61	2.71	0.06
(Sprint Existing)			2.00			1/2" Ice	2.84	2.95	0.08
			0.00						
FD-RRH 4x40 1900	C	From Leg	0.50	0.0000	170.00	No Ice	2.61	2.71	0.06
(Sprint Existing)			2.00			1/2" Ice	2.84	2.95	0.08

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
			0.00						
TD-RRH8x20-25	A	From Leg	3.00	0.0000	170.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			-5.00			1/2" Ice	5.01	1.92	0.10
			0.00						
TD-RRH8x20-25	B	From Leg	3.00	0.0000	170.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			-5.00			1/2" Ice	5.01	1.92	0.10
			0.00						
TD-RRH8x20-25	C	From Leg	3.00	0.0000	170.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			-5.00			1/2" Ice	5.01	1.92	0.10
			0.00						
Pirod 15' T-Frame Sector	A	From Leg	1.00	0.0000	170.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Sprint Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	1.00	0.0000	170.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Sprint Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	1.00	0.0000	170.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Sprint Existing)			0.00						
7770.00	A	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-5.00			1/2" Ice	6.31	3.27	0.07
			0.00						
AM-X-CD-16-65-00T-RET(72")	A	From Leg	3.00	0.0000	160.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
7770.00	A	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Reserved)			5.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(4) LPG21401 TMA	A	From Leg	3.00	0.0000	160.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) 7020 Dual Band RET	A	From Leg	3.00	0.0000	160.00	No Ice	0.40	0.20	0.00
(AT&T Existing)			0.00			1/2" Ice	0.49	0.27	0.01
			0.00						
7770.00	B	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-5.00			1/2" Ice	6.31	3.27	0.07
			0.00						
AM-X-CD-16-65-00T-RET(72")	B	From Leg	3.00	0.0000	160.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
7770.00	B	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Reserved)			5.00			1/2" Ice	6.31	3.27	0.07
			0.00						
(4) LPG21401 TMA	B	From Leg	3.00	0.0000	160.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) 7020 Dual Band RET	B	From Leg	3.00	0.0000	160.00	No Ice	0.40	0.20	0.00
(AT&T Existing)			0.00			1/2" Ice	0.49	0.27	0.01
			0.00						
7770.00	C	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-5.00			1/2" Ice	6.31	3.27	0.07
			0.00						
AM-X-CD-16-65-00T-RET(72")	C	From Leg	3.00	0.0000	160.00	No Ice	8.26	4.64	0.05
			0.00			1/2" Ice	8.81	5.09	0.10
(AT&T Existing)			0.00						
7770.00	C	From Leg	3.00	0.0000	160.00	No Ice	5.88	2.93	0.04
(AT&T Reserved)			5.00			1/2" Ice	6.31	3.27	0.07

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
			0.00						
(4) LPG21401 TMA	C	From Leg	3.00	0.0000	160.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			0.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) 7020 Dual Band RET	C	From Leg	3.00	0.0000	160.00	No Ice	0.40	0.20	0.00
(AT&T Existing)			0.00			1/2" Ice	0.49	0.27	0.01
			0.00						
(2) RRUS-11	A	From Leg	2.00	0.0000	160.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			0.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	B	From Leg	2.00	0.0000	160.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			0.00			1/2" Ice	3.23	1.41	0.07
			0.00						
(2) RRUS-11	C	From Leg	2.00	0.0000	160.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			0.00			1/2" Ice	3.23	1.41	0.07
			0.00						
DC6-48-60-18-8F Surge	A	From Leg	2.00	0.0000	160.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T Existing)			0.00						
Pirod 15' T-Frame Sector	A	From Leg	1.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(AT&T Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	1.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(AT&T Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	1.00	0.0000	160.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(AT&T Existing)			0.00						
APXV18-206517S	A	From Leg	0.50	0.0000	150.00	No Ice	5.17	3.04	0.03
(MetroPCS Reserved)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
APXV18-206517S	B	From Leg	0.50	0.0000	150.00	No Ice	5.17	3.04	0.03
(MetroPCS Reserved)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
APXV18-206517S	C	From Leg	0.50	0.0000	150.00	No Ice	5.17	3.04	0.03
(MetroPCS Reserved)			0.00			1/2" Ice	5.62	3.47	0.05
			0.00						
LNX-6514DS-VTM	A	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			-6.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	A	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-VTM	A	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	A	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-VTM	B	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			-6.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	B	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-VTM	B	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09

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
			0.00						
HBXX-6517DS	B	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-VTM	C	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Proposed)			-6.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	C	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			-4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
LNX-6514DS-VTM	C	From Leg	3.00	0.0000	140.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
HBXX-6517DS	C	From Leg	3.00	0.0000	140.00	No Ice	8.74	5.24	0.05
(Verizon Proposed)			4.00			1/2" Ice	9.31	5.71	0.10
			0.00						
(2) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	140.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
(2) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	140.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
(2) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	140.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
RRH2x60-AWS	A	From Leg	3.00	0.0000	140.00	No Ice	3.78	2.07	0.06
(Verizon Proposed)			-4.00			1/2" Ice	4.09	2.35	0.08
			0.00						
RRH2x60-AWS	B	From Leg	3.00	0.0000	140.00	No Ice	3.78	2.07	0.06
(Verizon Proposed)			-4.00			1/2" Ice	4.09	2.35	0.08
			0.00						
RRH2x60-AWS	C	From Leg	3.00	0.0000	140.00	No Ice	3.78	2.07	0.06
(Verizon Proposed)			-4.00			1/2" Ice	4.09	2.35	0.08
			0.00						
RRH2x60-PCS	A	From Leg	3.00	0.0000	140.00	No Ice	2.51	1.55	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	B	From Leg	3.00	0.0000	140.00	No Ice	2.51	1.55	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	C	From Leg	3.00	0.0000	140.00	No Ice	2.51	1.55	0.06
(Verizon Proposed)			4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
DB-T1-6Z-8AB-0Z	A	From Leg	1.00	0.0000	140.00	No Ice	5.60	2.33	0.04
(Verizon Proposed)			0.00			1/2" Ice	5.92	2.56	0.08
			0.00						
Pirod 12' T-Frame Sector	A	From Leg	1.00	0.0000	140.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Verizon Existing)			0.00						
Pirod 12' T-Frame Sector	B	From Leg	1.00	0.0000	140.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Verizon Existing)			0.00						
Pirod 12' T-Frame Sector	C	From Leg	1.00	0.0000	140.00	No Ice	13.60	13.60	0.47
Mount (1)			0.00			1/2" Ice	18.40	18.40	0.60
(Verizon Existing)			0.00						

Truss-Leg Properties

Section Designation	Area	Area Ice	Self Weight	Ice Weight	Equiv. Diameter	Equiv. Diameter Ice	Leg Area
	in^2	in^2	K	K	in	in	in^2
Pirod 105245	1090.3344	1814.3549	0.64	0.22	7.5718	12.5997	5.3014
Pirod 105218	2425.3141	3778.2146	0.69	0.45	8.4212	13.1188	7.2158
Pirod 105218	2425.3141	3778.2146	0.69	0.45	8.4212	13.1188	7.2158
Pirod 105219	2597.9095	4038.9458	1.03	0.48	9.0205	14.0241	9.4248
Pirod 105220	2735.0688	4240.4956	1.20	0.50	9.4968	14.7239	11.9282
Pirod 105220	2735.0688	4240.4956	1.20	0.50	9.4968	14.7239	11.9282
Pirod 112743	3389.3479	5023.2440	1.68	0.67	11.7686	17.4418	14.7262
Pirod 112743	3389.3479	5023.2440	1.68	0.67	11.7686	17.4418	14.7262
Pirod 112744	3520.4700	5193.9136	1.88	0.69	12.2239	18.0344	17.8187
Pirod 112744	3520.4700	5193.9136	1.88	0.69	12.2239	18.0344	17.8187
Pirod 112745	3701.5410	5446.9486	2.15	0.71	12.8526	18.9130	21.2058
Pirod 112740	3701.5410	5446.9486	2.15	0.71	12.8526	18.9130	21.2058

Tower Pressures - No Ice

$G_H = 1.092$

Section Elevation	z	K_z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
T1	275.00	1.833	34	51.458	A	0.000	10.535	2.917	27.68	0.000	0.000
280.00-270.00					B	0.000	7.235		40.31	0.000	0.000
					C	0.000	11.243		25.94	0.000	0.000
T2	260.00	1.804	33	103.333	A	0.000	20.718	6.667	32.18	0.000	0.000
270.00-250.00					B	0.000	14.118		47.22	0.000	0.000
					C	0.000	22.832		29.20	0.000	0.000
T3	240.00	1.763	33	104.167	A	0.000	49.405	8.333	16.87	0.000	0.000
250.00-230.00					B	0.000	42.805		19.47	0.000	0.000
					C	0.000	25.450		32.74	0.000	0.000
T4	225.00	1.731	32	66.264	A	4.235	29.141	12.641	37.87	0.000	0.000
230.00-220.00					B	4.235	25.841		42.03	0.000	0.000
					C	4.235	15.941		62.65	0.000	0.000
T5	210.00	1.697	31	162.945	A	10.467	61.118	28.118	39.28	0.000	0.000
220.00-200.00					B	10.467	54.518		43.27	0.000	0.000
					C	10.467	34.718		62.23	0.000	0.000
T6	190.00	1.649	30	202.945	A	15.714	69.368	28.118	33.05	0.000	0.000
200.00-180.00					B	15.714	64.418		35.09	0.000	0.000
					C	15.714	52.868		41.00	0.000	0.000
T7	170.00	1.597	30	243.362	A	19.853	80.902	30.118	29.89	0.000	0.000
180.00-160.00					B	19.853	67.702		34.40	0.000	0.000
					C	19.853	63.118		36.30	0.000	0.000
T8	150.00	1.541	29	283.780	A	20.877	85.775	31.709	29.73	0.000	0.000
160.00-140.00					B	20.877	70.575		34.67	0.000	0.000
					C	20.877	66.709		36.20	0.000	0.000
T9	130.00	1.48	27	323.780	A	19.635	89.075	31.709	29.17	0.000	0.000
140.00-120.00					B	19.635	96.975		27.19	0.000	0.000
					C	19.635	89.809		28.97	0.000	0.000
T10	110.00	1.411	26	374.209	A	14.190	96.661	39.294	35.45	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
120.00-100.00					B	14.190	104.561		33.09	0.000	0.000
					C	14.190	97.394		35.21	0.000	0.000
T11	90.00	1.332	25	414.209	A	14.825	96.661	39.294	35.25	0.000	0.000
100.00-80.00					B	14.825	104.561		32.91	0.000	0.000
					C	14.825	97.394		35.02	0.000	0.000
T12	70.00	1.24	23	454.627	A	15.712	98.181	40.814	35.84	0.000	0.000
80.00-60.00					B	15.712	106.081		33.51	0.000	0.000
					C	15.712	98.914		35.61	0.000	0.000
T13	50.00	1.126	21	494.627	A	16.624	98.181	40.814	35.55	0.000	0.000
60.00-40.00					B	16.624	106.081		33.26	0.000	0.000
					C	16.624	98.914		35.33	0.000	0.000
T14	30.00	1	18	535.044	A	17.558	100.280	42.913	36.42	0.000	0.000
40.00-20.00					B	17.558	108.180		34.13	0.000	0.000
					C	17.558	101.013		36.19	0.000	0.000
T15 20.00-0.00	10.00	1	18	575.044	A	18.514	100.280	42.913	36.12	0.000	0.000
					B	18.514	108.180		33.87	0.000	0.000
					C	18.514	101.013		35.90	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.092$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	275.00	1.833	25	0.5000	52.292	A	0.000	18.631	4.583	24.60	0.000	0.000
280.00-270.00						B	0.000	13.664		33.54	0.000	0.000
						C	0.000	20.148		22.75	0.000	0.000
T2	260.00	1.804	25	0.5000	105.000	A	0.000	35.727	10.000	27.99	0.000	0.000
270.00-250.00						B	0.000	25.794		38.77	0.000	0.000
						C	0.000	40.258		24.84	0.000	0.000
T3	240.00	1.763	24	0.5000	105.833	A	0.000	77.276	11.667	15.10	0.000	0.000
250.00-230.00						B	0.000	67.343		17.32	0.000	0.000
						C	0.000	42.784		27.27	0.000	0.000
T4	225.00	1.731	24	0.5000	67.098	A	4.235	47.562	21.034	40.61	0.000	0.000
230.00-220.00						B	4.235	42.595		44.92	0.000	0.000
						C	4.235	27.695		65.88	0.000	0.000
T5	210.00	1.697	24	0.5000	164.614	A	10.467	96.958	43.802	40.77	0.000	0.000
220.00-200.00						B	10.467	87.025		44.93	0.000	0.000
						C	10.467	57.225		64.71	0.000	0.000
T6	190.00	1.649	23	0.5000	204.614	A	15.714	111.124	43.802	34.53	0.000	0.000
200.00-180.00						B	15.714	103.674		36.69	0.000	0.000
						C	15.714	86.290		42.94	0.000	0.000
T7	170.00	1.597	22	0.5000	245.031	A	19.853	129.532	46.825	31.35	0.000	0.000
180.00-160.00						B	19.853	109.665		36.15	0.000	0.000
						C	19.853	102.582		38.24	0.000	0.000
T8	150.00	1.541	21	0.5000	285.448	A	22.210	138.526	49.162	30.59	0.000	0.000
160.00-140.00						B	20.877	113.993		36.45	0.000	0.000
						C	22.210	109.460		37.34	0.000	0.000
T9	130.00	1.48	21	0.5000	325.448	A	20.968	143.138	49.162	29.96	0.000	0.000
140.00-120.00						B	19.635	153.371		28.42	0.000	0.000
						C	20.968	143.871		29.82	0.000	0.000
T10	110.00	1.411	20	0.5000	375.878	A	15.523	150.657	58.236	35.04	0.000	0.000
120.00-100.00						B	14.190	160.891		33.26	0.000	0.000
						C	15.523	151.391		34.89	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
T11	90.00	1.332	18	0.5000	415.878	A	16.159	150.839	58.236	34.87	0.000	0.000
100.00-80.00						B	14.825	161.072		33.11	0.000	0.000
						C	16.159	151.572		34.72	0.000	0.000
T12 80.00-60.00	70.00	1.24	17	0.5000	456.295	A	17.045	153.071	60.215	35.40	0.000	0.000
						B	15.712	163.304		33.64	0.000	0.000
						C	17.045	153.804		35.24	0.000	0.000
T13 60.00-40.00	50.00	1.126	16	0.5000	496.295	A	17.957	153.331	60.215	35.15	0.000	0.000
						B	16.624	163.564		33.42	0.000	0.000
						C	17.957	154.064		35.00	0.000	0.000
T14 40.00-20.00	30.00	1	14	0.5000	536.712	A	18.892	156.532	63.148	36.00	0.000	0.000
						B	17.558	166.765		34.26	0.000	0.000
						C	18.892	157.265		35.85	0.000	0.000
T15 20.00-0.00	10.00	1	14	0.5000	576.712	A	19.848	156.805	63.148	35.75	0.000	0.000
						B	18.514	167.038		34.03	0.000	0.000
						C	19.848	157.538		35.60	0.000	0.000

