Robinson+Cole

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Also admitted in Massachusetts

July 11, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
61 Lowell Davis Road, Thompson, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains nine (9) antennas at the 243-foot level of the existing 250-foot tower at 61 Lowell Davis Road in Thompson, Connecticut (the "Property"). The tower is owned by Central States Tower. The Council approved Cellco's use of this tower in 1991. Cellco now intends to modify its facility by adding three (3) model WBX065X19x050, 2100 MHz antennas, for a total of twelve (12) antennas all at the same 243-foot level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

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

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's new antennas and RRHs will be installed at a centerline height of 243 feet on the existing 250-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 local criteria.

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

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Paul A. Lenky, Thompson First Selectman
NUMA Tool Company
Sandy M. Carter

ATTACHMENT 1

1710-2170 MHz

WBX065X19x050

X-Pol | VET Panel | 65° | 19.0 dBi

Model Number Options
WBX065X19M150 - Manual Electrical Tilt Antenna (aka 5142100)
WBX065X19R150 - Remote Electrical Tilt Antenna (aka 5142000)

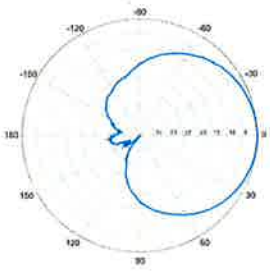
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1900-2170 MHz
Polarization	± 45°	± 45°	± 45°
Horizontal beamwidth	69°	66°	63°
Vertical beamwidth	4.9°	4.6°	4.3°
Gain	15.9 dBd / 18.0 dBi	16.4 dBd / 18.5 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt	2°-10° Variable Electrical Tilt		
Impedance	50Ω		
VSWR	< 1.4:1		
Upper sidelobe suppression	< -18 dB		
Front-to-Back ratio	> 25 dB		
First null	> -20 dB typical		
Inter-port isolation	> 30 dB		
IM3 (2x20W carrier)	< -153 dBc		
Input power	2 x 160 W		
Connector(s)	2 Ports / 7/16 DIN / Female / Bottom		
Operating temperature	-40° to +60° C (-40° to +140° F)		

Mechanical Characteristics		
Dimensions HxWxD	1950 x 157 x 69 mm	76.8 x 6.2 x 2.7 in
Weight without brackets	9.5 kg	20.9 lbs
Survival wind speed	241 km/hr	150 mph
Wind load @ 161 km/hr (100 mph)	Front: 405 N Side: 176 N	Front: 91 lbf Side: 40 lbf
RET type / Part number	Internal / RETU-CA01	

Mounting Options	Part Number	Fits Pipe Diameter	Weight
Pole mounting bracket kit	MKS05P01	40-115 mm 1.6-4.5 in	2.9 kg 6.5 lbs
Scissor tilt bracket kit	MKS05T03	40-115 mm 1.6-4.5 in	4.1 kg 9.1 lbs
Bar tilt bracket kit	MKS05T04	40-115 mm 1.6-4.5 in	4.0 kg 8.8 lbs

Concealment Options		
UNICELL module	UNX14-19	UNX20-19
Azimuth swivel	± 30°	± 30°
Elevation tilt	Fixed	Fixed
Required mounting kit	UNX14-WBX-AZ	UNX20-WBX-AZ
FP mounting configuration	None	

1710-1880 MHz



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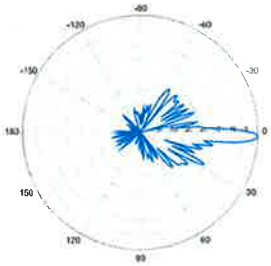
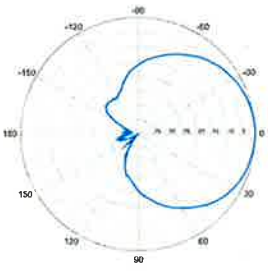


2° | Vertical

1850-1990 MHz



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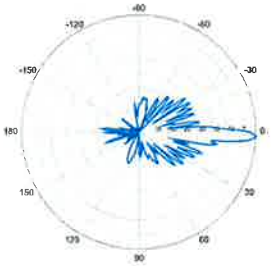
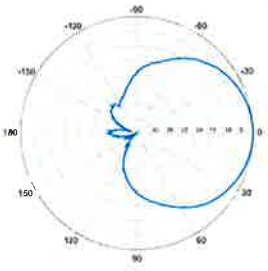


2° | Vertical

1900-2170 MHz



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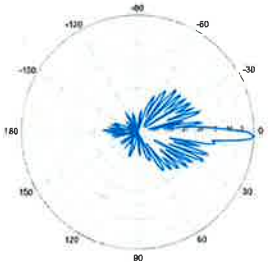
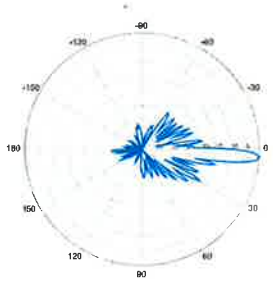
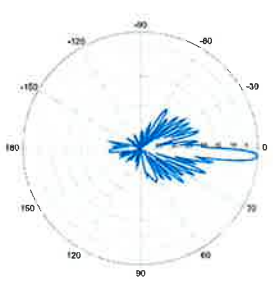
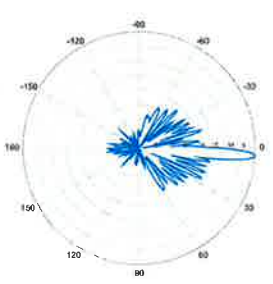


2° | Vertical

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

WBX065X19x050

X-Pol | VET Panel | 65° | 19.0 dBi

1710-1880 MHz	1850-1990 MHz	1900-2170 MHz
		
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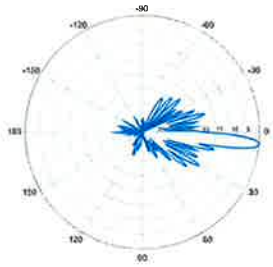	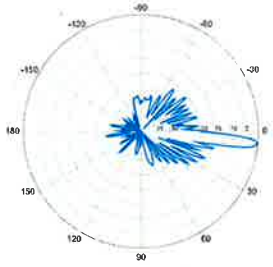	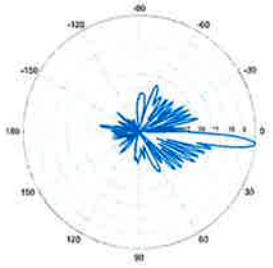
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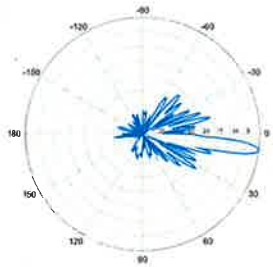	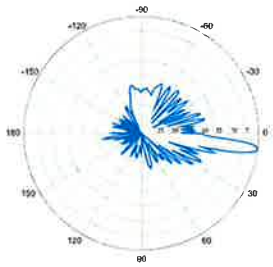	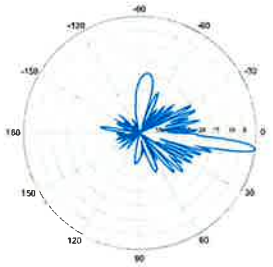
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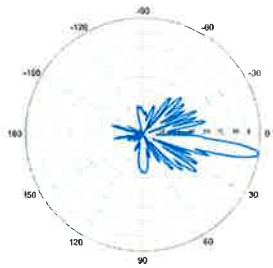	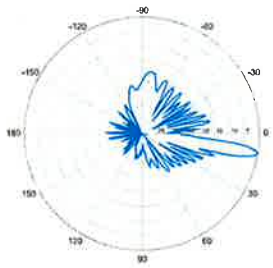	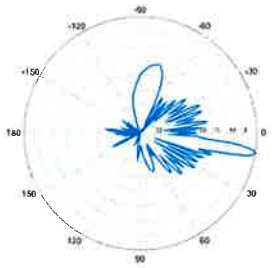
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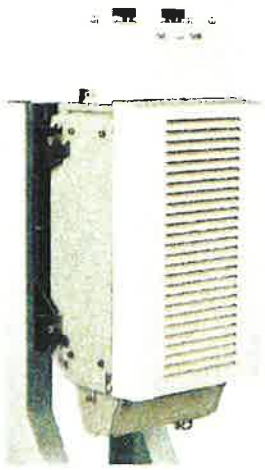
Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

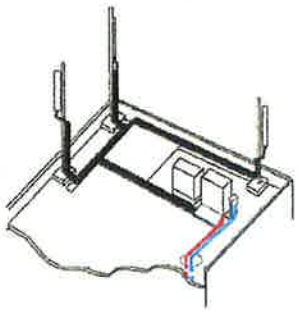
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced.
The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

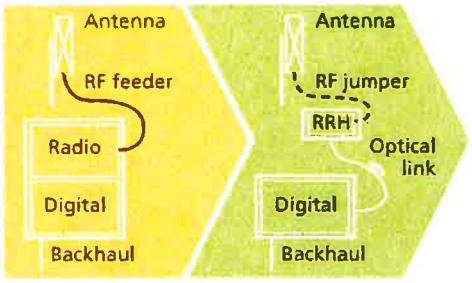
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

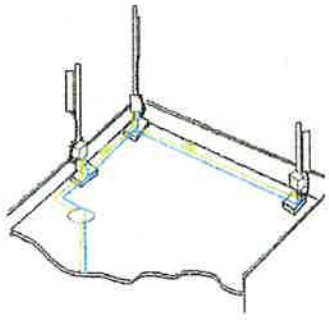
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

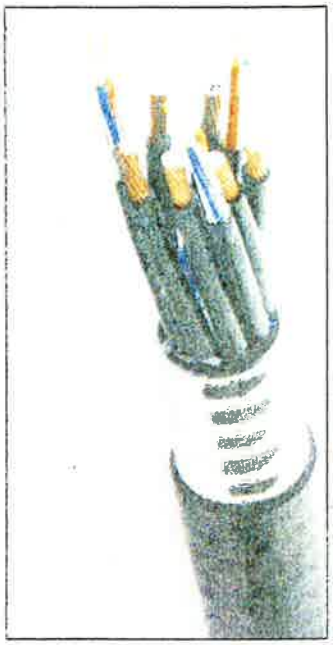


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Mechanical properties			
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)
Electrical properties			
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)
Fiber Optic properties			
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
DC Power cable properties			
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Temperature			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

* This data is provisional and subject to change

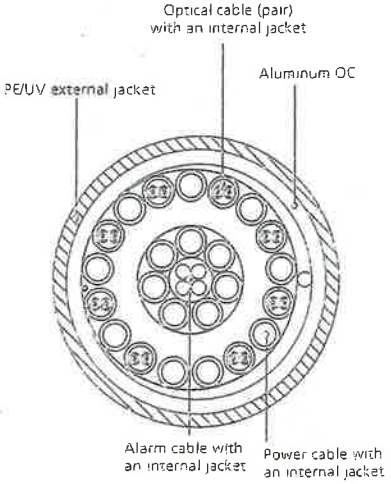


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Thompson								
Tower Height: 250'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	205	0.0097	880	0.5867	1.65%	
*AT&T UMTS	2	875	205	0.0150	1900	1.0000	1.50%	
*AT&T GSM	1	283	205	0.0024	880	0.5867	0.41%	
*AT&T GSM	4	525	205	0.0180	1900	1.0000	1.80%	
*AT&T LTE	1	1771	205	0.0152	734	0.4893	3.10%	
*MetroPCS	3	443.61	215	0.0104	2140	1.0000	1.04%	
*CONN-2 (Metro Mobile)	1	5130	235	0.0334	875	0.5833	5.73%	
*Nextel	9	100	190	0.0090	851	0.5673	1.58%	
*Paging	1	500	188	0.0051	928	0.6187	0.82%	
*EMS/Town	3	500	172	0.0182	450	0.3000	6.08%	
*Town	1	500	160	0.0070	66	0.2000	3.51%	
Verizon	**11**	**328**	**243**	**0.0220**	**1970**	**1.0000**	**2.20%**	
Verizon	**9**	**336**	**243**	**0.0184**	**869**	**0.5793**	**3.18%**	
Verizon	**1**	**1750**	**243**	**0.0107**	**2145**	**1.0000**	**1.07%**	
Verizon	**1**	**1050**	**243**	**0.0064**	**698**	**0.4973**	**1.29%**	
								34.9%
* Source: Siting Council								

ATTACHMENT 3

GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

STRUCTURAL ANALYSIS REPORT

250' Guyed Tower

61 Lowell Davis Road,
Thompson, CT 06277

Central States Tower Site Name: Thompson
Central States Tower Number: CT-00-3701

Verizon Wireless Collocation

GPD Project Number: 2014702.19

Analysis Results

Tower Components	82.3%	Sufficient
Foundation	96.6%	Sufficient

April 18, 2014

Respectfully submitted by:

4/18/14
John N. Kabak, P.E.
Connecticut #: PEN.0028336

520 South Main Street . Suite 2531 . Akron, Ohio 44311 . 330-572-2100 . Fax 330-572-2101 . www.GPDGroup.com
Glaus Pyle Schomer Burns and DeHaven, Inc.

