Robinson+Cole

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August 26, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
630 James Farm Road, Stratford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 98-foot level of the existing 110-foot tower at 630 James Farm Road in Stratford, Connecticut (the "Property"). The tower and Property are owned by Dana and Darcy Shoop. The Council approved Cellco's shared use of the tower in 2009. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model SBNHH-1D85B, 700/1900 MHz antennas and three (3) model SBNHH-1D85B, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") and install six (6) 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 John Harkins, Mayor for the Town of Stratford. A copy of this letter is also being sent to Dana and Darcy Shoop, the owners of the Property and tower.

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 located at the 98-foot level on the 110-foot 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/or local criteria.

4. The operation of the modified facility 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 behind 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 Stratford 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:
John Harkins, Stratford Mayor
Dana And Darcy Shoop
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D85B

Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 85° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	14.4	17.0	17.6	17.9	17.9
Beamwidth, Horizontal, degrees	83	86	81	79	79	79
Beamwidth, Vertical, degrees	12.3	11.1	5.7	5.3	5.0	4.6
Beam Tilt, degrees	0–12	0–12	0–8	0–8	0–8	0–8
USLS (First Lobe), dB	19	18	15	16	17	18
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	25	25	25	25
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	14.3	14.2	16.8	17.4	17.7	17.8
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.5	±0.3	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.2	0 ° | 14.1	0 ° | 16.8	0 ° | 17.5	0 ° | 17.7	0 ° | 17.6
	6 ° | 14.3	6 ° | 14.3	4 ° | 16.8	4 ° | 17.5	4 ° | 17.8	4 ° | 18.0
	12 ° | 14.1	12 ° | 13.9	8 ° | 16.7	8 ° | 17.2	8 ° | 17.5	8 ° | 17.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±4.8	±3.2	±3.8	±1.9
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.9	±0.2	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	15	16	17	18
Front-to-Back Total Power at 180° ± 30°, dB	23	23	27	26	25	27
CPR at Boresight, dB	20	20	23	22	18	22
CPR at Sector, dB	15	16	12	13	10	6

* 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-1D85B

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	19.1 kg | 42.1 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (2) | 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	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.2 kg | 68.8 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-1D85B

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

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.

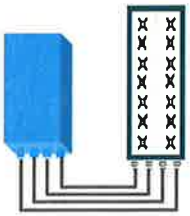
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (elther 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).

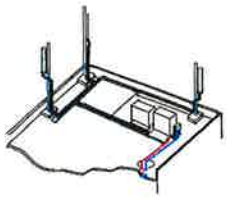
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

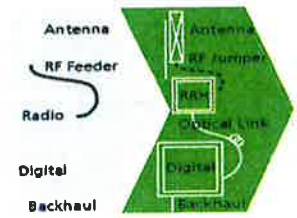
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation 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.

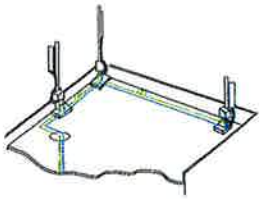
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



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

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 = 6.8n (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 CELLFLEX² 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-93-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

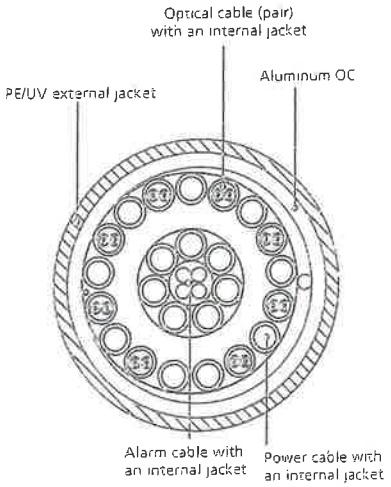


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Stratford N								
Tower Height: 110'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Clearwire	2	153	110	0.0102	2496	1.0000	0.10%	
*Clearwire	1	211	110	0.0070	11 GHz	1.0000	0.07%	
*Nextel	11	197	110	0.0721	851	0.5673	1.27%	
*Sprint	3	140	110	0.0140	2657	1.0000	0.14%	
*Sprint	2	289	109	0.0196	licrowave 225	1.0000	0.20%	
*Sprint	2	347	109	0.0235	licrowave 195	1.0000	0.24%	
Verizon	**1**	**1880**	**98**	**0.0704**	**1970**	**1.0000**	**7.04%**	
Verizon	**9**	**276**	**98**	**0.0930**	**869**	**0.5793**	**16.05%**	
Verizon	**1**	**1867**	**98**	**0.0699**	**2145**	**1.0000**	**6.99%**	
Verizon	**1**	**723**	**98**	**0.0271**	**746**	**0.4973**	**5.44%**	
								37.5%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

110-ft Existing ROHN Lattice Tower

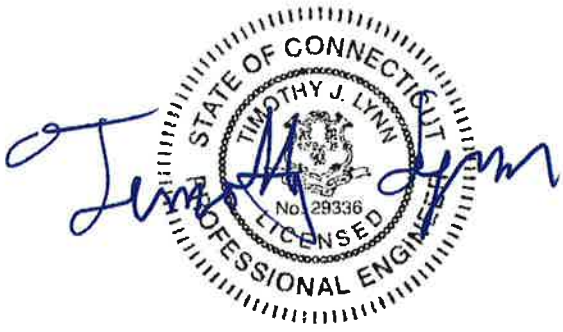
Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Stratford North

630 James Farm Road
Stratford, CT

Centek Project No. 15001.096

~~Date: October 27, 2015~~
~~Rev 1: October 28, 2015~~
Rev 2: August 24, 2016



Prepared for:

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

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Introduction

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

The host tower is a 110-ft, three legged, tapered lattice tower originally designed and manufactured by ROHN eng. file no. 15348PM dated March 9, 1982. The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry, structure member sizes and prior tower reinforcements were all obtained from a structural analysis report prepared by Centek Engineering, job no. 13001.027 dated July 10, 2013.

Antenna and appurtenance information were obtained from a combination of the aforementioned Centek structural report and a RF data sheet provided by Verizon Wireless.

The tower is made of six (6) tapered vertical sections consisting of ASTM A572-50 structural steel pipe legs. Diagonal lateral support bracing consists of ASTM A36 structural steel angle shapes. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted gusset connections. The width of the tower face is 1.55-ft at the top and 12.64-ft at the base.

Verizon proposes the removal of six (6) panel antennas and three (3) remote radio heads and the installation of six (6) panel antennas, nine (9) remote radio heads and one (1) main distribution box on the existing T-Frames. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- CLEARWIRE (Existing):
  Antennas: Three (3) Argus LLX310R panel antennas, one (1) Dragonwave A-Ant-23G-2 microwave dish, one (1) Dragonwave A-Ant-18G-2 microwave dish and three (3) RRUs mounted on three (3) existing 12' boom gates with a RAD center elevation of ±108-ft above the existing tower base.
  Coax Cables: Two (2) 2" ∅ inner ducts running on a leg/face of the existing tower as specified in Section 3 of this report.
- VERIZON (Existing to Remain):
  Antennas: Six (6) RFS APL868013 and three (3) RYMSA MG D3-800T0 panel antennas and one (1) GPS antenna mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Appurtenances: One (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables, two (2) 1/2" ∅ coax cables and one (1) 1-5/8" ∅ fiber cable running on a leg/face of the existing tower as specified in Section 3 of this report.

- VERIZON (Existing to Remove):
  Antennas: Two (2) Andrew LNX-6514DS-T4M, one (1) Powerwave P65-16-XL-2 and three (3) Antel BXA-171063-8BF panel antennas mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Appurtenances: Three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Coax Cables: Three (3) 1-5/8" ∅ coax cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON (PROPOSED):**
  Antennas: Six (6) Andrew SBNHH-1D85B panel antennas mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Appurtenances: Three (3) Alcatel-Lucent B13 RRH4x30-LTE remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z distribution box mounted on three (3) 15-ft T-Frames with a RAD center elevation of ±98-ft above the existing tower base.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.

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 existing 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:	Fairfield; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Stratford; v = 110 mph (3 second gust) equivalent to v = 90 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix-K wind speed controls.	
Load Cases:	Load Case 1; 90 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; 78 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 78 mph wind speed velocity represents 75% of the wind pressure generated by the 90 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 **89.5%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T4)	40.00'-60.00'	83.3%	**PASS**
Diagonal (T2)	80.00'-100.00'	89.5%	**PASS**
Top Girt (T6)	0.00'-20.00'	45.2%	**PASS**

Foundation

The existing foundation consists of three (3) reinforced concrete piers together with a reinforced concrete mat. Tower legs are connected to the three (3) piers by means of one stub angle per leg embedded into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	**20 kips**
	Compression	**13 kips**
	Moment	**1376 kip-ft**
Leg	Shear	**13 kips**
	Uplift	**119 kips**
	Compression	**130 kips**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Piers w/ Mat	OTM[2]	2.0	2.99	**PASS**

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

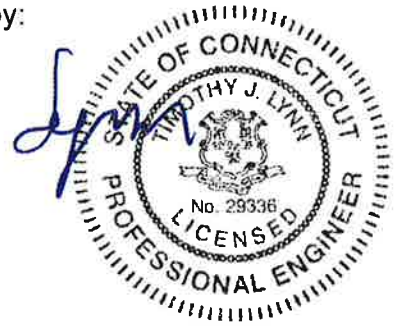
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

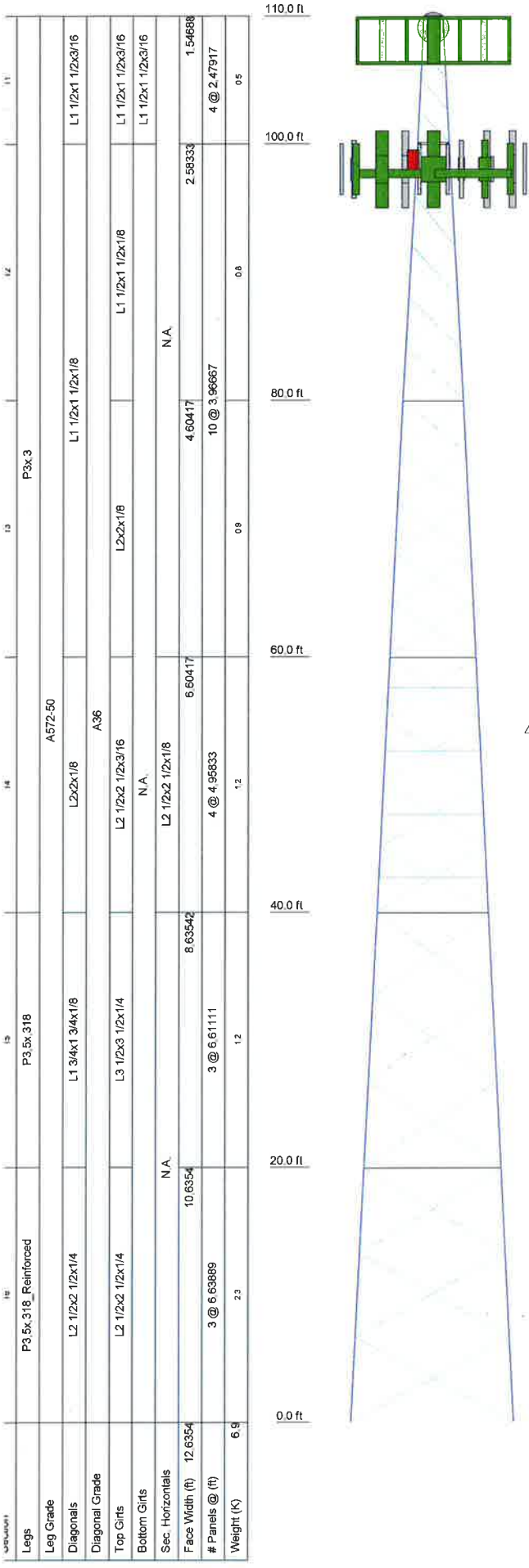
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

TnxTower Features:

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



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ANT-18G-2-C (Clearwire Existing)	109	RRH4x45/2x90-AWS (Verizon Proposed)	98
A-ANT-23G-2 (Clearwire Existing)	109	RRH4x45/2x90-AWS (Verizon Proposed)	98
LLPX310R (Clearwire Existing)	108	RRH4x45/2x90-AWS (Verizon Proposed)	98
RRU (Clearwire Existing)	108	RRH2x60-PCS (Verizon Proposed)	98
RRU (Clearwire Existing)	108	RRH2x60-PCS (Verizon Proposed)	98
RRU (Clearwire Existing)	108	RRH2x60-PCS (Verizon Proposed)	98
Filler Box (Clearwire Existing)	108	RRH4x30-B13 (Verizon Proposed)	98
Rohn 6'x12' Boom Gate (3) (Sprint Existing)	108	RRH4x30-B13 (Verizon Proposed)	98
LLPX310R (Clearwire Existing)	108	RRH4x30-B13 (Verizon Proposed)	98
LLPX310R (Clearwire Existing)	108	DB-T1-6Z-8AB-0Z (Verizon Existing)	98
SBNHH-1D85B (Verizon Proposed)	98	DB-T1-6Z-8AB-0Z (Verizon Proposed)	98
SBNHH-1D85B (Verizon Proposed)	98	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	98
APL868013 (Verizon Existing)	98	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	98
APL868013 (Verizon Existing)	98	Pirod 15' T-Frame Sector Mount (1) (Verizon Existing)	98
MG D3-800T0 (Verizon Existing)	98	GPS (Verizon Existing)	98
SBNHH-1D85B (Verizon Proposed)	98	APL868013 (Verizon Existing)	98
SBNHH-1D85B (Verizon Proposed)	98	MG D3-800T0 (Verizon Existing)	98
APL868013 (Verizon Existing)	98		
APL868013 (Verizon Existing)	98		
MG D3-800T0 (Verizon Existing)	98		
SBNHH-1D85B (Verizon Proposed)	98		
SBNHH-1D85B (Verizon Proposed)	98		
APL868013 (Verizon Existing)	98		

MATERIAL STRENGTH

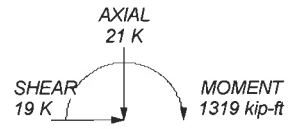
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

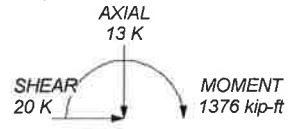
1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 89.5%