Tower Pressure - Service

$G_H = 1.092$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	275.00	1.833	12	51.458	A	0.000	10.535	2.917	27.68	0.000	0.000
280.00-270.00					B	0.000	7.235		40.31	0.000	0.000
					C	0.000	11.243		25.94	0.000	0.000
T2	260.00	1.804	12	103.333	A	0.000	20.718	6.667	32.18	0.000	0.000
270.00-250.00					B	0.000	14.118		47.22	0.000	0.000
					C	0.000	22.832		29.20	0.000	0.000
T3	240.00	1.763	11	104.167	A	0.000	49.405	8.333	16.87	0.000	0.000
250.00-230.00					B	0.000	42.805		19.47	0.000	0.000
					C	0.000	25.450		32.74	0.000	0.000
T4	225.00	1.731	11	66.264	A	4.235	29.141	12.641	37.87	0.000	0.000
230.00-220.00					B	4.235	25.841		42.03	0.000	0.000
					C	4.235	15.941		62.65	0.000	0.000
T5	210.00	1.697	11	162.945	A	10.467	61.118	28.118	39.28	0.000	0.000
220.00-200.00					B	10.467	54.518		43.27	0.000	0.000
					C	10.467	34.718		62.23	0.000	0.000
T6	190.00	1.649	11	202.945	A	15.714	69.368	28.118	33.05	0.000	0.000
200.00-180.00					B	15.714	64.418		35.09	0.000	0.000
					C	15.714	52.868		41.00	0.000	0.000
T7	170.00	1.597	10	243.362	A	19.853	80.902	30.118	29.89	0.000	0.000
180.00-160.00					B	19.853	67.702		34.40	0.000	0.000
					C	19.853	63.118		36.30	0.000	0.000
T8	150.00	1.541	10	283.780	A	20.877	85.775	31.709	29.73	0.000	0.000
160.00-140.00					B	20.877	70.575		34.67	0.000	0.000
					C	20.877	66.709		36.20	0.000	0.000
T9	130.00	1.48	9	323.780	A	19.635	89.075	31.709	29.17	0.000	0.000
140.00-120.00					B	19.635	96.975		27.19	0.000	0.000
					C	19.635	89.809		28.97	0.000	0.000
T10	110.00	1.411	9	374.209	A	14.190	96.661	39.294	35.45	0.000	0.000
120.00-100.00					B	14.190	104.561		33.09	0.000	0.000
					C	14.190	97.394		35.21	0.000	0.000
T11	90.00	1.332	9	414.209	A	14.825	96.661	39.294	35.25	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
100.00-80.00					B	14.825	104.561		32.91	0.000	0.000
					C	14.825	97.394		35.02	0.000	0.000
T12	70.00	1.24	8	454.627	A	15.712	98.181	40.814	35.84	0.000	0.000
80.00-60.00					B	15.712	106.081		33.51	0.000	0.000
					C	15.712	98.914		35.61	0.000	0.000
T13	50.00	1.126	7	494.627	A	16.624	98.181	40.814	35.55	0.000	0.000
60.00-40.00					B	16.624	106.081		33.26	0.000	0.000
					C	16.624	98.914		35.33	0.000	0.000
T14	30.00	1	6	535.044	A	17.558	100.280	42.913	36.42	0.000	0.000
40.00-20.00					B	17.558	108.180		34.13	0.000	0.000
					C	17.558	101.013		36.19	0.000	0.000
T15 20.00-0.00	10.00	1	6	575.044	A	18.514	100.280	42.913	36.12	0.000	0.000
					B	18.514	108.180		33.87	0.000	0.000
					C	18.514	101.013		35.90	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	1	1	6.230	0.63	62.72	C
280.00-270.00			B	0.141	2.806	0.58	1	1	4.197			
			C	0.218	2.535	0.594	1	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	1	1	12.234	1.25	62.53	C
270.00-250.00			B	0.137	2.821	0.58	1	1	8.181			
			C	0.221	2.527	0.595	1	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	1	1	33.828	2.33	116.58	A
250.00-230.00			B	0.411	2.043	0.656	1	1	28.085			
			C	0.244	2.455	0.6	1	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	1	1	24.615	1.63	163.08	A
230.00-220.00			B	0.454	1.967	0.675	1	1	21.679			
			C	0.304	2.284	0.617	1	1	14.075			
T5	0.33	2.61	A	0.439	1.991	0.668	1	1	51.320	3.50	175.13	A
220.00-200.00			B	0.399	2.066	0.651	1	1	45.964			
			C	0.277	2.358	0.609	1	1	31.618			
T6	0.61	2.85	A	0.419	2.027	0.66	1	1	61.472	4.15	207.53	A
200.00-180.00			B	0.395	2.074	0.65	1	1	57.554			
			C	0.338	2.2	0.628	1	1	48.928			
T7	0.94	4.60	A	0.414	2.037	0.657	1	1	73.039	4.80	240.02	A
180.00-160.00			B	0.36	2.149	0.636	1	1	62.912			
			C	0.341	2.193	0.629	1	1	59.572			
T8	1.19	5.27	A	0.376	2.114	0.642	1	1	75.947	5.00	249.90	A
160.00-140.00			B	0.322	2.238	0.623	1	1	64.842			
			C	0.309	2.273	0.619	1	1	62.141			
T9	1.54	5.15	A	0.336	2.205	0.627	1	1	75.529	5.22	261.06	B
140.00-120.00			B	0.36	2.148	0.636	1	1	81.326			
			C	0.338	2.2	0.628	1	1	76.059			
T10	1.54	7.28	A	0.296	2.306	0.615	1	1	73.612	5.08	253.84	B
120.00-100.00			B	0.317	2.251	0.621	1	1	79.160			
			C	0.298	2.301	0.615	1	1	74.121			
T11	1.54	7.40	A	0.269	2.381	0.607	1	1	73.493	4.94	246.92	B
100.00-80.00			B	0.288	2.328	0.612	1	1	78.855			
			C	0.271	2.376	0.607	1	1	73.986			
T12	1.54	8.13	A	0.251	2.436	0.602	1	1	74.817	4.78	239.05	B
80.00-60.00			B	0.268	2.385	0.607	1	1	80.061			
			C	0.252	2.431	0.602	1	1	75.300			

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
T13	1.54	8.26	A	0.232	2.492	0.597	1	1	75.284	4.47	223.45	B
60.00-40.00			B	0.248	2.443	0.601	1	1	80.419			
			C	0.234	2.488	0.598	1	1	75.757			
T14	1.54	9.20	A	0.22	2.53	0.595	1	1	77.199	4.13	206.32	B
40.00-20.00			B	0.235	2.483	0.598	1	1	82.268			
			C	0.222	2.525	0.595	1	1	77.666			
T15	1.54	9.34	A	0.207	2.574	0.592	1	1	77.857	4.23	211.67	B
20.00-0.00			B	0.22	2.53	0.595	1	1	82.855			
			C	0.208	2.57	0.592	1	1	78.318			
Sum Weight:	14.51	75.22						OTM	6919.97 kip-ft	56.14		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.825	1	6.230	0.63	62.72	C
280.00-270.00			B	0.141	2.806	0.58	0.825	1	4.197			
			C	0.218	2.535	0.594	0.825	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.825	1	12.234	1.25	62.53	C
270.00-250.00			B	0.137	2.821	0.58	0.825	1	8.181			
			C	0.221	2.527	0.595	0.825	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.825	1	33.828	2.33	116.58	A
250.00-230.00			B	0.411	2.043	0.656	0.825	1	28.085			
			C	0.244	2.455	0.6	0.825	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.825	1	23.874	1.58	158.17	A
230.00-220.00			B	0.454	1.967	0.675	0.825	1	20.938			
			C	0.304	2.284	0.617	0.825	1	13.334			
T5	0.33	2.61	A	0.439	1.991	0.668	0.825	1	49.488	3.38	168.88	A
220.00-200.00			B	0.399	2.066	0.651	0.825	1	44.133			
			C	0.277	2.358	0.609	0.825	1	29.786			
T6	0.61	2.85	A	0.419	2.027	0.66	0.825	1	58.722	3.96	198.24	A
200.00-180.00			B	0.395	2.074	0.65	0.825	1	54.804			
			C	0.338	2.2	0.628	0.825	1	46.178			
T7	0.94	4.60	A	0.414	2.037	0.657	0.825	1	69.565	4.57	228.60	A
180.00-160.00			B	0.36	2.149	0.636	0.825	1	59.438			
			C	0.341	2.193	0.629	0.825	1	56.098			
T8	1.19	5.27	A	0.376	2.114	0.642	0.825	1	72.294	4.76	237.88	A
160.00-140.00			B	0.322	2.238	0.623	0.825	1	61.189			
			C	0.309	2.273	0.619	0.825	1	58.488			
T9	1.54	5.15	A	0.336	2.205	0.627	0.825	1	72.093	5.00	250.03	B
140.00-120.00			B	0.36	2.148	0.636	0.825	1	77.890			
			C	0.338	2.2	0.628	0.825	1	72.623			
T10	1.54	7.28	A	0.296	2.306	0.615	0.825	1	71.129	4.92	245.87	B
120.00-100.00			B	0.317	2.251	0.621	0.825	1	76.676			
			C	0.298	2.301	0.615	0.825	1	71.638			
T11	1.54	7.40	A	0.269	2.381	0.607	0.825	1	70.899	4.78	238.80	B
100.00-80.00			B	0.288	2.328	0.612	0.825	1	76.260			
			C	0.271	2.376	0.607	0.825	1	71.391			
T12	1.54	8.13	A	0.251	2.436	0.602	0.825	1	72.068	4.62	230.84	B
80.00-60.00			B	0.268	2.385	0.607	0.825	1	77.311			
			C	0.252	2.431	0.602	0.825	1	72.550			
T13	1.54	8.26	A	0.232	2.492	0.597	0.825	1	72.375	4.31	215.37	B
60.00-40.00			B	0.248	2.443	0.601	0.825	1	77.510			

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	0.234	2.488	0.598	0.825	1	72.848			
T14	1.54	9.20	A	0.22	2.53	0.595	0.825	1	74.126	3.97	198.62	B
40.00-20.00			B	0.235	2.483	0.598	0.825	1	79.195			
			C	0.222	2.525	0.595	0.825	1	74.593			
T15	1.54	9.34	A	0.207	2.574	0.592	0.825	1	74.617	4.07	203.39	B
20.00-0.00			B	0.22	2.53	0.595	0.825	1	79.615			
			C	0.208	2.57	0.592	0.825	1	75.078			
Sum Weight:	14.51	75.22						OTM	6685.84 kip-ft	54.12		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.8	1	6.230	0.63	62.72	C
280.00-270.00			B	0.141	2.806	0.58	0.8	1	4.197			
			C	0.218	2.535	0.594	0.8	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.8	1	12.234	1.25	62.53	C
270.00-250.00			B	0.137	2.821	0.58	0.8	1	8.181			
			C	0.221	2.527	0.595	0.8	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.8	1	33.828	2.33	116.58	A
250.00-230.00			B	0.411	2.043	0.656	0.8	1	28.085			
			C	0.244	2.455	0.6	0.8	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.8	1	23.768	1.57	157.47	A
230.00-220.00			B	0.454	1.967	0.675	0.8	1	20.832			
			C	0.304	2.284	0.617	0.8	1	13.228			
T5	0.33	2.61	A	0.439	1.991	0.668	0.8	1	49.226	3.36	167.99	A
220.00-200.00			B	0.399	2.066	0.651	0.8	1	43.871			
			C	0.277	2.358	0.609	0.8	1	29.524			
T6	0.61	2.85	A	0.419	2.027	0.66	0.8	1	58.329	3.94	196.92	A
200.00-180.00			B	0.395	2.074	0.65	0.8	1	54.411			
			C	0.338	2.2	0.628	0.8	1	45.785			
T7	0.94	4.60	A	0.414	2.037	0.657	0.8	1	69.069	4.54	226.97	A
180.00-160.00			B	0.36	2.149	0.636	0.8	1	58.942			
			C	0.341	2.193	0.629	0.8	1	55.602			
T8	1.19	5.27	A	0.376	2.114	0.642	0.8	1	71.772	4.72	236.16	A
160.00-140.00			B	0.322	2.238	0.623	0.8	1	60.667			
			C	0.309	2.273	0.619	0.8	1	57.966			
T9	1.54	5.15	A	0.336	2.205	0.627	0.8	1	71.602	4.97	248.46	B
140.00-120.00			B	0.36	2.148	0.636	0.8	1	77.399			
			C	0.338	2.2	0.628	0.8	1	72.132			
T10	1.54	7.28	A	0.296	2.306	0.615	0.8	1	70.774	4.89	244.73	B
120.00-100.00			B	0.317	2.251	0.621	0.8	1	76.322			
			C	0.298	2.301	0.615	0.8	1	71.283			
T11	1.54	7.40	A	0.269	2.381	0.607	0.8	1	70.528	4.75	237.64	B
100.00-80.00			B	0.288	2.328	0.612	0.8	1	75.890			
			C	0.271	2.376	0.607	0.8	1	71.021			
T12	1.54	8.13	A	0.251	2.436	0.602	0.8	1	71.675	4.59	229.67	B
80.00-60.00			B	0.268	2.385	0.607	0.8	1	76.918			
			C	0.252	2.431	0.602	0.8	1	72.157			
T13	1.54	8.26	A	0.232	2.492	0.597	0.8	1	71.959	4.28	214.22	B
60.00-40.00			B	0.248	2.443	0.601	0.8	1	77.094			
			C	0.234	2.488	0.598	0.8	1	72.432			
T14	1.54	9.20	A	0.22	2.53	0.595	0.8	1	73.687	3.95	197.52	B

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
40.00-20.00			B	0.235	2.483	0.598	0.8	1	78.756			
			C	0.222	2.525	0.595	0.8	1	74.154			
T15	1.54	9.34	A	0.207	2.574	0.592	0.8	1	74.154	4.04	202.21	B
20.00-0.00			B	0.22	2.53	0.595	0.8	1	79.152			
			C	0.208	2.57	0.592	0.8	1	74.615			
Sum Weight:	14.51	75.22						OTM	6652.39 kip-ft	53.83		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.85	1	6.230	0.63	62.72	C
280.00-270.00			B	0.141	2.806	0.58	0.85	1	4.197			
			C	0.218	2.535	0.594	0.85	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.85	1	12.234	1.25	62.53	C
270.00-250.00			B	0.137	2.821	0.58	0.85	1	8.181			
			C	0.221	2.527	0.595	0.85	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.85	1	33.828	2.33	116.58	A
250.00-230.00			B	0.411	2.043	0.656	0.85	1	28.085			
			C	0.244	2.455	0.6	0.85	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.85	1	23.980	1.59	158.87	A
230.00-220.00			B	0.454	1.967	0.675	0.85	1	21.044			
			C	0.304	2.284	0.617	0.85	1	13.440			
T5	0.33	2.61	A	0.439	1.991	0.668	0.85	1	49.750	3.40	169.78	A
220.00-200.00			B	0.399	2.066	0.651	0.85	1	44.394			
			C	0.277	2.358	0.609	0.85	1	30.048			
T6	0.61	2.85	A	0.419	2.027	0.66	0.85	1	59.115	3.99	199.57	A
200.00-180.00			B	0.395	2.074	0.65	0.85	1	55.197			
			C	0.338	2.2	0.628	0.85	1	46.571			
T7	0.94	4.60	A	0.414	2.037	0.657	0.85	1	70.061	4.60	230.23	A
180.00-160.00			B	0.36	2.149	0.636	0.85	1	59.934			
			C	0.341	2.193	0.629	0.85	1	56.594			
T8	1.19	5.27	A	0.376	2.114	0.642	0.85	1	72.816	4.79	239.59	A
160.00-140.00			B	0.322	2.238	0.623	0.85	1	61.711			
			C	0.309	2.273	0.619	0.85	1	59.010			
T9	1.54	5.15	A	0.336	2.205	0.627	0.85	1	72.584	5.03	251.61	B
140.00-120.00			B	0.36	2.148	0.636	0.85	1	78.381			
			C	0.338	2.2	0.628	0.85	1	73.114			
T10	1.54	7.28	A	0.296	2.306	0.615	0.85	1	71.484	4.94	247.01	B
120.00-100.00			B	0.317	2.251	0.621	0.85	1	77.031			
			C	0.298	2.301	0.615	0.85	1	71.993			
T11	1.54	7.40	A	0.269	2.381	0.607	0.85	1	71.269	4.80	239.96	B
100.00-80.00			B	0.288	2.328	0.612	0.85	1	76.631			
			C	0.271	2.376	0.607	0.85	1	71.762			
T12	1.54	8.13	A	0.251	2.436	0.602	0.85	1	72.461	4.64	232.02	B
80.00-60.00			B	0.268	2.385	0.607	0.85	1	77.704			
			C	0.252	2.431	0.602	0.85	1	72.943			
T13	1.54	8.26	A	0.232	2.492	0.597	0.85	1	72.790	4.33	216.53	B
60.00-40.00			B	0.248	2.443	0.601	0.85	1	77.925			
			C	0.234	2.488	0.598	0.85	1	73.263			
T14	1.54	9.20	A	0.22	2.53	0.595	0.85	1	74.565	3.99	199.72	B
40.00-20.00			B	0.235	2.483	0.598	0.85	1	79.634			
			C	0.222	2.525	0.595	0.85	1	75.032			