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APPENDICES

1. TNXTOWER OUTPUT

Executive Summary

The purpose of this analysis is to verify whether the existing self support tower is structurally capable of carrying the proposed antenna and coax loads identified by Verizon Wireless to Central States Tower. This report was commissioned by Yuri Dobrowolsky of Central States Tower.

The existing structure and its foundations have been analyzed per the following requirements:

Governing Code/s	TIA/EIA-222-F, ASCE7-05, & 2013 CT State Building Code
Wind Speed	85 MPH Fastest Mile
Wind Speed w/ Ice	38 MPH Fastest Mile
Radial Ice Thickness	0.75″

Conclusions & Recommendations

The designs of the tower and foundations are sufficient for the proposed loading in accordance with the above loading criteria and will not require modification.

Tower Description

The existing 250' Guyed Tower is located in Thompson, CT. The original design loading was not provided. All loading and structural information was taken from the documents shown in the following table:

Documents Provided:

Document Type	Remarks	Source
Tower Mapping Report	GPD GROUP Job #: 2012816.10 Dated: 10/19/2012	GPD
Foundation NDT Mapping Report	GPD GROUP Job #: 2012816.10 Dated: 11/16/2012	GPD
Geotechnical Report	GPD GROUP Job #: 2012816.10 Dated: 11/16/2012	GPD
Previous Structural Analysis	GPD GROUP Job #: 2012816.10 Dated: 11/26/2012	GPD
Proposed Loading	Central States Tower Email Correspondence Dated: 03/25/2014	CST

Tower Materials: (Assumed)

Structural Components	Material Strength
Legs	ASTM 572 (50 KSI Yield Strength)
Bracing	ASTM A36 (36 KSI Yield Strength)
Bolts	A325
Guy Wires	EHS Strands

Tower Loading

The following data shows the major loading that the tower supports. All loading information was provided by Central States Tower, or taken from the previous structural analysis.

Existing/Leased Loading

Carrier	Mounting Level (ft)	Center Line Elevation (ft)	# of Antennas	Antenna Manufacture	Antenna/Mount Model	# of Coax	Coax Size (in)	Note
Verizon Wireless	243	243	3	Antel	BXA 70063/6CF	12	1-5/8	
			3	Antel	BXA 80063/6CF			
			3	Antel	BXA 171063/12CF			
			6	RFS	FD9R6004/2C-3L			
			3		Sector Mount			
AT&T	205	205	3	KMW	AM-X-CD-17-65-00T	12 1 1	1-5/8 7/8 Power 1/2 Fiber	1
			6	Powerwave	7770.0			
			6	Powerwave	LGP 21401			
			6	Powerwave	LGP 21901			
			6	Ericsson	RRUS-11			
			1	Raycap	DC6-48-60-18-8F			
			3		Sector Mount			
Unknown	200	205	1	Unknown	120" x 3" Omni	1	1-5/8	
			1		Standoff Mount			

Notes:

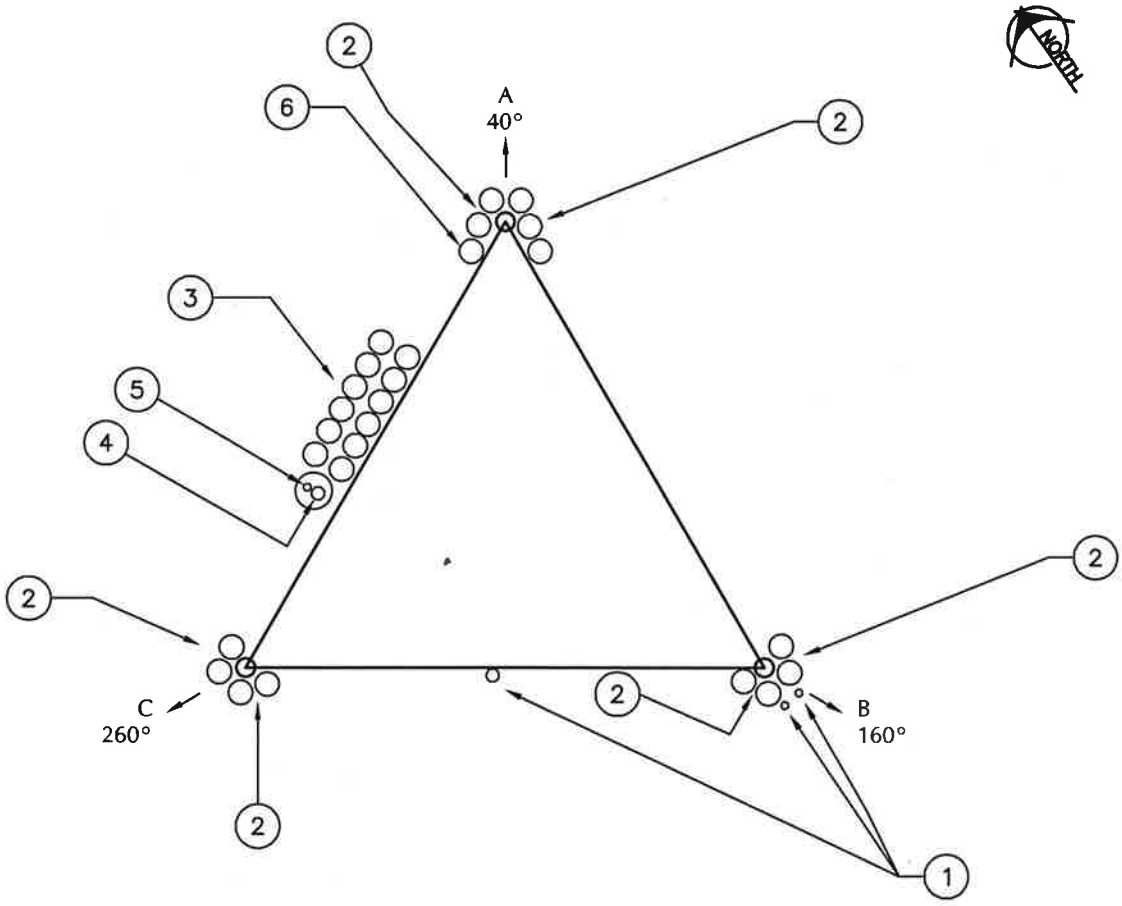
1) The 7/8" Power and 1/2" Fiber cables run inside one 3" flex conduit.

Final Loading Configuration

Carrier	Mounting Level (ft)	Center Line Elevation (ft)	# of Antennas	Antenna Manufacture	Antenna/Mount Model	# of Coax	Coax Size (in)	Note
Verizon Wireless	243	243	3	Antel	BXA 70063/6CF	13	1-5/8	1
			3	Antel	BXA 80063/6CF			
			3	Antel	BXA 171063/12CF			
			3	Antel	WBX 065X19R050			
			6	RFS	FD9R6004/2C-3L			
			3	ALU	RH-2X40-AWS			
			1	RFS	DB-T1-6Z-8AB-0Z			
			3		Sector Mount			
AT&T	205	205	3	KMW	AM-X-CD-17-65-00T	12 1 1	1-5/8 7/8 Power 1/2 Fiber	2
			6	Powerwave	7770.0			
			6	Powerwave	LGP 21401			
			6	Powerwave	LGP 21901			
			6	Ericsson	RRUS-11			
			1	Raycap	DC6-48-60-18-8F			
			3		Sector Mount			
Unknown	200	205	1	Unknown	120" x 3" Omni	1	1-5/8	
			1		Standoff Mount			

Notes:

1) This represents the final loading configuration for Verizon Wireless. See the next page for the proposed coax layout.
2) The 7/8" Power and 1/2" Fiber cables run inside one 3" flex conduit.



#	CARRIER	SIZE	QTY.	ELEVATION	NOTES
1	Tower Lighting	1/2" & 1"	2 & 1	124' & 250'	(1) 1/2" to 124'
2	Verizon	1-5/8"	13	243'	(1) Proposed
3	AT&T	1-5/8	12	205'	
4	AT&T	7/8"	1	205'	Within Flex Conduit
5	AT&T	1/2"	1	205'	Within Flex Conduit
6	Unknown	1-5/8"	1	200'	

Assumptions

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in the Existing/Reserved Loading and Proposed Loading Tables, and the specified documents.
4) All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5) Mount sizes, weights, and manufacturers are best estimates based on photos provided and determined without the benefit of a site visit by GPD.
6) The existing coax layout has been modeled based on the previous structural analysis.
7) The proposed coax shall be installed as illustrated in this report.
8) Tower leg azimuths have been taken from the previous structural analysis.
9) Structural material grades were assumed based on prior experience with similar guyed towers.
10) All member connections and foundation steel reinforcing are assumed designed to meet or exceed the load carrying capacity of the connected member and surrounding soils respectively unless otherwise specified in this report.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Group should be allowed to review any new information to determine its effect on the structural integrity of the tower.