MAX. CORNER REACTIONS AT BASE:
DOWN: 130 K
SHEAR: 13 K

UPLIFT: -119 K
SHEAR: 12 K



TORQUE 6 kip-ft
78 mph WIND - 0.5000 in ICE

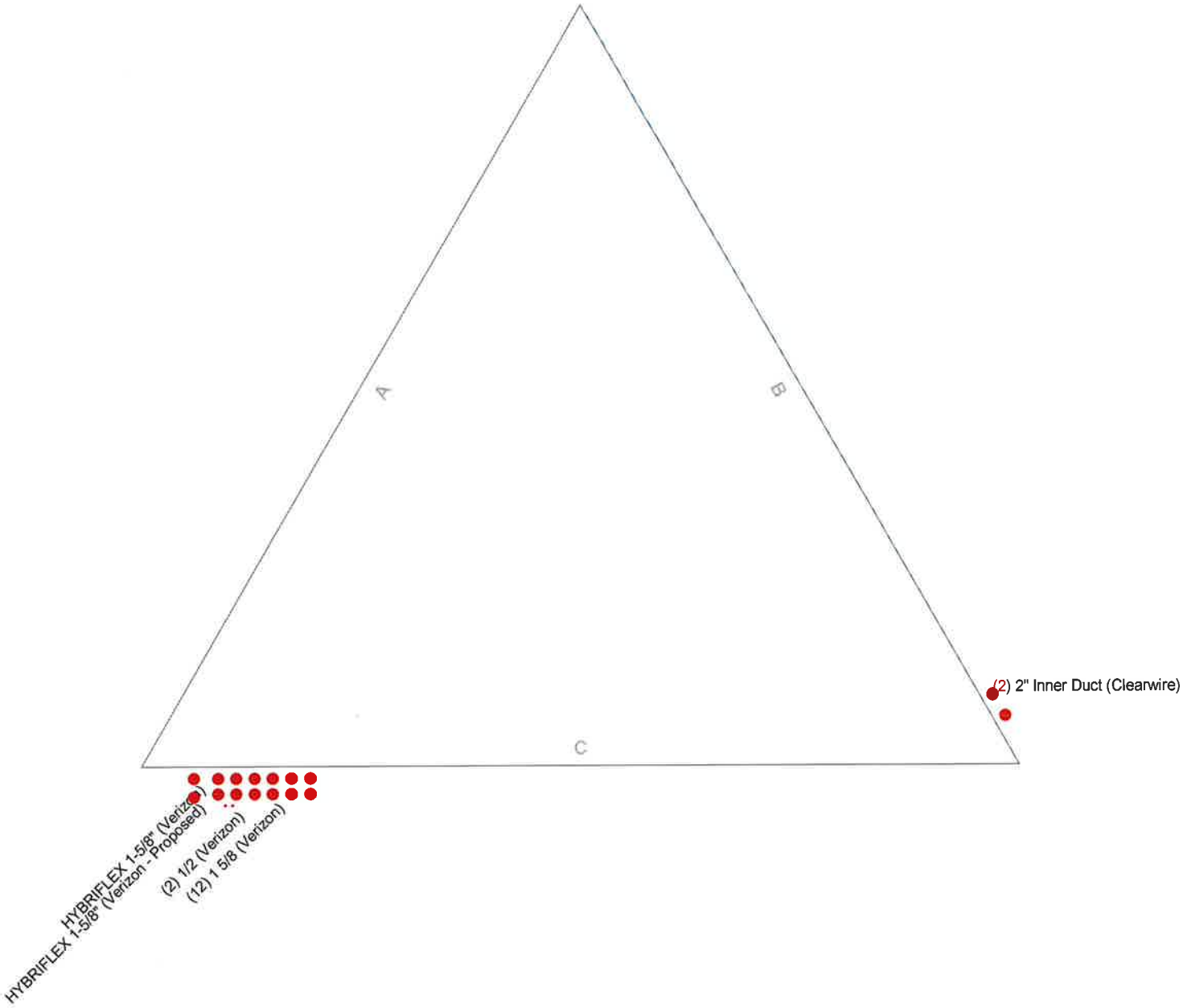


TORQUE 9 kip-ft
REACTIONS - 90 mph WIND

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

Job: 15001.096 - Stratford North			
Project: 110-ft Lattice Tower - 630 James Farm Rd. Stratford,			
Client: Verizon Wireless	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 08/24/16	Scale: N	
Path:		Dwg No.	

Round Flat App In Face App Out Face

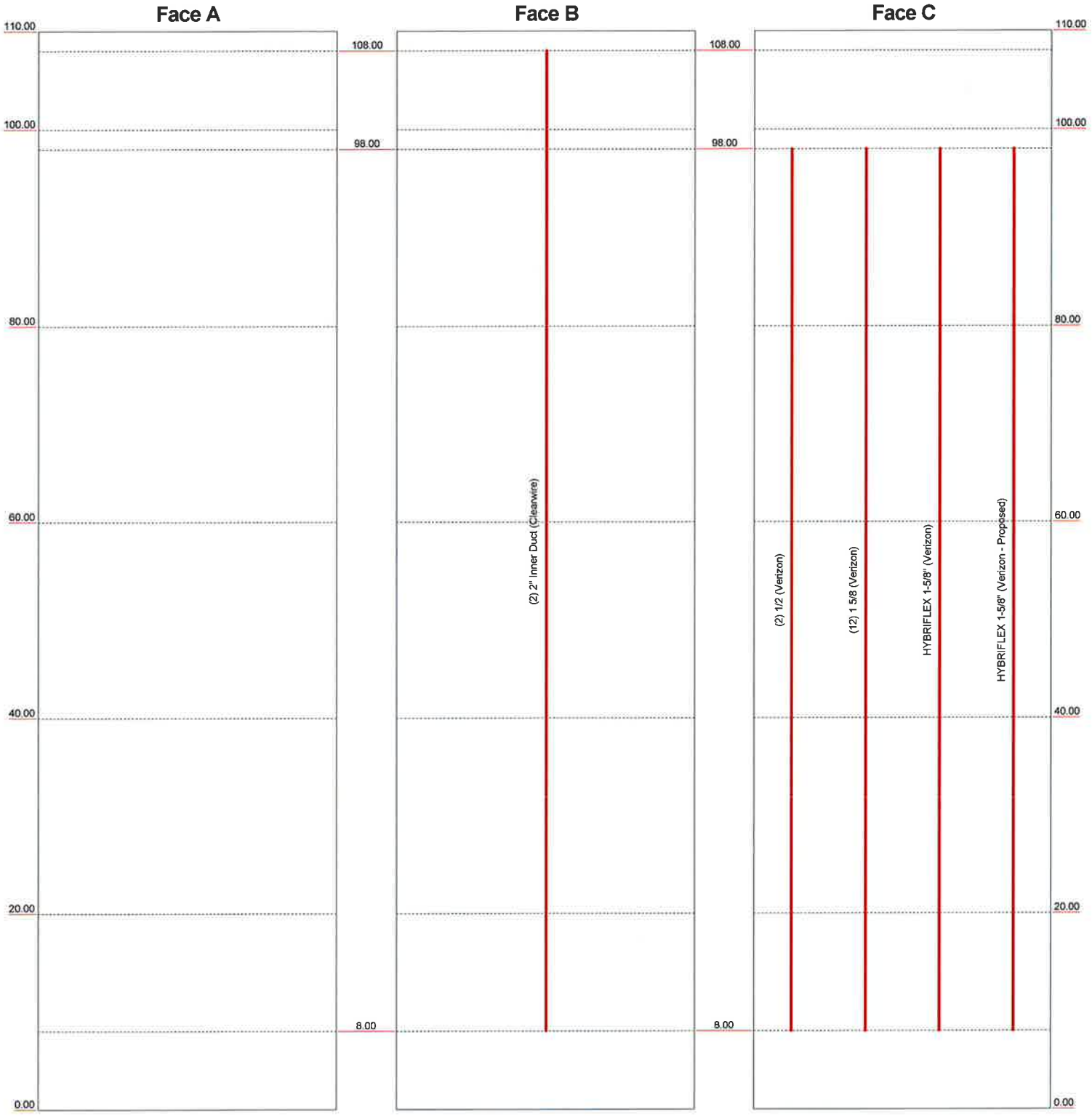


Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	15001.096 - Stratford North		
Project:	110-ft Lattice Tower - 630 James Farm Rd. Stratford,		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 08/24/16	Scale: N
Path:			Dwg No.

0' - 110'

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



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FAX: (203) 488-8587

Job:	***15001.096 - Stratford North***		
Project:	***110-ft Lattice Tower - 630 James Farm Rd. Stratford,***		
Client: Verizon Wireless		Drawn by: TJL	App'd:
Code: TIA/EIA-222-F		Date: 08/24/16	Scale: N
Path:			Dwg. No.

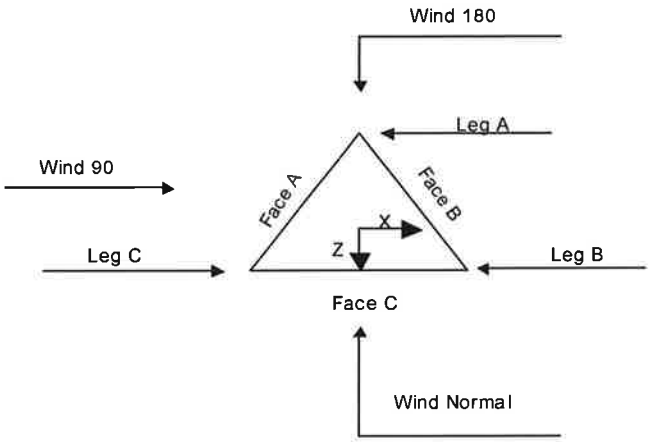
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 110.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 1.55 ft at the top and 12.64 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 78 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, 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				



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	110.00-100.00			1.55	1	10.00
T2	100.00-80.00			2.58	1	20.00
T3	80.00-60.00			4.60	1	20.00
T4	60.00-40.00			6.60	1	20.00
T5	40.00-20.00			8.64	1	20.00
T6	20.00-0.00			10.64	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	110.00-100.00	2.48	X Brace	No	Yes	0.0000	1.0000
T2	100.00-80.00	3.97	X Brace	No	Yes	1.0000	1.0000
T3	80.00-60.00	3.97	X Brace	No	Yes	1.0000	1.0000
T4	60.00-40.00	4.96	X Brace	No	Yes	1.0000	1.0000
T5	40.00-20.00	6.61	X Brace	No	Yes	1.0000	1.0000
T6	20.00-0.00	6.64	X Brace	No	Yes	1.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 110.00-100.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 100.00-80.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T3 80.00-60.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T4 60.00-40.00	Pipe	P3x.3	A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 40.00-20.00	Pipe	P3.5x.318	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x1/8	A36 (36 ksi)
T6 20.00-0.00	Pipe	P3.5x.318_Reinforced	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	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 110.00-100.00	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L1 1/2x1 1/2x3/16	A36 (36 ksi)
T2 100.00-80.00	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 80.00-60.00	Single Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 60.00-40.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T5 40.00-20.00	Single Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T6 20.00-0.00	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 60.00-40.00	Single Angle	L2 1/2x2 1/2x1/8	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 110.00-100.00	0.11	0.1875	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 100.00-80.00	0.11	0.1875	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 80.00-60.00	0.11	0.1875	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 60.00-40.00	0.11	0.1875	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 40.00-20.00	0.11	0.1875	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 20.00-0.00	0.11	0.1875	A36 (36 ksi)	1	1	1	0.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
110.00-100.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T5	No	No	0.5	0.3	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T6 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 110.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

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
T5 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 110.00-100.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0
T2 100.00-80.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0
T3 80.00-60.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0
T4 60.00-40.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0
T5 40.00-20.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	1	0.6250 A325N	0
T6 20.00-0.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	1	0.7500 A325X	2

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
1/2 (Verizon)	C	Yes	Ar (CfAe)	98.00 - 8.00	6.0000	0.4	2	2	0.5800	0.5800		0.25
1 5/8 (Verizon)	C	Yes	Ar (CfAe)	98.00 - 8.00	1.0000	0.36	12	6	1.0000 0.5000	1.9800		1.04
2" Inner Duct (Clearwire)	B	Yes	Ar (CfAe)	108.00 - 8.00	1.0000	0.43	2	2	2.0000 1.5000	2.0000		1.00
HYBRIFLEX 1-5/8" (Verizon)	C	Yes	Ar (CfAe)	98.00 - 8.00	1.0000	0.44	1	1	1.9800	1.9800		1.90
HYBRIFLEX 1-5/8" (Verizon - Proposed)	C	Yes	Ar (CfAe)	98.00 - 8.00	4.0000	0.44	1	1	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	110.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	2.667	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
T2	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.667	0.000	0.000	0.000	0.04
		C	33.307	0.000	0.000	0.000	0.30
T3	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.667	0.000	0.000	0.000	0.04
		C	37.008	0.000	0.000	0.000	0.34
T4	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.667	0.000	0.000	0.000	0.04
		C	37.008	0.000	0.000	0.000	0.34
T5	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.667	0.000	0.000	0.000	0.04
		C	37.008	0.000	0.000	0.000	0.34
T6	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	4.000	0.000	0.000	0.000	0.02
		C	22.205	0.000	0.000	0.000	0.20

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	110.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.00
T2	100.00-80.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.000	0.000	0.000	0.000	0.10
		C		15.780	24.397	0.000	0.000	0.79
T3	80.00-60.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.000	0.000	0.000	0.000	0.10
		C		17.533	27.108	0.000	0.000	0.88
T4	60.00-40.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.000	0.000	0.000	0.000	0.10
		C		17.533	27.108	0.000	0.000	0.88
T5	40.00-20.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		10.000	0.000	0.000	0.000	0.10
		C		17.533	27.108	0.000	0.000	0.88
T6	20.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		6.000	0.000	0.000	0.000	0.06
		C		10.520	16.265	0.000	0.000	0.53

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	110.00-100.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.490	0.490	0.734
		C	0.000	0.000	0.000	0.000
T2	100.00-80.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.673	0.673	1.009
		C	0.000	2.683	2.574	4.024

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T3	80.00-60.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.554	0.568	0.852
		C	0.000	2.456	2.415	3.776
T4	60.00-40.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.607	0.879	1.318
		C	0.000	2.689	3.734	5.838
T5	40.00-20.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.345	0.451	0.677
		C	0.000	1.529	1.918	3.000
T6	20.00-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.198	0.330	0.495
		C	0.000	0.876	1.401	2.191

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	110.00-100.00	1.0118	0.3610	0.9141	0.3261
T2	100.00-80.00	-4.1692	6.0268	-2.2723	4.2215
T3	80.00-60.00	-6.5536	8.5411	-3.7437	6.0507
T4	60.00-40.00	-6.7323	8.4022	-3.7099	5.8221
T5	40.00-20.00	-9.9498	12.2113	-6.0648	9.1500
T6	20.00-0.00	-6.0773	7.3552	-3.7911	5.6595

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R	A	From Face	4.00	0.0000	108.00	No Ice		4.83	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice		5.18	2.21	0.05
			0.00							
LLPX310R	B	From Face	4.00	0.0000	108.00	No Ice		4.83	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice		5.18	2.21	0.05
			0.00							
LLPX310R	C	From Face	4.00	0.0000	108.00	No Ice		4.83	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice		5.18	2.21	0.05
			0.00							
RRU	A	None		0.0000	108.00	No Ice		0.00	0.78	0.03
(Clearwire Existing)						1/2" Ice		0.00	0.92	0.04
RRU	B	None		0.0000	108.00	No Ice		0.00	0.78	0.03
(Clearwire Existing)						1/2" Ice		0.00	0.92	0.04
RRU	C	None		0.0000	108.00	No Ice		0.00	0.78	0.03
(Clearwire Existing)						1/2" Ice		0.00	0.92	0.04
Filter Box	A	From Leg	2.00	0.0000	108.00	No Ice		1.05	0.70	0.02
(Clearwire Existing)			0.00			1/2" Ice		1.21	0.85	0.02
			0.00							

