Robinson+Cole

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Also admitted in Massachusetts

August 13, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
112 Munn Road, Colchester, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 220-foot level of the existing 320-foot tower at 112 Munn Road in Colchester, Connecticut (the "Property"). The tower and underlying property are owned by State of Connecticut Department of Emergency Services and Public Protection, Division of State Police, ("DESPP"). The Council approved Cellco's use of this tower in 1990. Cellco now intends to replace nine (9) of its existing antennas with three (3) model LNX-6512DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

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

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRH's will be located at the 220-foot level on the 320-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 worst-case 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, with certain modifications, can support Cellco's proposed modifications. (*See* Detailed Structural Analysis and Modification Report included in Attachment 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Stan Soby, Colchester First Selectman
DESPP, Division of State Police
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6512DS-VTM

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

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Ideal choice for site collocations and tough zoning restrictions
- Extended elevation tilt for maximum flexibility in urban core areas
- Remote beam tilt management is an optional feature using Andrew's Teletilt® system
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	14.1	15.0
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	19.0	17.0
Beam Tilt, degrees	0–15	0–15
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	28	28
CPR at Boresight, dB	12	12
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

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

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	379.8 N @ 150 km/h 85.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Product Specifications

LNX-6512DS-VTM

Depth	181.0 mm | 7.1 in
Length	1232.0 mm | 48.5 in
Width	301.0 mm | 11.9 in
Net Weight	13.0 kg | 28.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6512DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6512DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

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

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

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® quad
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

HBXX-6517DS-VTM

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

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

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

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

* Footnotes

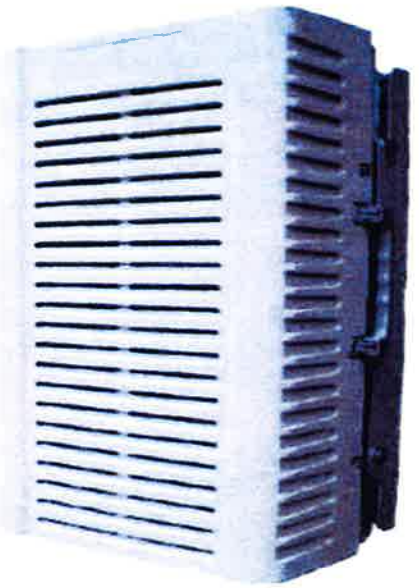
Performance Note	Severe environmental conditions may degrade optimum performance

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

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



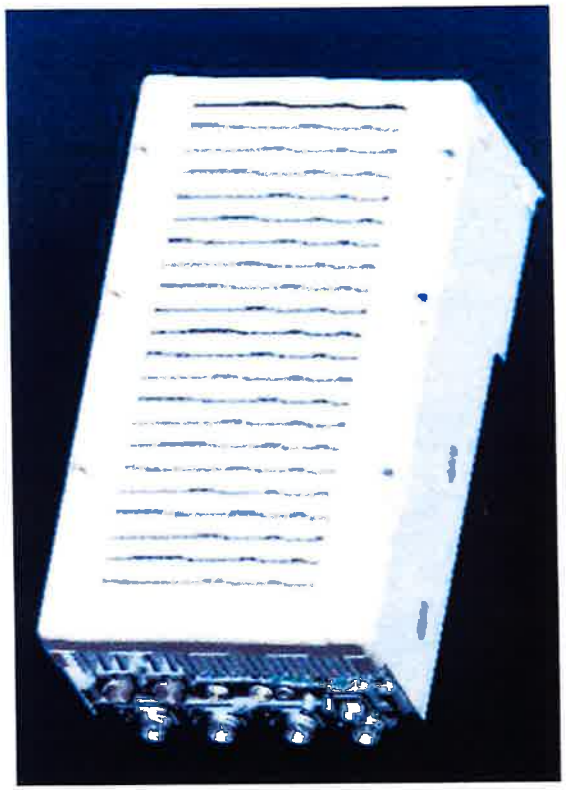
** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW

RRH2X60 - HW CHARACTERISTICS

LR14.3

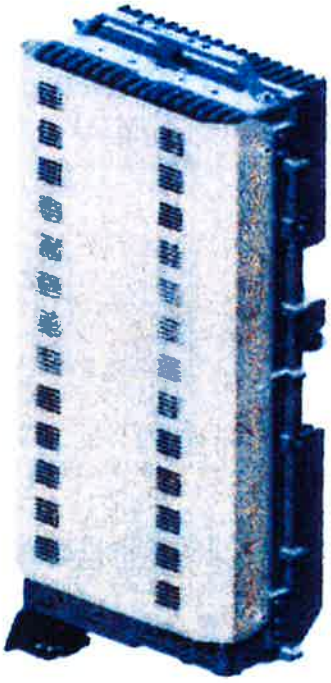
	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC
	Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental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



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

Alcatel-Lucent

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



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

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

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

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

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

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

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

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

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

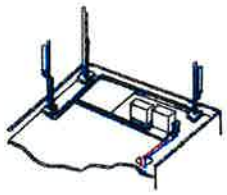
The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

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

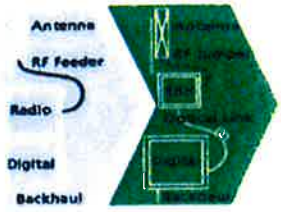
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

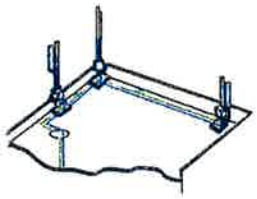
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control
- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

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

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

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

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

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

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

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX² accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

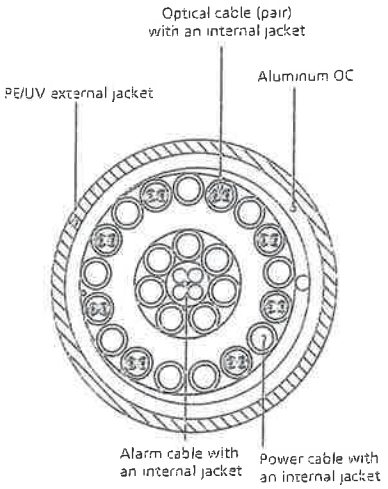


Figure 2: Construction Detail

¹ This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Colchester								
Tower Height: 320Ft.								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Antenna no. 2 (CSP/FBI)	1	330	320	0.0002	154.665	0.2000	0.09%	
*Antenna no. 3 (CSP)	1	1015	315	0.0000	2141	1.0000	0.00%	
*Antenna no. 4 (SHP)	1	398	294	0.0002	151.355	0.2000	0.12%	
*Antenna no. 5 (DEP)	1	175	292	0.0001	44.72	0.2000	0.06%	
*Antenna no. 6	1	100	257	0.0001	153.935	0.2000	0.04%	
*Antenna no. 7 (OEM)	1	178	243	0.0002	45.2	0.2000	0.08%	
*Antenna no. 8 (CSP)	1	330	227	0.0003	42.04	0.2000	0.17%	
*Antenna no. 9 (DEP)	1	125	138	0.0004	75.5	0.2000	0.18%	
*Antenna no. 10 (CSP)	1	569	97	0.0000	2138	1.0000	0.00%	
*Antenna no. 11 (CSP)	1	252	90	0.0000	2133.2	1.0000	0.00%	
*Antenna no. 12 (CSP)	1	5750	105	0.0005	6795	1.0000	0.05%	
*Antenna no. 13 (CSP)	1	1545	112	0.0000	10567.5	1.0000	0.00%	
*Antenna no. 14	5	200	320	0.0005	867.4	0.5783	0.09%	
*Antenna no. 15	5	200	320	0.0005	867.5	0.5783	0.09%	
*Antenna no. 18 (FBI)	1	473	100	0.0023	453.625	0.3024	0.77%	
*Antenna no. 31 (CTT)	1	10	100	0.0001	406	0.2707	0.02%	
*AT&T UMTS	2	565	200	0.0102	880	0.5867	1.73%	
*AT&T UMTS	2	875	200	0.0157	1900	1.0000	1.57%	
*AT&T GSM	1	283	200	0.0025	880	0.5867	0.43%	
*AT&T GSM	4	525	200	0.0189	1900	1.0000	1.89%	
*AT&T LTE	1	1375	200	0.0124	734	0.4893	2.53%	
Verizon PCS	**11**	**366**	**220**	**0.0299**	**1970**	**1.0000**	**2.99%**	
Verizon Cellular	**9**	**222**	**220**	**0.0148**	**869**	**0.5793**	**2.56%**	
Verizon AWS	**1**	**2806**	**220**	**0.0208**	**2145**	**1.0000**	**2.08%**	
Verizon 700	**1**	**773**	**220**	**0.0057**	**746**	**0.4973**	**1.15%**	
								18.71%
* Source: Siting Council								

ATTACHMENT 3

AECOM

Submitted to
Verizon Wireless
99 East River Drive
East Hartford, CT 06108

Submitted by
AECOM
500 Enterprise Drive,
Suite 3B
Rocky Hill, CT 06067
August 6, 2015

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 320' SELF SUPPORTING LATTICE TOWER AND FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

verizonwireless

Site Address: 112 Munn Road
Colchester, Connecticut
CSP Tower # 50

36917432.00000
VZ5-183 Rev. 2

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing reinforced 320' self-supporting lattice tower structure located at 112 Munn Road in Colchester, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard, and the Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 1/2" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

The proposed Verizon Wireless antenna modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(6) LPA-80080-4CF Panel Antennas** **(3) BXA-171085-8BF-EDIN-2 Panel Antennas**	**Verizon Wireless (Existing)**	**@ 220'**
Install: **(6) HBXX-6517DS-A2M Panel Antennas** **(3) LNX-6512DS-VTM Panel Antennas** **(3) AWS RRH Units** **(3) 1900MHz RRH Units** **(1) DB-T1-6Z-8AB-0Z Distribution Box** **(1) HB158-1-08U8-S8J18 Fiber Optic Cable**	**Verizon Wireless (Proposed)**	**@ 220'**

The results of an initial analysis indicated the tower structure did NOT have sufficient capacity to support the proposed loading conditions stated above. The tower structure requires modifications shown on SK-1 through SK-4. Once the modifications indicated on sheets SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified above with the existing and proposed antenna loading.

The tower deflection (sway) is 0.5968 degrees, and the tower rotation (twist) is 0.1464 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection (sway) and rotation (twist) are within the Connecticut State Police specification of 0.75 degrees combined for deflection (sway) and rotation (twist).** See Section 4 of this report for additional information.

The analysis results presented herewith are based on previous tower foundation modifications proposed by URS Corporation's tower modification analysis report 36922280 signed and sealed on July 13, 2012 with updated modification sketches signed and sealed December 18, 2013. A site inspection of the tower was performed June 16, 2014. The inspection of the site confirmed that (1) the foundation modification had been constructed, (2) none of the tower components were updated and (3) no Verizon Wireless antenna modifications had been installed.

1. EXECUTIVE SUMMARY *(continued)*

This analysis is based on:

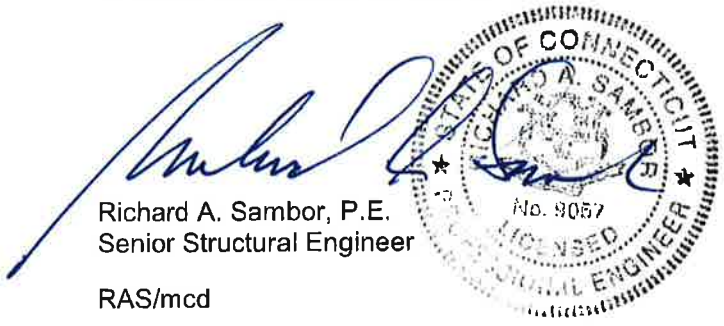
1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry, structural member sizes, and antenna mount assembly taken from original construction drawings (Rohn File #: 43233AE) prepared by Rohn Industries, Inc., approved May 10, 2001.
3) Previous structural analysis and reinforcement by URS Corporation for Verizon Wireless, project number VZ5-122 / 36922280, signed and sealed July 13, 2012 with updated modification sketches signed and sealed December 18, 2013. (Note: Only foundation components have been constructed from this report).
4) Verizon Wireless antenna RDFS, dated June 6, 2014.
5) Site Visit performed by URS Corporation on July 21, 2014.
6) Antenna inventory provided by Connecticut State Police via e-mail on December 22, 2014.
7) Previous structural analysis, performed by URS Corporation for Verizon Wireless, project number VZ5-183 / 36917432, signed and sealed January, 7, 2015.
8) Antenna and mount configuration as specified on the following page of this report.
9) Coax cable orientation as specified in section 6 of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the antenna, cabling and mount configuration used, as well as the physical condition of the tower members, connections and foundations. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

AECOM, contracting as URS Corporation AES



Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd

cc: ICA, MJE – URS
CF/Book

2. INTRODUCTION

The subject tower is located at 112 Munn Road in Colchester, Connecticut. The structure is a 320' self-supporting lattice tower structure designed by Rohn Industries, Inc.

The tower geometry and structure member sizes were taken from the original construction drawings (Rohn File #: 43233AE) prepared by Rohn Industries, Inc., approved May 10, 2001.

The inventory provided by the Connecticut State Police is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) Lighted Beacon	Tower (existing)	Tower Mount	320'	(1) 1/2" coax cable
(1) PD128 antenna	CSP/FBI (existing)	Side Arm Mount	320'	(1) 7/8" coax cable
(1) PD128 antenna	CSP (existing)	Side Arm Mount	318'	(1) 7/8" coax cable
(1) 8 FT dish	CSP (existing)	Dish Mount	315'	(1) 7/8" coax cable
(3) 6 FT dishes	(wind load)	(3) Dish Mount	308'	(3) EW63 coax cables
(1) DB224 antenna	SHF (existing)	Side Arm Mount	294'	(1) 7/8" coax cable
(1) PD320 antenna	DEP (existing)	Side Arm Mount	292'	(1) 7/8" coax cable
(2) DB809 antenna	CSP (existing)	Side Arm Mount	285'	(2) 1 5/8" coax cables
(3) SC479-HF1LDF (1) BCD806-09NE (1) Tower Top Amplifier	CSP 51-55 (existing)	(3) Side Arm Mounts	280'	(4) 1 5/8" coax cables (1) 1/2" coax cable
(2) OGT9 antenna	CSP (existing)	Side Arm Mount	275'	(2) 1 5/8" coax cables
(1) PD440 antenna	OEM (existing)	Side Arm Mount	257'	(1) 7/8" coax cable
(1) PD128 antenna	OEM (existing)	Side Arm Mount	243'	(1) 7/8" coax cable
(1) PD320 antenna	CSP (existing)	Side Arm Mount	227'	(1) 7/8" coax cable
(6) HBXX-6517DS-A2M_02DT_2100 (3) LNX-6512DS-VTM (3) AWS RRH Units (3) 1900 MHz RRH Units (1) DB-T1-6Z-8AB-0Z	**Verizon (proposed)**	(3) T-Arms (existing)	**220'**	**(1) HB158-1-08U8-S8J18 Fiber Optic Cable**
(3) BXA-70063-6CF (3) BXA-171085/8BF (6) Diplexers	Verizon (existing)	*See Above Mount*	220'	(12) 1 5/8" coax cables (existing)
(6) Powerwave 7770.00 antennas , (6) LPG21401 TMA's and (6) LPG13519 Diplexers	AT&T (existing)	(3) T-Arms	200'	(12) 1 5/8" coax cables
(1) DB-583	NEU – 48 (existing)	Side Arm Mount	174'	(1) 7/8" coax cable
(1) DB-630	NEU – 32 (existing)	Side Arm Mount	170'	(1) 7/8" coax cable

Antenna Type	Carrier	Mount	Antenna Centerline Elevation	Cable
(1) DB586-Y	NEU – 49 (existing)	Side Arm Mount	166'	(1) 7/8" coax cable
(1) BA1012 antenna	OEM (existing)	Side Arm Mount	140'	(1) 7/8" coax cable
(1) PD688S antenna	NEU (existing)	Side Arm Mount	140'	(1) 7/8" coax cable
(1) DB212 antenna	NEU (existing)	Side Arm Mount	140'	(1) 7/8" coax cable
(1) PD156S antenna	DEP (existing)	Flush Mount	138'	(1) 7/8" coax cable
(1) 4 FT dish	CSP (existing)	Dish Mount	112'	(1) EW108 coax cable
(1) 6 FT dish	CSP (existing)	Dish Mount	105'	(1) EW65 coax cable
(1) PD458 antenna	CTT (existing)	Side Arm Mount	100'	(1) 7/8" coax cable
(1) DB437 antenna	FBI (existing)	Side Arm Mount (listed above)	100'	(1) 7/8" coax cable
(1) 6 FT dish	CSP (existing)	Dish Mount	97'	(1) 7/8" coax cable
(1) 4 FT dish	CSP (existing)	Dish Mount	90'	(1) 7/8" coax cable

This structural analysis of the communications tower was performed by AECOM for Verizon Wireless. The purpose of this analysis was to investigate the structural integrity of the modified tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.1.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load
Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of an initial analysis indicated that the existing tower did not have enough capacity to support the proposed loading conditions. The tower structure requires modifications shown on SK-1 through SK-4. **Once the modifications indicated on sheets SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein.** See the below tables for tower capacity and tower deflection (sway) and rotation (twist) figures:

TABLE 1: Tower Deflection (Sway) and Rotation (Twist) at the top of the tower:

Description	Current	Allowable	Pass/Fail
Tower Sway (degrees)	0.5968	----	----
Tower Twist (degrees)	0.1464	----	----
Combined (degrees)	0.7432	0.750	Pass

TABLE 2: Tower Base Reactions:

Base Reactions	Original Tower Reactions	Proposed Tower Reactions
Axial Load (kips)	-	189
Shear per Leg (kips)	-	97
Total Shear (kips)	121.6	160
Uplift per Leg (kips)	549.0	616
Comp.per Leg (kips)	667.4	803
O.T. Moment (ft-kips)	21038.1	26055

For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

TABLE 3: Critical Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Stress (% capacity)	Pass/Fail
Tower Legs (T11)	ROHN 10 EH w/ L8x8x1/2"	Compression / 100' – 120'	72.0 %	Pass
Diagonals (T8)	L4x4x3/8"	Compression / 160' – 180'	98.9 %	Pass
Horizontals (T13)	ROHN 3 EH	Compression / 60' – 80'	93.2 %	Pass
Top Girts (T2)	L1.75x1.75x3/16	Compression / 280' – 300'	2.4 %	Pass
Redundant Horiz. Bracing (T12)	ROHN 1.5 STD	Compression / 80' – 100'	94.6 %	Pass
Redundant Diag. Bracing (T11)	ROHN 2 STD	Compression / 100' – 120'	95.8 %	Pass
Bolt Checks	7/8" A325X	Bolt Shear / 120' – 140'	98.0 %	Pass
Anchor Bolts	1 dia. A345	Tension & Shear	52 %	Pass
Previously Modified Foundation	Caisson	Compression	94.9 %	Pass
Antenna Mount Frame	Existing T-Arm Mount Frame	Compression	73.4 %	Pass

The analysis results presented herewith is based on previous tower modifications proposed by URS Corporation's tower modification analysis report 36922280 signed and sealed on July 13, 2012 with updated modification sketched signed and sealed December 18, 2013. A site inspection of the tower was performed June 16, 2014. The inspection of the site confirmed that only the foundation modification had been constructed as proposed by URS. None of the tower components were updated per the URS modification report.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of an initial analysis indicated the tower structure did NOT have sufficient capacity to support the proposed loading conditions stated above. The tower structure requires modifications shown on SK-1 through SK-4. Once the modifications indicated on sheets SK-1 through SK-4 are performed, the modified structure is considered structurally adequate with the wind load classification specified above with the existing and proposed antenna loading.

The tower deflection (sway) is 0.5941 degrees, and the tower rotation (twist) is 0.1464 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection (sway) and rotation (twist) are within the Connecticut State Police specification of 0.75 degrees combined for deflection (sway) and rotation (twist).** See Section 4 of this report for additional information.

The analysis results presented herewith is based on previous tower modifications proposed by URS Corporation's tower modification analysis report 36922280 signed and sealed on July 13, 2012 with updated modification sketched signed and sealed December 18, 2013. A site inspection of the tower was performed June 16, 2014. The inspection of the site confirmed that only the foundation modification had been constructed as proposed by URS. None of the tower components were updated per the URS modification report.

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations are in good condition without defect and were properly constructed to support original design loads as specified in the original design documents.

AECOM is not responsible for any modifications completed prior to or hereafter in which AECOM is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

AECOM hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact AECOM. AECOM disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

TOWER REINFORCEMENT DRAWINGS SK-1 THROUGH SK-4

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING, SUPPLEMENTS AND AMENDMENTS AND LIFE SAFETY CODES.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND NOTES FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.
8. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
10. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.
11. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT ANY DISCREPANCIES FROM THE DRAWINGS TO THE ARCHITECT.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURE AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.
14. EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE DOCUMENTS ARE BASED ON ORIGINAL TOWER CONSTRUCTION DRAWINGS PERFORMED BY ROHN INDUSTRIES, INC., DATED MAY 2001, AND ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.
15. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED FROM THE CONNECTICUT STATE POLICE DATED DECEMBER 2014 AND INFORMATION OBTAINED FROM VERIZON WIRELESS, DATED JUNE 2014.

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL STEEL BEAMS, CHANNELS, PLATES..... A36
STRUCTURAL ANGLES:
ANGLE SIZE 2-1/2"x2-1/2"x1/4" AND SMALLER A36
ANGLE SIZE GREATER THAN 2-1/2"x2-1/2"x1/4"..... A 572-Gr. 50
EXISTING TOWER LEG ROHN PIPE ..... A 572-Gr. 50
STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

SHOP AND ERECTION DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL STEEL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUBMIT 2 SETS OF PRINTS FOR THE ENGINEER REVIEW.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 3/4" DIA. A325-N BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20. REFER TO SK-3 AND SK-4 FOR V-BOLT REQUIREMENTS.

STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.

COMMENCEMENT OF WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. NO MEMBER OF THE TOWER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM MEMBER REPLACEMENT IN A WIND.

INSPECTIONS:

SPECIAL INSPECTIONS ARE REQUIRED PER THE CODE FOR STRUCTURAL STEEL WORK.

OWNER WILL SUPPLY THE SERVICES OF A SPECIAL INSPECTOR AND TESTING AGENTS AS REQUIRED. CONTRACTOR SHALL COORDINATE INSPECTIONS OF FABRICATOR'S AND ERECTOR'S WORK AND MATERIALS TO MEET THE REQUIREMENTS OF THE STATEMENT OF SPECIAL INSPECTIONS FOR THIS PROJECT.

COPIES OF TESTING AND INSPECTION REPORTS WILL BE PROVIDED TO THE OWNER, BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO. 36917432
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

verizon wireless

SITE ADDRESS: 112 MUNN ROAD
COLCHESTER, CONNECTICUT 06415

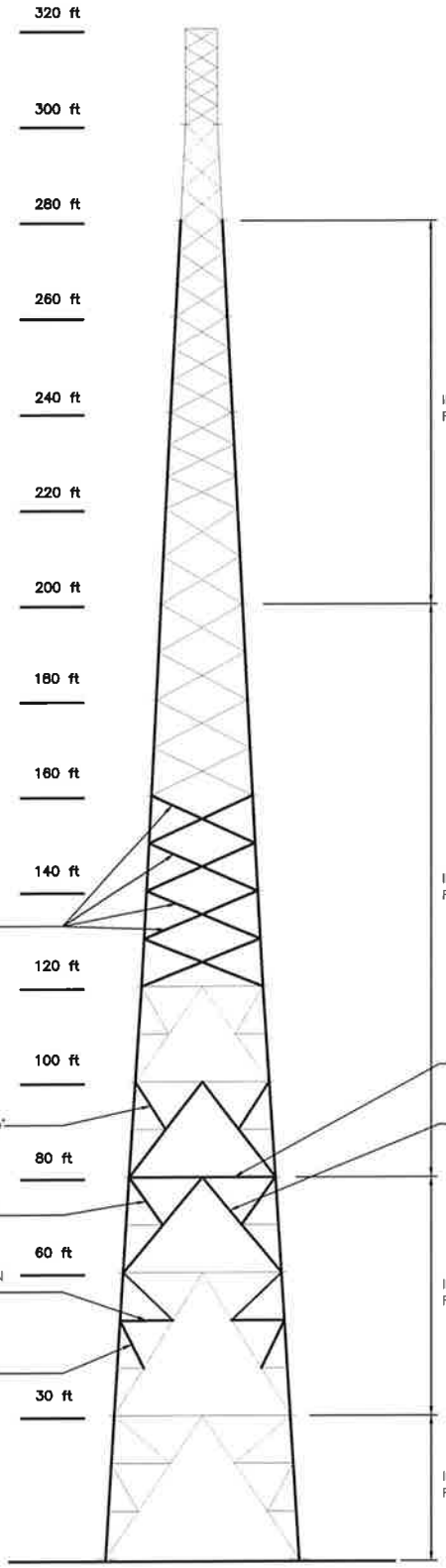
REV.	DATE:	DESCRIPTION
2	08/06/15	NO CHANGE
1	02/12/15	MODIFICATIONS

Scale: AS NOTED | Date: 02/12/15
Job No. VZ5-183 | File No.

Dwg. No. SK-1
Dwg. 1 of 4

NOTES:

1. ALL LISTED MEMBERS SHALL BE OF ASTM A 572-50 Gr. 50 (50 ksi) STEEL TO MATCH THE EXISTING MEMBER STEEL STRENGTH
2. REQUIRED REPLACEMENT PIPES ARE NOTED AS ROHN PIPE SIZES AS INDICATED IN AISC 9TH EDITION STEEL CONSTRUCTION MANUAL.
3. ANGLES ATTACHED TO TOWER LEGS SHALL USE V-BOLTS FOR ATTACHMENT. SEE SK-3 AND SK-4.
4. REINFORCEMENT OF TOWER SHALL OCCUR FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.



1 / SK-2 **TOWER ELEVATION**
SCALE: 1" = 30'-0"

PROJECT NO.	36917432
Designed by:	MCD
Drawn by:	KAP
Checked by:	KAB
Approved by:	RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

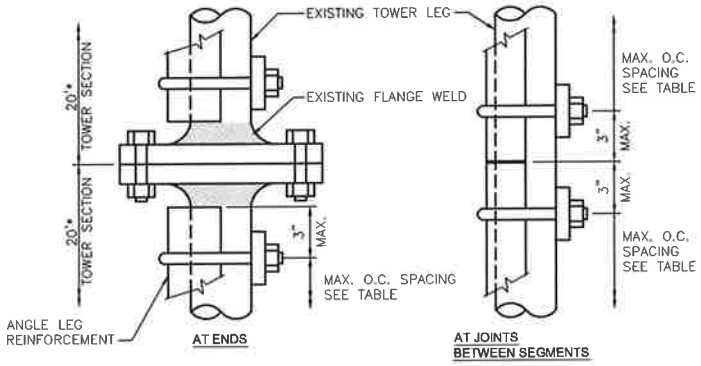
verizon wireless

SITE ADDRESS: 112 MUNN ROAD
COLCHESTER, CONNECTICUT 06415

REV.	DATE:	DESCRIPTION
2	08/06/15	NO CHANGE
1	02/12/15	MODIFICATIONS

Scale: AS NOTED | Date: 02/12/15
Job No. VZ5-183 | File No.

Dwg. No. SK-2

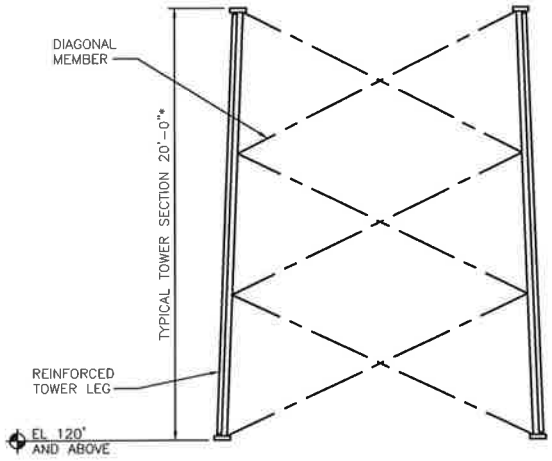


*NOTE: TYPICAL TOWER SECTION FOR ELEVATIONS 0' THROUGH 60' ARE IN 30' INCREMENTS, REMAINDER OF TOWER 60' THROUGH 280' IS IN 20' INCREMENTS.

2 SK-3 REINFORCEMENT DETAIL

SCALE: N.T.S.

NOTE: ANGLE LEG REINFORCING SHALL BE PLACED AS CLOSE TO EXISTING FLANGE WELD AS POSSIBLE.

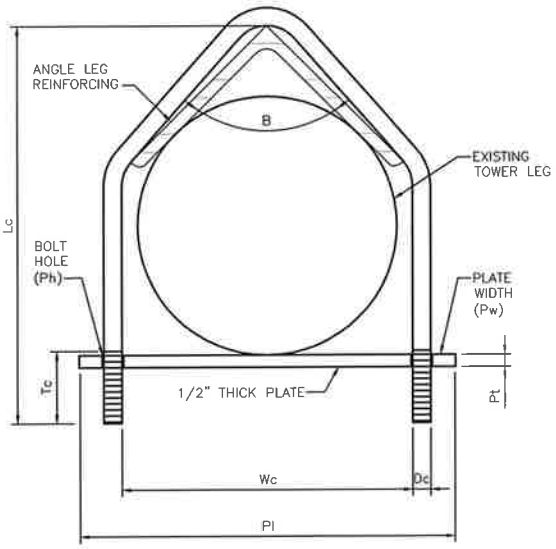


3 SK-3 LEG REINFORCEMENT AT TOWER SECTION

SCALE: N.T.S.

V-BOLT DIMENSIONS										
ELEVATION	LEG	Dc	Wc	Lc	Tc	B	Pl	Pw	Pt	Ph
(ft.)	(in.)	(in.)	(in.)	(in.)	(in.)	(deg)	(in.)			
220'-280'	8.625	3/4"	12-1/16"	1'-2"	3"	83°	15-5/8"	3"	1/2"	13/16"
200'-220'	8.625	3/4"	12-1/16"	1'-2"	3"	83°	15-5/8"	3"	1/2"	13/16"
80'-200'	10.750	3/4"	12-1/16"	1'-4 1/2"	3"	83°	15-5/8"	3"	1/2"	13/16"
60'-80'	10.750	3/4"	12-1/16"	1'-4 1/2"	3"	83°	15-5/8"	3"	1/2"	13/16"
30'-60'	12.750	3/4"	1'-1"	1'-7"	3"	83°	16-1/2"	3"	1/2"	13/16"
0'-30'	12.750	3/4"	1'-1"	1'-7"	3"	83°	16-1/2"	3"	1/2"	13/16"

V-BOLT QUANTITY / SPACING			
ELEVATION	MINIMUM # V-BOLTS / TOWER SECTION	TOWER SECTION	MAXIMUM SPACING
(ft.)	(qty.)	(ft.)	(in.)
220'-280'	135	60	18-1/2"
200'-220'	30	20	28-1/2"
80'-200'	180	120	28-1/2"
60'-80'	30	20	28-1/2"
30'-60'	45	30	28-1/2"
0'-30'	45	30	28-1/2"



1 SK-3 V-BOLT DIMENSIONING

SCALE: N.T.S.

