Robinson+Cole

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Also admitted in Massachusetts

August 24, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
14-20 Isham Road, West Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas on an existing 100-foot guyed-lattice tower on the roof of a 25-foot tall building at 14-20 Isham Road in West Hartford, Connecticut (the "Property"). Cellco's antennas are mounted 105 feet above ground level. The tower and underlying property are owned by M&R Gassner Family II, LLC. The Council approved Cellco's shared use of this tower in 2008. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace six (6) remote radio heads ("RRHs") with six (6) newer model RRHs and install three (3) new RRHs and one (1) HYBRIFLEX™ fiber optic 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 Ronald Van Winkle, Town Manager for the Town of West Hartford. A copy of this letter is also being sent to M&R Gassner Family II, LLC, the owner of the tower and 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 Cellco's existing antenna platform at the top of the existing roof-top 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 for 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).

A copy of the West Hartford Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Ronald Van Winkle, West Hartford Town Manager
M&R Gassner Family II, LLC
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

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

General Specifications

Antenna Type	Sector with internal RET
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

Product Specifications

SBNHH-1D65B

Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

Depth	296.0 mm | 11.7 in
Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Shipping Weight	31.0 kg | 68.3 lb

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

Product Specifications

SBNHH-1D65B

Included Products

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1

B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in (H=660mm) W = 11.4in (W=290mm) D = 5.9in (D=150mm)	H = 26.6in (H=675mm) W = 12in (W=304mm) D = 6.8in (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg

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)

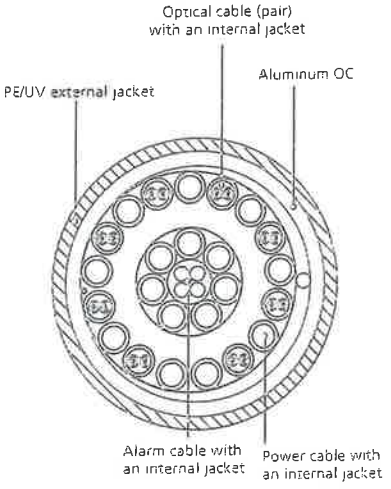


Figure 3: Construction Detail

* This data is provisional and subject to change

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

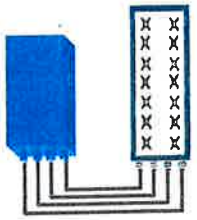
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

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

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. 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 RRH2x60-1900A-4R 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 RRH2x60-1900A-4R integrates all the latest technologies. This allows operators 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.

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 RRH2x60-1900A-4R 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).

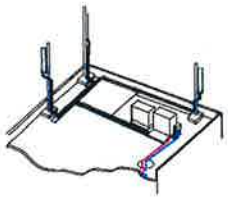
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

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 RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R 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 RRH2x60-190A-4R is compact and weighs about 21 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.



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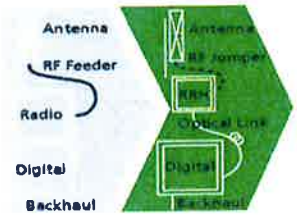
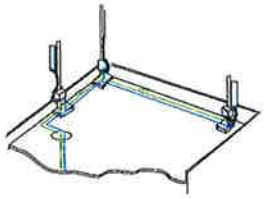


RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO deployment and/or WCDMA and LTE simultaneous 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 : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -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 15km 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: ETS300-019-1-4 class4.1E
- 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
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

ATTACHMENT 2

	General	Power	Density					
Site Name: West Hartford Center								
Tower Height: 100ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Nextel	12	100	123	851	0.0315	0.5673	0.56%	
*Clearwire	2	724	114	2495	0.0447	1.0000	0.45%	
*Clearwire	1	1239	110	23000	0.0412	1.0000	0.41%	
*Clearwire	1	1239	110	23000	0.0412	1.0000	0.41%	
*Clearwire	1	2060	119	18000	0.0580	1.0000	0.58%	
*MetroPCS AWS	3	727	132	2130	0.0494	1.0000	0.49%	
*MetroPCS LTE	1	866	107	2130	0.0305	1.0000	0.31%	
Verizon PCS	**1**	**5000**	**105**	**0.1631**	**1970**	**1.0000**	**16.31%**	
Verizon Cellular	**9**	**422**	**105**	**0.1239**	**869**	**0.5793**	**21.38%**	
Verizon AWS	**1**	**4960**	**105**	**0.1618**	**2145**	**1.0000**	**16.18%**	
Verizon 700	**1**	**2190**	**105**	**0.0714**	**746**	**0.4973**	**14.36%**	
								71.43%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

100-ft Existing Roof Top Mounted FWT
Guyed Lattice Tower

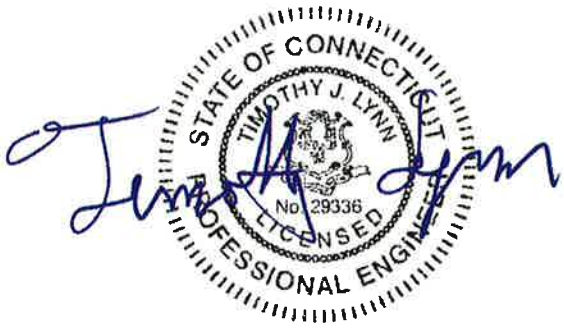
Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: West Hartford Center

14-20 Isham Road
West Hartford, CT

CENTEK Project No. 16001.17

Date: July 22, 2016



Prepared for:

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

Table of Contents

Introduction

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

The host tower is a 100-ft, six-section, three legged guyed lattice tower with pin base originally designed by Paul J Ford and Company job no; 19-636-97R dated November 10, 1997 and manufactured by FWT. The tower type, geometry and structure member sizes were taken from a previous structural report prepared by Centek Engineering job no; 12124.54 dated January 21, 2013. Guy anchorage to the existing host building roof top was taken from the original design documents prepared by Cianci & Cianci Structural Engineers job no; 97-113-01 dated October 22, 1997.

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

The tower is made up of six (6) vertical sections consisting of A572-50 solid steel legs. Diagonal and horizontal bracing consists of A36 solid round and steel angle construction. The vertical tower legs are connected together with bolted flanges while bracing consists of fully welded connections. The width of the tower face is 3'-0-1/2".

Verizon proposes the removal of nine (9) panel antennas and six (6) remote radio heads and the installation of nine (9) panel antennas, nine (9) remote radio heads and one (1) main distribution boxes mounted to the existing three (3) 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, proposed and future loads considered in this analysis consist of the following:

- UNKNOWN (Existing):
  Appurtenance: One (1) 18-ft Omni-directional whip antenna, one (1) 12-ft Omni-directional whip antenna, one (1) 6-ft Omni-directional whip antenna, one (1) 4-ft Omni-directional whip antenna and two (2) 4 Bay dipole antennas mounted to the top of the tower.
  Coax Cables: Three (3) 1-5/8" ∅ and four (4) 7/8" dia. coax cables running on the face of the existing tower as specified in Section 3 of this report.
- CLEARWIRE (Existing):
  Antennas: One (1) Andrew VHLP2-18 microwave dish pipe mounted with a RAD center elevation of 127-ft above existing grade (102-ft above tower base).
  Coax Cables: One (1) 1/2" ∅ coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEXTEL / CLEARWIRE (Existing):
  Antennas: Six (6) Decibel DB844H65E-XY panel antennas, three (3) Decibel DB844G65ZAXY panel antennas, three (3) Argus LLPX310R panel antennas and three (3) RRU's mounted to three (3) 12-ft boom gates with a RAD center elevation of 123-ft above existing grade (98-ft above tower base).
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables and one (1) 3" ∅ flex conduit running on the face of the existing tower as specified in Section 3 of this report.

- CLEARWIRE (Existing):
  Antennas: Two (2) Andrew VHLP1-23 microwave dishes pipe mounted with a RAD center elevation of 118-ft above existing grade (93-ft above tower base).
  Coax Cables: Two (2) 1/2" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) ANT-150D6-9 yagi antenna leg mounted with an elevation of 69-ft above existing grade (44-ft above tower base).
  Coax Cables: One (1) 1/2" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: One (1) ANT-150D6-9 yagi antenna leg mounted with an elevation of 55-ft above existing grade (30-ft above tower base).
  Coax Cables: One (1) 1/2" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.
- UNKNOWN (Existing):
  Antennas: Four (4) GPS antennas mounted on standoff arms with an elevation of 31-ft above existing grade (6-ft above tower base).
  Coax Cables: Four (4) 1/2" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Antennas: One (1) Antel BXA-80063-4CF and two (2) Swedcom SLCP 2X6014 panel antennas mounted to three (3) existing 12-ft T-Frames with a RAD center elevation of 105-ft above existing grade (80-ft above tower base).
  Appurtenances: One (1) RFS DB-T1-6Z-8AB-0Z main distribution box flush mounted to a leg of the existing tower with a RAD center elevation of 109-ft above existing grade (84-ft above tower base).
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on the face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remove):
  Antennas: One (1) Antel BXA-70063-6CF, two (2) Swedcom SLCP 2X6015, one (1) Antel BXA-171063-8BF, two (2) Swedcom SACP 2X5516, one (1) Antel BXA-171063-12CF panel antenna and two (2) Swedcom SACP 2X5516 panel antennas panel antennas mounted to three (3) existing 12-ft T-Frames with a RAD center elevation of 105-ft above existing grade (80-ft above tower base).
  Appurtenances: Three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads and three (3) Alcatel-Lucent RRH2x40-07-U Remote Radio Heads mounted to three (3) existing 12-ft T-Frames with a RAD center elevation of 105-ft above existing grade (80-ft above tower base).

- **VERIZON (PROPOSED):**
  Antennas: Nine (9) Andrew SBNHH-1D65B panel antennas mounted to three (3) existing 12-ft T-Frames with a RAD center elevation of 105-ft above existing grade (80-ft above tower base).
  Antennas: Three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution mounted to three (3) existing 12-ft T-Frames with a RAD center elevation of 105-ft above existing grade (80-ft above tower base).
  Coax Cables: One (1) 1-5/8" ∅ fiber cable running on the face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- 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 to be installed as indicated in 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 on 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:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	West Hartford; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed controls.	
Load Cases:	Load Case 1; 80 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; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 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 1, per tnxTower "Section Capacity Table", this tower was found to be at **71.7%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T4)	45'-65' AGL (20'-40' ATB)	71.7%	**PASS**
Diagonal (T3)	65'-85' AGL (40'-60' ATB)	61.4%	**PASS**
Guy A (T1)	117' AGL (92' ATB)	50.7%	**PASS**
Guy B (T1)	117' AGL (92' ATB)	54.6%	**PASS**
Guy C (T1)	117' AGL (92' ATB)	53.7%	**PASS**

Existing Guy Anchors and Tower Base

Guy forces are transferred to the existing building structure via three (3) 7/8" ∅ and three (3) 3/4" ∅ galvanized steel guy wires with turnbuckles. All guy anchorage posts are positively attached to the existing building structure. Connections to the existing building were originally designed by Cianci & Cianci Structural Engineers job no; 97-113-01 dated October 22, 1997.

Review of the guy anchor and tower base connections consisted of comparison of the proposed reactions and the design reactions obtained from the aforementioned design documents:

- The guy anchor bolts and tower base **were found** to be within allowable limits.

Tower Component	Original Design Reaction (kips)	Proposed Reaction (kips)	Stress Ratio (percentage of capacity)	Result
Tower Base	106 (Vert)	89 (Vert)	84.0%	**PASS**
	1.6 (Horz)	1 (Horz)	62.5%	**PASS**
Guy Anchor A @ 45'	40.3 (Vert)	32 (Vert)	79.4%	**PASS**
	28.1 (Horz)	21 (Horz)	74.7%	**PASS**
Guy Anchor B @ 39'	51.6 (Vert)	37 (Vert)	71.7%	**PASS**
	32.0 (Horz)	21 (Horz)	65.6%	**PASS**
Guy Anchor C @ 37.5'	43.7 (Vert)	35 (Vert)	80.1%	**PASS**
	28.6 (Horz)	21 (Horz)	73.4%	**PASS**

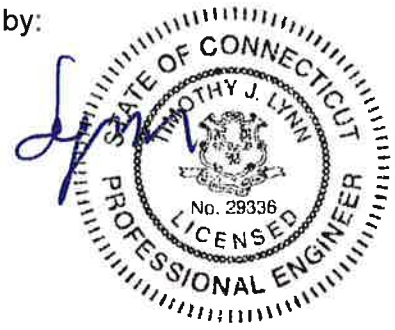
Conclusion

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

The analysis is based, in part, on the information provided to this office by 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:

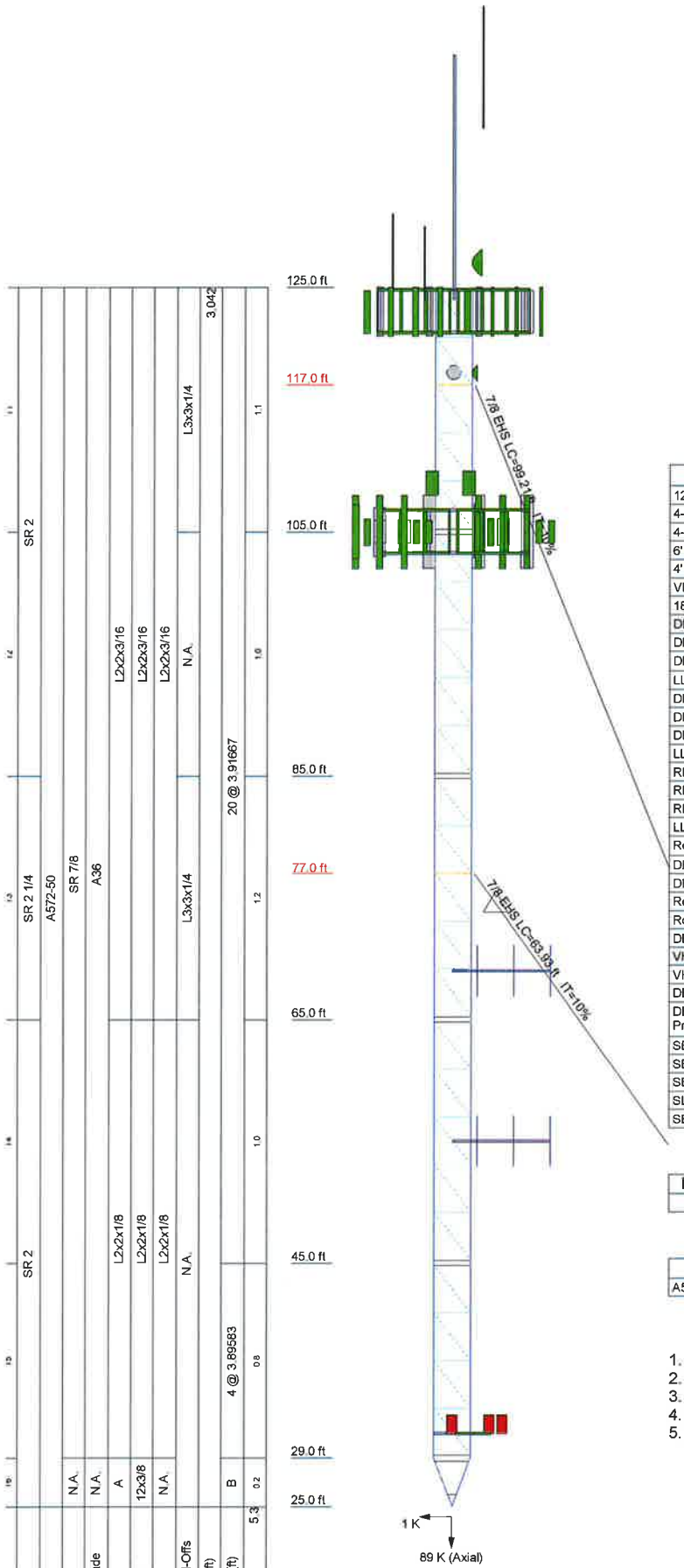
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or 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.

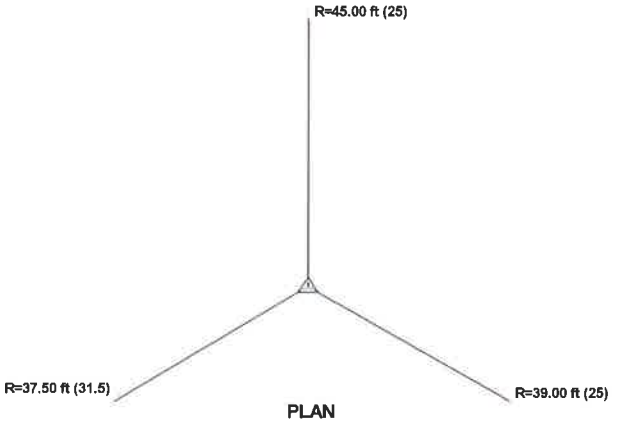
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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.