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
T15	1.54	9.34	A	0.207	2.574	0.592	0.85	1	75.079	4.09	204.57	B
20.00-0.00			B	0.22	2.53	0.595	0.85	1	80.078			
			C	0.208	2.57	0.592	0.85	1	75.541			
Sum Weight:	14.51	75.22						OTM	6719.28 kip-ft	54.41		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.10	0.86	A	0.356	2.157	0.635	1	1	11.826	0.76	75.63	C
280.00-270.00			B	0.261	2.404	0.605	1	1	8.264			
			C	0.385	2.094	0.646	1	1	13.010			
T2	0.20	1.75	A	0.34	2.194	0.629	1	1	22.474	1.49	74.41	C
270.00-250.00			B	0.246	2.451	0.601	1	1	15.496			
			C	0.383	2.098	0.645	1	1	25.966			
T3	0.82	2.32	A	0.73	1.781	0.842	1	1	65.059	3.09	154.71	A
250.00-230.00			B	0.636	1.786	0.776	1	1	52.291			
			C	0.404	2.056	0.653	1	1	27.953			
T4	0.41	1.67	A	0.772	1.798	0.874	1	1	45.800	2.16	215.88	A
230.00-220.00			B	0.698	1.776	0.818	1	1	39.096			
			C	0.476	1.933	0.685	1	1	23.220			
T5	0.82	4.36	A	0.653	1.781	0.787	1	1	86.792	3.97	198.65	A
220.00-200.00			B	0.592	1.809	0.749	1	1	75.638			
			C	0.411	2.042	0.656	1	1	48.020			
T6	1.51	4.78	A	0.62	1.793	0.766	1	1	100.832	4.52	225.81	A
200.00-180.00			B	0.583	1.815	0.744	1	1	92.809			
			C	0.499	1.902	0.697	1	1	75.837			
T7	2.30	6.76	A	0.61	1.798	0.76	1	1	118.240	5.15	257.28	A
180.00-160.00			B	0.529	1.866	0.712	1	1	97.988			
			C	0.5	1.9	0.697	1	1	91.386			
T8	2.92	7.49	A	0.563	1.832	0.732	1	1	123.571	5.28	264.22	A
160.00-140.00			B	0.472	1.938	0.684	1	1	98.831			
			C	0.461	1.955	0.679	1	1	96.480			
T9	3.75	7.33	A	0.504	1.895	0.7	1	1	121.118	5.39	269.57	B
140.00-120.00			B	0.532	1.862	0.714	1	1	129.161			
			C	0.507	1.892	0.701	1	1	121.799			
T10	3.75	10.03	A	0.442	1.987	0.67	1	1	116.416	5.15	257.52	B
120.00-100.00			B	0.466	1.948	0.681	1	1	123.700			
			C	0.444	1.983	0.671	1	1	117.041			
T11	3.75	10.18	A	0.402	2.061	0.652	1	1	114.541	4.95	247.32	B
100.00-80.00			B	0.423	2.02	0.661	1	1	121.332			
			C	0.403	2.057	0.653	1	1	115.129			
T12	3.75	10.99	A	0.373	2.12	0.641	1	1	115.146	4.75	237.46	B
80.00-60.00			B	0.392	2.079	0.648	1	1	121.614			
			C	0.374	2.117	0.641	1	1	115.710			
T13	3.75	11.16	A	0.345	2.183	0.631	1	1	114.670	4.42	220.77	B
60.00-40.00			B	0.363	2.142	0.637	1	1	120.851			
			C	0.347	2.179	0.631	1	1	115.213			
T14	3.75	12.22	A	0.327	2.227	0.624	1	1	116.643	4.06	203.16	B
40.00-20.00			B	0.343	2.187	0.63	1	1	122.646			
			C	0.328	2.224	0.625	1	1	117.173			
T15	3.75	12.40	A	0.306	2.279	0.618	1	1	116.730	4.16	207.90	B
20.00-0.00			B	0.322	2.24	0.623	1	1	122.545			

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
Sum Weight:	35.32	104.30	C	0.308	2.276	0.618	1	1 OTM	117.246 7612.34 kip-ft	59.29		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.10	0.86	A	0.356	2.157	0.635	0.825	1	11.826	0.76	75.63	C
280.00-270.00			B	0.261	2.404	0.605	0.825	1	8.264			
			C	0.385	2.094	0.646	0.825	1	13.010			
T2	0.20	1.75	A	0.34	2.194	0.629	0.825	1	22.474	1.49	74.41	C
270.00-250.00			B	0.246	2.451	0.601	0.825	1	15.496			
			C	0.383	2.098	0.645	0.825	1	25.966			
T3	0.82	2.32	A	0.73	1.781	0.842	0.825	1	65.059	3.09	154.71	A
250.00-230.00			B	0.636	1.786	0.776	0.825	1	52.291			
			C	0.404	2.056	0.653	0.825	1	27.953			
T4	0.41	1.67	A	0.772	1.798	0.874	0.825	1	45.059	2.12	212.39	A
230.00-220.00			B	0.698	1.776	0.818	0.825	1	38.355			
			C	0.476	1.933	0.685	0.825	1	22.479			
T5	0.82	4.36	A	0.653	1.781	0.787	0.825	1	84.960	3.89	194.45	A
220.00-200.00			B	0.592	1.809	0.749	0.825	1	73.807			
			C	0.411	2.042	0.656	0.825	1	46.188			
T6	1.51	4.78	A	0.62	1.793	0.766	0.825	1	98.082	4.39	219.66	A
200.00-180.00			B	0.583	1.815	0.744	0.825	1	90.059			
			C	0.499	1.902	0.697	0.825	1	73.087			
T7	2.30	6.76	A	0.61	1.798	0.76	0.825	1	114.765	4.99	249.72	A
180.00-160.00			B	0.529	1.866	0.712	0.825	1	94.514			
			C	0.5	1.9	0.697	0.825	1	87.912			
T8	2.92	7.49	A	0.563	1.832	0.732	0.825	1	119.684	5.12	255.91	A
160.00-140.00			B	0.472	1.938	0.684	0.825	1	95.177			
			C	0.461	1.955	0.679	0.825	1	92.593			
T9	3.75	7.33	A	0.504	1.895	0.7	0.825	1	117.449	5.25	262.40	B
140.00-120.00			B	0.532	1.862	0.714	0.825	1	125.725			
			C	0.507	1.892	0.701	0.825	1	118.129			
T10	3.75	10.03	A	0.442	1.987	0.67	0.825	1	113.700	5.05	252.35	B
120.00-100.00			B	0.466	1.948	0.681	0.825	1	121.217			
			C	0.444	1.983	0.671	0.825	1	114.324			
T11	3.75	10.18	A	0.402	2.061	0.652	0.825	1	111.713	4.84	242.03	B
100.00-80.00			B	0.423	2.02	0.661	0.825	1	118.737			
			C	0.403	2.057	0.653	0.825	1	112.301			
T12	3.75	10.99	A	0.373	2.12	0.641	0.825	1	112.163	4.64	232.09	B
80.00-60.00			B	0.392	2.079	0.648	0.825	1	118.865			
			C	0.374	2.117	0.641	0.825	1	112.728			
T13	3.75	11.16	A	0.345	2.183	0.631	0.825	1	111.528	4.31	215.46	B
60.00-40.00			B	0.363	2.142	0.637	0.825	1	117.942			
			C	0.347	2.179	0.631	0.825	1	112.071			
T14	3.75	12.22	A	0.327	2.227	0.624	0.825	1	113.337	3.96	198.07	B
40.00-20.00			B	0.343	2.187	0.63	0.825	1	119.573			
			C	0.328	2.224	0.625	0.825	1	113.867			
T15	3.75	12.40	A	0.306	2.279	0.618	0.825	1	113.256	4.05	202.40	B
20.00-0.00			B	0.322	2.24	0.623	0.825	1	119.305			
			C	0.308	2.276	0.618	0.825	1	113.772			

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:	35.32	104.30						OTM	7456.31 kip-ft	57.95		

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
T1	0.10	0.86	A	0.356	2.157	0.635	0.8	1	11.826	0.76	75.63	C
280.00-270.00			B	0.261	2.404	0.605	0.8	1	8.264			
			C	0.385	2.094	0.646	0.8	1	13.010			
T2	0.20	1.75	A	0.34	2.194	0.629	0.8	1	22.474	1.49	74.41	C
270.00-250.00			B	0.246	2.451	0.601	0.8	1	15.496			
			C	0.383	2.098	0.645	0.8	1	25.966			
T3	0.82	2.32	A	0.73	1.781	0.842	0.8	1	65.059	3.09	154.71	A
250.00-230.00			B	0.636	1.786	0.776	0.8	1	52.291			
			C	0.404	2.056	0.653	0.8	1	27.953			
T4	0.41	1.67	A	0.772	1.798	0.874	0.8	1	44.953	2.12	211.89	A
230.00-220.00			B	0.698	1.776	0.818	0.8	1	38.249			
			C	0.476	1.933	0.685	0.8	1	22.373			
T5	0.82	4.36	A	0.653	1.781	0.787	0.8	1	84.698	3.88	193.86	A
220.00-200.00			B	0.592	1.809	0.749	0.8	1	73.545			
			C	0.411	2.042	0.656	0.8	1	45.927			
T6	1.51	4.78	A	0.62	1.793	0.766	0.8	1	97.689	4.38	218.78	A
200.00-180.00			B	0.583	1.815	0.744	0.8	1	89.666			
			C	0.499	1.902	0.697	0.8	1	72.694			
T7	2.30	6.76	A	0.61	1.798	0.76	0.8	1	114.269	4.97	248.64	A
180.00-160.00			B	0.529	1.866	0.712	0.8	1	94.018			
			C	0.5	1.9	0.697	0.8	1	87.416			
T8	2.92	7.49	A	0.563	1.832	0.732	0.8	1	119.129	5.09	254.72	A
160.00-140.00			B	0.472	1.938	0.684	0.8	1	94.656			
			C	0.461	1.955	0.679	0.8	1	92.038			
T9	3.75	7.33	A	0.504	1.895	0.7	0.8	1	116.925	5.23	261.37	B
140.00-120.00			B	0.532	1.862	0.714	0.8	1	125.234			
			C	0.507	1.892	0.701	0.8	1	117.605			
T10	3.75	10.03	A	0.442	1.987	0.67	0.8	1	113.312	5.03	251.61	B
120.00-100.00			B	0.466	1.948	0.681	0.8	1	120.862			
			C	0.444	1.983	0.671	0.8	1	113.936			
T11	3.75	10.18	A	0.402	2.061	0.652	0.8	1	111.309	4.83	241.27	B
100.00-80.00			B	0.423	2.02	0.661	0.8	1	118.367			
			C	0.403	2.057	0.653	0.8	1	111.897			
T12	3.75	10.99	A	0.373	2.12	0.641	0.8	1	111.737	4.63	231.32	B
80.00-60.00			B	0.392	2.079	0.648	0.8	1	118.472			
			C	0.374	2.117	0.641	0.8	1	112.301			
T13	3.75	11.16	A	0.345	2.183	0.631	0.8	1	111.079	4.29	214.70	B
60.00-40.00			B	0.363	2.142	0.637	0.8	1	117.526			
			C	0.347	2.179	0.631	0.8	1	111.622			
T14	3.75	12.22	A	0.327	2.227	0.624	0.8	1	112.865	3.95	197.34	B
40.00-20.00			B	0.343	2.187	0.63	0.8	1	119.134			
			C	0.328	2.224	0.625	0.8	1	113.395			
T15	3.75	12.40	A	0.306	2.279	0.618	0.8	1	112.760	4.03	201.62	B
20.00-0.00			B	0.322	2.24	0.623	0.8	1	118.842			
			C	0.308	2.276	0.618	0.8	1	113.276			
Sum Weight:	35.32	104.30						OTM	7434.02	57.76		

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
									kip-ft			

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 ft^2	F K	w plf	Ctrl. Face
T1	0.10	0.86	A	0.356	2.157	0.635	0.85	1	11.826	0.76	75.63	C
280.00-270.00			B	0.261	2.404	0.605	0.85	1	8.264			
			C	0.385	2.094	0.646	0.85	1	13.010			
T2	0.20	1.75	A	0.34	2.194	0.629	0.85	1	22.474	1.49	74.41	C
270.00-250.00			B	0.246	2.451	0.601	0.85	1	15.496			
			C	0.383	2.098	0.645	0.85	1	25.966			
T3	0.82	2.32	A	0.73	1.781	0.842	0.85	1	65.059	3.09	154.71	A
250.00-230.00			B	0.636	1.786	0.776	0.85	1	52.291			
			C	0.404	2.056	0.653	0.85	1	27.953			
T4	0.41	1.67	A	0.772	1.798	0.874	0.85	1	45.165	2.13	212.89	A
230.00-220.00			B	0.698	1.776	0.818	0.85	1	38.461			
			C	0.476	1.933	0.685	0.85	1	22.584			
T5	0.82	4.36	A	0.653	1.781	0.787	0.85	1	85.222	3.90	195.05	A
220.00-200.00			B	0.592	1.809	0.749	0.85	1	74.068			
			C	0.411	2.042	0.656	0.85	1	46.450			
T6	1.51	4.78	A	0.62	1.793	0.766	0.85	1	98.475	4.41	220.54	A
200.00-180.00			B	0.583	1.815	0.744	0.85	1	90.452			
			C	0.499	1.902	0.697	0.85	1	73.480			
T7	2.30	6.76	A	0.61	1.798	0.76	0.85	1	115.262	5.02	250.80	A
180.00-160.00			B	0.529	1.866	0.712	0.85	1	95.010			
			C	0.5	1.9	0.697	0.85	1	88.409			
T8	2.92	7.49	A	0.563	1.832	0.732	0.85	1	120.240	5.14	257.10	A
160.00-140.00			B	0.472	1.938	0.684	0.85	1	95.699			
			C	0.461	1.955	0.679	0.85	1	93.148			
T9	3.75	7.33	A	0.504	1.895	0.7	0.85	1	117.973	5.27	263.42	B
140.00-120.00			B	0.532	1.862	0.714	0.85	1	126.216			
			C	0.507	1.892	0.701	0.85	1	118.653			
T10	3.75	10.03	A	0.442	1.987	0.67	0.85	1	114.088	5.06	253.09	B
120.00-100.00			B	0.466	1.948	0.681	0.85	1	121.572			
			C	0.444	1.983	0.671	0.85	1	114.713			
T11	3.75	10.18	A	0.402	2.061	0.652	0.85	1	112.117	4.86	242.78	B
100.00-80.00			B	0.423	2.02	0.661	0.85	1	119.108			
			C	0.403	2.057	0.653	0.85	1	112.705			
T12	3.75	10.99	A	0.373	2.12	0.641	0.85	1	112.589	4.66	232.86	B
80.00-60.00			B	0.392	2.079	0.648	0.85	1	119.257			
			C	0.374	2.117	0.641	0.85	1	113.154			
T13	3.75	11.16	A	0.345	2.183	0.631	0.85	1	111.977	4.32	216.22	B
60.00-40.00			B	0.363	2.142	0.637	0.85	1	118.358			
			C	0.347	2.179	0.631	0.85	1	112.520			
T14	3.75	12.22	A	0.327	2.227	0.624	0.85	1	113.809	3.98	198.80	B
40.00-20.00			B	0.343	2.187	0.63	0.85	1	120.012			
			C	0.328	2.224	0.625	0.85	1	114.339			
T15	3.75	12.40	A	0.306	2.279	0.618	0.85	1	113.753	4.06	203.19	B
20.00-0.00			B	0.322	2.24	0.623	0.85	1	119.768			
			C	0.308	2.276	0.618	0.85	1	114.268			
Sum Weight:	35.32	104.30						OTM	7478.60 kip-ft	58.14		