Tower Section Results

Capacity Summary of Structural Components

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF x P_{allow} K	% Capacity	Pass/ Fail
T1	250 - 240	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-5.9	58.2	18.3	Pass
T2	240 - 220	Leg	Pipe 2.875" x 0.203" (2.5 STD)	37	-35.6	57.5	62.0	Pass
T3	220 - 200	Leg	Pipe 2.875" x 0.203" (2.5 STD)	103	-40.8	57.6	71.0	Pass
T4	200 - 180	Leg	Pipe 2.875" x 0.203" (2.5 STD)	169	-37.1	57.4	64.5	Pass
T5	180 - 160	Leg	Pipe 2.875" x 0.203" (2.5 STD)	236	-19.0	41.5	45.9	Pass
T6	160 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	302	-19.9	41.5	47.9	Pass
T7	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	369	-37.4	57.0	65.5	Pass
T8	120 - 100	Leg	Pipe 2.875" x 0.203" (2.5 STD)	435	-37.4	57.0	65.5	Pass
T9	100 - 80	Leg	Pipe 2.875" x 0.203" (2.5 STD)	499	-25.0	41.5	60.4	Pass
T10	80 - 60	Leg	Pipe 2.875" x 0.203" (2.5 STD)	565	-26.9	41.5	64.8	Pass
T11	60 - 40	Leg	Pipe 2.875" x 0.203" (2.5 STD)	631	-27.7	41.4	67.0	Pass
T12	40 - 20	Leg	Pipe 2.875" x 0.203" (2.5 STD)	697	-28.6	41.4	69.0	Pass
T13	20 - 6.75	Leg	Pipe 2.875" x 0.203" (2.5 STD)	763	-29.1	41.4	70.2	Pass
T14	6.75 - 0	Leg	Pipe 2.875" x 0.203" (2.5 STD)	809	-30.2	41.4	72.8	Pass
T1	250 - 240	Diagonal	1 1/4	13	-1.8	23.9	7.6	Pass
T2	240 - 220	Diagonal	3/4	96	-3.5	6.2	56.9	Pass
T3	220 - 200	Diagonal	3/4	116	-3.3	6.2	53.7	Pass
T4	200 - 180	Diagonal	3/4	230	-3.4	6.2	55.2	Pass
T5	180 - 160	Diagonal	3/4	299	-2.2	6.2	35.1	Pass
T6	160 - 140	Diagonal	3/4	313	-2.3	6.2	37.8	Pass
T7	140 - 120	Diagonal	3/4	379	-3.2	6.2	51.5	Pass
T8	120 - 100	Diagonal	3/4	497	-3.1	6.2	50.6	Pass
T9	100 - 80	Diagonal	3/4	509	-2.1	4.7	44.9	Pass
T10	80 - 60	Diagonal	3/4	625	-2.1	4.7	45.2	Pass
T11	60 - 40	Diagonal	3/4	641	-2.3	4.7	49.8	Pass
T12	40 - 20	Diagonal	3/4	708	-2.4	4.7	51.2	Pass
T13	20 - 6.75	Diagonal	3/4	804	-2.4	4.7	50.4	Pass
T14	6.75 - 0	Diagonal	3/4	822	-3.8	5.7	66.9	Pass
T1	250 - 240	Horizontal	1 1/4	17	-0.9	23.4	3.9	Pass
T2	240 - 220	Horizontal	5/8	94	-1.1	2.8	40.0	Pass
T3	220 - 200	Horizontal	5/8	130	3.0	8.8	34.1	Pass
T4	200 - 180	Horizontal	5/8	226	2.4	8.8	27.3	Pass
T5	180 - 160	Horizontal	5/8	252	1.9	6.6	28.2	Pass
T6	160 - 140	Horizontal	5/8	318	2.0	6.6	29.6	Pass
T7	140 - 120	Horizontal	5/8	385	2.0	6.6	30.1	Pass
T8	120 - 100	Horizontal	5/8	451	2.4	6.6	36.0	Pass
T9	100 - 80	Horizontal	5/8	517	2.5	6.6	37.4	Pass
T10	80 - 60	Horizontal	5/8	583	2.5	6.6	38.1	Pass
T11	60 - 40	Horizontal	5/8	649	2.7	6.6	41.5	Pass
T12	40 - 20	Horizontal	5/8	715	2.8	6.6	42.8	Pass
T13	20 - 6.75	Horizontal	5/8	801	2.8	6.6	42.8	Pass
T14	6.75 - 0	Horizontal	2 x 1/4	814	3.5	10.8	32.0	Pass
T1	250 - 240	Secondary Horizontal	5/8	26	0.0	8.8	0.3	Pass
T2	240 - 220	Secondary Horizontal	5/8	102	0.0	8.8	0.3	Pass
T3	220 - 200	Secondary Horizontal	5/8	168	0.0	8.8	0.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF x P_{allow} K	% Capacity	Pass/ Fail
T4	200 - 180	Secondary Horizontal	5/8	234	0.0	8.8	0.1	Pass
T5	180 - 160	Secondary Horizontal	5/8	250	-0.0	5.9	0.1	Pass
T6	160 - 140	Secondary Horizontal	5/8	316	-0.0	5.9	0.1	Pass
T7	140 - 120	Secondary Horizontal	5/8	422	-0.0	5.9	0.1	Pass
T8	120 - 100	Secondary Horizontal	5/8	498	-0.0	5.9	0.1	Pass
T9	100 - 80	Secondary Horizontal	5/8	514	0.0	8.8	0.1	Pass
T10	80 - 60	Secondary Horizontal	5/8	580	0.0	8.8	0.1	Pass
T11	60 - 40	Secondary Horizontal	5/8	646	0.0	8.8	0.2	Pass
T12	40 - 20	Secondary Horizontal	5/8	712	0.0	8.8	0.3	Pass
T13	20 - 6.75	Secondary Horizontal	5/8	778	0.0	8.8	0.3	Pass
T1	250 - 240	Top Girt	L2x1 1/2x3/16	4	-0.0	9.5	0.2	Pass
T2	240 - 220	Top Girt	L2x1 1/2x3/16	40	-2.0	9.5	21.5	Pass
T3	220 - 200	Top Girt	L2x1 1/2x3/16	108	1.2	17.9	7.0	Pass
T4	200 - 180	Top Girt	L2x1 1/2x3/16	172	1.4	17.9	7.8	Pass
T5	180 - 160	Top Girt	L2x1 1/2x3/16	239	2.4	17.9	13.6	Pass
T6	160 - 140	Top Girt	L2x1 1/2x3/16	305	1.1	13.4	8.0	Pass
T7	140 - 120	Top Girt	L2x1 1/2x3/16	371	1.1	13.4	8.3	Pass
T8	120 - 100	Top Girt	L2x1 1/2x3/16	438	1.9	13.4	14.1	Pass
T9	100 - 80	Top Girt	L2x1 1/2x3/16	504	1.4	13.4	10.1	Pass
T10	80 - 60	Top Girt	L2x1 1/2x3/16	570	1.4	13.4	10.5	Pass
T11	60 - 40	Top Girt	L2x1 1/2x3/16	636	2.0	13.4	14.6	Pass
T12	40 - 20	Top Girt	L2x1 1/2x3/16	702	1.6	13.4	11.7	Pass
T13	20 - 6.75	Top Girt	L2x1 1/2x3/16	768	1.6	13.4	12.0	Pass
T2	240 - 220	Bottom Girt	L2x1 1/2x3/16	44	1.4	17.9	7.7	Pass
T3	220 - 200	Bottom Girt	L2x1 1/2x3/16	110	1.2	17.9	6.8	Pass
T5	180 - 160	Bottom Girt	L2x1 1/2x3/16	242	1.1	13.4	7.9	Pass
T6	160 - 140	Bottom Girt	L2x1 1/2x3/16	308	1.1	13.4	8.3	Pass
T8	120 - 100	Bottom Girt	L2x1 1/2x3/16	441	1.4	13.4	10.1	Pass
T9	100 - 80	Bottom Girt	L2x1 1/2x3/16	507	1.4	13.4	10.5	Pass
T11	60 - 40	Bottom Girt	L2x1 1/2x3/16	639	1.6	13.4	11.6	Pass
T12	40 - 20	Bottom Girt	L2x1 1/2x3/16	705	1.6	13.4	12.0	Pass
T13	20 - 6.75	Bottom Girt	2 x 1/4	771	3.3	10.8	30.8	Pass
T1	250 - 240	Guy A@240.083	9/16	845	10.5	17.5	60.1	Pass
T4	200 - 180	Guy A@180.083	9/16	853	13.1	17.5	74.9	Pass
T7	140 - 120	Guy A@120.083	1/2	856	8.9	13.4	65.9	Pass
T10	80 - 60	Guy A@60.0833	3/8	859	4.4	7.7	57.2	Pass
T1	250 - 240	Guy B@240.083	9/16	840	10.5	17.5	59.8	Pass
T4	200 - 180	Guy B@180.083	9/16	852	13.0	17.5	74.3	Pass
T7	140 - 120	Guy B@120.083	1/2	855	8.9	13.4	65.9	Pass
T10	80 - 60	Guy B@60.0833	3/8	858	4.4	7.7	57.1	Pass
T1	250 - 240	Guy C@240.083	9/16	833	10.5	17.5	60.1	Pass
T4	200 - 180	Guy C@180.083	9/16	851	13.1	17.5	75.1	Pass
T7	140 - 120	Guy C@120.083	1/2	854	8.9	13.4	66.2	Pass
T10	80 - 60	Guy C@60.0833	3/8	857	4.4	7.7	57.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF x P_{allow} K	% Capacity	Pass/ Fail
T1	250 - 240	Top Guy Pull-Off@240.083	L2x1 1/2x3/16	7	4.9	17.9	27.4	Pass
T4	200 - 180	Top Guy Pull-Off@180.083	L2x1 1/2x3/16	176	3.4	17.9	19.2	Pass
T7	140 - 120	Top Guy Pull-Off@120.083	L2x1 1/2x3/16	373	2.4	13.4	17.6	Pass
T10	80 - 60	Top Guy Pull-Off@60.0833	L2x1 1/2x3/16	571	2.3	13.4	17.2	Pass
T1	250 - 240	Torque Arm Top@240.083	L2x2x1/4	842	12.7	27.0	47.1	Pass
T1	250 - 240	Torque Arm Bottom@240.083	L2x2x1/4	844	-14.3	17.3	82.3	Pass
							Summary	
						Leg (T14)	72.8	Pass
						Diagonal (T14)	66.9	Pass
						Horizontal (T12)	42.8	Pass
						Secondary Horizontal (T2)	0.3	Pass
						Top Girt (T2)	21.5	Pass
						Bottom Girt (T13)	30.8	Pass
						Guy A (T4)	74.9	Pass
						Guy B (T4)	74.3	Pass
						Guy C (T4)	75.1	Pass
						Top Guy Pull-Off (T1)	27.4	Pass
						Torque Arm Top (T1)	47.1	Pass
						Torque Arm Bottom (T1)	82.3	Pass
						Bolt Checks	23.4	Pass
						RATING =	**82.3**	**Pass**

Additional Capacities

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Anchor Block	0	96.6	Pass
	Tower Base Foundation	0	23.1	Pass

Disclaimer of Warranties

GPD GROUP has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD GROUP in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

GPD GROUP does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD GROUP provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD GROUP, but are beyond the scope of this report.

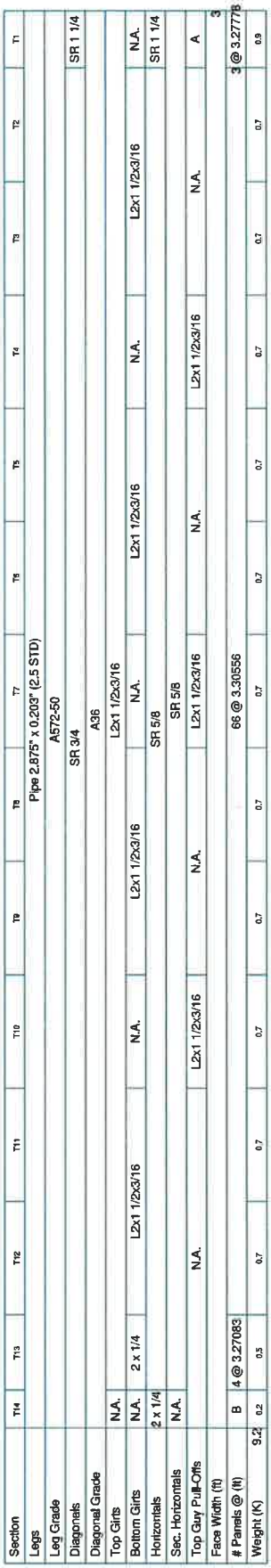
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

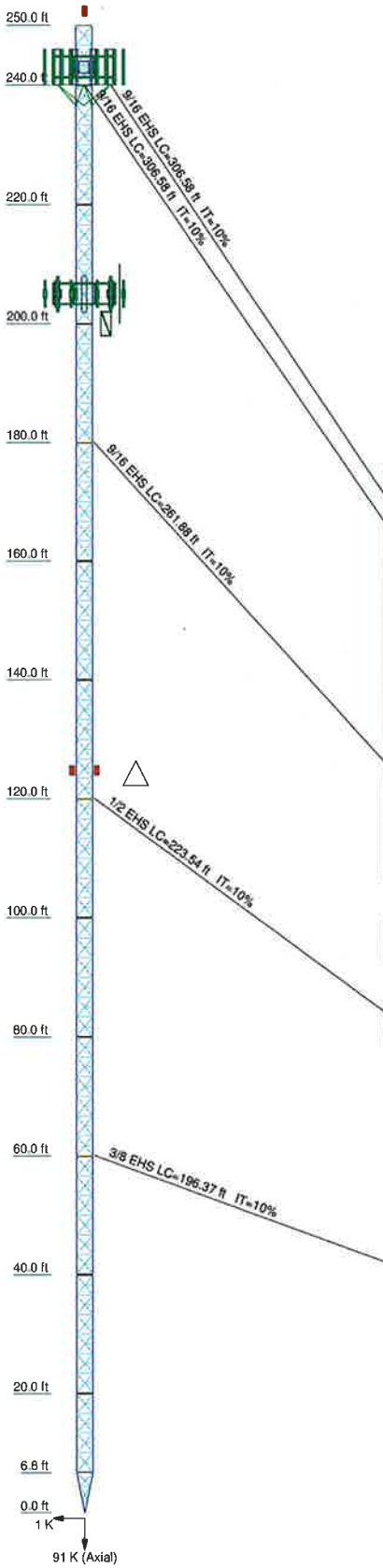
Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