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' x 3" Dia Omni	137	SLCP 2x6014 (Verizon - Existing)	105
4-Bay Dipole	129	RRH4x30-B13 (Verizon - Proposed)	105
4-Bay Dipole	129	RRH4x30-B13 (Verizon - Proposed)	105
6' x 3" Dia Omni	128	RRH4x30-B13 (Verizon - Proposed)	105
4' x 3" DIA Omni	127	RRH4x45/2x90-AWS (Verizon - Proposed)	105
VHLP2-18 (Clearwire)	127		
18' x 3" Dia Omni	125	RRH4x45/2x90-AWS (Verizon - Proposed)	105
DB844H65E-XY (Nextel)	123		
DB844H65E-XY (Nextel)	123	RRH4x45/2x90-AWS (Verizon - Proposed)	105
DB844H65E-XY (Nextel)	123		
LLPX310R (Clearwire)	123	RRH2x60-PCS (Verizon - Proposed)	105
DB844G65ZAXY (Nextel)	123	RRH2x60-PCS (Verizon - Proposed)	105
DB844G65ZAXY (Nextel)	123	RRH2x60-PCS (Verizon - Proposed)	105
DB844G65ZAXY (Nextel)	123	Pirod 12' T-Frame Sector Mount (1) (Verizon - Existing)	105
LLPX310R (Clearwire)	123	Pirod 12' T-Frame Sector Mount (1) (Verizon - Existing)	105
RRU (Clearwire)	123		
RRU (Clearwire)	123	Pirod 12' T-Frame Sector Mount (1) (Verizon - Existing)	105
RRU (Clearwire)	123		
LLPX310R (Clearwire)	123	SBNHH-1D65B (Verizon - Proposed)	105
Rohn 6' x 12' Boom Gate (1) (Nextel)	123	SBNHH-1D65B (Verizon - Proposed)	105
DB844H65E-XY (Nextel)	123	SBNHH-1D65B (Verizon - Proposed)	105
DB844H65E-XY (Nextel)	123	SBNHH-1D65B (Verizon - Proposed)	105
Rohn 6' x 12' Boom Gate (1) (Nextel)	123	SBNHH-1D65B (Verizon - Proposed)	105
Rohn 6' x 12' Boom Gate (1) (Nextel)	123	BXA-80063-4CF (Verizon - Existing)	105
DB844H65E-XY (Nextel)	123	ANT150D6-9	69
VHLP1-23 (Clearwire)	118	ANT150D6-9	55
VHLP1-23 (Clearwire)	118	GPS	31
DB-T1-6Z-8AB-0Z (Verizon - Existing)	109	3' Pipe Mount Side Arm	31
DB-T1-6Z-8AB-0Z (Verizon - Proposed)	109	3' Pipe Mount Side Arm	31
		3' Pipe Mount Side Arm	31
SBNHH-1D65B (Verizon - Proposed)	105	3' Pipe Mount Side Arm	31
SBNHH-1D65B (Verizon - Proposed)	105	GPS	31
SBNHH-1D65B (Verizon - Proposed)	105	GPS	31
SLCP 2x6014 (Verizon - Existing)	105	GPS	31
SBNHH-1D65B (Verizon - Proposed)	105		

SYMBOL LIST

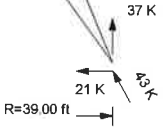
MARK	SIZE	MARK	SIZE
A	L3x3x1/8	B	1 @ 2.78842

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 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower is located on the roof of a building approximately 25'-0" above grade level.
5. TOWER RATING: 71.7%



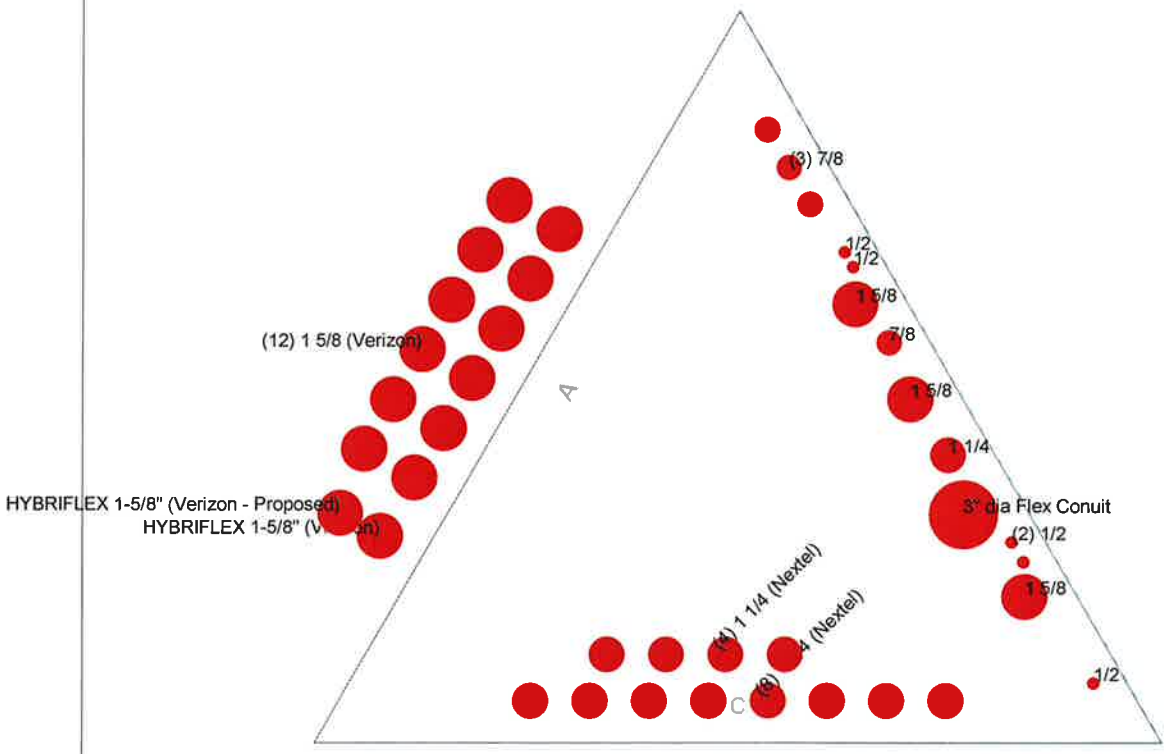
Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***16001.17 - West Hartford Center***		
Project:	***100-ft FWT Guyed Tower - 20 Isham Rd., West Hartford,***		
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/16	Scale: NTS	
Path:		Dwg No. E-1	

45'

Round Flat App In Face App Out Face

Section @ 45'



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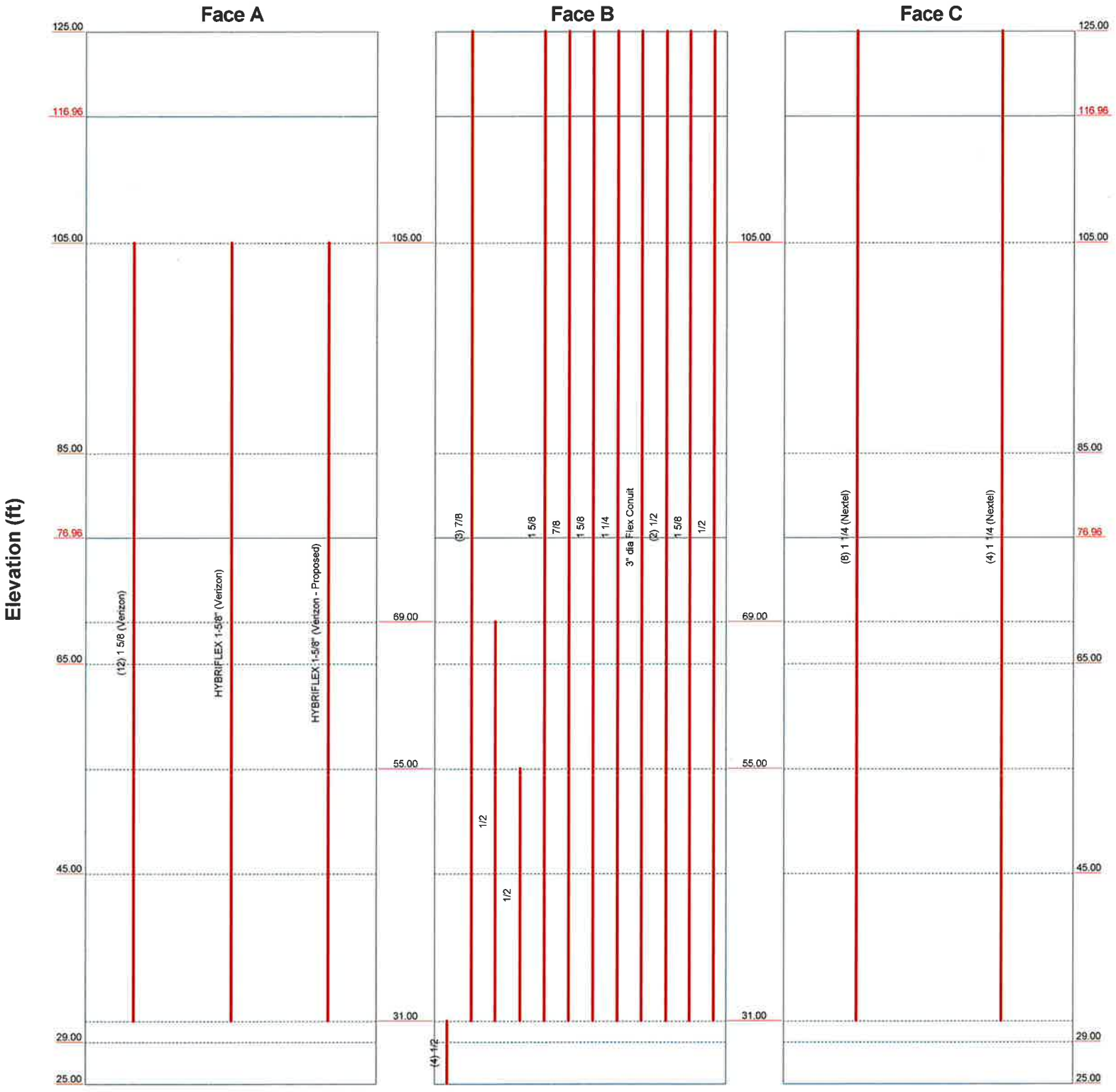
	Code: TIA/EIA-222-F	Date: 07/22/16	Scale: NTS
	Path:		Dwg No. E-7

25' - 125'

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



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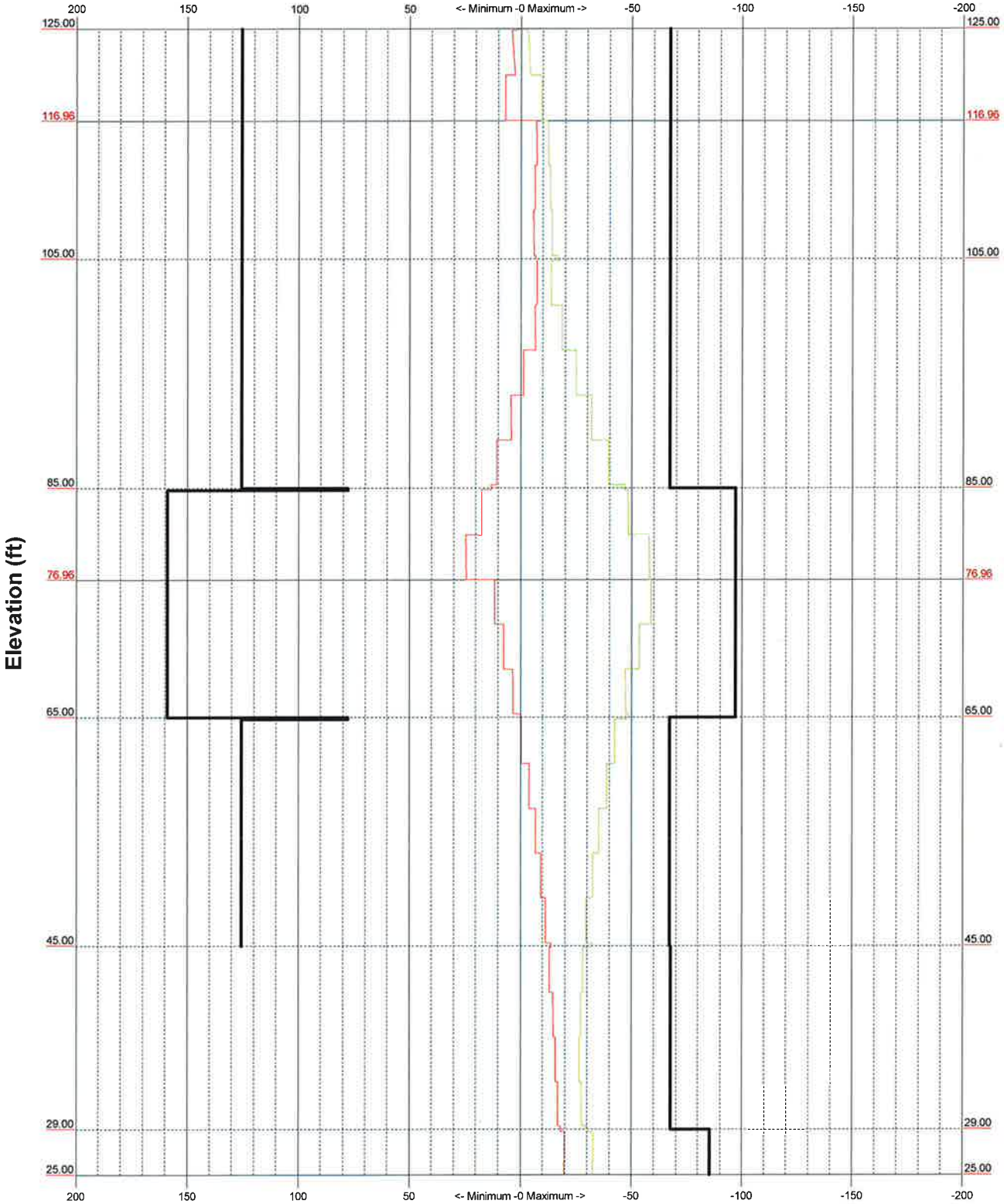
Path:		Dwg No. E-7

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

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



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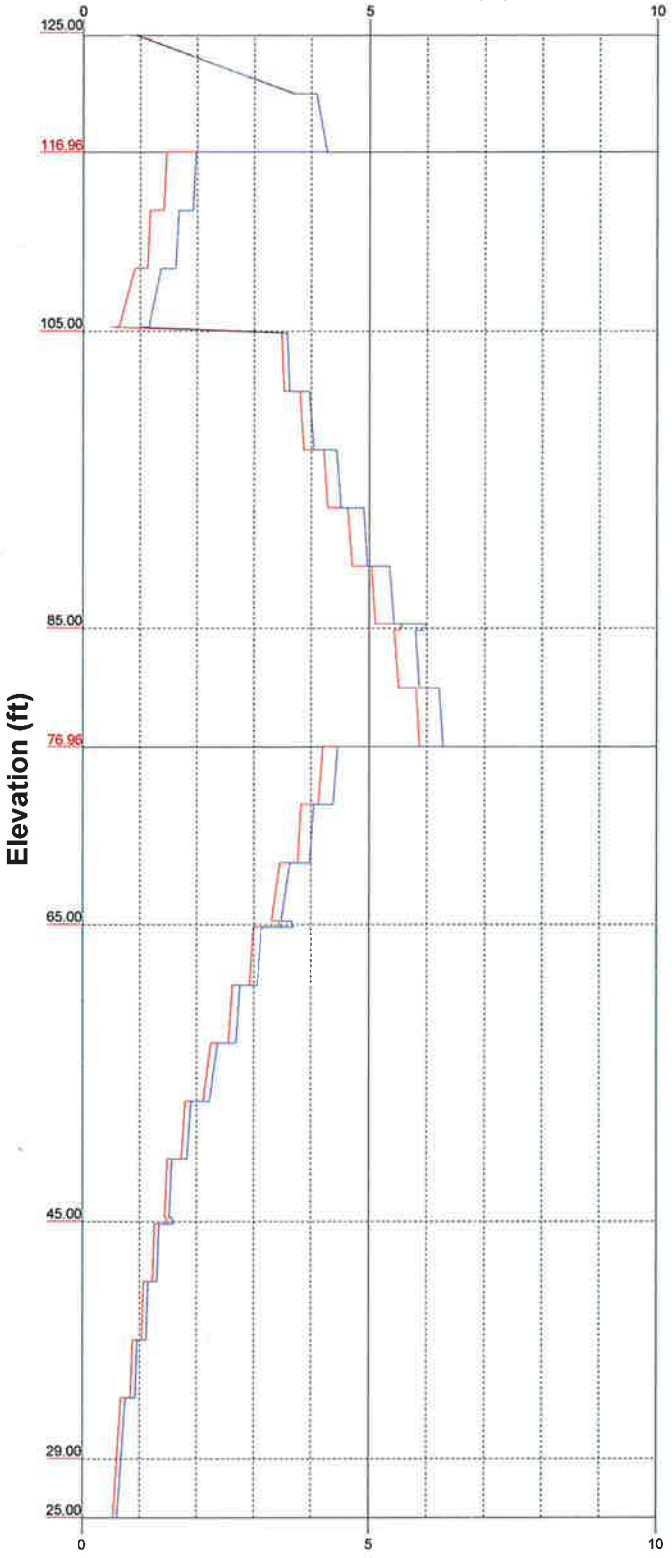
Code: TIA/EIA-222-F		Date: 07/22/16	Scale: NTS
Path:			Dwg No. E-3