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
T1	0.04	0.66	A	0.205	2.58	0.591	1	1	6.230	0.22	21.70	C
280.00-270.00			B	0.141	2.806	0.58	1	1	4.197			
			C	0.218	2.535	0.594	1	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	1	1	12.234	0.43	21.64	C
270.00-250.00			B	0.137	2.821	0.58	1	1	8.181			
			C	0.221	2.527	0.595	1	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	1	1	33.828	0.81	40.34	A
250.00-230.00			B	0.411	2.043	0.656	1	1	28.085			
			C	0.244	2.455	0.6	1	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	1	1	24.615	0.56	56.43	A
230.00-220.00			B	0.454	1.967	0.675	1	1	21.679			
			C	0.304	2.284	0.617	1	1	14.075			
T5	0.33	2.61	A	0.439	1.991	0.668	1	1	51.320	1.21	60.60	A
220.00-200.00			B	0.399	2.066	0.651	1	1	45.964			
			C	0.277	2.358	0.609	1	1	31.618			
T6	0.61	2.85	A	0.419	2.027	0.66	1	1	61.472	1.44	71.81	A
200.00-180.00			B	0.395	2.074	0.65	1	1	57.554			
			C	0.338	2.2	0.628	1	1	48.928			
T7	0.94	4.60	A	0.414	2.037	0.657	1	1	73.039	1.66	83.05	A
180.00-160.00			B	0.36	2.149	0.636	1	1	62.912			
			C	0.341	2.193	0.629	1	1	59.572			
T8	1.19	5.27	A	0.376	2.114	0.642	1	1	75.947	1.73	86.47	A
160.00-140.00			B	0.322	2.238	0.623	1	1	64.842			
			C	0.309	2.273	0.619	1	1	62.141			
T9	1.54	5.15	A	0.336	2.205	0.627	1	1	75.529	1.81	90.33	B
140.00-120.00			B	0.36	2.148	0.636	1	1	81.326			
			C	0.338	2.2	0.628	1	1	76.059			
T10	1.54	7.28	A	0.296	2.306	0.615	1	1	73.612	1.76	87.83	B
120.00-100.00			B	0.317	2.251	0.621	1	1	79.160			
			C	0.298	2.301	0.615	1	1	74.121			
T11	1.54	7.40	A	0.269	2.381	0.607	1	1	73.493	1.71	85.44	B
100.00-80.00			B	0.288	2.328	0.612	1	1	78.855			
			C	0.271	2.376	0.607	1	1	73.986			
T12	1.54	8.13	A	0.251	2.436	0.602	1	1	74.817	1.65	82.72	B
80.00-60.00			B	0.268	2.385	0.607	1	1	80.061			
			C	0.252	2.431	0.602	1	1	75.300			
T13	1.54	8.26	A	0.232	2.492	0.597	1	1	75.284	1.55	77.32	B
60.00-40.00			B	0.248	2.443	0.601	1	1	80.419			
			C	0.234	2.488	0.598	1	1	75.757			
T14	1.54	9.20	A	0.22	2.53	0.595	1	1	77.199	1.43	71.39	B
40.00-20.00			B	0.235	2.483	0.598	1	1	82.268			
			C	0.222	2.525	0.595	1	1	77.666			
T15	1.54	9.34	A	0.207	2.574	0.592	1	1	77.857	1.46	73.24	B
20.00-0.00			B	0.22	2.53	0.595	1	1	82.855			
			C	0.208	2.57	0.592	1	1	78.318			
Sum Weight:	14.51	75.22						OTM	2394.45 kip-ft	19.42		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.825	1	6.230	0.22	21.70	C
280.00-270.00			B	0.141	2.806	0.58	0.825	1	4.197			
			C	0.218	2.535	0.594	0.825	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.825	1	12.234	0.43	21.64	C
270.00-250.00			B	0.137	2.821	0.58	0.825	1	8.181			
			C	0.221	2.527	0.595	0.825	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.825	1	33.828	0.81	40.34	A
250.00-230.00			B	0.411	2.043	0.656	0.825	1	28.085			
			C	0.244	2.455	0.6	0.825	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.825	1	23.874	0.55	54.73	A
230.00-220.00			B	0.454	1.967	0.675	0.825	1	20.938			
			C	0.304	2.284	0.617	0.825	1	13.334			
T5	0.33	2.61	A	0.439	1.991	0.668	0.825	1	49.488	1.17	58.44	A
220.00-200.00			B	0.399	2.066	0.651	0.825	1	44.133			
			C	0.277	2.358	0.609	0.825	1	29.786			
T6	0.61	2.85	A	0.419	2.027	0.66	0.825	1	58.722	1.37	68.60	A
200.00-180.00			B	0.395	2.074	0.65	0.825	1	54.804			
			C	0.338	2.2	0.628	0.825	1	46.178			
T7	0.94	4.60	A	0.414	2.037	0.657	0.825	1	69.565	1.58	79.10	A
180.00-160.00			B	0.36	2.149	0.636	0.825	1	59.438			
			C	0.341	2.193	0.629	0.825	1	56.098			
T8	1.19	5.27	A	0.376	2.114	0.642	0.825	1	72.294	1.65	82.31	A
160.00-140.00			B	0.322	2.238	0.623	0.825	1	61.189			
			C	0.309	2.273	0.619	0.825	1	58.488			
T9	1.54	5.15	A	0.336	2.205	0.627	0.825	1	72.093	1.73	86.52	B
140.00-120.00			B	0.36	2.148	0.636	0.825	1	77.890			
			C	0.338	2.2	0.628	0.825	1	72.623			
T10	1.54	7.28	A	0.296	2.306	0.615	0.825	1	71.129	1.70	85.08	B
120.00-100.00			B	0.317	2.251	0.621	0.825	1	76.676			
			C	0.298	2.301	0.615	0.825	1	71.638			
T11	1.54	7.40	A	0.269	2.381	0.607	0.825	1	70.899	1.65	82.63	B
100.00-80.00			B	0.288	2.328	0.612	0.825	1	76.260			
			C	0.271	2.376	0.607	0.825	1	71.391			
T12	1.54	8.13	A	0.251	2.436	0.602	0.825	1	72.068	1.60	79.88	B
80.00-60.00			B	0.268	2.385	0.607	0.825	1	77.311			
			C	0.252	2.431	0.602	0.825	1	72.550			
T13	1.54	8.26	A	0.232	2.492	0.597	0.825	1	72.375	1.49	74.52	B
60.00-40.00			B	0.248	2.443	0.601	0.825	1	77.510			
			C	0.234	2.488	0.598	0.825	1	72.848			
T14	1.54	9.20	A	0.22	2.53	0.595	0.825	1	74.126	1.37	68.73	B
40.00-20.00			B	0.235	2.483	0.598	0.825	1	79.195			
			C	0.222	2.525	0.595	0.825	1	74.593			
T15	1.54	9.34	A	0.207	2.574	0.592	0.825	1	74.617	1.41	70.38	B
20.00-0.00			B	0.22	2.53	0.595	0.825	1	79.615			
			C	0.208	2.57	0.592	0.825	1	75.078			
Sum Weight:	14.51	75.22						OTM	2313.44 kip-ft	18.73		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.8	1	6.230	0.22	21.70	C

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
280.00-270.00			B	0.141	2.806	0.58	0.8	1	4.197			
			C	0.218	2.535	0.594	0.8	1	6.682			
T2	0.08	1.37	A	0.2	2.594	0.591	0.8	1	12.234	0.43	21.64	C
270.00-250.00			B	0.137	2.821	0.58	0.8	1	8.181			
			C	0.221	2.527	0.595	0.8	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.8	1	33.828	0.81	40.34	A
250.00-230.00			B	0.411	2.043	0.656	0.8	1	28.085			
			C	0.244	2.455	0.6	0.8	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.8	1	23.768	0.54	54.49	A
230.00-220.00			B	0.454	1.967	0.675	0.8	1	20.832			
			C	0.304	2.284	0.617	0.8	1	13.228			
T5	0.33	2.61	A	0.439	1.991	0.668	0.8	1	49.226	1.16	58.13	A
220.00-200.00			B	0.399	2.066	0.651	0.8	1	43.871			
			C	0.277	2.358	0.609	0.8	1	29.524			
T6	0.61	2.85	A	0.419	2.027	0.66	0.8	1	58.329	1.36	68.14	A
200.00-180.00			B	0.395	2.074	0.65	0.8	1	54.411			
			C	0.338	2.2	0.628	0.8	1	45.785			
T7	0.94	4.60	A	0.414	2.037	0.657	0.8	1	69.069	1.57	78.54	A
180.00-160.00			B	0.36	2.149	0.636	0.8	1	58.942			
			C	0.341	2.193	0.629	0.8	1	55.602			
T8	1.19	5.27	A	0.376	2.114	0.642	0.8	1	71.772	1.63	81.72	A
160.00-140.00			B	0.322	2.238	0.623	0.8	1	60.667			
			C	0.309	2.273	0.619	0.8	1	57.966			
T9	1.54	5.15	A	0.336	2.205	0.627	0.8	1	71.602	1.72	85.97	B
140.00-120.00			B	0.36	2.148	0.636	0.8	1	77.399			
			C	0.338	2.2	0.628	0.8	1	72.132			
T10	1.54	7.28	A	0.296	2.306	0.615	0.8	1	70.774	1.69	84.68	B
120.00-100.00			B	0.317	2.251	0.621	0.8	1	76.322			
			C	0.298	2.301	0.615	0.8	1	71.283			
T11	1.54	7.40	A	0.269	2.381	0.607	0.8	1	70.528	1.64	82.23	B
100.00-80.00			B	0.288	2.328	0.612	0.8	1	75.890			
			C	0.271	2.376	0.607	0.8	1	71.021			
T12	1.54	8.13	A	0.251	2.436	0.602	0.8	1	71.675	1.59	79.47	B
80.00-60.00			B	0.268	2.385	0.607	0.8	1	76.918			
			C	0.252	2.431	0.602	0.8	1	72.157			
T13	1.54	8.26	A	0.232	2.492	0.597	0.8	1	71.959	1.48	74.12	B
60.00-40.00			B	0.248	2.443	0.601	0.8	1	77.094			
			C	0.234	2.488	0.598	0.8	1	72.432			
T14	1.54	9.20	A	0.22	2.53	0.595	0.8	1	73.687	1.37	68.34	B
40.00-20.00			B	0.235	2.483	0.598	0.8	1	78.756			
			C	0.222	2.525	0.595	0.8	1	74.154			
T15	1.54	9.34	A	0.207	2.574	0.592	0.8	1	74.154	1.40	69.97	B
20.00-0.00			B	0.22	2.53	0.595	0.8	1	79.152			
			C	0.208	2.57	0.592	0.8	1	74.615			
Sum Weight:	14.51	75.22						OTM	2301.86 kip-ft	18.63		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.66	A	0.205	2.58	0.591	0.85	1	6.230	0.22	21.70	C
280.00-270.00			B	0.141	2.806	0.58	0.85	1	4.197			
			C	0.218	2.535	0.594	0.85	1	6.682			

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
T2	0.08	1.37	A	0.2	2.594	0.591	0.85	1	12.234	0.43	21.64	C
270.00-250.00			B	0.137	2.821	0.58	0.85	1	8.181			
			C	0.221	2.527	0.595	0.85	1	13.583			
T3	0.33	1.91	A	0.474	1.936	0.685	0.85	1	33.828	0.81	40.34	A
250.00-230.00			B	0.411	2.043	0.656	0.85	1	28.085			
			C	0.244	2.455	0.6	0.85	1	15.282			
T4	0.17	1.18	A	0.504	1.895	0.699	0.85	1	23.980	0.55	54.97	A
230.00-220.00			B	0.454	1.967	0.675	0.85	1	21.044			
			C	0.304	2.284	0.617	0.85	1	13.440			
T5	0.33	2.61	A	0.439	1.991	0.668	0.85	1	49.750	1.17	58.75	A
220.00-200.00			B	0.399	2.066	0.651	0.85	1	44.394			
			C	0.277	2.358	0.609	0.85	1	30.048			
T6	0.61	2.85	A	0.419	2.027	0.66	0.85	1	59.115	1.38	69.06	A
200.00-180.00			B	0.395	2.074	0.65	0.85	1	55.197			
			C	0.338	2.2	0.628	0.85	1	46.571			
T7	0.94	4.60	A	0.414	2.037	0.657	0.85	1	70.061	1.59	79.66	A
180.00-160.00			B	0.36	2.149	0.636	0.85	1	59.934			
			C	0.341	2.193	0.629	0.85	1	56.594			
T8	1.19	5.27	A	0.376	2.114	0.642	0.85	1	72.816	1.66	82.90	A
160.00-140.00			B	0.322	2.238	0.623	0.85	1	61.711			
			C	0.309	2.273	0.619	0.85	1	59.010			
T9	1.54	5.15	A	0.336	2.205	0.627	0.85	1	72.584	1.74	87.06	B
140.00-120.00			B	0.36	2.148	0.636	0.85	1	78.381			
			C	0.338	2.2	0.628	0.85	1	73.114			
T10	1.54	7.28	A	0.296	2.306	0.615	0.85	1	71.484	1.71	85.47	B
120.00-100.00			B	0.317	2.251	0.621	0.85	1	77.031			
			C	0.298	2.301	0.615	0.85	1	71.993			
T11	1.54	7.40	A	0.269	2.381	0.607	0.85	1	71.269	1.66	83.03	B
100.00-80.00			B	0.288	2.328	0.612	0.85	1	76.631			
			C	0.271	2.376	0.607	0.85	1	71.762			
T12	1.54	8.13	A	0.251	2.436	0.602	0.85	1	72.461	1.61	80.28	B
80.00-60.00			B	0.268	2.385	0.607	0.85	1	77.704			
			C	0.252	2.431	0.602	0.85	1	72.943			
T13	1.54	8.26	A	0.232	2.492	0.597	0.85	1	72.790	1.50	74.92	B
60.00-40.00			B	0.248	2.443	0.601	0.85	1	77.925			
			C	0.234	2.488	0.598	0.85	1	73.263			
T14	1.54	9.20	A	0.22	2.53	0.595	0.85	1	74.565	1.38	69.11	B
40.00-20.00			B	0.235	2.483	0.598	0.85	1	79.634			
			C	0.222	2.525	0.595	0.85	1	75.032			
T15	1.54	9.34	A	0.207	2.574	0.592	0.85	1	75.079	1.42	70.79	B
20.00-0.00			B	0.22	2.53	0.595	0.85	1	80.078			
			C	0.208	2.57	0.592	0.85	1	75.541			
Sum Weight:	14.51	75.22						OTM	2325.01 kip-ft	18.83		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	51.67					
Bracing Weight	23.55					
Total Member Self-Weight	75.22			-11.90	5.04	
Total Weight	109.93			-11.90	5.04	
Wind 0 deg - No Ice		0.00	-82.99	-12161.84	5.04	2.77

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - No Ice		40.58	-70.37	-10360.26	-5962.61	-3.23
Wind 45 deg - No Ice		57.18	-57.25	-8437.65	-8410.84	-5.96
Wind 60 deg - No Ice		69.79	-40.34	-5953.08	-10273.29	-8.26
Wind 90 deg - No Ice		81.16	0.00	-11.90	-11930.25	-11.21
Wind 120 deg - No Ice		71.78	41.49	6063.07	-10505.03	-11.34
Wind 135 deg - No Ice		57.18	57.25	8413.84	-8410.84	-9.83
Wind 150 deg - No Ice		40.58	70.37	10336.45	-5962.61	-7.98
Wind 180 deg - No Ice		0.00	80.68	11870.45	5.04	-2.73
Wind 210 deg - No Ice		-40.58	70.37	10336.45	5972.68	3.23
Wind 225 deg - No Ice		-57.18	57.25	8413.84	8420.91	5.96
Wind 240 deg - No Ice		-71.78	41.49	6063.07	10515.10	8.57
Wind 270 deg - No Ice		-81.16	0.00	-11.90	11940.33	11.21
Wind 300 deg - No Ice		-69.79	-40.34	-5953.08	10283.37	10.99
Wind 315 deg - No Ice		-57.18	-57.25	-8437.65	8420.91	9.83
Wind 330 deg - No Ice		-40.58	-70.37	-10360.26	5972.68	7.98
Member Ice	29.08					
Total Weight Ice	168.01			-28.54	13.65	
Wind 0 deg - Ice		0.00	-83.95	-12485.63	13.65	2.51
Wind 30 deg - Ice		41.36	-71.71	-10700.88	-6142.65	-4.05
Wind 45 deg - Ice		58.36	-58.42	-8726.70	-8676.91	-7.00
Wind 60 deg - Ice		71.31	-41.21	-6167.93	-10610.76	-9.46
Wind 90 deg - Ice		82.73	0.00	-28.54	-12298.94	-12.43
Wind 120 deg - Ice		72.64	41.98	6200.00	-10765.19	-12.19
Wind 135 deg - Ice		58.36	58.42	8669.62	-8676.91	-10.53
Wind 150 deg - Ice		41.36	71.71	10643.79	-6142.65	-8.38
Wind 180 deg - Ice		0.00	82.42	12250.23	13.65	-2.50
Wind 210 deg - Ice		-41.36	71.71	10643.79	6169.94	4.05
Wind 225 deg - Ice		-58.36	58.42	8669.62	8704.20	7.00
Wind 240 deg - Ice		-72.64	41.98	6200.00	10792.49	9.68
Wind 270 deg - Ice		-82.73	0.00	-28.54	12326.24	12.43
Wind 300 deg - Ice		-71.31	-41.21	-6167.93	10638.06	11.96
Wind 315 deg - Ice		-58.36	-58.42	-8726.70	8704.20	10.53
Wind 330 deg - Ice		-41.36	-71.71	-10700.88	6169.94	8.38
Total Weight	109.93			-11.90	5.04	
Wind 0 deg - Service		0.00	-28.72	-4205.12	-0.16	0.96
Wind 30 deg - Service		14.04	-24.35	-3581.74	-2065.09	-1.12
Wind 45 deg - Service		19.79	-19.81	-2916.47	-2912.23	-2.06
Wind 60 deg - Service		24.15	-13.96	-2056.76	-3556.68	-2.86
Wind 90 deg - Service		28.08	0.00	-0.99	-4130.02	-3.88
Wind 120 deg - Service		24.84	14.36	2101.08	-3636.87	-3.92
Wind 135 deg - Service		19.79	19.81	2914.49	-2912.23	-3.40
Wind 150 deg - Service		14.04	24.35	3579.75	-2065.09	-2.76
Wind 180 deg - Service		0.00	27.92	4110.55	-0.16	-0.94
Wind 210 deg - Service		-14.04	24.35	3579.75	2064.76	1.12
Wind 225 deg - Service		-19.79	19.81	2914.49	2911.90	2.06
Wind 240 deg - Service		-24.84	14.36	2101.08	3636.54	2.97
Wind 270 deg - Service		-28.08	0.00	-0.99	4129.69	3.88
Wind 300 deg - Service		-24.15	-13.96	-2056.76	3556.35	3.80
Wind 315 deg - Service		-19.79	-19.81	-2916.47	2911.90	3.40
Wind 330 deg - Service		-14.04	-24.35	-3581.74	2064.76	2.76