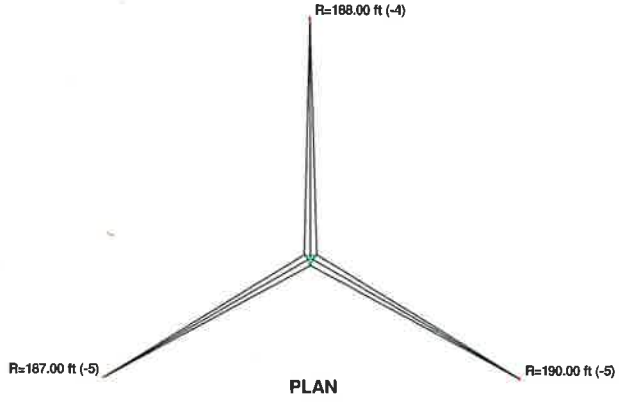
GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

Central States Tower Site ID#: CT-00-3701
April 18, 2014

TNX TOWER OUTPUT







DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Flash Beacon	250	AM-X-CD-17-65-00T w/ Mount Pipe	205
BXA 70063/6CF w/ Mount Pipe	243	AM-X-CD-17-65-00T w/ Mount Pipe	205
BXA 70063/6CF w/ Mount Pipe	243	AM-X-CD-17-65-00T w/ Mount Pipe	205
BXA 70063/6CF w/ Mount Pipe	243	(2) 7770.00 w/Mount Pipe	205
BXA 80063/6CF w/ Mount Pipe	243	(2) 7770.00 w/Mount Pipe	205
BXA 80063/6CF w/ Mount Pipe	243	(2) 7770.00 w/Mount Pipe	205
BXA 80063/6CF w/ Mount Pipe	243	(2) LGP21401	205
BXA 171063/12CF w/ Mount Pipe	243	(2) LGP21401	205
BXA 171063/12CF w/ Mount Pipe	243	(2) LGP21401	205
BXA 171063/12CF w/ Mount Pipe	243	(2) LGP21901	205
WBX 065X19R050 w/ Mount Pipe	243	(2) LGP21901	205
WBX 065X19R050 w/ Mount Pipe	243	(2) LGP21901	205
WBX 065X19R050 w/ Mount Pipe	243	(2) RRUS-11	205
(2) FD9R6004/2C-3L	243	(2) RRUS-11	205
(2) FD9R6004/2C-3L	243	(2) RRUS-11	205
(2) FD9R6004/2C-3L	243	DC6-48-60-18-8F	205
RRH2x40-AWS	243	(3) 12' T-Frame	205
RRH2x40-AWS	243	3" Dia 10' Omni w/mount pipe	200
RRH2x40-AWS	243	72" Standoff	200
DB-T1-6Z-8AB-0Z	243	Side Light	124
(3) 12' Lightweight T-Frame	243	Side Light	124

SYMBOL LIST

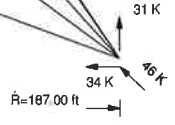
MARK	SIZE	MARK	SIZE
A	L2x1 1/2x3/16	B	3 @ 2.25

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 Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 82.3%



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Job: CT-00-3701 Thompson			
Project: 2014702.19			
Client: Central State Tower	Drawn by: B. Franczkowski	App'd:	
Code: TIA/EIA-222-F	Date: 04/18/14	Scale: NTS	
Path: O:\2014\2014702\19\tnx\CT Thompson.eri		Dwg No. E-1	

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GPD Group 520 S. Main St Akron, OH 44311 Phone: (330) 572 2100 FAX: (330) 572 2101	Project 2014702.19	Date 13:57:48 04/18/14
	Client Central State Tower	Designed by B. Franczkowski

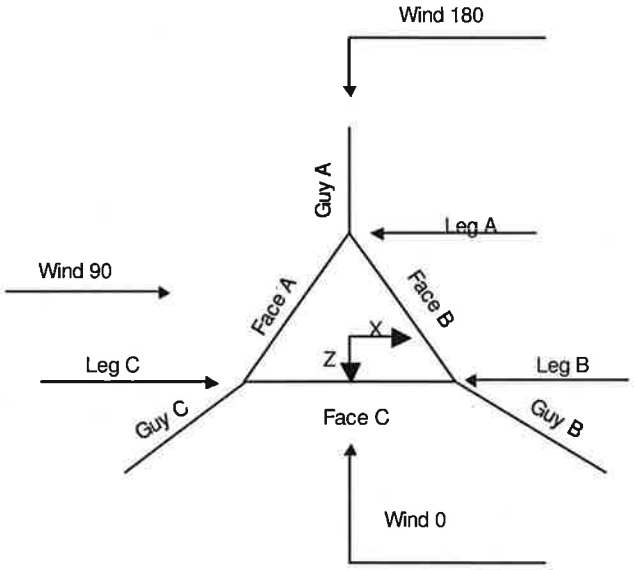
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 250.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.00 ft at the top and tapered at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

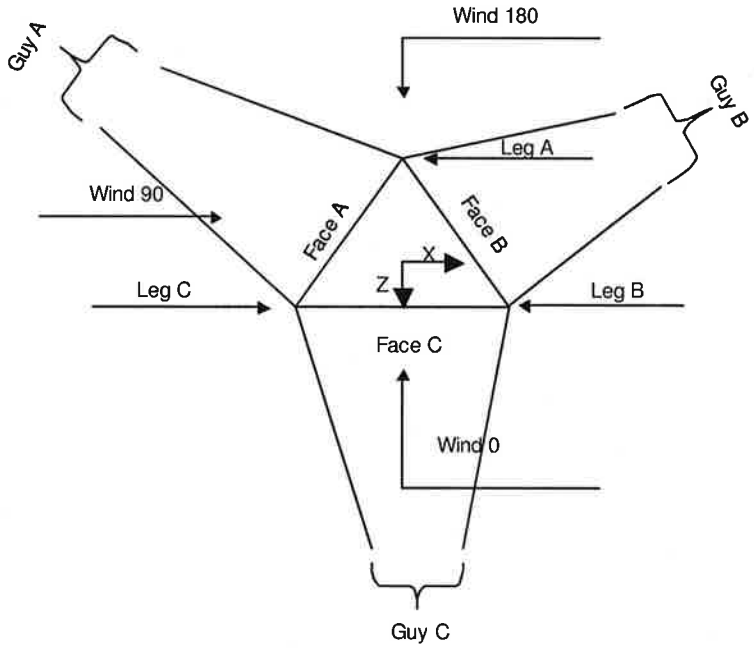
Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Pressures are calculated at each section.
Safety factor used in guy design is 2.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	250.00-240.00			3.00	1	10.00
T2	240.00-220.00			3.00	1	20.00
T3	220.00-200.00			3.00	1	20.00
T4	200.00-180.00			3.00	1	20.00
T5	180.00-160.00			3.00	1	20.00
T6	160.00-140.00			3.00	1	20.00
T7	140.00-120.00			3.00	1	20.00
T8	120.00-100.00			3.00	1	20.00
T9	100.00-80.00			3.00	1	20.00
T10	80.00-60.00			3.00	1	20.00
T11	60.00-40.00			3.00	1	20.00
T12	40.00-20.00			3.00	1	20.00
T13	20.00-6.75			3.00	1	13.25
T14	6.75-0.00			3.00	1	6.75

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	250.00-240.00	3.28	X Brace	No	Yes+Steps	1.0000	1.0000
T2	240.00-220.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T3	220.00-200.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T4	200.00-180.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T5	180.00-160.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T6	160.00-140.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T7	140.00-120.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T8	120.00-100.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T9	100.00-80.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T10	80.00-60.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T11	60.00-40.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T12	40.00-20.00	3.31	X Brace	No	Yes+Steps	1.0000	1.0000
T13	20.00-6.75	3.27	X Brace	No	Yes+Steps	1.0000	1.0000
T14	6.75-0.00	2.25	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 250.00-240.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T2 240.00-220.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T3 220.00-200.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T4 200.00-180.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T5 180.00-160.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T6 160.00-140.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T7 140.00-120.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T8 120.00-100.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T9 100.00-80.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T10 80.00-60.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T11 60.00-40.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T12 40.00-20.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T13 20.00-6.75	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	A36 (36 ksi)
T14 6.75-0.00	Pipe	Pipe 2.875" x 0.203" (2.5 STD)	A572-50 (50 ksi)	Solid Round	3/4	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 250.00-240.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T2 240.00-220.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T3 220.00-200.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T4 200.00-180.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T5 180.00-160.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T6 160.00-140.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T7 140.00-120.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T8 120.00-100.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T9 100.00-80.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T10 80.00-60.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T11 60.00-40.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T12 40.00-20.00	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)
T13 20.00-6.75	Single Angle	L2x1 1/2x3/16	A36 (36 ksi)	Flat Bar	2 x 1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 250.00-240.00	None	Flat Bar		A36 (36 ksi)	Solid Round	1 1/4	A36 (36 ksi)
T2 240.00-220.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T3 220.00-200.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T4 200.00-180.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T5 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T6 160.00-140.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T7 140.00-120.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T8 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T9 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Solid Round	5/8	A36 (36 ksi)
T10 80.00-60.00	None	Flat Bar		A36	Solid Round	5/8	A36

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T11 60.00-40.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	5/8	(36 ksi) A36 (36 ksi)
T12 40.00-20.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	5/8	(36 ksi) A36 (36 ksi)
T13 20.00-6.75	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	5/8	(36 ksi) A36 (36 ksi)
T14 6.75-0.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Flat Bar	2 x 1/4	(36 ksi) 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
T1 250.00-240.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T2 240.00-220.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T3 220.00-200.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T4 200.00-180.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T5 180.00-160.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T6 160.00-140.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T7 140.00-120.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T8 120.00-100.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T9 100.00-80.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T10 80.00-60.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T11 60.00-40.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T12 40.00-20.00	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)
T13 20.00-6.75	Solid Round	5/8	(36 ksi) A36 (36 ksi)	Solid Round		(50 ksi) A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
250.00-240.00			(36 ksi)					
T2	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
240.00-220.00			(36 ksi)					
T3	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
220.00-200.00			(36 ksi)					
T4	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
200.00-180.00			(36 ksi)					
T5	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
180.00-160.00			(36 ksi)					
T6	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
160.00-140.00			(36 ksi)					
T7	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
140.00-120.00			(36 ksi)					
T8	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
120.00-100.00			(36 ksi)					
T9	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
100.00-80.00			(36 ksi)					
T10	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
80.00-60.00			(36 ksi)					
T11	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
60.00-40.00			(36 ksi)					
T12	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
40.00-20.00			(36 ksi)					
T13 20.00-6.75	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
			(36 ksi)					
T14 6.75-0.00	0.00	0.0000	A36	1	1	1.02	36.0000	36.0000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
250.00-240.00				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
240.00-220.00				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1