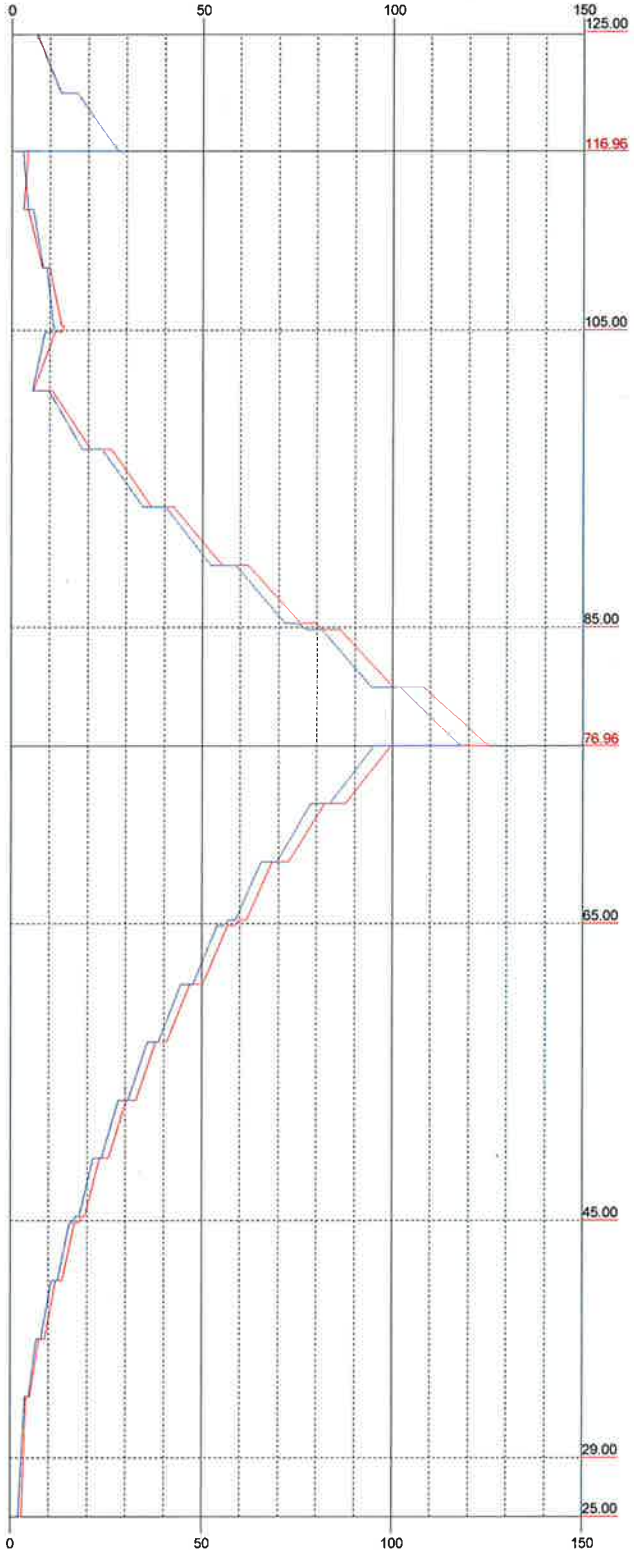
Vx Vz

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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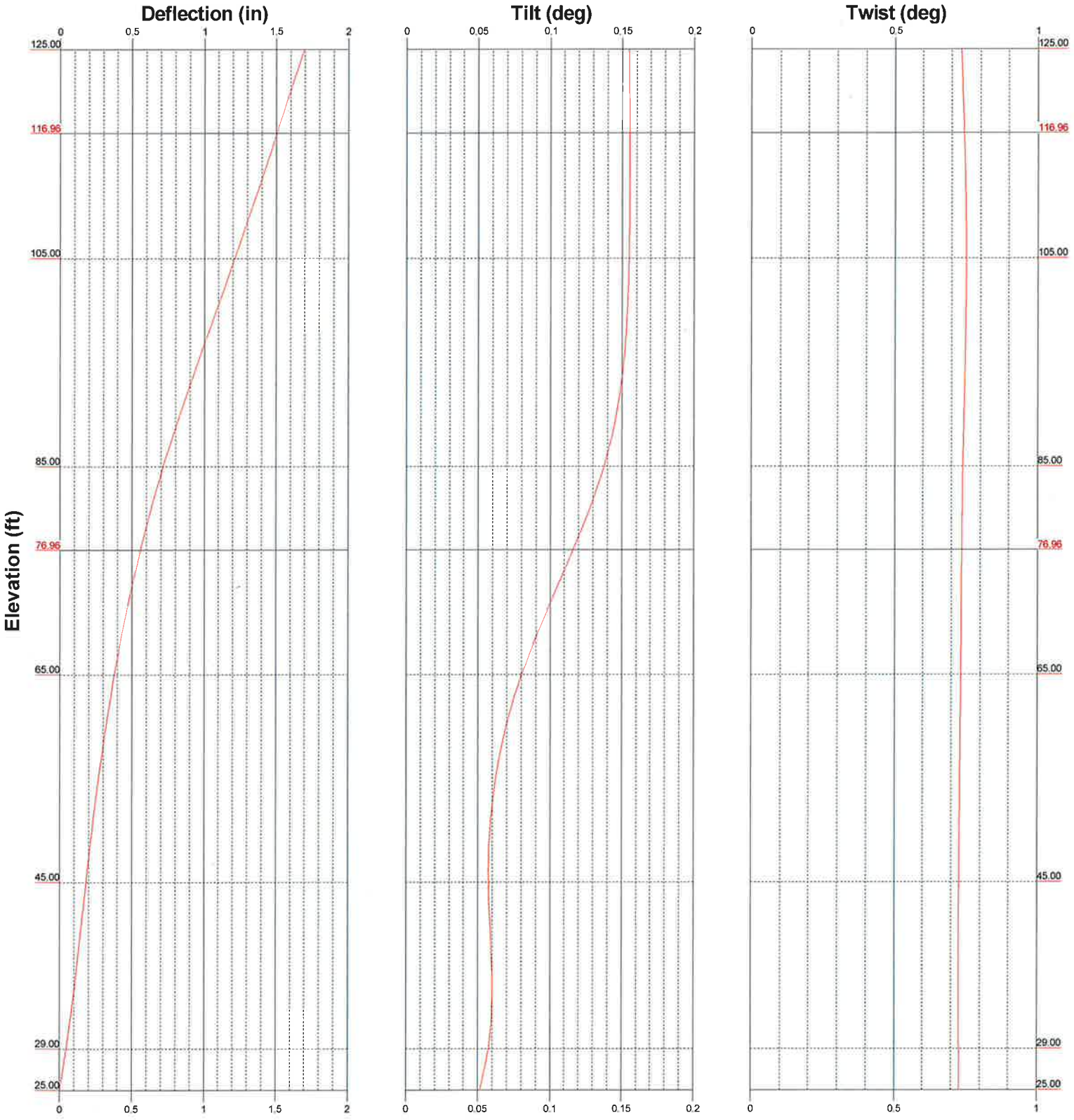
Code: TIA/EIA-222-F	Date: 07/22/16	Scale: NTS
Path:		Dwg No. E-4

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

Maximum Values



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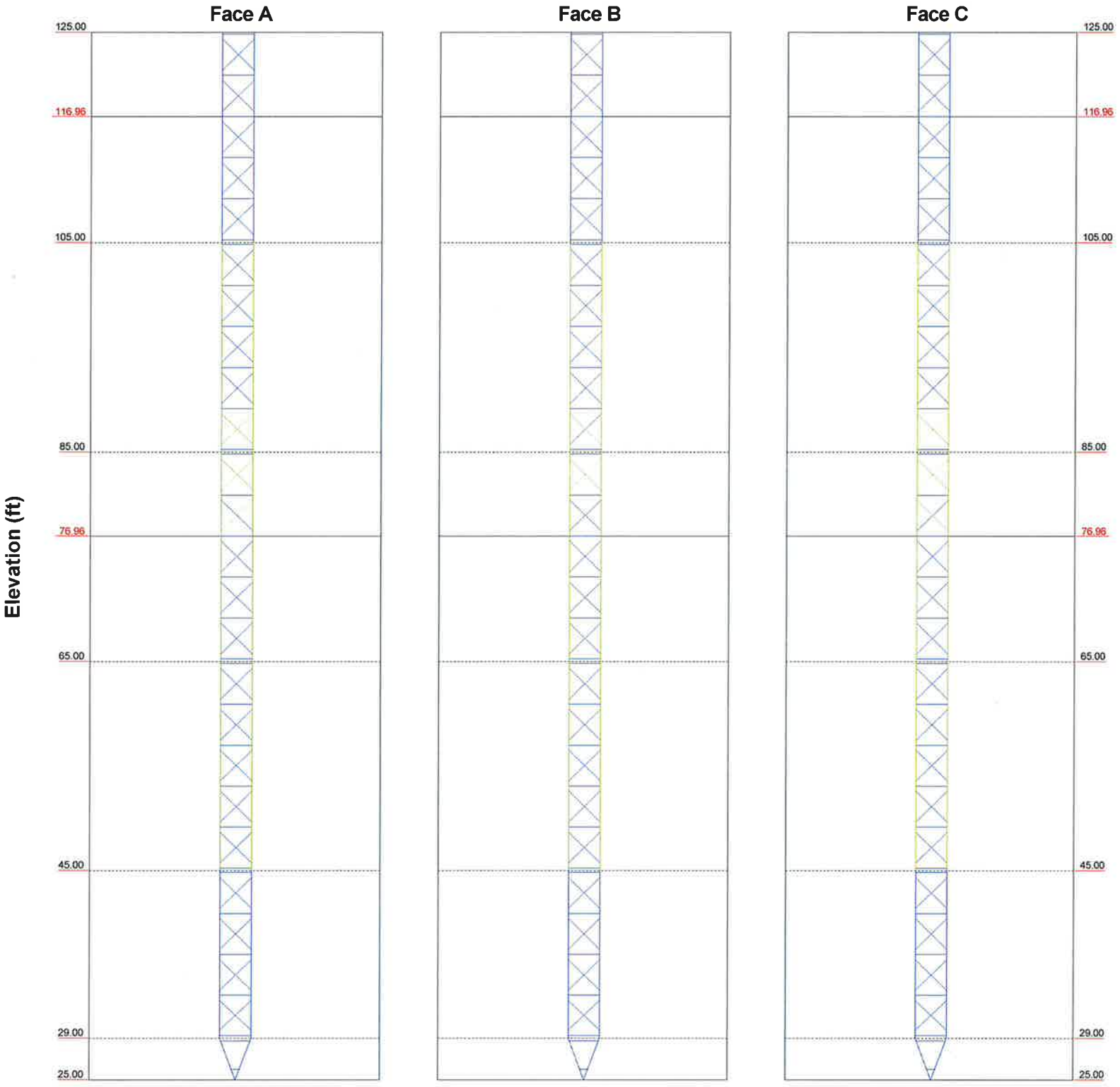
Path:		Dwg No. E-5

25' - 125'

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



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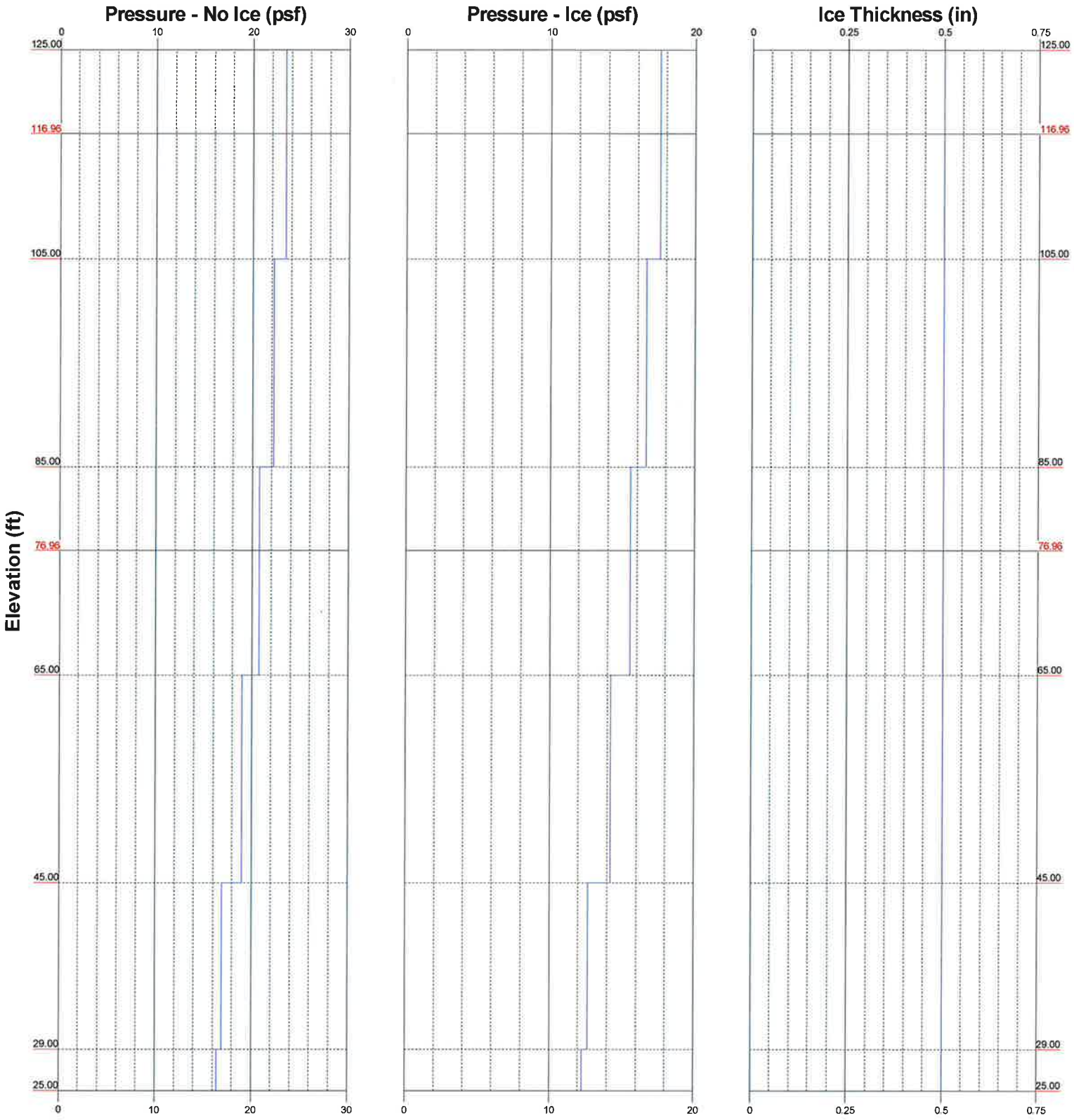
Path:		Dwg No. E-8

Wind Pressures and Ice Thickness

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice



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

Job:	***16001.17 - West Hartford Center***		
Project:	***100-ft FWT Guyed Tower - 20 Isham Rd., West Hartford,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 07/22/16	Scale: NTS
Path:			Dwg No. E-9

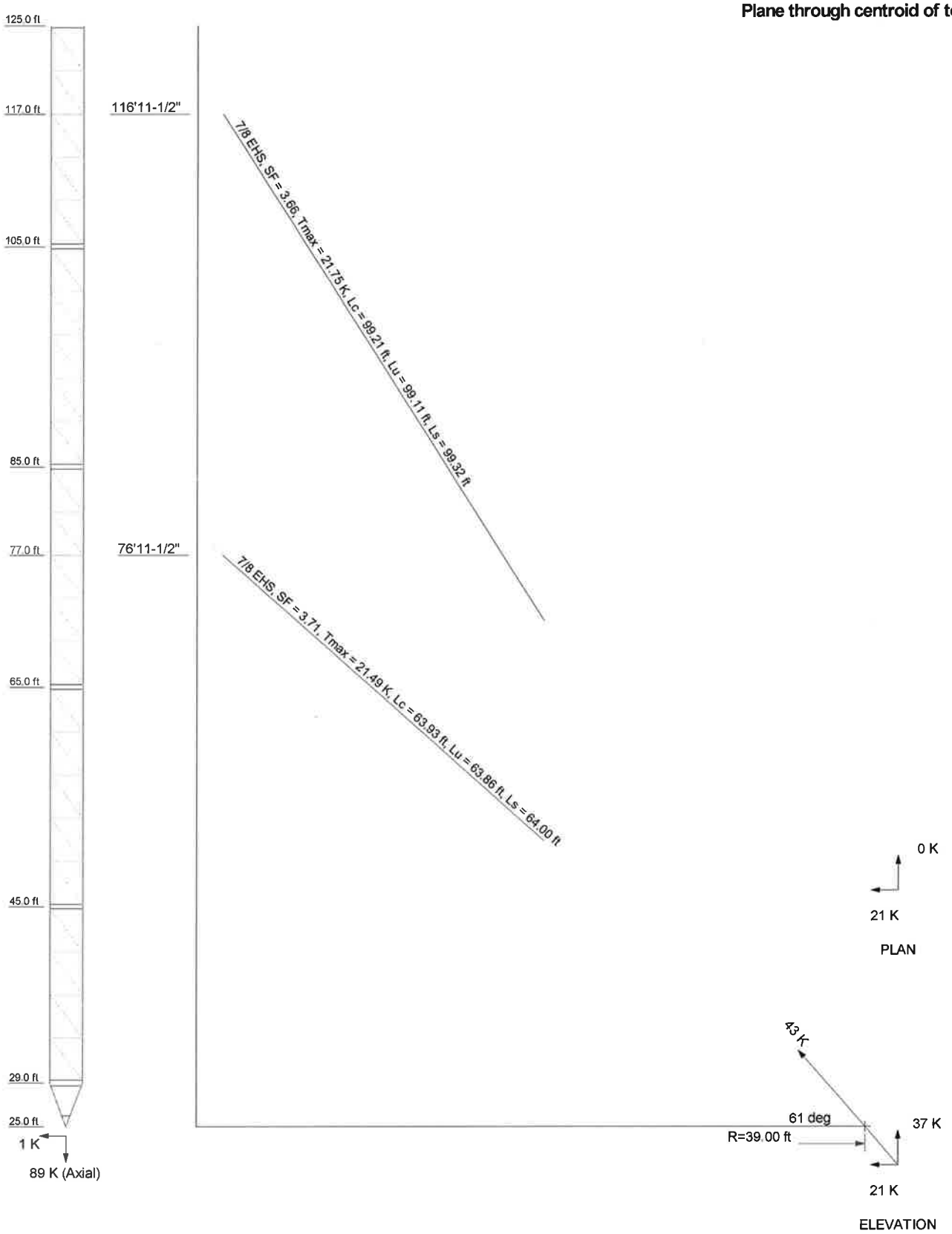
Guy Tensions and Tower Reactions

TIA/EIA-222-F - 80 mph/69 mph 0.500 in Ice

Maximum Values

Anchor 'B'@39 ft Azimuth 120 deg Elev 25 ft

Plane through centroid of tower



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Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 07/22/16	Scale: NTS	
Path:		Dwg No. E-6	

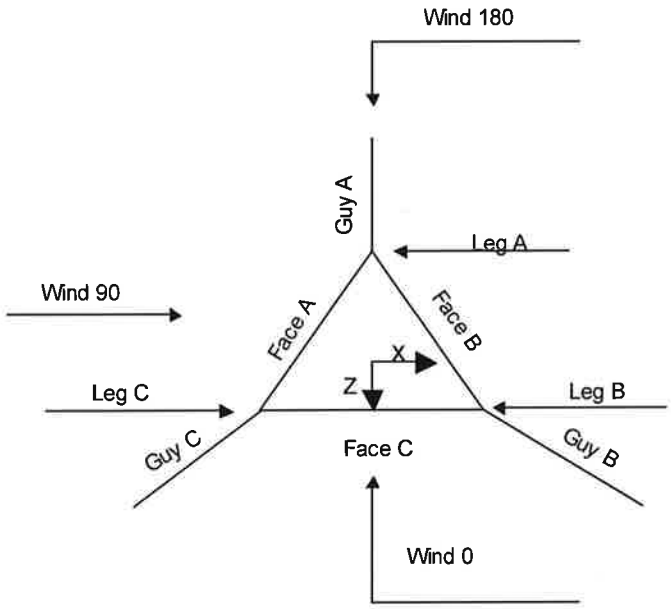
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 125.00 ft above the ground line.
The base of the tower is set at an elevation of 25.00 ft above the ground line.
The face width of the tower is 3.04 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Tower is located on the roof of a building approximately 25'-0" above grade level..
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Corner & Starmount Guyed Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	125.00-105.00			3.04	1	20.00
T2	105.00-85.00			3.04	1	20.00
T3	85.00-65.00			3.04	1	20.00
T4	65.00-45.00			3.04	1	20.00
T5	45.00-29.00			3.04	1	16.00
T6	29.00-25.00			3.04	1	4.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	125.00-105.00	3.92	X Brace	No	Yes	2.500	2.500
T2	105.00-85.00	3.92	X Brace	No	Yes	2.500	2.500
T3	85.00-65.00	3.92	X Brace	No	Yes	2.500	2.500
T4	65.00-45.00	3.92	X Brace	No	Yes	2.500	2.500

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
T5	45.00-29.00	3.90	X Brace	No	Yes	2.500	2.500
T6	29.00-25.00	2.79	X Brace	No	Yes	2.539	12.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 125.00-105.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 105.00-85.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T3 85.00-65.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T4 65.00-45.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T5 45.00-29.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)
T6 29.00-25.00	Solid Round	2	A572-50 (50 ksi)	Flat Bar		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 125.00-105.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 105.00-85.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T3 85.00-65.00	Single Angle	L2x2x3/16	A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T4 65.00-45.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 45.00-29.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T6 29.00-25.00	Single Angle	L3x3x1/8	A36 (36 ksi)	Flat Bar	12x3/8	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 125.00-105.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 105.00-85.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T3 85.00-65.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T4 65.00-45.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 45.00-29.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T6 29.00-25.00	1	Single Angle	L2x2x1/4	A36 (36 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 125.00-105.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T2 105.00-85.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T3 85.00-65.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T4 65.00-45.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T5 45.00-29.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000
T6 29.00-25.00	0.00	0.000	A36 (36 ksi)	1	1	1	36.000	36.000	36.000

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
125.00-105.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
105.00-85.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
85.00-65.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
65.00-45.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
45.00-29.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
29.00-25.00				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 125.00-105.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 105.00-85.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 85.00-65.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 65.00-45.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 45.00-29.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 29.00-25.00	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 125.00-105.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
T2 105.00-85.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
T3 85.00-65.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
T4 65.00-45.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
T5 45.00-29.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000
T6 29.00-25.00	6.000	0.000	6.000	0.000	0.000	0.000	0.000	0.000