NOTES:
V-BOLT DISTANCE FROM ENDS OF ANGLE LEG REINFORCEMENT SHALL BE 3" (MAX.)
V-BOLT MATERIAL SHALL BE (AT MINIMUM) GRADE A36 HOT DIPPED GALVANIZED.

ANGLE LEG REINFORCEMENT SHALL HAVE ENDS BUTTED AGAINST EACH OTHER TO MINIMIZE GAPS BETWEEN THE REINFORCEMENT DURING INSTALLATION. ANGLE LEG REINFORCING SHALL BE, AT MINIMUM, EQUIVALENT TO THE DETAILS SHOWN.

V-BOLT MANUFACTURER SHALL BE PORTLAND BOLT & MANUFACTURING COMPANY, WWW.PORTLANDBOLT.COM 503-227-5488 OR APPROVED EQUAL.

PROJECT NO. 36917432
Designed by: MCD
Drawn by: KAP
Checked by: KAB
Approved by: RAS

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
(860)-529-8882

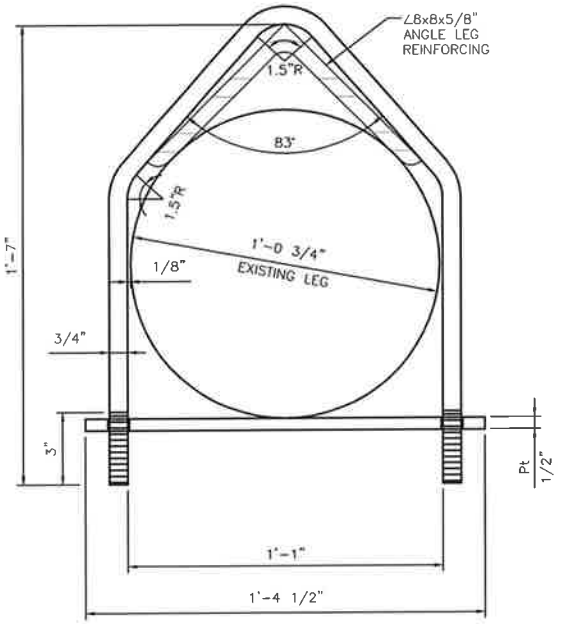
verizon wireless

SITE ADDRESS: 112 MUNN ROAD
COLCHESTER, CONNECTICUT 06415

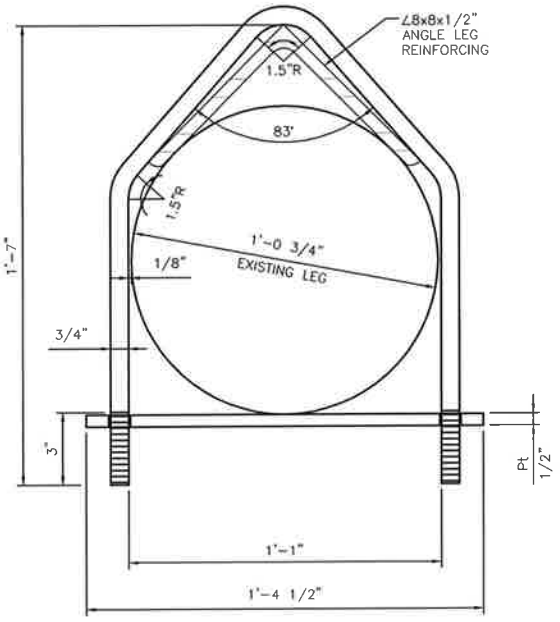
REV.	DATE:	DESCRIPTION
2	08/06/15	NO CHANGE
1	02/12/15	MODIFICATIONS

Scale: AS NOTED | Date: 02/12/15
Job No. VZ5-183 | File No.

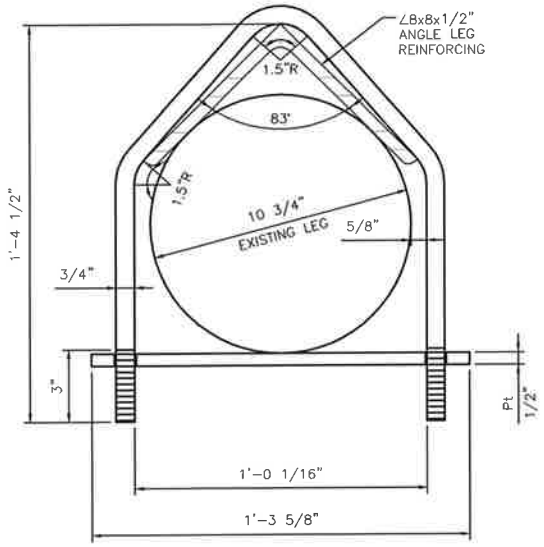
Dwg. No. SK-3



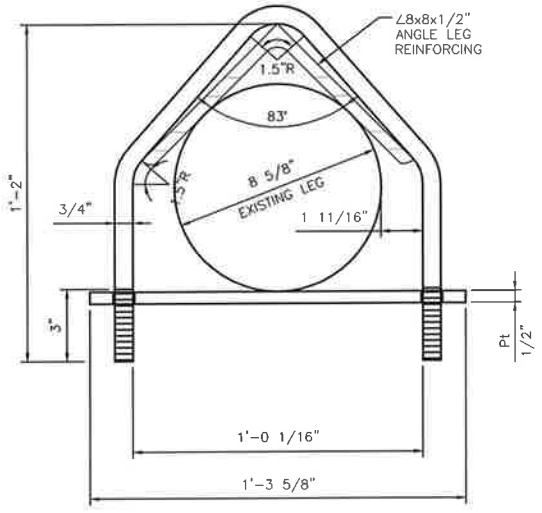
ELEVATION 0'-30' V-BOLT



ELEVATION 30'-80' V-BOLT



ELEVATION 80'-200' V-BOLT



ELEVATION 200'-280' V-BOLT

1 / SK-4 V-BOLT FOR LEG REINFORCEMENT

SCALE: 1-1/2" = 1'-0"

PROJECT NO. 36917432	AECOM	verizon wireless
Designed by: MCD	500 ENTERPRISE DRIVE	SITE ADDRESS: 112 MUNN ROAD
Drawn by: KAP	ROCKY HILL, CONNECTICUT	COLCHESTER, CONNECTICUT 06415
Checked by: KAB	(860)-529-8882	
Approved by: RAS		

REV.	DATE:	DESCRIPTION
2	08/06/15	NO CHANGE
1	02/12/15	MODIFICATIONS

Scale: AS NOTED | Date: 02/12/15 | Job No. VZ5-183 | File No.

Dwg. No. SK-4

Dwg. 4 of 4

URS

Job Collocation MOD. Fication | Project No. 425-185 R1 | Page ____ of ____

Description Effective Clamps for Leg Reinforcing | Computed by MCD | Date 2/20/15 | Sheet ____ of ____

Checked by ____ | Date ____

Reference

Calculate Effective distance of Clamps for reinforced leg:

- For the region of 0'-50':
  - Use L8x8x5/8" @ 50ksi (minimum)

    r = 2.48 in

- Consider leg effective length = 10ft = 120 in
  - Compare property of existing leg against the reinforcing angle:

- Leg properties: RCHN 12 EHS (12x x S Pipe)

K = 1.0
L = 120 in
r = 4.2925 in

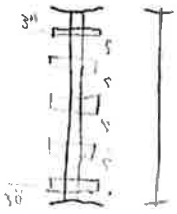
$\frac{KL}{r} = \frac{120}{4.2925} = 27.958$

- Consider weaker radius of gyration for analysis:

$\frac{KL/(\#\text{clamp}-1)}{r_{weak}} = \frac{(1.0)(120\text{ in})/(5-1)}{2.48\text{ in}} = 24.1935 < 27.958 \therefore$ Ok

min clamp for Section = 5/10ft segment

- Note: The number of clamps considered will be increased to 5 per 10' segment (F.S = 1.67)



120" - 3" - 5" = 28.5" max spacing

Result:

- Because the local (KL/r) ratio is less than the existing (KL/r) ratio, the use of 5 clamps, at a maximum spacing of 28.5 in for a 10ft long section of tower leg, per tower leg, shall be a minimum requirement for reinforcing leg installation.

URS

Job Colchester Modification | Project No. 1125-183R1 | Page ____ of ____

Description Effective clamps for Leg Reinforcement. | Computed by MCD | Date 2/2015

Checked by ____ | Date ____

Reference

Calculate effective distance of clamp for reinforced leg:

- For the region 30'-80':
  - Use L8x8x1/2" @ 5 Pcks. (minimum)

    r = 2.49 in

- Consider leg effective length = 10ft = 120 in
  - Compare property of existing leg against the reinforcing angle:
    - Leg Properties: ROHN 12 EH (125Ch 8C)

K = 1.0
L = 120 in
r = 4.35 in

$\frac{KL}{r} = \frac{(1.0)(120)}{4.35} = 27.586$

  - Consider weaker radius of gyration for analysis:

$\frac{KL/(\#clamp-1)}{r_{weak}} = \frac{(1.0)(120 in)/(5-1)}{2.49 in} = 24.096 < 27.586 \therefore$ (OK)

#min Clamp for Section = 5/10ft segment

- NOTE: The number of clamps considered will be increased +0.5 clamps per 10' segment (F.S. = 1.67)

Result:

- Because the local (KL/r) ratio is less than the existing (KL/r) ratio, the use of 5 clamps, at a maximum spacing of 28.5 in for a 10' long section of lower leg, per tower leg, shall be a minimum requirement for reinforcing leg installation.

URS

Job Colonest MOD.ification | Project No. V65-193 R1 | Page ___ of ___
Description Effective Clamps for Leg Reinforcing | Computed by MCD | Sheet 3 of ___
Checked by ___ | Date 2/2015 | Date ___

Reference

Calculate Effective distance of Clamp for reinforced leg:

- For the region of 80' - 200':
  - Use L8x8x1/2 @ 50ksi (minimum)

    r = 2.49 in
  - Consider leg effective length = 10ft = 120 in
    - Compare property of existing leg against the reinforcing angle:
      - Leg Properties: RCHN10 EH (10 Sch80)

K = 1.0
L = 120 in
r = 3.63 in

$$\frac{KL}{r} = \frac{(1.0)(120\text{ in})}{3.63\text{ in}} = 33.06 > 8$$

    - Consider weaker radius of gyration for analysis

$$\frac{KL/(\#clamp-1)}{r} = \frac{(1.0)(120\text{ in})/(3-1)}{2.49\text{ in}} = 24.096 < 33.0578 \therefore \text{OK}$$

min. Clamp for section = 3/10ft segment

- Note: the number of clamps considered will be increased to 5 clamps per 10' segment (F.S. = 1.67)

Result:
- Because the local (KL/r) ratio is less than the existing (KL/r) ratio, the use of 5 clamps, at a maximum spacing of 28.5 in for a 10' long section of tower leg, per tower leg, shall be a minimum requirement for reinforcing leg installation.

URS

Job Calculation MODification | Project No. V65-193R1 | Page ____ of ____
Description Effective Clamps for Leg Reinforcing | Computed by MCD | Date 2/2015 | Sheet 4 of ____
Checked by ____ | Date ____
Reference

Calculate Effective distance of Clamp for reinforced leg:

— For the region of 200' – 220':

- Use L8x8x1/2 @ 50ksi (minimum)

r = 2.49 in

- Consider leg effective length = 10ft = 120 in

• Compare property of existing leg against the reinforcing angle:

- Leg Properties: RCHN 8 EH (8 Sch 80)

K = 1.0
L = 120 in
r = 2.88 in

$$\frac{KL}{r} = \frac{(1.0)(120\text{ in})}{2.88\text{ in}} = 41.\overline{6}$$

• Consider weaker radius of gyration for analysis

$$\frac{KL/(\#\text{clamp}-1)}{r} = \frac{(1.0)(120\text{ in})/(3-1)}{2.49\text{ in}} = 24.096 < 41.\overline{6} \quad \therefore \text{OK}$$

min. Clamp for section = 3/10ft segment

• Note: the number of clamps considered will be increased to 5 clamps per 10' segment (F.S. = 1.67)

Results:

- Because the local (kL/r) ratio is less than the existing (kL/r) ratio, the use of 5 clamps, at a maximum spacing of 28.5 in for a 10' long section of tower leg, per tower leg, shall be a minimum requirement for reinforcing leg installation.

URS

Job Colchester MODification | Project No. V65-193R1 | Page ___ of ___
Description Effective Clamps for Leg Reinforcing | Computed by MCD | Sheet 5 of 5
Checked by ___ | Date 2/2017 | Date ___
Reference

Calculate Effective distance of Clamp for reinforced leg:

– For the region of 220' - 280'

– Use L8x8x½ @ 50ksi (minimum)

r = 2.49 in

– Consider leg effective length = 6.67ft = 80 in

• Compare property of existing leg against the reinforcing angle:

– Leg Properties: RCHN 8 EH (8 Sch 8C)

K = 1.0
L = 80 in
r = 2.88 in

$$\frac{KL}{r} = \frac{(1.0)(80\text{ in})}{2.88\text{ in}} = 27.77$$

• Consider weaker radius of gyration for analysis:

$$\frac{KL/(\#clamp-1)}{r} = \frac{(1.0)(80\text{ in})/(3-1)}{2.49\text{ in}} = 16.06 < 27.77 \quad \therefore \text{OK}$$

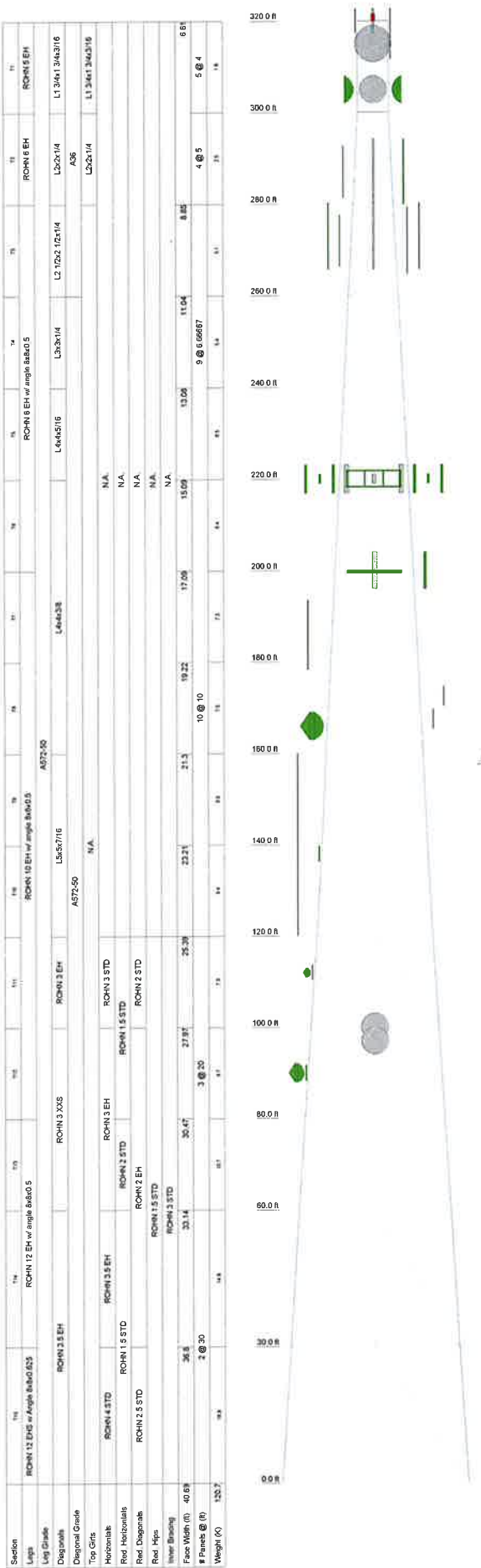
min. Clamp for section = 3/6.67ft segment

• Note: the number of clamps considered will be increased to 5 clamps per 6.67' segment (F.S. = 1.67)

Result:

– Because the local (KL/r) ratio is less than the existing (KL/r) ratio, the use of 5 clamps, at a maximum spacing of 18.5 in for a 6.67' lower section of tower leg, per tower leg, shall be a minimum for reinforcing leg installation.

TNX TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Dual Lights (Tower)	320	HBXX-6517DS-VTM (Verizon-PCS)	220
5'3"x4" Pipe Mount (CSP-56)	320	RRH_2x60-AWS (Verizon-AWS)	220
5'3"x4" Pipe Mount (CSP-57)	320	RRH_2x60-AWS (Verizon-AWS)	220
5'3"x4" Pipe Mount (CSP-58)	320	RRH_2x60-AWS (Verizon-AWS)	220
PD128-1 (CSP-2)	320	DB-T1-6Z-8AB-0Z (Verizon-AWS)	220
6' Side Mount Standoff (CSP-2)	320	(2) FD9R6002/2C-3L Diplexer (Verizon-700)	220
PD128-1 (CSP-1)	316	(2) FD9R6002/2C-3L Diplexer (Verizon-700)	220
6' Side Mount Standoff (CSP-1)	316	(2) FD9R6002/2C-3L Diplexer (Verizon-700)	220
6'8"x4" Pipe Mount (CSP-3)	315	RRH_2x60-AWS (Verizon-PCS)	220
P8F-21C (CSP-3)	315	RRH_2x60-AWS (Verizon-PCS)	220
PA6-65AC (CSP-56)	305	RRH_2x60-AWS (Verizon-PCS)	220
PA6-65AC (CSP-57)	305	(2) RRH (ATT)	200
PA6-65AC (CSP-58)	305	(2) RRH (ATT)	200
SC479-HF1LDF (CSP-51)	294 - 280	(2) RRH (ATT)	200
DB809T3E-XC (CSP-14)	294 - 280	DC6-48-60-18-8F (ATT)	200
OGT9-840 (CSP-15)	294 - 280	PiROD 12' Lightweight T-Frame (ATT)	200
PD340-1 (CSP-4)	294	PiROD 12' Lightweight T-Frame (ATT)	200
6' Side Mount Standoff (CSP-4)	294	PiROD 12' Lightweight T-Frame (ATT)	200
PD1142-1 (DEP-5)	292	7770.00 (ATT)	200
6' Side Mount Standoff (DEP-5)	292	7770.00 (ATT)	200
TMA (CSP-55)	280	7770.00 (ATT)	200
6' Side Mount Standoff (CSP-51)	280	7770.00 (ATT)	200
SC479-HF1LDF (CSP-52)	280 - 266	7770.00 (ATT)	200
DB810K-XT (CSP-16)	280 - 264	7770.00 (ATT)	200
OGT9-840 (CSP-17)	280 - 264	SBNH-1D6565C (ATT)	200
SC479-HF1LDF (CSP-53)	280 - 266	SBNH-1D6565C (ATT)	200
6' Side Mount Standoff (CSP-53)	280	AM-X-CD-16-65-00T RET (ATT)	200
SC479-HF1LDF (CSP-54)	280 - 266	1151-3 (NEU-32)	192 - 180
6' Side Mount Standoff (CSP-54)	280	6' Side Mount Standoff (NEU-32)	180
PD440-2 (DEHMS-6)	257	DB586-Y (NEU-48)	175 - 170
6' Side Mount Standoff (DEHMS-6)	257	DB586-Y (NEU-49)	170 - 165
PD1142-1 (DEHMS-7)	243	6' Side Mount Standoff (NEU-48,49,50)	170
6' Side Mount Standoff (DEHMS-7)	243	430-94C-09168-M-11048 TTA (NEU-50)	170
531-70HD Exposed Dipole Antenna (CSP-8)	227	PA6-65AC (CSP-34)	166
6' Side Mount Standoff (CSP-8)	227	DB212-1 (NEU-33)	140
Mounting Frame (Verizon)	220	6' Side Mount Standoff (NEU-33)	140
Mounting Frame (Verizon)	220	PD156S (DEP-9)	138
Mounting Frame (Verizon)	220	3'4"x4" Pipe Mount (DEP-8)	138
HBXX-6517DS-VTM (Verizon-AWS)	220	3'4"x4" Pipe Mount (CSP-13)	112
BXA-70063-6CF (Verizon-700)	220	Andrew 2' w/Radome (CSP-13)	112
LNX-6512DS-VTM (Verizon-850)	220	6' Side Mount Standoff (CTTFBI)	100
HBXX-6517DS-VTM (Verizon-PCS)	220	5'3"x4" Pipe Mount (CSP-12)	100
HBXX-6517DS-VTM (Verizon-AWS)	220	PD458 (CTT-18)	100
BXA-70063-6CF (Verizon-700)	220	Andrew 6' w/Radome (CSP-12)	100
LNX-6512DS-VTM (Verizon-850)	220	PD688S-4 (FBI-31)	100
HBXX-6517DS-VTM (Verizon-PCS)	220	P6F-21C (CSP-10)	97
HBXX-6517DS-VTM (Verizon-AWS)	220	5'3"x4" Pipe Mount (CSP-10)	97
BXA-70063-6CF (Verizon-700)	220	P4F-21D (CSP-11)	90
LNX-6512DS-VTM (Verizon-850)	220	3'4"x4" Pipe Mount (CSP-11)	90

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. TOWER RATING: 98.9%

MAX. CORNER REACTIONS AT BASE:
DOWN: 803 K
SHEAR: 97 K

UPLIFT: -618 K
SHEAR: 80 K

AXIAL
189 K

SHEAR
160 K

MOMENT
26055 kip-ft

TORQUE 284 kip-ft
90 mph WIND - 0.5000 in ICE

AXIAL
138 K

SHEAR
137 K

MOMENT
22609 kip-ft

TORQUE 180 kip-ft
REACTIONS - 90 mph WIND

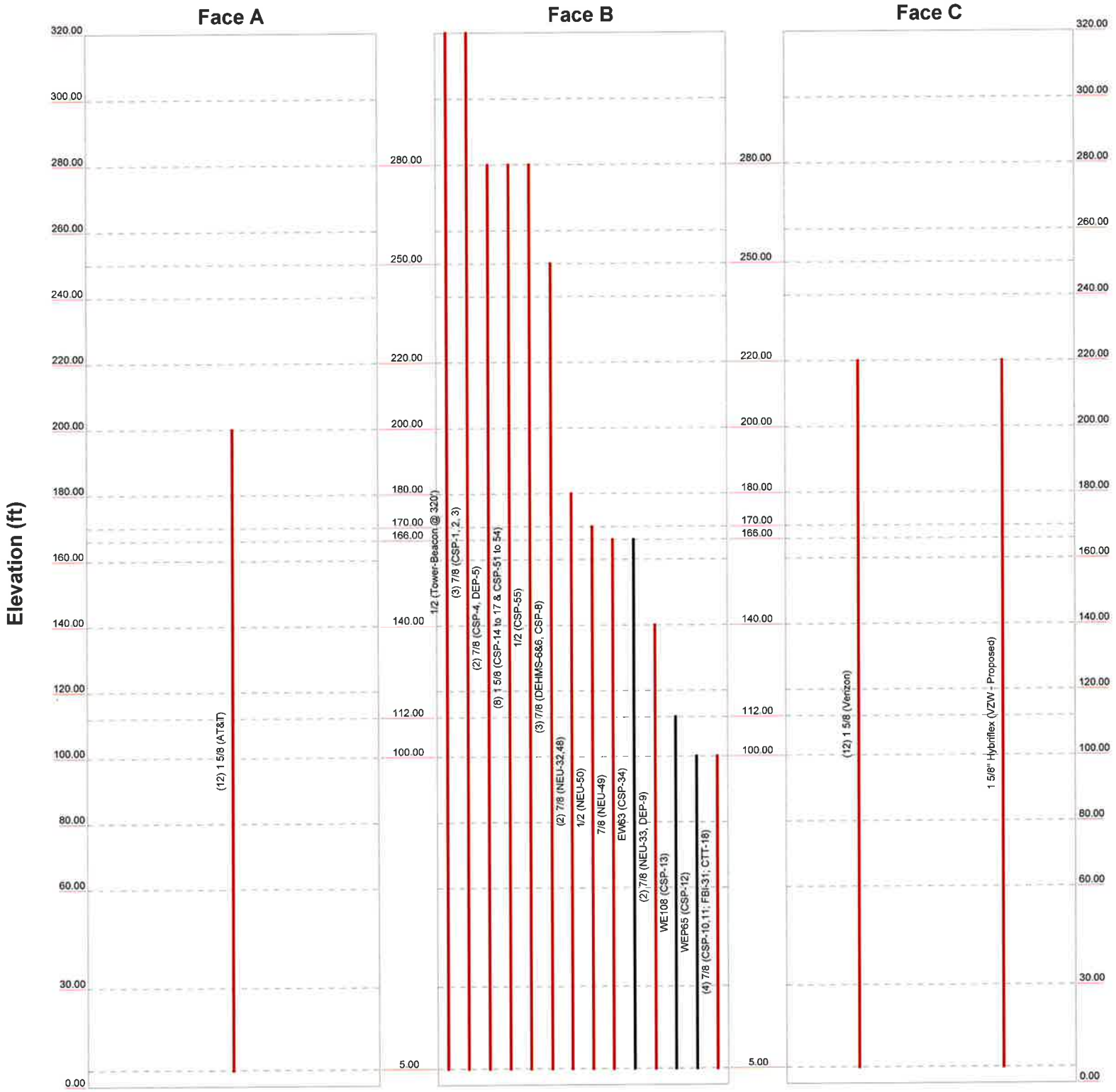
AECOM
500 Enterprise Drive, Suite 3B
Rocky Hill, CT
Phone: 860-529-8882
FAX: 860-529-3991

Job:	320' Rohn SSVMW
Project:	CSP Tower - Colchester, CT
Client:	Verizon Wireless / VZ5-183Rev2
Drawn by:	MCD
App'd:	
Code:	TIA/EIA-222-F
Date:	08/06/15
Scale:	NTS
Path:	
Dwg No.	E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

0' - 320'

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



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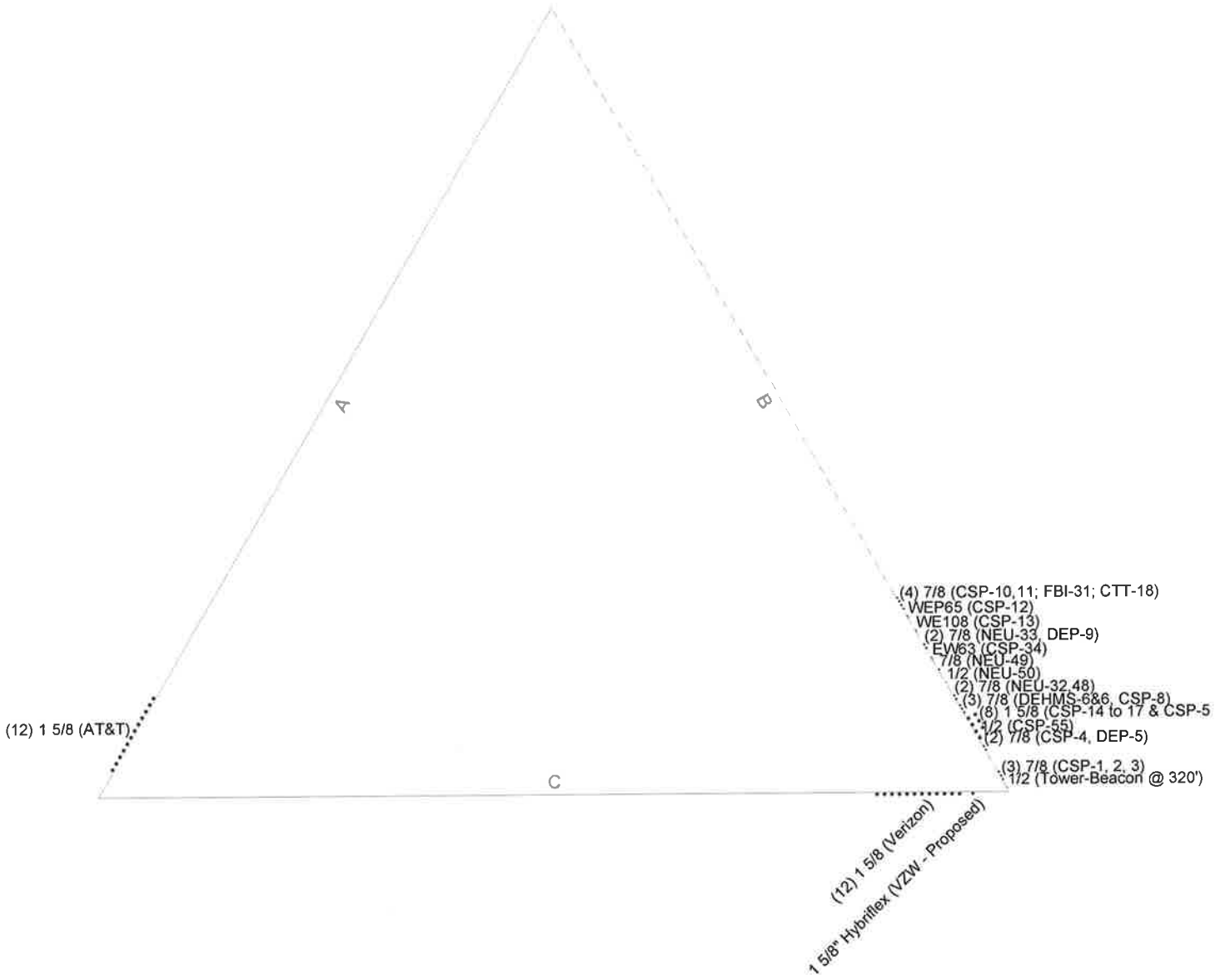
Job:	**320' Rohn SSVMW**		
Project:	***CSP Tower - Colchester, CT***		
Client:	Verizon Wireless / VZ5-183Rev2	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 08/06/15	Scale: N
Path:			Dwg No.