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Rohn 6'x12' Boom Gate (3)	C	None		0.0000	108.00	No Ice	49.80	49.80	1.68
(Sprint Existing)						1/2" Ice	59.30	59.30	2.10
APL868013	A	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
MG D3-800T0	A	From Face	4.00	0.0000	98.00	No Ice	3.46	2.24	0.03
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.57	0.05
			0.00						
SBNHH-1D85B	A	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.99	5.88	0.09
			0.00						
SBNHH-1D85B	A	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			4.00			1/2" Ice	8.99	5.88	0.09
			0.00						
APL868013	A	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
APL868013	B	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
MG D3-800T0	B	From Face	4.00	0.0000	98.00	No Ice	3.46	2.24	0.03
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.57	0.05
			0.00						
SBNHH-1D85B	B	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.99	5.88	0.09
			0.00						
SBNHH-1D85B	B	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			4.00			1/2" Ice	8.99	5.88	0.09
			0.00						
APL868013	B	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
APL868013	C	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
MG D3-800T0	C	From Face	4.00	0.0000	98.00	No Ice	3.46	2.24	0.03
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.57	0.05
			0.00						
SBNHH-1D85B	C	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			0.00			1/2" Ice	8.99	5.88	0.09
			0.00						
SBNHH-1D85B	C	From Face	4.00	0.0000	98.00	No Ice	8.43	5.42	0.04
(Verizon Proposed)			4.00			1/2" Ice	8.99	5.88	0.09
			0.00						
APL868013	C	From Face	4.00	0.0000	98.00	No Ice	2.87	3.73	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.10	0.03
			0.00						
RRH4x45/2x90-AWS	A	From Face	4.00	0.0000	98.00	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 Face	4.00	0.0000	98.00	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 Face	4.00	0.0000	98.00	No Ice	3.01	1.91	0.08
(Verizon Proposed)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH2x60-PCS	A	From Face	4.00	0.0000	98.00	No Ice	2.51	1.55	0.06

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
(Verizon Proposed)			-4.00 0.00			1/2" Ice	2.73	1.74	0.07
RRH2x60-PCS	B	From Face	4.00	0.0000	98.00	No Ice	2.51	1.55	0.06
(Verizon Proposed)			-4.00 0.00			1/2" Ice	2.73	1.74	0.07
RRH2x60-PCS	C	From Face	4.00	0.0000	98.00	No Ice	2.51	1.55	0.06
(Verizon Proposed)			-4.00 0.00			1/2" Ice	2.73	1.74	0.07
RRH4x30-B13	A	From Face	4.00	0.0000	98.00	No Ice	2.52	1.89	0.06
(Verizon Proposed)			0.00 0.00			1/2" Ice	2.74	2.09	0.08
RRH4x30-B13	B	From Face	4.00	0.0000	98.00	No Ice	2.52	1.89	0.06
(Verizon Proposed)			0.00 0.00			1/2" Ice	2.74	2.09	0.08
RRH4x30-B13	C	From Face	4.00	0.0000	98.00	No Ice	2.52	1.89	0.06
(Verizon Proposed)			0.00 0.00			1/2" Ice	2.74	2.09	0.08
DB-T1-6Z-8AB-0Z	C	From Face	4.00	0.0000	98.00	No Ice	5.60	2.33	0.04
(Verizon Existing)			0.00 0.00			1/2" Ice	5.92	2.56	0.08
DB-T1-6Z-8AB-0Z	B	From Face	4.00	0.0000	98.00	No Ice	5.60	2.33	0.04
(Verizon Proposed)			0.00 0.00			1/2" Ice	5.92	2.56	0.08
Pirod 15' T-Frame Sector	A	From Leg	2.00	0.0000	98.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
Pirod 15' T-Frame Sector	B	From Leg	2.00	0.0000	98.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
Pirod 15' T-Frame Sector	C	From Leg	2.00	0.0000	98.00	No Ice	15.00	15.00	0.50
Mount (1)			0.00			1/2" Ice	20.60	20.60	0.65
(Verizon Existing)			0.00						
GPS	A	From Face	1.00	0.0000	98.00	No Ice	1.00	1.00	0.01
(Verizon Existing)			0.00 0.00			1/2" Ice	1.50	1.50	0.01

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
ANT-18G-2-C	A	Paraboloid	From	4.00	Worst		109.00	2.50	No Ice	4.91	0.04
(Clearwire Existing)		w/Radome	Leg	0.00 0.00					1/2" Ice	5.24	0.07
A-ANT-23G-2	A	Paraboloid	From	4.00	Worst		109.00	2.50	No Ice	4.91	0.04
(Clearwire Existing)		w/Radome	Leg	0.00 0.00					1/2" Ice	5.24	0.07

Tower Pressures - No Ice

$G_H = 1.155$

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	105.00	1.392	29	23.572	A	3.317	5.844	5.844	63.79	0.000	0.000
110.00-100.00					B	2.827	8.510		51.54	0.000	0.000
					C	3.317	5.844		63.79	0.000	0.000
T2	90.00	1.332	28	77.716	A	6.553	11.687	11.687	64.07	0.000	0.000
100.00-80.00					B	5.880	18.353		48.22	0.000	0.000
					C	3.979	44.994		23.86	0.000	0.000
T3 80.00-60.00	70.00	1.24	26	117.924	A	8.970	11.686	11.686	56.58	0.000	0.000
					B	8.401	18.353		43.68	0.000	0.000
					C	6.554	48.694		21.15	0.000	0.000
T4 60.00-40.00	50.00	1.126	23	158.237	A	19.187	11.687	11.687	37.85	0.000	0.000
					B	18.308	18.353		31.88	0.000	0.000
					C	15.452	48.695		18.22	0.000	0.000
T5 40.00-20.00	30.00	1	21	199.383	A	12.404	13.356	13.356	51.85	0.000	0.000
					B	11.953	20.022		41.77	0.000	0.000
					C	10.486	50.364		21.95	0.000	0.000
T6 20.00-0.00	10.00	1	21	241.886	A	18.322	18.364	18.364	50.06	0.000	0.000
					B	17.992	22.364		45.50	0.000	0.000
					C	16.921	40.569		31.94	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.155$

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	105.00	1.392	22	0.5000	24.406	A	3.317	9.709	7.513	57.68	0.000	0.000
110.00-100.00						B	2.583	13.219		47.55	0.000	0.000
						C	3.317	9.709		57.68	0.000	0.000
T2 100.00-80.00	90.00	1.332	21	0.5000	79.385	A	6.553	19.378	15.026	57.94	0.000	0.000
						B	5.544	28.705		43.87	0.000	0.000
						C	26.926	32.475		25.29	0.000	0.000
T3 80.00-60.00	70.00	1.24	19	0.5000	119.593	A	8.970	20.869	15.025	50.35	0.000	0.000
						B	8.117	30.314		39.10	0.000	0.000
						C	32.302	35.946		22.02	0.000	0.000
T4 60.00-40.00	50.00	1.126	18	0.5000	159.906	A	19.187	23.879	15.026	34.89	0.000	0.000
						B	17.869	33.272		29.38	0.000	0.000
						C	40.456	38.724		18.98	0.000	0.000
T5 40.00-20.00	30.00	1	16	0.5000	201.052	A	12.404	23.084	16.694	47.04	0.000	0.000
						B	11.727	32.739		37.54	0.000	0.000
						C	36.513	39.088		22.08	0.000	0.000
T6 20.00-0.00	10.00	1	16	0.5000	243.555	A	18.322	29.043	21.703	45.82	0.000	0.000
						B	17.827	34.846		41.20	0.000	0.000
						C	32.396	38.687		30.53	0.000	0.000

Tower Pressure - Service

$G_H = 1.155$

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	105.00	1.392	9	23.572	A	3.317	5.844	5.844	63.79	0.000	0.000
110.00-100.00					B	2.827	8.510		51.54	0.000	0.000
					C	3.317	5.844		63.79	0.000	0.000
T2	90.00	1.332	9	77.716	A	6.553	11.687	11.687	64.07	0.000	0.000
100.00-80.00					B	5.880	18.353		48.22	0.000	0.000
					C	3.979	44.994		23.86	0.000	0.000
T3 80.00-60.00	70.00	1.24	8	117.924	A	8.970	11.686	11.686	56.58	0.000	0.000
					B	8.401	18.353		43.68	0.000	0.000
					C	6.554	48.694		21.15	0.000	0.000
T4 60.00-40.00	50.00	1.126	7	158.237	A	19.187	11.687	11.687	37.85	0.000	0.000
					B	18.308	18.353		31.88	0.000	0.000
					C	15.452	48.695		18.22	0.000	0.000
T5 40.00-20.00	30.00	1	6	199.383	A	12.404	13.356	13.356	51.85	0.000	0.000
					B	11.953	20.022		41.77	0.000	0.000
					C	10.486	50.364		21.95	0.000	0.000
T6 20.00-0.00	10.00	1	6	241.886	A	18.322	18.364	18.364	50.06	0.000	0.000
					B	17.992	22.364		45.50	0.000	0.000
					C	16.921	40.569		31.94	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	0.02	0.47	A	0.389	2.087	0.647	1	1	7.098	0.56	55.75	B
110.00-100.00			B	0.481	1.926	0.688	1	1	8.682			
			C	0.389	2.087	0.647	1	1	7.098			
T2	0.34	0.82	A	0.235	2.484	0.598	1	1	13.543	2.21	110.52	C
100.00-80.00			B	0.312	2.265	0.62	1	1	17.252			
			C	0.63	1.788	0.773	1	1	38.738			
T3	0.38	0.89	A	0.175	2.681	0.586	1	1	15.814	2.30	114.78	C
80.00-60.00			B	0.227	2.509	0.596	1	1	19.344			
			C	0.469	1.944	0.682	1	1	39.761			
T4	0.38	1.23	A	0.195	2.612	0.589	1	1	26.075	2.62	130.96	C
60.00-40.00			B	0.232	2.494	0.597	1	1	29.272			
			C	0.405	2.053	0.654	1	1	47.290			
T5	0.38	1.20	A	0.129	2.85	0.579	1	1	20.131	2.27	113.67	C
40.00-20.00			B	0.16	2.734	0.583	1	1	23.628			
			C	0.305	2.282	0.618	1	1	41.586			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	1	1	29.005	2.44	122.17	C
			B	0.167	2.71	0.584	1	1	31.057			
			C	0.238	2.475	0.599	1	1	41.214			
Sum Weight:	1.72	6.92						OTM	641.78 kip-ft	12.40		

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	0.02	0.47	A	0.389	2.087	0.647	0.825	1	6.518	0.53	52.58	B
110.00-100.00			B	0.481	1.926	0.688	0.825	1	8.188			
			C	0.389	2.087	0.647	0.825	1	6.518			
T2	0.34	0.82	A	0.235	2.484	0.598	0.825	1	12.396	2.17	108.53	C
100.00-80.00			B	0.312	2.265	0.62	0.825	1	16.223			
			C	0.63	1.788	0.773	0.825	1	38.041			
T3	0.38	0.89	A	0.175	2.681	0.586	0.825	1	14.244	2.23	111.47	C
80.00-60.00			B	0.227	2.509	0.596	0.825	1	17.874			
			C	0.469	1.944	0.682	0.825	1	38.614			
T4	0.38	1.23	A	0.195	2.612	0.589	0.825	1	22.717	2.47	123.48	C
60.00-40.00			B	0.232	2.494	0.597	0.825	1	26.068			
			C	0.405	2.053	0.654	0.825	1	44.586			
T5	0.38	1.20	A	0.129	2.85	0.579	0.825	1	17.960	2.17	108.66	C
40.00-20.00			B	0.16	2.734	0.583	0.825	1	21.536			
			C	0.305	2.282	0.618	0.825	1	39.751			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.825	1	25.798	2.27	113.39	C
			B	0.167	2.71	0.584	0.825	1	27.908			
			C	0.238	2.475	0.599	0.825	1	38.253			
Sum Weight:	1.72	6.92						OTM	617.98 kip-ft	11.84		

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	0.02	0.47	A	0.389	2.087	0.647	0.8	1	6.435	0.52	52.12	B
110.00-100.00			B	0.481	1.926	0.688	0.8	1	8.117			
			C	0.389	2.087	0.647	0.8	1	6.435			
T2	0.34	0.82	A	0.235	2.484	0.598	0.8	1	12.232	2.16	108.25	C
100.00-80.00			B	0.312	2.265	0.62	0.8	1	16.076			
			C	0.63	1.788	0.773	0.8	1	37.942			
T3	0.38	0.89	A	0.175	2.681	0.586	0.8	1	14.020	2.22	111.00	C
80.00-60.00			B	0.227	2.509	0.596	0.8	1	17.664			
			C	0.469	1.944	0.682	0.8	1	38.450			
T4	0.38	1.23	A	0.195	2.612	0.589	0.8	1	22.238	2.45	122.41	C
60.00-40.00			B	0.232	2.494	0.597	0.8	1	25.610			
			C	0.405	2.053	0.654	0.8	1	44.199			
T5	0.38	1.20	A	0.129	2.85	0.579	0.8	1	17.650	2.16	107.94	C
40.00-20.00			B	0.16	2.734	0.583	0.8	1	21.238			
			C	0.305	2.282	0.618	0.8	1	39.488			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.8	1	25.340	2.24	112.14	C
			B	0.167	2.71	0.584	0.8	1	27.459			
			C	0.238	2.475	0.599	0.8	1	37.829			
Sum Weight:	1.72	6.92						OTM	614.58 kip-ft	11.76		