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
80.00-60.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T12	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T13	Yes	Yes	1	1	1	1	1	1	1	1
20.00-6.75				1	1	1	1	1	1	1
T14 6.75-0.00	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 Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 250.00-240.00	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 240.00-220.00	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 220.00-200.00	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 200.00-180.00	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
T5 180.00-160.00	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 160.00-140.00	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
T7 140.00-120.00	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
T8 120.00-100.00	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
T9 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
T10 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
T11 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
T12 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
T13 20.00-6.75	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
T14 6.75-0.00	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	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
250.00-240.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T2	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
240.00-220.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T3	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
220.00-200.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T4	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
200.00-180.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T5	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
180.00-160.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T6	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
160.00-140.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T7	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
140.00-120.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T8	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
120.00-100.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
100.00-80.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
80.00-60.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
60.00-40.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T12	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
40.00-20.00		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T13 20.00-6.75	Flange	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T14 6.75-0.00	Flange	0.7500	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
240.083	EHS	A	9/16	3.5	10%	21000	0.671	306.13	188.00	0.0000	-4.00	100%
		B	9/16	3.5	10%	21000	0.671	308.13	190.00	0.0000	-5.00	100%
		C	9/16	3.5	10%	21000	0.671	306.32	187.00	0.0000	-5.00	100%
180.083	EHS	A	9/16	3.5	10%	21000	0.671	261.67	188.00	0.0000	-4.00	100%
		B	9/16	3.5	10%	21000	0.671	263.79	190.00	0.0000	-5.00	100%
		C	9/16	3.5	10%	21000	0.671	261.66	187.00	0.0000	-5.00	100%
120.083	EHS	A	1/2	2.7	10%	21000	0.517	223.63	188.00	0.0000	-4.00	100%
		B	1/2	2.7	10%	21000	0.517	225.85	190.00	0.0000	-5.00	100%
		C	1/2	2.7	10%	21000	0.517	223.36	187.00	0.0000	-5.00	100%
60.0833	EHS	A	3/8	1.5	10%	21000	0.273	196.81	188.00	0.0000	-4.00	100%
		B	3/8	1.5	10%	21000	0.273	199.02	190.00	0.0000	-5.00	100%
		C	3/8	1.5	10%	21000	0.273	196.19	187.00	0.0000	-5.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
240.083	Torque Arm	10.00	20.0000	Bat Ear	A36 (36 ksi)	Equal Angle	L2x2x1/4
180.083	Corner						
120.083	Corner						
60.0833	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
240.08	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16
180.08	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16
120.08	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16
60.08	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Single Angle	L2x1 1/2x3/16

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
240.083	0.2	0.2	0.2		8.79 5.1 sec/pulse	8.90 5.2 sec/pulse	8.80 5.1 sec/pulse	
180.083	0.2	0.2	0.2		6.46 4.4 sec/pulse	6.56 4.4 sec/pulse	6.46 4.4 sec/pulse	
120.083	0.1	0.1	0.1		4.75 3.8 sec/pulse	4.85 3.8 sec/pulse	4.74 3.8 sec/pulse	
60.0833	0.1	0.1	0.1		3.42 3.2 sec/pulse	3.49 3.2 sec/pulse	3.40 3.2 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
240.083	No	No	0.5	0.5	1	1	1	1
180.083	No	No			1	1	1	1

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
120.083	No	No			1	1	1	1
60.0833	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
240.083	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
180.083	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
120.083	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
60.0833	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
240.083	A	118.04	27	5	0.8739
	B	117.54	27	5	0.8735
	C	117.54	27	5	0.8735
180.083	A	88.04	24	5	0.8437
	B	87.54	24	5	0.8432
	C	87.54	24	5	0.8432
120.083	A	58.04	22	4	0.8026
	B	57.54	22	4	0.8017
	C	57.54	22	4	0.8017
60.0833	A	28.04	18	4	0.7500
	B	27.54	18	4	0.7500
	C	27.54	18	4	0.7500

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
LDF4-50A(1/2")	B	Yes	Ar (CfAe)	124.00 - 8.00	1.0000	0.5	1	1	0.6300	0.6300		0.15
1" Coax	C	Yes	Ar (CfAe)	250.00 - 8.00	0.0000	0	1	1	1.0000	1.0000		0.60
LDF5-50A(1-5/8")	A	No	Ar (Leg)	243.00 - 8.00	0.0000	0	4	2	1.0000	1.0900		0.33
LDF5-50A(1-5/8")	B	No	Ar (Leg)	243.00 - 8.00	0.0000	0	4	2	1.0000	1.0900		0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A(1-5/8")	C	No	Ar (Leg)	243.00 - 8.00	0.0000	0	4	2	1.0000	1.0900		0.33
LDF5-50A(1-5/8")	A	Yes	Ar (CfAe)	205.00 - 8.00	0.0000	0	12	6	1.0000	1.0900		0.33
LDF5-50A(1-5/8")	A	Yes	Ar (CfAe)	200.00 - 8.00	0.0000	0.49	1	1	1.0000	1.0900		0.33
Safety Line 3/8	B	Yes	Ar (CfAe)	250.00 - 8.00	0.0000	-0.2	1	1	0.3750	0.3750		0.22
LDF4-50A(1/2")	B	Yes	Ar (CfAe)	250.00 - 8.00	1.0000	0.5	1	1	0.6300	0.6300		0.15
LDF5-50A(7/8")	A	Yes	Ar (CfAe)	205.00 - 8.00	0.0000	-0.2	1	1	1.0000	0.0000		0.33
LDF4P-50A(1/2")	A	Yes	Ar (CfAe)	205.00 - 8.00	0.0000	-0.2	1	1	0.6300	0.0000		0.15
3" Flex Conduit	A	Yes	Ar (CfAe)	205.00 - 8.00	0.0000	-0.2	1	1	1.0000	3.0000		0.48
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	243.00 - 8.00	0.0000	0.475	1	1	1.0000	1.9800		0.82

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Flash Beacon	A	From Leg	0.00 0.00 1.50	0.0000	250.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 4.50 6.00 9.00 15.00	3.00 4.50 6.00 9.00 15.00	0.1 0.1 0.2 0.3 0.5
Side Light	B	From Leg	1.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.47 0.60 0.87 1.40	0.33 0.47 0.60 0.87 1.40	0.0 0.0 0.0 0.0 0.0
Side Light	C	From Leg	1.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.33 0.47 0.60 0.87 1.40	0.33 0.47 0.60 0.87 1.40	0.0 0.0 0.0 0.0 0.0
BXA 70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.99 9.71 11.09 13.97	5.66 6.92 8.04 9.94 13.94	0.0 0.1 0.2 0.3 0.8
BXA 70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.99 9.71 11.09 13.97	5.66 6.92 8.04 9.94 13.94	0.0 0.1 0.2 0.3 0.8
BXA 70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.99 9.71 11.09 13.97	5.66 6.92 8.04 9.94 13.94	0.0 0.1 0.2 0.3 0.8

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
BXA 80063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.76 8.30 8.85 9.98 12.34	5.19 6.12 6.93 8.60 12.14	0.0 0.1 0.2 0.3 0.8
BXA 80063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.76 8.30 8.85 9.98 12.34	5.19 6.12 6.93 8.60 12.14	0.0 0.1 0.2 0.3 0.8
BXA 80063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.76 8.30 8.85 9.98 12.34	5.19 6.12 6.93 8.60 12.14	0.0 0.1 0.2 0.3 0.8
BXA 171063/12CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.0 0.1 0.2 0.3 0.7
BXA 171063/12CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.0 0.1 0.2 0.3 0.7
BXA 171063/12CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.0 0.1 0.2 0.3 0.7
WBX 065X19R050 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.25 5.73 6.22 7.23 9.32	4.75 5.84 6.70 8.48 12.23	0.1 0.1 0.2 0.3 0.7
WBX 065X19R050 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.25 5.73 6.22 7.23 9.32	4.75 5.84 6.70 8.48 12.23	0.1 0.1 0.2 0.3 0.7
WBX 065X19R050 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.25 5.73 6.22 7.23 9.32	4.75 5.84 6.70 8.48 12.23	0.1 0.1 0.2 0.3 0.7
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.0 0.0 0.0 0.0 0.1
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	243.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.0 0.0 0.0 0.0 0.1
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00	0.0000	243.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.0 0.0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1" Ice	0.54	0.20	0.0
							2" Ice	0.75	0.34	0.0
							4" Ice	1.28	0.74	0.1
RRH2x40-AWS	A	From Leg	0.50	0.00	0.0000	243.00	No Ice	2.52	1.59	0.0
			0.00				1/2" Ice	2.75	1.80	0.1
							1" Ice	2.99	2.01	0.1
							2" Ice	3.50	2.46	0.1
							4" Ice	4.61	3.48	0.3
RRH2x40-AWS	B	From Leg	0.50	0.00	0.0000	243.00	No Ice	2.52	1.59	0.0
			0.00				1/2" Ice	2.75	1.80	0.1
							1" Ice	2.99	2.01	0.1
							2" Ice	3.50	2.46	0.1
							4" Ice	4.61	3.48	0.3
RRH2x40-AWS	C	From Leg	0.50	0.00	0.0000	243.00	No Ice	2.52	1.59	0.0
			0.00				1/2" Ice	2.75	1.80	0.1
							1" Ice	2.99	2.01	0.1
							2" Ice	3.50	2.46	0.1
							4" Ice	4.61	3.48	0.3
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.00	0.0000	243.00	No Ice	5.60	2.33	0.0
			0.00				1/2" Ice	5.92	2.56	0.1
							1" Ice	6.24	2.79	0.1
							2" Ice	6.91	3.28	0.2
							4" Ice	8.37	4.37	0.5
(3) 12' Lightweight T-Frame	C	None			0.0000	243.00	No Ice	19.83	19.83	0.9
							1/2" Ice	29.41	29.41	1.3
							1" Ice	38.99	38.99	1.7
							2" Ice	58.15	58.15	2.5
							4" Ice	96.47	96.47	4.1
AM-X-CD-17-65-00T w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	205.00	No Ice	11.31	9.10	0.1
			0.00				1/2" Ice	11.93	10.52	0.2
							1" Ice	12.55	11.60	0.3
							2" Ice	13.88	13.80	0.5
							4" Ice	16.88	18.41	1.1
AM-X-CD-17-65-00T w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	205.00	No Ice	11.31	9.10	0.1
			0.00				1/2" Ice	11.93	10.52	0.2
							1" Ice	12.55	11.60	0.3
							2" Ice	13.88	13.80	0.5
							4" Ice	16.88	18.41	1.1
AM-X-CD-17-65-00T w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	205.00	No Ice	11.31	9.10	0.1
			0.00				1/2" Ice	11.93	10.52	0.2
							1" Ice	12.55	11.60	0.3
							2" Ice	13.88	13.80	0.5
							4" Ice	16.88	18.41	1.1
(2) 7770.00 w/Mount Pipe	A	From Leg	4.00	0.00	0.0000	205.00	No Ice	5.88	4.10	0.1
			0.00				1/2" Ice	6.31	4.73	0.1
							1" Ice	6.75	5.37	0.2
							2" Ice	7.66	6.70	0.3
							4" Ice	9.58	9.87	0.7
(2) 7770.00 w/Mount Pipe	B	From Leg	4.00	0.00	0.0000	205.00	No Ice	5.88	4.10	0.1
			0.00				1/2" Ice	6.31	4.73	0.1
							1" Ice	6.75	5.37	0.2
							2" Ice	7.66	6.70	0.3
							4" Ice	9.58	9.87	0.7
(2) 7770.00 w/Mount Pipe	C	From Leg	4.00	0.00	0.0000	205.00	No Ice	5.88	4.10	0.1
			0.00				1/2" Ice	6.31	4.73	0.1
							1" Ice	6.75	5.37	0.2
							2" Ice	7.66	6.70	0.3