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 125.00-105.00	Flange	0.750 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T2 105.00-85.00	Flange	0.750 A325N	0	0.000 A325N	0	0.000 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T3 85.00-65.00	Flange	0.750 A325N	3	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T4 65.00-45.00	Flange	0.750 A325N	3	0.000 A325N	0	0.500 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T5 45.00-29.00	Flange	0.750 A325N	3	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0
T6 29.00-25.00	Flange	0.750 A325N	3	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0	0.000 A325N	0	0.625 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
116.958	EHS	A	7/8	7.97	10%	19000	1.581	101.53	45.00	0.0000	25.00	100%
		B	7/8	7.97	10%	19000	1.581	99.12	39.00	0.0000	25.00	100%
		C	7/8	7.97	10%	19000	1.581	92.55	37.50	0.0000	31.50	100%
76.9583	EHS	A	7/8	7.97	10%	19000	1.581	67.54	45.00	0.0000	25.00	100%
		B	7/8	7.97	10%	19000	1.581	63.87	39.00	0.0000	25.00	100%
		C	7/8	7.97	10%	19000	1.581	57.78	37.50	0.0000	31.50	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
116.958	Corner						
76.9583	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
116.96	A36 (36 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L3x3x1/4
76.96	A36 (36 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L3x3x1/4

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
116.958	0.16	0.16	0.15		1.01 1.7 sec/pulse	0.97 1.7 sec/pulse	0.84 1.6 sec/pulse	
76.9583	0.11	0.10	0.09		0.45 1.2 sec/pulse	0.40 1.1 sec/pulse	0.33 1.0 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
116.958	Yes	Yes			1	1	1	1
76.9583	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
116.958	0.000 A325N	0	0.000	1	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75
76.9583	0.000 A325N	0	0.000	1	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
116.958	A	70.98	20	15	0.500
	B	70.98	20	15	0.500
	C	74.23	21	15	0.500
76.9583	A	50.98	19	14	0.500
	B	50.98	19	14	0.500
	C	54.23	19	14	0.500

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
116.958	A	64.8146	8.12	0.00	7.36	-3.42	-12.92	0.00	0.00

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
			7.97						
	B	67.9517	8.12	2.61	7.53	1.51	6.61	0.00	-11.46
			7.97						
	C	67.3025	8.10	-2.69	7.49	1.55	6.58	-0.00	11.39
			7.97						
			Sum:	**-0.07**	22.38	**-0.36**	**0.27**	0.00	**-0.07**
76.9583	A	50.2302	8.05	0.00	6.21	-5.12	-10.91	0.00	0.00
			7.97						
	B	54.3671	8.05	4.04	6.56	2.33	5.76	0.00	-9.98
			7.97						
	C	51.8222	8.04	-4.29	6.34	2.47	5.57	-0.00	9.64
			7.97						
			Sum:	**-0.24**	19.11	**-0.32**	**0.42**	0.00	**-0.34**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
116.958	A	64.8146	11.00	0.00	9.98	-4.63	-17.52	0.00	0.00
			10.78						
	B	67.9517	11.00	3.54	10.21	2.04	8.97	0.00	-15.53
			10.77						
	C	67.3025	10.98	-3.64	10.15	2.10	8.91	-0.00	15.44
			10.78						
			Sum:	**-0.10**	30.34	**-0.49**	**0.36**	0.00	**-0.09**
76.9583	A	50.2302	10.92	0.00	8.43	-6.94	-14.80	0.00	0.00
			10.79						
	B	54.3671	10.92	5.48	8.90	3.16	7.81	0.00	-13.53
			10.79						
	C	51.8222	10.90	-5.81	8.60	3.35	7.55	-0.00	13.08
			10.79						
			Sum:	**-0.33**	25.92	**-0.43**	**0.57**	0.00	**-0.46**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top / Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	K	K	K	K	kip-ft	kip-ft	kip-ft
116.958	A	64.8146	8.12	0.00	7.36	-3.42	-12.92	0.00	0.00
			7.97						
	B	67.9517	8.12	2.61	7.53	1.51	6.61	0.00	-11.46
			7.97						
	C	67.3025	8.10	-2.69	7.49	1.55	6.58	-0.00	11.39
			7.97						

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top Bottom K	F_x K	F_y K	F_z K	M_x kip-ft	M_y kip-ft	M_z kip-ft
			Sum:	**-0.07**	22.38	**-0.36**	**0.27**	0.00	**-0.07**
76.9583	A	50.2302	8.05 7.97	0.00	6.21	-5.12	-10.91	0.00	0.00
	B	54.3671	8.05 7.97	4.04	6.56	2.33	5.76	0.00	-9.98
	C	51.8222	8.04 7.97	-4.29	6.34	2.47	5.57	-0.00	9.64
			Sum:	**-0.24**	19.11	**-0.32**	**0.42**	0.00	**-0.34**

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension K	0 F Intercept ft	20 F Initial Tension K	20 F Intercept ft	40 F Initial Tension K	40 F Intercept ft	60 F Initial Tension K	60 F Intercept ft	80 F Initial Tension K	80 F Intercept ft	100 F Initial Tension K	100 F Intercept ft	120 F Initial Tension K	120 F Intercept ft
116.958	A	43.24	91.96	8.583	0.94	8.379	0.96	8.174	0.99	7.970	1.01	7.766	1.04	7.562	1.07	7.358	1.10
	B	37.24	91.96	8.448	0.91	8.288	0.93	8.129	0.95	7.970	0.97	7.811	0.99	7.652	1.01	7.493	1.03
	C	35.74	85.46	8.475	0.79	8.307	0.81	8.138	0.83	7.970	0.84	7.802	0.86	7.634	0.88	7.466	0.90
76.9583	A	43.24	51.96	9.357	0.38	8.894	0.40	8.432	0.43	7.970	0.45	7.509	0.48	7.049	0.51	6.590	0.54
	B	37.24	51.96	9.121	0.35	8.737	0.37	8.353	0.38	7.970	0.40	7.587	0.42	7.204	0.45	6.822	0.47
	C	35.74	45.46	9.267	0.28	8.834	0.30	8.402	0.31	7.970	0.33	7.539	0.35	7.108	0.37	6.678	0.39

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)	A	Yes	Ar (CfAe)	105.00 - 31.00	1.000	0	12	6	0.500	1.980		1.04
1 1/4 (Nextel)	C	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0	8	8	1.000	1.550		0.66
1 1/4 (Nextel)	C	Yes	Ar (CfAe)	125.00 - 31.00	-3.000	0.05	4	4	1.000	1.550		0.66
1/2	B	Yes	Ar (CfAe)	31.00 - 25.00	0.000	0	4	4	0.580	0.580		0.25
7/8	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	-0.31	3	3	0.750	1.110		0.54
1/2	B	Yes	Ar (CfAe)	69.00 - 31.00	-1.000	-0.19	1	1	0.580	0.580		0.25
1/2	B	Yes	Ar (CfAe)	55.00 - 31.00	-1.000	-0.17	1	1	0.580	0.580		0.25
1 5/8	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	-0.13	1	1	1.980	1.980		1.04
7/8	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	-0.07	1	1	1.110	1.110		0.54
1 5/8	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0	1	1	1.980	1.980		1.04
1 1/4	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0.08	1	1	1.550	1.550		0.66
3" dia Flex Conuit	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0.15	1	1	3.000	3.000		5.00
1/2	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0.22	2	2	0.400	0.580		0.25
1 5/8	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0.27	1	1	1.980	1.980		1.04
HYBRIFLEX 1-5/8" (Verizon)	A	Yes	Ar (CfAe)	105.00 - 31.00	1.000	-0.25	1	1	1.980	1.980		1.90
1/2	B	Yes	Ar (CfAe)	125.00 - 31.00	-1.000	0.4	1	1	0.580	0.580		0.25
HYBRIFLEX	A	Yes	Ar (CfAe)	105.00 - 31.00	3.000	-0.25	1	1	1.980	1.980		1.90

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 - Proposed)												

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	125.00-105.00	A	0.000	0.000	0.000	0.000	0.00
		B	27.783	0.000	0.000	0.000	0.23
		C	31.000	0.000	0.000	0.000	0.16
T2	105.00-85.00	A	26.400	0.000	0.000	0.000	0.33
		B	27.783	0.000	0.000	0.000	0.23
		C	31.000	0.000	0.000	0.000	0.16
T3	85.00-65.00	A	26.400	0.000	0.000	0.000	0.33
		B	27.977	0.000	0.000	0.000	0.23
		C	31.000	0.000	0.000	0.000	0.16
T4	65.00-45.00	A	26.400	0.000	0.000	0.000	0.33
		B	29.233	0.000	0.000	0.000	0.24
		C	31.000	0.000	0.000	0.000	0.16
T5	45.00-29.00	A	18.480	0.000	0.000	0.000	0.23
		B	21.188	0.000	0.000	0.000	0.17
		C	21.700	0.000	0.000	0.000	0.11
T6	29.00-25.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.773	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	125.00-105.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		38.117	7.833	0.000	0.000	0.51
		C		8.500	42.500	0.000	0.000	0.57
T2	105.00-85.00	A	0.500	14.900	20.667	0.000	0.000	0.74
		B		38.117	7.833	0.000	0.000	0.51
		C		8.500	42.500	0.000	0.000	0.57
T3	85.00-65.00	A	0.500	14.900	20.667	0.000	0.000	0.74
		B		38.643	7.833	0.000	0.000	0.52
		C		8.500	42.500	0.000	0.000	0.57
T4	65.00-45.00	A	0.500	14.900	20.667	0.000	0.000	0.74
		B		42.067	7.833	0.000	0.000	0.54
		C		8.500	42.500	0.000	0.000	0.57
T5	45.00-29.00	A	0.500	10.430	14.467	0.000	0.000	0.52
		B		30.632	6.063	0.000	0.000	0.39
		C		5.950	29.750	0.000	0.000	0.40
T6	29.00-25.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.527	1.160	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	125.00-105.00	A	0.000	0.000	0.000	0.000
		B	1.651	7.001	1.505	2.489
		C	1.843	7.771	1.679	2.763
T2	105.00-85.00	A	1.569	5.419	1.320	1.778
		B	1.651	7.001	1.389	2.297
		C	1.843	7.771	1.550	2.550
T3	85.00-65.00	A	1.569	5.419	1.430	1.927
		B	1.663	7.081	1.515	2.517
		C	1.843	7.771	1.679	2.763
T4	65.00-45.00	A	1.569	5.419	1.320	1.778
		B	1.738	7.603	1.462	2.495
		C	1.843	7.771	1.550	2.550
T5	45.00-29.00	A	1.095	3.809	0.962	1.297
		B	1.255	5.614	1.104	1.911
		C	1.285	5.462	1.130	1.859
T6	29.00-25.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.066	0.149	0.356
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	125.00-105.00	1.922	1.395	1.643	1.183
T2	105.00-85.00	-1.151	0.109	-0.484	0.413
T3	85.00-65.00	-1.110	0.090	-0.461	0.378
T4	65.00-45.00	-1.086	-0.010	-0.390	0.214
T5	45.00-29.00	-0.970	-0.066	-0.306	0.126
T6	29.00-25.00	0.607	-0.350	0.507	-0.293

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Rohn 6' x 12' Boom Gate (1)	A	From Leg	2.00	0.0000	123.00	No Ice	16.60	16.60	0.70
(Nextel)			0.00			1/2" Ice	25.00	25.00	1.10
			0.00						
Rohn 6' x 12' Boom Gate (1)	B	From Leg	2.00	0.0000	123.00	No Ice	16.60	16.60	0.70
(Nextel)			0.00			1/2" Ice	25.00	25.00	1.10
			0.00						
Rohn 6' x 12' Boom Gate (1)	C	From Leg	2.00	0.0000	123.00	No Ice	16.60	16.60	0.70
(Nextel)			0.00			1/2" Ice	25.00	25.00	1.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
DB844H65E-XY	A	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			-6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	A	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			-2.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	A	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			2.00			1/2" Ice	3.18	4.57	0.04
			0.00						
LLPX310R	A	From Leg	3.00	0.0000	123.00	No Ice	4.83	1.95	0.03
(Clearwire)			6.00			1/2" Ice	5.18	2.21	0.05
			0.00						
DB844H65E-XY	B	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			-6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	B	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			-2.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	B	From Leg	3.00	0.0000	123.00	No Ice	2.87	4.20	0.01
(Nextel)			2.00			1/2" Ice	3.18	4.57	0.04
			0.00						
LLPX310R	B	From Leg	3.00	0.0000	123.00	No Ice	4.83	1.95	0.03
(Clearwire)			6.00			1/2" Ice	5.18	2.21	0.05
			0.00						
DB844G65ZAXY	C	From Leg	3.00	0.0000	123.00	No Ice	4.67	3.73	0.02
(Nextel)			-6.00			1/2" Ice	5.05	4.10	0.05
			0.00						
DB844G65ZAXY	C	From Leg	3.00	0.0000	123.00	No Ice	4.67	3.73	0.02
(Nextel)			-2.00			1/2" Ice	5.05	4.10	0.05
			0.00						
DB844G65ZAXY	C	From Leg	3.00	0.0000	123.00	No Ice	4.67	3.73	0.02
(Nextel)			2.00			1/2" Ice	5.05	4.10	0.05
			0.00						
LLPX310R	C	From Leg	3.00	0.0000	123.00	No Ice	4.83	1.95	0.03
(Clearwire)			6.00			1/2" Ice	5.18	2.21	0.05
			0.00						
RRU	A	From Leg	0.00	0.0000	123.00	No Ice	1.80	0.78	0.03
(Clearwire)			0.00			1/2" Ice	2.00	0.92	0.04
			0.00						
RRU	B	From Leg	0.00	0.0000	123.00	No Ice	1.80	0.78	0.03
(Clearwire)			0.00			1/2" Ice	2.00	0.92	0.04
			0.00						
RRU	C	From Leg	0.00	0.0000	123.00	No Ice	1.80	0.78	0.03
(Clearwire)			0.00			1/2" Ice	2.00	0.92	0.04
			0.00						
Pirod 12' T-Frame Sector	A	From Leg	2.00	0.0000	105.00	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	2.00	0.0000	105.00	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	2.00	0.0000	105.00	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						
SBNHH-1D65B	A	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			6.00			1/2" Ice	8.88	5.79	0.09

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
			0.00						
SBNHH-1D65B	A	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	A	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
BXA-80063-4CF	A	From Leg	4.00	0.0000	105.00	No Ice	5.16	2.52	0.01
(Verizon - Existing)			-6.00			1/2" Ice	5.55	2.82	0.04
			0.00						
SBNHH-1D65B	B	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			6.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	B	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	B	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SLCP 2x6014	B	From Leg	4.00	0.0000	105.00	No Ice	7.21	5.67	0.02
(Verizon - Existing)			6.00			1/2" Ice	7.65	6.09	0.07
			0.00						
SBNHH-1D65B	C	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			6.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	C	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	C	From Leg	4.00	0.0000	105.00	No Ice	8.33	5.34	0.04
(Verizon - Proposed)			-2.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SLCP 2x6014	C	From Leg	4.00	0.0000	105.00	No Ice	7.21	5.67	0.02
(Verizon - Existing)			6.00			1/2" Ice	7.65	6.09	0.07
			0.00						
DB-T1-6Z-8AB-0Z	C	From Leg	0.00	0.0000	109.00	No Ice	5.60	2.33	0.04
(Verizon - Existing)			0.50			1/2" Ice	5.92	2.56	0.08
			0.00						
DB-T1-6Z-8AB-0Z	B	From Leg	0.00	0.0000	109.00	No Ice	5.60	2.33	0.04
(Verizon - Proposed)			0.50			1/2" Ice	5.92	2.56	0.08
			0.00						
RRH4x30-B13	A	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.89	0.06
(Verizon - Proposed)			-4.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH4x30-B13	B	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.89	0.06
(Verizon - Proposed)			-4.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH4x30-B13	C	From Leg	4.00	0.0000	105.00	No Ice	2.52	1.89	0.06
(Verizon - Proposed)			-4.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH4x45/2x90-AWS	A	From Leg	4.00	0.0000	105.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH4x45/2x90-AWS	B	From Leg	4.00	0.0000	105.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH4x45/2x90-AWS	C	From Leg	4.00	0.0000	105.00	No Ice	3.01	1.91	0.08
(Verizon - Proposed)			4.00			1/2" Ice	3.26	2.13	0.10

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						
RRH2x60-PCS	A	From Leg	4.00	0.0000	105.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			-6.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	B	From Leg	4.00	0.0000	105.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			-6.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	C	From Leg	4.00	0.0000	105.00	No Ice	2.51	1.55	0.06
(Verizon - Proposed)			-6.00			1/2" Ice	2.73	1.74	0.07
			0.00						
18' x 3" Dia Omni	A	From Leg	1.00	0.0000	125.00	No Ice	5.40	5.40	0.05
			0.00			1/2" Ice	7.23	7.23	0.09
			9.00						
12' x 3" Dia Omni	B	From Leg	1.00	0.0000	137.00	No Ice	3.60	3.60	0.04
			0.00			1/2" Ice	4.83	4.83	0.06
			6.00						
6' x 3" Dia Omni	C	From Leg	4.00	0.0000	128.00	No Ice	1.77	1.77	0.02
			0.00			1/2" Ice	2.13	2.13	0.03
			0.00						
4' x 3" DIA Omni	C	From Leg	1.00	0.0000	127.00	No Ice	1.00	1.00	0.02
			0.00			1/2" Ice	1.25	1.25	0.02
			0.00						
4-Bay Dipole	A	From Leg	1.00	0.0000	129.00	No Ice	3.15	3.15	0.03
			0.00			1/2" Ice	5.67	5.67	0.04
			0.00						
4-Bay Dipole	A	From Leg	1.00	0.0000	129.00	No Ice	3.15	3.15	0.03
			0.00			1/2" Ice	5.67	5.67	0.04
			0.00						
ANT150D6-9	A	From Leg	1.00	0.0000	69.00	No Ice	4.00	4.00	0.03
			0.00			1/2" Ice	4.60	4.60	0.03
			0.00						
ANT150D6-9	A	From Leg	1.00	0.0000	55.00	No Ice	4.00	4.00	0.03
			0.00			1/2" Ice	4.60	4.60	0.03
			0.00						
GPS	A	From Leg	3.00	0.0000	31.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS	A	From Leg	0.00	0.0000	31.00	No Ice	1.00	1.00	0.01
			3.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS	B	From Leg	3.00	0.0000	31.00	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS	B	From Leg	0.00	0.0000	31.00	No Ice	1.00	1.00	0.01
			3.00			1/2" Ice	1.50	1.50	0.01
			0.00						
3' Pipe Mount Side Arm	A	From Leg	1.00	0.0000	31.00	No Ice	0.47	0.47	0.01
			0.00			1/2" Ice	0.69	0.69	0.05
			0.00						
3' Pipe Mount Side Arm	A	From Leg	0.00	0.0000	31.00	No Ice	0.47	0.47	0.01
			1.00			1/2" Ice	0.69	0.69	0.05
			0.00						
3' Pipe Mount Side Arm	B	From Leg	1.00	0.0000	31.00	No Ice	0.47	0.47	0.01
			0.00			1/2" Ice	0.69	0.69	0.05
			0.00						
3' Pipe Mount Side Arm	B	From Leg	0.00	0.0000	31.00	No Ice	0.47	0.47	0.01
			1.00			1/2" Ice	0.69	0.69	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00					

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP1-23 (Clearwire)	A	Paraboloid w/o Radome	From Leg	0.00 0.00 0.00	Worst		118.00	1.27	No Ice 1/2" Ice	1.28 1.45	0.01 0.01
VHLP1-23 (Clearwire)	B	Paraboloid w/o Radome	From Leg	0.00 0.00 0.00	Worst		118.00	1.27	No Ice 1/2" Ice	1.28 1.45	0.01 0.01
VHLP2-18 (Clearwire)	B	Paraboloid w/o Radome	From Leg	0.00 0.00 0.00	Worst		127.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.04