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	0.02	0.47	A	0.389	2.087	0.647	0.85	1	6.600	0.53	53.03	B
110.00-100.00			B	0.481	1.926	0.688	0.85	1	8.258			
			C	0.389	2.087	0.647	0.85	1	6.600			
T2	0.34	0.82	A	0.235	2.484	0.598	0.85	1	12.560	2.18	108.82	C
100.00-80.00			B	0.312	2.265	0.62	0.85	1	16.370			
			C	0.63	1.788	0.773	0.85	1	38.141			
T3	0.38	0.89	A	0.175	2.681	0.586	0.85	1	14.468	2.24	111.95	C
80.00-60.00			B	0.227	2.509	0.596	0.85	1	18.084			
			C	0.469	1.944	0.682	0.85	1	38.778			
T4	0.38	1.23	A	0.195	2.612	0.589	0.85	1	23.197	2.49	124.55	C
60.00-40.00			B	0.232	2.494	0.597	0.85	1	26.526			
			C	0.405	2.053	0.654	0.85	1	44.972			
T5	0.38	1.20	A	0.129	2.85	0.579	0.85	1	18.270	2.19	109.37	C
40.00-20.00			B	0.16	2.734	0.583	0.85	1	21.835			
			C	0.305	2.282	0.618	0.85	1	40.013			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.85	1	26.256	2.29	114.65	C
			B	0.167	2.71	0.584	0.85	1	28.358			
			C	0.238	2.475	0.599	0.85	1	38.676			
Sum Weight:	1.72	6.92						OTM	621.38 kip-ft	11.92		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.68	A	0.534	1.86	0.715	1	1	10.261	0.58	57.69	B
110.00-100.00			B	0.647	1.782	0.784	1	1	12.943			
			C	0.534	1.86	0.715	1	1	10.261			
T2	0.90	1.23	A	0.327	2.228	0.624	1	1	18.653	2.34	116.96	C
100.00-80.00			B	0.431	2.005	0.665	1	1	24.631			
			C	0.748	1.787	0.856	1	1	54.710			
T3	0.98	1.38	A	0.25	2.439	0.602	1	1	21.527	2.39	119.43	C
80.00-60.00			B	0.321	2.241	0.623	1	1	26.993			
			C	0.571	1.825	0.736	1	1	58.761			
T4	0.98	2.06	A	0.269	2.381	0.607	1	1	33.681	2.60	129.91	C
60.00-40.00			B	0.32	2.245	0.622	1	1	38.569			
			C	0.495	1.906	0.695	1	1	67.371			
T5	0.98	1.82	A	0.177	2.676	0.586	1	1	25.929	2.34	116.97	C
40.00-20.00			B	0.221	2.527	0.595	1	1	31.205			
			C	0.376	2.113	0.642	1	1	61.612			
T6 20.00-0.00	0.59	3.14	A	0.194	2.615	0.589	1	1	35.437	2.34	116.86	C
			B	0.216	2.543	0.594	1	1	38.520			
			C	0.292	2.318	0.613	1	1	56.128			
Sum Weight:	4.49	10.33						OTM	661.77 kip-ft	12.58		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.68	A	0.534	1.86	0.715	0.825	1	9.681	0.56	55.67	B
110.00-100.00			B	0.647	1.782	0.784	0.825	1	12.491			
			C	0.534	1.86	0.715	0.825	1	9.681			
T2	0.90	1.23	A	0.327	2.228	0.624	0.825	1	17.506	2.14	106.89	C
100.00-80.00			B	0.431	2.005	0.665	0.825	1	23.660			
			C	0.748	1.787	0.856	0.825	1	49.998			
T3	0.98	1.38	A	0.25	2.439	0.602	0.825	1	19.958	2.16	107.94	C
80.00-60.00			B	0.321	2.241	0.623	0.825	1	25.572			
			C	0.571	1.825	0.736	0.825	1	53.108			
T4	0.98	2.06	A	0.269	2.381	0.607	0.825	1	30.323	2.33	116.26	C
60.00-40.00			B	0.32	2.245	0.622	0.825	1	35.442			
			C	0.495	1.906	0.695	0.825	1	60.291			
T5	0.98	1.82	A	0.177	2.676	0.586	0.825	1	23.758	2.10	104.84	C
40.00-20.00			B	0.221	2.527	0.595	0.825	1	29.153			
			C	0.376	2.113	0.642	0.825	1	55.222			
T6 20.00-0.00	0.59	3.14	A	0.194	2.615	0.589	0.825	1	32.230	2.10	105.06	C
			B	0.216	2.543	0.594	0.825	1	35.401			
			C	0.292	2.318	0.613	0.825	1	50.459			
Sum Weight:	4.49	10.33						OTM	602.14 kip-ft	11.38		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.68	A	0.534	1.86	0.715	0.8	1	9.598	0.55	55.38	B
110.00-100.00			B	0.647	1.782	0.784	0.8	1	12.427			
			C	0.534	1.86	0.715	0.8	1	9.598			
T2	0.90	1.23	A	0.327	2.228	0.624	0.8	1	17.343	2.11	105.45	C
100.00-80.00			B	0.431	2.005	0.665	0.8	1	23.522			
			C	0.748	1.787	0.856	0.8	1	49.325			
T3	0.98	1.38	A	0.25	2.439	0.602	0.8	1	19.734	2.13	106.30	C
80.00-60.00			B	0.321	2.241	0.623	0.8	1	25.370			
			C	0.571	1.825	0.736	0.8	1	52.301			
T4	0.98	2.06	A	0.269	2.381	0.607	0.8	1	29.843	2.29	114.31	C
60.00-40.00			B	0.32	2.245	0.622	0.8	1	34.996			
			C	0.495	1.906	0.695	0.8	1	59.280			
T5	0.98	1.82	A	0.177	2.676	0.586	0.8	1	23.448	2.06	103.10	C
40.00-20.00			B	0.221	2.527	0.595	0.8	1	28.860			
			C	0.376	2.113	0.642	0.8	1	54.309			
T6 20.00-0.00	0.59	3.14	A	0.194	2.615	0.589	0.8	1	31.772	2.07	103.37	C
			B	0.216	2.543	0.594	0.8	1	34.955			
			C	0.292	2.318	0.613	0.8	1	49.649			
Sum Weight:	4.49	10.33						OTM	593.63 kip-ft	11.20		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	0.68	A	0.534	1.86	0.715	0.85	1	9.764	0.56	55.96	B
110.00-100.00			B	0.647	1.782	0.784	0.85	1	12.556			
			C	0.534	1.86	0.715	0.85	1	9.764			
T2	0.90	1.23	A	0.327	2.228	0.624	0.85	1	17.670	2.17	108.33	C
100.00-80.00			B	0.431	2.005	0.665	0.85	1	23.799			
			C	0.748	1.787	0.856	0.85	1	50.672			
T3	0.98	1.38	A	0.25	2.439	0.602	0.85	1	20.182	2.19	109.58	C
80.00-60.00			B	0.321	2.241	0.623	0.85	1	25.775			
			C	0.571	1.825	0.736	0.85	1	53.916			
T4	0.98	2.06	A	0.269	2.381	0.607	0.85	1	30.803	2.36	118.21	C
60.00-40.00			B	0.32	2.245	0.622	0.85	1	35.889			
			C	0.495	1.906	0.695	0.85	1	61.303			
T5	0.98	1.82	A	0.177	2.676	0.586	0.85	1	24.068	2.13	106.57	C
40.00-20.00			B	0.221	2.527	0.595	0.85	1	29.446			
			C	0.376	2.113	0.642	0.85	1	56.135			
T6 20.00-0.00	0.59	3.14	A	0.194	2.615	0.589	0.85	1	32.688	2.13	106.75	C
			B	0.216	2.543	0.594	0.85	1	35.846			
			C	0.292	2.318	0.613	0.85	1	51.269			
Sum Weight:	4.49	10.33						OTM	610.66 kip-ft	11.55		

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	0.02	0.47	A	0.389	2.087	0.647	1	1	7.098	0.17	17.21	B
110.00-100.00			B	0.481	1.926	0.688	1	1	8.682			
			C	0.389	2.087	0.647	1	1	7.098			
T2	0.34	0.82	A	0.235	2.484	0.598	1	1	13.543	0.68	34.11	C
100.00-80.00			B	0.312	2.265	0.62	1	1	17.252			
			C	0.63	1.788	0.773	1	1	38.738			
T3	0.38	0.89	A	0.175	2.681	0.586	1	1	15.814	0.71	35.43	C
80.00-60.00			B	0.227	2.509	0.596	1	1	19.344			
			C	0.469	1.944	0.682	1	1	39.761			
T4	0.38	1.23	A	0.195	2.612	0.589	1	1	26.075	0.81	40.42	C
60.00-40.00			B	0.232	2.494	0.597	1	1	29.272			
			C	0.405	2.053	0.654	1	1	47.290			
T5	0.38	1.20	A	0.129	2.85	0.579	1	1	20.131	0.70	35.08	C
40.00-20.00			B	0.16	2.734	0.583	1	1	23.628			
			C	0.305	2.282	0.618	1	1	41.586			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	1	1	29.005	0.75	37.71	C
			B	0.167	2.71	0.584	1	1	31.057			
			C	0.238	2.475	0.599	1	1	41.214			
Sum Weight:	1.72	6.92						OTM	198.08 kip-ft	3.83		

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	0.02	0.47	A	0.389	2.087	0.647	0.825	1	6.518	0.16	16.23	B
110.00-100.00			B	0.481	1.926	0.688	0.825	1	8.188			
			C	0.389	2.087	0.647	0.825	1	6.518			
T2	0.34	0.82	A	0.235	2.484	0.598	0.825	1	12.396	0.67	33.50	C
100.00-80.00			B	0.312	2.265	0.62	0.825	1	16.223			
			C	0.63	1.788	0.773	0.825	1	38.041			
T3	0.38	0.89	A	0.175	2.681	0.586	0.825	1	14.244	0.69	34.41	C
80.00-60.00			B	0.227	2.509	0.596	0.825	1	17.874			
			C	0.469	1.944	0.682	0.825	1	38.614			
T4	0.38	1.23	A	0.195	2.612	0.589	0.825	1	22.717	0.76	38.11	C
60.00-40.00			B	0.232	2.494	0.597	0.825	1	26.068			
			C	0.405	2.053	0.654	0.825	1	44.586			
T5	0.38	1.20	A	0.129	2.85	0.579	0.825	1	17.960	0.67	33.54	C
40.00-20.00			B	0.16	2.734	0.583	0.825	1	21.536			
			C	0.305	2.282	0.618	0.825	1	39.751			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.825	1	25.798	0.70	35.00	C
			B	0.167	2.71	0.584	0.825	1	27.908			
			C	0.238	2.475	0.599	0.825	1	38.253			
Sum Weight:	1.72	6.92						OTM	190.73 kip-ft	3.65		

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	0.02	0.47	A	0.389	2.087	0.647	0.8	1	6.435	0.16	16.09	B
110.00-100.00			B	0.481	1.926	0.688	0.8	1	8.117			
			C	0.389	2.087	0.647	0.8	1	6.435			
T2	0.34	0.82	A	0.235	2.484	0.598	0.8	1	12.232	0.67	33.41	C
100.00-80.00			B	0.312	2.265	0.62	0.8	1	16.076			
			C	0.63	1.788	0.773	0.8	1	37.942			
T3	0.38	0.89	A	0.175	2.681	0.586	0.8	1	14.020	0.69	34.26	C
80.00-60.00			B	0.227	2.509	0.596	0.8	1	17.664			
			C	0.469	1.944	0.682	0.8	1	38.450			
T4	0.38	1.23	A	0.195	2.612	0.589	0.8	1	22.238	0.76	37.78	C
60.00-40.00			B	0.232	2.494	0.597	0.8	1	25.610			
			C	0.405	2.053	0.654	0.8	1	44.199			
T5	0.38	1.20	A	0.129	2.85	0.579	0.8	1	17.650	0.67	33.32	C
40.00-20.00			B	0.16	2.734	0.583	0.8	1	21.238			
			C	0.305	2.282	0.618	0.8	1	39.488			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.8	1	25.340	0.69	34.61	C
			B	0.167	2.71	0.584	0.8	1	27.459			
			C	0.238	2.475	0.599	0.8	1	37.829			
Sum Weight:	1.72	6.92						OTM	189.68 kip-ft	3.63		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.02	0.47	A	0.389	2.087	0.647	0.85	1	6.600	0.16	16.37	B
110.00-100.00			B	0.481	1.926	0.688	0.85	1	8.258			
			C	0.389	2.087	0.647	0.85	1	6.600			
T2	0.34	0.82	A	0.235	2.484	0.598	0.85	1	12.560	0.67	33.59	C
100.00-80.00			B	0.312	2.265	0.62	0.85	1	16.370			
			C	0.63	1.788	0.773	0.85	1	38.141			
T3	0.38	0.89	A	0.175	2.681	0.586	0.85	1	14.468	0.69	34.55	C
80.00-60.00			B	0.227	2.509	0.596	0.85	1	18.084			
			C	0.469	1.944	0.682	0.85	1	38.778			
T4	0.38	1.23	A	0.195	2.612	0.589	0.85	1	23.197	0.77	38.44	C
60.00-40.00			B	0.232	2.494	0.597	0.85	1	26.526			
			C	0.405	2.053	0.654	0.85	1	44.972			
T5	0.38	1.20	A	0.129	2.85	0.579	0.85	1	18.270	0.68	33.76	C
40.00-20.00			B	0.16	2.734	0.583	0.85	1	21.835			
			C	0.305	2.282	0.618	0.85	1	40.013			
T6 20.00-0.00	0.23	2.29	A	0.152	2.765	0.582	0.85	1	26.256	0.71	35.38	C
			B	0.167	2.71	0.584	0.85	1	28.358			
			C	0.238	2.475	0.599	0.85	1	38.676			
Sum Weight:	1.72	6.92						OTM	191.78 kip-ft	3.68		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	4.09					
Bracing Weight	2.81					
Total Member Self-Weight	6.90			3.54	3.38	
Gusset Weight	0.01					
Total Weight	13.16			3.54	3.38	
Wind 0 deg - No Ice		0.05	-19.55	-1363.06	-1.15	-6.30
Wind 30 deg - No Ice		9.54	-16.53	-1164.57	-670.39	-1.86
Wind 45 deg - No Ice		13.41	-13.46	-949.17	-944.73	0.49
Wind 60 deg - No Ice		16.34	-9.49	-670.08	-1153.21	2.77
Wind 90 deg - No Ice		19.00	-0.05	-0.99	-1336.32	6.75
Wind 120 deg - No Ice		16.85	9.73	682.92	-1172.23	9.28
Wind 135 deg - No Ice		13.34	13.39	949.84	-938.32	8.97
Wind 150 deg - No Ice		9.46	16.49	1167.12	-662.54	8.60
Wind 180 deg - No Ice		-0.05	18.90	1342.94	7.91	5.95
Wind 210 deg - No Ice		-9.54	16.53	1171.65	677.15	1.86
Wind 225 deg - No Ice		-13.41	13.46	956.25	951.49	-0.49
Wind 240 deg - No Ice		-16.89	9.81	690.76	1183.52	-2.98
Wind 270 deg - No Ice		-19.00	0.05	8.07	1343.07	-6.75
Wind 300 deg - No Ice		-16.29	-9.41	-662.23	1155.43	-8.72
Wind 315 deg - No Ice		-13.34	-13.39	-942.76	945.08	-8.97
Wind 330 deg - No Ice		-9.46	-16.49	-1160.04	669.30	-8.60
Member Ice	3.41					
Gusset Ice	0.01					
Total Weight Ice	21.11			9.63	8.84	
Wind 0 deg - Ice		0.04	-18.87	-1289.59	5.34	-3.66
Wind 30 deg - Ice		8.92	-15.46	-1073.02	-615.73	-0.59
Wind 45 deg - Ice		12.48	-12.52	-869.37	-866.61	0.86
Wind 60 deg - Ice		15.12	-8.78	-608.94	-1054.71	2.21
Wind 90 deg - Ice		17.79	-0.04	6.14	-1234.26	4.58