Load Combinations

Comb. No.	Description
1	Dead Only

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	280 - 270	Leg	Max Tension	5	6.33	0.44	-0.25
			Max. Compression	24	-9.93	-0.15	-0.11
			Max. Mx	31	-8.79	-0.49	0.05
			Max. My	19	1.97	0.00	-0.52

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	31	-1.23	0.17	-0.03
			Max. Vx	19	-1.31	0.02	0.19
		Diagonal	Max Tension	34	1.79	0.00	0.00
			Max. Compression	34	-1.79	0.00	0.00
			Max. Mx	30	0.03	-0.00	0.00
			Max. My	32	-1.34	-0.00	0.00
			Max. Vy	29	-0.00	-0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.27	0.00	0.00
			Max. Compression	2	-0.16	0.00	0.00
			Max. Mx	18	0.07	0.01	0.00
			Max. My	32	-0.04	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Top Girt	Max Tension	13	0.67	0.00	0.00
			Max. Compression	5	-0.69	0.00	0.00
			Max. Mx	18	-0.01	0.01	0.00
			Max. My	25	-0.17	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	25	-0.00	0.00	0.00
		Bottom Girt	Max Tension	27	0.73	0.00	0.00
			Max. Compression	30	-0.70	0.00	0.00
			Max. Mx	18	0.01	0.01	0.00
			Max. My	25	0.22	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.11	0.00	0.00
			Max. Compression	2	-0.01	0.00	0.00
			Max. Mx	18	0.01	0.01	0.00
			Max. My	25	0.01	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
T2	270 - 250	Leg	Max Tension	27	25.53	0.03	0.74
			Max. Compression	30	-30.74	0.28	-0.17
			Max. Mx	31	-8.81	0.74	-0.09
			Max. My	19	-9.89	0.08	0.79
			Max. Vy	31	-1.85	0.29	-0.07
			Max. Vx	19	-2.00	0.02	0.33
		Diagonal	Max Tension	34	2.40	0.00	0.00
			Max. Compression	34	-2.40	0.00	0.00
			Max. Mx	28	1.33	-0.00	0.00
			Max. My	33	-1.94	-0.00	0.00
			Max. Vy	28	-0.01	-0.00	0.00
			Max. Vx	32	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.44	0.00	0.00
			Max. Compression	2	-0.32	0.00	0.00
			Max. Mx	18	0.08	0.01	0.00
			Max. My	31	0.06	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Top Girt	Max Tension	30	0.81	0.00	0.00
			Max. Compression	32	-0.81	0.00	0.00
			Max. Mx	18	-0.00	0.01	0.00
			Max. My	25	-0.22	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	25	0.00	0.00	0.00
		Bottom Girt	Max Tension	27	1.02	0.00	0.00
			Max. Compression	19	-0.95	0.00	0.00
			Max. Mx	18	0.02	0.01	0.00
			Max. My	31	0.11	0.00	-0.00
			Max. Vy	18	0.01	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	31	0.00	0.00	0.00
		Mid Girt	Max Tension	27	0.29	0.00	0.00
			Max. Compression	2	-0.18	0.00	0.00
			Max. Mx	18	0.02	0.01	0.00
			Max. My	31	0.06	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
T3	250 - 230	Leg	Max Tension	32	68.82	-0.42	-0.27
			Max. Compression	19	-80.87	0.05	2.99
			Max. Mx	30	-80.72	2.53	-1.58
			Max. My	19	-80.87	0.05	2.99
			Max. Vy	30	-5.46	2.53	-1.58
			Max. Vx	19	-6.40	0.05	2.99
		Diagonal	Max Tension	34	5.51	0.00	0.00
			Max. Compression	26	-5.60	0.00	0.00
			Max. Mx	19	4.28	-0.01	-0.00
			Max. My	33	-3.89	-0.00	0.00
			Max. Vy	19	0.01	-0.01	-0.00
			Max. Vx	33	0.00	0.00	0.00
		Horizontal	Max Tension	27	0.77	0.00	0.00
			Max. Compression	2	-0.61	0.00	0.00
			Max. Mx	18	0.13	0.01	0.00
			Max. My	31	0.08	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Top Girt	Max Tension	24	1.55	0.00	0.00
			Max. Compression	22	-1.51	0.00	0.00
			Max. Mx	18	0.01	0.02	0.00
			Max. My	31	-0.02	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Bottom Girt	Max Tension	27	1.10	0.00	0.00
			Max. Compression	19	-0.95	0.00	0.00
			Max. Mx	18	0.04	0.02	0.00
			Max. My	31	0.03	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
T4	230 - 220	Leg	Max Tension	32	73.67	-2.84	-0.14
			Max. Compression	19	-85.14	4.05	-0.05
			Max. Mx	32	73.37	-4.56	-0.12
			Max. My	31	-6.44	-0.24	-6.87
			Max. Vy	27	0.33	-4.54	0.02
			Max. Vx	31	0.74	-0.24	-6.87
		Diagonal	Max Tension	32	5.72	0.00	0.00
			Max. Compression	24	-6.60	0.00	0.00
			Max. Mx	32	4.43	0.06	-0.00
			Max. My	25	-6.25	-0.04	0.03
			Max. Vy	32	0.02	0.06	-0.00
			Max. Vx	33	0.01	0.00	0.00
T5	220 - 200	Leg	Max Tension	32	102.83	-4.04	-0.04
			Max. Compression	19	-118.42	5.10	-0.01
			Max. Mx	19	-118.42	5.10	-0.01
			Max. My	31	-7.65	-0.24	-6.87
			Max. Vy	24	-0.25	5.07	0.03
			Max. Vx	31	-0.53	-0.09	-5.70
		Diagonal	Max Tension	25	5.88	0.00	0.00
			Max. Compression	25	-6.27	0.00	0.00
			Max. Mx	19	4.88	0.09	-0.00
			Max. My	31	-4.92	-0.03	-0.02
			Max. Vy	19	-0.03	0.09	-0.01
			Max. Vx	31	0.00	-0.03	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	200 - 180	Leg	Max Tension	32	131.09	-3.64	-0.02
			Max. Compression	19	-152.02	5.66	0.00
			Max. Mx	19	-152.02	5.66	0.00
			Max. My	31	-11.30	0.06	-4.91
			Max. Vy	10	-1.02	-4.34	-0.00
			Max. Vx	14	-0.86	-0.08	-4.30
		Diagonal	Max Tension	32	7.86	0.00	0.00
			Max. Compression	24	-9.18	0.00	0.00
			Max. Mx	29	5.49	0.08	0.00
			Max. My	32	-4.33	-0.01	-0.01
			Max. Vy	33	0.03	0.08	0.00
			Max. Vx	32	0.00	0.00	0.00
		Top Girt	Max Tension	32	3.81	0.00	0.00
			Max. Compression	19	-2.88	0.00	0.00
			Max. Mx	18	0.47	-0.05	0.00
			Max. My	31	0.38	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	31	0.00	0.00	0.00
		Mid Girt	Max Tension	32	4.76	0.00	0.00
			Max. Compression	19	-3.40	0.00	0.00
			Max. Mx	18	0.66	-0.07	0.00
			Max. My	23	0.55	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
T7	180 - 160	Leg	Max Tension	32	166.27	-3.80	0.01
			Max. Compression	19	-195.79	5.93	0.01
			Max. Mx	19	-195.79	5.93	0.01
			Max. My	31	-11.79	0.06	-4.91
			Max. Vy	5	-1.15	-3.40	0.01
			Max. Vx	14	-1.46	-0.10	-4.40
		Diagonal	Max Tension	22	10.25	0.00	0.00
			Max. Compression	30	-12.04	0.00	0.00
			Max. Mx	30	4.70	0.11	-0.01
			Max. My	22	-6.01	0.00	0.01
			Max. Vy	32	0.04	0.11	-0.01
			Max. Vx	22	-0.00	0.00	0.00
		Top Girt	Max Tension	32	6.15	0.00	0.00
			Max. Compression	19	-4.45	0.00	0.00
			Max. Mx	18	0.83	-0.13	0.00
			Max. My	22	-1.90	0.00	0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Mid Girt	Max Tension	32	6.53	0.00	0.00
			Max. Compression	19	-4.60	0.00	0.00
			Max. Mx	18	0.96	-0.15	0.00
			Max. My	22	-1.88	0.00	0.00
			Max. Vy	18	0.06	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
T8	160 - 140	Leg	Max Tension	32	208.37	-4.29	-0.01
			Max. Compression	19	-250.76	4.74	-0.01
			Max. Mx	19	-221.83	5.93	0.01
			Max. My	34	-19.06	-0.31	7.26
			Max. Vy	10	-1.53	-5.07	-0.02
			Max. Vx	6	0.96	0.16	2.52
		Diagonal	Max Tension	28	11.52	0.00	0.00
			Max. Compression	29	-11.62	0.00	0.00
			Max. Mx	30	9.32	0.16	-0.01
			Max. My	21	-10.67	0.00	0.03
			Max. Vy	30	-0.05	0.16	-0.01
			Max. Vx	21	-0.01	0.00	0.00
		Top Girt	Max Tension	32	5.17	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. Compression	19	-3.69	0.00	0.00
			Max. Mx	18	0.74	-0.18	0.00
			Max. My	22	-1.52	0.00	0.01
			Max. Vy	18	-0.06	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T9	140 - 120	Leg	Max Tension	32	251.50	-4.62	0.00
			Max. Compression	19	-304.48	10.02	-0.00
			Max. Mx	32	250.72	-10.73	-0.11
			Max. My	31	-26.68	-0.38	-9.96
			Max. Vy	10	-1.67	-4.52	-0.01
			Max. Vx	14	-1.83	-0.05	-4.09
		Diagonal	Max Tension	28	12.74	0.00	0.00
			Max. Compression	28	-13.46	0.00	0.00
			Max. Mx	33	6.94	0.18	-0.01
			Max. My	21	-11.98	0.03	0.04
			Max. Vy	33	0.06	0.18	-0.01
			Max. Vx	21	-0.01	0.00	0.00
T10	120 - 100	Leg	Max Tension	32	279.28	-10.73	-0.11
			Max. Compression	19	-336.47	11.40	-0.08
			Max. Mx	15	270.59	-11.59	-0.04
			Max. My	20	-27.65	-0.06	-19.00
			Max. Vy	10	0.41	-11.59	0.02
			Max. Vx	20	0.76	-0.06	-19.00
		Diagonal	Max Tension	4	16.39	0.00	0.00
			Max. Compression	29	-18.20	0.00	0.00
			Max. Mx	32	14.36	-0.47	0.03
			Max. My	20	-17.46	-0.08	-0.12
			Max. Vy	32	-0.12	-0.47	0.03
			Max. Vx	21	0.01	0.00	0.00
T11	100 - 80	Leg	Max Tension	32	317.97	-11.30	-0.05
			Max. Compression	19	-388.30	12.17	-0.04
			Max. Mx	32	315.76	-16.14	-0.05
			Max. My	20	-31.53	-0.06	-19.00
			Max. Vy	27	0.59	-16.10	0.01
			Max. Vx	20	-0.81	-0.06	-19.00
		Diagonal	Max Tension	28	17.18	0.00	0.00
			Max. Compression	11	-17.19	0.00	0.00
			Max. Mx	32	13.79	-0.49	0.07
			Max. My	21	11.32	-0.48	-0.07
			Max. Vy	33	-0.13	-0.49	-0.06
			Max. Vx	20	0.01	0.00	0.00
T12	80 - 60	Leg	Max Tension	32	354.20	-16.14	-0.05
			Max. Compression	19	-431.64	16.58	-0.05
			Max. Mx	19	-431.64	16.58	-0.05
			Max. My	31	-39.02	4.64	-16.44
			Max. Vy	27	-0.80	-16.10	0.01
			Max. Vx	20	0.68	4.61	-16.44
		Diagonal	Max Tension	11	15.84	0.00	0.00
			Max. Compression	28	-17.64	0.00	0.00
			Max. Mx	32	12.18	-0.53	0.06
			Max. My	31	-9.13	-0.38	0.07
			Max. Vy	32	-0.14	-0.53	0.06
			Max. Vx	31	-0.01	0.00	0.00
T13	60 - 40	Leg	Max Tension	32	382.31	-6.99	-0.05
			Max. Compression	19	-476.46	4.59	-0.03
			Max. Mx	32	379.88	-23.46	-0.04
			Max. My	31	-44.24	4.64	-16.44
			Max. Vy	27	1.14	-23.43	0.01
			Max. Vx	31	-0.75	4.64	-16.44
		Diagonal	Max Tension	26	17.77	0.00	0.00
			Max. Compression	9	-17.02	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	32	15.51	-0.55	0.06
			Max. My	32	15.51	-0.55	0.06
			Max. Vy	32	-0.15	-0.55	0.06
			Max. Vx	33	0.01	0.00	0.00
T14	40 - 20	Leg	Max Tension	32	419.87	-23.46	-0.04
			Max. Compression	19	-515.23	24.64	-0.05
			Max. Mx	19	-515.23	24.64	-0.05
			Max. My	20	-45.00	12.04	-24.61
			Max. Vy	27	-1.48	-23.43	0.01
			Max. Vx	20	1.14	12.04	-24.61
		Diagonal	Max Tension	8	15.71	0.00	0.00
			Max. Compression	33	-18.99	0.00	0.00
			Max. Mx	32	8.61	-0.65	0.09
			Max. My	32	-17.38	-0.37	0.12
			Max. Vy	32	-0.16	-0.65	0.09
			Max. Vx	32	-0.01	0.00	0.00
T15	20 - 0	Leg	Max Tension	15	440.57	-13.19	-0.05
			Max. Compression	19	-557.96	-0.00	0.00
			Max. Mx	19	-554.90	24.64	-0.05
			Max. My	20	-54.80	12.04	-24.61
			Max. Vy	24	1.38	24.61	0.00
			Max. Vx	20	-1.46	12.04	-24.61
		Diagonal	Max Tension	33	21.19	0.00	0.00
			Max. Compression	8	-18.76	0.00	0.00
			Max. Mx	34	19.80	-0.59	-0.07
			Max. My	33	2.32	-0.52	0.09
			Max. Vy	34	-0.17	-0.59	-0.07
			Max. Vx	33	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	573.74	44.70	-26.07
	Max. H_x	13	540.16	47.93	-27.89
	Max. H_z	22	-454.52	-46.79	27.22
	Min. Vert	5	-455.91	-41.61	24.21
	Min. H_x	22	-454.52	-46.79	27.22
	Min. H_z	13	540.16	47.93	-27.89
Leg B	Max. Vert	24	572.75	-44.66	-26.09
	Max. H_x	32	-455.51	46.78	27.28
	Max. H_z	32	-455.51	46.78	27.28
	Min. Vert	15	-456.28	41.58	24.27
	Min. H_x	7	539.80	-47.90	-27.93
	Min. H_z	7	539.80	-47.90	-27.93
Leg A	Max. Vert	19	575.34	0.04	51.81
	Max. H_x	14	37.13	2.90	3.00
	Max. H_z	2	541.14	0.05	55.51
	Min. Vert	10	-455.80	-0.06	-48.17
	Min. H_x	6	37.13	-2.91	3.00
	Min. H_z	27	-453.59	-0.06	-54.14