Tower Pressures - No Ice

$G_H = 1.162$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 125.00-105.00	115.00	1.429	23	64.173	A	3.115	9.740	6.667	51.86	0.000	0.000
					B	1.610	35.872		17.79	0.000	0.000
					C	1.436	38.897		16.53	0.000	0.000
T2 105.00-85.00	95.00	1.353	22	64.173	A	1.555	34.571	6.667	18.45	0.000	0.000
					B	1.486	35.872		17.85	0.000	0.000
					C	1.325	38.897		16.57	0.000	0.000
T3 85.00-65.00	75.00	1.264	21	64.590	A	1.662	35.404	7.500	20.23	0.000	0.000
					B	1.577	36.887		19.50	0.000	0.000
					C	1.413	39.730		18.23	0.000	0.000
T4 65.00-45.00	55.00	1.157	19	64.173	A	1.555	34.571	6.667	18.45	0.000	0.000
					B	1.414	37.235		17.25	0.000	0.000
					C	1.325	38.897		16.57	0.000	0.000
T5 45.00-29.00	37.00	1.033	17	51.339	A	1.434	25.169	5.333	20.05	0.000	0.000
					B	1.293	27.716		18.39	0.000	0.000
					C	1.266	28.198		18.10	0.000	0.000
T6 29.00-25.00	27.00	1	16	6.797	A	1.272	1.456	1.456	53.37	0.000	0.000
					B	1.123	2.230		43.43	0.000	0.000
					C	1.272	1.456		53.37	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.162$

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	115.00	1.429	18	0.500	65.840	A	3.115	18.023	10.000	47.31	0.000	0.000
125.00-105.00						B	8.459	49.138		17.36	0.000	0.000
						C	42.852	18.752		16.23	0.000	0.000
T2 105.00-85.00	95.00	1.353	17	0.500	65.840	A	21.764	27.504	10.000	20.30	0.000	0.000
						B	8.411	49.138		17.38	0.000	0.000
						C	42.825	18.752		16.24	0.000	0.000
T3 85.00-65.00	75.00	1.264	16	0.500	66.257	A	21.833	28.326	10.833	21.60	0.000	0.000
						B	8.408	50.407		18.42	0.000	0.000
						C	42.830	19.575		17.36	0.000	0.000
T4 65.00-45.00	55.00	1.157	14	0.500	65.840	A	21.764	27.504	10.000	20.30	0.000	0.000
						B	8.214	52.486		16.47	0.000	0.000
						C	42.825	18.752		16.24	0.000	0.000
T5 45.00-29.00	37.00	1.033	13	0.500	52.672	A	15.566	21.069	8.000	21.84	0.000	0.000
						B	6.548	39.466		17.39	0.000	0.000
						C	30.287	14.936		17.69	0.000	0.000
T6 29.00-25.00	27.00	1	12	0.500	7.154	A	1.272	2.460	2.184	58.52	0.000	0.000
						B	2.077	2.921		43.71	0.000	0.000
						C	1.272	2.460		58.52	0.000	0.000

Tower Pressure - Service

$G_H = 1.162$

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	115.00	1.429	9	64.173	A	3.115	9.740	6.667	51.86	0.000	0.000
125.00-105.00					B	1.610	35.872		17.79	0.000	0.000
					C	1.436	38.897		16.53	0.000	0.000
T2	95.00	1.353	9	64.173	A	1.555	34.571	6.667	18.45	0.000	0.000
105.00-85.00					B	1.486	35.872		17.85	0.000	0.000
					C	1.325	38.897		16.57	0.000	0.000
T3 85.00-65.00	75.00	1.264	8	64.590	A	1.662	35.404	7.500	20.23	0.000	0.000
					B	1.577	36.887		19.50	0.000	0.000
					C	1.413	39.730		18.23	0.000	0.000
T4 65.00-45.00	55.00	1.157	7	64.173	A	1.555	34.571	6.667	18.45	0.000	0.000
					B	1.414	37.235		17.25	0.000	0.000
					C	1.325	38.897		16.57	0.000	0.000
T5 45.00-29.00	37.00	1.033	7	51.339	A	1.434	25.169	5.333	20.05	0.000	0.000
					B	1.293	27.716		18.39	0.000	0.000
					C	1.266	28.198		18.10	0.000	0.000
T6 29.00-25.00	27.00	1	6	6.797	A	1.272	1.456	1.456	53.37	0.000	0.000
					B	1.123	2.230		43.43	0.000	0.000
					C	1.272	1.456		53.37	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	0.39	1.06	A	0.2	2.595	0.59	1	1	8.866	1.53	76.51	C
125.00-105.00			B	0.584	1.815	0.744	1	1	28.298			
			C	0.628	1.789	0.771	1	1	31.443			
T2	0.72	1.03	A	0.563	1.832	0.732	1	1	26.848	1.44	72.12	C
105.00-85.00			B	0.582	1.816	0.743	1	1	28.133			
			C	0.627	1.79	0.77	1	1	31.290			
T3	0.72	1.23	A	0.574	1.823	0.738	1	1	27.789	1.39	69.39	C
85.00-65.00			B	0.596	1.807	0.751	1	1	29.274			
			C	0.637	1.786	0.777	1	1	32.281			
T4	0.73	0.99	A	0.563	1.832	0.732	1	1	26.848	1.23	61.69	C
65.00-45.00			B	0.602	1.803	0.755	1	1	29.526			
			C	0.627	1.79	0.77	1	1	31.290			
T5	0.51	0.79	A	0.518	1.878	0.707	1	1	19.226	0.79	49.47	C
45.00-29.00			B	0.565	1.83	0.733	1	1	21.604			
			C	0.574	1.822	0.738	1	1	22.075			
T6	0.00	0.20	A	0.401	2.061	0.652	1	1	2.222	0.10	24.27	B
29.00-25.00			B	0.493	1.909	0.694	1	1	2.671			
			C	0.401	2.061	0.652	1	1	2.222			
Sum Weight:	3.07	5.30								6.48		

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	0.39	1.06	A	0.2	2.595	0.59	0.825	1	8.321	1.52	75.90	C
125.00-105.00			B	0.584	1.815	0.744	0.825	1	28.016			
			C	0.628	1.789	0.771	0.825	1	31.192			
T2	0.72	1.03	A	0.563	1.832	0.732	0.825	1	26.576	1.43	71.59	C
105.00-85.00			B	0.582	1.816	0.743	0.825	1	27.873			
			C	0.627	1.79	0.77	0.825	1	31.058			
T3	0.72	1.23	A	0.574	1.823	0.738	0.825	1	27.498	1.38	68.85	C
85.00-65.00			B	0.596	1.807	0.751	0.825	1	28.998			
			C	0.637	1.786	0.777	0.825	1	32.034			
T4	0.73	0.99	A	0.563	1.832	0.732	0.825	1	26.576	1.22	61.24	C
65.00-45.00			B	0.602	1.803	0.755	0.825	1	29.279			
			C	0.627	1.79	0.77	0.825	1	31.058			
T5	0.51	0.79	A	0.518	1.878	0.707	0.825	1	18.975	0.78	48.97	C
45.00-29.00			B	0.565	1.83	0.733	0.825	1	21.378			
			C	0.574	1.822	0.738	0.825	1	21.854			
T6	0.00	0.20	A	0.401	2.061	0.652	0.825	1	1.999	0.09	22.48	B
29.00-25.00			B	0.493	1.909	0.694	0.825	1	2.474			
			C	0.401	2.061	0.652	0.825	1	1.999			
Sum Weight:	3.07	5.30								6.42		

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	0.39	1.06	A	0.2	2.595	0.59	0.8	1	8.243	1.52	75.81	C
125.00-105.00			B	0.584	1.815	0.744	0.8	1	27.976			
			C	0.628	1.789	0.771	0.8	1	31.156			
T2	0.72	1.03	A	0.563	1.832	0.732	0.8	1	26.537	1.43	71.51	C
105.00-85.00			B	0.582	1.816	0.743	0.8	1	27.836			
			C	0.627	1.79	0.77	0.8	1	31.025			
T3	0.72	1.23	A	0.574	1.823	0.738	0.8	1	27.456	1.38	68.78	C
85.00-65.00			B	0.596	1.807	0.751	0.8	1	28.958			
			C	0.637	1.786	0.777	0.8	1	31.999			
T4	0.73	0.99	A	0.563	1.832	0.732	0.8	1	26.537	1.22	61.17	C
65.00-45.00			B	0.602	1.803	0.755	0.8	1	29.243			
			C	0.627	1.79	0.77	0.8	1	31.025			
T5	0.51	0.79	A	0.518	1.878	0.707	0.8	1	18.939	0.78	48.90	C
45.00-29.00			B	0.565	1.83	0.733	0.8	1	21.346			
			C	0.574	1.822	0.738	0.8	1	21.822			
T6	0.00	0.20	A	0.401	2.061	0.652	0.8	1	1.968	0.09	22.23	B
29.00-25.00			B	0.493	1.909	0.694	0.8	1	2.446			
			C	0.401	2.061	0.652	0.8	1	1.968			
Sum Weight:	3.07	5.30								6.42		

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	0.39	1.06	A	0.2	2.595	0.59	0.85	1	8.399	1.52	75.98	C
125.00-105.00			B	0.584	1.815	0.744	0.85	1	28.056			
			C	0.628	1.789	0.771	0.85	1	31.228			
T2	0.72	1.03	A	0.563	1.832	0.732	0.85	1	26.615	1.43	71.66	C
105.00-85.00			B	0.582	1.816	0.743	0.85	1	27.910			
			C	0.627	1.79	0.77	0.85	1	31.091			
T3	0.72	1.23	A	0.574	1.823	0.738	0.85	1	27.540	1.38	68.93	C
85.00-65.00			B	0.596	1.807	0.751	0.85	1	29.037			
			C	0.637	1.786	0.777	0.85	1	32.069			
T4	0.73	0.99	A	0.563	1.832	0.732	0.85	1	26.615	1.23	61.30	C
65.00-45.00			B	0.602	1.803	0.755	0.85	1	29.314			
			C	0.627	1.79	0.77	0.85	1	31.091			
T5	0.51	0.79	A	0.518	1.878	0.707	0.85	1	19.011	0.78	49.04	C
45.00-29.00			B	0.565	1.83	0.733	0.85	1	21.410			
			C	0.574	1.822	0.738	0.85	1	21.885			
T6	0.00	0.20	A	0.401	2.061	0.652	0.85	1	2.031	0.09	22.74	B
29.00-25.00			B	0.493	1.909	0.694	0.85	1	2.502			
			C	0.401	2.061	0.652	0.85	1	2.031			
Sum Weight:	3.07	5.30								6.43		

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	1.08	1.37	A	0.321	2.242	0.623	1	1	14.335	2.49	124.35	C
125.00-105.00			B	0.875	1.89	0.96	1	1	55.647			
			C	0.936	1.979	1	1	1	61.604			
T2	1.82	1.34	A	0.748	1.787	0.856	1	1	45.295	2.35	117.66	C
105.00-85.00			B	0.874	1.889	0.96	1	1	55.566			
			C	0.935	1.978	1	1	1	61.577			
T3	1.82	1.55	A	0.757	1.79	0.862	1	1	46.258	2.24	112.08	C
85.00-65.00			B	0.888	1.907	0.972	1	1	57.398			
			C	0.942	1.989	1	1	1	62.405			
T4	1.85	1.29	A	0.748	1.787	0.856	1	1	45.295	2.01	100.65	C
65.00-45.00			B	0.922	1.957	1	1	1	60.700			
			C	0.935	1.978	1	1	1	61.577			
T5	1.31	1.04	A	0.696	1.776	0.817	1	1	32.774	1.24	77.35	B
45.00-29.00			B	0.874	1.889	0.959	1	1	44.405			
			C	0.859	1.871	0.946	1	1	44.416			
T6	0.01	0.25	A	0.522	1.873	0.709	1	1	3.016	0.11	28.33	B
29.00-25.00			B	0.699	1.776	0.819	1	1	4.468			
			C	0.522	1.873	0.709	1	1	3.016			
Sum Weight:	7.89	6.84								10.45		

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	1.08	1.37	A	0.321	2.242	0.623	0.825	1	13.790	2.18	109.22	C
125.00-105.00			B	0.875	1.89	0.96	0.825	1	54.166			
			C	0.936	1.979	1	0.825	1	54.105			
T2	1.82	1.34	A	0.748	1.787	0.856	0.825	1	41.486	2.07	103.34	C
105.00-85.00			B	0.874	1.889	0.96	0.825	1	54.094			
			C	0.935	1.978	1	0.825	1	54.083			
T3	1.82	1.55	A	0.757	1.79	0.862	0.825	1	42.437	1.97	98.61	C
85.00-65.00			B	0.888	1.907	0.972	0.825	1	55.927			
			C	0.942	1.989	1	0.825	1	54.910			
T4	1.85	1.29	A	0.748	1.787	0.856	0.825	1	41.486	1.92	95.81	B
65.00-45.00			B	0.922	1.957	1	0.825	1	59.263			
			C	0.935	1.978	1	0.825	1	54.083			
T5	1.31	1.04	A	0.696	1.776	0.817	0.825	1	30.050	1.21	75.35	B
45.00-29.00			B	0.874	1.889	0.959	0.825	1	43.259			
			C	0.859	1.871	0.946	0.825	1	39.116			
T6	0.01	0.25	A	0.522	1.873	0.709	0.825	1	2.793	0.10	26.03	B
29.00-25.00			B	0.699	1.776	0.819	0.825	1	4.105			
			C	0.522	1.873	0.709	0.825	1	2.793			
Sum Weight:	7.89	6.84								9.45		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.08	1.37	A	0.321	2.242	0.623	0.8	1	13.712	2.14	107.05	C
125.00-105.00			B	0.875	1.89	0.96	0.8	1	53.955			
			C	0.936	1.979	1	0.8	1	53.034			
T2	1.82	1.34	A	0.748	1.787	0.856	0.8	1	40.942	2.03	101.29	C
105.00-85.00			B	0.874	1.889	0.96	0.8	1	53.884			
			C	0.935	1.978	1	0.8	1	53.012			
T3	1.82	1.55	A	0.757	1.79	0.862	0.8	1	41.891	1.93	96.69	C
85.00-65.00			B	0.888	1.907	0.972	0.8	1	55.717			
			C	0.942	1.989	1	0.8	1	53.839			
T4	1.85	1.29	A	0.748	1.787	0.856	0.8	1	40.942	1.91	95.48	B
65.00-45.00			B	0.922	1.957	1	0.8	1	59.057			
			C	0.935	1.978	1	0.8	1	53.012			
T5	1.31	1.04	A	0.696	1.776	0.817	0.8	1	29.661	1.20	75.07	B
45.00-29.00			B	0.874	1.889	0.959	0.8	1	43.095			
			C	0.859	1.871	0.946	0.8	1	38.359			
T6	0.01	0.25	A	0.522	1.873	0.709	0.8	1	2.762	0.10	25.70	B
29.00-25.00			B	0.699	1.776	0.819	0.8	1	4.053			
			C	0.522	1.873	0.709	0.8	1	2.762			
Sum Weight:	7.89	6.84								9.31		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	1.08	1.37	A	0.321	2.242	0.623	0.85	1	13.868	2.23	111.38	C
125.00-105.00			B	0.875	1.89	0.96	0.85	1	54.378			
			C	0.936	1.979	1	0.85	1	55.177			
T2	1.82	1.34	A	0.748	1.787	0.856	0.85	1	42.030	2.11	105.38	C
105.00-85.00			B	0.874	1.889	0.96	0.85	1	54.305			
			C	0.935	1.978	1	0.85	1	55.154			
T3	1.82	1.55	A	0.757	1.79	0.862	0.85	1	42.983	2.01	100.54	C
85.00-65.00			B	0.888	1.907	0.972	0.85	1	56.137			
			C	0.942	1.989	1	0.85	1	55.980			
T4	1.85	1.29	A	0.748	1.787	0.856	0.85	1	42.030	1.92	96.14	B
65.00-45.00			B	0.922	1.957	1	0.85	1	59.468			
			C	0.935	1.978	1	0.85	1	55.154			
T5	1.31	1.04	A	0.696	1.776	0.817	0.85	1	30.439	1.21	75.64	B
45.00-29.00			B	0.874	1.889	0.959	0.85	1	43.422			
			C	0.859	1.871	0.946	0.85	1	39.873			
T6	0.01	0.25	A	0.522	1.873	0.709	0.85	1	2.825	0.11	26.35	B
29.00-25.00			B	0.699	1.776	0.819	0.85	1	4.157			
			C	0.522	1.873	0.709	0.85	1	2.825			
Sum Weight:	7.89	6.84								9.58		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.39	1.06	A	0.2	2.595	0.59	1	1	8.866	0.60	29.89	C
125.00-105.00			B	0.584	1.815	0.744	1	1	28.298			
			C	0.628	1.789	0.771	1	1	31.443			
T2	0.72	1.03	A	0.563	1.832	0.732	1	1	26.848	0.56	28.17	C
105.00-85.00			B	0.582	1.816	0.743	1	1	28.133			
			C	0.627	1.79	0.77	1	1	31.290			
T3	0.72	1.23	A	0.574	1.823	0.738	1	1	27.789	0.54	27.10	C
85.00-65.00			B	0.596	1.807	0.751	1	1	29.274			
			C	0.637	1.786	0.777	1	1	32.281			
T4	0.73	0.99	A	0.563	1.832	0.732	1	1	26.848	0.48	24.10	C
65.00-45.00			B	0.602	1.803	0.755	1	1	29.526			
			C	0.627	1.79	0.77	1	1	31.290			
T5	0.51	0.79	A	0.518	1.878	0.707	1	1	19.226	0.31	19.32	C
45.00-29.00			B	0.565	1.83	0.733	1	1	21.604			
			C	0.574	1.822	0.738	1	1	22.075			
T6	0.00	0.20	A	0.401	2.061	0.652	1	1	2.222	0.04	9.48	B
29.00-25.00			B	0.493	1.909	0.694	1	1	2.671			
			C	0.401	2.061	0.652	1	1	2.222			
Sum Weight:	3.07	5.30								2.53		

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	0.39	1.06	A	0.2	2.595	0.59	0.825	1	8.321	0.59	29.65	C
125.00-105.00			B	0.584	1.815	0.744	0.825	1	28.016			
			C	0.628	1.789	0.771	0.825	1	31.192			
T2	0.72	1.03	A	0.563	1.832	0.732	0.825	1	26.576	0.56	27.96	C
105.00-85.00			B	0.582	1.816	0.743	0.825	1	27.873			
			C	0.627	1.79	0.77	0.825	1	31.058			
T3	0.72	1.23	A	0.574	1.823	0.738	0.825	1	27.498	0.54	26.90	C
85.00-65.00			B	0.596	1.807	0.751	0.825	1	28.998			
			C	0.637	1.786	0.777	0.825	1	32.034			
T4	0.73	0.99	A	0.563	1.832	0.732	0.825	1	26.576	0.48	23.92	C
65.00-45.00			B	0.602	1.803	0.755	0.825	1	29.279			
			C	0.627	1.79	0.77	0.825	1	31.058			
T5	0.51	0.79	A	0.518	1.878	0.707	0.825	1	18.975	0.31	19.13	C
45.00-29.00			B	0.565	1.83	0.733	0.825	1	21.378			
			C	0.574	1.822	0.738	0.825	1	21.854			
T6	0.00	0.20	A	0.401	2.061	0.652	0.825	1	1.999	0.04	8.78	B
29.00-25.00			B	0.493	1.909	0.694	0.825	1	2.474			
			C	0.401	2.061	0.652	0.825	1	1.999			
Sum Weight:	3.07	5.30								2.51		