TNX TOWER FEEDLINE PLAN

Round Flat App In Face App Out Face



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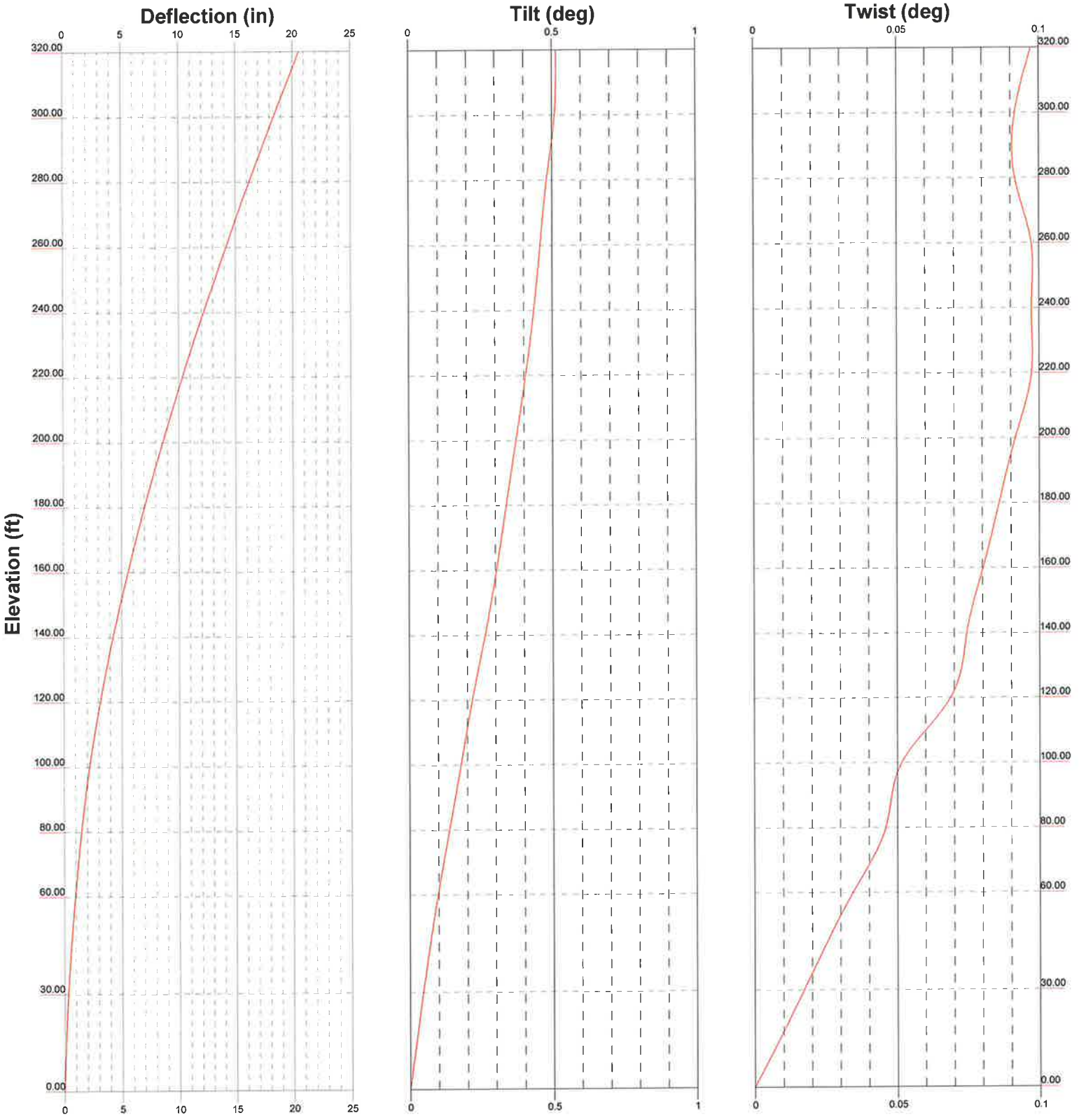
Job:	***320' Rohn SSVMW***		
Project:	***CSP Tower - Colchester, CT***		
Client:	Verizon Wireless / VZ5-183Rev2	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 08/06/15	Scale: N
Path:			Dwg No.

TNX TOWER DEFLECTION, TILT, TWIST

TIA/EIA-222-F - Service - 90 mph

Maximum Values



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500 Enterprise Drive, Suite 3B
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Job:	***320' Rohn SSVMW***		
Project:	***CSP Tower - Colchester, CT***		
Client:	Verizon Wireless / VZ5-183Rev2	Drawn by: MCD	App'd:
Code:	TIA/EIA-222-F	Date: 08/06/15	Scale: N
Path:			Dwg No.

TNX TOWER DETAILED OUTPUT

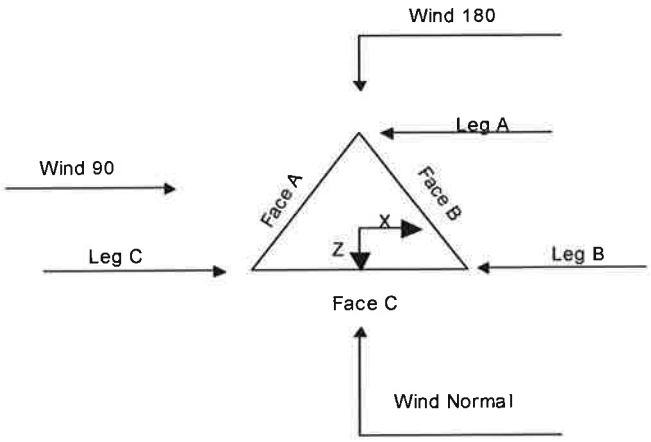
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 320.00 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 6.81 ft at the top and 40.69 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 90 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	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	



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	320.00-300.00			6.81	1	20.00
T2	300.00-280.00			6.81	1	20.00
T3	280.00-260.00			8.85	1	20.00
T4	260.00-240.00			11.04	1	20.00
T5	240.00-220.00			13.08	1	20.00
T6	220.00-200.00			15.09	1	20.00
T7	200.00-180.00			17.09	1	20.00
T8	180.00-160.00			19.22	1	20.00
T9	160.00-140.00			21.30	1	20.00
T10	140.00-120.00			23.21	1	20.00
T11	120.00-100.00			25.39	1	20.00
T12	100.00-80.00			27.97	1	20.00
T13	80.00-60.00			30.47	1	20.00
T14	60.00-30.00			33.14	1	30.00
T15	30.00-0.00			36.80	1	30.00

Tower Section Geometry *(cont'd)*

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

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	320.00-300.00	4.00	X Brace	No	No	0.0000	0.0000
T2	300.00-280.00	5.00	X Brace	No	No	0.0000	0.0000
T3	280.00-260.00	6.67	X Brace	No	No	0.0000	0.0000
T4	260.00-240.00	6.67	X Brace	No	No	0.0000	0.0000
T5	240.00-220.00	6.67	X Brace	No	No	0.0000	0.0000
T6	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T7	200.00-180.00	10.00	X Brace	No	No	0.0000	0.0000
T8	180.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T9	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T10	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T11	120.00-100.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T12	100.00-80.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T13	80.00-60.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T14	60.00-30.00	30.00	K2 Down	No	Yes	0.0000	0.0000
T15	30.00-0.00	30.00	K2 Down	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 320.00-300.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 300.00-280.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 280.00-260.00	Arbitrary Shape	ROHN 8 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 260.00-240.00	Arbitrary Shape	ROHN 8 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T5 240.00-220.00	Arbitrary Shape	ROHN 8 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T6 220.00-200.00	Arbitrary Shape	ROHN 8 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T7 200.00-180.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T8 180.00-160.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T9 160.00-140.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x7/16	A572-50 (50 ksi)
T10 140.00-120.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x7/16	A572-50 (50 ksi)
T11 120.00-100.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T12 100.00-80.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T13 80.00-60.00	Arbitrary Shape	ROHN 12 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T14 60.00-30.00	Arbitrary Shape	ROHN 12 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)
T15 30.00-0.00	Arbitrary Shape	ROHN 12 EHS w Angle 8x8x0.625	A572-50 (50 ksi)	Pipe	ROHN 3.5 EH	A572-50 (50 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 320.00-300.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T2 300.00-280.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		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
T11 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T13 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T14 60.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)
T15 30.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 4 STD	A572-50 (50 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
T11 120.00-100.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T12 100.00-80.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T13 80.00-60.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T14 60.00-30.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T15 30.00-0.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T11	A572-50	Horizontal (1)	Pipe	ROHN 1.5 STD	1
120.00-100.00	(50 ksi)	Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 2.5 STD	1
T12	A572-50	Horizontal (1)	Pipe	ROHN 1.5 STD	1
100.00-80.00	(50 ksi)	Diagonal (1)	Pipe	ROHN 2 EH	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 2.5 STD	1
T13	A572-50	Horizontal (1)	Pipe	ROHN 2 STD	1
80.00-60.00	(50 ksi)	Diagonal (1)	Pipe	ROHN 2 EH	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 3 STD	1
T14	A572-50	Horizontal (1)	Pipe	ROHN 1.5 STD	1
60.00-30.00	(50 ksi)	Horizontal (2)		ROHN 2 XXS	
		Diagonal (1)	Pipe	ROHN 2 EH	1
		Diagonal (2)		ROHN 2.5 STD	
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip (2)		ROHN 2 STD	
		Hip Diagonal		ROHN 2 STD	1
T15	A572-50	Horizontal (1)	Pipe	ROHN 1.5 STD	1
30.00-0.00	(50 ksi)	Horizontal (2)		ROHN 2.5 EH	
		Diagonal (1)	Pipe	ROHN 2.5 STD	1
		Diagonal (2)		ROHN 2.5 STD	
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip (2)		ROHN 2 STD	
		Hip Diagonal		ROHN 2.5 STD	1

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	36.0000	36.0000
320.00-300.00			(36 ksi)					
T2	0.00	0.0000	A36	1	1	1	36.0000	36.0000
300.00-280.00			(36 ksi)					
T3	0.00	0.0000	A36	1	1	1	36.0000	36.0000
280.00-260.00			(36 ksi)					
T4	0.00	0.0000	A36	1	1	1	36.0000	36.0000
260.00-240.00			(36 ksi)					
T5	0.00	0.0000	A36	1	1	1	36.0000	36.0000
240.00-220.00			(36 ksi)					
T6	0.00	0.0000	A36	1	1	1	36.0000	36.0000
220.00-200.00			(36 ksi)					
T7	0.00	0.0000	A36	1	1	1	36.0000	36.0000
200.00-180.00			(36 ksi)					
T8	0.00	0.0000	A36	1	1	1	36.0000	36.0000
180.00-160.00			(36 ksi)					
T9	0.00	0.0000	A36	1	1	1	36.0000	36.0000
160.00-140.00			(36 ksi)					
T10	0.00	0.0000	A36	1	1	1	36.0000	36.0000
140.00-120.00			(36 ksi)					
T11	0.00	0.0000	A36	1	1	1	36.0000	36.0000
120.00-100.00			(36 ksi)					
T12	0.00	0.0000	A36	1	1	1	36.0000	36.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
100.00-80.00			(36 ksi)					
T13	0.00	0.0000	A36	1	1	1	36.0000	36.0000
80.00-60.00			(36 ksi)					
T14	0.00	0.0000	A36	1	1	1	36.0000	36.0000
60.00-30.00			(36 ksi)					
T15 30.00-0.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
320.00-300.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
300.00-280.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
280.00-260.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
260.00-240.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
240.00-220.00				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
220.00-200.00				1	1	1	1	1	1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
200.00-180.00				1	1	1	1	1	1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
180.00-160.00				1	1	1	1	1	1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1	1	1	1	1	1
T11	No	No	1	1	0.95	1	1	1	1	1	1	1	1	1	1
120.00-100.00				1	0.95	1	1	1	1	1	1	1	1	1	1
T12	No	No	1	1	0.95	1	1	1	1	1	1	1	1	1	1
100.00-80.00				1	0.95	1	1	1	1	1	1	1	1	1	1
T13	No	No	1	1	0.95	1	1	1	1	1	1	1	1	1	1
80.00-60.00				1	0.95	1	1	1	1	1	1	1	1	1	1
T14	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-30.00				1	1	1	1	1	1	1	1	1	1	1	1
T15	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
30.00-0.00				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 320.00-300.00	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 300.00-280.00	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 280.00-260.00	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 260.00-240.00	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
T5 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
T6 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
T7 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
T8 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
T9 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
T10 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
T11 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
T12 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
T13 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
T14 60.00-30.00	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
T15 30.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 320.00-300.00	Flange	1.0000 A325N	6	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 300.00-280.00	Flange	1.0000 A325N	8	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 280.00-260.00	Flange	1.0000 A325N	8	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 260.00-240.00	Flange	1.0000 A325N	8	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 240.00-220.00	Flange	1.0000 A325N	8	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 220.00-200.00	Flange	1.0000 A325N	12	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 200.00-180.00	Flange	1.0000 A325N	12	0.8750 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T8	Flange	1.0000	12	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
180.00-160.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T9	Flange	1.0000	12	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
160.00-140.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T10	Flange	1.0000	12	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
140.00-120.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T11	Flange	1.0000	12	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
120.00-100.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	
T12	Flange	1.0000	16	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
100.00-80.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	
T13	Flange	1.0000	16	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
80.00-60.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	
T14	Flange	1.0000	16	0.8750	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
60.00-30.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	
T15 30.00-0.00	Flange	1.0000	24	0.8750	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
		A325N		A325X		A325N		A325N		A325N		A325X		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (AT&T)	A	Yes	Ar (CfAe)	200.00 - 5.00	0.0000	-0.42	12	12	1.9800	1.9800		1.04
1 5/8 (Verizon)	C	Yes	Ar (CfAe)	220.00 - 5.00	0.0000	-0.4	12	12	1.9800	1.9800		1.04
1/2 (Tower-Beacon @ 320')	B	Yes	Ar (CfAe)	320.00 - 5.00	0.0000	0.495	1	1	0.5800	0.5800		0.25
7/8 (CSP-1, 2, 3)	B	Yes	Ar (CfAe)	320.00 - 5.00	0.0000	0.48	3	3	1.1100	1.1100		0.54
7/8 (CSP-4, DEP-5)	B	Yes	Ar (CfAe)	280.00 - 5.00	0.0000	0.445	2	2	1.1100	1.1100		0.54
1 5/8 (CSP-14 to 17 & CSP-51 to 54)	B	Yes	Ar (CfAe)	280.00 - 5.00	0.0000	0.42	8	4	1.9800	1.9800		1.04
1/2 (CSP-55)	B	Yes	Ar (CfAe)	280.00 - 5.00	1.5000	0.43	1	1	0.5800	0.5800		0.25
7/8 (DEHMS-6&6, CSP-8)	B	Yes	Ar (CfAe)	250.00 - 5.00	0.0000	0.395	3	3	1.1100	1.1100		0.54
7/8 (NEU-32,48)	B	Yes	Ar (CfAe)	180.00 - 5.00	0.0000	0.38	2	2	1.1100	1.1100		0.54
1/2 (NEU-50)	B	Yes	Ar (CfAe)	170.00 - 5.00	0.0000	0.361	1	1	0.5800	0.5800		0.25
7/8 (NEU-49)	B	Yes	Ar (CfAe)	166.00 - 5.00	0.0000	0.345	1	1	1.1100	1.1100		0.54
EW63 (CSP-34)	B	Yes	Af (CfAe)	166.00 - 5.00	0.0000	0.33	1	1	1.5742	1.5742	5.0668	0.51
7/8 (NEU-33, DEP-9)	B	Yes	Ar (CfAe)	140.00 - 5.00	0.0000	0.315	2	2	1.1100	1.1100		0.54

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
WE108 (CSP-13)	B	Yes	Af (CfAe)	112.00 - 5.00	0.0000	0.295	1	1	1.0149	1.0149	3.4851	0.35
WEP65 (CSP-12)	B	Yes	Af (CfAe)	100.00 - 5.00	0.0000	0.277	1	1	1.5836	1.5836	5.1284	0.53
7/8 (CSP-10,11; FBI-31; CTT-18)	B	Yes	Ar (CfAe)	100.00 - 5.00	0.0000	0.26	4	4	1.1100	1.1100		0.54
1 5/8" Hybriflex (VZW - Proposed)	C	Yes	Ar (CfAe)	220.00 - 5.00	0.0000	-0.46	1	1	1.6250	1.6250		1.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	320.00-300.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.517	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.00
T2	300.00-280.00	A	0.000	0.000	0.000	0.000	0.00
		B	6.517	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.00
T3	280.00-260.00	A	0.000	0.000	0.000	0.000	0.00
		B	24.383	0.000	0.000	0.000	0.23
		C	0.000	0.000	0.000	0.000	0.00
T4	260.00-240.00	A	0.000	0.000	0.000	0.000	0.00
		B	27.158	0.000	0.000	0.000	0.25
		C	0.000	0.000	0.000	0.000	0.00
T5	240.00-220.00	A	0.000	0.000	0.000	0.000	0.00
		B	29.933	0.000	0.000	0.000	0.26
		C	0.000	0.000	0.000	0.000	0.00
T6	220.00-200.00	A	0.000	0.000	0.000	0.000	0.00
		B	29.933	0.000	0.000	0.000	0.26
		C	42.308	0.000	0.000	0.000	0.27
T7	200.00-180.00	A	39.600	0.000	0.000	0.000	0.25
		B	29.933	0.000	0.000	0.000	0.26
		C	42.308	0.000	0.000	0.000	0.27
T8	180.00-160.00	A	39.600	0.000	0.000	0.000	0.25
		B	34.672	0.787	0.000	0.000	0.29
		C	42.308	0.000	0.000	0.000	0.27
T9	160.00-140.00	A	39.600	0.000	0.000	0.000	0.25
		B	36.450	2.624	0.000	0.000	0.31
		C	42.308	0.000	0.000	0.000	0.27
T10	140.00-120.00	A	39.600	0.000	0.000	0.000	0.25
		B	40.150	2.624	0.000	0.000	0.33
		C	42.308	0.000	0.000	0.000	0.27
T11	120.00-100.00	A	39.600	0.000	0.000	0.000	0.25
		B	40.150	3.639	0.000	0.000	0.34
		C	42.308	0.000	0.000	0.000	0.27
T12	100.00-80.00	A	39.600	0.000	0.000	0.000	0.25
		B	47.550	6.954	0.000	0.000	0.39
		C	42.308	0.000	0.000	0.000	0.27
T13	80.00-60.00	A	39.600	0.000	0.000	0.000	0.25
		B	47.550	6.954	0.000	0.000	0.39
		C	42.308	0.000	0.000	0.000	0.27

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T14	60.00-30.00	A	59.400	0.000	0.000	0.000	0.37
		B	71.325	10.432	0.000	0.000	0.59
		C	63.462	0.000	0.000	0.000	0.40
T15	30.00-0.00	A	49.500	0.000	0.000	0.000	0.31
		B	59.438	8.693	0.000	0.000	0.49
		C	52.885	0.000	0.000	0.000	0.34

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	320.00-300.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		13.183	0.000	0.000	0.000	0.11
		C		0.000	0.000	0.000	0.000	0.00
T2	300.00-280.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		13.183	0.000	0.000	0.000	0.11
		C		0.000	0.000	0.000	0.000	0.00
T3	280.00-260.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		42.717	0.000	0.000	0.000	0.60
		C		0.000	0.000	0.000	0.000	0.00
T4	260.00-240.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		47.992	0.000	0.000	0.000	0.64
		C		0.000	0.000	0.000	0.000	0.00
T5	240.00-220.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		53.267	0.000	0.000	0.000	0.69
		C		0.000	0.000	0.000	0.000	0.00
T6	220.00-200.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		53.267	0.000	0.000	0.000	0.69
		C		63.975	0.000	0.000	0.000	0.66
T7	200.00-180.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		53.267	0.000	0.000	0.000	0.69
		C		63.975	0.000	0.000	0.000	0.66
T8	180.00-160.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		62.672	1.120	0.000	0.000	0.78
		C		63.975	0.000	0.000	0.000	0.66
T9	160.00-140.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		66.450	3.735	0.000	0.000	0.84
		C		63.975	0.000	0.000	0.000	0.66
T10	140.00-120.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		73.483	3.735	0.000	0.000	0.90
		C		63.975	0.000	0.000	0.000	0.66
T11	120.00-100.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		73.483	5.416	0.000	0.000	0.91
		C		63.975	0.000	0.000	0.000	0.66
T12	100.00-80.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		87.550	10.288	0.000	0.000	1.08
		C		63.975	0.000	0.000	0.000	0.66
T13	80.00-60.00	A	0.500	59.600	0.000	0.000	0.000	0.61
		B		87.550	10.288	0.000	0.000	1.08
		C		63.975	0.000	0.000	0.000	0.66
T14	60.00-30.00	A	0.500	89.400	0.000	0.000	0.000	0.92
		B		131.325	15.432	0.000	0.000	1.63
		C		95.963	0.000	0.000	0.000	0.99
T15	30.00-0.00	A	0.500	74.500	0.000	0.000	0.000	0.77
		B		109.438	12.860	0.000	0.000	1.36
		C		79.969	0.000	0.000	0.000	0.82

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	320.00-300.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.692	0.599	1.211
		C	0.000	0.000	0.000	0.000
T2	300.00-280.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.577	0.571	1.155
		C	0.000	0.000	0.000	0.000
T3	280.00-260.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.288	1.837	3.219
		C	0.000	0.000	0.000	0.000
T4	260.00-240.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.372	2.329	4.115
		C	0.000	0.000	0.000	0.000
T5	240.00-220.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.474	3.313	5.895
		C	0.000	0.000	0.000	0.000
T6	220.00-200.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.046	2.350	4.182
		C	0.000	1.256	3.322	5.023
T7	200.00-180.00	A	0.000	1.134	3.015	4.537
		B	0.000	1.014	2.279	4.055
		C	0.000	1.218	3.221	4.870
T8	180.00-160.00	A	0.000	1.108	2.945	4.432
		B	0.000	1.189	2.637	4.756
		C	0.000	1.189	3.146	4.757
T9	160.00-140.00	A	0.000	1.089	3.618	5.446
		B	0.000	1.293	3.570	6.463
		C	0.000	1.169	3.866	5.845
T10	140.00-120.00	A	0.000	1.074	3.569	5.371
		B	0.000	1.402	3.855	7.009
		C	0.000	1.153	3.813	5.766
T11	120.00-100.00	A	2.688	5.475	0.000	0.000
		B	2.972	7.330	0.000	0.000
		C	2.871	5.877	0.000	0.000
T12	100.00-80.00	A	2.574	5.241	0.000	0.000
		B	3.542	8.751	0.000	0.000
		C	2.750	5.626	0.000	0.000
T13	80.00-60.00	A	2.561	5.175	0.000	0.000
		B	3.525	8.640	0.000	0.000
		C	2.737	5.555	0.000	0.000
T14	60.00-30.00	A	4.172	8.404	0.000	0.000
		B	5.742	14.031	0.000	0.000
		C	4.457	9.021	0.000	0.000
T15	30.00-0.00	A	3.596	7.104	0.000	0.000
		B	4.950	11.861	0.000	0.000
		C	3.842	7.626	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	320.00-300.00	2.4880	1.3534	3.4729	1.8935
T2	300.00-280.00	2.5162	1.3728	3.6938	2.0197
T3	280.00-260.00	7.3631	3.4893	10.2471	4.9269
T4	260.00-240.00	8.8357	4.1945	12.3883	5.9487
T5	240.00-220.00	9.3941	4.4570	13.3912	6.4132
T6	220.00-200.00	22.1300	13.5822	28.2439	17.0997
T7	200.00-180.00	8.1202	17.5319	11.4814	21.5154
T8	180.00-160.00	10.3753	19.4990	14.6744	23.9320
T9	160.00-140.00	11.2025	19.5345	15.9784	24.3201
T10	140.00-120.00	12.8879	20.9525	18.3871	26.0842
T11	120.00-100.00	15.9981	25.5414	21.9092	30.5988
T12	100.00-80.00	20.4942	27.6507	27.6324	32.9265
T13	80.00-60.00	20.4114	27.5464	28.0035	33.3782
T14	60.00-30.00	21.9044	29.5696	30.0111	35.7859
T15	30.00-0.00	20.0998	27.1403	28.0502	33.4576

Discrete Tower Loads

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
Dual Lights (Tower)	C	None			0.0000	320.00	No Ice	4.00	4.00	0.25
							1/2" Ice	4.80	4.80	0.40
5'3"x4" Pipe Mount (CSP-56)	A	From Leg	0.50	0.00	0.0000	320.00	No Ice	1.88	1.88	0.06
							1/2" Ice	2.21	2.21	0.07
5'3"x4" Pipe Mount (CSP-57)	B	From Leg	0.50	0.00	0.0000	320.00	No Ice	1.88	1.88	0.06
							1/2" Ice	2.21	2.21	0.07
5'3"x4" Pipe Mount (CSP-58)	C	From Leg	0.50	0.00	0.0000	320.00	No Ice	1.88	1.88	0.06
							1/2" Ice	2.21	2.21	0.07
PD128-1 (CSP-2)	C	From Leg	6.00	0.00	0.0000	320.00	No Ice	1.00	1.00	0.01
							1/2" Ice	1.80	1.80	0.02
6' Side Mount Standoff (CSP-2)	C	None			0.0000	320.00	No Ice	6.50	6.50	0.10
							1/2" Ice	8.50	8.50	0.17
PD128-1 (CSP-1)	A	From Leg	6.00	0.00	0.0000	316.00	No Ice	1.00	1.00	0.01
							1/2" Ice	1.80	1.80	0.02
6' Side Mount Standoff (CSP-1)	A	None			0.0000	316.00	No Ice	6.50	6.50	0.10
							1/2" Ice	8.50	8.50	0.17
6'8"x4" Pipe Mount (CSP-3)	B	From Leg	0.50	0.00	0.0000	315.00	No Ice	2.60	2.60	0.07
							1/2" Ice	3.01	3.01	0.09
PD340-1 (CSP-4)	A	From Leg	6.00	0.00	0.0000	294.00	No Ice	3.30	3.30	0.04
							1/2" Ice	5.94	5.94	0.05
6' Side Mount Standoff (CSP-4)	A	None			0.0000	294.00	No Ice	6.50	6.50	0.10
							1/2" Ice	8.50	8.50	0.17
PD1142-1 (DEP-5)	C	From Leg	6.00	0.00	0.0000	292.00	No Ice	1.32	1.32	0.01
							1/2" Ice	3.21	3.21	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
6' Side Mount Standoff (DEP-5)	C	None		0.0000	292.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
SC479-HF1LDF (CSP-51)	A	From Leg	6.00 0.00 0.00	0.0000	294.00 - 280.00	No Ice	5.06	5.06	0.03
						1/2" Ice	6.54	6.54	0.07
6' Side Mount Standoff (CSP-51)	A	None		0.0000	280.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
SC479-HF1LDF (CSP-52)	A	From Leg	6.00 0.00 0.00	0.0000	266.00 - 280.00	No Ice	5.06	5.06	0.03
						1/2" Ice	6.54	6.54	0.07
SC479-HF1LDF (CSP-53)	B	From Leg	6.00 0.00 0.00	0.0000	266.00 - 280.00	No Ice	5.06	5.06	0.03
						1/2" Ice	6.54	6.54	0.07
6' Side Mount Standoff (CSP-53)	B	None		0.0000	280.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
SC479-HF1LDF (CSP-54)	C	From Leg	6.00 0.00 0.00	0.0000	266.00 - 280.00	No Ice	5.06	5.06	0.03
						1/2" Ice	6.54	6.54	0.07
6' Side Mount Standoff (CSP-54)	C	None		0.0000	280.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
TMA (CSP-55)	C	None		0.0000	280.00	No Ice	1.06	0.45	0.02
						1/2" Ice	1.21	0.57	0.03
DB809T3E-XC (CSP-14)	B	From Leg	3.00 0.00 0.00	0.0000	294.00 - 280.00	No Ice	4.25	4.25	0.04
						1/2" Ice	5.70	5.70	0.07
OGT9-840 (CSP-15)	C	From Leg	3.00 0.00 0.00	0.0000	294.00 - 280.00	No Ice	2.27	2.27	0.02
						1/2" Ice	3.44	3.44	0.04
DB810K-XT (CSP-16)	B	From Leg	3.00 0.00 0.00	0.0000	264.00 - 280.00	No Ice	3.63	3.63	0.04
						1/2" Ice	5.10	5.10	0.06
OGT9-840 (CSP-17)	C	From Leg	3.00 0.00 0.00	0.0000	264.00 - 280.00	No Ice	2.27	2.27	0.02
						1/2" Ice	3.44	3.44	0.04
PD440-2 (DEHMS-6)	B	From Leg	6.00 0.00 0.00	0.0000	257.00	No Ice	1.38	1.38	0.02
						1/2" Ice	2.48	2.48	0.02
6' Side Mount Standoff (DEHMS-6)	B	None		0.0000	257.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
PD1142-1 (DEHMS-7)	C	From Leg	6.00 0.00 0.00	0.0000	243.00	No Ice	1.32	1.32	0.01
						1/2" Ice	3.21	3.21	0.02
6' Side Mount Standoff (DEHMS-7)	C	None		0.0000	243.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
531-70HD Exposed Dipole Antenna (CSP-8)	A	From Leg	6.00 0.00 0.00	0.0000	227.00	No Ice	5.91	5.91	0.05
						1/2" Ice	7.68	7.68	0.08
6' Side Mount Standoff (CSP-8)	A	None		0.0000	227.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
6' Side Mount Standoff (NEU-32)	C	None		0.0000	180.00	No Ice	6.50	6.50	0.10
						1/2" Ice	8.50	8.50	0.17
1151-3 (NEU-32)	C	From Leg	6.00 0.00 0.00	0.0000	192.00 - 180.00	No Ice	4.18	4.18	0.02
						1/2" Ice	5.73	5.73	0.05
DB586-Y (NEU-48)	B	From Leg	6.00 0.00	0.0000	175.00 - 170.00	No Ice	1.01	1.01	0.01
						1/2" Ice	1.28	1.28	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
6' Side Mount Standoff	B	None		0.0000	170.00	No Ice	6.50	6.50	0.10
(NEU-48,49,50)						1/2" Ice	8.50	8.50	0.17
430-94C-09168-M-11048	C	From Leg	6.00	0.0000	170.00	No Ice	1.63	0.95	0.03
TTA			0.00			1/2" Ice	1.81	1.09	0.04
(NEU-50)			0.00						
DB586-Y	B	From Leg	3.00	0.0000	165.00 - 170.00	No Ice	1.01	1.01	0.01
(NEU-49)			0.00			1/2" Ice	1.28	1.28	0.02
			0.00						
DB212-1	C	From Leg	6.00	0.0000	140.00	No Ice	4.40	4.40	0.03
(NEU-33)			0.00			1/2" Ice	8.42	8.42	0.07
			0.00						
6' Side Mount Standoff	C	None		0.0000	140.00	No Ice	6.50	6.50	0.10
(NEU-33)						1/2" Ice	8.50	8.50	0.17
PD156S	C	From Leg	1.00	0.0000	138.00	No Ice	0.44	0.44	0.01
(DEP-9)			0.00			1/2" Ice	0.79	0.79	0.01
			0.00						
3'4"x4" Pipe Mount	C	From Leg	0.50	0.0000	138.00	No Ice	1.05	1.05	0.04
(DEP-9)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00						
3'4"x4" Pipe Mount	C	From Leg	0.50	0.0000	112.00	No Ice	1.05	1.05	0.04
(CSP-13)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00						
5'3"x4" Pipe Mount	A	From Leg	0.50	0.0000	100.00	No Ice	1.88	1.88	0.06
(CSP-12)			0.00			1/2" Ice	2.21	2.21	0.07
			0.00						
PD458	B	From Leg	6.00	0.0000	100.00	No Ice	2.88	2.88	0.02
(CTT-18)			0.00			1/2" Ice	4.34	4.34	0.05
			0.00						
PD688S-4	B	From Leg	6.00	0.0000	100.00	No Ice	0.35	0.35	0.00
(FBI-31)			0.00			1/2" Ice	0.63	0.63	0.00
			0.00						
6' Side Mount Standoff	B	None		0.0000	100.00	No Ice	6.50	6.50	0.10
(CTT&FBI)						1/2" Ice	8.50	8.50	0.17
5'3"x4" Pipe Mount	A	From Leg	0.50	0.0000	97.00	No Ice	1.88	1.88	0.06
(CSP-10)			0.00			1/2" Ice	2.21	2.21	0.07
			0.00						
3'4"x4" Pipe Mount	C	From Leg	0.50	0.0000	90.00	No Ice	1.05	1.05	0.04
(CSP-11)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00						
PiROD 12' Lightweight	A	None		0.0000	200.00	No Ice	10.20	10.20	0.25
T-Frame						1/2" Ice	16.20	16.20	0.35
(AT&T)									
PiROD 12' Lightweight	B	None		0.0000	200.00	No Ice	10.20	10.20	0.25
T-Frame						1/2" Ice	16.20	16.20	0.35
(AT&T)									
PiROD 12' Lightweight	C	None		0.0000	200.00	No Ice	10.20	10.20	0.25
T-Frame						1/2" Ice	16.20	16.20	0.35
(AT&T)									
7770.00	A	From Leg	3.00	0.0000	200.00	No Ice	10.03	5.60	0.02
(AT&T)			4.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	B	From Leg	3.00	0.0000	200.00	No Ice	10.03	5.60	0.02
(AT&T)			4.00			1/2" Ice	10.61	6.15	0.07
			0.00						
7770.00	C	From Leg	3.00	0.0000	200.00	No Ice	10.03	5.60	0.02
(AT&T)			4.00			1/2" Ice	10.61	6.15	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
7770.00 (AT&T)	A	From Leg	3.00 -4.00 0.00	0.0000	200.00	No Ice 1/2" Ice	10.03 10.61	5.60 6.15	0.02 0.07
7770.00 (AT&T)	B	From Leg	3.00 -4.00 0.00	0.0000	200.00	No Ice 1/2" Ice	10.03 10.61	5.60 6.15	0.02 0.07
7770.00 (AT&T)	C	From Leg	3.00 -4.00 0.00	0.0000	200.00	No Ice 1/2" Ice	10.03 10.61	5.60 6.15	0.02 0.07
SBNH-1D6565C (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.05 0.12
SBNH-1D6565C (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	11.45 12.06	7.70 8.29	0.05 0.12
AM-X-CD-16-65-00T RET (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	6.62 7.05	4.13 4.54	0.03 0.07
(2) RRH (AT&T)	A	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.05 0.07
(2) RRH (AT&T)	B	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.05 0.07
(2) RRH (AT&T)	C	From Leg	3.00 0.00 0.00	0.0000	200.00	No Ice 1/2" Ice	2.25 2.45	1.23 1.39	0.05 0.07
DC6-48-60-18-8F (AT&T)	C	None		0.0000	200.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
Mounting Frame (Verizon)	A	None		0.0000	220.00	No Ice 1/2" Ice	17.00 20.00	17.00 20.00	0.56 0.70
Mounting Frame (Verizon)	B	None		0.0000	220.00	No Ice 1/2" Ice	17.00 20.00	17.00 20.00	0.56 0.70
Mounting Frame (Verizon)	C	None		0.0000	220.00	No Ice 1/2" Ice	17.00 20.00	17.00 20.00	0.56 0.70
HBXX-6517DS-VTM (Verizon-AWS)	A	From Leg	5.00 6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
BXA-70063-6CF (Verizon-700)	A	From Leg	5.00 3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
LNX-6512DS-VTM (Verizon-850)	A	From Leg	5.00 -3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	5.61 6.01	3.30 3.66	0.03 0.06
HBXX-6517DS-VTM (Verizon-PCS)	A	From Leg	5.00 -6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
HBXX-6517DS-VTM (Verizon-AWS)	B	From Leg	5.00 6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
BXA-70063-6CF (Verizon-700)	B	From Leg	5.00 3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
LNX-6512DS-VTM (Verizon-850)	B	From Leg	5.00 -3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	5.61 6.01	3.30 3.66	0.03 0.06