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	109.93	0.00	0.00	-11.68	5.04	-0.00
Dead+Wind 0 deg - No Ice	109.93	0.00	-82.99	-12233.38	5.08	2.73
Dead+Wind 30 deg - No Ice	109.93	40.58	-70.37	-10421.45	-5997.97	-3.26
Dead+Wind 45 deg - No Ice	109.93	57.18	-57.25	-8487.52	-8460.76	-6.01
Dead+Wind 60 deg - No Ice	109.93	69.79	-40.34	-5988.27	-10334.30	-8.35
Dead+Wind 90 deg - No Ice	109.93	81.16	-0.00	-11.87	-12000.99	-11.33
Dead+Wind 120 deg - No Ice	109.93	71.78	41.49	6099.02	-10567.04	-11.38
Dead+Wind 135 deg - No Ice	109.93	57.18	57.25	8463.92	-8460.69	-9.82
Dead+Wind 150 deg - No Ice	109.93	40.58	70.37	10397.97	-5997.93	-7.92
Dead+Wind 180 deg - No Ice	109.93	-0.00	80.68	11941.19	5.09	-2.67
Dead+Wind 210 deg - No Ice	109.93	-40.58	70.37	10397.97	6008.10	3.26
Dead+Wind 225 deg - No Ice	109.93	-57.18	57.25	8463.92	8470.86	6.02
Dead+Wind 240 deg - No Ice	109.93	-71.78	41.49	6099.02	10577.21	8.66
Dead+Wind 270 deg - No Ice	109.93	-81.16	-0.00	-11.86	12011.16	11.33
Dead+Wind 300 deg - No Ice	109.93	-69.79	-40.34	-5988.26	10344.47	11.03
Dead+Wind 315 deg - No Ice	109.93	-57.18	-57.25	-8487.51	8470.92	9.80
Dead+Wind 330 deg - No Ice	109.93	-40.58	-70.37	-10421.44	6008.14	7.92
Dead+Ice+Temp	168.01	0.00	0.00	-28.25	13.67	-0.00
Dead+Wind 0 deg+Ice+Temp	168.01	-0.00	-83.95	-12593.28	13.83	2.39
Dead+Wind 30 deg+Ice+Temp	168.01	41.36	-71.71	-10793.39	-6195.92	-4.16
Dead+Wind 45 deg+Ice+Temp	168.01	58.36	-58.42	-8802.17	-8752.23	-7.16
Dead+Wind 60 deg+Ice+Temp	168.01	71.31	-41.21	-6221.27	-10702.90	-9.67
Dead+Wind 90 deg+Ice+Temp	168.01	82.73	-0.00	-28.62	-12405.61	-12.69
Dead+Wind 120 deg+Ice+Temp	168.01	72.64	41.97	6253.88	-10858.26	-12.27
Dead+Wind 135 deg+Ice+Temp	168.01	58.36	58.42	8745.16	-8752.11	-10.51
Dead+Wind 150 deg+Ice+Temp	168.01	41.36	71.71	10736.48	-6195.85	-8.27
Dead+Wind 180 deg+Ice+Temp	168.01	-0.00	82.42	12357.02	13.85	-2.35
Dead+Wind 210 deg+Ice+Temp	168.01	-41.36	71.71	10736.48	6223.52	4.17
Dead+Wind 225 deg+Ice+Temp	168.01	-58.36	58.42	8745.16	8779.78	7.16
Dead+Wind 240 deg+Ice+Temp	168.01	-72.64	41.97	6253.89	10885.93	9.89
Dead+Wind 270 deg+Ice+Temp	168.01	-82.73	-0.00	-28.60	12433.27	12.69
Dead+Wind 300 deg+Ice+Temp	168.01	-71.31	-41.21	-6221.26	10730.56	12.04
Dead+Wind 315 deg+Ice+Temp	168.01	-58.36	-58.42	-8802.16	8779.89	10.51
Dead+Wind 330 deg+Ice+Temp	168.01	-41.36	-71.71	-10793.37	6223.58	8.27
Dead+Wind 0 deg - Service	109.93	0.00	-28.72	-4240.82	5.08	0.94
Dead+Wind 30 deg - Service	109.93	14.04	-24.35	-3613.82	-2072.15	-1.14
Dead+Wind 45 deg - Service	109.93	19.79	-19.81	-2944.61	-2924.34	-2.09
Dead+Wind 60 deg - Service	109.93	24.15	-13.96	-2079.79	-3572.64	-2.89
Dead+Wind 90 deg - Service	109.93	28.08	-0.00	-11.77	-4149.37	-3.91
Dead+Wind 120 deg - Service	109.93	24.84	14.36	2102.78	-3653.20	-3.94
Dead+Wind 135 deg - Service	109.93	19.79	19.81	2921.10	-2924.33	-3.40
Dead+Wind 150 deg - Service	109.93	14.04	24.35	3590.31	-2072.14	-2.76
Dead+Wind 180 deg - Service	109.93	0.00	27.92	4124.30	5.09	-0.93
Dead+Wind 210 deg - Service	109.93	-14.04	24.35	3590.31	2082.31	1.14
Dead+Wind 225 deg - Service	109.93	-19.79	19.81	2921.10	2934.50	2.09
Dead+Wind 240 deg - Service	109.93	-24.84	14.36	2102.78	3663.36	3.00
Dead+Wind 270 deg - Service	109.93	-28.08	-0.00	-11.77	4159.54	3.91
Dead+Wind 300 deg - Service	109.93	-24.15	-13.96	-2079.79	3582.81	3.82
Dead+Wind 315 deg - Service	109.93	-19.79	-19.81	-2944.61	2934.51	3.40
Dead+Wind 330 deg - Service	109.93	-14.04	-24.35	-3613.82	2082.31	2.76

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	-109.93	0.00	0.00	109.93	0.00	0.000%
2	0.00	-109.93	-82.99	-0.00	109.93	82.99	0.000%
3	40.58	-109.93	-70.37	-40.58	109.93	70.37	0.000%
4	57.18	-109.93	-57.25	-57.18	109.93	57.25	0.000%
5	69.79	-109.93	-40.34	-69.79	109.93	40.34	0.000%
6	81.16	-109.93	-0.00	-81.16	109.93	0.00	0.000%
7	71.78	-109.93	41.49	-71.78	109.93	-41.49	0.000%
8	57.18	-109.93	57.25	-57.18	109.93	-57.25	0.000%
9	40.58	-109.93	70.37	-40.58	109.93	-70.37	0.000%
10	0.00	-109.93	80.68	0.00	109.93	-80.68	0.000%
11	-40.58	-109.93	70.37	40.58	109.93	-70.37	0.000%
12	-57.18	-109.93	57.25	57.18	109.93	-57.25	0.000%
13	-71.78	-109.93	41.49	71.78	109.93	-41.49	0.000%
14	-81.16	-109.93	-0.00	81.16	109.93	0.00	0.000%
15	-69.79	-109.93	-40.34	69.79	109.93	40.34	0.000%
16	-57.18	-109.93	-57.25	57.18	109.93	57.25	0.000%
17	-40.58	-109.93	-70.37	40.58	109.93	70.37	0.000%
18	0.00	-168.01	0.00	-0.00	168.01	-0.00	0.000%
19	0.00	-168.01	-83.95	0.00	168.01	83.95	0.000%
20	41.36	-168.01	-71.71	-41.36	168.01	71.71	0.000%
21	58.36	-168.01	-58.42	-58.36	168.01	58.42	0.000%
22	71.31	-168.01	-41.21	-71.31	168.01	41.21	0.000%
23	82.73	-168.01	0.00	-82.73	168.01	0.00	0.000%
24	72.64	-168.01	41.98	-72.64	168.01	-41.97	0.000%
25	58.36	-168.01	58.42	-58.36	168.01	-58.42	0.000%
26	41.36	-168.01	71.71	-41.36	168.01	-71.71	0.000%
27	0.00	-168.01	82.42	0.00	168.01	-82.42	0.000%
28	-41.36	-168.01	71.71	41.36	168.01	-71.71	0.000%
29	-58.36	-168.01	58.42	58.36	168.01	-58.42	0.000%
30	-72.64	-168.01	41.98	72.64	168.01	-41.97	0.000%
31	-82.73	-168.01	0.00	82.73	168.01	0.00	0.000%
32	-71.31	-168.01	-41.21	71.31	168.01	41.21	0.000%
33	-58.36	-168.01	-58.42	58.36	168.01	58.42	0.000%
34	-41.36	-168.01	-71.71	41.36	168.01	71.71	0.000%
35	0.00	-109.93	-28.72	0.00	109.93	28.72	0.000%
36	14.04	-109.93	-24.35	-14.04	109.93	24.35	0.000%
37	19.79	-109.93	-19.81	-19.79	109.93	19.81	0.000%
38	24.15	-109.93	-13.96	-24.15	109.93	13.96	0.000%
39	28.08	-109.93	0.00	-28.08	109.93	0.00	0.000%
40	24.84	-109.93	14.36	-24.84	109.93	-14.36	0.000%
41	19.79	-109.93	19.81	-19.79	109.93	-19.81	0.000%
42	14.04	-109.93	24.35	-14.04	109.93	-24.35	0.000%
43	0.00	-109.93	27.92	0.00	109.93	-27.92	0.000%
44	-14.04	-109.93	24.35	14.04	109.93	-24.35	0.000%
45	-19.79	-109.93	19.81	19.79	109.93	-19.81	0.000%
46	-24.84	-109.93	14.36	24.84	109.93	-14.36	0.000%
47	-28.08	-109.93	0.00	28.08	109.93	0.00	0.000%
48	-24.15	-109.93	-13.96	24.15	109.93	13.96	0.000%
49	-19.79	-109.93	-19.81	19.79	109.93	19.81	0.000%
50	-14.04	-109.93	-24.35	14.04	109.93	24.35	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001

2	Yes	4	0.00000001	0.00000096
3	Yes	4	0.00000001	0.00000144
4	Yes	4	0.00000001	0.00000148
5	Yes	4	0.00000001	0.00000142
6	Yes	4	0.00000001	0.00000152
7	Yes	4	0.00000001	0.00000098
8	Yes	4	0.00000001	0.00000149
9	Yes	4	0.00000001	0.00000147
10	Yes	4	0.00000001	0.00000142
11	Yes	4	0.00000001	0.00000144
12	Yes	4	0.00000001	0.00000146
13	Yes	4	0.00000001	0.00000098
14	Yes	4	0.00000001	0.00000152
15	Yes	4	0.00000001	0.00000142
16	Yes	4	0.00000001	0.00000150
17	Yes	4	0.00000001	0.00000147
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000331
20	Yes	4	0.00000001	0.00000426
21	Yes	4	0.00000001	0.00000410
22	Yes	4	0.00000001	0.00000419
23	Yes	4	0.00000001	0.00000444
24	Yes	4	0.00000001	0.00000333
25	Yes	4	0.00000001	0.00000354
26	Yes	4	0.00000001	0.00000428
27	Yes	4	0.00000001	0.00000418
28	Yes	4	0.00000001	0.00000426
29	Yes	4	0.00000001	0.00000350
30	Yes	4	0.00000001	0.00000333
31	Yes	4	0.00000001	0.00000443
32	Yes	4	0.00000001	0.00000418
33	Yes	4	0.00000001	0.00000412
34	Yes	4	0.00000001	0.00000427
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000147
38	Yes	4	0.00000001	0.00000150
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000149
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000143
48	Yes	4	0.00000001	0.00000150
49	Yes	4	0.00000001	0.00000148
50	Yes	4	0.00000001	0.00000143

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 270	11.795	35	0.4322	0.0344
T2	270 - 250	10.868	35	0.4281	0.0297
T3	250 - 230	9.082	35	0.4028	0.0262
T4	230 - 220	7.434	35	0.3570	0.0218
T5	220 - 200	6.700	35	0.3273	0.0166

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	200 - 180	5.401	35	0.2836	0.0108
T7	180 - 160	4.273	35	0.2404	0.0069
T8	160 - 140	3.313	35	0.2053	0.0051
T9	140 - 120	2.485	35	0.1751	0.0037
T10	120 - 100	1.780	35	0.1427	0.0024
T11	100 - 80	1.213	35	0.1151	0.0018
T12	80 - 60	0.773	35	0.0869	0.0013
T13	60 - 40	0.437	35	0.0633	0.0009
T14	40 - 20	0.202	35	0.0396	0.0006
T15	20 - 0	0.055	35	0.0196	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Flash Beacon Lighting	35	11.795	0.4322	0.0344	93612
250.00	RR90-17-02DP	35	9.082	0.4028	0.0262	40821
245.00	DB420-A	35	8.653	0.3934	0.0258	31299
235.00	DB225-2-F	35	7.826	0.3707	0.0238	19957
200.00	(3) DB980H120E-M	35	5.401	0.2836	0.0108	30854
190.00	(3) DB980H120E-M	35	4.816	0.2619	0.0087	28782
180.00	(3) DB980H120E-M	35	4.273	0.2404	0.0069	26783
170.00	APXVSPP18-C-A20	35	3.774	0.2216	0.0058	31422
160.00	7770.00	35	3.313	0.2053	0.0051	38470
150.00	APXV18-206517S	35	2.884	0.1903	0.0044	39877
140.00	LNX-6514DS-VTM	35	2.485	0.1751	0.0037	40128

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	280 - 270	35.763	19	1.3172	0.1363
T2	270 - 250	32.940	19	1.3053	0.1174
T3	250 - 230	27.496	19	1.2293	0.0993
T4	230 - 220	22.465	19	1.0904	0.0804
T5	220 - 200	20.221	19	0.9997	0.0599
T6	200 - 180	16.251	19	0.8648	0.0376
T7	180 - 160	12.819	19	0.7295	0.0233
T8	160 - 140	9.912	19	0.6202	0.0169
T9	140 - 120	7.417	19	0.5270	0.0121
T10	120 - 100	5.304	19	0.4280	0.0079
T11	100 - 80	3.609	19	0.3447	0.0058
T12	80 - 60	2.294	19	0.2597	0.0042
T13	60 - 40	1.296	19	0.1888	0.0029
T14	40 - 20	0.598	19	0.1180	0.0018
T15	20 - 0	0.161	19	0.0582	0.0009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
280.00	Flash Beacon Lighting	19	35.763	1.3172	0.1363	32672
250.00	RR90-17-02DP	19	27.496	1.2293	0.0993	13449
245.00	DB420-A	19	26.187	1.2008	0.0965	10315
235.00	DB225-2-F	19	23.663	1.1320	0.0881	6648
200.00	(3) DB980H120E-M	19	16.251	0.8648	0.0376	9745
190.00	(3) DB980H120E-M	19	14.469	0.7970	0.0298	9121
180.00	(3) DB980H120E-M	19	12.819	0.7295	0.0233	8531
170.00	APXVSPP18-C-A20	19	11.306	0.6709	0.0194	10046
160.00	7770.00	19	9.912	0.6202	0.0169	12358
150.00	APXV18-206517S	19	8.618	0.5738	0.0145	12811
140.00	LNX-6514DS-VTM	19	7.417	0.5270	0.0121	12909