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	0.39	1.06	A	0.2	2.595	0.59	0.8	1	8.243	0.59	29.61	C
125.00-105.00			B	0.584	1.815	0.744	0.8	1	27.976			
			C	0.628	1.789	0.771	0.8	1	31.156			
T2	0.72	1.03	A	0.563	1.832	0.732	0.8	1	26.537	0.56	27.93	C
105.00-85.00			B	0.582	1.816	0.743	0.8	1	27.836			
			C	0.627	1.79	0.77	0.8	1	31.025			
T3	0.72	1.23	A	0.574	1.823	0.738	0.8	1	27.456	0.54	26.87	C
85.00-65.00			B	0.596	1.807	0.751	0.8	1	28.958			
			C	0.637	1.786	0.777	0.8	1	31.999			
T4	0.73	0.99	A	0.563	1.832	0.732	0.8	1	26.537	0.48	23.89	C
65.00-45.00			B	0.602	1.803	0.755	0.8	1	29.243			
			C	0.627	1.79	0.77	0.8	1	31.025			
T5	0.51	0.79	A	0.518	1.878	0.707	0.8	1	18.939	0.31	19.10	C
45.00-29.00			B	0.565	1.83	0.733	0.8	1	21.346			
			C	0.574	1.822	0.738	0.8	1	21.822			
T6	0.00	0.20	A	0.401	2.061	0.652	0.8	1	1.968	0.03	8.68	B
29.00-25.00			B	0.493	1.909	0.694	0.8	1	2.446			
			C	0.401	2.061	0.652	0.8	1	1.968			
Sum Weight:	3.07	5.30								2.51		

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	0.39	1.06	A	0.2	2.595	0.59	0.85	1	8.399	0.59	29.68	C
125.00-105.00			B	0.584	1.815	0.744	0.85	1	28.056			
			C	0.628	1.789	0.771	0.85	1	31.228			
T2	0.72	1.03	A	0.563	1.832	0.732	0.85	1	26.615	0.56	27.99	C
105.00-85.00			B	0.582	1.816	0.743	0.85	1	27.910			
			C	0.627	1.79	0.77	0.85	1	31.091			
T3	0.72	1.23	A	0.574	1.823	0.738	0.85	1	27.540	0.54	26.93	C
85.00-65.00			B	0.596	1.807	0.751	0.85	1	29.037			
			C	0.637	1.786	0.777	0.85	1	32.069			
T4	0.73	0.99	A	0.563	1.832	0.732	0.85	1	26.615	0.48	23.95	C
65.00-45.00			B	0.602	1.803	0.755	0.85	1	29.314			
			C	0.627	1.79	0.77	0.85	1	31.091			
T5	0.51	0.79	A	0.518	1.878	0.707	0.85	1	19.011	0.31	19.16	C
45.00-29.00			B	0.565	1.83	0.733	0.85	1	21.410			
			C	0.574	1.822	0.738	0.85	1	21.885			
T6	0.00	0.20	A	0.401	2.061	0.652	0.85	1	2.031	0.04	8.88	B
29.00-25.00			B	0.493	1.909	0.694	0.85	1	2.502			
			C	0.401	2.061	0.652	0.85	1	2.031			
Sum Weight:	3.07	5.30								2.51		

Force Totals (Does not include forces on guys)

Load Case	*Vertical Forces* K	*Sum of Forces X* K	*Sum of Forces Z* K	*Sum of Torques* kip-ft
Leg Weight	3.39			
Bracing Weight	1.91			
Total Member Self-Weight	5.30			
Guy Weight	0.76			
Total Weight	14.40			
Wind 0 deg - No Ice		0.08	-14.11	-1.46
Wind 30 deg - No Ice		7.18	-12.22	-1.30
Wind 45 deg - No Ice		10.10	-9.99	-1.08
Wind 60 deg - No Ice		12.34	-7.09	-0.79
Wind 90 deg - No Ice		14.21	-0.08	-0.06
Wind 120 deg - No Ice		12.31	6.98	0.68
Wind 135 deg - No Ice		9.99	9.88	0.99
Wind 150 deg - No Ice		7.04	12.14	1.23
Wind 180 deg - No Ice		-0.08	14.04	1.46
Wind 210 deg - No Ice		-7.18	12.22	1.30
Wind 225 deg - No Ice		-10.10	9.99	1.08
Wind 240 deg - No Ice		-12.39	7.13	0.78
Wind 270 deg - No Ice		-14.21	0.08	0.06
Wind 300 deg - No Ice		-12.25	-6.95	-0.68
Wind 315 deg - No Ice		-9.99	-9.88	-0.99
Wind 330 deg - No Ice		-7.04	-12.14	-1.23
Member Ice	1.54			
Guy Ice	0.41			
Total Weight Ice	24.24			
Wind 0 deg - Ice		0.06	-17.50	-0.88
Wind 30 deg - Ice		8.43	-14.44	-0.85
Wind 45 deg - Ice		11.80	-11.72	-0.75
Wind 60 deg - Ice		14.31	-8.24	-0.60
Wind 90 deg - Ice		16.76	-0.06	-0.16
Wind 120 deg - Ice		15.23	8.70	0.34
Wind 135 deg - Ice		11.71	11.63	0.51
Wind 150 deg - Ice		8.32	14.38	0.69
Wind 180 deg - Ice		-0.06	16.37	0.90
Wind 210 deg - Ice		-8.43	14.44	0.85
Wind 225 deg - Ice		-11.80	11.72	0.75
Wind 240 deg - Ice		-15.29	8.81	0.54
Wind 270 deg - Ice		-16.76	0.06	0.16
Wind 300 deg - Ice		-14.25	-8.13	-0.30
Wind 315 deg - Ice		-11.71	-11.63	-0.51
Wind 330 deg - Ice		-8.32	-14.38	-0.69
Total Weight	14.40			
Wind 0 deg - Service		0.03	-5.51	-0.57
Wind 30 deg - Service		2.80	-4.77	-0.51
Wind 45 deg - Service		3.95	-3.90	-0.42
Wind 60 deg - Service		4.82	-2.77	-0.31
Wind 90 deg - Service		5.55	-0.03	-0.02
Wind 120 deg - Service		4.81	2.73	0.26
Wind 135 deg - Service		3.90	3.86	0.39
Wind 150 deg - Service		2.75	4.74	0.48
Wind 180 deg - Service		-0.03	5.49	0.57
Wind 210 deg - Service		-2.80	4.77	0.51
Wind 225 deg - Service		-3.95	3.90	0.42
Wind 240 deg - Service		-4.84	2.78	0.31
Wind 270 deg - Service		-5.55	0.03	0.02
Wind 300 deg - Service		-4.79	-2.72	-0.26
Wind 315 deg - Service		-3.90	-3.86	-0.39
Wind 330 deg - Service		-2.75	-4.74	-0.48

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	125 - 105	Leg	Max Tension	22	6.89	-1.14	0.66
			Max. Compression	34	-16.48	-1.00	-0.58
			Max. Mx	30	-9.17	1.32	-0.75
			Max. My	19	-9.07	0.09	1.51
			Max. Vy	23	-0.85	-0.88	0.45
			Max. Vx	27	-0.93	-0.04	-1.11
		Diagonal	Max Tension	17	2.70	0.00	0.00
			Max. Compression	25	-3.11	0.00	0.00
			Max. Mx	10	0.22	-0.00	-0.00
			Max. My	10	-2.08	0.00	-0.00
			Max. Vy	27	0.00	-0.00	-0.00
			Max. Vx	10	-0.00	0.00	0.00
		Horizontal	Max Tension	30	2.40	0.00	0.00
			Max. Compression	13	-0.36	0.00	0.00
			Max. Mx	32	1.01	-0.01	0.00
			Max. My	20	2.03	0.00	-0.00
			Max. Vy	32	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.70	0.00	0.00
			Max. Compression	15	-0.26	0.00	0.00
			Max. Mx	32	0.05	-0.01	0.00
			Max. My	20	0.38	0.00	-0.00
			Max. Vy	32	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Bottom Girt	Max Tension	24	1.19	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	32	0.90	-0.01	0.00
			Max. My	20	1.07	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Guy A	Bottom Tension	27	19.96		
			Top Tension	27	20.19		
			Top Cable Vert	27	18.32		
			Top Cable Norm	27	8.47		
			Top Cable Tan	27	0.00		
			Bot Cable Vert	27	-17.96		
			Bot Cable Norm	27	8.72		
			Bot Cable Tan	27	0.00		
		Guy B	Bottom Tension	31	21.53		
			Top Tension	31	21.75		
			Top Cable Vert	31	20.19		
			Top Cable Norm	31	8.08		
			Top Cable Tan	31	0.02		
			Bot Cable Vert	31	-19.86		
			Bot Cable Norm	31	8.31		
			Bot Cable Tan	31	0.13		
		Guy C	Bottom Tension	22	21.21		
			Top Tension	22	21.42		
			Top Cable Vert	22	19.80		
			Top Cable Norm	22	8.17		
			Top Cable Tan	22	0.01		
			Bot Cable Vert	22	-19.47		
			Bot Cable Norm	22	8.42		
			Bot Cable Tan	22	0.01		
		Top Guy Pull-Off	Max Tension	30	5.02	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	32	2.32	-0.01	0.00
			Max. My	2	2.22	0.00	0.00
			Max. Vy	32	-0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T2	105 - 85	Leg	Max Tension	5	13.23	0.16	-0.10

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	-46.47	-0.01	1.46
			Max. Mx	24	-37.90	1.71	0.85
			Max. My	19	-39.36	0.09	-1.95
			Max. Vy	23	2.41	0.07	0.85
			Max. Vx	19	-2.47	0.54	-0.34
		Diagonal	Max Tension	15	2.25	0.00	0.00
			Max. Compression	19	-5.27	0.00	0.00
			Max. Mx	19	0.66	-0.01	0.00
			Max. My	19	-5.25	-0.00	-0.00
			Max. Vy	19	0.00	-0.01	0.00
			Max. Vx	19	0.00	-0.00	-0.00
		Horizontal	Max Tension	23	2.96	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	2.04	-0.01	0.00
			Max. My	20	2.24	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Top Girt	Max Tension	19	2.03	0.00	0.00
			Max. Compression	15	-0.26	0.00	0.00
			Max. Mx	32	0.29	-0.01	0.00
			Max. My	20	1.11	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Bottom Girt	Max Tension	22	3.36	0.00	0.00
			Max. Compression	2	-1.55	0.00	0.00
			Max. Mx	18	1.07	-0.01	0.00
			Max. My	19	2.63	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T3	85 - 65	Leg	Max Tension	22	24.47	-1.17	0.68
			Max. Compression	19	-58.63	0.02	1.07
			Max. Mx	23	14.64	-2.26	0.41
			Max. My	19	-48.30	0.09	-2.49
			Max. Vy	23	2.41	-0.43	0.81
			Max. Vx	19	-2.47	0.62	0.18
		Diagonal	Max Tension	15	2.96	0.00	0.00
			Max. Compression	19	-5.97	0.00	0.00
			Max. Mx	19	0.81	-0.01	0.00
			Max. My	19	-5.95	-0.00	-0.00
			Max. Vy	19	0.01	-0.01	0.00
			Max. Vx	19	0.00	-0.00	-0.00
		Horizontal	Max Tension	20	3.86	0.00	0.00
			Max. Compression	2	-1.25	0.00	0.00
			Max. Mx	18	2.52	-0.01	0.00
			Max. My	19	3.10	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	19	2.15	0.00	0.00
			Max. Compression	15	-0.45	0.00	0.00
			Max. Mx	18	0.91	-0.01	0.00
			Max. My	19	0.42	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Bottom Girt	Max Tension	19	1.99	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	1.28	-0.01	0.00
			Max. My	19	1.31	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Guy A	Bottom Tension	26	18.81		
			Top Tension	26	18.94		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Vert	26	14.61		
			Top Cable Norm	26	12.05		
			Top Cable Tan	26	0.02		
			Bot Cable Vert	26	-14.37		
			Bot Cable Norm	26	12.14		
			Bot Cable Tan	26	0.06		
		Guy B	Bottom Tension	31	21.37		
			Top Tension	31	21.49		
			Top Cable Vert	31	17.50		
			Top Cable Norm	31	12.47		
			Top Cable Tan	31	0.01		
			Bot Cable Vert	31	-17.28		
			Bot Cable Norm	31	12.57		
			Bot Cable Tan	31	0.07		
		Guy C	Bottom Tension	23	20.56		
			Top Tension	23	20.67		
			Top Cable Vert	23	16.28		
			Top Cable Norm	23	12.73		
			Top Cable Tan	23	0.01		
			Bot Cable Vert	23	-16.08		
			Bot Cable Norm	23	12.81		
			Bot Cable Tan	23	0.07		
		Top Guy Pull-Off	Max Tension	19	6.76	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	5.04	-0.01	0.00
			Max. My	2	4.47	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T4	65 - 45	Leg	Max Tension	5	0.19	0.33	-0.18
			Max. Compression	19	-48.20	0.01	1.41
			Max. Mx	30	-46.78	1.36	-0.80
			Max. My	19	-48.20	0.01	1.61
			Max. Vy	23	-1.44	0.06	1.13
			Max. Vx	19	1.40	-0.94	-0.59
		Diagonal	Max Tension	5	0.41	0.00	0.00
			Max. Compression	19	-4.36	0.00	0.00
			Max. Mx	19	-3.65	-0.01	-0.00
			Max. My	34	-4.14	-0.01	-0.00
			Max. Vy	19	0.00	-0.01	-0.00
			Max. Vx	34	0.00	-0.01	-0.00
		Horizontal	Max Tension	19	3.47	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2.86	-0.00	0.00
			Max. My	19	3.47	0.00	0.00
			Max. Vy	24	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	20	2.64	0.00	0.00
			Max. Compression	7	-0.15	0.00	0.00
			Max. Mx	18	1.32	-0.00	0.00
			Max. My	19	2.43	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Bottom Girt	Max Tension	19	2.00	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1.91	-0.00	0.00
			Max. My	19	1.60	0.00	0.00
			Max. Vy	24	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T5	45 - 29	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-32.01	0.00	1.25
			Max. Mx	30	-26.02	-1.20	-0.56

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	19	-32.01	0.00	1.35
			Max. Vy	19	-6.51	0.69	0.34
			Max. Vx	19	7.45	0.00	0.67
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-3.17	0.00	0.00
			Max. Mx	19	-2.54	-0.00	-0.00
			Max. My	19	-2.07	-0.00	-0.00
			Max. Vy	19	0.00	-0.00	-0.00
			Max. Vx	19	0.00	-0.00	-0.00
		Horizontal	Max Tension	19	3.32	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	3.21	-0.00	0.00
			Max. My	19	3.28	0.00	0.00
			Max. Vy	24	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Top Girt	Max Tension	24	1.89	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1.28	-0.00	0.00
			Max. My	19	1.88	0.00	0.00
			Max. Vy	24	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
		Bottom Girt	Max Tension	19	5.45	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	5.21	-0.00	0.00
			Max. My	19	5.44	0.00	0.00
			Max. Vy	24	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T6	29 - 25	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-32.63	0.04	-0.01
			Max. Mx	19	-29.68	0.88	0.00
			Max. My	19	-30.09	0.76	0.08
			Max. Vy	19	5.06	-0.40	-0.05
			Max. Vx	27	-0.11	-0.30	0.02
		Top Girt	Max Tension	19	3.29	0.10	-0.04
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	3.14	0.15	-0.06
			Max. My	19	3.17	0.14	-0.06
			Max. Vy	2	0.05	0.14	-0.05
			Max. Vx	2	0.02	0.01	-0.00
		Bottom Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-0.29	-0.13	0.00
			Max. Mx	10	-0.29	-0.16	-0.00
			Max. My	2	-0.25	-0.14	-0.00
			Max. Vy	2	-0.11	-0.14	-0.00
			Max. Vx	2	-0.01	-0.14	-0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	19	88.73	0.03	-0.13
	Max. H_x	7	65.67	0.49	0.14
	Max. H_z	13	67.28	-0.52	0.19
	Max. M_x	1	0.00	0.01	-0.03
	Max. M_z	1	0.00	0.01	-0.03
	Max. Torsion	1	0.00	0.01	-0.03

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. Vert	46	54.60	-0.04	-0.02
	Min. H_x	13	67.28	-0.52	0.19
	Min. H_z	2	68.47	0.03	-0.59
	Min. M_x	1	0.00	0.01	-0.03
	Min. M_z	1	0.00	0.01	-0.03
	Min. Torsion	1	0.00	0.01	-0.03
Guy C @ 37.5 ft Elev 31.5 ft Azimuth 240 deg	Max. Vert	13	-0.61	-0.18	0.10
	Max. H_x	13	-0.61	-0.18	0.10
	Max. H_z	20	-35.19	-18.10	10.71
	Min. Vert	21	-35.46	-18.26	10.68
	Min. H_x	23	-35.42	-18.41	10.41
	Min. H_z	13	-0.61	-0.18	0.10
Guy B @ 39 ft Elev 25 ft Azimuth 120 deg	Max. Vert	7	-0.87	0.27	0.16
	Max. H_x	31	-37.14	18.19	10.26
	Max. H_z	34	-36.90	17.89	10.57
	Min. Vert	31	-37.14	18.19	10.26
	Min. H_x	7	-0.87	0.27	0.16
	Min. H_z	7	-0.87	0.27	0.16
Guy A @ 45 ft Elev 25 ft Azimuth 0 deg	Max. Vert	2	-0.55	-0.00	-0.20
	Max. H_x	30	-28.67	0.37	-18.56
	Max. H_z	2	-0.55	-0.00	-0.20
	Min. Vert	27	-32.17	0.01	-20.73
	Min. H_x	24	-28.50	-0.34	-18.48
	Min. H_z	26	-32.14	-0.19	-20.75

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	55.07	-0.01	0.03	0.00	0.00	0.00
Dead+Wind 0 deg - No Ice+Guy	68.47	-0.03	0.59	0.00	0.00	0.00
Dead+Wind 30 deg - No Ice+Guy	63.49	-0.12	0.46	0.00	0.00	0.00
Dead+Wind 45 deg - No Ice+Guy	59.86	-0.17	0.30	0.00	0.00	0.00
Dead+Wind 60 deg - No Ice+Guy	58.52	-0.23	0.13	0.00	0.00	0.00
Dead+Wind 90 deg - No Ice+Guy	62.09	-0.45	-0.07	0.00	0.00	0.00
Dead+Wind 120 deg - No Ice+Guy	65.67	-0.49	-0.14	0.00	0.00	0.00
Dead+Wind 135 deg - No Ice+Guy	64.00	-0.42	-0.15	0.00	0.00	0.00
Dead+Wind 150 deg - No Ice+Guy	60.63	-0.30	-0.12	0.00	0.00	0.00
Dead+Wind 180 deg - No Ice+Guy	56.49	0.02	-0.05	0.00	0.00	0.00
Dead+Wind 210 deg - No Ice+Guy	61.14	0.35	-0.15	0.00	0.00	0.00