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *K*
HBXX-6517DS-VTM (Verizon-PCS)	B	From Leg	5.00 -6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
HBXX-6517DS-VTM (Verizon-AWS)	C	From Leg	5.00 6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
BXA-70063-6CF (Verizon-700)	C	From Leg	5.00 3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	7.73 8.27	4.16 4.60	0.02 0.06
LNX-6512DS-VTM (Verizon-850)	C	From Leg	5.00 -3.00 0.00	0.0000	220.00	No Ice 1/2" Ice	5.61 6.01	3.30 3.66	0.03 0.06
HBXX-6517DS-VTM (Verizon-PCS)	C	From Leg	5.00 -6.00 0.00	0.0000	220.00	No Ice 1/2" Ice	8.74 9.31	5.24 5.71	0.04 0.09
RRH_2x60-AWS (Verizon-AWS)	A	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11
RRH_2x60-AWS (Verizon-AWS)	B	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11
RRH_2x60-AWS (Verizon-AWS)	C	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11
DB-T1-6Z-8AB-0Z (Verizon-AWS)	C	None		0.0000	220.00	No Ice 1/2" Ice	5.35 5.75	2.40 2.72	0.04 0.07
(2) FD9R600/2C-3L Diplexer (Verizon-700)	A	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	0.36 0.45	0.08 0.13	0.00 0.00
(2) FD9R600/2C-3L Diplexer (Verizon-700)	A	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	0.36 0.45	0.08 0.13	0.00 0.00
(2) FD9R600/2C-3L Diplexer (Verizon-700)	A	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	0.36 0.45	0.08 0.13	0.00 0.00
RRH_2x60-AWS (Verizon-PCS)	A	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11
RRH_2x60-AWS (Verizon-PCS)	B	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11
RRH_2x60-AWS (Verizon-PCS)	C	From Leg	5.00 0.00 0.00	0.0000	220.00	No Ice 1/2" Ice	3.66 4.13	3.31 3.88	0.08 0.11

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
P8F-21C	A	Paraboloid	From	1.00	Worst		315.00	8.00	No Ice	50.26	0.25
(CSP-3)		w/Radome	Leg	0.00					1/2" Ice	51.29	0.51
				0.00							
PA6-65AC	A	Paraboloid w/o	From	1.00	Worst		305.00	6.00	No Ice	28.27	0.09
(CSP-56)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	B	Paraboloid w/o	From	1.00	Worst		305.00	6.00	No Ice	28.27	0.09
(CSP-57)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	C	Paraboloid w/o	From	1.00	Worst		305.00	6.00	No Ice	28.27	0.09
(CSP-58)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
Andrew 2' w/Radome	C	Paraboloid	From	1.00	Worst		112.00	2.00	No Ice	3.14	0.07
(CSP-13)		w/Radome	Leg	0.00					1/2" Ice	3.41	0.28
				0.00							
Andrew 6' w/Radome	A	Paraboloid	From	1.00	Worst		100.00	6.00	No Ice	28.27	0.38
(CSP-12)		w/Radome	Leg	0.00					1/2" Ice	29.07	0.45
				0.00							
P6F-21C	A	Paraboloid	From	1.00	Worst		97.00	6.00	No Ice	28.27	0.14
(CSP-10)		w/Radome	Leg	0.00					1/2" Ice	29.05	0.29
				0.00							
P4F-21D	C	Paraboloid	From	1.00	Worst		90.00	4.00	No Ice	12.57	0.10
(CSP-11)		w/Radome	Leg	0.00					1/2" Ice	13.09	0.17
				0.00							
PA6-65AC	C	Paraboloid	From	1.00	Worst		166.00	6.00	No Ice	28.27	0.09
(CSP-34)		w/Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							

Tower Pressures - No Ice

$G_H = 1.084$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	310.00	1.897	39	145.472	A	11.659	18.543	18.543	61.40	0.000	0.000
320.00-300.00					B	11.061	25.060		51.34	0.000	0.000
					C	11.659	18.543		61.40	0.000	0.000
T2	290.00	1.861	39	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
300.00-280.00					B	12.025	28.638		54.40	0.000	0.000
					C	12.596	22.122		63.72	0.000	0.000
T3	270.00	1.823	38	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
280.00-260.00					B	49.627	24.383		51.06	0.000	0.000
					C	51.464	0.000		73.43	0.000	0.000
T4	250.00	1.783	37	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
260.00-240.00					B	54.539	27.158		46.24	0.000	0.000
					C	56.868	0.000		66.43	0.000	0.000
T5	230.00	1.741	36	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
240.00-220.00					B	63.588	29.933		40.39	0.000	0.000
					C	66.901	0.000		56.46	0.000	0.000
T6	210.00	1.697	35	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
220.00-200.00					B	59.238	29.933		42.36	0.000	0.000
					C	58.266	42.308		37.56	0.000	0.000
T7	190.00	1.649	34	385.076	A	68.831	39.600	45.633	42.09	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
200.00-180.00					B	69.567	29.933		45.86	0.000	0.000
					C	68.625	42.308		41.14	0.000	0.000
T8	170.00	1.597	33	427.175	A	71.412	39.600	45.629	41.10	0.000	0.000
180.00-160.00					B	72.507	34.672		42.57	0.000	0.000
					C	71.210	42.308		40.20	0.000	0.000
T9	150.00	1.541	32	467.070	A	80.943	39.600	45.617	37.84	0.000	0.000
160.00-140.00					B	83.615	36.450		37.99	0.000	0.000
					C	80.696	42.308		37.09	0.000	0.000
T10	130.00	1.48	31	507.978	A	84.169	39.600	45.637	36.87	0.000	0.000
140.00-120.00					B	86.507	40.150		36.03	0.000	0.000
					C	83.925	42.308		36.15	0.000	0.000
T11	110.00	1.411	29	555.591	A	45.673	72.116	45.673	38.78	0.000	0.000
120.00-100.00					B	49.312	68.751		38.69	0.000	0.000
					C	45.673	67.379		40.40	0.000	0.000
T12	90.00	1.332	28	606.388	A	45.666	74.323	45.666	38.06	0.000	0.000
100.00-80.00					B	52.620	77.471		35.10	0.000	0.000
					C	45.666	69.189		39.76	0.000	0.000
T13	70.00	1.24	26	662.098	A	53.708	78.684	53.708	40.57	0.000	0.000
80.00-60.00					B	60.663	80.748		37.98	0.000	0.000
					C	53.708	71.372		42.94	0.000	0.000
T14	45.00	1.093	23	1088.08	A	80.523	117.921	80.523	40.58	0.000	0.000
60.00-30.00				3	B	90.955	124.731		37.33	0.000	0.000
					C	80.523	114.609		41.27	0.000	0.000
T15 30.00-0.00	15.00	1	21	1202.12	A	81.480	118.404	81.480	40.76	0.000	0.000
				2	B	90.173	122.368		38.34	0.000	0.000
					C	81.480	112.303		42.05	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.084$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	310.00	1.897	39	0.5000	147.138	A	11.659	28.539	21.877	54.42	0.000	0.000
320.00-300.00						B	10.448	41.030		42.50	0.000	0.000
						C	11.659	28.539		54.42	0.000	0.000
T2	290.00	1.861	39	0.5000	169.325	A	12.596	31.759	25.461	57.40	0.000	0.000
300.00-280.00						B	11.441	44.365		45.62	0.000	0.000
						C	12.596	31.759		57.40	0.000	0.000
T3	270.00	1.823	38	0.5000	218.499	A	53.691	5.471	40.014	67.64	0.000	0.000
280.00-260.00						B	50.472	46.900		41.09	0.000	0.000
						C	53.691	5.471		67.64	0.000	0.000
T4	250.00	1.783	37	0.5000	260.795	A	59.094	6.363	40.004	61.11	0.000	0.000
260.00-240.00						B	54.979	52.983		37.05	0.000	0.000
						C	59.094	6.363		61.11	0.000	0.000
T5	230.00	1.741	36	0.5000	301.294	A	69.127	7.281	40.002	52.35	0.000	0.000
240.00-220.00						B	63.232	59.074		32.71	0.000	0.000
						C	69.127	7.281		52.35	0.000	0.000
T6	210.00	1.697	35	0.5000	341.394	A	63.814	5.953	40.001	57.34	0.000	0.000
220.00-200.00						B	59.631	58.174		33.96	0.000	0.000
						C	58.791	68.672		31.38	0.000	0.000
T7	190.00	1.649	34	0.5000	386.745	A	69.535	65.019	47.860	35.57	0.000	0.000
200.00-180.00						B	70.017	58.806		37.15	0.000	0.000
						C	69.202	69.311		34.55	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T8	170.00	1.597	33	0.5000	428.844	A	72.151	65.674	47.856	34.72	0.000	0.000
180.00-160.00						B	72.947	68.664		33.79	0.000	0.000
						C	71.825	69.967		33.75	0.000	0.000
T9	150.00	1.541	32	0.5000	468.739	A	81.342	66.300	47.842	32.40	0.000	0.000
160.00-140.00						B	84.059	72.946		30.47	0.000	0.000
						C	80.942	70.595		31.57	0.000	0.000
T10	130.00	1.48	31	0.5000	509.647	A	84.593	66.946	47.864	31.59	0.000	0.000
140.00-120.00						B	86.690	80.502		28.63	0.000	0.000
						C	84.199	71.242		30.79	0.000	0.000
T11	110.00	1.411	29	0.5000	557.261	A	47.902	101.093	47.902	32.15	0.000	0.000
120.00-100.00						B	53.318	108.228		29.65	0.000	0.000
						C	47.902	95.280		33.46	0.000	0.000
T12	90.00	1.332	28	0.5000	608.058	A	47.894	104.136	47.894	31.50	0.000	0.000
100.00-80.00						B	58.182	123.411		26.37	0.000	0.000
						C	47.894	97.794		32.87	0.000	0.000
T13 80.00-60.00	70.00	1.24	26	0.5000	663.769	A	55.937	109.245	55.937	33.86	0.000	0.000
						B	66.225	127.401		28.89	0.000	0.000
						C	55.937	100.582		35.74	0.000	0.000
T14 60.00-30.00	45.00	1.093	23	0.5000	1090.588	A	83.865	164.131	83.865	33.82	0.000	0.000
						B	99.296	195.392		28.46	0.000	0.000
						C	83.865	160.002		34.39	0.000	0.000
T15 30.00-0.00	15.00	1	21	0.5000	1204.627	A	84.823	161.794	84.823	34.39	0.000	0.000
						B	97.682	185.748		29.93	0.000	0.000
						C	84.823	154.288		35.47	0.000	0.000