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 120 deg - Ice		16.28	9.40	656.22	-1110.23	6.26
Wind 135 deg - Ice		12.43	12.47	883.69	-861.67	5.49
Wind 150 deg - Ice		8.86	15.43	1088.79	-609.68	5.18
Wind 180 deg - Ice		-0.04	17.49	1240.71	12.33	3.22
Wind 210 deg - Ice		-8.92	15.46	1092.28	633.41	0.59
Wind 225 deg - Ice		-12.48	12.52	888.63	884.29	-0.86
Wind 240 deg - Ice		-16.31	9.46	662.27	1131.40	-2.59
Wind 270 deg - Ice		-17.79	0.04	13.12	1251.93	-4.58
Wind 300 deg - Ice		-15.09	-8.72	-602.88	1068.89	-5.43
Wind 315 deg - Ice		-12.43	-12.47	-864.43	879.35	-5.49
Wind 330 deg - Ice		-8.86	-15.43	-1069.52	627.36	-5.18
Total Weight	13.16			3.54	3.38	
Wind 0 deg - Service		0.01	-6.03	-422.16	-1.55	-1.94
Wind 30 deg - Service		2.94	-5.10	-360.90	-208.11	-0.57
Wind 45 deg - Service		4.14	-4.15	-294.41	-292.78	0.15
Wind 60 deg - Service		5.04	-2.93	-208.28	-357.12	0.86
Wind 90 deg - Service		5.86	-0.01	-1.77	-413.64	2.08
Wind 120 deg - Service		5.20	3.00	209.31	-362.99	2.86
Wind 135 deg - Service		4.12	4.13	291.70	-290.80	2.77
Wind 150 deg - Service		2.92	5.09	358.76	-205.68	2.66
Wind 180 deg - Service		-0.01	5.83	413.02	1.25	1.84
Wind 210 deg - Service		-2.94	5.10	360.16	207.80	0.57
Wind 225 deg - Service		-4.14	4.15	293.68	292.47	-0.15
Wind 240 deg - Service		-5.21	3.03	211.74	364.09	-0.92
Wind 270 deg - Service		-5.86	0.01	1.03	413.34	-2.08
Wind 300 deg - Service		-5.03	-2.90	-205.86	355.42	-2.69
Wind 315 deg - Service		-4.12	-4.13	-292.44	290.50	-2.77
Wind 330 deg - Service		-2.92	-5.09	-359.50	205.38	-2.66

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp

Comb. No.	Description
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	110 - 100	Leg	Max Tension	5	8.79	-0.38	-0.07
			Max. Compression	2	-10.61	0.45	-0.00
			Max. Mx	5	8.79	-0.47	-0.05
			Max. My	3	-0.69	-0.01	-0.51
			Max. Vy	10	1.08	-0.47	0.00
			Max. Vx	6	-0.87	-0.01	0.07
		Diagonal	Max Tension	15	1.92	0.00	0.00
			Max. Compression	7	-1.99	0.00	0.00
			Max. Mx	12	0.19	-0.01	-0.00
			Max. My	14	-1.16	0.00	-0.01
			Max. Vy	19	-0.01	0.01	0.00
			Max. Vx	14	0.01	0.00	0.00
		Top Girt	Max Tension	5	0.02	0.00	0.00
			Max. Compression	19	-0.01	0.00	0.00
			Max. Mx	18	0.00	-0.00	0.00
			Max. My	22	-0.01	0.00	0.00
			Max. Vy	18	0.00	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
		Bottom Girt	Max Tension	30	0.10	0.00	0.00
			Max. Compression	10	-0.05	0.00	0.00
			Max. Mx	18	0.03	-0.00	0.00
			Max. My	21	0.07	0.00	0.00
			Max. Vy	18	0.00	0.00	0.00
			Max. Vx	21	-0.00	0.00	0.00
T2	100 - 80	Leg	Max Tension	10	45.76	0.03	-0.00
			Max. Compression	13	-50.11	0.24	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	11.18	1.08	-0.01
			Max. My	11	-0.68	-0.01	-1.19
			Max. Vy	2	-3.15	0.24	0.01
			Max. Vx	11	0.91	-0.01	0.53
		Diagonal	Max Tension	9	3.78	0.00	0.00
			Max. Compression	17	-3.79	0.00	0.00
			Max. Mx	30	1.99	0.01	-0.00
			Max. My	16	-3.63	-0.00	-0.00
			Max. Vy	30	-0.01	0.01	-0.00
			Max. Vx	16	0.00	0.00	0.00
		Top Girt	Max Tension	13	0.18	0.00	0.00
			Max. Compression	10	-0.18	0.00	0.00
			Max. Mx	18	-0.00	-0.00	0.00
			Max. My	21	0.10	0.00	0.00
			Max. Vy	18	-0.00	0.00	0.00
			Max. Vx	21	-0.00	0.00	0.00
T3	80 - 60	Leg	Max Tension	10	69.65	0.12	-0.00
			Max. Compression	13	-75.18	0.14	0.00
			Max. Mx	2	-50.10	0.51	0.01
			Max. My	9	-2.96	-0.01	-0.32
			Max. Vy	2	-3.25	0.14	0.01
			Max. Vx	17	-1.00	0.00	0.09
		Diagonal	Max Tension	3	2.59	0.00	0.00
			Max. Compression	3	-2.68	0.00	0.00
			Max. Mx	30	1.93	0.01	-0.00
			Max. My	11	-2.67	-0.00	-0.00
			Max. Vy	30	-0.01	0.01	-0.00
			Max. Vx	28	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.61	0.00	0.00
			Max. Compression	2	-0.55	0.00	0.00
			Max. Mx	18	0.05	-0.01	0.00
			Max. My	24	0.31	0.00	0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T4	60 - 40	Leg	Max Tension	10	88.11	0.28	0.01
			Max. Compression	13	-95.27	0.01	0.00
			Max. Mx	13	-82.49	0.82	-0.00
			Max. My	9	-3.29	-0.06	-0.61
			Max. Vy	2	-3.78	0.01	0.01
			Max. Vx	17	-1.08	-0.00	-0.00
		Diagonal	Max Tension	6	2.98	0.01	-0.00
			Max. Compression	7	-3.18	0.00	0.00
			Max. Mx	30	1.83	0.03	-0.00
			Max. My	7	-2.91	-0.01	-0.01
			Max. Vy	30	-0.01	0.03	-0.00
			Max. Vx	7	-0.00	0.00	0.00
		Secondary Horizontal	Max Tension	13	1.60	0.00	0.00
			Max. Compression	13	-1.60	0.01	-0.00
			Max. Mx	33	-0.45	0.02	-0.00
			Max. My	26	-0.34	0.01	0.01
			Max. Vy	33	-0.01	0.02	-0.00
			Max. Vx	34	-0.00	0.00	0.00
		Top Girt	Max Tension	10	0.68	0.00	0.00
			Max. Compression	13	-0.67	0.00	0.00
			Max. Mx	22	0.63	-0.03	0.00
			Max. My	24	0.34	0.00	0.00
			Max. Vy	22	0.02	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T5	40 - 20	Leg	Max Tension	10	104.45	-0.33	-0.03
			Max. Compression	13	-113.32	0.69	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	19	-108.73	0.87	0.04
			Max. My	9	-4.12	-0.01	-0.39
			Max. Vy	19	-4.34	0.87	0.04
			Max. Vx	17	-1.30	0.00	0.33
		Diagonal	Max Tension	7	3.18	0.00	0.00
			Max. Compression	7	-3.40	0.00	0.00
			Max. Mx	30	2.28	0.02	-0.00
			Max. My	7	-3.32	-0.00	-0.01
			Max. Vy	33	0.01	0.02	0.00
			Max. Vx	24	0.00	0.00	0.00
		Top Girt	Max Tension	10	0.95	0.00	0.00
			Max. Compression	13	-0.92	0.00	0.00
			Max. Mx	18	0.09	-0.08	0.00
			Max. My	24	0.52	0.00	0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T6	20 - 0	Leg	Max Tension	10	116.29	-0.51	-0.02
			Max. Compression	13	-127.04	0.00	0.00
			Max. Mx	30	-118.41	1.44	0.00
			Max. My	9	-5.02	-0.01	-0.75
			Max. Vy	19	-4.33	1.23	0.05
			Max. Vx	17	-1.30	0.01	0.44
		Diagonal	Max Tension	23	4.63	0.00	0.00
			Max. Compression	23	-4.39	0.00	0.00
			Max. Mx	27	0.68	0.07	-0.01
			Max. My	7	-3.78	-0.01	-0.01
			Max. Vy	27	0.03	0.07	-0.01
			Max. Vx	31	-0.00	0.00	0.00
		Top Girt	Max Tension	10	1.24	0.00	0.00
			Max. Compression	30	-1.81	0.00	0.00
			Max. Mx	18	-0.70	-0.09	0.00
			Max. My	24	-0.17	0.00	0.00
			Max. Vy	18	-0.03	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	130.16	11.00	-6.19
	Max. H_x	13	130.16	11.00	-6.19
	Max. H_z	21	-101.95	-10.67	6.32
	Min. Vert	5	-118.03	-10.02	5.64
	Min. H_x	22	-104.96	-11.02	6.25
	Min. H_z	13	130.16	11.00	-6.19
Leg B	Max. Vert	7	128.90	-11.08	-5.91
	Max. H_x	32	-105.81	11.08	6.13
	Max. H_z	33	-102.74	10.75	6.14
	Min. Vert	15	-117.84	10.12	5.38
	Min. H_x	7	128.90	-11.08	-5.91
	Min. H_z	7	128.90	-11.08	-5.91
Leg A	Max. Vert	2	129.49	-0.29	12.61
	Max. H_x	13	-59.01	0.54	-5.79
	Max. H_z	2	129.49	-0.29	12.61
	Min. Vert	10	-118.87	0.27	-11.52
	Min. H_x	5	65.89	-0.50	6.33

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. H_z	27	-107.06	0.13	-12.72

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	13.16	0.00	0.00	3.54	3.38	-0.00
Dead+Wind 0 deg - No Ice	13.16	0.05	-19.55	-1368.93	-1.14	-6.32
Dead+Wind 30 deg - No Ice	13.16	9.54	-16.53	-1169.61	-673.29	-1.86
Dead+Wind 45 deg - No Ice	13.16	13.41	-13.46	-953.28	-948.83	0.49
Dead+Wind 60 deg - No Ice	13.16	16.34	-9.49	-672.99	-1158.21	2.78
Dead+Wind 90 deg - No Ice	13.16	19.00	-0.05	-0.99	-1342.10	6.76
Dead+Wind 120 deg - No Ice	13.16	16.85	9.73	685.87	-1177.26	9.30
Dead+Wind 135 deg - No Ice	13.16	13.34	13.39	953.97	-942.36	9.00
Dead+Wind 150 deg - No Ice	13.16	9.46	16.49	1172.18	-665.39	8.63
Dead+Wind 180 deg - No Ice	13.16	-0.05	18.90	1348.76	7.96	5.97
Dead+Wind 210 deg - No Ice	13.16	-9.54	16.53	1176.71	680.08	1.86
Dead+Wind 225 deg - No Ice	13.16	-13.41	13.46	960.39	955.60	-0.49
Dead+Wind 240 deg - No Ice	13.16	-16.89	9.81	693.74	1188.61	-2.98
Dead+Wind 270 deg - No Ice	13.16	-19.00	0.05	8.12	1348.88	-6.76
Dead+Wind 300 deg - No Ice	13.16	-16.29	-9.41	-665.09	1160.45	-8.75
Dead+Wind 315 deg - No Ice	13.16	-13.34	-13.39	-946.82	949.19	-9.00
Dead+Wind 330 deg - No Ice	13.16	-9.46	-16.49	-1165.04	672.22	-8.63
Dead+Ice+Temp	21.11	0.00	-0.00	9.66	8.87	-0.00
Dead+Wind 0 deg+Ice+Temp	21.11	0.04	-18.87	-1297.57	5.40	-3.71
Dead+Wind 30 deg+Ice+Temp	21.11	8.92	-15.46	-1079.74	-619.60	-0.61
Dead+Wind 45 deg+Ice+Temp	21.11	12.48	-12.52	-874.83	-872.06	0.87
Dead+Wind 60 deg+Ice+Temp	21.11	15.12	-8.78	-612.77	-1061.35	2.23
Dead+Wind 90 deg+Ice+Temp	21.11	17.79	-0.04	6.17	-1241.99	4.63
Dead+Wind 120 deg+Ice+Temp	21.11	16.28	9.40	660.31	-1117.07	6.33
Dead+Wind 135 deg+Ice+Temp	21.11	12.43	12.47	889.23	-867.11	5.56
Dead+Wind 150 deg+Ice+Temp	21.11	8.86	15.43	1095.60	-613.49	5.25
Dead+Wind 180 deg+Ice+Temp	21.11	-0.04	17.49	1248.50	12.41	3.27
Dead+Wind 210 deg+Ice+Temp	21.11	-8.92	15.46	1099.11	637.37	0.61
Dead+Wind 225 deg+Ice+Temp	21.11	-12.48	12.52	894.17	889.88	-0.86
Dead+Wind 240 deg+Ice+Temp	21.11	-16.31	9.46	666.37	1138.37	-2.62
Dead+Wind 270 deg+Ice+Temp	21.11	-17.79	0.04	13.21	1259.76	-4.63
Dead+Wind 300 deg+Ice+Temp	21.11	-15.09	-8.72	-606.67	1075.61	-5.50
Dead+Wind 315 deg+Ice+Temp	21.11	-12.43	-12.47	-869.85	884.86	-5.57
Dead+Wind 330 deg+Ice+Temp	21.11	-8.86	-15.43	-1076.21	631.29	-5.25
Dead+Wind 0 deg - Service	13.16	0.01	-6.03	-420.07	1.99	-1.95
Dead+Wind 30 deg - Service	13.16	2.94	-5.10	-358.55	-205.47	-0.58
Dead+Wind 45 deg - Service	13.16	4.14	-4.15	-291.78	-290.51	0.15
Dead+Wind 60 deg - Service	13.16	5.04	-2.93	-205.26	-355.14	0.86
Dead+Wind 90 deg - Service	13.16	5.86	-0.01	2.15	-411.90	2.09
Dead+Wind 120 deg - Service	13.16	5.20	3.00	214.15	-361.02	2.87
Dead+Wind 135 deg - Service	13.16	4.12	4.13	296.90	-288.52	2.78
Dead+Wind 150 deg - Service	13.16	2.92	5.09	364.25	-203.03	2.66
Dead+Wind 180 deg - Service	13.16	-0.01	5.83	418.75	4.80	1.84
Dead+Wind 210 deg - Service	13.16	-2.94	5.10	365.65	212.25	0.58
Dead+Wind 225 deg - Service	13.16	-4.14	4.15	298.88	297.29	-0.15
Dead+Wind 240 deg - Service	13.16	-5.21	3.03	216.58	369.21	-0.92
Dead+Wind 270 deg - Service	13.16	-5.86	0.01	4.96	418.68	-2.09
Dead+Wind 300 deg - Service	13.16	-5.03	-2.90	-202.83	360.52	-2.70
Dead+Wind 315 deg - Service	13.16	-4.12	-4.13	-289.79	295.31	-2.78
Dead+Wind 330 deg - Service	13.16	-2.92	-5.09	-357.14	209.82	-2.66