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
							4" Ice	9.58	9.87	0.7
(2) LGP21401	A	From Leg	4.00	0.00	0.0000	205.00	No Ice	1.29	0.23	0.0
			0.00				1/2" Ice	1.45	0.31	0.0
			0.00				1" Ice	1.61	0.40	0.0
							2" Ice	1.97	0.61	0.1
							4" Ice	2.79	1.12	0.1
(2) LGP21401	B	From Leg	4.00	0.00	0.0000	205.00	No Ice	1.29	0.23	0.0
			0.00				1/2" Ice	1.45	0.31	0.0
			0.00				1" Ice	1.61	0.40	0.0
							2" Ice	1.97	0.61	0.1
							4" Ice	2.79	1.12	0.1
(2) LGP21401	C	From Leg	4.00	0.00	0.0000	205.00	No Ice	1.29	0.23	0.0
			0.00				1/2" Ice	1.45	0.31	0.0
			0.00				1" Ice	1.61	0.40	0.0
							2" Ice	1.97	0.61	0.1
							4" Ice	2.79	1.12	0.1
(2) LGP21901	A	From Leg	4.00	0.00	0.0000	205.00	No Ice	0.27	0.18	0.0
			0.00				1/2" Ice	0.34	0.25	0.0
			0.00				1" Ice	0.43	0.32	0.0
							2" Ice	0.62	0.49	0.0
							4" Ice	1.10	0.94	0.1
(2) LGP21901	B	From Leg	4.00	0.00	0.0000	205.00	No Ice	0.27	0.18	0.0
			0.00				1/2" Ice	0.34	0.25	0.0
			0.00				1" Ice	0.43	0.32	0.0
							2" Ice	0.62	0.49	0.0
							4" Ice	1.10	0.94	0.1
(2) LGP21901	C	From Leg	4.00	0.00	0.0000	205.00	No Ice	0.27	0.18	0.0
			0.00				1/2" Ice	0.34	0.25	0.0
			0.00				1" Ice	0.43	0.32	0.0
							2" Ice	0.62	0.49	0.0
							4" Ice	1.10	0.94	0.1
(2) RRUS-11	A	From Leg	4.00	0.00	0.0000	205.00	No Ice	2.94	1.19	0.1
			0.00				1/2" Ice	3.17	1.35	0.1
			0.00				1" Ice	3.41	1.52	0.1
							2" Ice	3.91	1.89	0.2
							4" Ice	5.02	2.72	0.3
(2) RRUS-11	B	From Leg	4.00	0.00	0.0000	205.00	No Ice	2.94	1.19	0.1
			0.00				1/2" Ice	3.17	1.35	0.1
			0.00				1" Ice	3.41	1.52	0.1
							2" Ice	3.91	1.89	0.2
							4" Ice	5.02	2.72	0.3
(2) RRUS-11	C	From Leg	4.00	0.00	0.0000	205.00	No Ice	2.94	1.19	0.1
			0.00				1/2" Ice	3.17	1.35	0.1
			0.00				1" Ice	3.41	1.52	0.1
							2" Ice	3.91	1.89	0.2
							4" Ice	5.02	2.72	0.3
DC6-48-60-18-8F	C	From Leg	0.00	0.00	0.0000	205.00	No Ice	2.57	2.57	0.0
			0.00				1/2" Ice	2.80	2.80	0.0
			0.00				1" Ice	3.04	3.04	0.1
							2" Ice	3.54	3.54	0.1
							4" Ice	4.66	4.66	0.3
(3) 12' T-Frame	C	None			0.0000	205.00	No Ice	30.02	30.02	1.0
							1/2" Ice	40.48	40.48	1.4
							1" Ice	50.94	50.94	1.9
							2" Ice	71.86	71.86	2.8
							4" Ice	113.70	113.70	4.6
3" Dia 10' Omni w/mount	B	From Leg	6.00		0.0000	200.00	No Ice	4.11	4.11	0.1

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
pipe			0.00			1/2" Ice	5.39	5.39	0.1
			5.00			1" Ice	6.64	6.64	0.2
						2" Ice	8.42	8.42	0.3
						4" Ice	12.41	12.41	0.7
72" Standoff	B	From Leg	3.00	0.0000	200.00	No Ice	0.98	3.03	0.1
			0.00			1/2" Ice	1.70	5.22	0.1
			0.00			1" Ice	2.42	7.41	0.1
						2" Ice	3.86	11.79	0.2
						4" Ice	6.74	20.55	0.3
***									

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	2.600	29	0.1668	0.0360
T2	240 - 220	2.870	29	0.1696	0.0365
T3	220 - 200	3.351	29	0.1046	0.0487
T4	200 - 180	3.377	29	0.0590	0.0615
T5	180 - 160	2.975	29	0.0937	0.0441
T6	160 - 140	2.605	29	0.0921	0.0290
T7	140 - 120	2.195	29	0.0985	0.0332
T8	120 - 100	1.830	29	0.0576	0.0386
T9	100 - 80	1.710	31	0.0279	0.0413
T10	80 - 60	1.580	31	0.0445	0.0427
T11	60 - 40	1.350	31	0.0599	0.0429
T12	40 - 20	1.065	31	0.0857	0.0412
T13	20 - 6.75	0.613	31	0.1296	0.0386
T14	6.75 - 0	0.219	31	0.1489	0.0359

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Flash Beacon	29	2.600	0.1668	0.0360	119313
243.00	BXA 70063/6CF w/ Mount Pipe	29	2.788	0.1706	0.0361	88568
240.08	Guy	29	2.868	0.1696	0.0365	99593
205.00	AM-X-CD-17-65-00T w/ Mount Pipe	29	3.422	0.0538	0.0608	8370
200.00	3" Dia 10' Omni w/mount pipe	29	3.377	0.0590	0.0615	8807
180.08	Guy	29	2.977	0.0937	0.0442	28056
124.00	Side Light	29	1.886	0.0676	0.0377	17240
120.08	Guy	29	1.831	0.0578	0.0386	15219
60.08	Guy	31	1.351	0.0598	0.0429	552663

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	250 - 240	13.980	2	0.4635	0.0942
T2	240 - 220	14.911	2	0.4722	0.0948
T3	220 - 200	16.591	2	0.3021	0.1171
T4	200 - 180	16.821	2	0.2219	0.1550
T5	180 - 160	15.527	2	0.3471	0.1150
T6	160 - 140	13.968	2	0.4168	0.1032
T7	140 - 120	12.046	2	0.4773	0.0948
T8	120 - 100	10.154	2	0.3642	0.0894
T9	100 - 80	8.940	2	0.2689	0.0844
T10	80 - 60	7.756	2	0.3143	0.0895
T11	60 - 40	6.312	2	0.3580	0.0924
T12	40 - 20	4.712	2	0.4362	0.0899
T13	20 - 6.75	2.602	2	0.5702	0.0847
T14	6.75 - 0	0.915	2	0.6291	0.0789

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
250.00	Flash Beacon	2	13.980	0.4635	0.0942	31498
243.00	BXA 70063/6CF w/ Mount Pipe	2	14.628	0.4766	0.0943	22953
240.08	Guy	2	14.903	0.4724	0.0948	20042
205.00	AM-X-CD-17-65-00T w/ Mount Pipe	2	16.937	0.1856	0.1527	2557
200.00	3" Dia 10' Omni w/mount pipe	2	16.821	0.2219	0.1550	2637
180.08	Guy	2	15.534	0.3464	0.1151	10693
124.00	Side Light	2	10.483	0.3943	0.0904	5528
120.08	Guy	2	10.160	0.3648	0.0894	4897
60.08	Guy	2	6.318	0.3578	0.0924	38534

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	250	Leg	A325N	0.7500	3	1.4	19.4	0.074 ✔	1.333	Bolt Tension
T2	240	Leg	A325N	0.7500	3	5.4	19.4	0.276 ✔	1.333	Bolt Tension
T3	220	Leg	A325N	0.7500	3	6.1	19.4	0.312 ✔	1.333	Bolt Tension
T4	200	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T5	180	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T6	160	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T7	140	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T8	120	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	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
T9	100	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T10	80	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T11	60	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T12	40	Leg	A325N	0.7500	3	0.0	19.4	0.000 ✔	1.333	Bolt Tension
T13	20	Leg	A325N	0.7500	3	0.0	19.3	0.000 ✔	1.333	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
T1	240.08 (A) (845)	9/16 EHS	3.5	35.0	10.5	17.5	2.000	3.326 ✔
	240.08 (A) (846)	9/16 EHS	3.5	35.0	10.5	17.5	2.000	3.340 ✔
	240.08 (B) (839)	9/16 EHS	3.5	35.0	10.4	17.5	2.000	3.375 ✔
	240.08 (B) (840)	9/16 EHS	3.5	35.0	10.5	17.5	2.000	3.345 ✔
	240.08 (C) (833)	9/16 EHS	3.5	35.0	10.5	17.5	2.000	3.327 ✔
	240.08 (C) (834)	9/16 EHS	3.5	35.0	10.5	17.5	2.000	3.342 ✔
T4	180.08 (A) (853)	9/16 EHS	3.5	35.0	13.1	17.5	2.000	2.670 ✔
	180.08 (B) (852)	9/16 EHS	3.5	35.0	13.0	17.5	2.000	2.690 ✔
	180.08 (C) (851)	9/16 EHS	3.5	35.0	13.1	17.5	2.000	2.662 ✔
T7	120.08 (A) (856)	1/2 EHS	2.7	26.9	8.9	13.4	2.000	3.034 ✔
	120.08 (B) (855)	1/2 EHS	2.7	26.9	8.9	13.4	2.000	3.035 ✔
	120.08 (C) (854)	1/2 EHS	2.7	26.9	8.9	13.4	2.000	3.020 ✔
T10	60.08 (A) (859)	3/8 EHS	1.5	15.4	4.4	7.7	2.000	3.499 ✔
	60.08 (B) (858)	3/8 EHS	1.5	15.4	4.4	7.7	2.000	3.503 ✔
	60.08 (C) (857)	3/8 EHS	1.5	15.4	4.4	7.7	2.000	3.485 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	Mast Stability Index	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	Pipe 2.875" x 0.203" (2.5 STD)	10.00	3.28	41.5 K=1.00	1.00	25.618	1.7040	-6.2	43.7	0.142 ✔
T2	240 - 220	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.99	25.310	1.7040	-35.6	43.1	0.826 ✔
T3	220 - 200	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.99	25.336	1.7040	-40.8	43.2	0.946 ✔
T4	200 - 180	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.99	25.284	1.7040	-37.1	43.1	0.860 ✔
T5	180 - 160	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.326	1.7040	-19.0	41.5	0.459* ✔
T6	160 - 140	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.326	1.7040	-19.9	41.5	0.479* ✔
T7	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.98	25.105	1.7040	-37.4	42.8	0.873 ✔
T8	120 - 100	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.98	25.105	1.7040	-37.4	42.8	0.873 ✔
T9	100 - 80	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.326	1.7040	-25.0	41.5	0.604* ✔
T10	80 - 60	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.326	1.7040	-26.9	41.5	0.648* ✔
T11	60 - 40	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.315	1.7040	-27.7	41.4	0.670* ✔
T12	40 - 20	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9 K=1.00	0.95	24.315	1.7040	-28.6	41.4	0.690* ✔
T13	20 - 6.75	Pipe 2.875" x 0.203" (2.5 STD)	13.25	3.27	41.4 K=1.00	0.95	24.315	1.7040	-29.1	41.4	0.702* ✔
T14	6.75 - 0	Pipe 2.875" x 0.203" (2.5 STD)	6.97	2.32	29.4 K=1.00	0.89	24.315	1.7040	-30.2	41.4	0.728* ✔

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	1 1/4	4.44	2.04	86.4 K=1.10	14.633	1.2272	-1.8	18.0	0.101 ✔
T2	240 - 220	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-3.5	4.7	0.759 ✔
T3	220 - 200	3/4	4.46	2.05	118.3	10.526	0.4418	-3.3	4.7	0.716

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	200 - 180	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-3.4	4.7	0.736 ✔
T5	180 - 160	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.2	4.7	0.468 ✔
T6	160 - 140	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.3	4.7	0.504 ✔
T7	140 - 120	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-3.2	4.7	0.686 ✔
T8	120 - 100	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-3.1	4.7	0.675 ✔
T9	100 - 80	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.1	4.7	0.449* ✔
T10	80 - 60	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.1	4.7	0.452* ✔
T11	60 - 40	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.3	4.7	0.498* ✔
T12	40 - 20	3/4	4.46	2.05	118.3 K=0.90	10.526	0.4418	-2.4	4.7	0.512* ✔
T13	20 - 6.75	3/4	4.44	2.04	117.6 K=0.90	10.622	0.4418	-2.4	4.7	0.504* ✔
T14	6.75 - 0	3/4	2.72	1.60	101.2 K=0.99	12.830	0.4418	-3.8	5.7	0.669* ✔

* DL controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	1 1/4	3.00	2.76	89.0 K=0.84	14.318	1.2272	-0.9	17.6	0.052 ✔
T2	240 - 220	5/8	3.00	2.76	148.4 K=0.70	6.781	0.3068	-1.1	2.1	0.533 ✔
T3	220 - 200	5/8	3.00	2.76	148.4 K=0.70	6.781	0.3068	-0.9	2.1	0.440 ✔
T4	200 - 180	5/8	3.00	2.76	148.4 K=0.70	6.781	0.3068	-0.1	2.1	0.029 ✔