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 225 deg - No Ice+Guy	65.30	0.47	-0.19	0.00	0.00	0.00
Dead+Wind 240 deg - No Ice+Guy	67.28	0.52	-0.19	0.00	0.00	0.00
Dead+Wind 270 deg - No Ice+Guy	62.85	0.46	-0.13	0.00	0.00	0.00
Dead+Wind 300 deg - No Ice+Guy	56.64	0.20	0.08	0.00	0.00	0.00
Dead+Wind 315 deg - No Ice+Guy	58.92	0.12	0.27	0.00	0.00	0.00
Dead+Wind 330 deg - No Ice+Guy	63.57	0.08	0.43	0.00	0.00	0.00
Dead+Ice+Temp+Guy	67.55	-0.01	0.03	0.00	0.00	0.00
Dead+Wind 0 deg+Ice+Temp+Guy	88.73	-0.03	0.13	0.00	0.00	0.00
Dead+Wind 30 deg+Ice+Temp+Guy	80.48	0.16	0.05	0.00	0.00	0.00
Dead+Wind 45 deg+Ice+Temp+Guy	75.33	0.23	-0.03	0.00	0.00	0.00
Dead+Wind 60 deg+Ice+Temp+Guy	73.17	0.24	-0.12	0.00	0.00	0.00
Dead+Wind 90 deg+Ice+Temp+Guy	78.69	0.06	-0.09	0.00	0.00	0.00
Dead+Wind 120 deg+Ice+Temp+Guy	85.22	-0.07	0.13	0.00	0.00	0.00
Dead+Wind 135 deg+Ice+Temp+Guy	80.78	-0.08	0.24	0.00	0.00	0.00
Dead+Wind 150 deg+Ice+Temp+Guy	77.07	-0.07	0.36	0.00	0.00	0.00
Dead+Wind 180 deg+Ice+Temp+Guy	70.51	0.02	0.50	0.00	0.00	0.00
Dead+Wind 210 deg+Ice+Temp+Guy	77.69	0.12	0.33	0.00	0.00	0.00
Dead+Wind 225 deg+Ice+Temp+Guy	82.08	0.13	0.19	0.00	0.00	0.00
Dead+Wind 240 deg+Ice+Temp+Guy	87.05	0.11	0.07	0.00	0.00	0.00
Dead+Wind 270 deg+Ice+Temp+Guy	79.73	-0.05	-0.15	0.00	0.00	0.00
Dead+Wind 300 deg+Ice+Temp+Guy	71.44	-0.26	-0.17	0.00	0.00	0.00
Dead+Wind 315 deg+Ice+Temp+Guy	74.87	-0.27	-0.06	0.00	0.00	0.00
Dead+Wind 330 deg+Ice+Temp+Guy	80.81	-0.21	0.03	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	55.27	-0.02	0.03	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	55.54	-0.05	0.04	0.00	0.00	0.00
Dead+Wind 45 deg - Service+Guy	55.63	-0.06	0.05	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	55.69	-0.07	0.05	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	55.66	-0.08	0.04	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	55.51	-0.06	0.04	0.00	0.00	0.00
Dead+Wind 135 deg - Service+Guy	55.41	-0.05	0.03	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	55.30	-0.03	0.02	0.00	0.00	0.00

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 180 deg - Service+Guy	55.04	-0.00	0.02	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	54.78	0.03	0.02	0.00	0.00	0.00
Dead+Wind 225 deg - Service+Guy	54.67	0.04	0.02	0.00	0.00	0.00
Dead+Wind 240 deg - Service+Guy	54.60	0.04	0.02	0.00	0.00	0.00
Dead+Wind 270 deg - Service+Guy	54.61	0.05	0.02	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	54.77	0.04	0.03	0.00	0.00	0.00
Dead+Wind 315 deg - Service+Guy	54.88	0.03	0.03	0.00	0.00	0.00
Dead+Wind 330 deg - Service+Guy	55.01	0.02	0.03	0.00	0.00	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-14.40	0.00	-0.00	14.40	-0.00	0.001%
2	0.08	-14.40	-14.90	-0.08	14.40	14.90	0.002%
3	7.58	-14.38	-12.91	-7.58	14.38	12.91	0.001%
4	10.68	-14.37	-10.56	-10.68	14.37	10.56	0.001%
5	13.04	-14.37	-7.49	-13.04	14.37	7.49	0.003%
6	15.03	-14.39	-0.08	-15.03	14.39	0.08	0.001%
7	13.02	-14.41	7.38	-13.02	14.41	-7.38	0.001%
8	10.56	-14.41	10.44	-10.56	14.41	-10.44	0.001%
9	7.44	-14.41	12.82	-7.44	14.41	-12.82	0.000%
10	-0.08	-14.40	14.84	0.08	14.40	-14.84	0.001%
11	-7.58	-14.41	12.91	7.58	14.41	-12.91	0.001%
12	-10.68	-14.42	10.56	10.68	14.42	-10.56	0.001%
13	-13.10	-14.42	7.52	13.10	14.42	-7.52	0.001%
14	-15.03	-14.40	0.08	15.03	14.40	-0.08	0.002%
15	-12.96	-14.38	-7.35	12.96	14.38	7.35	0.003%
16	-10.56	-14.38	-10.44	10.56	14.38	10.44	0.002%
17	-7.44	-14.39	-12.82	7.44	14.39	12.82	0.001%
18	0.00	-24.24	0.00	-0.00	24.24	0.00	0.000%
19	0.06	-24.24	-18.78	-0.06	24.24	18.78	0.002%
20	9.08	-24.22	-15.55	-9.09	24.22	15.55	0.005%
21	12.72	-24.21	-12.62	-12.72	24.21	12.62	0.002%
22	15.45	-24.20	-8.88	-15.45	24.20	8.88	0.002%
23	18.07	-24.24	-0.06	-18.07	24.23	0.06	0.003%
24	16.36	-24.27	9.34	-16.36	24.27	-9.34	0.009%
25	12.63	-24.27	12.53	-12.63	24.27	-12.53	0.006%
26	8.98	-24.26	15.49	-8.98	24.26	-15.49	0.003%
27	-0.06	-24.24	17.65	0.06	24.24	-17.65	0.002%
28	-9.08	-24.27	15.55	9.08	24.27	-15.55	0.006%
29	-12.72	-24.28	12.62	12.72	24.28	-12.62	0.008%
30	-16.43	-24.28	9.45	16.42	24.28	-9.45	0.007%
31	-18.07	-24.25	0.06	18.07	24.25	-0.06	0.006%
32	-15.38	-24.22	-8.77	15.38	24.22	8.77	0.001%
33	-12.63	-24.22	-12.53	12.63	24.22	12.53	0.001%
34	-8.98	-24.23	-15.49	8.98	24.23	15.49	0.005%
35	0.03	-14.40	-5.82	-0.03	14.40	5.82	0.001%
36	2.96	-14.39	-5.04	-2.96	14.39	5.04	0.002%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
37	4.17	-14.39	-4.12	-4.17	14.39	4.12	0.003%
38	5.09	-14.39	-2.93	-5.09	14.39	2.93	0.002%
39	5.87	-14.40	-0.03	-5.87	14.39	0.03	0.001%
40	5.09	-14.40	2.88	-5.09	14.40	-2.88	0.001%
41	4.13	-14.40	4.08	-4.13	14.40	-4.08	0.002%
42	2.91	-14.40	5.01	-2.91	14.40	-5.01	0.003%
43	-0.03	-14.40	5.80	0.03	14.40	-5.80	0.004%
44	-2.96	-14.40	5.04	2.96	14.40	-5.04	0.003%
45	-4.17	-14.41	4.12	4.17	14.41	-4.12	0.003%
46	-5.12	-14.41	2.94	5.12	14.41	-2.94	0.000%
47	-5.87	-14.40	0.03	5.87	14.40	-0.03	0.001%
48	-5.06	-14.39	-2.87	5.06	14.39	2.87	0.002%
49	-4.13	-14.39	-4.08	4.13	14.39	4.08	0.002%
50	-2.91	-14.39	-5.01	2.91	14.39	5.01	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	17	0.00000001	0.00000000
2	Yes	37	0.00000001	0.00019064
3	Yes	38	0.00000001	0.00019435
4	Yes	37	0.00000001	0.00018316
5	Yes	32	0.00000001	0.00017717
6	Yes	26	0.00000001	0.00011481
7	Yes	36	0.00000001	0.00019745
8	Yes	37	0.00000001	0.00019535
9	Yes	38	0.00000001	0.00019815
10	Yes	40	0.00000001	0.00019117
11	Yes	38	0.00000001	0.00019944
12	Yes	37	0.00000001	0.00019816
13	Yes	39	0.00000001	0.00018595
14	Yes	27	0.00000001	0.00011369
15	Yes	34	0.00000001	0.00010554
16	Yes	35	0.00000001	0.00019171
17	Yes	38	0.00000001	0.00019108
18	Yes	15	0.00000001	0.00000000
19	Yes	33	0.00000001	0.00019451
20	Yes	28	0.00000001	0.00017196
21	Yes	28	0.00000001	0.00016991
22	Yes	28	0.00000001	0.00016169
23	Yes	24	0.00000001	0.00019544
24	Yes	25	0.00000001	0.00018887
25	Yes	26	0.00000001	0.00019248
26	Yes	27	0.00000001	0.00018792
27	Yes	29	0.00000001	0.00017072
28	Yes	28	0.00000001	0.00017793
29	Yes	28	0.00000001	0.00017657
30	Yes	29	0.00000001	0.00018563
31	Yes	25	0.00000001	0.00019093
32	Yes	28	0.00000001	0.00013340
33	Yes	29	0.00000001	0.00013909
34	Yes	28	0.00000001	0.00017190
35	Yes	41	0.00000001	0.00019439
36	Yes	36	0.00000001	0.00018480
37	Yes	33	0.00000001	0.00013425

38	Yes	33	0.00000001	0.00008611
39	Yes	27	0.00000001	0.00009498
40	Yes	37	0.00000001	0.00018803
41	Yes	33	0.00000001	0.00016887
42	Yes	33	0.00000001	0.00017520
43	Yes	33	0.00000001	0.00019506
44	Yes	34	0.00000001	0.00018312
45	Yes	34	0.00000001	0.00019033
46	Yes	41	0.00000001	0.00018882
47	Yes	28	0.00000001	0.00008975
48	Yes	33	0.00000001	0.00008055
49	Yes	34	0.00000001	0.00009880
50	Yes	34	0.00000001	0.00019659

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	125 - 105	1.694	48	0.1568	0.7326
T2	105 - 85	1.213	48	0.1567	0.7484
T3	85 - 65	0.714	49	0.1361	0.7373
T4	65 - 45	0.378	49	0.0822	0.7311
T5	45 - 29	0.181	49	0.0579	0.7299
T6	29 - 25	0.046	49	0.0548	0.7281

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
137.00	12' x 3" Dia Omni	48	1.694	0.1568	0.7326	205558
129.00	4-Bay Dipole	48	1.694	0.1568	0.7326	205558
128.00	6' x 3" Dia Omni	48	1.694	0.1568	0.7326	205558
127.00	VHLP2-18	48	1.694	0.1568	0.7326	205558
125.00	18' x 3" Dia Omni	48	1.694	0.1568	0.7326	205558
123.00	Rohn 6' x 12' Boom Gate (1)	48	1.647	0.1571	0.7349	205558
118.00	VHLP1-23	48	1.530	0.1576	0.7404	146827
116.96	Guy	48	1.506	0.1577	0.7415	127808
109.00	DB-T1-6Z-8AB-0Z	48	1.313	0.1575	0.7474	64356
105.00	Pirod 12' T-Frame Sector Mount (1)	48	1.213	0.1567	0.7484	63116
76.96	Guy	49	0.556	0.1153	0.7335	22878
69.00	ANT150D6-9	49	0.431	0.0923	0.7316	27227
55.00	ANT150D6-9	49	0.267	0.0654	0.7304	46092
31.00	GPS	49	0.066	0.0551	0.7283	30221

Maximum Tower Deflections - Design Wind

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

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	125 - 105	7.521	19	0.6591	1.7500
T2	105 - 85	5.488	19	0.6507	1.7917
T3	85 - 65	3.453	19	0.5654	1.7652
T4	65 - 45	1.996	19	0.3822	1.7501
T5	45 - 29	0.999	19	0.3071	1.7469
T6	29 - 25	0.254	19	0.3025	1.7424

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
137.00	12' x 3" Dia Omni	19	7.521	0.6591	1.7500	86452
129.00	4-Bay Dipole	19	7.521	0.6591	1.7500	86452
128.00	6' x 3" Dia Omni	19	7.521	0.6591	1.7500	86452
127.00	VHLP2-18	19	7.521	0.6591	1.7500	86452
125.00	18' x 3" Dia Omni	19	7.521	0.6591	1.7500	86452
123.00	Rohn 6' x 12' Boom Gate (1)	19	7.321	0.6594	1.7560	86452
118.00	VHLP1-23	19	6.820	0.6598	1.7704	61752
116.96	Guy	19	6.716	0.6597	1.7731	53753
109.00	DB-T1-6Z-8AB-0Z	19	5.905	0.6558	1.7888	27074
105.00	Pirod 12' T-Frame Sector Mount (1)	19	5.488	0.6507	1.7917	27386
76.96	Guy	19	2.791	0.4924	1.7559	7302
69.00	ANT150D6-9	19	2.241	0.4154	1.7513	9043
55.00	ANT150D6-9	19	1.455	0.3285	1.7484	13320
31.00	GPS	19	0.368	0.3028	1.7430	5474

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
T3	85	Leg	A325N	0.750	3	4.41	19.43	0.227 ✔	1.333	Bolt Tension
T4	65	Leg	A325N	0.750	3	0.06	19.43	0.003 ✔	1.333	Bolt Tension
T5	45	Leg	A325N	0.750	3	0.00	19.44	0.000 ✔	1.333	Bolt Tension
T6	29	Leg	A325N	0.750	3	0.00	19.18	0.000 ✔	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
T1	116.96 (A) (258)	7/8 EHS	7.97	79.70	20.19	39.85	2.000	3.948 ✔

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
	116.96 (B) (257)	7/8 EHS	7.97	79.70	21.75	39.85	2.000	3.665 ✔
	116.96 (C) (256)	7/8 EHS	7.97	79.70	21.42	39.85	2.000	3.721 ✔
T3	76.96 (A) (261)	7/8 EHS	7.97	79.70	18.94	39.85	2.000	4.208 ✔
	76.96 (B) (260)	7/8 EHS	7.97	79.70	21.49	39.85	2.000	3.708 ✔
	76.96 (C) (259)	7/8 EHS	7.97	79.70	20.67	39.85	2.000	3.856 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	125 - 105	2	20.00	3.92	94.0 K=1.00	1.00	16.065	3.142	-16.48	50.47	0.326 ✔
T2	105 - 85	2	20.00	3.92	94.0 K=1.00	1.00	16.065	3.142	-46.47	50.47	0.921 ✔
T3	85 - 65	2 1/4	20.00	3.92	83.6 K=1.00	1.00	18.292	3.976	-58.63	72.73	0.806 ✔
T4	65 - 45	2	20.00	3.92	94.0 K=1.00	1.00	16.065	3.142	-48.20	50.47	0.955 ✔
T5	45 - 29	2	16.00	3.90	93.5 K=1.00	1.00	16.175	3.142	-32.01	50.82	0.630 ✔
T6	29 - 25	2	4.37	3.05	73.1 K=1.00	1.00	20.359	3.142	-24.62	63.96	0.385* ✔

* DL controls

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	125 - 105	7/8	4.21	2.11	106.6 K=0.92	12.128	0.601	-3.11	7.29	0.426 ✔
T2	105 - 85	7/8	4.21	2.11	106.6 K=0.92	12.128	0.601	-5.27	7.29	0.723 ✔
T3	85 - 65	7/8	4.21	2.11	106.6 K=0.92	12.128	0.601	-5.97	7.29	0.818 ✔
T4	65 - 45	7/8	4.21	2.11	106.6 K=0.92	12.128	0.601	-4.36	7.29	0.597

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T5	45 - 29	7/8	4.20	2.10	106.4 K=0.92	12.146	0.601	-3.17	7.30	0.434

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	125 - 105	L2x2x3/16	3.04	2.88	103.8 K=1.19	12.493	0.715	-0.36	8.93	0.041
T3	85 - 65	L2x2x3/16	3.04	2.85	103.5 K=1.19	12.534	0.715	-1.25	8.96	0.140

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	125 - 105	L2x2x3/16	3.04	2.88	103.8 K=1.19	12.493	0.715	-0.26	8.93	0.029
T2	105 - 85	L2x2x3/16	3.04	2.88	103.8 K=1.19	12.493	0.715	-0.26	8.93	0.029
T3	85 - 65	L2x2x3/16	3.04	2.85	103.5 K=1.19	12.534	0.715	-0.45	8.96	0.050
T4	65 - 45	L2x2x1/8	3.04	2.88	103.4 K=1.19	12.338	0.484	-0.15	5.98	0.024

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 $\frac{P}{P_a}$
T2	105 - 85	L2x2x3/16	3.04	2.88	103.8 K=1.19	12.493	0.715	-1.55	8.93	0.174
T6	29 - 25	12x3/8	0.76	0.59	65.8 K=1.00	16.857	4.500	-0.29	75.86	0.004

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	125 - 105	L3x3x1/4	3.04	2.88	37.1 K=1.53	21.600	1.440	0.00	20.60	0.000*
T3	85 - 65	L3x3x1/4	3.04	2.85	36.8 K=1.00	21.600	1.440	0.00	25.39	0.000*

* DL controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	125 - 105	L3x3x1/4	-0.01	-0.077	21.600	0.004	-0.01	-0.152	21.600	0.007
T3	85 - 65	L3x3x1/4	-0.01	-0.077	21.600	0.004	-0.01	-0.152	21.600	0.007

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	125 - 105	L3x3x1/4	0.000	0.004	0.007	0.011* ✔	1.000	H1-3 ✔
T3	85 - 65	L3x3x1/4	0.000	0.004	0.007	0.011* ✔	1.000	H1-3 ✔

* DL controls

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	125 - 105	2	20.00	3.92	94.0	30.000	3.142	6.89	94.25	0.073 ✔
T2	105 - 85	2	20.00	3.92	94.0	30.000	3.142	13.23	94.25	0.140 ✔
T3	85 - 65	2 1/4	20.00	3.92	83.6	30.000	3.976	24.47	119.28	0.205 ✔
T4	65 - 45	2	20.00	3.92	94.0	30.000	3.142	0.19	94.25	0.002 ✔

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	125 - 105	7/8	4.21	2.11	115.6	21.600	0.601	2.70	12.99	0.208 ✔
T2	105 - 85	7/8	4.21	2.11	115.6	21.600	0.601	2.25	12.99	0.173 ✔
T3	85 - 65	7/8	4.21	2.11	115.6	21.600	0.601	2.96	12.99	0.228 ✔
T4	65 - 45	7/8	4.21	2.11	115.6	21.600	0.601	0.41	12.99	0.031 ✔