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	280	Leg	A325N	0.6250	5	1.99	12.89	0.154 ✓	1.333	Bolt DS
T2	270	Leg	A325N	0.7500	5	6.15	18.56	0.331 ✓	1.333	Bolt DS
T3	250	Leg	A325N	1.0000	6	11.47	34.49	0.333 ✓	1.333	Bolt Tension
T4	230	Leg	A325N	1.0000	6	12.28	34.56	0.355 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	5.72	6.93	0.826 ✓	1.333	Member Block Shear
T5	220	Leg	A325N	1.0000	6	17.14	34.56	0.496 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	5.88	7.61	0.773 ✓	1.333	Member Block Shear
T6	200	Leg	A325N	1.0000	6	21.75	34.56	0.629 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	1	7.86	7.61	1.033 ✓	1.333	Member Block Shear
		Top Girt	A325N	1.0000	1	3.81	7.61	0.501 ✓	1.333	Member Block Shear
		Mid Girt	A325N	1.0000	1	4.76	7.61	0.625 ✓	1.333	Member Block Shear
T7	180	Leg	A325N	1.2500	6	27.54	54.00	0.510 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	10.25	13.59	0.754 ✓	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	6.15	12.69	0.485 ✓	1.333	Member Block Shear
		Mid Girt	A325N	1.2500	1	6.53	12.69	0.514 ✓	1.333	Member Block Shear
T8	160	Leg	A325N	1.2500	6	34.72	54.00	0.643 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	11.52	15.86	0.726 ✓	1.333	Member Block Shear
		Top Girt	A325N	1.2500	1	5.17	15.86	0.326 ✓	1.333	Member Block Shear
T9	140	Leg	A325N	1.2500	6	41.92	54.00	0.776 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	12.74	15.86	0.803 ✓	1.333	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T10	120	Leg	A325N	1.2500	12	23.27	54.00	0.431 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.20	25.15	0.326 ✓	1.333	Member Block Shear
T11	100	Leg	A325N	1.2500	12	26.50	54.00	0.491 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.59	25.15	0.342 ✓	1.333	Member Block Shear
T12	80	Leg	A325N	1.2500	12	29.52	54.00	0.547 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	7.92	25.15	0.315 ✓	1.333	Member Block Shear
T13	60	Leg	A325N	1.2500	12	31.86	54.00	0.590 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	8.89	25.15	0.353 ✓	1.333	Member Block Shear
T14	40	Leg	A325N	1.2500	12	34.99	54.00	0.648 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	7.85	25.15	0.312 ✓	1.333	Member Block Shear
T15	20	Leg	A687	2.0000	6	73.43	155.51	0.472 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.0000	2	10.59	25.15	0.421 ✓	1.333	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1 3/4	10.00	2.25	61.7 K=1.00	22.423	2.4053	-9.93	53.93	0.184 ✓
T2	270 - 250	2	20.00	2.38	57.0 K=1.00	23.223	3.1416	-30.74	72.96	0.421 ✓
T3	250 - 230	2 1/2	20.00	2.38	45.6 K=1.00	25.022	4.9087	-80.87	122.83	0.658 ✓
T4	230 - 220	Pirod 105245	10.02	10.02	37.8 K=1.00	26.132	5.3014	-85.14	138.54	0.615 ✓
T5	220 - 200	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-118.42	193.73	0.611 ✓
T6	200 - 180	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-152.03	193.73	0.785 ✓
T7	180 - 160	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-195.79	257.78	0.760 ✓
T8	160 - 140	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-250.76	330.69	0.758 ✓
T9	140 - 120	Pirod 105220	20.03	10.02	25.2 K=1.00	27.723	11.9282	-304.48	330.69	0.921 ✓
T10	120 - 100	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-336.47	395.05	0.852 ✓

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 $\frac{P}{P_a}$
T11	100 - 80	Pirod 112743	20.03	20.03	32.6 K=1.00	26.826	14.7262	-388.30	395.05	0.983 ✓
T12	80 - 60	Pirod 112744	20.03	20.03	32.6 K=1.00	26.829	17.8187	-431.64	478.06	0.903 ✓
T13	60 - 40	Pirod 112744	20.03	20.03	32.6 K=1.00	26.829	17.8187	-476.46	478.06	0.997 ✓
T14	40 - 20	Pirod 112745	20.03	20.03	32.5 K=1.00	26.833	21.2057	-515.23	569.01	0.905 ✓
T15	20 - 0	Pirod 112740	20.03	20.03	32.5 K=1.00	26.833	21.2057	-557.96	569.01	0.981 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	230 - 220	0.5	1.47	141.2	7.490	0.1963	0.74	1.65	0.447 ✓
T5	220 - 200	0.5	1.46	140.0	7.617	0.1963	0.53	1.67	0.315 ✓
T6	200 - 180	0.5	1.46	140.0	7.617	0.1963	1.02	1.67	0.607 ✓
T7	180 - 160	0.625	1.45	111.1	11.525	0.3068	1.06	3.96	0.269 ✓
T8	160 - 140	0.625	1.43	110.2	11.648	0.3068	1.53	4.00	0.383 ✓
T9	140 - 120	0.625	1.43	110.2	11.648	0.3068	1.83	4.00	0.459 ✓
T10	120 - 100	0.75	1.73	110.5	12.229	0.4418	0.76	7.44	0.102 ✓
T11	100 - 80	0.75	1.73	110.5	12.229	0.4418	0.83	7.44	0.112 ✓
T12	80 - 60	0.75	1.71	109.5	12.452	0.4418	0.84	7.58	0.111 ✓
T13	60 - 40	0.75	1.71	109.5	12.452	0.4418	1.16	7.58	0.153 ✓
T14	40 - 20	0.875	1.70	93.0	16.281	0.6013	1.64	13.48	0.122 ✓
T15	20 - 0	0.875	1.70	93.0	16.281	0.6013	1.62	13.48	0.120 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.48	2.66	109.5	12.454	0.6013	-1.79	7.49	0.238

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=0.75					✓
T2	270 - 250	7/8	5.54	2.68	110.1 K=0.75	12.325	0.6013	-2.40	7.41	0.324 ✓
T3	250 - 230	1	5.54	2.65	95.5 K=0.75	15.734	0.7854	-5.60	12.36	0.453 ✓
T4	230 - 220	L2 1/2x2 1/2x3/16	11.42	5.00	121.3 K=1.00	10.097	0.9020	-6.60	9.11	0.725 ✓
T5	220 - 200	L3x3x3/16	12.50	5.65	115.3 K=1.01	10.840	1.0900	-6.27	11.82	0.530 ✓
T6	200 - 180	L3x3x3/16	13.80	6.35	127.8 K=1.00	9.141	1.0900	-9.18	9.96	0.922 ✓
T7	180 - 160	L3x3x5/16	15.24	7.06	143.9 K=1.00	7.216	1.7800	-12.04	12.84	0.937 ✓
T8	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.86	136.7 K=1.00	7.989	2.0900	-11.50	16.70	0.689 ✓
T9	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.29	144.1 K=1.00	7.188	2.0900	-13.46	15.02	0.896 ✓
T10	120 - 100	2L3 1/2x3 1/2x5/16	26.26	12.43	133.8 K=0.97	8.337	4.1800	-18.20	34.85	0.522 ✓
T11	100 - 80	2L3 1/2x3 1/2x5/16	27.59	13.12	139.7 K=0.96	7.653	4.1800	-17.19	31.99	0.537 ✓
T12	80 - 60	2L3 1/2x3 1/2x5/16	29.01	13.85	145.8 K=0.95	7.022	4.1800	-17.64	29.35	0.601 ✓
T13	60 - 40	2L3 1/2x3 1/2x5/16	30.49	14.60	152.2 K=0.94	6.446	4.1800	-17.02	26.94	0.632 ✓
T14	40 - 20	2L3 1/2x3 1/2x5/16	32.02	15.38	158.8 K=0.93	5.922	4.1800	-18.99	24.75	0.767 ✓
T15	20 - 0	2L3 1/2x3 1/2x5/16	33.61	16.18	165.6 K=0.92	5.446	4.1800	-18.76	22.77	0.824 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.00	4.85	186.4 K=0.70	4.298	0.6013	-0.16	2.58	0.063 ✓
T2	270 - 250	7/8	5.00	4.83	185.6 K=0.70	4.335	0.6013	-0.32	2.61	0.123 ✓
T3	250 - 230	7/8	5.00	4.79	184.0 K=0.70	4.411	0.6013	-0.61	2.65	0.230 ✓

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 $\frac{P}{P_a}$

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	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.69	4.41	0.156 ✔
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.81	4.45	0.181 ✔
T3	250 - 230	1 1/4	5.00	4.79	128.8 K=0.70	9.002	1.2272	-1.51	11.05	0.137 ✔
T6	200 - 180	L3x3x3/16	8.00	6.63	133.4 K=1.00	8.393	1.0900	-2.88	9.15	0.314 ✔
T7	180 - 160	L4x4x1/4	10.00	8.54	128.9 K=1.00	8.983	1.9400	-4.45	17.43	0.255 ✔
T8	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.54	183.3 K=1.00	4.443	2.0900	-3.69	9.29	0.397 ✔

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	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.70	4.41	0.158 ✔
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.95	4.45	0.214 ✔
T3	250 - 230	1 1/4	5.00	4.79	128.8 K=0.70	9.002	1.2272	-0.95	11.05	0.086 ✔

Mid 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	280 - 270	1	5.00	4.85	163.1 K=0.70	5.614	0.7854	-0.01	4.41	0.002 ✔
T2	270 - 250	1	5.00	4.83	162.4 K=0.70	5.662	0.7854	-0.18	4.45	0.040 ✔
T6	200 - 180	L3x3x3/16	9.00	7.63	153.5 K=1.00	6.336	1.0900	-3.40	6.91	0.492 ✔
T7	180 - 160	L4x4x1/4	11.00	9.54	144.0 K=1.00	7.199	1.9400	-4.60	13.97	0.329 ✔

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	280 - 270	1 3/4	10.00	2.25	61.7	32.500	1.2339	6.33	40.10	0.158 ✓
T2	270 - 250	2	20.00	2.38	57.0	32.500	1.5625	25.53	50.78	0.503 ✓
T3	250 - 230	2 1/2	20.00	2.38	45.6	30.000	4.9087	68.82	147.26	0.467 ✓
T4	230 - 220	Pirod 105245	10.02	10.02	37.8	30.000	5.3014	73.67	159.04	0.463 ✓
T5	220 - 200	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	102.83	216.47	0.475 ✓
T6	200 - 180	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	130.52	216.47	0.603 ✓
T7	180 - 160	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	165.27	282.74	0.585 ✓
T8	160 - 140	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	208.33	357.85	0.582 ✓
T9	140 - 120	Pirod 105220	20.03	10.02	25.2	30.000	11.9282	251.50	357.85	0.703 ✓
T10	120 - 100	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	279.28	441.79	0.632 ✓
T11	100 - 80	Pirod 112743	20.03	20.03	32.6	30.000	14.7262	317.97	441.79	0.720 ✓
T12	80 - 60	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	354.20	534.56	0.663 ✓
T13	60 - 40	Pirod 112744	20.03	20.03	32.6	30.000	17.8187	382.31	534.56	0.715 ✓
T14	40 - 20	Pirod 112745	20.03	20.03	32.5	30.000	21.2057	419.87	636.17	0.660 ✓
T15	20 - 0	Pirod 112740	20.03	20.03	32.5	30.000	21.2057	440.57	636.17	0.693 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T4	230 - 220	0.5	1.47	141.2	7.490	0.1963	0.74	1.65	0.447 ✓
T5	220 - 200	0.5	1.46	140.0	7.617	0.1963	0.53	1.67	0.315 ✓
T6	200 - 180	0.5	1.46	140.0	7.617	0.1963	1.02	1.67	0.607 ✓
T7	180 - 160	0.625	1.45	111.1	11.525	0.3068	1.06	3.96	0.269 ✓
T8	160 - 140	0.625	1.43	110.2	11.648	0.3068	1.53	4.00	0.383 ✓
T9	140 - 120	0.625	1.43	110.2	11.648	0.3068	1.83	4.00	0.459 ✓
T10	120 - 100	0.75	1.73	110.5	12.229	0.4418	0.76	7.44	0.102 ✓

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T11	100 - 80	0.75	1.73	110.5	12.229	0.4418	0.83	7.44	0.112 ✓
T12	80 - 60	0.75	1.71	109.5	12.452	0.4418	0.84	7.58	0.111 ✓
T13	60 - 40	0.75	1.71	109.5	12.452	0.4418	1.16	7.58	0.153 ✓
T14	40 - 20	0.875	1.70	93.0	16.281	0.6013	1.64	13.48	0.122 ✓
T15	20 - 0	0.875	1.70	93.0	16.281	0.6013	1.62	13.48	0.120 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.48	2.66	146.0	30.000	0.6013	1.79	18.04	0.099 ✓
T2	270 - 250	7/8	5.54	2.68	146.8	30.000	0.6013	2.40	18.04	0.133 ✓
T3	250 - 230	1	5.54	2.65	127.3	30.000	0.7854	5.51	23.56	0.234 ✓
T4	230 - 220	L2 1/2x2 1/2x3/16	11.42	5.00	80.1	21.600	0.9020	5.72	19.48	0.294 ✓
T5	220 - 200	L3x3x3/16	11.93	5.40	71.5	21.600	1.0900	5.88	23.54	0.250 ✓
T6	200 - 180	L3x3x3/16	13.80	6.35	83.5	21.600	1.0900	7.86	23.54	0.334 ✓
T7	180 - 160	L3x3x5/16	15.24	7.06	94.9	21.600	1.7800	10.25	38.45	0.267 ✓
T8	160 - 140	L3 1/2x3 1/2x5/16	16.80	7.86	89.9	21.600	2.0900	11.52	45.14	0.255 ✓
T9	140 - 120	L3 1/2x3 1/2x5/16	17.62	8.29	94.6	21.600	2.0900	12.74	45.14	0.282 ✓
T10	120 - 100	2L3 1/2x3 1/2x5/16	26.26	12.43	141.6	21.600	4.1800	16.39	90.29	0.182 ✓
T11	100 - 80	2L3 1/2x3 1/2x5/16	27.59	13.12	149.3	21.600	4.1800	17.18	90.29	0.190 ✓
T12	80 - 60	2L3 1/2x3 1/2x5/16	29.01	13.85	157.3	21.600	4.1800	15.84	90.29	0.175 ✓
T13	60 - 40	2L3 1/2x3 1/2x5/16	30.49	14.60	165.7	21.600	4.1800	17.77	90.29	0.197 ✓
T14	40 - 20	2L3 1/2x3 1/2x5/16	32.02	15.38	174.3	21.600	4.1800	15.71	90.29	0.174 ✓
T15	20 - 0	2L3 1/2x3 1/2x5/16	33.61	16.18	183.2	21.600	4.1800	21.19	90.29	0.235 ✓

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	7/8	5.00	4.85	266.3	30.000	0.6013	0.27	18.04	0.015 ✔
T2	270 - 250	7/8	5.00	4.83	265.1	30.000	0.6013	0.44	18.04	0.024 ✔
T3	250 - 230	7/8	5.00	4.79	262.9	30.000	0.6013	0.77	18.04	0.043 ✔

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.67	23.56	0.028 ✔
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	0.81	23.56	0.034 ✔
T3	250 - 230	1 1/4	5.00	4.79	184.0	30.000	1.2272	1.55	36.82	0.042 ✔
T6	200 - 180	L3x3x3/16	8.00	6.63	89.5	21.600	1.0900	3.81	23.54	0.162 ✔
T7	180 - 160	L4x4x1/4	10.00	8.54	86.4	21.600	1.9400	6.15	41.90	0.147 ✔
T8	160 - 140	L3 1/2x3 1/2x5/16	12.00	10.54	122.2	21.600	2.0900	5.17	45.14	0.114 ✔

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	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.73	23.56	0.031 ✔
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	1.02	23.56	0.043 ✔
T3	250 - 230	1 1/4	5.00	4.79	184.0	30.000	1.2272	1.10	36.82	0.030 ✔