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 $\frac{P}{P_a}$
T1	250 - 240	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	240 - 220	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T3	220 - 200	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T4	200 - 180	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T5	180 - 160	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T6	160 - 140	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T7	140 - 120	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T8	120 - 100	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T9	100 - 80	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T10	80 - 60	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T11	60 - 40	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T12	40 - 20	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔
T13	20 - 6.75	5/8	1.50	1.38	89.0 K=0.84	14.318	0.3068	-0.0	4.4	0.000 ✔

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	250 - 240	L2x1 1/2x3/16	3.00	2.76	111.4 K=1.08	11.477	0.6211	-0.0	7.1	0.003 ✔
T2	240 - 220	L2x1 1/2x3/16	3.00	2.76	111.4 K=1.08	11.477	0.6211	-2.0	7.1	0.287 ✔
T3	220 - 200	L2x1 1/2x3/16	3.00	2.76	111.4 K=1.08	11.477	0.6211	-0.2	7.1	0.029 ✔
T4	200 - 180	L2x1 1/2x3/16	3.00	2.76	111.4 K=1.08	11.477	0.6211	-0.3	7.1	0.036 ✔

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	240 - 220	L2x1 1/2x3/16	3.00	2.76	111.4 K=1.08	11.477	0.6211	-0.3	7.1	0.042 ✔
T3	220 - 200	L2x1 1/2x3/16	3.00	2.76	111.4	11.477	0.6211	-0.1	7.1	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=1.08					✓

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	L2x1 1/2x3/16	3.00	2.76	102.9 K=1.00	12.610	0.6211	-2.1	7.8	0.269 ✓

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240 (837)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.1	13.0	1.084 ✓
T1	250 - 240 (838)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.1	13.0	1.087 ✓
T1	250 - 240 (843)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.0	13.0	1.080 ✓
T1	250 - 240 (844)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.3	13.0	1.097 ✓
T1	250 - 240 (849)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.0	13.0	1.075 ✓
T1	250 - 240 (850)	L2x2x1/4	6.20	6.05	92.9 K=0.50	13.862	0.9380	-14.2	13.0	1.095 ✓

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	250 - 240	Pipe 2.875" x 0.203" (2.5 STD)	10.00	3.28	41.5	30.000	1.7040	4.3	51.1	0.084 ✓
T2	240 - 220	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9	30.000	1.7040	16.1	51.1	0.315 ✓
T3	220 - 200	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9	30.000	1.7040	24.3	51.1	0.475 ✓
T4	200 - 180	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9	30.000	1.7040	18.2	51.1	0.356

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T7	140 - 120	Pipe 2.875" x 0.203" (2.5 STD)	20.00	3.31	41.9	30.000	1.7040	2.2	51.1	0.044 ✔

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	250 - 240	1 1/4	4.44	2.04	78.5	21.600	1.2272	2.2	26.5	0.084 ✔
T2	240 - 220	3/4	4.46	2.05	131.4	21.600	0.4418	3.1	9.5	0.330 ✔
T3	220 - 200	3/4	4.46	2.05	131.4	21.600	0.4418	1.3	9.5	0.139 ✔
T4	200 - 180	3/4	4.46	2.05	131.4	21.600	0.4418	2.1	9.5	0.218 ✔
T7	140 - 120	3/4	4.46	2.05	131.4	21.600	0.4418	0.5	9.5	0.052 ✔
T8	120 - 100	3/4	4.46	2.05	131.4	21.600	0.4418	0.1	9.5	0.015 ✔

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	1 1/4	3.00	2.76	106.0	21.600	1.2272	0.7	26.5	0.028 ✔
T2	240 - 220	5/8	3.00	2.76	212.0	21.600	0.3068	2.3	6.6	0.348 ✔
T3	220 - 200	5/8	3.00	2.76	212.0	21.600	0.3068	3.0	6.6	0.455 ✔
T4	200 - 180	5/8	3.00	2.76	212.0	21.600	0.3068	2.4	6.6	0.364 ✔
T5	180 - 160	5/8	3.00	2.76	212.0	21.600	0.3068	1.9	6.6	0.282* ✔
T6	160 - 140	5/8	3.00	2.76	212.0	21.600	0.3068	2.0	6.6	0.296* ✔
T7	140 - 120	5/8	3.00	2.76	212.0	21.600	0.3068	2.0	6.6	0.301* ✔
T8	120 - 100	5/8	3.00	2.76	212.0	21.600	0.3068	2.4	6.6	0.360* ✔
T9	100 - 80	5/8	3.00	2.76	212.0	21.600	0.3068	2.5	6.6	0.374* ✔
T10	80 - 60	5/8	3.00	2.76	212.0	21.600	0.3068	2.5	6.6	0.381* ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T11	60 - 40	5/8	3.00	2.76	212.0	21.600	0.3068	2.7	6.6	0.415* ✔
T12	40 - 20	5/8	3.00	2.76	212.0	21.600	0.3068	2.8	6.6	0.428* ✔
T13	20 - 6.75	5/8	3.00	2.76	212.0	21.600	0.3068	2.8	6.6	0.428* ✔
T14	6.75 - 0	2 x 1/4	3.00	2.76	459.0	21.600	0.5000	3.5	10.8	0.320* ✔

* DL controls

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 $\frac{P}{P_a}$
T1	250 - 240	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T2	240 - 220	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T3	220 - 200	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T4	200 - 180	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T5	180 - 160	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T6	160 - 140	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T7	140 - 120	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T8	120 - 100	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T9	100 - 80	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T10	80 - 60	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T11	60 - 40	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T12	40 - 20	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔
T13	20 - 6.75	5/8	1.50	1.38	106.0	21.600	0.3068	0.0	6.6	0.000 ✔

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	250 - 240	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	0.0	13.4	0.002 ✔
T2	240 - 220	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	3.7	13.4	0.274 ✔
T3	220 - 200	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.2	13.4	0.093 ✔
T4	200 - 180	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.104 ✔
T5	180 - 160	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	2.4	13.4	0.181 ✔
T6	160 - 140	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.1	13.4	0.080* ✔
T7	140 - 120	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.1	13.4	0.083* ✔
T8	120 - 100	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.9	13.4	0.141* ✔
T9	100 - 80	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.101* ✔
T10	80 - 60	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.105* ✔
T11	60 - 40	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	2.0	13.4	0.146* ✔
T12	40 - 20	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.6	13.4	0.117* ✔
T13	20 - 6.75	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.6	13.4	0.120* ✔

* DL controls

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 $\frac{P}{P_a}$
T2	240 - 220	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.102 ✔
T3	220 - 200	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.2	13.4	0.090 ✔
T5	180 - 160	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.1	13.4	0.079* ✔
T6	160 - 140	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.1	13.4	0.083* ✔
T8	120 - 100	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.101* ✔
T9	100 - 80	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.4	13.4	0.105* ✔
T11	60 - 40	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.6	13.4	0.116* ✔
T12	40 - 20	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	1.6	13.4	0.120* ✔
T13	20 - 6.75	2 x 1/4	3.00	2.76	459.0	21.600	0.5000	3.3	10.8	0.308* ✔

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 $\frac{P}{P_a}$

* DL controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	4.9	13.4	0.365 ✔
T4	200 - 180	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	3.4	13.4	0.255 ✔
T7	140 - 120	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	2.4	13.4	0.176* ✔
T10	80 - 60	L2x1 1/2x3/16	3.00	2.76	75.4	21.600	0.6211	2.3	13.4	0.172* ✔

* DL controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	250 - 240 (835)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.626 ✔
T1	250 - 240 (836)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.628 ✔
T1	250 - 240 (841)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.625 ✔
T1	250 - 240 (842)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.628 ✔
T1	250 - 240 (847)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.627 ✔
T1	250 - 240 (848)	L2x2x1/4	5.13	5.01	98.8	21.600	0.9380	12.7	20.3	0.626 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	250 - 240	Leg	Pipe 2.875" x 0.203" (2.5 STD)	2	-5.9	58.2	18.3	Pass
T2	240 - 220	Leg	Pipe 2.875" x 0.203" (2.5 STD)	37	-35.6	57.5	62.0	Pass
T3	220 - 200	Leg	Pipe 2.875" x 0.203" (2.5 STD)	103	-40.8	57.6	71.0	Pass
T4	200 - 180	Leg	Pipe 2.875" x 0.203" (2.5 STD)	169	-37.1	57.4	64.5	Pass
T5	180 - 160	Leg	Pipe 2.875" x 0.203" (2.5 STD)	236	-19.0	41.5	45.9	Pass
T6	160 - 140	Leg	Pipe 2.875" x 0.203" (2.5 STD)	302	-19.9	41.5	47.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	140 - 120	Leg	Pipe 2.875" x 0.203" (2.5 STD)	369	-37.4	57.0	65.5	Pass
T8	120 - 100	Leg	Pipe 2.875" x 0.203" (2.5 STD)	435	-37.4	57.0	65.5	Pass
T9	100 - 80	Leg	Pipe 2.875" x 0.203" (2.5 STD)	499	-25.0	41.5	60.4	Pass
T10	80 - 60	Leg	Pipe 2.875" x 0.203" (2.5 STD)	565	-26.9	41.5	64.8	Pass
T11	60 - 40	Leg	Pipe 2.875" x 0.203" (2.5 STD)	631	-27.7	41.4	67.0	Pass
T12	40 - 20	Leg	Pipe 2.875" x 0.203" (2.5 STD)	697	-28.6	41.4	69.0	Pass
T13	20 - 6.75	Leg	Pipe 2.875" x 0.203" (2.5 STD)	763	-29.1	41.4	70.2	Pass
T14	6.75 - 0	Leg	Pipe 2.875" x 0.203" (2.5 STD)	809	-30.2	41.4	72.8	Pass
T1	250 - 240	Diagonal	1 1/4	13	-1.8	23.9	7.6	Pass
T2	240 - 220	Diagonal	3/4	96	-3.5	6.2	56.9	Pass
T3	220 - 200	Diagonal	3/4	116	-3.3	6.2	53.7	Pass
T4	200 - 180	Diagonal	3/4	230	-3.4	6.2	55.2	Pass
T5	180 - 160	Diagonal	3/4	299	-2.2	6.2	35.1	Pass
T6	160 - 140	Diagonal	3/4	313	-2.3	6.2	37.8	Pass
T7	140 - 120	Diagonal	3/4	379	-3.2	6.2	51.5	Pass
T8	120 - 100	Diagonal	3/4	497	-3.1	6.2	50.6	Pass
T9	100 - 80	Diagonal	3/4	509	-2.1	4.7	44.9	Pass
T10	80 - 60	Diagonal	3/4	625	-2.1	4.7	45.2	Pass
T11	60 - 40	Diagonal	3/4	641	-2.3	4.7	49.8	Pass
T12	40 - 20	Diagonal	3/4	708	-2.4	4.7	51.2	Pass
T13	20 - 6.75	Diagonal	3/4	804	-2.4	4.7	50.4	Pass
T14	6.75 - 0	Diagonal	3/4	822	-3.8	5.7	66.9	Pass
T1	250 - 240	Horizontal	1 1/4	17	-0.9	23.4	3.9	Pass
T2	240 - 220	Horizontal	5/8	94	-1.1	2.8	40.0	Pass
T3	220 - 200	Horizontal	5/8	130	3.0	8.8	34.1	Pass
T4	200 - 180	Horizontal	5/8	226	2.4	8.8	27.3	Pass
T5	180 - 160	Horizontal	5/8	252	1.9	6.6	28.2	Pass
T6	160 - 140	Horizontal	5/8	318	2.0	6.6	29.6	Pass
T7	140 - 120	Horizontal	5/8	385	2.0	6.6	30.1	Pass
T8	120 - 100	Horizontal	5/8	451	2.4	6.6	36.0	Pass
T9	100 - 80	Horizontal	5/8	517	2.5	6.6	37.4	Pass
T10	80 - 60	Horizontal	5/8	583	2.5	6.6	38.1	Pass
T11	60 - 40	Horizontal	5/8	649	2.7	6.6	41.5	Pass
T12	40 - 20	Horizontal	5/8	715	2.8	6.6	42.8	Pass
T13	20 - 6.75	Horizontal	5/8	801	2.8	6.6	42.8	Pass
T14	6.75 - 0	Horizontal	2 x 1/4	814	3.5	10.8	32.0	Pass
T1	250 - 240	Secondary Horizontal	5/8	26	0.0	8.8	0.3	Pass
T2	240 - 220	Secondary Horizontal	5/8	102	0.0	8.8	0.3	Pass
T3	220 - 200	Secondary Horizontal	5/8	168	0.0	8.8	0.3	Pass
T4	200 - 180	Secondary Horizontal	5/8	234	0.0	8.8	0.1	Pass
T5	180 - 160	Secondary Horizontal	5/8	250	-0.0	5.9	0.1	Pass
T6	160 - 140	Secondary Horizontal	5/8	316	-0.0	5.9	0.1	Pass
T7	140 - 120	Secondary Horizontal	5/8	422	-0.0	5.9	0.1	Pass
T8	120 - 100	Secondary Horizontal	5/8	498	-0.0	5.9	0.1	Pass
T9	100 - 80	Secondary Horizontal	5/8	514	0.0	8.8	0.1	Pass
T10	80 - 60	Secondary Horizontal	5/8	580	0.0	8.8	0.1	Pass
T11	60 - 40	Secondary Horizontal	5/8	646	0.0	8.8	0.2	Pass
T12	40 - 20	Secondary Horizontal	5/8	712	0.0	8.8	0.3	Pass
T13	20 - 6.75	Secondary Horizontal	5/8	778	0.0	8.8	0.3	Pass
T1	250 - 240	Top Girt	L2x1 1/2x3/16	4	-0.0	9.5	0.2	Pass
T2	240 - 220	Top Girt	L2x1 1/2x3/16	40	-2.0	9.5	21.5	Pass
T3	220 - 200	Top Girt	L2x1 1/2x3/16	108	1.2	17.9	7.0	Pass
T4	200 - 180	Top Girt	L2x1 1/2x3/16	172	1.4	17.9	7.8	Pass
T5	180 - 160	Top Girt	L2x1 1/2x3/16	239	2.4	17.9	13.6	Pass
T6	160 - 140	Top Girt	L2x1 1/2x3/16	305	1.1	13.4	8.0	Pass
T7	140 - 120	Top Girt	L2x1 1/2x3/16	371	1.1	13.4	8.3	Pass
T8	120 - 100	Top Girt	L2x1 1/2x3/16	438	1.9	13.4	14.1	Pass
T9	100 - 80	Top Girt	L2x1 1/2x3/16	504	1.4	13.4	10.1	Pass
T10	80 - 60	Top Girt	L2x1 1/2x3/16	570	1.4	13.4	10.5	Pass
T11	60 - 40	Top Girt	L2x1 1/2x3/16	636	2.0	13.4	14.6	Pass
T12	40 - 20	Top Girt	L2x1 1/2x3/16	702	1.6	13.4	11.7	Pass