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	125 - 105	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	1.86	15.44	0.121* ✔
T2	105 - 85	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	2.96	15.44	0.192 ✔
T3	85 - 65	L2x2x3/16	3.04	2.85	55.5	21.600	0.715	3.86	15.44	0.250 ✔
T4	65 - 45	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	2.65	10.46	0.254* ✔
T5	45 - 29	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	2.66	10.46	0.254* ✔

* DL controls

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	125 - 105	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	0.70	15.44	0.045 ✔
T2	105 - 85	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	2.03	15.44	0.131 ✔
T3	85 - 65	L2x2x3/16	3.04	2.85	55.5	21.600	0.715	2.15	15.44	0.139 ✔
T4	65 - 45	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	2.64	10.46	0.252 ✔
T5	45 - 29	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	1.89	10.46	0.181 ✔
T6	29 - 25	L3x3x1/8	2.88	2.71	34.3	21.600	0.734	3.29	15.86	0.208

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 $\frac{P}{P_a}$
										✔

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	125 - 105	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	0.91	15.44	0.059* ✔
T2	105 - 85	L2x2x3/16	3.04	2.88	55.9	21.600	0.715	3.36	15.44	0.217 ✔
T3	85 - 65	L2x2x3/16	3.04	2.85	55.5	21.600	0.715	1.99	15.44	0.129 ✔
T4	65 - 45	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	2.00	10.46	0.191 ✔
T5	45 - 29	L2x2x1/8	3.04	2.88	55.1	21.600	0.484	4.26	10.46	0.408* ✔

* DL controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	125 - 105	L3x3x1/4	3.04	2.88	37.1	21.600	1.440	5.02	31.10	0.161
T3	85 - 65	L3x3x1/4	3.04	2.85	36.8	21.600	1.440	5.05	31.10	0.162*

* DL controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
T1	125 - 105	L3x3x1/4	-0.01	0.077	23.760	0.003	-0.01	0.149	23.760	0.006
T3	85 - 65	L3x3x1/4	-0.01	0.077	23.760	0.003	-0.01	0.149	23.760	0.006

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	125 - 105	L3x3x1/4	0.161	0.003	0.006	0.171	1.333	H2-1 ✔
T3	85 - 65	L3x3x1/4	0.162	0.003	0.006	0.172* ✔	1.000	H2-1 ✔

* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	125 - 105	Leg	2	2	-16.48	67.27	24.5	Pass
T2	105 - 85	Leg	2	54	-46.47	67.27	69.1	Pass
T3	85 - 65	Leg	2 1/4	105	-58.63	96.95	60.5	Pass
T4	65 - 45	Leg	2	156	-48.20	67.27	71.7	Pass
T5	45 - 29	Leg	2	207	-32.01	67.74	47.3	Pass
T6	29 - 25	Leg	2	249	-24.62	63.96	38.5	Pass
T1	125 - 105	Diagonal	7/8	39	-3.11	9.72	32.0	Pass
T2	105 - 85	Diagonal	7/8	65	-5.27	9.72	54.2	Pass
T3	85 - 65	Diagonal	7/8	152	-5.97	9.72	61.4	Pass
T4	65 - 45	Diagonal	7/8	201	-4.36	9.72	44.8	Pass
T5	45 - 29	Diagonal	7/8	243	-3.17	9.74	32.6	Pass
T1	125 - 105	Horizontal	L2x2x3/16	16	1.86	15.44	12.1	Pass
T2	105 - 85	Horizontal	L2x2x3/16	68	2.96	20.59	14.4	Pass
T3	85 - 65	Horizontal	L2x2x3/16	119	3.86	20.59	18.7	Pass
T4	65 - 45	Horizontal	L2x2x1/8	170	2.65	10.46	25.4	Pass
T5	45 - 29	Horizontal	L2x2x1/8	239	2.66	10.46	25.4	Pass
T1	125 - 105	Top Girt	L2x2x3/16	4	0.70	20.59	3.4	Pass
T2	105 - 85	Top Girt	L2x2x3/16	55	2.03	20.59	9.9	Pass
T3	85 - 65	Top Girt	L2x2x3/16	106	2.15	20.59	10.4	Pass
T4	65 - 45	Top Girt	L2x2x1/8	158	2.64	13.95	18.9	Pass
T5	45 - 29	Top Girt	L2x2x1/8	209	1.89	13.95	13.5	Pass
T6	29 - 25	Top Girt	L3x3x1/8	250	3.29	21.14	15.6	Pass
T1	125 - 105	Bottom Girt	L2x2x3/16	8	0.91	15.44	5.9	Pass
T2	105 - 85	Bottom Girt	L2x2x3/16	59	3.36	20.59	16.3	Pass
T3	85 - 65	Bottom Girt	L2x2x3/16	109	1.99	20.59	9.7	Pass
T4	65 - 45	Bottom Girt	L2x2x1/8	160	2.00	13.95	14.4	Pass
T5	45 - 29	Bottom Girt	L2x2x1/8	213	4.26	10.46	40.8	Pass
T6	29 - 25	Bottom Girt	12x3/8	254	-0.29	101.12	0.3	Pass
T1	125 - 105	Guy A@116.958	7/8	258	20.19	39.85	50.7	Pass
T3	85 - 65	Guy A@76.9583	7/8	261	18.94	39.85	47.5	Pass
T1	125 - 105	Guy B@116.958	7/8	257	21.75	39.85	54.6	Pass
T3	85 - 65	Guy B@76.9583	7/8	260	21.49	39.85	53.9	Pass
T1	125 - 105	Guy C@116.958	7/8	256	21.42	39.85	53.7	Pass
T3	85 - 65	Guy C@76.9583	7/8	259	20.67	39.85	51.9	Pass
T1	125 - 105	Top Guy Pull-Off@116.958	L3x3x1/4	35	5.02	41.46	12.8	Pass
T3	85 - 65	Top Guy Pull-Off@76.9583	L3x3x1/4	137	5.05	31.10	17.2	Pass

Summary		
Leg (T4)	71.7	Pass
Diagonal (T3)	61.4	Pass
Horizontal (T5)	25.4	Pass
Top Girt	18.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						(T4)		
						Bottom Girt	40.8	Pass
						(T5)		
						Guy A (T1)	50.7	Pass
						Guy B (T1)	54.6	Pass
						Guy C (T1)	53.7	Pass
						Top Guy	17.2	Pass
						Pull-Off		
						(T3)		
						Bolt Checks	17.0	Pass
						RATING =	**71.7**	**Pass**

Program Version 7.0.5.1 - 2/1/2016 File:J:/Jobs/1600100.WI/17_West Hartford Center/Backup Documentation/Calcs/ERI Files/100_FWT_Guyed_Twr_West Hartford_CT_.eri

SITE NAME	WEST HARTFORD CENTER CT		ECP - CELL #		AWS1	8	290
LATITUDE	41-45-41.60 N		LONGITUDE		72-44-25.35 W		
700 tilt change plus RET antenna swap outs and 40W to 60W RRH upgrades. The 60W 4 port 700 RRH will be connected to the low band ports on the 700 and AWS antenna.			SAVE BUTTON				
			STRUCTURE TYPE		LATTICE		
700 Mhz - LTE Current Config	**ALPHA**		**BETA**		**GAMMA**		
EQUIPMENT TYPE	700 eNodeB		700 eNodeB		700 eNodeB		
ANTENNA TYPE	BXA-70063-6CF-2-750MHZ		SLCP 2X6015		SLCP 2X6015		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	0		4		4		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEXER - QTY / MODEL							
RRH - QTY/MODEL	1	ALU RH_2X40-700	1	ALU RH_2X40-700	1	ALU RH_2X40-700	
700 Mhz - LTE Future Config	**ALPHA**		**BETA**		**GAMMA**		
EQUIPMENT TYPE	700 eNodeB		700 eNodeB		700 eNodeB		
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B		SBNHH-1D65B		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	3 electrical		5 electrical		5 electrical		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEXER - QTY / MODEL							
RRH - QTY/MODEL	1	ALU RH_2X60-700	1	ALU RH_2X60-700	1	ALU RH_2X60-700	
850 Celluar - Current Config	**ALPHA**		**BETA**		**GAMMA**		
EQUIPMENT TYPE	Cellular Mod 4.0B		Cellular Mod 4.0B		Cellular Mod 4.0B		
ANTENNA TYPE	BXA-80063/4		SLCP 2X6014		SLCP 2X6014		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	0		4		4		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEXER - QTY / MODEL	0		0		0		
850 Celluar - Future Config	**ALPHA**		**BETA**		**GAMMA**		
EQUIPMENT TYPE	Cellular Mod 4.0B		Cellular Mod 4.0B		Cellular Mod 4.0B		
ANTENNA TYPE	BXA-80063/4		SLCP 2X6014		SLCP 2X6014		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	0		4		4		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEXER - QTY / MODEL	0		0		0		
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-171063-8BF-EDIN-2		SACP 2X5516		SACP 2X5516		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	0		2		2		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEXER - QTY / MODEL							
1900 PCS - Future Config	**ALPHA**		**BETA**		**GAMMA**		
EQUIPMENT TYPE	PCS Mod 4.0B		PCS Mod 4.0B		PCS Mod 4.0B		
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B		SBNHH-1D65B		
QTY OF ANTENNAS PER FACE	1		1		1		
ORIENTATION (DEG)	60		180		290		
DOWN TILT (MECH/DEG)	2 electrical		3 electrical		3 electrical		
RAD CTR (FT AGL)	100		100		100		
TMA - QTY / MODEL							
DIPLEX WITH CELLULAR CABLE	REMOVE DIPLEXERS		REMOVE DIPLEXERS		REMOVE DIPLEXERS		
RRH - QTY/MODEL	1	ALU RH_2X60-PCS	1	ALU RH_2X60-PCS	1	ALU RH_2X60-PCS	
SECTOR DISTRIBUTION BOX							
MAIN DISTRIBUTION BOX							

AWS - LTE Current Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz eNodeB		2100 MHz eNodeB		2100 MHz eNodeB	
ANTENNA TYPE	BXA-171063-12CF-EDIN-2		SACP 2X5516		SACP 2X5516	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	60		180		290	
DOWN TILT (MECH/DEG)	0		0		0	
RAD CTR (FT AGL)	100		100		100	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			
AWS - LTE Future Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	2100 MHz eNodeB		2100 MHz eNodeB		2100 MHz eNodeB	
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B		SBNHH-1D65B	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	60		180		290	
DOWN TILT (MECH/DEG)	2 electrical		3 electrical		3 electrical	
RAD CTR (FT AGL)	100		100		100	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X60-AWS	1	ALU RH_2X60-AWS	1	ALU RH_2X60-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

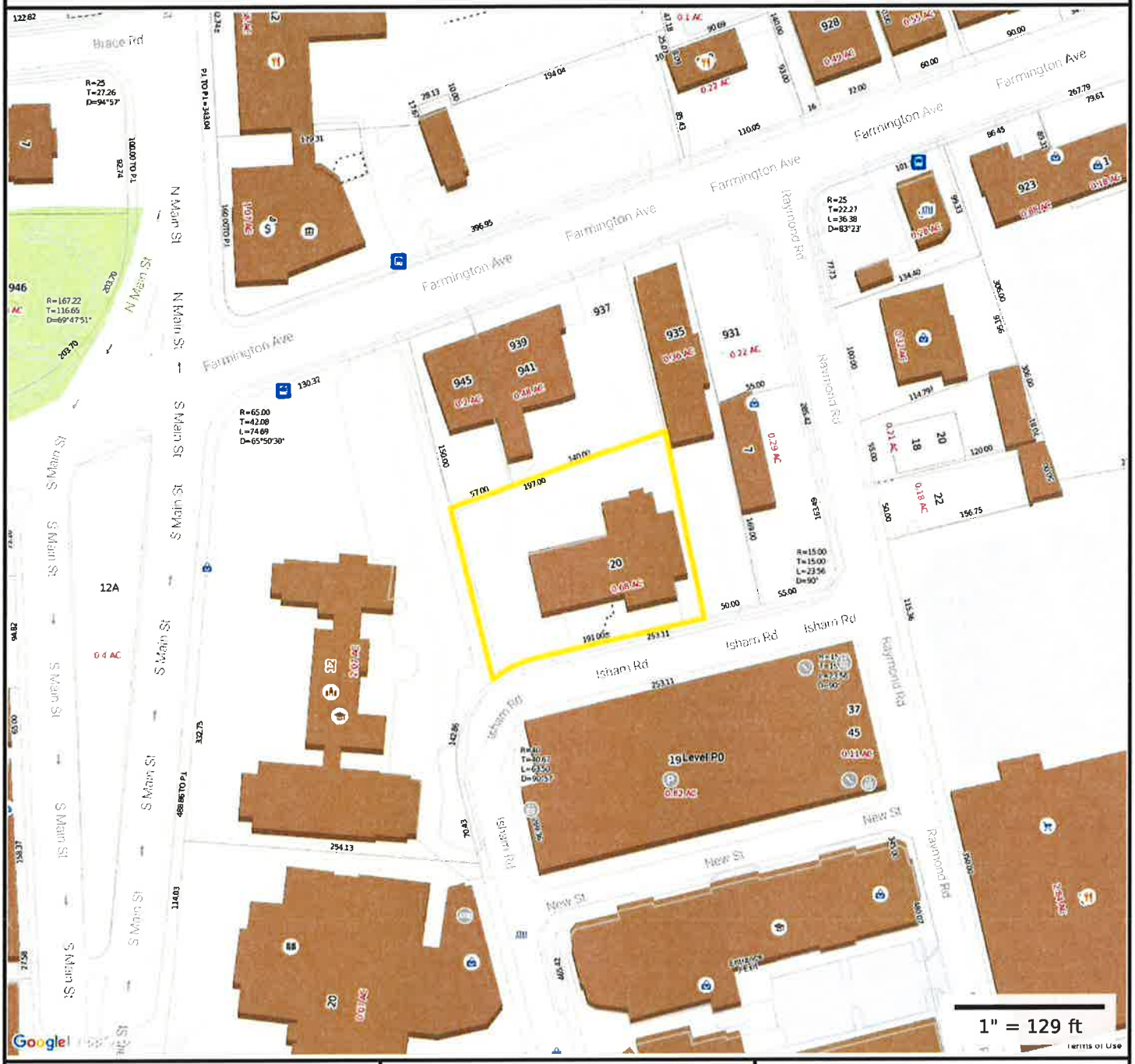
NUMBER OF CABLE'S NEEDED					Fiber Lines Model number			
TOTAL # FIBER LINES	2	TOTAL # OF MAINLINES		12	FIBER LINE MODEL #			HB158-1-08U8-S8J18
TOTAL # TOP JUMPERS	12	TOTAL # OF TOP JUMPERS		36	FIBER TOP JUMPER MODEL #			HB114-1-08U4-S4J18
Equipment Cable Ordering		**MAIN CABLE**	12	+ 0	**TOP JUMPER #**	24	+	12

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	**PCS F / AWS-Band**	**700 Mhz C - B**	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-21	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-17	RX - 776-787	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/OR ANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/WH ITE	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/BR OWN	F1-F	1700	Tx/Rx	GREEN/GREEN/BROWN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Mark Brauer	Alex Restrepo	MB	7/10/2015

ATTACHMENT 4



Property Information

Property ID	2901 2 20 0001
Location	20 ISHAM ROAD
Owner	M + R GASSNER FAMILY II LLC

TOWN OF WEST HARTFORD

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of West Hartford, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 5/22/2015
Properties updated Daily

20 ISHAM ROAD

Location	20 ISHAM ROAD	**Mblu**	F9/ 2901/ 20/ /
Parcel ID	2901 2 20 0001	**Owner**	M + R GASSNER FAMILY II LLC
Assessment	$1,602,440	**Appraisal**	$2,289,200
Vision Id #	10289	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,101,400	$1,187,800	$2,289,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$770,980	$831,460	$1,602,440

Owner of Record

Owner	M + R GASSNER FAMILY II LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	20 ISHAM ROAD WEST HARTFORD, CT 06107	**Book & Page**	2394/ 221
		Sale Date	12/31/1998
		Instrument	U

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
M + R GASSNER FAMILY II LLC	$0		2394/ 221	U	12/31/1998
M & R GASSNER FAMILY LLC	$487,000		2194/ 310	Q	05/16/1998
NEW ENGLAND ACQUISITION CORPORATION	$1,067,000		2007/ 193	Q	05/10/1995
IMPRINT INC	$508,000		759/ 57	Q	01/31/1981
LARSEN CHRISTOPHER	$0		478/ 67	U	09/24/1970

Building Information

Building 1 : Section 1

Year Built:	1951
Living Area:	11,807
Replacement Cost:	$1,375,880

Building Percent Good: 79

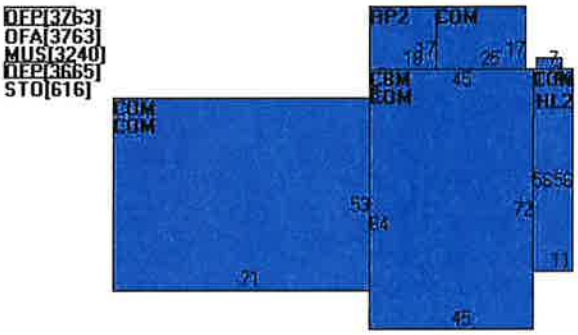
Replacement Cost Less Depreciation: $1,086,900

Building Attributes	
Field	**Description**
STYLE	Office Area
MODEL	Comm/Ind
Grade	C 1.00
Stories:	2
Occupancy	
Exterior Wall 1	Concrete Block
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Built Up
Interior Wall 1	Typical
Interior Wall 2	
Floor Type	Metal Deck
Floor Cover	Carpet
Heating Fuel	Typical
Heating Type	Hot Water
AC Type	Central - Zone
As Built Use	OFF
Bldg Use	Commercial
# of Bedrooms	
Total Baths	
Type	00
Wet Sprinkler	
Dry Sprinkler	
1st Floor Use:	
Class	Class C
Frame Type	Masonry
Plumbing	LIGHT
Ceiling	Acoustic Panel
Group	COM
Wall Height	20
Adjustment	

Building Photo

(http://images.vgsi.com/photos/WestHartfordCTPhotos//\00\00

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
OFP	LOW RISE PROF BLDG	7,428	7,428
OFA	OFFICE MIXED USE	3,763	3,763
STO	STORAGE AREA MIXED	616	616
CBM	BSMT COMM - NV	3,240	0
COM	COMMERCIAL - NV	11,807	0
HL2	LOAD LEVEL DOCK	21	0
MUS	MULTI USE STORAGE	3,240	0
RP2	COVERED PORCH	306	0
		30,421	11,807

Extra Features

Extra Features	Legend

No Data for Extra Features

Land

Land Use

Use Code	201
Description	Commercial
Zone	BC
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.68
Frontage	
Depth	
Assessed Value	$831,460
Appraised Value	$1,187,800

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CLP4	Paving, Asphalt			16000 SF	$10,900	1
CHL2	Loading Dock Leveler			1 UNITS	$1,800	1
CRP2	Covered Porch commercial			306 SF	$1,800	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$1,101,400	$1,187,800	$2,289,200
2013	$1,101,400	$1,187,800	$2,289,200
2012	$1,101,400	$1,187,800	$2,289,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$770,980	$831,460	$1,602,440
2013	$770,980	$831,460	$1,602,440
2012	$770,980	$831,460	$1,602,440