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-13.16	0.00	0.00	13.16	0.00	0.000%
2	0.05	-13.16	-19.55	-0.05	13.16	19.55	0.000%
3	9.54	-13.16	-16.53	-9.54	13.16	16.53	0.000%
4	13.41	-13.16	-13.46	-13.41	13.16	13.46	0.000%
5	16.34	-13.16	-9.49	-16.34	13.16	9.49	0.000%
6	19.00	-13.16	-0.05	-19.00	13.16	0.05	0.000%
7	16.85	-13.16	9.73	-16.85	13.16	-9.73	0.000%
8	13.34	-13.16	13.39	-13.34	13.16	-13.39	0.000%
9	9.46	-13.16	16.49	-9.46	13.16	-16.49	0.000%
10	-0.05	-13.16	18.90	0.05	13.16	-18.90	0.000%
11	-9.54	-13.16	16.53	9.54	13.16	-16.53	0.000%
12	-13.41	-13.16	13.46	13.41	13.16	-13.46	0.000%
13	-16.89	-13.16	9.81	16.89	13.16	-9.81	0.000%
14	-19.00	-13.16	0.05	19.00	13.16	-0.05	0.000%
15	-16.29	-13.16	-9.41	16.29	13.16	9.41	0.000%
16	-13.34	-13.16	-13.39	13.34	13.16	13.39	0.000%
17	-9.46	-13.16	-16.49	9.46	13.16	16.49	0.000%
18	0.00	-21.11	0.00	-0.00	21.11	0.00	0.000%
19	0.04	-21.11	-18.87	-0.04	21.11	18.87	0.000%
20	8.92	-21.11	-15.46	-8.92	21.11	15.46	0.000%
21	12.48	-21.11	-12.52	-12.48	21.11	12.52	0.000%
22	15.12	-21.11	-8.78	-15.12	21.11	8.78	0.000%
23	17.79	-21.11	-0.04	-17.79	21.11	0.04	0.000%
24	16.28	-21.11	9.40	-16.28	21.11	-9.40	0.000%
25	12.43	-21.11	12.47	-12.43	21.11	-12.47	0.000%
26	8.86	-21.11	15.43	-8.86	21.11	-15.43	0.000%
27	-0.04	-21.11	17.49	0.04	21.11	-17.49	0.000%
28	-8.92	-21.11	15.46	8.92	21.11	-15.46	0.000%
29	-12.48	-21.11	12.52	12.48	21.11	-12.52	0.000%
30	-16.31	-21.11	9.46	16.31	21.11	-9.46	0.000%
31	-17.79	-21.11	0.04	17.79	21.11	-0.04	0.000%
32	-15.09	-21.11	-8.72	15.09	21.11	8.72	0.000%
33	-12.43	-21.11	-12.47	12.43	21.11	12.47	0.000%
34	-8.86	-21.11	-15.43	8.86	21.11	15.43	0.000%
35	0.01	-13.16	-6.03	-0.01	13.16	6.03	0.000%
36	2.94	-13.16	-5.10	-2.94	13.16	5.10	0.000%
37	4.14	-13.16	-4.15	-4.14	13.16	4.15	0.000%
38	5.04	-13.16	-2.93	-5.04	13.16	2.93	0.000%
39	5.86	-13.16	-0.01	-5.86	13.16	0.01	0.000%
40	5.20	-13.16	3.00	-5.20	13.16	-3.00	0.000%
41	4.12	-13.16	4.13	-4.12	13.16	-4.13	0.000%
42	2.92	-13.16	5.09	-2.92	13.16	-5.09	0.000%
43	-0.01	-13.16	5.83	0.01	13.16	-5.83	0.000%
44	-2.94	-13.16	5.10	2.94	13.16	-5.10	0.000%
45	-4.14	-13.16	4.15	4.14	13.16	-4.15	0.000%
46	-5.21	-13.16	3.03	5.21	13.16	-3.03	0.000%
47	-5.86	-13.16	0.01	5.86	13.16	-0.01	0.000%
48	-5.03	-13.16	-2.90	5.03	13.16	2.90	0.000%
49	-4.12	-13.16	-4.13	4.12	13.16	4.13	0.000%
50	-2.92	-13.16	-5.09	2.92	13.16	5.09	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000179
3	Yes	4	0.00000001	0.00000256
4	Yes	4	0.00000001	0.00000216
5	Yes	4	0.00000001	0.00000156
6	Yes	4	0.00000001	0.00000239
7	Yes	4	0.00000001	0.00000194
8	Yes	4	0.00000001	0.00000266
9	Yes	4	0.00000001	0.00000311
10	Yes	4	0.00000001	0.00000162
11	Yes	4	0.00000001	0.00000260
12	Yes	4	0.00000001	0.00000223
13	Yes	4	0.00000001	0.00000171
14	Yes	4	0.00000001	0.00000242
15	Yes	4	0.00000001	0.00000176
16	Yes	4	0.00000001	0.00000260
17	Yes	4	0.00000001	0.00000311
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000635
20	Yes	4	0.00000001	0.00000718
21	Yes	4	0.00000001	0.00000764
22	Yes	4	0.00000001	0.00000783
23	Yes	4	0.00000001	0.00000722
24	Yes	4	0.00000001	0.00000646
25	Yes	4	0.00000001	0.00000679
26	Yes	4	0.00000001	0.00000735
27	Yes	4	0.00000001	0.00000780
28	Yes	4	0.00000001	0.00000716
29	Yes	4	0.00000001	0.00000662
30	Yes	4	0.00000001	0.00000632
31	Yes	4	0.00000001	0.00000721
32	Yes	4	0.00000001	0.00000800
33	Yes	4	0.00000001	0.00000779
34	Yes	4	0.00000001	0.00000735
35	Yes	4	0.00000001	0.00009332
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	110 - 100	3.702	46	0.2981	0.0313
T2	100 - 80	3.076	46	0.2930	0.0200
T3	80 - 60	1.892	46	0.2434	0.0256
T4	60 - 40	0.989	46	0.1701	0.0202
T5	40 - 20	0.404	46	0.0956	0.0129
T6	20 - 0	0.091	46	0.0367	0.0034

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.00	ANT-18G-2-C	46	3.639	0.2979	0.0293	236424
108.00	LLPX310R	46	3.577	0.2977	0.0275	236424
98.00	APL868013	46	2.951	0.2904	0.0201	67584

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	110 - 100	11.918	13	0.9623	0.1014
T2	100 - 80	9.899	13	0.9442	0.0649
T3	80 - 60	6.087	13	0.7830	0.0831
T4	60 - 40	3.181	13	0.5467	0.0655
T5	40 - 20	1.302	13	0.3072	0.0418
T6	20 - 0	0.294	13	0.1179	0.0112

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
109.00	ANT-18G-2-C	13	11.715	0.9615	0.0950	85569
108.00	LLPX310R	13	11.513	0.9605	0.0891	85569
98.00	APL868013	13	9.497	0.9355	0.0653	22469

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	110	Leg	A325N	0.8750	4	2.20	26.45	0.083 ✔	1.333	Bolt Tension

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
		Diagonal	A325N	0.5000	1	1.99	4.12	0.484 ✔	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	0.02	4.08	0.004 ✔	1.333	Gusset Bearing
		Bottom Girt	A325N	0.5000	1	0.10	4.08	0.024 ✔	1.333	Gusset Bearing
T2	100	Leg	A325N	0.8750	4	11.44	26.41	0.433 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3.78	3.17	1.193 ✔	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.18	3.17	0.055 ✔	1.333	Member Bearing
T3	80	Leg	A325N	0.8750	4	17.41	26.41	0.659 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.59	3.17	0.817 ✔	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.61	3.17	0.193 ✔	1.333	Member Bearing
T4	60	Leg	A325N	0.8750	4	22.03	26.39	0.835 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.98	3.17	0.941 ✔	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.68	4.08	0.166 ✔	1.333	Gusset Bearing
T5	40	Leg	A325N	0.8750	4	26.11	26.38	0.990 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	3.18	3.17	1.003 ✔	1.333	Member Bearing
		Top Girt	A325N	0.5000	1	0.95	4.08	0.232 ✔	1.333	Gusset Bearing
T6	20	Leg	A325N	0.8750	4	29.07	26.46	1.099 ✔	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4.63	4.08	1.135 ✔	1.333	Gusset Bearing
		Top Girt	A325N	0.5000	1	1.81	4.12	0.439 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	110 - 100	P3x.3	10.02	0.08	0.9 K=1.00	29.944	3.0159	-10.61	90.31	0.117 ✔
T2	100 - 80	P3x.3	20.03	3.97	42.0 K=1.00	25.554	3.0159	-46.49	77.07	0.603 ✔
T3	80 - 60	P3x.3	20.03	3.97	42.0 K=1.00	25.554	3.0159	-72.57	77.07	0.942 ✔
T4	60 - 40	P3x.3	20.03	2.56	27.0 K=1.00	27.514	3.0159	-92.12	82.98	1.110 ✔
T5	40 - 20	P3.5x.318	20.03	6.62	30.4 K=0.50	27.102	3.6784	-109.88	99.69	1.102 ✔
T6	20 - 0	P3.5x.318_Reinforced	20.03	6.65	43.8 K=1.00	25.289	5.7832	-127.04	146.25	0.869 ✔

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	110 - 100	L1 1/2x1 1/2x3/16	3.14	1.35	71.6 K=1.29	16.268	0.5273	-1.99	8.58	0.232 ✔
T2	100 - 80	L1 1/2x1 1/2x1/8	5.09	2.40	102.8 K=1.06	12.621	0.3594	-3.79	4.54	0.835 ✔
T3	80 - 60	L1 1/2x1 1/2x1/8	7.53	3.59	145.6 K=1.00	7.040	0.3594	-2.58	2.53	1.019 ✔
T4	60 - 40	L2x2x1/8	9.73	4.73	142.8 K=1.00	7.328	0.4844	-3.18	3.55	0.896 ✔
T5	40 - 20	L1 3/4x1 3/4x1/8	12.24	6.12	134.5 K=1.00	8.252	0.4219	-3.40	3.48	0.976 ✔
T6	20 - 0	L2 1/2x2 1/2x1/4	13.40	6.52	159.3 K=1.00	5.887	1.1900	-4.39	7.01	0.627 ✔

Secondary 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 $\frac{P}{P_a}$
T4	60 - 40	L2 1/2x2 1/2x1/8	8.37	8.08	121.9 K=0.99	9.583	0.6094	-1.60	5.84	0.274 ✔

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	110 - 100	L1 1/2x1 1/2x3/16	1.55	1.03	81.0 K=1.93	15.245	0.5273	-0.01	8.04	0.002 ✔
T2	100 - 80	L1 1/2x1 1/2x1/8	2.59	2.07	102.0 K=1.22	12.729	0.3594	-0.18	4.57	0.040 ✔
T3	80 - 60	L2x2x1/8	4.61	4.09	123.5 K=1.00	9.740	0.4844	-0.55	4.72	0.117 ✔
T4	60 - 40	L2 1/2x2 1/2x3/16	6.61	6.09	147.7 K=1.00	6.847	0.9020	-0.67	6.18	0.109 ✔
T5	40 - 20	L3 1/2x3 1/2x1/4	8.64	8.31	143.7 K=1.00	7.232	1.6900	-0.92	12.22	0.076 ✔
T6	20 - 0	L2 1/2x2 1/2x1/4	10.64	9.96	243.3 K=1.00	2.522	1.1900	-1.81	3.00	0.603 ✔
		KL/R > 200 (C) - 176								

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	110 - 100	L1 1/2x1 1/2x3/16	2.57	2.05	102.0 K=1.21	12.722	0.5273	-0.05	6.71	0.008 ✔

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	110 - 100	P3x.3	10.02	0.08	0.9	30.000	3.0159	8.79	90.48	0.097 ✔
T2	100 - 80	P3x.3	20.03	0.08	0.9	30.000	3.0159	45.76	90.48	0.506 ✔
T3	80 - 60	P3x.3	20.03	0.08	0.9	30.000	3.0159	69.65	90.48	0.770 ✔
T4	60 - 40	P3x.3	20.03	0.08	0.9	30.000	3.0159	88.11	90.48	0.974 ✔
T5	40 - 20	P3.5x.318	20.03	0.08	0.8	30.000	3.6784	104.45	110.35	0.946 ✔
T6	20 - 0	P3.5x.318_Reinforced	20.03	6.65	43.8	30.000	5.7832	116.29	173.50	0.670 ✔

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	110 - 100	L1 1/2x1 1/2x3/16	3.14	1.35	38.6	29.000	0.3076	1.92	8.92	0.215 ✔
T2	100 - 80	L1 1/2x1 1/2x1/8	5.09	2.40	64.8	29.000	0.2109	3.78	6.12	0.619 ✔
T3	80 - 60	L1 1/2x1 1/2x1/8	6.24	2.96	79.3	29.000	0.2109	2.59	6.12	0.423 ✔
T4	60 - 40	L2x2x1/8	9.73	4.73	92.8	29.000	0.3047	2.98	8.84	0.338 ✔
T5	40 - 20	L1 3/4x1 3/4x1/8	11.69	5.85	128.6	29.000	0.2578	3.18	7.48	0.425 ✔
T6	20 - 0	L2 1/2x2 1/2x1/4	13.98	6.80	108.0	29.000	0.7753	4.63	22.48	0.206 ✔

Secondary 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 $\frac{P}{P_a}$
T4	60 - 40	L2 1/2x2 1/2x1/8	8.37	8.08	123.1	32.500	0.4570	1.60	14.85	0.108 ✔

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	110 - 100	L1 1/2x1 1/2x3/16	1.55	1.03	33.0	29.000	0.3076	0.02	8.92	0.002 ✔
T2	100 - 80	L1 1/2x1 1/2x1/8	2.59	2.07	59.3	29.000	0.2109	0.18	6.12	0.029 ✔
T3	80 - 60	L2x2x1/8	4.61	4.09	82.8	29.000	0.3047	0.61	8.84	0.069 ✔
T4	60 - 40	L2 1/2x2 1/2x3/16	6.61	6.09	97.5	29.000	0.5886	0.68	17.07	0.040 ✔
T5	40 - 20	L3 1/2x3 1/2x1/4	8.64	8.31	91.5	29.000	1.1503	0.95	33.36	0.028 ✔
T6	20 - 0	L2 1/2x2 1/2x1/4	10.64	9.96	158.9	29.000	0.7753	1.24	22.48	0.055 ✔

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	110 - 100	L1 1/2x1 1/2x3/16	2.57	2.05	60.0	29.000	0.3076	0.10	8.92	0.011 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	110 - 100	Leg	P3x.3	3	-10.61	120.38	8.8	Pass
T2	100 - 80	Leg	P3x.3	34	-46.49	102.73	45.3	Pass
T3	80 - 60	Leg	P3x.3	70	-72.57	102.73	70.6	Pass
T4	60 - 40	Leg	P3x.3	106	-92.12	110.61	83.3	Pass
T5	40 - 20	Leg	P3.5x.318	148	-109.88	132.89	82.7	Pass
T6	20 - 0	Leg	P3.5x.318_Reinforced	172	-127.04	194.95	65.2 82.4 (b)	Pass
T1	110 - 100	Diagonal	L1 1/2x1 1/2x3/16	24	-1.99	11.44	17.4 36.3 (b)	Pass
T2	100 - 80	Diagonal	L1 1/2x1 1/2x1/8	61	-3.79	6.05	62.6 89.5 (b)	Pass
T3	80 - 60	Diagonal	L1 1/2x1 1/2x1/8	77	-2.58	3.37	76.5	Pass
T4	60 - 40	Diagonal	L2x2x1/8	113	-3.18	4.73	67.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
							70.6 (b)	
T5	40 - 20	Diagonal	L1 3/4x1 3/4x1/8	155	-3.40	4.64	73.2	Pass
							75.2 (b)	
T6	20 - 0	Diagonal	L2 1/2x2 1/2x1/4	185	-4.39	9.34	47.0	Pass
							85.1 (b)	
T4	60 - 40	Secondary Horizontal	L2 1/2x2 1/2x1/8	118	-1.60	7.78	20.5	Pass
T1	110 - 100	Top Girt	L1 1/2x1 1/2x3/16	5	0.02	11.89	0.1	Pass
							0.3 (b)	
T2	100 - 80	Top Girt	L1 1/2x1 1/2x1/8	37	-0.18	6.10	3.0	Pass
							4.1 (b)	
T3	80 - 60	Top Girt	L2x2x1/8	73	-0.55	6.29	8.8	Pass
							14.5 (b)	
T4	60 - 40	Top Girt	L2 1/2x2 1/2x3/16	110	-0.67	8.23	8.2	Pass
							12.4 (b)	
T5	40 - 20	Top Girt	L3 1/2x3 1/2x1/4	152	-0.92	16.29	5.7	Pass
							17.4 (b)	
T6	20 - 0	Top Girt	L2 1/2x2 1/2x1/4	176	-1.81	4.00	45.2	Pass
T1	110 - 100	Bottom Girt	L1 1/2x1 1/2x3/16	8	0.10	11.89	0.8	Pass
							1.8 (b)	
							Summary	
						Leg (T4)	83.3	Pass
						Diagonal (T2)	89.5	Pass
						Secondary Horizontal (T4)	20.5	Pass
						Top Girt (T6)	45.2	Pass
						Bottom Girt (T1)	1.8	Pass
						Bolt Checks	89.5	Pass
						RATING =	**89.5**	**Pass**