Tower Pressure - Service

$G_H = 1.084$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	310.00	1.897	39	145.472	A	11.659	18.543	18.543	61.40	0.000	0.000
320.00-300.00					B	11.061	25.060		51.34	0.000	0.000
					C	11.659	18.543		61.40	0.000	0.000
T2	290.00	1.861	39	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
300.00-280.00					B	12.025	28.638		54.40	0.000	0.000
					C	12.596	22.122		63.72	0.000	0.000
T3	270.00	1.823	38	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
280.00-260.00					B	49.627	24.383		51.06	0.000	0.000
					C	51.464	0.000		73.43	0.000	0.000
T4	250.00	1.783	37	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
260.00-240.00					B	54.539	27.158		46.24	0.000	0.000
					C	56.868	0.000		66.43	0.000	0.000
T5	230.00	1.741	36	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
240.00-220.00					B	63.588	29.933		40.39	0.000	0.000
					C	66.901	0.000		56.46	0.000	0.000
T6	210.00	1.697	35	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
220.00-200.00					B	59.238	29.933		42.36	0.000	0.000
					C	58.266	42.308		37.56	0.000	0.000
T7	190.00	1.649	34	385.076	A	68.831	39.600	45.633	42.09	0.000	0.000
200.00-180.00					B	69.567	29.933		45.86	0.000	0.000
					C	68.625	42.308		41.14	0.000	0.000
T8	170.00	1.597	33	427.175	A	71.412	39.600	45.629	41.10	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
180.00-160.00					B	72.507	34.672		42.57	0.000	0.000
					C	71.210	42.308		40.20	0.000	0.000
T9	150.00	1.541	32	467.070	A	80.943	39.600	45.617	37.84	0.000	0.000
160.00-140.00					B	83.615	36.450		37.99	0.000	0.000
					C	80.696	42.308		37.09	0.000	0.000
T10	130.00	1.48	31	507.978	A	84.169	39.600	45.637	36.87	0.000	0.000
140.00-120.00					B	86.507	40.150		36.03	0.000	0.000
					C	83.925	42.308		36.15	0.000	0.000
T11	110.00	1.411	29	555.591	A	45.673	72.116	45.673	38.78	0.000	0.000
120.00-100.00					B	49.312	68.751		38.69	0.000	0.000
					C	45.673	67.379		40.40	0.000	0.000
T12	90.00	1.332	28	606.388	A	45.666	74.323	45.666	38.06	0.000	0.000
100.00-80.00					B	52.620	77.471		35.10	0.000	0.000
					C	45.666	69.189		39.76	0.000	0.000
T13	70.00	1.24	26	662.098	A	53.708	78.684	53.708	40.57	0.000	0.000
80.00-60.00					B	60.663	80.748		37.98	0.000	0.000
					C	53.708	71.372		42.94	0.000	0.000
T14	45.00	1.093	23	1088.08	A	80.523	117.921	80.523	40.58	0.000	0.000
60.00-30.00				3	B	90.955	124.731		37.33	0.000	0.000
					C	80.523	114.609		41.27	0.000	0.000
T15 30.00-0.00	15.00	1	21	1202.12	A	81.480	118.404	81.480	40.76	0.000	0.000
				2	B	90.173	122.368		38.34	0.000	0.000
					C	81.480	112.303		42.05	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	1	1	22.637	2.72	136.02	B
320.00-300.00			B	0.248	2.443	0.601	1	1	26.133			
			C	0.208	2.571	0.592	1	1	22.637			
T2	0.04	2.50	A	0.207	2.573	0.592	1	1	25.689	3.00	150.22	B
300.00-280.00			B	0.243	2.46	0.6	1	1	29.208			
			C	0.207	2.573	0.592	1	1	25.689			
T3	0.23	5.07	A	0.237	2.476	0.599	1	1	51.464	5.83	291.73	B
280.00-260.00			B	0.341	2.192	0.629	1	1	64.974			
			C	0.237	2.476	0.599	1	1	51.464			
T4	0.25	5.41	A	0.219	2.532	0.595	1	1	56.868	6.46	322.79	B
260.00-240.00			B	0.315	2.256	0.621	1	1	71.396			
			C	0.219	2.532	0.595	1	1	56.868			
T5	0.26	6.48	A	0.223	2.52	0.595	1	1	66.901	7.28	363.91	B
240.00-220.00			B	0.312	2.264	0.62	1	1	82.138			
			C	0.223	2.52	0.595	1	1	66.901			
T6	0.53	6.41	A	0.181	2.66	0.587	1	1	61.588	7.41	370.59	C
220.00-200.00			B	0.262	2.401	0.605	1	1	77.351			
			C	0.296	2.307	0.615	1	1	84.273			
T7	0.78	7.30	A	0.282	2.346	0.61	1	1	93.004	8.16	407.77	C
200.00-180.00			B	0.258	2.413	0.604	1	1	87.648			
			C	0.288	2.328	0.612	1	1	94.531			
T8	0.81	7.52	A	0.26	2.408	0.604	1	1	95.348	8.31	415.64	C
180.00-160.00			B	0.251	2.435	0.602	1	1	93.383			
			C	0.266	2.391	0.606	1	1	96.850			
T9	0.83	9.04	A	0.258	2.413	0.604	1	1	104.861	8.84	442.00	B
160.00-140.00			B	0.257	2.416	0.604	1	1	105.620			
			C	0.263	2.398	0.605	1	1	106.308			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T10	0.85	9.36	A	0.244	2.457	0.6	1	1	107.940	8.98	448.79	B
140.00-120.00			B	0.249	2.439	0.602	1	1	110.665			
			C	0.249	2.442	0.601	1	1	109.373			
T11	0.86	7.92	A	0.212	2.556	0.593	1	1	88.432	7.30	364.76	B
120.00-100.00			B	0.212	2.555	0.593	1	1	90.083			
			C	0.203	2.584	0.591	1	1	85.503			
T12	0.91	9.68	A	0.198	2.603	0.59	1	1	89.514	7.52	376.01	B
100.00-80.00			B	0.215	2.548	0.593	1	1	98.597			
			C	0.189	2.632	0.588	1	1	86.370			
T13	0.91	10.69	A	0.2	2.596	0.59	1	1	100.163	7.72	385.81	B
80.00-60.00			B	0.214	2.551	0.593	1	1	108.567			
			C	0.189	2.633	0.588	1	1	95.690			
T14	1.37	14.59	A	0.182	2.656	0.587	1	1	149.738	10.51	350.43	B
60.00-30.00			B	0.198	2.602	0.59	1	1	164.551			
			C	0.179	2.666	0.586	1	1	147.730			
T15	1.14	16.94	A	0.166	2.713	0.584	1	1	150.640	9.73	324.39	B
30.00-0.00			B	0.177	2.675	0.586	1	1	161.874			
			C	0.161	2.731	0.583	1	1	146.981			
Sum Weight:	9.81	120.69						OTM	16228.39 kip-ft	109.77		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.825	1	20.596	2.52	125.95	B
320.00-300.00			B	0.248	2.443	0.601	0.825	1	24.197			
			C	0.208	2.571	0.592	0.825	1	20.596			
T2	0.04	2.50	A	0.207	2.573	0.592	0.825	1	23.485	2.79	139.40	B
300.00-280.00			B	0.243	2.46	0.6	0.825	1	27.104			
			C	0.207	2.573	0.592	0.825	1	23.485			
T3	0.23	5.07	A	0.237	2.476	0.599	0.825	1	42.458	5.05	252.74	B
280.00-260.00			B	0.341	2.192	0.629	0.825	1	56.289			
			C	0.237	2.476	0.599	0.825	1	42.458			
T4	0.25	5.41	A	0.219	2.532	0.595	0.825	1	46.916	5.59	279.64	B
260.00-240.00			B	0.315	2.256	0.621	0.825	1	61.852			
			C	0.219	2.532	0.595	0.825	1	46.916			
T5	0.26	6.48	A	0.223	2.52	0.595	0.825	1	55.194	6.29	314.61	B
240.00-220.00			B	0.312	2.264	0.62	0.825	1	71.010			
			C	0.223	2.52	0.595	0.825	1	55.194			
T6	0.53	6.41	A	0.181	2.66	0.587	0.825	1	50.810	6.52	325.75	C
220.00-200.00			B	0.262	2.401	0.605	0.825	1	66.985			
			C	0.296	2.307	0.615	0.825	1	74.076			
T7	0.78	7.30	A	0.282	2.346	0.61	0.825	1	80.959	7.12	355.97	C
200.00-180.00			B	0.258	2.413	0.604	0.825	1	75.474			
			C	0.288	2.328	0.612	0.825	1	82.522			
T8	0.81	7.52	A	0.26	2.408	0.604	0.825	1	82.851	7.24	362.16	C
180.00-160.00			B	0.251	2.435	0.602	0.825	1	80.694			
			C	0.266	2.391	0.606	0.825	1	84.388			
T9	0.83	9.04	A	0.258	2.413	0.604	0.825	1	90.696	7.66	382.84	C
160.00-140.00			B	0.257	2.416	0.604	0.825	1	90.987			
			C	0.263	2.398	0.605	0.825	1	92.186			
T10	0.85	9.36	A	0.244	2.457	0.6	0.825	1	93.210	7.75	387.40	B
140.00-120.00			B	0.249	2.439	0.602	0.825	1	95.527			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.249	2.442	0.601	0.825	1	94.686			
T11	0.86	7.92	A	0.212	2.556	0.593	0.825	1	80.440	6.60	329.81	B
120.00-100.00			B	0.212	2.555	0.593	0.825	1	81.454			
			C	0.203	2.584	0.591	0.825	1	77.510			
T12	0.91	9.68	A	0.198	2.603	0.59	0.825	1	81.522	6.82	340.89	B
100.00-80.00			B	0.215	2.548	0.593	0.825	1	89.389			
			C	0.189	2.632	0.588	0.825	1	78.378			
T13	0.91	10.69	A	0.2	2.596	0.59	0.825	1	90.764	6.96	348.09	B
80.00-60.00			B	0.214	2.551	0.593	0.825	1	97.951			
			C	0.189	2.633	0.588	0.825	1	86.291			
T14	1.37	14.59	A	0.182	2.656	0.587	0.825	1	135.647	9.50	316.53	B
60.00-30.00			B	0.198	2.602	0.59	0.825	1	148.634			
			C	0.179	2.666	0.586	0.825	1	133.638			
T15	1.14	16.94	A	0.166	2.713	0.584	0.825	1	136.381	8.78	292.77	B
30.00-0.00			B	0.177	2.675	0.586	0.825	1	146.093			
			C	0.161	2.731	0.583	0.825	1	132.722			
Sum Weight:	9.81	120.69						OTM	14293.03 kip-ft	97.18		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.8	1	20.305	2.49	124.51	B
320.00-300.00			B	0.248	2.443	0.601	0.8	1	23.921			
			C	0.208	2.571	0.592	0.8	1	20.305			
T2	0.04	2.50	A	0.207	2.573	0.592	0.8	1	23.170	2.76	137.86	B
300.00-280.00			B	0.243	2.46	0.6	0.8	1	26.803			
			C	0.207	2.573	0.592	0.8	1	23.170			
T3	0.23	5.07	A	0.237	2.476	0.599	0.8	1	41.171	4.94	247.16	B
280.00-260.00			B	0.341	2.192	0.629	0.8	1	55.049			
			C	0.237	2.476	0.599	0.8	1	41.171			
T4	0.25	5.41	A	0.219	2.532	0.595	0.8	1	45.494	5.47	273.47	B
260.00-240.00			B	0.315	2.256	0.621	0.8	1	60.488			
			C	0.219	2.532	0.595	0.8	1	45.494			
T5	0.26	6.48	A	0.223	2.52	0.595	0.8	1	53.521	6.15	307.56	B
240.00-220.00			B	0.312	2.264	0.62	0.8	1	69.420			
			C	0.223	2.52	0.595	0.8	1	53.521			
T6	0.53	6.41	A	0.181	2.66	0.587	0.8	1	49.270	6.39	319.34	C
220.00-200.00			B	0.262	2.401	0.605	0.8	1	65.504			
			C	0.296	2.307	0.615	0.8	1	72.620			
T7	0.78	7.30	A	0.282	2.346	0.61	0.8	1	79.238	6.97	348.57	C
200.00-180.00			B	0.258	2.413	0.604	0.8	1	73.735			
			C	0.288	2.328	0.612	0.8	1	80.806			
T8	0.81	7.52	A	0.26	2.408	0.604	0.8	1	81.065	7.09	354.52	C
180.00-160.00			B	0.251	2.435	0.602	0.8	1	78.881			
			C	0.266	2.391	0.606	0.8	1	82.608			
T9	0.83	9.04	A	0.258	2.413	0.604	0.8	1	88.672	7.49	374.46	C
160.00-140.00			B	0.257	2.416	0.604	0.8	1	88.897			
			C	0.263	2.398	0.605	0.8	1	90.169			
T10	0.85	9.36	A	0.244	2.457	0.6	0.8	1	91.106	7.57	378.63	B
140.00-120.00			B	0.249	2.439	0.602	0.8	1	93.364			
			C	0.249	2.442	0.601	0.8	1	92.588			
T11	0.86	7.92	A	0.212	2.556	0.593	0.8	1	79.298	6.50	324.82	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
120.00-100.00			B	0.212	2.555	0.593	0.8	1	80.221			
			C	0.203	2.584	0.591	0.8	1	76.368			
T12	0.91	9.68	A	0.198	2.603	0.59	0.8	1	80.381	6.72	335.87	B
100.00-80.00			B	0.215	2.548	0.593	0.8	1	88.073			
			C	0.189	2.632	0.588	0.8	1	77.236			
T13	0.91	10.69	A	0.2	2.596	0.59	0.8	1	89.421	6.85	342.70	B
80.00-60.00			B	0.214	2.551	0.593	0.8	1	96.435			
			C	0.189	2.633	0.588	0.8	1	84.948			
T14	1.37	14.59	A	0.182	2.656	0.587	0.8	1	133.634	9.35	311.69	B
60.00-30.00			B	0.198	2.602	0.59	0.8	1	146.360			
			C	0.179	2.666	0.586	0.8	1	131.625			
T15	1.14	16.94	A	0.166	2.713	0.584	0.8	1	134.344	8.65	288.25	B
30.00-0.00			B	0.177	2.675	0.586	0.8	1	143.839			
			C	0.161	2.731	0.583	0.8	1	130.685			
Sum Weight:	9.81	120.69						OTM	14016.77 kip-ft	95.39		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.85	1	20.888	2.55	127.39	B
320.00-300.00			B	0.248	2.443	0.601	0.85	1	24.474			
			C	0.208	2.571	0.592	0.85	1	20.888			
T2	0.04	2.50	A	0.207	2.573	0.592	0.85	1	23.800	2.82	140.95	B
300.00-280.00			B	0.243	2.46	0.6	0.85	1	27.404			
			C	0.207	2.573	0.592	0.85	1	23.800			
T3	0.23	5.07	A	0.237	2.476	0.599	0.85	1	43.745	5.17	258.31	B
280.00-260.00			B	0.341	2.192	0.629	0.85	1	57.530			
			C	0.237	2.476	0.599	0.85	1	43.745			
T4	0.25	5.41	A	0.219	2.532	0.595	0.85	1	48.338	5.72	285.80	B
260.00-240.00			B	0.315	2.256	0.621	0.85	1	63.215			
			C	0.219	2.532	0.595	0.85	1	48.338			
T5	0.26	6.48	A	0.223	2.52	0.595	0.85	1	56.866	6.43	321.65	B
240.00-220.00			B	0.312	2.264	0.62	0.85	1	72.599			
			C	0.223	2.52	0.595	0.85	1	56.866			
T6	0.53	6.41	A	0.181	2.66	0.587	0.85	1	52.350	6.64	332.16	C
220.00-200.00			B	0.262	2.401	0.605	0.85	1	68.466			
			C	0.296	2.307	0.615	0.85	1	75.533			
T7	0.78	7.30	A	0.282	2.346	0.61	0.85	1	82.680	7.27	363.37	C
200.00-180.00			B	0.258	2.413	0.604	0.85	1	77.213			
			C	0.288	2.328	0.612	0.85	1	84.238			
T8	0.81	7.52	A	0.26	2.408	0.604	0.85	1	84.636	7.40	369.80	C
180.00-160.00			B	0.251	2.435	0.602	0.85	1	82.507			
			C	0.266	2.391	0.606	0.85	1	86.168			
T9	0.83	9.04	A	0.258	2.413	0.604	0.85	1	92.719	7.82	391.21	C
160.00-140.00			B	0.257	2.416	0.604	0.85	1	93.078			
			C	0.263	2.398	0.605	0.85	1	94.204			
T10	0.85	9.36	A	0.244	2.457	0.6	0.85	1	95.315	7.92	396.17	B
140.00-120.00			B	0.249	2.439	0.602	0.85	1	97.689			
			C	0.249	2.442	0.601	0.85	1	96.784			
T11	0.86	7.92	A	0.212	2.556	0.593	0.85	1	81.581	6.70	334.81	B
120.00-100.00			B	0.212	2.555	0.593	0.85	1	82.687			
			C	0.203	2.584	0.591	0.85	1	78.651			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T12	0.91	9.68	A	0.198	2.603	0.59	0.85	1	82.664	6.92	345.91	B
100.00-80.00			B	0.215	2.548	0.593	0.85	1	90.704			
			C	0.189	2.632	0.588	0.85	1	79.520			
T13	0.91	10.69	A	0.2	2.596	0.59	0.85	1	92.107	7.07	353.48	B
80.00-60.00			B	0.214	2.551	0.593	0.85	1	99.468			
			C	0.189	2.633	0.588	0.85	1	87.633			
T14	1.37	14.59	A	0.182	2.656	0.587	0.85	1	137.660	9.64	321.38	B
60.00-30.00			B	0.198	2.602	0.59	0.85	1	150.908			
			C	0.179	2.666	0.586	0.85	1	135.651			
T15	1.14	16.94	A	0.166	2.713	0.584	0.85	1	138.418	8.92	297.28	B
30.00-0.00			B	0.177	2.675	0.586	0.85	1	148.348			
			C	0.161	2.731	0.583	0.85	1	134.759			
Sum Weight:	9.81	120.69						OTM	14569.29 kip-ft	98.98		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.11	2.46	A	0.273	2.37	0.608	1	1	29.013	3.37	168.44	B
320.00-300.00			B	0.35	2.172	0.632	1	1	36.397			
			C	0.273	2.37	0.608	1	1	29.013			
T2	0.11	3.23	A	0.262	2.402	0.605	1	1	31.810	3.64	181.90	B
300.00-280.00			B	0.33	2.22	0.625	1	1	39.187			
			C	0.262	2.402	0.605	1	1	31.810			
T3	0.60	6.50	A	0.271	2.377	0.607	1	1	57.014	6.65	332.52	B
280.00-260.00			B	0.446	1.981	0.671	1	1	81.955			
			C	0.271	2.377	0.607	1	1	57.014			
T4	0.64	7.01	A	0.251	2.435	0.602	1	1	62.926	7.33	366.60	B
260.00-240.00			B	0.414	2.037	0.657	1	1	89.810			
			C	0.251	2.435	0.602	1	1	62.926			
T5	0.69	8.39	A	0.254	2.427	0.603	1	1	73.517	8.18	409.09	B
240.00-220.00			B	0.406	2.052	0.654	1	1	101.869			
			C	0.254	2.427	0.603	1	1	73.517			
T6	1.35	8.13	A	0.204	2.582	0.591	1	1	67.334	8.31	415.40	C
220.00-200.00			B	0.345	2.183	0.631	1	1	96.323			
			C	0.373	2.119	0.641	1	1	102.816			
T7	1.96	9.25	A	0.348	2.176	0.632	1	1	110.609	9.03	451.69	C
200.00-180.00			B	0.333	2.212	0.627	1	1	106.864			
			C	0.358	2.153	0.635	1	1	113.243			
T8	2.05	9.55	A	0.321	2.241	0.623	1	1	113.044	9.23	461.55	B
180.00-160.00			B	0.33	2.219	0.626	1	1	115.904			
			C	0.331	2.218	0.626	1	1	115.608			
T9	2.11	11.37	A	0.315	2.257	0.621	1	1	122.487	9.92	496.18	B
160.00-140.00			B	0.335	2.207	0.627	1	1	129.812			
			C	0.323	2.236	0.623	1	1	124.944			
T10	2.17	11.79	A	0.297	2.303	0.615	1	1	125.771	10.13	506.50	B
140.00-120.00			B	0.328	2.224	0.625	1	1	136.994			
			C	0.305	2.283	0.617	1	1	128.187			
T11	2.19	9.94	A	0.267	2.386	0.606	1	1	109.210	8.81	440.55	B
120.00-100.00			B	0.29	2.323	0.613	1	1	119.647			
			C	0.257	2.417	0.604	1	1	105.419			
T12	2.36	11.75	A	0.25	2.437	0.602	1	1	110.572	9.23	461.65	B
100.00-80.00			B	0.299	2.3	0.615	1	1	134.139			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.24	2.469	0.599	1	1	106.500			
T13	2.36	12.99	A	0.249	2.441	0.602	1	1	121.657	9.32	466.20	B
80.00-60.00			B	0.292	2.318	0.613	1	1	144.372			
			C	0.236	2.481	0.598	1	1	116.121			
T14	3.54	18.10	A	0.227	2.507	0.596	1	1	181.748	12.73	424.24	B
60.00-30.00			B	0.27	2.378	0.607	1	1	217.946			
			C	0.224	2.519	0.596	1	1	179.146			
T15	2.95	20.67	A	0.205	2.58	0.591	1	1	180.504	11.65	388.26	B
30.00-0.00			B	0.235	2.482	0.598	1	1	208.803			
			C	0.198	2.601	0.59	1	1	175.867			
Sum Weight:	25.17	151.14						OTM	18645.97 kip-ft	127.54		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.11	2.46	A	0.273	2.37	0.608	0.825	1	26.972	3.20	159.98	B
320.00-300.00			B	0.35	2.172	0.632	0.825	1	34.568			
			C	0.273	2.37	0.608	0.825	1	26.972			
T2	0.11	3.23	A	0.262	2.402	0.605	0.825	1	29.606	3.45	172.61	B
300.00-280.00			B	0.33	2.22	0.625	0.825	1	37.184			
			C	0.262	2.402	0.605	0.825	1	29.606			
T3	0.60	6.50	A	0.271	2.377	0.607	0.825	1	47.618	5.93	296.69	B
280.00-260.00			B	0.446	1.981	0.671	0.825	1	73.122			
			C	0.271	2.377	0.607	0.825	1	47.618			
T4	0.64	7.01	A	0.251	2.435	0.602	0.825	1	52.584	6.55	327.32	B
260.00-240.00			B	0.414	2.037	0.657	0.825	1	80.189			
			C	0.251	2.435	0.602	0.825	1	52.584			
T5	0.69	8.39	A	0.254	2.427	0.603	0.825	1	61.419	7.29	364.66	B
240.00-220.00			B	0.406	2.052	0.654	0.825	1	90.803			
			C	0.254	2.427	0.603	0.825	1	61.419			
T6	1.35	8.13	A	0.204	2.582	0.591	0.825	1	56.166	7.48	373.83	C
220.00-200.00			B	0.345	2.183	0.631	0.825	1	85.888			
			C	0.373	2.119	0.641	0.825	1	92.528			
T7	1.96	9.25	A	0.348	2.176	0.632	0.825	1	98.441	8.07	403.39	C
200.00-180.00			B	0.333	2.212	0.627	0.825	1	94.611			
			C	0.358	2.153	0.635	0.825	1	101.133			
T8	2.05	9.55	A	0.321	2.241	0.623	0.825	1	100.418	8.21	410.72	B
180.00-160.00			B	0.33	2.219	0.626	0.825	1	103.139			
			C	0.331	2.218	0.626	0.825	1	103.038			
T9	2.11	11.37	A	0.315	2.257	0.621	0.825	1	108.252	8.80	439.96	B
160.00-140.00			B	0.335	2.207	0.627	0.825	1	115.102			
			C	0.323	2.236	0.623	0.825	1	110.779			
T10	2.17	11.79	A	0.297	2.303	0.615	0.825	1	110.967	9.01	450.41	B
140.00-120.00			B	0.328	2.224	0.625	0.825	1	121.824			
			C	0.305	2.283	0.617	0.825	1	113.452			
T11	2.19	9.94	A	0.267	2.386	0.606	0.825	1	100.828	8.12	406.20	B
120.00-100.00			B	0.29	2.323	0.613	0.825	1	110.316			
			C	0.257	2.417	0.604	0.825	1	97.036			
T12	2.36	11.75	A	0.25	2.437	0.602	0.825	1	102.190	8.53	426.61	B
100.00-80.00			B	0.299	2.3	0.615	0.825	1	123.957			
			C	0.24	2.469	0.599	0.825	1	98.118			
T13	2.36	12.99	A	0.249	2.441	0.602	0.825	1	111.868	8.58	428.78	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
80.00-60.00			B	0.292	2.318	0.613	0.825	1	132.783			
			C	0.236	2.481	0.598	0.825	1	106.332			
T14	3.54	18.10	A	0.227	2.507	0.596	0.825	1	167.072	11.71	390.41	B
60.00-30.00			B	0.27	2.378	0.607	0.825	1	200.569			
			C	0.224	2.519	0.596	0.825	1	164.470			
T15	2.95	20.67	A	0.205	2.58	0.591	0.825	1	165.660	10.69	356.47	B
30.00-0.00			B	0.235	2.482	0.598	0.825	1	191.709			
			C	0.198	2.601	0.59	0.825	1	161.023			
Sum Weight:	25.17	151.14						OTM	16848.78 kip-ft	115.63		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.11	2.46	A	0.273	2.37	0.608	0.8	1	26.681	3.18	158.77	B
320.00-300.00			B	0.35	2.172	0.632	0.8	1	34.307			
			C	0.273	2.37	0.608	0.8	1	26.681			
T2	0.11	3.23	A	0.262	2.402	0.605	0.8	1	29.291	3.43	171.28	B
300.00-280.00			B	0.33	2.22	0.625	0.8	1	36.898			
			C	0.262	2.402	0.605	0.8	1	29.291			
T3	0.60	6.50	A	0.271	2.377	0.607	0.8	1	46.275	5.83	291.57	B
280.00-260.00			B	0.446	1.981	0.671	0.8	1	71.861			
			C	0.271	2.377	0.607	0.8	1	46.275			
T4	0.64	7.01	A	0.251	2.435	0.602	0.8	1	51.107	6.43	321.71	B
260.00-240.00			B	0.414	2.037	0.657	0.8	1	78.814			
			C	0.251	2.435	0.602	0.8	1	51.107			
T5	0.69	8.39	A	0.254	2.427	0.603	0.8	1	59.691	7.17	358.31	B
240.00-220.00			B	0.406	2.052	0.654	0.8	1	89.222			
			C	0.254	2.427	0.603	0.8	1	59.691			
T6	1.35	8.13	A	0.204	2.582	0.591	0.8	1	54.571	7.36	367.89	C
220.00-200.00			B	0.345	2.183	0.631	0.8	1	84.397			
			C	0.373	2.119	0.641	0.8	1	91.058			
T7	1.96	9.25	A	0.348	2.176	0.632	0.8	1	96.702	7.93	396.49	C
200.00-180.00			B	0.333	2.212	0.627	0.8	1	92.861			
			C	0.358	2.153	0.635	0.8	1	99.403			
T8	2.05	9.55	A	0.321	2.241	0.623	0.8	1	98.614	8.07	403.46	B
180.00-160.00			B	0.33	2.219	0.626	0.8	1	101.315			
			C	0.331	2.218	0.626	0.8	1	101.243			
T9	2.11	11.37	A	0.315	2.257	0.621	0.8	1	106.219	8.64	431.92	B
160.00-140.00			B	0.335	2.207	0.627	0.8	1	113.000			
			C	0.323	2.236	0.623	0.8	1	108.756			
T10	2.17	11.79	A	0.297	2.303	0.615	0.8	1	108.852	8.85	442.40	B
140.00-120.00			B	0.328	2.224	0.625	0.8	1	119.656			
			C	0.305	2.283	0.617	0.8	1	111.347			
T11	2.19	9.94	A	0.267	2.386	0.606	0.8	1	99.630	8.03	401.29	B
120.00-100.00			B	0.29	2.323	0.613	0.8	1	108.983			
			C	0.257	2.417	0.604	0.8	1	95.839			
T12	2.36	11.75	A	0.25	2.437	0.602	0.8	1	100.993	8.43	421.60	B
100.00-80.00			B	0.299	2.3	0.615	0.8	1	122.503			
			C	0.24	2.469	0.599	0.8	1	96.921			
T13	2.36	12.99	A	0.249	2.441	0.602	0.8	1	110.469	8.47	423.43	B
80.00-60.00			B	0.292	2.318	0.613	0.8	1	131.127			
			C	0.236	2.481	0.598	0.8	1	104.934			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T14	3.54	18.10	A	0.227	2.507	0.596	0.8	1	164.975	11.57	385.58	B
60.00-30.00			B	0.27	2.378	0.607	0.8	1	198.086			
			C	0.224	2.519	0.596	0.8	1	162.373			
T15	2.95	20.67	A	0.205	2.58	0.591	0.8	1	163.539	10.56	351.93	B
30.00-0.00			B	0.235	2.482	0.598	0.8	1	189.267			
			C	0.198	2.601	0.59	0.8	1	158.902			
Sum Weight:	25.17	151.14						OTM	16592.04 kip-ft	113.93		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.11	2.46	A	0.273	2.37	0.608	0.85	1	27.264	3.22	161.19	B
320.00-300.00			B	0.35	2.172	0.632	0.85	1	34.830			
			C	0.273	2.37	0.608	0.85	1	27.264			
T2	0.11	3.23	A	0.262	2.402	0.605	0.85	1	29.920	3.48	173.94	B
300.00-280.00			B	0.33	2.22	0.625	0.85	1	37.471			
			C	0.262	2.402	0.605	0.85	1	29.920			
T3	0.60	6.50	A	0.271	2.377	0.607	0.85	1	48.960	6.04	301.81	B
280.00-260.00			B	0.446	1.981	0.671	0.85	1	74.384			
			C	0.271	2.377	0.607	0.85	1	48.960			
T4	0.64	7.01	A	0.251	2.435	0.602	0.85	1	54.062	6.66	332.93	B
260.00-240.00			B	0.414	2.037	0.657	0.85	1	81.563			
			C	0.251	2.435	0.602	0.85	1	54.062			
T5	0.69	8.39	A	0.254	2.427	0.603	0.85	1	63.147	7.42	371.00	B
240.00-220.00			B	0.406	2.052	0.654	0.85	1	92.384			
			C	0.254	2.427	0.603	0.85	1	63.147			
T6	1.35	8.13	A	0.204	2.582	0.591	0.85	1	57.762	7.60	379.77	C
220.00-200.00			B	0.345	2.183	0.631	0.85	1	87.379			
			C	0.373	2.119	0.641	0.85	1	93.997			
T7	1.96	9.25	A	0.348	2.176	0.632	0.85	1	100.179	8.21	410.29	C
200.00-180.00			B	0.333	2.212	0.627	0.85	1	96.362			
			C	0.358	2.153	0.635	0.85	1	102.863			
T8	2.05	9.55	A	0.321	2.241	0.623	0.85	1	102.222	8.36	417.98	B
180.00-160.00			B	0.33	2.219	0.626	0.85	1	104.962			
			C	0.331	2.218	0.626	0.85	1	104.834			
T9	2.11	11.37	A	0.315	2.257	0.621	0.85	1	110.286	8.96	447.99	B
160.00-140.00			B	0.335	2.207	0.627	0.85	1	117.203			
			C	0.323	2.236	0.623	0.85	1	112.803			
T10	2.17	11.79	A	0.297	2.303	0.615	0.85	1	113.082	9.17	458.42	B
140.00-120.00			B	0.328	2.224	0.625	0.85	1	123.991			
			C	0.305	2.283	0.617	0.85	1	115.557			
T11	2.19	9.94	A	0.267	2.386	0.606	0.85	1	102.025	8.22	411.10	B
120.00-100.00			B	0.29	2.323	0.613	0.85	1	111.649			
			C	0.257	2.417	0.604	0.85	1	98.234			
T12	2.36	11.75	A	0.25	2.437	0.602	0.85	1	103.387	8.63	431.62	B
100.00-80.00			B	0.299	2.3	0.615	0.85	1	125.412			
			C	0.24	2.469	0.599	0.85	1	99.316			
T13	2.36	12.99	A	0.249	2.441	0.602	0.85	1	113.266	8.68	434.12	B
80.00-60.00			B	0.292	2.318	0.613	0.85	1	134.438			
			C	0.236	2.481	0.598	0.85	1	107.730			
T14	3.54	18.10	A	0.227	2.507	0.596	0.85	1	169.168	11.86	395.25	B
60.00-30.00			B	0.27	2.378	0.607	0.85	1	203.051			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.224	2.519	0.596	0.85	1	166.566			
T15	2.95	20.67	A	0.205	2.58	0.591	0.85	1	167.780	10.83	361.02	B
30.00-0.00			B	0.235	2.482	0.598	0.85	1	194.151			
			C	0.198	2.601	0.59	0.85	1	163.143			
Sum Weight:	25.17	151.14						OTM	17105.52 kip-ft	117.33		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	1	1	22.637	2.72	136.02	B
320.00-300.00			B	0.248	2.443	0.601	1	1	26.133			
			C	0.208	2.571	0.592	1	1	22.637			
T2	0.04	2.50	A	0.207	2.573	0.592	1	1	25.689	3.00	150.22	B
300.00-280.00			B	0.243	2.46	0.6	1	1	29.208			
			C	0.207	2.573	0.592	1	1	25.689			
T3	0.23	5.07	A	0.237	2.476	0.599	1	1	51.464	5.83	291.73	B
280.00-260.00			B	0.341	2.192	0.629	1	1	64.974			
			C	0.237	2.476	0.599	1	1	51.464			
T4	0.25	5.41	A	0.219	2.532	0.595	1	1	56.868	6.46	322.79	B
260.00-240.00			B	0.315	2.256	0.621	1	1	71.396			
			C	0.219	2.532	0.595	1	1	56.868			
T5	0.26	6.48	A	0.223	2.52	0.595	1	1	66.901	7.28	363.91	B
240.00-220.00			B	0.312	2.264	0.62	1	1	82.138			
			C	0.223	2.52	0.595	1	1	66.901			
T6	0.53	6.41	A	0.181	2.66	0.587	1	1	61.588	7.41	370.59	C
220.00-200.00			B	0.262	2.401	0.605	1	1	77.351			
			C	0.296	2.307	0.615	1	1	84.273			
T7	0.78	7.30	A	0.282	2.346	0.61	1	1	93.004	8.16	407.77	C
200.00-180.00			B	0.258	2.413	0.604	1	1	87.648			
			C	0.288	2.328	0.612	1	1	94.531			
T8	0.81	7.52	A	0.26	2.408	0.604	1	1	95.348	8.31	415.64	C
180.00-160.00			B	0.251	2.435	0.602	1	1	93.383			
			C	0.266	2.391	0.606	1	1	96.850			
T9	0.83	9.04	A	0.258	2.413	0.604	1	1	104.861	8.84	442.00	B
160.00-140.00			B	0.257	2.416	0.604	1	1	105.620			
			C	0.263	2.398	0.605	1	1	106.308			
T10	0.85	9.36	A	0.244	2.457	0.6	1	1	107.940	8.98	448.79	B
140.00-120.00			B	0.249	2.439	0.602	1	1	110.665			
			C	0.249	2.442	0.601	1	1	109.373			
T11	0.86	7.92	A	0.212	2.556	0.593	1	1	88.432	7.30	364.76	B
120.00-100.00			B	0.212	2.555	0.593	1	1	90.083			
			C	0.203	2.584	0.591	1	1	85.503			
T12	0.91	9.68	A	0.198	2.603	0.59	1	1	89.514	7.52	376.01	B
100.00-80.00			B	0.215	2.548	0.593	1	1	98.597			
			C	0.189	2.632	0.588	1	1	86.370			
T13	0.91	10.69	A	0.2	2.596	0.59	1	1	100.163	7.72	385.81	B
80.00-60.00			B	0.214	2.551	0.593	1	1	108.567			
			C	0.189	2.633	0.588	1	1	95.690			
T14	1.37	14.59	A	0.182	2.656	0.587	1	1	149.738	10.51	350.43	B
60.00-30.00			B	0.198	2.602	0.59	1	1	164.551			
			C	0.179	2.666	0.586	1	1	147.730			
T15	1.14	16.94	A	0.166	2.713	0.584	1	1	150.640	9.73	324.39	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
30.00-0.00			B	0.177	2.675	0.586	1	1	161.874			
			C	0.161	2.731	0.583	1	1	146.981			
Sum Weight:	9.81	120.69						OTM	16228.39 kip-ft	109.77		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.825	1	20.596	2.52	125.95	B
320.00-300.00			B	0.248	2.443	0.601	0.825	1	24.197			
			C	0.208	2.571	0.592	0.825	1	20.596			
T2	0.04	2.50	A	0.207	2.573	0.592	0.825	1	23.485	2.79	139.40	B
300.00-280.00			B	0.243	2.46	0.6	0.825	1	27.104			
			C	0.207	2.573	0.592	0.825	1	23.485			
T3	0.23	5.07	A	0.237	2.476	0.599	0.825	1	42.458	5.05	252.74	B
280.00-260.00			B	0.341	2.192	0.629	0.825	1	56.289			
			C	0.237	2.476	0.599	0.825	1	42.458			
T4	0.25	5.41	A	0.219	2.532	0.595	0.825	1	46.916	5.59	279.64	B
260.00-240.00			B	0.315	2.256	0.621	0.825	1	61.852			
			C	0.219	2.532	0.595	0.825	1	46.916			
T5	0.26	6.48	A	0.223	2.52	0.595	0.825	1	55.194	6.29	314.61	B
240.00-220.00			B	0.312	2.264	0.62	0.825	1	71.010			
			C	0.223	2.52	0.595	0.825	1	55.194			
T6	0.53	6.41	A	0.181	2.66	0.587	0.825	1	50.810	6.52	325.75	C
220.00-200.00			B	0.262	2.401	0.605	0.825	1	66.985			
			C	0.296	2.307	0.615	0.825	1	74.076			
T7	0.78	7.30	A	0.282	2.346	0.61	0.825	1	80.959	7.12	355.97	C
200.00-180.00			B	0.258	2.413	0.604	0.825	1	75.474			
			C	0.288	2.328	0.612	0.825	1	82.522			
T8	0.81	7.52	A	0.26	2.408	0.604	0.825	1	82.851	7.24	362.16	C
180.00-160.00			B	0.251	2.435	0.602	0.825	1	80.694			
			C	0.266	2.391	0.606	0.825	1	84.388			
T9	0.83	9.04	A	0.258	2.413	0.604	0.825	1	90.696	7.66	382.84	C
160.00-140.00			B	0.257	2.416	0.604	0.825	1	90.987			
			C	0.263	2.398	0.605	0.825	1	92.186			
T10	0.85	9.36	A	0.244	2.457	0.6	0.825	1	93.210	7.75	387.40	B
140.00-120.00			B	0.249	2.439	0.602	0.825	1	95.527			
			C	0.249	2.442	0.601	0.825	1	94.686			
T11	0.86	7.92	A	0.212	2.556	0.593	0.825	1	80.440	6.60	329.81	B
120.00-100.00			B	0.212	2.555	0.593	0.825	1	81.454			
			C	0.203	2.584	0.591	0.825	1	77.510			
T12	0.91	9.68	A	0.198	2.603	0.59	0.825	1	81.522	6.82	340.89	B
100.00-80.00			B	0.215	2.548	0.593	0.825	1	89.389			
			C	0.189	2.632	0.588	0.825	1	78.378			
T13	0.91	10.69	A	0.2	2.596	0.59	0.825	1	90.764	6.96	348.09	B
80.00-60.00			B	0.214	2.551	0.593	0.825	1	97.951			
			C	0.189	2.633	0.588	0.825	1	86.291			
T14	1.37	14.59	A	0.182	2.656	0.587	0.825	1	135.647	9.50	316.53	B
60.00-30.00			B	0.198	2.602	0.59	0.825	1	148.634			
			C	0.179	2.666	0.586	0.825	1	133.638			
T15	1.14	16.94	A	0.166	2.713	0.584	0.825	1	136.381	8.78	292.77	B
30.00-0.00			B	0.177	2.675	0.586	0.825	1	146.093			
			C	0.161	2.731	0.583	0.825	1	132.722			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	9.81	120.69						OTM	14293.03 kip-ft	97.18		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.8	1	20.305	2.49	124.51	B
320.00-300.00			B	0.248	2.443	0.601	0.8	1	23.921			
			C	0.208	2.571	0.592	0.8	1	20.305			
T2	0.04	2.50	A	0.207	2.573	0.592	0.8	1	23.170	2.76	137.86	B
300.00-280.00			B	0.243	2.46	0.6	0.8	1	26.803			
			C	0.207	2.573	0.592	0.8	1	23.170			
T3	0.23	5.07	A	0.237	2.476	0.599	0.8	1	41.171	4.94	247.16	B
280.00-260.00			B	0.341	2.192	0.629	0.8	1	55.049			
			C	0.237	2.476	0.599	0.8	1	41.171			
T4	0.25	5.41	A	0.219	2.532	0.595	0.8	1	45.494	5.47	273.47	B
260.00-240.00			B	0.315	2.256	0.621	0.8	1	60.488			
			C	0.219	2.532	0.595	0.8	1	45.494			
T5	0.26	6.48	A	0.223	2.52	0.595	0.8	1	53.521	6.15	307.56	B
240.00-220.00			B	0.312	2.264	0.62	0.8	1	69.420			
			C	0.223	2.52	0.595	0.8	1	53.521			
T6	0.53	6.41	A	0.181	2.66	0.587	0.8	1	49.270	6.39	319.34	C
220.00-200.00			B	0.262	2.401	0.605	0.8	1	65.504			
			C	0.296	2.307	0.615	0.8	1	72.620			
T7	0.78	7.30	A	0.282	2.346	0.61	0.8	1	79.238	6.97	348.57	C
200.00-180.00			B	0.258	2.413	0.604	0.8	1	73.735			
			C	0.288	2.328	0.612	0.8	1	80.806			
T8	0.81	7.52	A	0.26	2.408	0.604	0.8	1	81.065	7.09	354.52	C
180.00-160.00			B	0.251	2.435	0.602	0.8	1	78.881			
			C	0.266	2.391	0.606	0.8	1	82.608			
T9	0.83	9.04	A	0.258	2.413	0.604	0.8	1	88.672	7.49	374.46	C
160.00-140.00			B	0.257	2.416	0.604	0.8	1	88.897			
			C	0.263	2.398	0.605	0.8	1	90.169			
T10	0.85	9.36	A	0.244	2.457	0.6	0.8	1	91.106	7.57	378.63	B
140.00-120.00			B	0.249	2.439	0.602	0.8	1	93.364			
			C	0.249	2.442	0.601	0.8	1	92.588			
T11	0.86	7.92	A	0.212	2.556	0.593	0.8	1	79.298	6.50	324.82	B
120.00-100.00			B	0.212	2.555	0.593	0.8	1	80.221			
			C	0.203	2.584	0.591	0.8	1	76.368			
T12	0.91	9.68	A	0.198	2.603	0.59	0.8	1	80.381	6.72	335.87	B
100.00-80.00			B	0.215	2.548	0.593	0.8	1	88.073			
			C	0.189	2.632	0.588	0.8	1	77.236			
T13	0.91	10.69	A	0.2	2.596	0.59	0.8	1	89.421	6.85	342.70	B
80.00-60.00			B	0.214	2.551	0.593	0.8	1	96.435			
			C	0.189	2.633	0.588	0.8	1	84.948			
T14	1.37	14.59	A	0.182	2.656	0.587	0.8	1	133.634	9.35	311.69	B
60.00-30.00			B	0.198	2.602	0.59	0.8	1	146.360			
			C	0.179	2.666	0.586	0.8	1	131.625			
T15	1.14	16.94	A	0.166	2.713	0.584	0.8	1	134.344	8.65	288.25	B
30.00-0.00			B	0.177	2.675	0.586	0.8	1	143.839			
			C	0.161	2.731	0.583	0.8	1	130.685			
Sum Weight:	9.81	120.69						OTM	14016.77	95.39		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.04	1.79	A	0.208	2.571	0.592	0.85	1	20.888	2.55	127.39	B
320.00-300.00			B	0.248	2.443	0.601	0.85	1	24.474			
			C	0.208	2.571	0.592	0.85	1	20.888			
T2	0.04	2.50	A	0.207	2.573	0.592	0.85	1	23.800	2.82	140.95	B
300.00-280.00			B	0.243	2.46	0.6	0.85	1	27.404			
			C	0.207	2.573	0.592	0.85	1	23.800			
T3	0.23	5.07	A	0.237	2.476	0.599	0.85	1	43.745	5.17	258.31	B
280.00-260.00			B	0.341	2.192	0.629	0.85	1	57.530			
			C	0.237	2.476	0.599	0.85	1	43.745			
T4	0.25	5.41	A	0.219	2.532	0.595	0.85	1	48.338	5.72	285.80	B
260.00-240.00			B	0.315	2.256	0.621	0.85	1	63.215			
			C	0.219	2.532	0.595	0.85	1	48.338			
T5	0.26	6.48	A	0.223	2.52	0.595	0.85	1	56.866	6.43	321.65	B
240.00-220.00			B	0.312	2.264	0.62	0.85	1	72.599			
			C	0.223	2.52	0.595	0.85	1	56.866			
T6	0.53	6.41	A	0.181	2.66	0.587	0.85	1	52.350	6.64	332.16	C
220.00-200.00			B	0.262	2.401	0.605	0.85	1	68.466			
			C	0.296	2.307	0.615	0.85	1	75.533			
T7	0.78	7.30	A	0.282	2.346	0.61	0.85	1	82.680	7.27	363.37	C
200.00-180.00			B	0.258	2.413	0.604	0.85	1	77.213			
			C	0.288	2.328	0.612	0.85	1	84.238			
T8	0.81	7.52	A	0.26	2.408	0.604	0.85	1	84.636	7.40	369.80	C
180.00-160.00			B	0.251	2.435	0.602	0.85	1	82.507			
			C	0.266	2.391	0.606	0.85	1	86.168			
T9	0.83	9.04	A	0.258	2.413	0.604	0.85	1	92.719	7.82	391.21	C
160.00-140.00			B	0.257	2.416	0.604	0.85	1	93.078			
			C	0.263	2.398	0.605	0.85	1	94.204			
T10	0.85	9.36	A	0.244	2.457	0.6	0.85	1	95.315	7.92	396.17	B
140.00-120.00			B	0.249	2.439	0.602	0.85	1	97.689			
			C	0.249	2.442	0.601	0.85	1	96.784			
T11	0.86	7.92	A	0.212	2.556	0.593	0.85	1	81.581	6.70	334.81	B
120.00-100.00			B	0.212	2.555	0.593	0.85	1	82.687			
			C	0.203	2.584	0.591	0.85	1	78.651			
T12	0.91	9.68	A	0.198	2.603	0.59	0.85	1	82.664	6.92	345.91	B
100.00-80.00			B	0.215	2.548	0.593	0.85	1	90.704			
			C	0.189	2.632	0.588	0.85	1	79.520			
T13	0.91	10.69	A	0.2	2.596	0.59	0.85	1	92.107	7.07	353.48	B
80.00-60.00			B	0.214	2.551	0.593	0.85	1	99.468			
			C	0.189	2.633	0.588	0.85	1	87.633			
T14	1.37	14.59	A	0.182	2.656	0.587	0.85	1	137.660	9.64	321.38	B
60.00-30.00			B	0.198	2.602	0.59	0.85	1	150.908			
			C	0.179	2.666	0.586	0.85	1	135.651			
T15	1.14	16.94	A	0.166	2.713	0.584	0.85	1	138.418	8.92	297.28	B
30.00-0.00			B	0.177	2.675	0.586	0.85	1	148.348			
			C	0.161	2.731	0.583	0.85	1	134.759			
Sum Weight:	9.81	120.69						OTM	14569.29 kip-ft	98.98		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	73.04					
Bracing Weight	47.65					
Total Member Self-Weight	120.69			51.29	-45.91	
Total Weight	138.40			51.29	-45.91	
Wind 0 deg - No Ice		-0.01	-137.43	-22780.13	-43.58	112.82
Wind 30 deg - No Ice		63.28	-109.68	-18283.31	-10621.55	150.15
Wind 45 deg - No Ice		88.22	-88.28	-14722.81	-14807.99	157.04
Wind 60 deg - No Ice		106.50	-61.52	-10256.60	-17887.29	153.00
Wind 90 deg - No Ice		126.57	0.01	53.61	-21201.22	126.48
Wind 120 deg - No Ice		118.96	68.73	11469.01	-19804.93	67.06
Wind 135 deg - No Ice		88.24	88.29	14828.68	-14811.27	18.04
Wind 150 deg - No Ice		63.29	109.69	18388.22	-10625.58	-23.67
Wind 180 deg - No Ice		0.01	123.06	20671.09	-48.23	-96.21
Wind 210 deg - No Ice		-63.28	109.68	18385.89	10529.74	-150.15
Wind 225 deg - No Ice		-88.22	88.28	14825.39	14716.17	-157.04
Wind 240 deg - No Ice		-118.95	68.71	11464.99	19710.80	-179.88
Wind 270 deg - No Ice		-126.57	-0.01	48.97	21109.41	-126.48
Wind 300 deg - No Ice		-106.51	-61.54	-10260.62	17797.80	-56.79
Wind 315 deg - No Ice		-88.24	-88.29	-14726.10	14719.46	-18.04
Wind 330 deg - No Ice		-63.29	-109.69	-18285.63	10533.76	23.67
Member Ice	30.45					
Total Weight Ice	189.39			142.29	-126.67	
Wind 0 deg - Ice		-0.01	-159.57	-26121.70	-124.45	189.02
Wind 30 deg - Ice		74.63	-129.35	-21267.82	-12477.25	249.05
Wind 45 deg - Ice		104.35	-104.41	-17156.78	-17412.64	258.71
Wind 60 deg - Ice		126.33	-72.97	-11960.82	-21076.04	250.57
Wind 90 deg - Ice		149.28	0.01	144.51	-24831.68	199.28
Wind 120 deg - Ice		138.13	79.79	13276.21	-22857.01	94.64
Wind 135 deg - Ice		104.36	104.42	17444.50	-17415.78	18.61
Wind 150 deg - Ice		74.65	129.36	21554.61	-12481.10	-49.77
Wind 180 deg - Ice		0.01	145.96	24352.35	-128.89	-167.03
Wind 210 deg - Ice		-74.63	129.35	21552.39	12223.91	-249.05
Wind 225 deg - Ice		-104.35	104.41	17441.36	17159.30	-258.71
Wind 240 deg - Ice		-138.12	79.78	13272.36	22601.46	-283.66
Wind 270 deg - Ice		-149.28	-0.01	140.06	24578.35	-199.28
Wind 300 deg - Ice		-126.34	-72.99	-11964.67	20824.92	-83.55
Wind 315 deg - Ice		-104.36	-104.42	-17159.93	17162.44	-18.61
Wind 330 deg - Ice		-74.65	-129.36	-21270.04	12227.76	49.77
Total Weight	138.40			51.29	-45.91	
Wind 0 deg - Service		-0.01	-137.43	-22840.22	7.46	112.82
Wind 30 deg - Service		63.28	-109.68	-18343.41	-10570.50	150.15
Wind 45 deg - Service		88.22	-88.28	-14782.91	-14756.94	157.04
Wind 60 deg - Service		106.50	-61.52	-10316.69	-17836.24	153.00
Wind 90 deg - Service		126.57	0.01	-6.48	-21150.17	126.48
Wind 120 deg - Service		118.96	68.73	11408.92	-19753.89	67.06
Wind 135 deg - Service		88.24	88.29	14768.58	-14760.22	18.04
Wind 150 deg - Service		63.29	109.69	18328.12	-10574.53	-23.67
Wind 180 deg - Service		0.01	123.06	20610.99	2.82	-96.21
Wind 210 deg - Service		-63.28	109.68	18325.80	10580.79	-150.15
Wind 225 deg - Service		-88.22	88.28	14765.30	14767.22	-157.04
Wind 240 deg - Service		-118.95	68.71	11404.89	19761.84	-179.88
Wind 270 deg - Service		-126.57	-0.01	-11.13	21160.46	-126.48
Wind 300 deg - Service		-106.51	-61.54	-10320.72	17848.85	-56.79