tnxTower	Job	Page
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GPD Group 520 S. Main St Akron, OH 44311 Phone: (330) 572 2100 FAX: (330) 572 2101	Project 2014702.19	Date 13:57:48 04/18/14
	Client Central State Tower	Designed by B. Franczkowski

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T13	20 - 6.75	Top Girt	L2x1 1/2x3/16	768	1.6	13.4	12.0	Pass
T2	240 - 220	Bottom Girt	L2x1 1/2x3/16	44	1.4	17.9	7.7	Pass
T3	220 - 200	Bottom Girt	L2x1 1/2x3/16	110	1.2	17.9	6.8	Pass
T5	180 - 160	Bottom Girt	L2x1 1/2x3/16	242	1.1	13.4	7.9	Pass
T6	160 - 140	Bottom Girt	L2x1 1/2x3/16	308	1.1	13.4	8.3	Pass
T8	120 - 100	Bottom Girt	L2x1 1/2x3/16	441	1.4	13.4	10.1	Pass
T9	100 - 80	Bottom Girt	L2x1 1/2x3/16	507	1.4	13.4	10.5	Pass
T11	60 - 40	Bottom Girt	L2x1 1/2x3/16	639	1.6	13.4	11.6	Pass
T12	40 - 20	Bottom Girt	L2x1 1/2x3/16	705	1.6	13.4	12.0	Pass
T13	20 - 6.75	Bottom Girt	2 x 1/4	771	3.3	10.8	30.8	Pass
T1	250 - 240	Guy A@240.083	9/16	845	10.5	17.5	60.1	Pass
T4	200 - 180	Guy A@180.083	9/16	853	13.1	17.5	74.9	Pass
T7	140 - 120	Guy A@120.083	1/2	856	8.9	13.4	65.9	Pass
T10	80 - 60	Guy A@60.0833	3/8	859	4.4	7.7	57.2	Pass
T1	250 - 240	Guy B@240.083	9/16	840	10.5	17.5	59.8	Pass
T4	200 - 180	Guy B@180.083	9/16	852	13.0	17.5	74.3	Pass
T7	140 - 120	Guy B@120.083	1/2	855	8.9	13.4	65.9	Pass
T10	80 - 60	Guy B@60.0833	3/8	858	4.4	7.7	57.1	Pass
T1	250 - 240	Guy C@240.083	9/16	833	10.5	17.5	60.1	Pass
T4	200 - 180	Guy C@180.083	9/16	851	13.1	17.5	75.1	Pass
T7	140 - 120	Guy C@120.083	1/2	854	8.9	13.4	66.2	Pass
T10	80 - 60	Guy C@60.0833	3/8	857	4.4	7.7	57.4	Pass
T1	250 - 240	Top Guy Pull-Off@240.083	L2x1 1/2x3/16	7	4.9	17.9	27.4	Pass
T4	200 - 180	Top Guy Pull-Off@180.083	L2x1 1/2x3/16	176	3.4	17.9	19.2	Pass
T7	140 - 120	Top Guy Pull-Off@120.083	L2x1 1/2x3/16	373	2.4	13.4	17.6	Pass
T10	80 - 60	Top Guy Pull-Off@60.0833	L2x1 1/2x3/16	571	2.3	13.4	17.2	Pass
T1	250 - 240	Torque Arm Top@240.083	L2x2x1/4	842	12.7	27.0	47.1	Pass
T1	250 - 240	Torque Arm Bottom@240.083	L2x2x1/4	844	-14.3	17.3	82.3	Pass

	Summary	
Leg (T14)	72.8	Pass
Diagonal (T14)	66.9	Pass
Horizontal (T12)	42.8	Pass
Secondary Horizontal (T2)	0.3	Pass
Top Girt (T2)	21.5	Pass
Bottom Girt (T13)	30.8	Pass
Guy A (T4)	74.9	Pass
Guy B (T4)	74.3	Pass
Guy C (T4)	75.1	Pass
Top Guy Pull-Off (T1)	27.4	Pass
Torque Arm Top (T1)	47.1	Pass
Torque Arm Bottom (T1)	82.3	Pass
Bolt Checks	23.4	Pass
RATING =	**82.3**	**Pass**

GPD GROUP

Guyed Tower Base Foundation
Thompson, CT
2014702.19

Tower Reactions		
Axial	91	k
Shear	1	k
Pad & Pier Geometry		
Height	4	ft
Height above Grade	2	ft
Pad Width	8	ft
Pad Thickness	2	ft
Pier Shape	Round	
Round Pier Diameter	2.5	ft

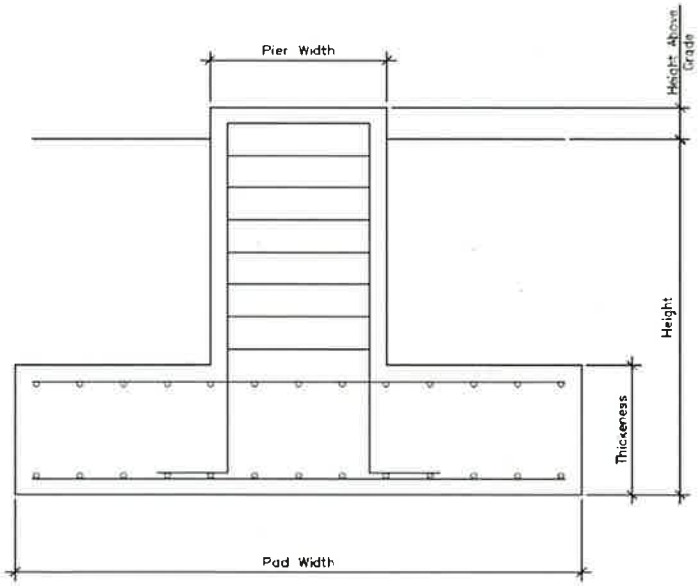
Pad & Pier Reinforcing		
F_c'	3	ksi
Clear Cover	3	in
Rebar Fy	60	ksi
Pad Rebar Size	# 6	
Pad Rebar Quantity	9	
Pier Rebar Size	# 6	
Pier Rebar Quantity	8	

Soil Properties		
Concrete Unit Weight	150	pcf
Soil Unit Weight	120	pcf
Bearing Type	Net	
Allowable Bearing	9	ksf
Water Table Depth	3.5	ft

Bearing Capacity Calculations		
Vs	118.18	ft^3
Vc	147.63	ft^3
Ws	14.18	k
Wc	22.15	k
Q_{max}	2.06	ksf
Q_{max} @ 45°	2.09	ksf

Reinforcing Calculations		
Pad Moment Capacity		
Mu=	7.65	k-ft
Ø Mn=	43.19	k-ft
Moment Capacity	17.7%	**OK**
Punching Shear		
Vu=	118.30	k
ØVc=	511.71	k
Shear Capacity	23.1%	**OK**
Pier Compression		
Pu=	127.4	k
øPn=	1107.60	k
Compression Capacity	11.5%	**OK**

Overall Capacities		
Bearing Capacity	17.9%	**OK**
Reinforcement Capacity	23.1%	**OK**
Controlling Capacity	**23.1%**	**OK**



GPD GROUP

Guyed Tower Anchor Foundation TIA/EIA-222-F
2014702.19 Thompson CT

Guy Anchor Location	
Azimuth/Leg	*A, B, & C*
Radius	*180, 190', 187'*
Tower Height (ft)	*250*

Tower Reactions	
Vertical	31 k
Horizontal	34 k

Anchor Block Geometry	
Width	5 ft
Height	4 ft
Length	12 ft
Depth	6 ft

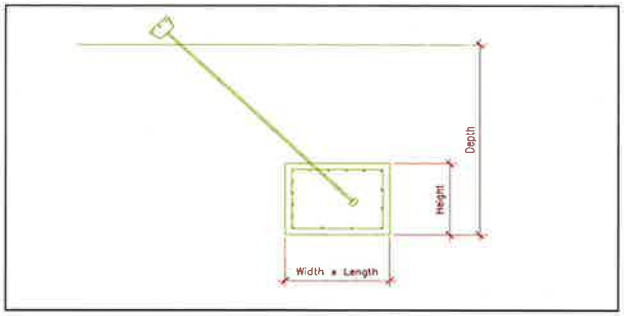
Soil Capacity Calcualtions		
W_s	17.88 k	
W_c	21.02 k	
$(W_s+W_c)/1.5$	25.94 k	
$(W_s/2)+(W_c/1.25)$	25.76 k	
Uplift Resistance	32.96 k	
Horizontal Resistance	35.18 k	
Uplift Capacity=	94.1%	OK
Horizontal Capacity=	96.6%	OK

Anchor Block Reinformement	
Is Reinforcement Known?	no

Capacity Summary		
Soil Capacity=	96.6%	OK
Controlling Capacity=	96.6%	OK

<--- Reinforcement capacity not verified

Soil Properties					
Layer	C, psf	ϕ, degrees	γ_{soil}, pcf	$\gamma_{concrete}$, pcf	d, ft
1	0	34	110	150	2
2	0	34	120	150	4
3					
4					
Ignored Depth	2 ft		Consider soil for uplift		
Water Table	2 ft		Granular		



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