Element Map

Section No.	Section Elevation ft	Component Type	Element List
T1	110.00-100.00	Leg	1-3
		Diagonal	10-33
		Top Girt	4-6
		Bottom Girt	7-9
T2	100.00-80.00	Leg	34-36
		Diagonal	40-69
		Top Girt	37-39
T3	80.00-60.00	Leg	70-72
		Diagonal	76-105
		Top Girt	73-75
T4	60.00-40.00	Leg	106-108
		Diagonal	112-117,121-126,130-135,139-144
		Secondary Horizontal	118-120,127-129,136-138,145-147
		Top Girt	109-111
T5	40.00-20.00	Leg	148-150
		Diagonal	154-171
		Top Girt	151-153
T6	20.00-0.00	Leg	172-174

Section No.	Section Elevation ft	Component Type	Element List
		Diagonal Top Girt	178-195 175-177 Total number of elements: 195

Program Version 7.0.5.1 - 2/1/2016 File:J:/Jobs/1500100.WI/096 - Stratford North CT/Backup Documentation/Rev (2)/ERI Files/110-ft_Rohn_SSV_Lattice w_reinforcement.eri

CENTEK engineering
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Subject:	Lattice Tower Pad and Pier w/ Mat Foundation Check
Location:	Stratford, CT
Rev. 2: 8/24/16	Prepared by: TJL. Checked by: C.F.C. Job No. 15001.096

(3) Pad and Pier w/ Mat Foundation:

Input Data:

Tower Data

Max Uplift Force =	Uplift := 119·kips	(User Input from RISATower)	(Leg)
Max Shear Force =	Shear := 13·kips	(User Input from RISATower)	(Leg)
Max Compressive Force =	Compression := 130·kips	(User Input from RISATower)	(Leg)
Base Shear =	$Shear_{tot}$:= 20·kips	(User Input from RISATower)	(Tower)
Base Compression =	$Comp_{tot}$:= 13·kips	(User Input from RISATower)	(Tower)
Base Moment =	Moment := 1376·ft·kips	(User Input from RISATower)	(Tower)
Tower Height =	H_t := 110·ft	(User Input)	

Footing Data:

Overall Depth of Footing =	D_f := 10.0ft	(User Input)	
Length of Pier =	L_p := 9ft	(User Input)	
Extension of Pier Above Grade =	L_{pag} := 1.0ft	(User Input)	
Diameter of Pier =	d_p := 2.0ft	(User Input)	
Thickness of Footing =	T_f := 2.0ft	(User Input)	
Width of Footing =	W_f := 9.0·ft	(User Input)	

Material Properties:

Internal Friction Angle of Soil =	Φ_s := 30·deg	(User Input)	
Allowable Soil Bearing Capacity =	q_s := 2000·psf	(User Input)	
Unit Weight of Soil =	γ_{soil} := 110·pcf	(User Input)	
Unit Weight of Concrete =	γ_{conc} := 150·pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 0·ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0·ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

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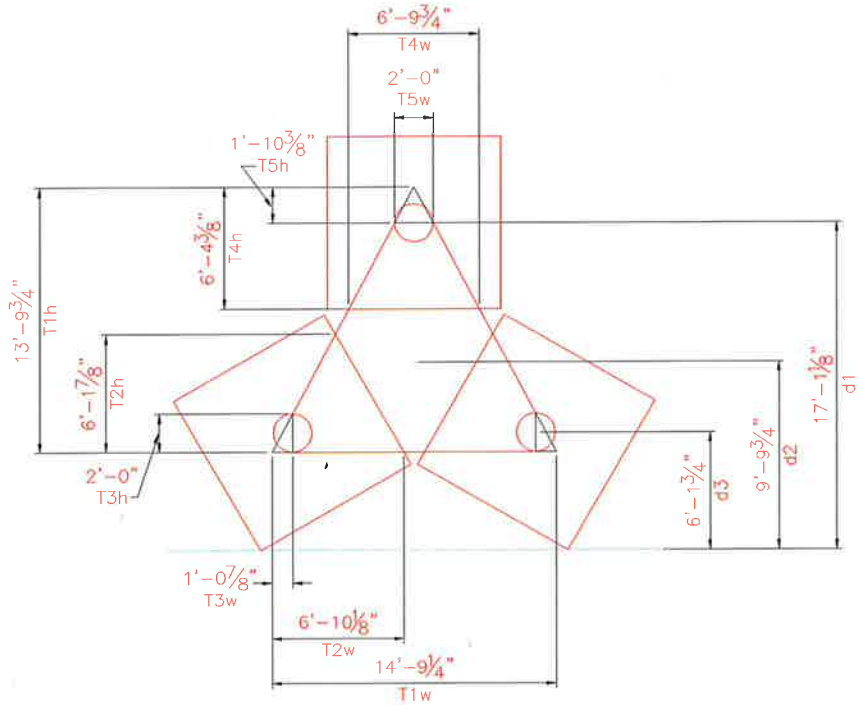
Proposed Concrete Mat Propperties:

Triangle One Width =	$T1_w := 14.77ft$	(User Input)
Triangle One Height =	$T1_h := 13.81ft$	(User Input)
Triangle Two Width =	$T2_w := 6.84ft$	(User Input)
Triangle Two Height =	$T2_h := 6.16ft$	(User Input)
Triangle Three Width =	$T3_w := 1.07ft$	(User Input)
Triangle Three Height =	$T3_h := 2.0ft$	(User Input)
Triangle Four Width =	$T4_w := 6.81ft$	(User Input)
Triangle Four Height =	$T4_h := 6.36ft$	(User Input)
Triangle Five Width =	$T5_w := 2.0ft$	(User Input)
Triangle Five Height =	$T5_h := 1.86ft$	(User Input)
Thickness of Mat =	$Mat_t := 2ft$	(User Input)

Distance To Centroids:

	$d_1 := 17.09ft$	(User Input)
	$d_2 := 9.81ft$	(User Input)
	$d_3 := 6.15ft$	(User Input)



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Overturning Moment Check:

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

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 110 \cdot pcf$

Cross Sectional Area 1 of Resisting Pyramid = $B_1 := W_f^2 = 81\,ft^2$

Cross Sectional Area 2 of Resisting Pyramid = $B_2 := \left[2\left(L_p - L_{pag} - n\right)\cdot\tan\left(\Phi_s\right) + W_f\right]^2 = 332.6\,ft^2$

Volume of Concrete Pad and Pier = $V_{pp} := \left[\left(W_f^2 \cdot T_f\right) + \frac{d_p^2 \cdot \pi}{4} L_p\right] = 190.3 \cdot ft^3$

Volume of the Concrete Mat = $V_{mat} := \frac{1}{2}\cdot\left[T1_w \cdot T1_h - \left(T3_w \cdot T3_h\right)\cdot 2 - \left(T5_w \cdot T5_h\right) - \left(\frac{d_p^2 \cdot \pi}{4}\right)\cdot 3\right]\cdot Mat_t = 187 \cdot ft^3$

Volume of Soil = $V_{soil} := \left[\frac{\left(L_p - L_{pag} - n\right)}{3}\cdot\left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right]\cdot\frac{3}{4} - \frac{d_p^2 \cdot \pi}{4}\left(L_p - L_{pag}\right) = 1130 \cdot ft^3$

Note: 3/4 reduction taken for amount soil used due to the concrete mat.

Overturning Moment = $M_{ot} := Moment + Shear_{tot}\cdot\left(L_p + T_f\right) = 1596 \cdot kip \cdot ft$

Weight of Soil = $WT_s := V_{soil}\cdot\gamma_s = 124.3 \cdot kip$

Weight of Concrete Mat = $WT_{mat} := V_{mat}\cdot\gamma_c = 28 \cdot kips$

Weight of Concrete Pad and Pier = $WT_{pp} := V_{pp}\cdot\gamma_c = 28.5 \cdot kips$

Resisting Moment = $M_r := \left(WT_{pp} + WT_s\right)\cdot d_1 + \left(WT_{pp} + WT_s\right)\cdot d_3 \cdot 2 + WT_{mat}\cdot d_2 = 4767.7\,ft \cdot kips$

Factor of Safety = $\frac{M_r}{M_{ot}} = 2.99$

$Overturning\_Moment := if\left(\frac{M_r}{M_{ot}} > 2, "OK", "NG"\right)$

Overturning_Moment = "OK"

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Bearing Pressure:

Area of the Pad = $A_{pad} := 64 \cdot ft^2$

Cross Sectional Area of Base = $A_{mat} := \frac{1}{2} \cdot \left[T1_w \cdot T1_h - \left(T2_w \cdot T2_h \right) \cdot 2 - T4_w \cdot T4_h \right] = 38.2 ft^2$

Cross Sectional Area of Base = $A := A_{pad} \cdot 3 + A_{mat} = 230.197 ft^2$

Section Modulus of Foundation = $S := \frac{A_{pad} \cdot d_1^2 + A_{pad} \cdot d_3^2 \cdot 2 + A_{mat} \cdot d_2^2}{d_2} = 2773.7 \cdot ft^3$

Weight of Soil Above Footing = $WT_{soil} := \left[\left(W_f^2 - \frac{\pi d_p^2}{4} \right) \cdot \left(L_p - L_{pag} - n \right) \right] \cdot \frac{3}{4} \cdot \gamma_s = 51.387 \cdot kips$

Total Weight = $P := \left(WT_{pp} + WT_{soil} \right) \cdot 3 + WT_{mat} = 267.8 \cdot kips$

Max Pressure = $q_{max} := \frac{P}{A} + \frac{M_{ot}}{S} = 1.74 \cdot ksf$

$Max\_Pressure\_Check := if\left(q_{max} < q_s, "OK", "NG" \right)$

Max_Pressure_Check = "OK"

Minimum Pressure in Mat = $P_{min} := \frac{P}{A} - \frac{M_{ot}}{S} = 0.588 \cdot ksf$

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

Min_Pressure_Check = "Okay"

SITE NAME	STRATFORD NORTH, CT		ECP - CELL #		5	0145
LATITUDE	41-14-43.20 N		LONGITUDE		73-07-12.00 W	
NOTE: **Please Order Appropriate RET Cables.** Install PCS LTE antennas and RRH's. Install 2x60W RRH's for 700Mhz and 4x45W for AWS. Install RET antennas.			SAVE BUTTON		PCS1	
			STRUCTURE TYPE		ROOFTOP	
700 Mhz - LTE Current Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	ALU 700 MHz TRDU		ALU 700 MHz TRDU		ALU 700 MHz TRDU	
ANTENNA TYPE	LNX-6514DS-T4M-750_4		LNX-6514DS-T4M-750_4		P65-16-XL-2_2_790_-2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	15		135		255	
DOWN TILT (ELEC+MECH)	4 Elec + 0 Mech		4 Elec + 0 Mech		2 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	NA		NA		NA	
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX						
700 Mhz - LTE Future Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	ALU 700 MHz RRH		ALU 700 MHz RRH		ALU 700 MHz RRH	
ANTENNA TYPE	SBNHH-1D85B		SBNHH-1D85B		SBNHH-1D85B	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	15		135		225	
DOWN TILT (ELEC+MECH)	4 Elec + 0 Mech		6 Elec + 0 Mech		4 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RRH_2X60-700U	1	ALU RRH_2X60-700U	1	ALU RRH_2X60-700U
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1				DB-T1-6Z-8AB-0Z	
1900 PCS - Current Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	PCS Modcell 4.0		PCS Modcell 4.0		PCS Modcell 4.0	
ANTENNA TYPE	MG D3-800T0		MG D3-800T0		MG D3-800T0	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	15		135		255	
DOWN TILT (ELEC+MECH)	0 Elec + 0 Mech		0 Elec + 0 Mech		0 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
1900 PCS - Future Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	ALU 1900 MHz RRH		ALU 1900 MHz RRH		ALU 1900 MHz RRH	
ANTENNA TYPE	SBNHH-1D85B		SBNHH-1D85B		SBNHH-1D85B	
QTY OF ANTENNAS PER FACE	*(shared w/ LTE 700)*		*(shared w/ LTE 700)*		*(shared w/ LTE 700)*	
ORIENTATION (DEG)	15		135		225	
DOWN TILT (ELEC+MECH)	3 Elec + 0 Mech		4 Elec + 0 Mech		4 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RRH_2X60-PCS	1	ALU RRH_2X60-PCS	1	ALU RRH_2X60-PCS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX						
2100 AWS - Current Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	ALU 2100 MHz RRH		ALU 2100 MHz RRH		ALU 2100 MHz RRH	
ANTENNA TYPE	BXA-171063-8BF-EDIN-0		BXA-171063-8BF-EDIN-0		BXA-171063-8BF-EDIN-0	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	15		135		255	
DOWN TILT (ELEC+MECH)	0 Elec + 0 Mech		0 Elec + 0 Mech		0 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RRH_2X40-AWS	1	ALU RRH_2X40-AWS	1	ALU RRH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1				DB-T1-6Z-8AB-0Z	
2100 AWS - Future Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	ALU 2100 MHz RRH		ALU 2100 MHz RRH		ALU 2100 MHz RRH	
ANTENNA TYPE	SBNHH-1D85B		SBNHH-1D85B		SBNHH-1D85B	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	15		135		225	
DOWN TILT (ELEC+MECH)	3 Elec + 0 Mech		4 Elec + 0 Mech		4 Elec + 0 Mech	
RAD CTR (FT AGL)	98		98		98	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RRH_4X45-AWS	1	ALU RRH_4X45-AWS	1	ALU RRH_4X45-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1				DB-T1-6Z-8AB-0Z	

850 Cellular - No Change	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	Cellular Modcell 4.0HD	Cellular Modcell 4.0HD	Cellular Modcell 4.0HD
ANTENNA TYPE	APL868013	APL868013	APL868013
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	15	135	255
DOWN TILT (ELEC+MECH)	0 Elec + 0 Mech	0 Elec + 0 Mech	0 Elec + 0 Mech
RAD CTR (FT AGL)	98	98	98
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			