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 315 deg - Service		-88.24	-88.29	-14786.19	14770.51	-18.04
Wind 330 deg - Service		-63.29	-109.69	-18345.73	10584.81	23.67

Load Combinations

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

Comb. No.	Description
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	320 - 300	Leg	Max Tension	22	14.39	-0.29	0.17
			Max. Compression	19	-17.73	0.06	0.58
			Max. Mx	31	-1.46	-1.44	0.01
			Max. My	27	-5.43	0.05	1.42
			Max. Vy	23	1.57	-0.26	0.13
			Max. Vx	27	1.60	0.01	-0.33
		Diagonal	Max Tension	33	5.38	0.00	0.00
			Max. Compression	25	-5.41	0.00	0.00
			Max. Mx	23	3.66	0.01	0.00
			Max. My	24	-5.24	0.00	0.01
			Max. Vy	23	0.01	0.01	0.00
			Max. Vx	24	-0.00	0.00	0.01
		Top Girt	Max Tension	19	0.06	0.00	0.00
			Max. Compression	32	-0.08	0.00	0.00
			Max. Mx	18	-0.01	-0.02	0.00
			Max. My	19	-0.05	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T2	300 - 280	Leg	Max Tension	22	48.91	-0.19	-0.01
			Max. Compression	19	-55.38	0.85	-0.01
			Max. Mx	19	-55.38	0.85	-0.01
			Max. My	20	-2.56	-0.01	-0.51
			Max. Vy	24	-0.29	0.47	0.01
			Max. Vx	23	0.46	-0.03	0.32
		Diagonal	Max Tension	33	5.51	0.00	0.00
			Max. Compression	25	-5.56	0.00	0.00
			Max. Mx	32	3.56	0.02	-0.00
			Max. My	32	-5.09	0.01	-0.01
			Max. Vy	32	0.02	0.02	-0.00
			Max. Vx	32	0.00	0.00	0.00
		Top Girt	Max Tension	22	0.15	0.00	0.00
			Max. Compression	24	-0.16	0.00	0.00
			Max. Mx	18	-0.01	-0.03	0.00
			Max. My	19	0.07	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T3	280 - 260	Leg	Max Tension	22	81.54	-0.64	0.03
			Max. Compression	24	-93.92	1.37	0.11
			Max. Mx	32	80.29	-1.37	-0.11
			Max. My	23	-5.36	-0.01	1.42
			Max. Vy	27	-0.64	-0.81	0.02
			Max. Vx	31	-0.53	0.01	-0.51
		Diagonal	Max Tension	34	7.25	0.00	0.00
			Max. Compression	34	-7.30	0.00	0.00
			Max. Mx	33	4.17	0.03	-0.01
			Max. My	32	-5.85	0.02	-0.01
			Max. Vy	33	0.02	0.03	-0.01
			Max. Vx	32	0.00	0.00	0.00
T4	260 - 240	Leg	Max Tension	22	117.01	-0.66	0.02
			Max. Compression	24	-137.16	2.98	0.14
			Max. Mx	19	-136.39	2.99	-0.21
			Max. My	20	-8.99	0.05	-2.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	19	-0.59	2.99	-0.21
			Max. Vx	28	-0.47	0.05	2.24
		Diagonal	Max Tension	34	8.55	0.00	0.00
			Max. Compression	34	-8.64	0.00	0.00
			Max. Mx	27	6.12	0.06	0.01
			Max. My	26	-8.41	0.03	0.01
			Max. Vy	27	0.03	0.06	0.01
			Max. Vx	33	0.00	0.00	0.00
T5	240 - 220	Leg	Max Tension	22	153.57	-0.95	-0.06
			Max. Compression	24	-183.19	2.24	0.05
			Max. Mx	19	-150.61	2.99	-0.21
			Max. My	20	-9.34	0.04	-2.24
			Max. Vy	30	0.49	2.98	0.07
			Max. Vx	31	0.48	0.03	-1.16
		Diagonal	Max Tension	34	10.65	0.00	0.00
			Max. Compression	34	-10.70	0.00	0.00
			Max. Mx	27	7.61	0.12	0.02
			Max. My	19	-0.35	0.10	-0.02
			Max. Vy	27	0.06	0.12	0.02
			Max. Vx	27	-0.00	0.00	0.00
T6	220 - 200	Leg	Max Tension	22	194.08	-1.02	-0.21
			Max. Compression	24	-235.81	2.36	-0.10
			Max. Mx	19	-233.76	2.37	-0.12
			Max. My	20	-15.37	-0.15	-3.32
			Max. Vy	27	-2.60	-2.06	0.21
			Max. Vx	28	2.31	0.02	0.49
		Diagonal	Max Tension	34	15.54	0.00	0.00
			Max. Compression	34	-15.68	0.00	0.00
			Max. Mx	24	12.14	0.19	0.02
			Max. My	27	-12.42	0.10	0.04
			Max. Vy	21	0.08	0.19	-0.03
			Max. Vx	27	-0.01	0.00	0.00
T7	200 - 180	Leg	Max Tension	22	242.51	-2.62	-0.11
			Max. Compression	24	-297.40	2.81	-0.06
			Max. Mx	19	-294.53	2.81	-0.05
			Max. My	26	-16.67	-0.12	-2.99
			Max. Vy	32	-2.01	-2.11	0.08
			Max. Vx	28	1.83	0.08	0.16
		Diagonal	Max Tension	34	17.80	0.00	0.00
			Max. Compression	34	-17.93	0.00	0.00
			Max. Mx	27	12.44	0.22	0.03
			Max. My	27	-14.77	0.13	0.04
			Max. Vy	27	0.08	0.22	0.03
			Max. Vx	27	-0.01	0.00	0.00
T8	180 - 160	Leg	Max Tension	27	291.97	-2.72	-0.08
			Max. Compression	24	-359.23	5.63	-0.25
			Max. Mx	19	-355.49	5.64	-0.19
			Max. My	28	-26.81	0.16	4.18
			Max. Vy	19	-0.67	5.64	-0.19
			Max. Vx	30	-0.70	-2.58	3.94
		Diagonal	Max Tension	31	19.25	0.00	0.00
			Max. Compression	31	-19.54	0.00	0.00
			Max. Mx	27	13.68	0.25	0.03
			Max. My	21	-14.27	0.19	-0.05
			Max. Vy	27	0.09	0.25	0.03
			Max. Vx	21	0.01	0.00	0.00
T9	160 - 140	Leg	Max Tension	27	343.03	-2.34	0.07
			Max. Compression	24	-423.88	5.32	-0.11
			Max. Mx	19	-386.49	5.64	-0.19
			Max. My	28	-27.92	0.16	4.18
			Max. Vy	19	0.63	5.64	-0.19

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	28	0.65	-0.34	3.40
		Diagonal	Max Tension	31	22.24	0.00	0.00
			Max. Compression	31	-22.73	0.00	0.00
			Max. Mx	24	17.49	0.45	-0.04
			Max. My	21	-16.22	0.28	-0.07
			Max. Vy	21	0.14	0.44	-0.05
			Max. Vx	21	0.01	0.00	0.00
T10	140 - 120	Leg	Max Tension	27	391.19	-3.37	0.10
			Max. Compression	24	-486.83	-4.70	-0.07
			Max. Mx	24	-455.25	5.32	-0.11
			Max. My	28	-34.37	-0.23	5.38
			Max. Vy	19	0.99	3.10	-0.08
			Max. Vx	28	-0.85	-0.23	5.38
		Diagonal	Max Tension	31	23.01	0.00	0.00
			Max. Compression	30	-23.58	0.00	0.00
			Max. Mx	24	17.48	0.52	-0.06
			Max. My	22	-19.09	0.31	-0.10
			Max. Vy	28	0.15	0.49	0.07
			Max. Vx	22	0.01	0.00	0.00
T11	120 - 100	Leg	Max Tension	27	399.18	1.80	-0.01
			Max. Compression	24	-501.10	-13.03	-1.15
			Max. Mx	24	-500.10	19.46	0.80
			Max. My	28	-40.03	-2.86	15.17
			Max. Vy	24	3.41	19.46	0.81
			Max. Vx	28	-2.50	-2.86	15.17
		Diagonal	Max Tension	31	33.67	-0.16	-0.03
			Max. Compression	30	-36.11	0.00	0.00
			Max. Mx	31	14.27	-0.22	0.01
			Max. My	31	-35.04	-0.08	-0.15
			Max. Vy	31	0.06	-0.22	0.01
			Max. Vx	31	-0.01	0.00	0.00
		Horizontal	Max Tension	31	19.10	-0.21	0.00
			Max. Compression	31	-19.19	-0.22	0.00
			Max. Mx	27	-4.42	-0.28	-0.04
			Max. My	19	2.25	-0.14	0.04
			Max. Vy	27	0.09	-0.28	-0.04
			Max. Vx	19	-0.00	-0.14	0.04
		Redund Horz 1 Bracing	Max Tension	24	8.70	0.00	0.00
			Max. Compression	24	-8.70	0.00	0.00
			Max. Mx	18	0.68	0.02	0.00
			Max. My	20	7.15	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	20	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	7.89	0.00	0.00
			Max. Compression	24	-7.89	0.00	0.00
			Max. Mx	23	6.59	0.04	0.00
			Max. My	30	3.38	0.00	0.00
			Max. Vy	23	-0.02	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-0.09	0.00	0.00
			Max. Mx	18	-0.01	0.02	0.00
			Max. My	30	-0.05	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	23	0.16	0.00	0.00
			Max. Compression	30	-0.10	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	24	0.14	0.17	0.00
			Max. My	30	0.08	0.00	0.00
			Max. Vy	24	-0.04	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Inner Bracing	Max Tension	23	0.01	0.00	0.00
			Max. Compression	23	-0.04	0.00	0.00
			Max. Mx	18	-0.01	0.20	0.00
			Max. My	24	0.00	0.00	0.00
			Max. Vy	18	-0.06	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
T12	100 - 80	Leg	Max Tension	27	434.37	6.20	1.42
			Max. Compression	24	-549.13	-21.91	-0.50
			Max. Mx	24	-548.30	26.35	0.56
			Max. My	28	-41.79	-2.87	15.16
			Max. Vy	24	5.09	26.35	0.56
			Max. Vx	28	2.79	-2.87	15.16
		Diagonal	Max Tension	31	37.19	-0.34	-0.05
			Max. Compression	30	-40.20	0.00	0.00
			Max. Mx	27	27.62	-0.40	0.09
			Max. My	31	-38.96	-0.11	-0.16
			Max. Vy	27	0.11	-0.40	0.10
			Max. Vx	30	0.01	-0.07	-0.16
		Horizontal	Max Tension	31	21.31	-0.32	-0.00
			Max. Compression	30	-23.13	-0.37	-0.02
			Max. Mx	27	4.75	-0.40	-0.04
			Max. My	19	4.36	-0.24	0.05
			Max. Vy	27	-0.12	-0.40	-0.04
			Max. Vx	19	-0.00	-0.24	0.05
		Redund Horz 1 Bracing	Max Tension	24	9.53	0.00	0.00
			Max. Compression	24	-9.53	0.00	0.00
			Max. Mx	18	0.76	0.03	0.00
			Max. My	20	7.83	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	8.08	0.00	0.00
			Max. Compression	24	-8.08	0.00	0.00
			Max. Mx	23	6.74	0.06	0.00
			Max. My	30	3.97	0.00	0.00
			Max. Vy	23	-0.02	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-0.08	0.00	0.00
			Max. Mx	18	-0.01	0.03	0.00
			Max. My	30	-0.02	0.00	0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	23	0.12	0.00	0.00
			Max. Compression	30	-0.08	0.00	0.00
			Max. Mx	24	0.10	0.20	0.00
			Max. My	30	0.06	0.00	0.00
			Max. Vy	24	-0.05	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Inner Bracing	Max Tension	28	0.00	0.00	0.00
			Max. Compression	19	-0.03	0.00	0.00
			Max. Mx	18	-0.01	0.25	0.00
			Max. My	30	-0.00	0.00	0.00
			Max. Vy	18	-0.07	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	30	-0.00	0.00	0.00
T13	80 - 60	Leg	Max Tension	27	472.26	13.29	0.86
			Max. Compression	24	-601.48	-26.11	-0.61
			Max. Mx	24	-600.76	34.31	0.49
			Max. My	28	-49.92	-4.68	16.56
			Max. Vy	24	6.19	34.31	0.49
			Max. Vx	28	-2.53	-4.68	16.56
		Diagonal	Max Tension	31	35.76	-0.34	-0.04
			Max. Compression	30	-39.78	0.00	0.00
			Max. Mx	31	16.19	-0.40	0.03
			Max. My	31	-38.07	-0.18	-0.13
			Max. Vy	31	0.12	-0.40	0.03
			Max. Vx	31	0.01	-0.18	-0.13
		Horizontal	Max Tension	31	21.39	-0.38	-0.00
			Max. Compression	30	-23.01	-0.41	-0.02
			Max. Mx	27	5.20	-0.44	-0.04
			Max. My	19	4.38	-0.31	0.04
			Max. Vy	27	-0.13	-0.44	-0.04
			Max. Vx	19	-0.00	-0.31	0.04
		Redund Horz 1 Bracing	Max Tension	24	10.44	0.00	0.00
			Max. Compression	24	-10.44	0.00	0.00
			Max. Mx	18	0.85	0.04	0.00
			Max. My	20	8.57	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	20	0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	8.35	0.00	0.00
			Max. Compression	24	-8.35	0.00	0.00
			Max. Mx	23	6.96	0.07	0.00
			Max. My	30	4.33	0.00	0.00
			Max. Vy	23	-0.02	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	23	-0.07	0.00	0.00
			Max. Mx	18	-0.02	0.03	0.00
			Max. My	30	-0.02	0.00	0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	23	0.11	0.00	0.00
			Max. Compression	30	-0.09	0.00	0.00
			Max. Mx	24	0.10	0.29	0.00
			Max. My	30	0.06	0.00	0.00
			Max. Vy	24	-0.07	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-0.03	0.00	0.00
			Max. Mx	18	-0.02	0.29	0.00
			Max. My	30	-0.01	0.00	0.00
			Max. Vy	18	-0.08	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
T14	60 - 30	Leg	Max Tension	27	510.54	14.61	1.11
			Max. Compression	24	-655.14	6.05	0.71
			Max. Mx	24	-648.52	36.12	0.97
			Max. My	20	-56.83	-2.00	-28.47
			Max. Vy	24	6.22	36.12	0.97
			Max. Vx	20	4.08	-2.00	-28.47
		Diagonal	Max Tension	31	49.72	-0.26	-0.04
			Max. Compression	30	-54.55	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	27	38.47	-0.33	0.23
			Max. My	31	-49.68	0.13	-0.41
			Max. Vy	30	-0.08	-0.22	0.24
			Max. Vx	30	0.05	0.18	-0.40
		Horizontal	Max Tension	31	25.21	-0.55	-0.00
			Max. Compression	31	-25.47	-0.55	-0.00
			Max. Mx	27	-5.77	-0.68	-0.05
			Max. My	19	3.28	-0.40	0.06
			Max. Vy	27	0.17	-0.68	-0.05
			Max. Vx	19	-0.00	-0.40	0.06
		Redund Horz 1 Bracing	Max Tension	24	11.37	0.00	0.00
			Max. Compression	24	-11.37	0.00	0.00
			Max. Mx	18	0.98	0.02	0.00
			Max. My	30	-0.15	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Redund Horz 2 Bracing	Max Tension	24	11.37	0.00	0.00
			Max. Compression	24	-11.37	0.00	0.00
			Max. Mx	18	0.98	0.16	0.00
			Max. My	30	11.27	0.00	0.00
			Max. Vy	18	-0.06	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	11.47	0.00	0.00
			Max. Compression	24	-11.47	0.00	0.00
			Max. Mx	23	9.55	0.05	0.00
			Max. My	23	9.55	0.00	-0.00
			Max. Vy	23	-0.02	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
		Redund Diag 2 Bracing	Max Tension	24	7.44	0.00	0.00
			Max. Compression	24	-7.44	0.00	0.00
			Max. Mx	30	7.38	0.15	0.00
			Max. My	30	7.38	0.00	0.00
			Max. Vy	30	-0.04	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	23	0.02	0.00	0.00
			Max. Compression	23	-0.21	0.00	0.00
			Max. Mx	18	-0.01	0.02	0.00
			Max. My	30	-0.12	0.00	-0.00
			Max. Vy	18	-0.01	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Redund Hip 2 Bracing	Max Tension	27	0.02	0.00	0.00
			Max. Compression	27	-0.09	0.00	0.00
			Max. Mx	18	-0.01	0.08	0.00
			Max. My	28	-0.00	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	28	0.00	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	23	0.37	0.00	0.00
			Max. Compression	29	-0.14	0.00	0.00
			Max. Mx	30	0.12	0.18	0.00
			Max. My	20	-0.01	0.00	-0.00
			Max. Vy	30	0.04	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00
		Inner Bracing	Max Tension	21	0.03	0.00	0.00
			Max. Compression	31	-0.06	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	18	-0.01	0.34	0.00
			Max. My	30	0.03	0.00	0.00
			Max. Vy	18	0.08	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T15	30 - 0	Leg	Max Tension	27	567.43	17.97	2.97
			Max. Compression	24	-733.93	4.67	0.82
			Max. Mx	24	-730.80	32.89	1.35
			Max. My	20	-60.77	-2.00	-28.46
			Max. Vy	24	3.41	32.89	1.35
			Max. Vx	20	-3.89	-2.00	-28.46
		Diagonal	Max Tension	31	47.42	-0.24	-0.04
			Max. Compression	30	-50.82	0.00	0.00
			Max. Mx	27	33.82	-0.31	0.19
			Max. My	31	-47.44	0.06	-0.36
			Max. Vy	30	-0.08	-0.25	0.21
			Max. Vx	30	0.05	0.12	-0.35
		Horizontal	Max Tension	31	25.48	-0.55	0.00
			Max. Compression	30	-28.77	-0.62	-0.04
			Max. Mx	27	6.36	-0.67	-0.07
			Max. My	19	7.04	-0.44	0.08
			Max. Vy	27	-0.16	-0.67	-0.07
			Max. Vx	19	-0.00	-0.44	0.08
		Redund Horz 1 Bracing	Max Tension	24	12.74	0.00	0.00
			Max. Compression	24	-12.74	0.00	0.00
			Max. Mx	28	10.49	0.02	0.00
			Max. Vy	28	-0.01	0.00	0.00
		Redund Horz 2 Bracing	Max Tension	24	12.74	0.00	0.00
			Max. Compression	24	-12.74	0.00	0.00
			Max. Mx	26	1.02	0.18	0.00
			Max. My	22	-1.45	0.00	0.00
			Max. Vy	26	-0.06	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	24	11.85	0.00	0.00
			Max. Compression	24	-11.85	0.00	0.00
			Max. Mx	30	11.75	0.06	0.00
			Max. My	31	3.13	0.00	0.00
			Max. Vy	30	-0.02	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
		Redund Diag 2 Bracing	Max Tension	24	7.96	0.00	0.00
			Max. Compression	24	-7.96	0.00	0.00
			Max. Mx	30	7.89	0.18	0.00
			Max. My	23	3.18	0.00	-0.00
			Max. Vy	30	-0.05	0.00	0.00
			Max. Vx	23	0.00	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	23	0.02	0.00	0.00
			Max. Compression	23	-0.18	0.00	0.00
			Max. Mx	18	-0.01	0.02	0.00
			Max. Vy	18	-0.01	0.00	0.00
		Redund Hip 2 Bracing	Max Tension	27	0.02	0.00	0.00
			Max. Compression	32	-0.07	0.00	0.00
			Max. Mx	18	-0.02	0.10	0.00
			Max. My	20	-0.05	0.00	0.00
			Max. Vy	18	-0.03	0.00	0.00
		Redund Hip Diagonal Bracing	Max Tension	23	0.32	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	30	-0.14	0.00	0.00
			Max. Mx	30	0.11	0.31	0.00
			Max. My	21	0.22	0.00	-0.00
			Max. Vy	30	-0.06	0.00	0.00
			Max. Vx	21	0.00	0.00	0.00
		Inner Bracing	Max Tension	22	0.03	0.00	0.00
			Max. Compression	31	-0.06	0.00	0.00
			Max. Mx	18	-0.01	0.42	0.00
			Max. My	30	0.02	0.00	0.00
			Max. Vy	18	-0.09	0.00	0.00
			Max. Vx	30	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	796.18	86.19	-45.23
	Max. H_x	30	796.18	86.19	-45.23
	Max. H_z	21	-598.78	-67.94	38.83
	Min. Vert	22	-614.88	-71.33	37.00
	Min. H_x	22	-614.88	-71.33	37.00
	Min. H_z	30	796.18	86.19	-45.23
Leg B	Max. Vert	24	802.53	-84.99	-47.56
	Max. H_x	32	-608.74	70.03	39.04
	Max. H_z	33	-592.65	66.14	41.83
	Min. Vert	32	-608.74	70.03	39.04
	Min. H_x	24	802.53	-84.99	-47.56
	Min. H_z	24	802.53	-84.99	-47.56
Leg A	Max. Vert	19	793.68	2.62	97.25
	Max. H_x	31	59.16	9.86	5.40
	Max. H_z	19	793.68	2.62	97.25
	Min. Vert	27	-618.28	-2.41	-80.37
	Min. H_x	24	-308.27	-10.67	-41.25
	Min. H_z	27	-618.28	-2.41	-80.37

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	138.40	-0.00	-0.00	51.24	-45.90	0.00
Dead+Wind 0 deg - No Ice	138.40	-0.01	-137.41	-22503.37	-43.72	112.96
Dead+Wind 30 deg - No Ice	138.40	63.27	-109.66	-18064.24	-10495.72	150.35
Dead+Wind 45 deg - No Ice	138.40	88.21	-88.26	-14546.86	-14632.59	157.24
Dead+Wind 60 deg - No Ice	138.40	106.48	-61.51	-10134.33	-17675.71	153.19
Dead+Wind 90 deg - No Ice	138.40	126.55	0.01	53.25	-20948.65	126.61
Dead+Wind 120 deg - No Ice	138.40	118.94	68.71	11330.72	-19565.37	67.12
Dead+Wind 135 deg - No Ice	138.40	88.22	88.28	14652.90	-14635.08	18.06
Dead+Wind 150 deg - No Ice	138.40	63.28	109.67	18169.71	-10498.96	-23.70
Dead+Wind 180 deg - No Ice	138.40	0.01	123.04	20426.79	-48.31	-96.34
Dead+Wind 210 deg - No Ice	138.40	-63.27	109.66	18167.45	10402.95	-150.35
Dead+Wind 225 deg - No Ice	138.40	-88.21	88.26	14649.78	14540.02	-157.24

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 240 deg - No Ice	138.40	-118.93	68.70	11326.80	19471.05	-180.08
Dead+Wind 270 deg - No Ice	138.40	-126.55	-0.01	48.67	20856.64	-126.61
Dead+Wind 300 deg - No Ice	138.40	-106.49	-61.53	-10138.33	17586.01	-56.85
Dead+Wind 315 deg - No Ice	138.40	-88.22	-88.28	-14550.15	14543.86	-18.06
Dead+Wind 330 deg - No Ice	138.40	-63.28	-109.67	-18066.57	10407.67	23.70
Dead+Ice+Temp	189.39	-0.00	-0.00	142.25	-126.59	-0.00
Dead+Wind 0 deg+Ice+Temp	189.39	-0.01	-159.53	-25743.65	-124.86	189.40
Dead+Wind 30 deg+Ice+Temp	189.39	74.61	-129.32	-20963.85	-12302.92	249.59
Dead+Wind 45 deg+Ice+Temp	189.39	104.32	-104.38	-16911.95	-17168.89	259.26
Dead+Wind 60 deg+Ice+Temp	189.39	126.30	-72.96	-11790.16	-20781.03	251.09
Dead+Wind 90 deg+Ice+Temp	189.39	149.24	0.01	144.08	-24481.50	199.65
Dead+Wind 120 deg+Ice+Temp	189.39	138.09	79.77	13087.48	-22530.02	94.80
Dead+Wind 135 deg+Ice+Temp	189.39	104.33	104.39	17200.12	-17170.77	18.64
Dead+Wind 150 deg+Ice+Temp	189.39	74.63	129.33	21251.69	-12305.53	-49.87
Dead+Wind 180 deg+Ice+Temp	189.39	0.01	145.93	24011.70	-129.05	-167.39
Dead+Wind 210 deg+Ice+Temp	189.39	-74.61	129.32	21249.61	12047.96	-249.60
Dead+Wind 225 deg+Ice+Temp	189.39	-104.32	104.38	17197.19	16913.86	-259.25
Dead+Wind 240 deg+Ice+Temp	189.39	-138.08	79.76	13083.90	22273.97	-284.20
Dead+Wind 270 deg+Ice+Temp	189.39	-149.24	-0.01	139.89	24227.56	-199.65
Dead+Wind 300 deg+Ice+Temp	189.39	-126.31	-72.97	-11793.81	20529.23	-83.70
Dead+Wind 315 deg+Ice+Temp	189.39	-104.34	-104.39	-16914.93	16917.96	-18.64
Dead+Wind 330 deg+Ice+Temp	189.39	-74.63	-129.33	-20965.96	12052.65	49.87
Dead+Wind 0 deg - Service	138.40	-0.01	-137.41	-22503.37	-43.72	112.96
Dead+Wind 30 deg - Service	138.40	63.27	-109.66	-18064.24	-10495.72	150.35
Dead+Wind 45 deg - Service	138.40	88.21	-88.26	-14546.86	-14632.59	157.24
Dead+Wind 60 deg - Service	138.40	106.48	-61.51	-10134.33	-17675.71	153.19
Dead+Wind 90 deg - Service	138.40	126.55	0.01	53.25	-20948.65	126.61
Dead+Wind 120 deg - Service	138.40	118.94	68.71	11330.72	-19565.37	67.12
Dead+Wind 135 deg - Service	138.40	88.22	88.28	14652.90	-14635.08	18.06
Dead+Wind 150 deg - Service	138.40	63.28	109.67	18169.71	-10498.96	-23.70
Dead+Wind 180 deg - Service	138.40	0.01	123.04	20426.79	-48.31	-96.34
Dead+Wind 210 deg - Service	138.40	-63.27	109.66	18167.45	10402.95	-150.35
Dead+Wind 225 deg - Service	138.40	-88.21	88.26	14649.78	14540.02	-157.24
Dead+Wind 240 deg - Service	138.40	-118.93	68.70	11326.80	19471.05	-180.08
Dead+Wind 270 deg - Service	138.40	-126.55	-0.01	48.67	20856.64	-126.61
Dead+Wind 300 deg - Service	138.40	-106.49	-61.53	-10138.33	17586.01	-56.85
Dead+Wind 315 deg - Service	138.40	-88.22	-88.28	-14550.15	14543.86	-18.06
Dead+Wind 330 deg - Service	138.40	-63.28	-109.67	-18066.57	10407.67	23.70