Mid 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 $\frac{P}{P_a}$

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	280 - 270	1	5.00	4.85	233.0	30.000	0.7854	0.11	23.56	0.005 ✔
T2	270 - 250	1	5.00	4.83	232.0	30.000	0.7854	0.29	23.56	0.012 ✔
T6	200 - 180	L3x3x3/16	9.00	7.63	102.2	21.600	1.0900	4.76	23.54	0.202 ✔
T7	180 - 160	L4x4x1/4	11.00	9.54	96.0	21.600	1.9400	6.53	41.90	0.156 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	280 - 270	Leg	1 3/4	2	-9.93	71.89	13.8	Pass
T2	270 - 250	Leg	2	41	25.53	67.69	37.7	Pass
T3	250 - 230	Leg	2 1/2	107	-80.87	163.73	49.4	Pass
T4	230 - 220	Leg	Pirod 105245	171	-85.14	184.67	46.1	Pass
T5	220 - 200	Leg	Pirod 105218	180	-118.42	258.24	45.9	Pass
T6	200 - 180	Leg	Pirod 105218	195	-152.03	258.24	58.9	Pass
T7	180 - 160	Leg	Pirod 105219	216	-195.79	343.62	57.0	Pass
T8	160 - 140	Leg	Pirod 105220	237	-250.76	440.81	56.9	Pass
T9	140 - 120	Leg	Pirod 105220	255	-304.48	440.81	69.1	Pass
T10	120 - 100	Leg	Pirod 112743	270	-336.47	526.59	63.9	Pass
T11	100 - 80	Leg	Pirod 112743	279	-388.30	526.59	73.7	Pass
T12	80 - 60	Leg	Pirod 112744	288	-431.64	637.26	67.7	Pass
T13	60 - 40	Leg	Pirod 112744	297	-476.46	637.26	74.8	Pass
T14	40 - 20	Leg	Pirod 112745	306	-515.23	758.48	67.9	Pass
T15	20 - 0	Leg	Pirod 112740	315	-557.96	758.48	73.6	Pass
T1	280 - 270	Diagonal	7/8	16	-1.79	9.98	17.9	Pass
T2	270 - 250	Diagonal	7/8	54	-2.40	9.88	24.3	Pass
T3	250 - 230	Diagonal	1	116	-5.60	16.47	34.0	Pass
T4	230 - 220	Diagonal	L2 1/2x2 1/2x3/16	174	-6.60	12.14	54.4 61.9 (b)	Pass
T5	220 - 200	Diagonal	L3x3x3/16	183	-6.27	15.75	39.8 58.0 (b)	Pass
T6	200 - 180	Diagonal	L3x3x3/16	204	-9.18	13.28	69.2 77.5 (b)	Pass
T7	180 - 160	Diagonal	L3x3x5/16	228	-12.04	17.12	70.3	Pass
T8	160 - 140	Diagonal	L3 1/2x3 1/2x5/16	246	-11.50	22.26	51.7 54.5 (b)	Pass
T9	140 - 120	Diagonal	L3 1/2x3 1/2x5/16	267	-13.46	20.03	67.2	Pass
T10	120 - 100	Diagonal	2L3 1/2x3 1/2x5/16	276	-18.20	46.45	39.2	Pass
T11	100 - 80	Diagonal	2L3 1/2x3 1/2x5/16	285	-17.19	42.64	40.3	Pass
T12	80 - 60	Diagonal	2L3 1/2x3 1/2x5/16	294	-17.64	39.13	45.1	Pass
T13	60 - 40	Diagonal	2L3 1/2x3 1/2x5/16	300	-17.02	35.92	47.4	Pass
T14	40 - 20	Diagonal	2L3 1/2x3 1/2x5/16	310	-18.99	33.00	57.6	Pass
T15	20 - 0	Diagonal	2L3 1/2x3 1/2x5/16	318	-18.76	30.35	61.8	Pass
T1	280 - 270	Horizontal	7/8	32	-0.16	3.45	4.7	Pass
T2	270 - 250	Horizontal	7/8	98	-0.32	3.47	9.2	Pass
T3	250 - 230	Horizontal	7/8	162	-0.61	3.54	17.3	Pass
T1	280 - 270	Top Girt	1	5	-0.69	5.88	11.7	Pass
T2	270 - 250	Top Girt	1	44	-0.81	5.93	13.6	Pass
T3	250 - 230	Top Girt	1 1/4	109	-1.51	14.73	10.3	Pass
T6	200 - 180	Top Girt	L3x3x3/16	196	-2.88	12.19	23.6 37.6 (b)	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	180 - 160	Top Girt	L4x4x1/4	217	-4.45	23.23	19.1 36.4 (b)	Pass
T8	160 - 140	Top Girt	L3 1/2x3 1/2x5/16	238	-3.69	12.38	29.8	Pass
T1	280 - 270	Bottom Girt	1	8	-0.70	5.88	11.9	Pass
T2	270 - 250	Bottom Girt	1	45	-0.95	5.93	16.0	Pass
T3	250 - 230	Bottom Girt	1 1/4	111	-0.95	14.73	6.5	Pass
T1	280 - 270	Mid Girt	1	10	0.11	31.41	0.3	Pass
T2	270 - 250	Mid Girt	1	48	-0.18	5.93	3.0	Pass
T6	200 - 180	Mid Girt	L3x3x3/16	199	-3.40	9.21	36.9 46.9 (b)	Pass
T7	180 - 160	Mid Girt	L4x4x1/4	220	-4.60	18.62	24.7 38.6 (b)	Pass
							Summary	
						Leg (T13)	74.8	Pass
						Diagonal (T6)	77.5	Pass
						Horizontal (T3)	17.3	Pass
						Top Girt (T6)	37.6	Pass
						Bottom Girt (T2)	16.0	Pass
						Mid Girt (T6)	46.9	Pass
						Bolt Checks	77.5	Pass
						RATING =	**77.5**	**Pass**

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 12593 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 84 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 168 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 575 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 456 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 280 \cdot ft$	(User Input)	
Tower Width =	$W_t := 28 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 1$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 3.25 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 38.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 3.25 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 5.0 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 5000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 9$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.128 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 23$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 11$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.41 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 60$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 11$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.41 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 60$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area =

$$A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.999 \cdot in^2$$

Pad Top Reinforcement Bar Area =

$$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 1.561 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =

$$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 1.561 \cdot in^2$$

Coefficient of Lateral Soil Pressure =

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

Load Factor =

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

Stability of Footing:

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

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

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = 0.99 \cdot ksf$

$P_{top} := if\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 0.99 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 2.16 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.575 \cdot ksf$

$T_p := if\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 3.25$

$A_p := W_f \cdot T_p = 125.125$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 197.072 \cdot kip$

Weight of Concrete Pad = $WT_{pad} := \left(W_f^2 \cdot T_f\right) \cdot \gamma_c = 722.597 \cdot kip$

Weight of Concrete Piers = $WT_{pier} := 3 \cdot \left[\left(L_p \cdot d_p^2\right) \cdot \gamma_c\right] = 36.563 \cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier} = 759 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left(W_f^2 - 3 \cdot d_p^2\right) \cdot \left(L_p - L_{pag}\right) \cdot \gamma_s = 464 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{3}$

$X_t := if\left(Pos_t, X_{t1}, X_{t2}\right) = 7.126$

$X_{off} := \frac{W_f}{2} - \left[\frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{3} + X_t\right] = 4.041$

Resisting Moment = $M_r := \left(WT_c + WT_{s1} + WT_t\right) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} = 27001 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot \left(L_p + T_f\right) = 13139 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.06$

Factor of Safety Required = $FS_{req} := 2$

$OverTurning\_Moment\_Check := if\left(FS \geq FS_{req}, "Okay", "No\ Good"\right)$

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 1392 \cdot kip$

Area of the Mat = $A_{mat} := W_f^2 = 1.482 \times 10^3$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 9511.1 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 2.32 \cdot ksf$

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

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.443 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < q_s), "Okay", "No Good"]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 10.777$

Distance to Kern = $X_k := \frac{W_f}{6} = 6.417$

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 9.442$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 2.457 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 2.457 \cdot ksf$

$Pressure\_Check := if(q_{adj} < q_s, "Okay", "No Good")$

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 6249 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if(P_b > LF \cdot C_t, "Okay", "No Good")$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.75$ (ACI 9.3.2.3)

$d := T_f - Cvr_{pad} - \frac{d_{bbot}}{2} = 35.295 \cdot in$

$FL := \frac{C_t}{W_f^2} = 0.3879 \cdot ksf$

$V_{req} := LF \cdot FL \cdot \left(X_t - 0.5 \cdot d_p - d\right) \cdot W_f = 33.534 \cdot kip$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1547 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No\ Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot 4 = 31.8$

Required Shear Strength = $V_{req} := LF \cdot FL \cdot \left[W_f^2 - \left(d_p + d\right)^2\right] = 733.9 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2552.7 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No\ Good"\right)$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$M_{max} := 2125 \cdot kip \cdot ft$

Design Moment = $M_n := \frac{LF \cdot M_{max}}{\phi_m} = 3147 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 \text{ if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 \text{ if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right] \cdot 0.5\right] \text{ otherwise} \end{cases}$$ $= 0.85$ (ACI-200810.2.7.3)

$d := T_f - Cvr_{pad} - d_{bbot} = 34.59 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 18.198 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot W_f} = 0.695 \cdot in$

$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2}\right)} = 18.383 \cdot in^2$

$\rho := \frac{A_s}{W_f \cdot d} = 0.00115$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018 \qquad \text{(ACI -2008 7.12.2.1)}$$

Check Bottom Bars:

$$As := \begin{cases} \left(\rho \cdot W_f \cdot d\right) & \text{if } \left(\rho \cdot W_f \cdot d\right) > \rho_{sh} \cdot \frac{W_f}{2} \cdot d \\ \rho_{sh} \cdot \frac{W_f}{2} \cdot d & \text{otherwise} \end{cases} = 18.383 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 93.7 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No\ Good"\right)$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{W_f}{2} \cdot d\right) = 14.4 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 93.7 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, "Okay", "No\ Good"\right)$$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 6.29 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0 \qquad \text{(ACI-2008 12.2.3)}$$

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 47.2 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in \qquad \text{(ACI-2008 12.2.1)}$$

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right) = "Use\ L.dbt"$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 60 \cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No\ Good"\right)$$

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier =

$$A_p := \frac{\pi \cdot d_p^{\,2}}{4} = 2827.43 \cdot in^2$$

$$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 14.14 \cdot in^2$$ (ACI-2008 10.8.4 & 10.9.1)

$$A_{sprov} := NB_{pier} \cdot A_{bpier} = 22.98 \cdot in^2$$

$$Steel\_Area\_Check := if\left(A_{sprov} > A_{smin}, "Okay", "No Good"\right)$$

Steel_Area_Check = "Okay"

Bar Spacing In Pier =

$$B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 7.067 \cdot in$$

Diameter of Reinforcement Cage =

$$Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 54 \cdot in$$

Maximum Moment in Pier =

$$M_p := \left[S_t \cdot \left(L_p + \frac{A_{BP}}{2}\right)\right] \cdot LF = 5038.7 \cdot in \cdot kips$$

Pier Check evaluated from outside program and results are listed below;

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := \left(d_p \cdot 12 \;\; NB_{pier} \;\; BS_{pier} \;\; \frac{C_t \cdot 1.333}{kips} \;\; \frac{M_p}{in \cdot kips}\right)$$

$$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) = (60 \;\; 23 \;\; 9 \;\; 766.5 \;\; 5038.7)$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := \phi P'_n\left(D, N, n, P_u, M_{xu}\right)^T$$

$$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = (4474 \;\; 29411.5 \;\; -21.4 \;\; 0)$$

$$Axial\_Load\_Check := if\left(\phi P_n \geq P_u, "Okay", "No Good"\right)$$

Axial_Load_Check = "Okay"

$$Bending\_Check := if\left(\phi M_{xn} \geq M_{xu}, "Okay", "No Good"\right)$$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 36 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 36 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 3 \cdot in$

Transverse Reinforcement =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 30.18 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 14.982 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 21.402 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 20.304 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 21.402 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

SITE NAME	WOODBRIDGE NORTH CT	ECP & CELL #	2	0106
Note: AWS Add (Root Metric Site). PCS RRH for leasing only, do not order equipment.		LATITUDE	41-23-29.50 N	
		LONGITUDE	73-03-12.00 W	
		STRUCTURE TYPE	Lattice	
AWS - LTE ANTENNA ADD	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	2100 MHz BBU	2100 MHz BBU	2100 MHz BBU	
ANTENNA TYPE	HBXX-6517DS-A2M_02DT	HBXX-6517DS-A2M_02DT	HBXX-6517DS-A2M_02DT	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	0	0	0	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEXER - QTY / MODEL				
RRH - QTY/MODEL	1 x ALU RH_2X60-AWS	1 x ALU RH_2X60-AWS	1 x ALU RH_2X60-AWS	
SECTOR DISTRIBUTION BOX				
MAIN DISTRIBUTION BOX	1 x DB-T1-6Z-8AB-0Z			
700 LTE - CURRENT CONFIG	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	700 eNodeB	700 eNodeB	700 eNodeB	
ANTENNA TYPE	LNX-6514DS-T4M-750_4	LNX-6514DS-T4M-750_4	LNX-6514DS-T4M-750_4	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	2	4	4	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEXER - QTY / MODEL				
700 Mhz - LTE Future Config	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	700 eNodeB	700 eNodeB	700 eNodeB	
ANTENNA TYPE	LNX-6514DS-T4M-750_4	LNX-6514DS-T4M-750_4	LNX-6514DS-T4M-750_4	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	2	4	4	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEXER - QTY / MODEL				
RRH - QTY/MODEL				
850 CELLULAR - CURRENT CONFIG	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B	
ANTENNA TYPE	LPA-80063/6CF	LPA-80063/6CF	LPA-80063/6CF	
QTY OF ANTENNAS PER FACE	2	2	2	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	2	4	4	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEXER - QTY / MODEL	2 x FD9R6004/2C-3L	2 x FD9R6004/2C-3L	2 x FD9R6004/2C-3L	
850 CELLULAR - FUTURE CONFIG	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	Cellular Mod 4.0B	Cellular Mod 4.0B	Cellular Mod 4.0B	
ANTENNA TYPE	LNX-6514DS-A1M_02DT_0850	LNX-6514DS-A1M_04DT_0850	LNX-6514DS-A1M_04DT_0850	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	0	0	0	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEXER - QTY / MODEL	2 x FD9R6004/2C-3L	2 x FD9R6004/2C-3L	2 x FD9R6004/2C-3L	
DIPLEX WITH LTE CABLE				
1900 PCS - CURRENT CONFIG	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	PCS Mod 4.0B	PCS Mod 4.0B	PCS Mod 4.0B	
ANTENNA TYPE	BXA-171063-12BF-EDIN-2	BXA-171063-12BF-EDIN-2	BXA-171063-12BF-EDIN-2	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	0	0	0	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEX WITH CELLULAR CABLE	YES	YES	YES	
1900 PCS - FUTURE CONFIG	**ALPHA**	**BETA**	**GAMMA**	
EQUIPMENT TYPE	PCS Mod 4.0B	PCS Mod 4.0B	PCS Mod 4.0B	
ANTENNA TYPE	HBXX-6517DS-A2M_02DT	HBXX-6517DS-A2M_02DT	HBXX-6517DS-A2M_02DT	
QTY OF ANTENNAS PER FACE	1	1	1	
ORIENTATION (DEG)	10	110	240	
DOWN TILT (MECH/DEG)	0	0	0	
RAD CTR (FT AGL)	140	140	140	
TMA - QTY / MODEL				
DIPLEX WITH CELLULAR CABLE	YES	YES	YES	
RRH - QTY/MODEL	1 x ALU RH_60W-PCS	1 x ALU RH_60W-PCS	1 x ALU RH_60W-PCS	

NUMBER OF CABLES NEEDED						FIBER LINES MODEL NUMBER			
TOTAL # FIBER LINES	1	TOTAL # OF MAINLINES	12			FIBER LINE MODEL #	HB158-1-08U8-S8J18		
TOTAL # TOP JUMPERS	3	TOTAL # OF TOP JUMPERS	18			FIBER TOP JUMPER MODEL #	HB114-1-08U4-S4J18		
EQUIPMENT CABLE ORDERING		MAIN CABLE #	12	+	0	TOP JUMPER #	18	+	0

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 MHz	TX: 746-757 MHz	PCS (Watts)	16
RX: 824-835/845-846.5 MHz	RX: 1890-1895/1745-1755 MHz	RX: 776-787 MHz	LTE/AWS (Watts)	40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	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	INITIALS	DATE
Prepared by: Jaime Laredo	Robert Hesselbach	JL	7/10/2014

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® single band, quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz
Number of Ports, all types	4

Mechanical Specifications

Color	Light gray
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

Product Specifications

HBXX-6517DS-VTM

RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1903.0 mm | 74.9 in
Width	305.0 mm | 12.0 in
Net Weight	19.5 kg | 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	HBXX-6517DS-R2M
Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
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.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

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

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity, total	2
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Product Specifications

LNX-6514DS-VTM

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	17.6 kg | 38.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

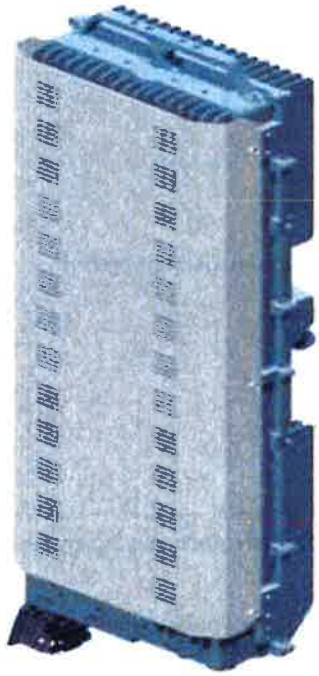
Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

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.

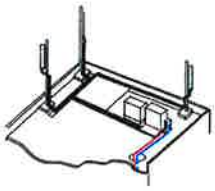
EASY INSTALLATION

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.

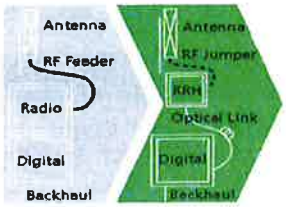
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

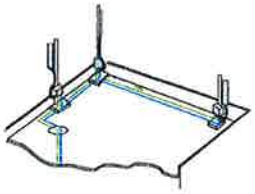
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

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

Features/Benefits

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

Technical Specifications

Mechanical Specifications

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

Electrical Specifications

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

* This data is provisional and subject to change.