NUMBER OF CABLE'S NEEDED						ESTIMATED CABLE LENGTH			
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES			12	MAINLINE (FT)			
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS			12	TOP JUMPER (FT)			12
Equipment Cable Ordering		**MAIN CABLE #**	12	+	0	**TOP JUMPER #**		+	0
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES			**2**	FIBER LINE MODEL #			HB158-1-08U8-S8J18
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS			**9**	TOP JUMPER MODEL #			HB058-1-08U1-S1J18
Fiber Cable Ordering		**FIBER CABLE #**	1	+	**1**	**TOP JUMPER #**	3	+	**6**

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

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1	800	Tx1/Rx0	RED	A7	800	Tx2/Rx0	BLUE	A13	800	Tx3/Rx0	GREEN
A2	1900	Tx1/Rx0	RED/ WHITE	A8	1900	Tx2/Rx0	BLUE/ WHITE	A14	1900	Tx3/Rx0	GREEN/WHITE
A3	700	Tx1/Rx0	RED/ ORANGE	A9	700	Tx2/Rx0	BLUE/ ORANGE	A15	700	Tx3/Rx0	GREEN/ORANGE
A4	700	Tx4/Rx1	RED/RED/ ORANGE	A10	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A16	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A5	1900	Tx4/Rx1	RED/RED/ WHITE	A11	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A17	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A6	800	Tx4/Rx1	RED/RED	A12	800	Tx5/Rx1	BLUE/BLUE	A18	800	Tx6/Rx1	GREEN/GREEN
F1-A	1700	Tx/Rx	RED/ BROWN	F1-B	1700	Tx/Rx	BLUE/BROWN	F1-C	1700	Tx/Rx	GREEN/BROWN
F1-D	1700	Tx/Rx	RED/RED/ BROWN	F1-E	1700	Tx/Rx	BLUE/BLUE/BROWN	F1-F	1700	Tx/Rx	GREEN/GREEN/BROWN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By : Ryan Ulanday	Alex Restrepo	RU	7/15/2016

Site Configuration

Product Specifications

COMMSCOPE®

SBNHH-1D85B

Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 85° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.5	14.4	17.0	17.6	17.9	17.9
Beamwidth, Horizontal, degrees	83	86	81	79	79	79
Beamwidth, Vertical, degrees	12.3	11.1	5.7	5.3	5.0	4.6
Beam Tilt, degrees	0–12	0–12	0–8	0–8	0–8	0–8
USLS (First Lobe), dB	19	18	15	16	17	18
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	25	25	25	25
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	14.3	14.2	16.8	17.4	17.7	17.8
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.5	±0.5	±0.3	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.2	0 ° | 14.1	0 ° | 16.8	0 ° | 17.5	0 ° | 17.7	0 ° | 17.6
	6 ° | 14.3	6 ° | 14.3	4 ° | 16.8	4 ° | 17.5	4 ° | 17.8	4 ° | 18.0
	12 ° | 14.1	12 ° | 13.9	8 ° | 16.7	8 ° | 17.2	8 ° | 17.5	8 ° | 17.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±4.8	±3.2	±3.8	±1.9
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.9	±0.2	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	15	16	17	18
Front-to-Back Total Power at 180° ± 30°, dB	23	23	27	26	25	27
CPR at Boresight, dB	20	20	23	22	18	22
CPR at Sector, dB	15	16	12	13	10	6

* 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-1D85B

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	19.1 kg | 42.1 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (2) | 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	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.2 kg | 68.8 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

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.

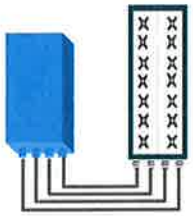
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

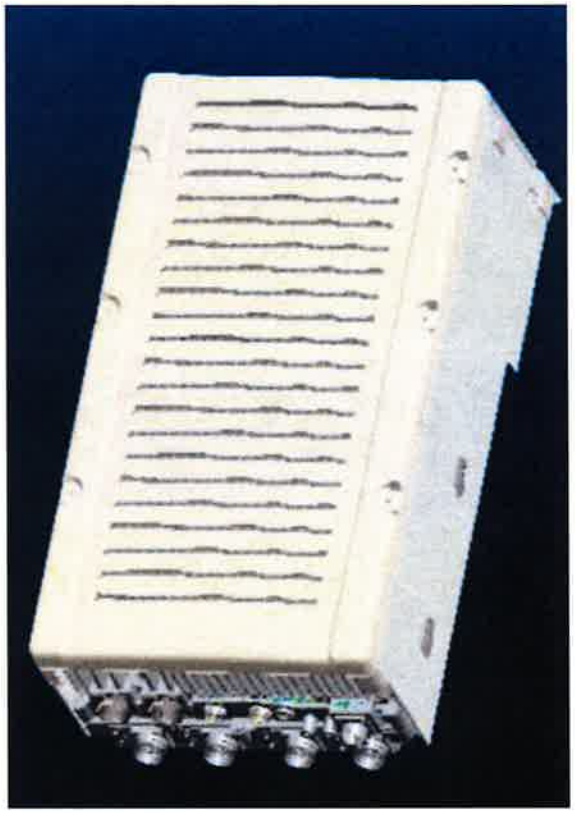
TECHNICAL SPECIFICATIONS

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

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

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



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

Alcatel·Lucent

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent		Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)		Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.		
*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [L_{WAd}]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	

*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled

Power Reporting					
Power Input	-48V	No. Power Supplies	N/A (Customer provided power plant)	Number of Inputs per Power Supply	1
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)	Maximum Input (each power supply in Watts)	N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)	58W (to AISG port, 29V/2A)
Power Supply Connection Type	DC entry via Conduit Box	Power Supply Make & Model	N/A (Customer provided power plant)		
Input Protection	no input fuse	Input Protection Make & Model	N/A (Customer provided power plant)		
Redundancy Scheme	N/A				
Nominal Voltage	-48VDC	Maximum Voltage	-57V	Minimum Voltage	-38V
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)	*25)Max Current at Maximum Voltage	14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage	21.7A (add 1.5A if AISG port loaded 2A*29V)

Return completed forms to Engineering and Operations Support (EOS)

Richard.damiano@verizonwireless.com

Product Data Sheet DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

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

Features/Benefits

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

Technical Specifications

Mechanical Specifications

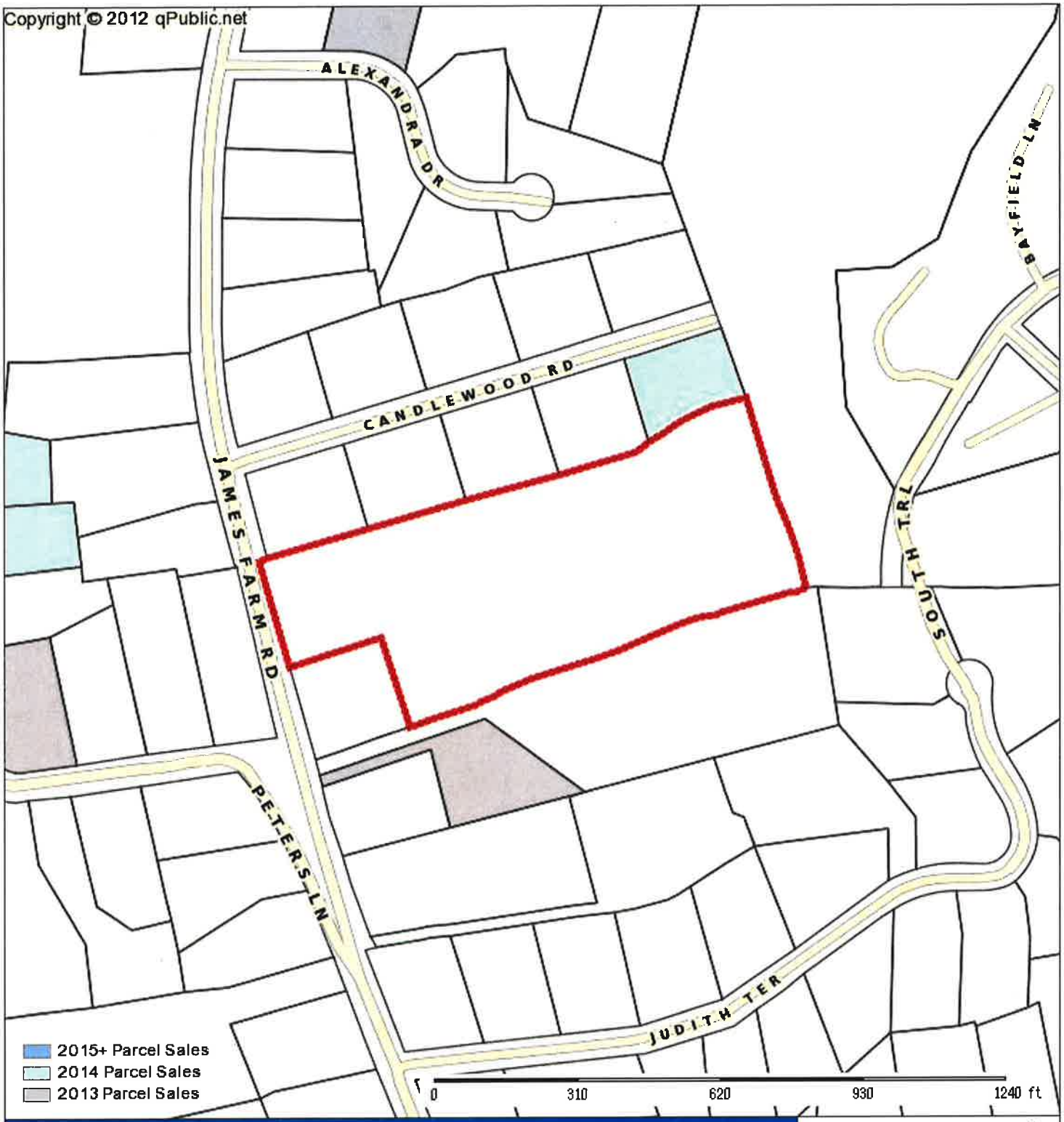
Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum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

Electrical Specifications

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

* This data is provisional and subject to change.

ATTACHMENT 4



Town of Stratford

Parcel: 8882 Acres: 9.61003

Name:	SHOOP DARCY (50%) &	Land Value:	388700
Site:	630 JAMES FARM RD	Improvement Value:	127700
Sale:	$0 on 2012-07-19 Reason=11 Qual=U	Accessory Value:	0
Mail:	41 WILDWOOD LN ROCKY HILL, CT 06067	Total Value:	777700

Date printed: 08/25/16 : 10:36:51

TOWN OF STRATFORD

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Owner and Parcel Information

Owner Name	SHOOP DARCY (50%) & SHOOP DANA (50%)	**Today's Date**	August 25, 2016
Mailing Address	41 WILDWOOD LN	**Account #**	0857800
	ROCKY HILL, CT 06067		
Location Address	630 JAMES FARM RD	**Census Tract**	0813
Map / Block / Lot	50 /19 / 3 / 28/ Dev Lot: 11.8 ACRES E/S	**Acreage**	9.61
Use Class / Description	101 Single Family	**Parcel Map**	Show Parcel Map / Owner List By Radius

Current Appraised Value Information

Building Value	OB Value	Land Value	Special Land Value	Total Appraised Value	Net Appraised Value	Current Assessment
$ 127,700	$ 261,300	$ 388,700		$ 777,700	$ 777,700	$ 544,390

Assessment History

Year	Building	OB/Misc	Land	Total Assessment
Current	$ 89,390	$ 182,910	$ 272,090	$ 544,390
2015	$ 89,390	$ 182,910	$ 272,090	$ 544,390
2014	$ 89,390	$ 182,910	$ 272,090	$ 544,390

Land Information

Use	Class	Zoning	Area	Value
Single Family	R	RS-1	1 AC	$ 109,300
Single Family	R	RS-1	8.61 AC	$ 108,900
Cell Site	I	RS-1	1 SF	$ 170,500

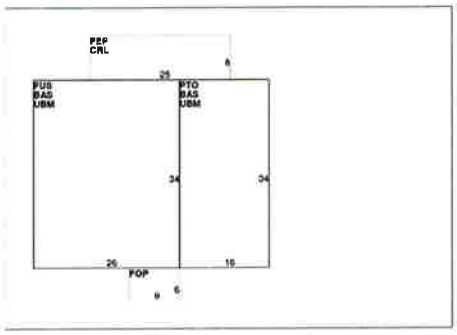
Residential Building Information

Style	Year Built	Living Area	Stories	Grade	Exterior Wall	Interior Wall	Fireplaces
Modern/Contemp	1947	2,312	2.00	C+	Stone	Plastered and Plastered	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC**	**Bedrooms/Full Baths/Half Baths/Total Rooms**	**Basement Sq Ft**
T&G/Rubber	Flat	Vinyl/Asphalt and Ceram Clay Til	Oil	Radiant	None	3 / 2 / 1 / 6	1,428

Building Sub Areas

Code	Description	Living Area	Gross Area	Effective Area
BAS	First Floor	1,428	1,428	
CRL	Crawl Space	0	200	
FEP	Finished Enclosed Porch	0	200	
FOP	Finished Open Porch	0	54	
FUS	Finished Upper Story	884	884	
PTO	Patio	0	544	
UBM	Unfinished Basement	0	1,428	
	Totals	**2,312**	**4,738**	**2,803**

Building Sketch Enlarge



Building Photo Enlarge

Out Buildings / Extra Features

Description	Sub Description	Area	Year Built	Value
Garage	Frame	1,050 S.F.	1947	$ 14,300
Shed	Frame	240 S.F.	1953	$ 1,300
Shed	Metal	60 S.F.	2000	$ 0
Shed	Cell	360 S.F.	2006	$ 113,400
Shed	Cell	420 S.F.	2008	$ 132,300
ELEVATOR-NON FUNCTIONAL		1		$ 0

Sale Information

Sale Date	Sale Price	Deed Book/Page	Sale Qualification	Reason	Vacant or Improved	Owner
07/19/2012		3594/0229	Unqualified	Judicial Sale	Improved	SHOOP DARCY (50%) & SHOOP DANA (50%)
10/27/2011		3517/0310	Unqualified	Judicial Sale	Improved	FEDORKO WILHELMINA EST & SHOOP RANDY CO- SHOOP WILHELMINA J
02/24/2005		2587/ 348	Unqualified	Other	Improved	FEDORKO WILHELMINA & SHOOP RANDY CO-TRUSTEES
06/27/2003		2181/0244	Unqualified	NT		FEDORKO PETRO EST & WILMA B
05/11/1945		0208/0309	Unqualified		Improved	FEDORKO PETRO & WILMA B

Permit Information

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments

21237	03/06/2014	BP	Building Permi	$ 9,000		100		ADD 3 ANTEENNAS; BELL ATLANTIC
18415	06/04/2010	EL	Electrical Per	$ 1,500	08/09/2010	100		WIRE NEW CABINET
18583	05/17/2010	BP	Building Permi	$ 20,000	07/13/2010	100		REPL ANTENNAS/DISHES & CAB.
18375	02/16/2010	BP	Building Permi	$ 39,000	05/24/2010	100		REPL ANTENNAE
11668	09/29/2005	EL	Electrical Per	$ 14,000	06/27/2006	100		WIRE CELL SITE
14848	06/20/2005	BP	Building Permi	$ 100,000	06/27/2006	100		TELE/COM ANTENNA
11207	06/16/2000					100		COMMUNICATION FACILITY;

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