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-138.40	0.00	0.00	138.40	0.00	0.000%
2	-0.01	-138.40	-137.43	0.01	138.40	137.41	0.012%
3	63.28	-138.40	-109.68	-63.27	138.40	109.66	0.011%
4	88.22	-138.40	-88.28	-88.21	138.40	88.26	0.011%
5	106.50	-138.40	-61.52	-106.48	138.40	61.51	0.011%
6	126.57	-138.40	0.01	-126.55	138.40	-0.01	0.011%
7	118.96	-138.40	68.73	-118.94	138.40	-68.71	0.012%
8	88.24	-138.40	88.29	-88.22	138.40	-88.28	0.012%
9	63.29	-138.40	109.69	-63.28	138.40	-109.67	0.011%
10	0.01	-138.40	123.06	-0.01	138.40	-123.04	0.011%
11	-63.28	-138.40	109.68	63.27	138.40	-109.66	0.011%
12	-88.22	-138.40	88.28	88.21	138.40	-88.26	0.012%
13	-118.95	-138.40	68.71	118.93	138.40	-68.70	0.012%
14	-126.57	-138.40	-0.01	126.55	138.40	0.01	0.011%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
15	-106.51	-138.40	-61.54	106.49	138.40	61.53	0.011%
16	-88.24	-138.40	-88.29	88.22	138.40	88.28	0.011%
17	-63.29	-138.40	-109.69	63.28	138.40	109.67	0.011%
18	0.00	-189.39	0.00	0.00	189.39	0.00	0.000%
19	-0.01	-189.39	-159.57	0.01	189.39	159.53	0.015%
20	74.63	-189.39	-129.35	-74.61	189.39	129.32	0.014%
21	104.35	-189.39	-104.41	-104.32	189.39	104.38	0.014%
22	126.33	-189.39	-72.97	-126.30	189.39	72.96	0.014%
23	149.28	-189.39	0.01	-149.24	189.39	-0.01	0.015%
24	138.13	-189.39	79.79	-138.09	189.39	-79.77	0.016%
25	104.36	-189.39	104.42	-104.33	189.39	-104.39	0.015%
26	74.65	-189.39	129.36	-74.63	189.39	-129.33	0.015%
27	0.01	-189.39	145.96	-0.01	189.39	-145.93	0.014%
28	-74.63	-189.39	129.35	74.61	189.39	-129.32	0.014%
29	-104.35	-189.39	104.41	104.32	189.39	-104.38	0.015%
30	-138.12	-189.39	79.78	138.08	189.39	-79.76	0.016%
31	-149.28	-189.39	-0.01	149.24	189.39	0.01	0.014%
32	-126.34	-189.39	-72.99	126.31	189.39	72.97	0.014%
33	-104.36	-189.39	-104.42	104.34	189.39	104.39	0.014%
34	-74.65	-189.39	-129.36	74.63	189.39	129.33	0.014%
35	-0.01	-138.40	-137.43	0.01	138.40	137.41	0.012%
36	63.28	-138.40	-109.68	-63.27	138.40	109.66	0.011%
37	88.22	-138.40	-88.28	-88.21	138.40	88.26	0.011%
38	106.50	-138.40	-61.52	-106.48	138.40	61.51	0.011%
39	126.57	-138.40	0.01	-126.55	138.40	-0.01	0.011%
40	118.96	-138.40	68.73	-118.94	138.40	-68.71	0.012%
41	88.24	-138.40	88.29	-88.22	138.40	-88.28	0.012%
42	63.29	-138.40	109.69	-63.28	138.40	-109.67	0.011%
43	0.01	-138.40	123.06	-0.01	138.40	-123.04	0.011%
44	-63.28	-138.40	109.68	63.27	138.40	-109.66	0.011%
45	-88.22	-138.40	88.28	88.21	138.40	-88.26	0.012%
46	-118.95	-138.40	68.71	118.93	138.40	-68.70	0.012%
47	-126.57	-138.40	-0.01	126.55	138.40	0.01	0.011%
48	-106.51	-138.40	-61.54	106.49	138.40	61.53	0.011%
49	-88.24	-138.40	-88.29	88.22	138.40	88.28	0.011%
50	-63.29	-138.40	-109.69	63.28	138.40	109.67	0.011%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00021415	0.00044561
3	Yes	4	0.00019971	0.00041590
4	Yes	4	0.00019006	0.00039583
5	Yes	4	0.00018636	0.00038814
6	Yes	4	0.00020056	0.00041761
7	Yes	4	0.00021446	0.00044608
8	Yes	4	0.00020964	0.00043653
9	Yes	4	0.00020057	0.00041754
10	Yes	4	0.00018629	0.00038791
11	Yes	4	0.00019927	0.00041487
12	Yes	4	0.00020865	0.00043448
13	Yes	4	0.00021482	0.00044686
14	Yes	4	0.00020141	0.00041947
15	Yes	4	0.00018629	0.00038809

16	Yes	4	0.00018986	0.00039549
17	Yes	4	0.00019964	0.00041582
18	Yes	4	0.00000001	0.00000307
19	Yes	4	0.00029508	0.00061375
20	Yes	4	0.00027809	0.00057878
21	Yes	4	0.00026694	0.00055553
22	Yes	4	0.00026298	0.00054728
23	Yes	4	0.00028015	0.00058274
24	Yes	4	0.00029600	0.00061507
25	Yes	4	0.00029044	0.00060411
26	Yes	4	0.00027961	0.00058141
27	Yes	4	0.00026259	0.00054616
28	Yes	4	0.00027789	0.00057799
29	Yes	4	0.00028969	0.00060274
30	Yes	4	0.00029671	0.00061674
31	Yes	4	0.00028095	0.00058473
32	Yes	4	0.00026227	0.00054612
33	Yes	4	0.00026635	0.00055458
34	Yes	4	0.00027798	0.00057875
35	Yes	4	0.00021415	0.00044561
36	Yes	4	0.00019971	0.00041590
37	Yes	4	0.00019006	0.00039583
38	Yes	4	0.00018636	0.00038814
39	Yes	4	0.00020056	0.00041761
40	Yes	4	0.00021446	0.00044608
41	Yes	4	0.00020964	0.00043653
42	Yes	4	0.00020057	0.00041754
43	Yes	4	0.00018629	0.00038791
44	Yes	4	0.00019927	0.00041487
45	Yes	4	0.00020865	0.00043448
46	Yes	4	0.00021482	0.00044686
47	Yes	4	0.00020141	0.00041947
48	Yes	4	0.00018629	0.00038809
49	Yes	4	0.00018986	0.00039549
50	Yes	4	0.00019964	0.00041582

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	320 - 300	20.581	40	0.5181	0.0985
T2	300 - 280	18.358	40	0.5090	0.0930
T3	280 - 260	16.197	40	0.4790	0.0900
T4	260 - 240	14.142	40	0.4612	0.0947
T5	240 - 220	12.165	40	0.4372	0.0966
T6	220 - 200	10.320	40	0.4073	0.0957
T7	200 - 180	8.603	40	0.3726	0.0931
T8	180 - 160	7.008	40	0.3393	0.0878
T9	160 - 140	5.544	40	0.3027	0.0807
T10	140 - 120	4.262	40	0.2621	0.0746
T11	120 - 100	3.151	40	0.2192	0.0675
T12	100 - 80	2.201	40	0.1783	0.0517
T13	80 - 60	1.498	40	0.1355	0.0439
T14	60 - 30	0.960	35	0.0977	0.0363
T15	30 - 0	0.339	35	0.0437	0.0182

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
320.00	Dual Lights	40	20.581	0.5181	0.0985	310926
316.00	PD128-1	40	20.134	0.5175	0.0943	310926
315.00	P8F-21C	40	20.023	0.5173	0.0942	310926
305.00	PA6-65AC	40	18.910	0.5134	0.0935	103642
294.00	PD340-1	40	17.700	0.5009	0.0923	57869
292.00	PD1142-1	40	17.482	0.4977	0.0921	53327
287.00	SC479-HF1LDF	40	16.942	0.4895	0.0913	44580
280.00	SC479-HF1LDF	40	16.197	0.4790	0.0900	38144
274.67	DB810K-XT	40	15.640	0.4731	0.0888	43782
273.00	SC479-HF1LDF	40	15.467	0.4716	0.0888	46747
269.33	DB810K-XT	40	15.090	0.4686	0.0910	54934
266.00	SC479-HF1LDF	40	14.750	0.4660	0.0926	65335
264.00	DB810K-XT	40	14.546	0.4645	0.0934	73639
257.00	PD440-2	40	13.840	0.4583	0.0953	74810
243.00	PD1142-1	40	12.454	0.4413	0.0966	34450
227.00	531-70HD Exposed Dipole Antenna	40	10.950	0.4184	0.0962	36072
220.00	Mounting Frame	40	10.320	0.4073	0.0957	39263
200.00	PiROD 12' Lightweight T-Frame	40	8.603	0.3726	0.0931	38500
192.00	1151-3	40	7.951	0.3592	0.0913	39769
186.00	1151-3	40	7.474	0.3494	0.0897	40956
180.00	6' Side Mount Standoff	40	7.008	0.3393	0.0878	40729
175.00	DB586-Y	40	6.628	0.3306	0.0861	35378
172.50	DB586-Y	40	6.441	0.3261	0.0852	32728
170.00	DB586-Y	40	6.256	0.3216	0.0843	30447
167.50	DB586-Y	40	6.074	0.3170	0.0834	28463
166.00	PA6-65AC	40	5.966	0.3142	0.0828	27393
165.00	DB586-Y	40	5.894	0.3123	0.0825	26722
140.00	DB212-1	40	4.262	0.2621	0.0746	27542
138.00	PD156S	40	4.144	0.2579	0.0741	28270
112.00	Andrew 2' w/Radome	40	2.746	0.2028	0.0614	24692
100.00	Andrew 6' w/Radome	40	2.201	0.1783	0.0517	16541
97.00	P6F-21C	40	2.080	0.1719	0.0500	17131
90.00	P4F-21D	40	1.821	0.1567	0.0469	21155

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	320 - 300	23.711	24	0.5968	0.1464
T2	300 - 280	21.153	24	0.5863	0.1453
T3	280 - 260	18.664	24	0.5525	0.1488
T4	260 - 240	16.292	24	0.5323	0.1571
T5	240 - 220	14.010	24	0.5047	0.1557
T6	220 - 200	11.881	24	0.4702	0.1519
T7	200 - 180	9.900	24	0.4300	0.1465
T8	180 - 160	8.061	24	0.3914	0.1376
T9	160 - 140	6.374	24	0.3491	0.1265
T10	140 - 120	4.898	24	0.3022	0.1171
T11	120 - 100	3.619	24	0.2527	0.1064
T12	100 - 80	2.530	24	0.2054	0.0827
T13	80 - 60	1.724	24	0.1561	0.0701
T14	60 - 30	1.107	19	0.1125	0.0577

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T15	30 - 0	0.393	19	0.0504	0.0289

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
320.00	Dual Lights	24	23.711	0.5968	0.1464	259997
316.00	PD128-1	24	23.197	0.5961	0.1463	259997
315.00	P8F-21C	24	23.069	0.5959	0.1462	259997
305.00	PA6-65AC	24	21.788	0.5913	0.1457	86665
294.00	PD340-1	24	20.395	0.5771	0.1447	50673
292.00	PD1142-1	24	20.145	0.5736	0.1444	47205
287.00	SC479-HF1LDF	24	19.523	0.5643	0.1444	40309
280.00	SC479-HF1LDF	24	18.664	0.5525	0.1488	35079
274.67	DB810K-XT	24	18.021	0.5459	0.1509	39909
273.00	SC479-HF1LDF	24	17.822	0.5442	0.1521	42452
269.33	DB810K-XT	24	17.387	0.5408	0.1542	49374
266.00	SC479-HF1LDF	24	16.994	0.5379	0.1556	57967
264.00	DB810K-XT	24	16.759	0.5361	0.1563	64666
257.00	PD440-2	24	15.943	0.5290	0.1574	63968
243.00	PD1142-1	24	14.344	0.5094	0.1562	29860
227.00	531-70HD Exposed Dipole Antenna	24	12.608	0.4830	0.1533	30958
220.00	Mounting Frame	24	11.881	0.4702	0.1519	33492
200.00	PiROD 12' Lightweight T-Frame	24	9.900	0.4300	0.1465	33376
192.00	1151-3	24	9.148	0.4145	0.1434	34330
186.00	1151-3	24	8.598	0.4031	0.1407	35197
180.00	6' Side Mount Standoff	24	8.061	0.3914	0.1376	34883
175.00	DB586-Y	24	7.623	0.3814	0.1349	30361
172.50	DB586-Y	24	7.407	0.3762	0.1335	28123
170.00	DB586-Y	24	7.195	0.3709	0.1321	26192
167.50	DB586-Y	24	6.985	0.3656	0.1307	24509
166.00	PA6-65AC	24	6.860	0.3624	0.1298	23600
165.00	DB586-Y	24	6.778	0.3602	0.1292	23030
140.00	DB212-1	24	4.898	0.3022	0.1171	24066
138.00	PD156S	24	4.762	0.2973	0.1164	24632
112.00	Andrew 2' w/Radome	24	3.155	0.2338	0.0973	21190
100.00	Andrew 6' w/Radome	24	2.530	0.2054	0.0827	14612
97.00	P6F-21C	24	2.391	0.1980	0.0800	15142
90.00	P4F-21D	24	2.095	0.1805	0.0751	18619

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	320	Leg	A325N	1.0000	6	2.40	34.56	0.069 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.6250	1	5.38	5.10	1.055 ✔	1.333	Member Bearing
T2	300	Leg	A325N	1.0000	8	6.11	34.56	0.177 ✔	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325X	0.6250	1	5.51	6.80	0.811 ✔	1.333	Member Bearing
T3	280	Leg	A325N	1.0000	8	10.19	34.56	0.295 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	7.25	8.16	0.889 ✔	1.333	Member Bearing
T4	260	Leg	A325N	1.0000	8	14.63	34.56	0.423 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	8.55	9.14	0.935 ✔	1.333	Member Bearing
T5	240	Leg	A325N	1.0000	8	19.20	34.56	0.555 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.65	11.43	0.932 ✔	1.333	Member Bearing
T6	220	Leg	A325N	1.0000	12	16.17	34.56	0.468 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	15.68	13.25	1.183 ✔	1.333	Bolt Shear
T7	200	Leg	A325N	1.0000	12	20.21	34.56	0.585 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	1	17.80	16.00	1.113 ✔	1.333	Member Bearing
T8	180	Leg	A325N	1.0000	12	24.33	34.56	0.704 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	1	19.25	16.00	1.204 ✔	1.333	Member Bearing
T9	160	Leg	A325N	1.0000	12	28.59	34.56	0.827 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	1	22.73	18.04	1.260 ✔	1.333	Bolt Shear
T10	140	Leg	A325N	1.0000	12	32.60	34.56	0.943 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	1	23.58	18.04	1.307 ✔	1.333	Bolt Shear
T11	120	Leg	A325N	1.0000	12	33.18	34.56	0.960 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	3	12.04	13.25	0.908 ✔	1.333	Bolt Shear
		Horizontal	A325X	0.7500	2	9.59	13.25	0.724 ✔	1.333	Bolt Shear
T12	100	Leg	A325N	1.0000	16	27.02	34.55	0.782 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	3	13.40	13.25	1.011 ✔	1.333	Bolt Shear
		Horizontal	A325X	0.7500	2	11.56	13.25	0.872 ✔	1.333	Bolt Shear
T13	80	Leg	A325N	1.0000	16	29.42	34.55	0.852 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.7500	3	13.26	13.25	1.001 ✔	1.333	Bolt Shear
		Horizontal	A325X	0.7500	2	11.50	13.25	0.868 ✔	1.333	Bolt Shear
T14	60	Leg	A325N	1.0000	16	31.26	34.55	0.905 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	3	18.18	18.04	1.008 ✔	1.333	Bolt Shear
		Horizontal	A325X	0.7500	2	12.74	13.25	0.961 ✔	1.333	Bolt Shear
T15	30	Leg	A325N	1.0000	24	23.31	34.56	0.675 ✔	1.333	Bolt Tension
		Diagonal	A325X	0.8750	3	16.94	18.04	0.939 ✔	1.333	Bolt Shear
		Horizontal	A325X	0.7500	2	14.39	13.25	1.085 ✔	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	320 - 300	ROHN 5 EH	20.00	4.00	26.1 K=1.00	27.622	6.1120	-17.73	168.82	0.105 ✓
T2	300 - 280	ROHN 6 EH	20.03	5.01	27.4 K=1.00	27.470	8.4049	-55.38	230.89	0.240 ✓
T3	280 - 260	ROHN 8 EH w/ angle 8x8x0.5	20.04	6.68	27.0 K=1.00	27.519	20.5036	-93.92	564.24	0.166 ✓
T4	260 - 240	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0 K=1.00	27.520	20.5036	-137.16	564.25	0.243 ✓
T5	240 - 220	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0 K=1.00	27.520	20.5036	-183.19	564.26	0.325 ✓
T6	220 - 200	ROHN 8 EH w/ angle 8x8x0.5	20.03	10.02	40.4 K=1.00	25.769	20.5036	-235.82	528.36	0.446 ✓
T7	200 - 180	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6 K=1.00	26.561	23.8453	-297.40	633.35	0.470 ✓
T8	180 - 160	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6 K=1.00	26.561	23.8453	-359.23	633.36	0.567 ✓
T9	160 - 140	ROHN 10 EH w/ angle 8x8x0.5	20.03	10.02	34.6 K=1.00	26.563	23.8453	-423.88	633.39	0.669 ✓
T10	140 - 120	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6 K=1.00	26.561	23.8453	-486.83	633.34	0.769 ✓
T11	120 - 100	ROHN 10 EH w/ angle 8x8x0.5	20.06	10.03	34.7 K=1.00	26.557	23.8453	-501.10	633.26	0.791 ✓
T12	100 - 80	ROHN 10 EH w/ angle 8x8x0.5	20.05	10.03	34.7 K=1.00	26.558	23.8453	-549.13	633.28	0.867 ✓
T13	80 - 60	ROHN 12 EH w/ angle 8x8x0.5	20.06	10.03	29.9 K=1.00	27.163	26.9670	-601.48	732.50	0.821 ✓
T14	60 - 30	ROHN 12 EH w/ angle 8x8x0.5	30.07	10.02	29.9 K=1.00	27.165	26.9670	-655.14	732.55	0.894 ✓
T15	30 - 0	ROHN 12 EHS w Angle 8x8x0.625	30.08	10.03	30.2 K=1.00	27.128	33.3120	-733.93	903.67	0.812 ✓

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	320 - 300	L1 3/4x1 3/4x3/16	7.90	3.56	124.4 K=1.00	9.644	0.6211	-5.41	5.99	0.903 ✓
T2	300 - 280	L2x2x1/4	9.94	4.68	143.7 K=1.00	7.236	0.9380	-5.56	6.79	0.818 ✓
T3	280 - 260	L2 1/2x2 1/2x1/4	12.59	5.83	142.4 K=1.00	7.359	1.1900	-7.30	8.76	0.834 ✓
T4	260 - 240	L3x3x1/4	14.38	6.72	136.3 K=1.00	8.036	1.4400	-8.64	11.57	0.747 ✓
T5	240 - 220	L4x4x5/16	16.19	7.64	116.9 K=1.01	10.928	2.4000	-10.70	26.23	0.408 ✓
T6	220 - 200	L4x4x3/8	19.37	9.30	141.7 K=1.00	7.440	2.8600	-15.68	21.28	0.737 ✓
T7	200 - 180	L4x4x3/8	21.20	10.21	155.6 K=1.00	6.171	2.8600	-17.93	17.65	1.016 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T8	180 - 160	L4x4x3/8	23.06	11.15	169.7 K=1.00	5.183	2.8600	-19.54	14.82	1.318 ✔
T9	160 - 140	L5x5x7/16	24.84	12.01	146.2 K=1.00	6.986	4.1800	-22.73	29.20	0.778 ✔
T10	140 - 120	L5x5x7/16	26.78	13.03	158.5 K=1.00	5.941	4.1800	-23.58	24.84	0.949 ✔
T11	120 - 100	ROHN 3 EH	24.42	12.21	122.5 K=0.95	9.956	3.0159	-36.11	30.03	1.203 ✔
T12	100 - 80	ROHN 3 XXS	25.15	12.58	136.9 K=0.95	7.965	5.4664	-40.20	43.54	0.923 ✔
T13	80 - 60	ROHN 3 XXS	25.98	12.99	141.5 K=0.95	7.463	5.4664	-39.78	40.79	0.975 ✔
T14	60 - 30	ROHN 3.5 EH	35.21	11.74	107.8 K=1.00	12.854	3.6784	-54.55	47.28	1.154 ✔
T15	30 - 0	ROHN 3.5 EH	36.27	12.09	111.0 K=1.00	12.116	3.6784	-50.82	44.57	1.140 ✔

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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 3 STD	25.39	12.22	126.1 K=1.00	9.397	2.2285	-19.19	20.94	0.916 ✔
T12	100 - 80	ROHN 3 EH	27.97	13.51	142.7 K=1.00	7.333	3.0159	-23.13	22.11	1.046 ✔
T13	80 - 60	ROHN 3 EH	30.47	14.76	155.9 K=1.00	6.143	3.0159	-23.01	18.53	1.242 ✔
T14	60 - 30	ROHN 3.5 EH	33.14	16.04	147.3 K=1.00	6.883	3.6784	-25.47	25.32	1.006 ✔
T15	30 - 0	ROHN 4 STD	36.80	17.87	142.0 K=1.00	7.401	3.1741	-28.77	23.49	1.225 ✔

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	320 - 300	L1 3/4x1 3/4x3/16	6.81	6.35	182.6 K=0.82	4.480	0.6211	-0.08	2.78	0.029 ✔
T2	300 - 280	L2x2x1/4	6.81	6.35	166.0 K=0.85	5.420	0.9380	-0.16	5.08	0.032 ✔

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T11	120 - 100	ROHN 1.5 STD	6.35	5.88	113.3 K=1.00	11.642	0.7995	-8.70	9.31	0.934 ✓
T12	100 - 80	ROHN 1.5 STD	6.99	6.52	125.7 K=1.00	9.453	0.7995	-9.53	7.56	1.261 ✓
T13	80 - 60	ROHN 2 STD	7.62	7.09	108.0 K=1.00	12.795	1.0745	-10.44	13.75	0.759 ✓
T14	60 - 30	ROHN 1.5 STD	5.52	4.99	96.2 K=1.00	15.570	0.7995	-11.37	12.45	0.913 ✓
T15	30 - 0	ROHN 1.5 STD	6.13	5.60	108.0 K=1.00	12.809	0.7995	-12.74	10.24	1.244 ✓

Redundant Horizontal (2) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T14	60 - 30	ROHN 2 XXS	11.05	10.52	179.6 K=1.00	4.630	2.6559	-11.37	12.30	0.924 ✓
T15	30 - 0	ROHN 2.5 EH	12.27	11.74	152.4 K=1.00	6.430	2.2535	-12.74	14.49	0.879 ✓

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T11	120 - 100	ROHN 2 STD	11.52	10.57	161.1 K=1.00	5.753	1.0745	-7.89	6.18	1.276 ✓
T12	100 - 80	ROHN 2 EH	11.86	10.98	171.6 K=1.00	5.073	1.4807	-8.08	7.51	1.076 ✓
T13	80 - 60	ROHN 2 EH	12.18	11.36	177.4 K=1.00	4.744	1.4807	-8.35	7.02	1.189 ✓
T14	60 - 30	ROHN 2 EH	11.15	9.95	155.3 K=1.00	6.188	1.4807	-11.47	9.16	1.252 ✓
T15	30 - 0	ROHN 2.5 STD	11.41	10.31	130.6 K=1.00	8.759	1.7040	-11.85	14.93	0.794 ✓

Redundant Diagonal (2) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T14	60 - 30	ROHN 2.5 STD	14.46	13.72	173.8 K=1.00	4.943	1.7040	-7.44	8.42	0.883

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 $\frac{P}{P_a}$
T15	30 - 0	ROHN 2.5 STD	15.33	14.63	185.3 K=1.00	4.347	1.7040	-7.96	7.41	1.075 ✔

Redundant Hip (1) 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 1.5 STD	6.35	6.35	122.3 K=1.00	9.977	0.7995	-0.09	7.98	0.011 ✔
T12	100 - 80	ROHN 1.5 STD	6.99	6.99	134.8 K=1.00	8.221	0.7995	-0.08	6.57	0.013 ✔
T13	80 - 60	ROHN 1.5 STD	7.62	7.62	146.8 K=1.00	6.928	0.7995	-0.07	5.54	0.013 ✔
T14	60 - 30	ROHN 1.5 STD	5.52	5.52	106.5 K=1.00	13.175	0.7995	-0.21	10.53	0.020 ✔
T15	30 - 0	ROHN 1.5 STD	6.13	6.13	118.2 K=1.00	10.686	0.7995	-0.18	8.54	0.021 ✔

Redundant Hip (2) 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 $\frac{P}{P_a}$
T14	60 - 30	ROHN 2 STD	11.05	11.05	168.4 K=1.00	5.265	1.0745	-0.09	5.66	0.015 ✔
T15	30 - 0	ROHN 2 STD	12.27	12.27	187.0 K=1.00	4.270	1.0745	-0.07	4.59	0.015 ✔

Redundant Hip 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 2.5 STD	15.15	15.15	191.9 K=1.00	4.054	1.7040	-0.10	6.91	0.015 ✔
T12	100 - 80	ROHN 2.5 STD	16.00	16.00	202.6 K=1.00	3.637	1.7040	-0.08	6.20	0.014 ✔
T13	80 - 60	ROHN 3 STD	16.88	16.88	174.1 K=1.00	4.929	2.2285	-0.09	10.98	0.008 ✔
T14	60 - 30	ROHN 2 STD	17.91	17.91	273.1 K=1.00	2.003	1.0745	-0.12	2.15	0.056 ✔

KL/R > 250 (C) - 351

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 $\frac{P}{P_a}$
T15	30 - 0	ROHN 2.5 STD	19.28	19.28	244.2 K=1.00	2.503	1.7040	-0.12	4.27	0.027 ✔

Inner Bracing 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 3 STD	12.69	12.69	130.9 K=1.00	8.712	2.2285	-0.04	19.41	0.002 ✔
T12	100 - 80	ROHN 3 STD	13.99	13.99	144.2 K=1.00	7.179	2.2285	-0.03	16.00	0.002 ✔
T13	80 - 60	ROHN 3 STD	15.24	15.24	157.1 K=1.00	6.049	2.2285	-0.03	13.48	0.002 ✔
T14	60 - 30	ROHN 3 STD	16.57	16.57	170.9 K=1.00	5.114	2.2285	-0.06	11.40	0.005 ✔
T15	30 - 0	ROHN 3 STD	18.40	18.40	189.8 K=1.00	4.147	2.2285	-0.06	9.24	0.007 ✔

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	320 - 300	ROHN 5 EH	20.00	4.00	26.1	30.000	6.1120	14.39	183.36	0.078 ✔
T2	300 - 280	ROHN 6 EH	20.03	5.01	27.4	30.000	8.4049	48.91	252.15	0.194 ✔
T3	280 - 260	ROHN 8 EH w/ angle 8x8x0.5	20.04	6.68	27.0	30.000	20.5036	81.54	615.11	0.133 ✔
T4	260 - 240	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0	30.000	20.5036	117.01	615.11	0.190 ✔
T5	240 - 220	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0	30.000	20.5036	153.57	615.11	0.250 ✔
T6	220 - 200	ROHN 8 EH w/ angle 8x8x0.5	20.03	10.02	40.4	30.000	20.5036	194.08	615.11	0.316 ✔
T7	200 - 180	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6	30.000	23.8453	242.51	715.36	0.339 ✔
T8	180 - 160	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6	30.000	23.8453	291.93	715.36	0.408 ✔
T9	160 - 140	ROHN 10 EH w/ angle 8x8x0.5	20.03	10.02	34.6	30.000	23.8453	343.03	715.36	0.480 ✔
T10	140 - 120	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6	30.000	23.8453	391.19	715.36	0.547

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T11	120 - 100	ROHN 10 EH w/ angle 8x8x0.5	20.06	10.03	34.7	30.000	23.8453	399.18	715.36	0.558 ✔
T12	100 - 80	ROHN 10 EH w/ angle 8x8x0.5	20.05	10.03	34.7	30.000	23.8453	434.37	715.36	0.607 ✔
T13	80 - 60	ROHN 12 EH w/ angle 8x8x0.5	20.06	10.03	29.9	30.000	26.9670	472.26	809.01	0.584 ✔
T14	60 - 30	ROHN 12 EH w/ angle 8x8x0.5	30.07	10.02	29.9	30.000	26.9670	510.54	809.01	0.631 ✔
T15	30 - 0	ROHN 12 EHS w Angle 8x8x0.625	30.08	10.03	30.2	30.000	33.3120	567.43	999.36	0.568 ✔

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 P / P_a
T1	320 - 300	L1 3/4x1 3/4x3/16	7.90	3.56	82.2	29.000	0.3604	5.38	10.45	0.515 ✔
T2	300 - 280	L2x2x1/4	9.51	4.46	90.3	29.000	0.5629	5.51	16.32	0.338 ✔
T3	280 - 260	L2 1/2x2 1/2x1/4	12.59	5.83	93.1	29.000	0.7284	7.25	21.12	0.343 ✔
T4	260 - 240	L3x3x1/4	14.38	6.72	88.5	32.500	0.9159	8.55	29.77	0.287 ✔
T5	240 - 220	L4x4x5/16	16.19	7.64	75.2	32.500	1.5949	10.65	51.84	0.205 ✔
T6	220 - 200	L4x4x3/8	19.37	9.30	92.1	32.500	1.8989	15.54	61.71	0.252 ✔
T7	200 - 180	L4x4x3/8	21.20	10.21	101.1	32.500	1.8637	17.80	60.57	0.294 ✔
T8	180 - 160	L4x4x3/8	23.06	11.15	110.2	32.500	1.8637	19.25	60.57	0.318 ✔
T9	160 - 140	L5x5x7/16	24.84	12.01	94.2	32.500	2.8069	22.24	91.22	0.244 ✔
T10	140 - 120	L5x5x7/16	26.78	13.03	102.0	32.500	2.8069	23.01	91.22	0.252 ✔
T11	120 - 100	ROHN 3 EH	24.42	12.21	128.9	30.000	3.0159	33.67	90.48	0.372 ✔
T12	100 - 80	ROHN 3 XXS	25.15	12.58	144.1	30.000	5.4664	37.19	163.99	0.227 ✔
T13	80 - 60	ROHN 3 XXS	25.98	12.99	148.9	30.000	5.4664	35.76	163.99	0.218 ✔
T14	60 - 30	ROHN 3.5 EH	35.21	11.74	107.8	30.000	3.6784	49.72	110.35	0.451 ✔
T15	30 - 0	ROHN 3.5 EH	36.27	12.09	111.0	30.000	3.6784	47.42	110.35	0.430 ✔

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T11	120 - 100	ROHN 3 STD	25.39	12.22	126.1	30.000	2.2285	19.10	66.85	0.286 ✔
T12	100 - 80	ROHN 3 EH	27.97	13.51	142.7	30.000	3.0159	21.31	90.48	0.236 ✔
T13	80 - 60	ROHN 3 EH	30.47	14.76	155.9	30.000	3.0159	21.39	90.48	0.236 ✔
T14	60 - 30	ROHN 3.5 EH	33.14	16.04	147.3	30.000	3.6784	25.21	110.35	0.228 ✔
T15	30 - 0	ROHN 4 STD	36.80	17.87	142.0	30.000	3.1741	25.48	95.22	0.268 ✔

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T1	320 - 300	L1 3/4x1 3/4x3/16	6.81	6.35	141.8	21.600	0.6211	0.06	13.42	0.004 ✔
T2	300 - 280	L2x2x1/4	6.81	6.35	125.1	21.600	0.9380	0.15	20.26	0.008 ✔

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
T11	120 - 100	ROHN 1.5 STD	6.35	5.88	113.3	30.000	0.7995	8.70	23.98	0.363 ✔
T12	100 - 80	ROHN 1.5 STD	6.99	6.52	125.7	30.000	0.7995	9.53	23.98	0.397 ✔
T13	80 - 60	ROHN 2 STD	7.62	7.09	108.0	30.000	1.0745	10.44	32.24	0.324 ✔
T14	60 - 30	ROHN 1.5 STD	5.52	4.99	96.2	30.000	0.7995	11.37	23.98	0.474 ✔
T15	30 - 0	ROHN 1.5 STD	6.13	5.60	108.0	30.000	0.7995	12.74	23.98	0.531 ✔

Redundant Horizontal (2) 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 $\frac{P}{P_a}$
T14	60 - 30	ROHN 2 XXS	11.05	10.52	179.6	30.000	2.6559	11.37	79.68	0.143 ✔
T15	30 - 0	ROHN 2.5 EH	12.27	11.74	152.4	30.000	2.2535	12.74	67.61	0.188 ✔

Redundant Diagonal (1) 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 2 STD	11.52	10.57	161.1	30.000	1.0745	7.89	32.24	0.245 ✔
T12	100 - 80	ROHN 2 EH	11.86	10.98	171.6	30.000	1.4807	8.08	44.42	0.182 ✔
T13	80 - 60	ROHN 2 EH	12.18	11.36	177.4	30.000	1.4807	8.35	44.42	0.188 ✔
T14	60 - 30	ROHN 2 EH	11.15	9.95	155.3	30.000	1.4807	11.47	44.42	0.258 ✔
T15	30 - 0	ROHN 2.5 STD	11.41	10.31	130.6	30.000	1.7040	11.85	51.12	0.232 ✔

Redundant Diagonal (2) 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 $\frac{P}{P_a}$
T14	60 - 30	ROHN 2.5 STD	14.46	13.72	173.8	30.000	1.7040	7.44	51.12	0.146 ✔
T15	30 - 0	ROHN 2.5 STD	15.33	14.63	185.3	30.000	1.7040	7.96	51.12	0.156 ✔

Redundant Hip (1) 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 $\frac{P}{P_a}$
T14	60 - 30	ROHN 1.5 STD	5.52	5.52	106.5	30.000	0.7995	0.02	23.98	0.001 ✔
T15	30 - 0	ROHN 1.5 STD	6.13	6.13	118.2	30.000	0.7995	0.02	23.98	0.001 ✔

Redundant Hip (2) 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 $\frac{P}{P_a}$
T14	60 - 30	ROHN 2 STD	11.05	11.05	168.4	30.000	1.0745	0.02	32.24	0.001 ✔
T15	30 - 0	ROHN 2 STD	12.27	12.27	187.0	30.000	1.0745	0.02	32.24	0.001 ✔

Redundant Hip 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 2.5 STD	15.15	15.15	191.9	30.000	1.7040	0.16	51.12	0.003 ✔
T12	100 - 80	ROHN 2.5 STD	16.00	16.00	202.6	30.000	1.7040	0.12	51.12	0.002 ✔
T13	80 - 60	ROHN 3 STD	16.88	16.88	174.1	30.000	2.2285	0.11	66.85	0.002 ✔
T14	60 - 30	ROHN 2 STD	14.10	14.10	214.9	30.000	1.0745	0.37	32.24	0.012 ✔
T15	30 - 0	ROHN 2.5 STD	14.88	14.88	188.4	30.000	1.7040	0.32	51.12	0.006 ✔

Inner Bracing 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 $\frac{P}{P_a}$
T11	120 - 100	ROHN 3 STD	12.69	12.69	130.9	30.000	2.2285	0.01	66.85	0.000 ✔
T12	100 - 80	ROHN 3 STD	13.99	13.99	144.2	30.000	2.2285	0.00	66.85	0.000 ✔
T14	60 - 30	ROHN 3 STD	16.57	16.57	170.9	30.000	2.2285	0.03	66.85	0.000 ✔
T15	30 - 0	ROHN 3 STD	18.40	18.40	189.8	30.000	2.2285	0.03	66.85	0.000 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	320 - 300	Leg	ROHN 5 EH	3	-17.73	225.04	7.9	Pass
T2	300 - 280	Leg	ROHN 6 EH	39	-55.38	307.77	18.0	Pass
T3	280 - 260	Leg	ROHN 8 EH w/ angle 8x8x0.5	68	-93.92	752.13	12.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
							22.1 (b)	
T4	260 - 240	Leg	ROHN 8 EH w/ angle 8x8x0.5	89	-137.16	752.15	18.2	Pass
							31.8 (b)	
T5	240 - 220	Leg	ROHN 8 EH w/ angle 8x8x0.5	110	-183.19	752.15	24.4	Pass
							41.7 (b)	
T6	220 - 200	Leg	ROHN 8 EH w/ angle 8x8x0.5	131	-235.82	704.30	33.5	Pass
							35.1 (b)	
T7	200 - 180	Leg	ROHN 10 EH w/ angle 8x8x0.5	146	-297.40	844.26	35.2	Pass
							43.9 (b)	
T8	180 - 160	Leg	ROHN 10 EH w/ angle 8x8x0.5	161	-359.23	844.27	42.5	Pass
							52.8 (b)	
T9	160 - 140	Leg	ROHN 10 EH w/ angle 8x8x0.5	176	-423.88	844.31	50.2	Pass
							62.1 (b)	
T10	140 - 120	Leg	ROHN 10 EH w/ angle 8x8x0.5	191	-486.83	844.25	57.7	Pass
							70.8 (b)	
T11	120 - 100	Leg	ROHN 10 EH w/ angle 8x8x0.5	206	-501.10	844.13	59.4	Pass
							72.0 (b)	
T12	100 - 80	Leg	ROHN 10 EH w/ angle 8x8x0.5	239	-549.13	844.16	65.1	Pass
T13	80 - 60	Leg	ROHN 12 EH w/ angle 8x8x0.5	272	-601.48	976.42	61.6	Pass
							63.9 (b)	
T14	60 - 30	Leg	ROHN 12 EH w/ angle 8x8x0.5	305	-655.14	976.48	67.1	Pass
							67.9 (b)	
T15	30 - 0	Leg	ROHN 12 EHS w Angle 8x8x0.625	356	-733.93	1204.60	60.9	Pass
T1	320 - 300	Diagonal	L1 3/4x1 3/4x3/16	9	-5.41	7.98	67.8	Pass
							79.2 (b)	
T2	300 - 280	Diagonal	L2x2x1/4	45	-5.56	9.05	61.4	Pass
T3	280 - 260	Diagonal	L2 1/2x2 1/2x1/4	73	-7.30	11.67	62.5	Pass
							66.7 (b)	
T4	260 - 240	Diagonal	L3x3x1/4	94	-8.64	15.43	56.0	Pass
							70.2 (b)	
T5	240 - 220	Diagonal	L4x4x5/16	115	-10.70	34.96	30.6	Pass
							69.9 (b)	
T6	220 - 200	Diagonal	L4x4x3/8	136	-15.68	28.36	55.3	Pass
							88.8 (b)	
T7	200 - 180	Diagonal	L4x4x3/8	151	-17.93	23.53	76.2	Pass
							83.5 (b)	
T8	180 - 160	Diagonal	L4x4x3/8	163	-19.54	19.76	98.9	Pass
T9	160 - 140	Diagonal	L5x5x7/16	178	-22.73	38.93	58.4	Pass
							94.5 (b)	
T10	140 - 120	Diagonal	L5x5x7/16	193	-23.58	33.11	71.2	Pass
							98.0 (b)	
T11	120 - 100	Diagonal	ROHN 3 EH	209	-36.11	40.02	90.2	Pass
T12	100 - 80	Diagonal	ROHN 3 XXS	242	-40.20	58.04	69.3	Pass
							75.8 (b)	
T13	80 - 60	Diagonal	ROHN 3 XXS	275	-39.78	54.38	73.2	Pass
							75.1 (b)	
T14	60 - 30	Diagonal	ROHN 3.5 EH	308	-54.55	63.03	86.6	Pass
T15	30 - 0	Diagonal	ROHN 3.5 EH	359	-50.82	59.41	85.5	Pass
T11	120 - 100	Horizontal	ROHN 3 STD	208	-19.19	27.91	68.7	Pass
T12	100 - 80	Horizontal	ROHN 3 EH	241	-23.13	29.48	78.4	Pass
T13	80 - 60	Horizontal	ROHN 3 EH	274	-23.01	24.70	93.2	Pass
T14	60 - 30	Horizontal	ROHN 3.5 EH	307	-25.47	33.75	75.5	Pass
T15	30 - 0	Horizontal	ROHN 4 STD	358	-28.77	31.31	91.9	Pass
T1	320 - 300	Top Girt	L1 3/4x1 3/4x3/16	6	-0.08	3.71	2.2	Pass
T2	300 - 280	Top Girt	L2x2x1/4	42	-0.16	6.78	2.4	Pass
T11	120 - 100	Redund Horz 1 Bracing	ROHN 1.5 STD	217	-8.70	12.41	70.1	Pass
T12	100 - 80	Redund Horz 1 Bracing	ROHN 1.5 STD	246	-9.53	10.07	94.6	Pass
T13	80 - 60	Redund Horz 1	ROHN 2 STD	279	-10.44	18.33	57.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
T14	60 - 30	Bracing Redund Horz 1 Bracing	ROHN 1.5 STD	314	-11.37	16.59	68.5	Pass
T15	30 - 0	Redund Horz 1 Bracing	ROHN 1.5 STD	365	-12.74	13.65	93.3	Pass
T14	60 - 30	Redund Horz 2 Bracing	ROHN 2 XXS	315	-11.37	16.39	69.3	Pass
T15	30 - 0	Redund Horz 2 Bracing	ROHN 2.5 EH	366	-12.74	19.31	66.0	Pass
T11	120 - 100	Redund Diag 1 Bracing	ROHN 2 STD	214	-7.89	8.24	95.8	Pass
T12	100 - 80	Redund Diag 1 Bracing	ROHN 2 EH	247	-8.08	10.01	80.7	Pass
T13	80 - 60	Redund Diag 1 Bracing	ROHN 2 EH	280	-8.35	9.36	89.2	Pass
T14	60 - 30	Redund Diag 1 Bracing	ROHN 2 EH	316	-11.47	12.21	93.9	Pass
T15	30 - 0	Redund Diag 1 Bracing	ROHN 2.5 STD	367	-11.85	19.90	59.6	Pass
T14	60 - 30	Redund Diag 2 Bracing	ROHN 2.5 STD	317	-7.44	11.23	66.3	Pass
T15	30 - 0	Redund Diag 2 Bracing	ROHN 2.5 STD	374	-7.96	9.87	80.6	Pass
T11	120 - 100	Redund Hip 1 Bracing	ROHN 1.5 STD	233	-0.09	10.63	0.9	Pass
T12	100 - 80	Redund Hip 1 Bracing	ROHN 1.5 STD	266	-0.08	8.76	1.0	Pass
T13	80 - 60	Redund Hip 1 Bracing	ROHN 1.5 STD	299	-0.07	7.38	1.0	Pass
T14	60 - 30	Redund Hip 1 Bracing	ROHN 1.5 STD	348	-0.21	14.04	1.5	Pass
T15	30 - 0	Redund Hip 1 Bracing	ROHN 1.5 STD	399	-0.18	11.39	1.6	Pass
T14	60 - 30	Redund Hip 2 Bracing	ROHN 2 STD	345	-0.09	7.54	1.1	Pass
T15	30 - 0	Redund Hip 2 Bracing	ROHN 2 STD	381	-0.07	6.12	1.1	Pass
T11	120 - 100	Redund Hip Diagonal Bracing	ROHN 2.5 STD	223	-0.10	9.21	1.1	Pass
T12	100 - 80	Redund Hip Diagonal Bracing	ROHN 2.5 STD	256	-0.08	8.26	1.0	Pass
T13	80 - 60	Redund Hip Diagonal Bracing	ROHN 3 STD	289	-0.09	14.64	0.6	Pass
T14	60 - 30	Redund Hip Diagonal Bracing	ROHN 2 STD	351	-0.12	2.87	4.2	Pass
T15	30 - 0	Redund Hip Diagonal Bracing	ROHN 2.5 STD	402	-0.12	5.69	2.1	Pass
T11	120 - 100	Inner Bracing	ROHN 3 STD	236	-0.02	25.88	0.3	Pass
T12	100 - 80	Inner Bracing	ROHN 3 STD	269	-0.01	16.00	0.5	Pass
T13	80 - 60	Inner Bracing	ROHN 3 STD	301	-0.03	17.97	0.3	Pass
T14	60 - 30	Inner Bracing	ROHN 3 STD	352	-0.06	15.19	0.4	Pass
T15	30 - 0	Inner Bracing	ROHN 3 STD	403	-0.06	12.32	0.5	Pass
							Summary	
						Leg (T11)	72.0	Pass
						Diagonal (T8)	98.9	Pass
						Horizontal (T13)	93.2	Pass
						Top Girt (T2)	2.4	Pass
						Redund	94.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Horz 1 Bracing (T12) Redund	69.3	Pass
						Horz 2 Bracing (T14) Redund	95.8	Pass
						Diag 1 Bracing (T11) Redund	80.6	Pass
						Diag 2 Bracing (T15) Redund Hip 1 Bracing (T15)	1.6	Pass
						Redund Hip 2 Bracing (T14)	1.1	Pass
						Redund Hip Diagonal Bracing (T14)	4.2	Pass
						Inner Bracing (T15)	0.5	Pass
						Bolt Checks	98.0	Pass
						RATING =	**98.9**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 618·kips	*user input*
Shear:	Shear := 97·kips	*user input*
Compression:	Compression := 803·kips	*user input*

Anchor Bolt Data:

Use ASTM A354 Grade BC

Number of Anchor Bolts = N	N := 24	*user input*	
Bolt Ultimate Strength:	F_u := 125·ksi	*user input*	
Bolt Yield Strength:	Fy := 109·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1in	*user input*	
Threads per Inch:	n := 8	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 0.785\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 0.606\cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.33\cdot\left(0.33\cdot A_g\cdot F_u\right) \qquad AllowableTension = 43.1\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.33\cdot\left(0.60\cdot A_n\cdot Fy\right) \qquad F_{net.area} = 52.7\cdot kips$$

Note: 1.33 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 25.7\cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.49$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

AECOM

				Page	of
Job	320' Rohn SSVMW - Colchester, CT	Project No.	VZ5-183R2	Sheet 3	of 3
Description	Anchor Bolt Analysis	Computed by	MCD	Date	08/06/15
		Checked by		Date	

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Stell Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 7.6 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 2.8 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 14.5 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.52$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.19$$

Condition3 = "OK"

FOUNDATION ANALYSIS

AECOM

Page ___ of ___

Job	320' Rohn SSVMW - Colchester, CT	Project No.	VZ5-183R2	Sheet	1 of 2
Description	Evaluation of Drilled Pier Caisson	Computed by	MCD	Date	08/06/15
		Checked by		Date	

3 SIDED SELF SUPPORTING TOWER FOUNDATION DRILLED PIER

Compression:	DownLoad := 803·kips	γc := 150pcf	Concrete unit weight
Uplift:	uplift := 618·kips	γw := 62.4pcf	Water unit weight
Depth Neglected for Skin Friction at the top	Depthunbond := 4·ft	γs := 120pcf	Soil unit weight
Drill Caisson length	CasissonLength := 35.5·ft	Pierϕ := 7.5·ft	Pier diameter
Water Table Below grade:	Wd := 10·ft	hg := 0.5·ft	Height of Pier Above grade
Ave allowable Shear at Depth of 4' to 10'	f1 := 380psf	Per BL Companies Report 9.13.2000	SoilBearingCapacity = 6.7ksf
Ave allowable Shear at Depth of 10' to 35'	f2 := 700psf		Allowable Bearing Pressure at Depth 35'

Loading:

$$\text{TotalDownLoad} := \text{DownLoad} + \pi \cdot \frac{\text{Pier}\phi^2}{4} \cdot [\text{hg} \cdot \gamma c + [(\gamma c - \gamma s) \cdot (\text{CasissonLength} - \text{hg})]]$$

$$\text{TotalDownLoad} = 852.7 \cdot \text{kips}$$

$$\text{Pierweight} := \pi \cdot \frac{\text{Pier}\phi^2}{4} \cdot [(\text{Wd} + \text{hg}) \cdot \gamma c + (\text{CasissonLength} - \text{Wd} - \text{hg}) \cdot (\gamma c - \gamma w)]$$

$$\text{Pierweight} = 166.33 \cdot \text{kips}$$

$$\text{Soilshear} := \pi \cdot \text{Pier}\phi \cdot [f1 \cdot (\text{Wd} - \text{Depthunbond}) + f2 \cdot (\text{CasissonLength} - \text{Wd} - \text{hg})]$$

$$\text{Soilshear} = 466.06 \cdot \text{kips}$$

Compression Capacity:

$$\text{TotalDownLoadCapacity} := \text{Soilshear} + \text{SoilBearingCapacity} \cdot \left(\pi \cdot \frac{\text{Pier}\phi^2}{4} \right)$$

$$\text{TotalDownLoadCapacity} = 762.05 \cdot \text{kips}$$

Tension Capacity:

$$\text{TotalUpLiftCapacity} := \text{Soilshear} + \text{Pierweight}$$

$$\text{TotalUpLiftCapacity} = 632.39 \cdot \text{kips}$$

AECOM

Page ___ of ___

Job Description: 320' Rohn SSVMW - Colchester, CT / Evaluation of Drilled Pier Caisson
Project No. VZ5-183R2
Computed by MCD
Checked by
Sheet 2 of 2
Date 08/06/15
Date

Check Cone Failure

$$ConeFailureCapacity := \frac{[(CasissonLength - hg)\cdot\tan(30\cdot deg)\cdot 2 + Pier\phi]^2\cdot\pi}{4}\cdot\frac{CasissonLength - hg}{3}\cdot\gamma s$$

$ConeFailureCapacity = 2524.37\cdot kips$

$CheckConeFailureCapacity := if(uplift < ConeFailureCapacity, "Okay", "No Good")$

$CheckConeFailureCapacity = "Okay"$

$$\frac{uplift}{ConeFailureCapacity} = 24.5\cdot\%$$

Foundation Check (Previous foundation Mod. designed by URS dated 7/13/2012 (VZ5-122)):

Add Concrete around existing caisson foundations

$L_{modification} := 12ft$ $Depth_{modification} := 4ft$

$$Area_{modification} := L_{modification}^2 - \pi\cdot\frac{Pier\phi^2}{4} \qquad Area_{modification} = 99.82\,ft^2$$

$Weight_{modification} := Area_{modification}\cdot Depth_{modification}\cdot\gamma c$ $Weight_{modification} = 59.89\cdot kip$

$SoilBearingCapacity_{4ft} := 2ksf$ Soil Bearing Capacity at 4' Below --> Based on Boring Logs

$TotalDownLoad_2 := TotalDownLoad + Weight_{modification}$ $TotalDownLoad_2 = 912.59\cdot kip$

$TotalDownLoadCapacity_2 := TotalDownLoadCapacity + Area_{modification}\cdot SoilBearingCapacity_{4ft}$

$TotalDownLoadCapacity_2 = 961.69\cdot kip$

$CheckDownLoadCapacity_2 := if(TotalDownLoad_2 < TotalDownLoadCapacity_2, "Okay", "No Good")$

$CheckDownLoadCapacity_2 = "Okay"$

$$\frac{TotalDownLoad_2}{TotalDownLoadCapacity_2} = 94.9\cdot\%$$

$TotalUpLiftCapacity_2 := TotalUpLiftCapacity + Weight_{modification}$

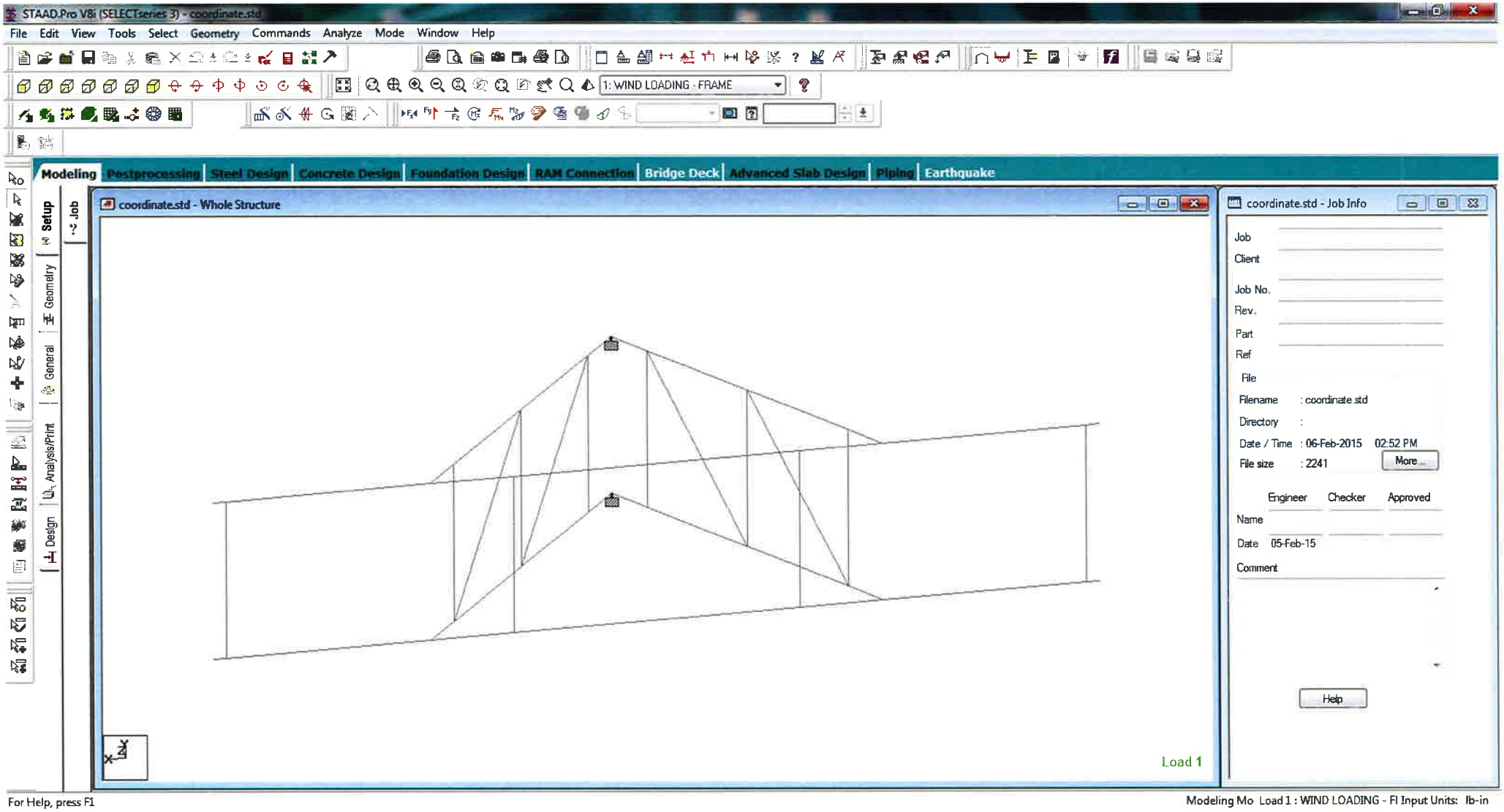
$TotalUpLiftCapacity_2 = 692.28\cdot kips$

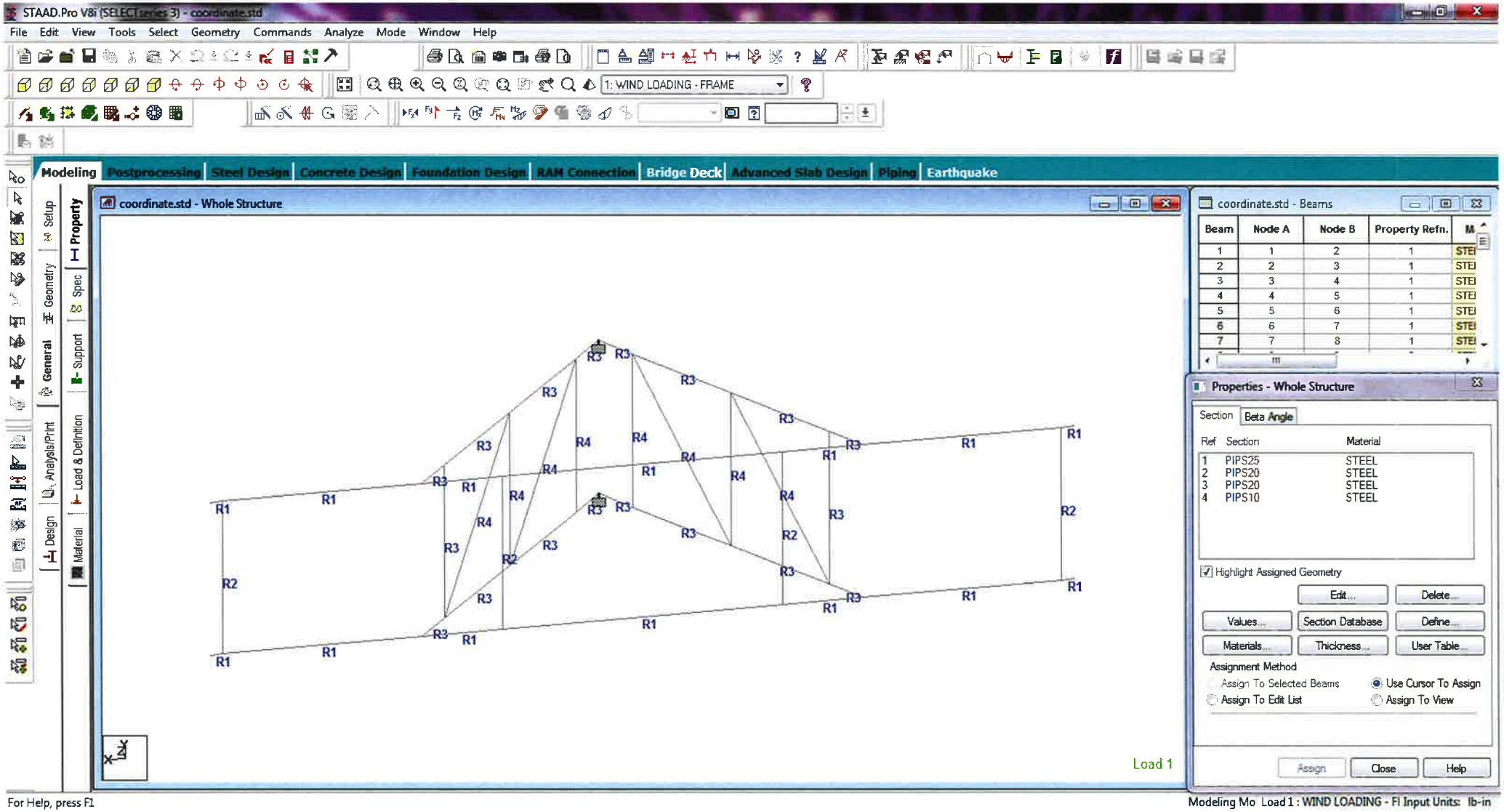
$CheckUpLiftCapacity_2 := if(uplift < TotalUpLiftCapacity_2, "Okay", "No Good")$

$$\frac{uplift}{TotalUpLiftCapacity_2} = 89.3\cdot\%$$

$CheckUpLiftCapacity_2 = "Okay"$

ANTENNA MOUNT FRAME ANALYSIS


STAAD.Pro V8i (SELECTseries 3) - coordinate.std
File Edit View Tools Select Geometry Commands Analyze Mode Window Help
1: WIND LOADING - FRAME
Modeling Postprocessing Steel Design Concrete Design Foundation Design RAM Connection Bridge Deck Advanced Slab Design Piping Earthquake
Setup Job
Geometry
General
Analysis/Print
Design
coordinate.std - Whole Structure
Load 1
coordinate.std - Job Info
Job
Client
Job No.
Rev.
Part
Ref
File
Filename : coordinate.std
Directory :
Date / Time : 06-Feb-2015 02:52 PM
File size : 2241
More...
Engineer Checker Approved
Name
Date 05-Feb-15
Comment
Help
For Help, press F1
Modeling Mo Load 1 : WIND LOADING - FI Input Units: lb-in


STAAD.Pro V8i (SELECTseries 3) - coordinate.std
File Edit View Tools Select Geometry Commands Analyze Mode Window Help
1: WIND LOADING - FRAME
Modeling Postprocessing Steel Design Concrete Design Foundation Design RAM Connection Bridge Deck Advanced Slab Design Piping Earthquake
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
coordinate.std - Whole Structure
Load 1
coordinate.std - Beams
Beam Node A Node B Property Refn.
1 1 2 1
2 2 3 1
3 3 4 1
4 4 5 1
5 5 6 1
6 6 7 1
7 7 8 1
Properties - Whole Structure
Section Beta Angle
Ref Section Material
1 PIPS25 STEEL
2 PIPS20 STEEL
3 PIPS20 STEEL
4 PIPS10 STEEL
Highlight Assigned Geometry
Edit... Delete...
Values... Section Database Define...
Materials... Thickness... User Table...
Assignment Method
Assign To Selected Beams
Use Cursor To Assign
Assign To Edit List
Assign To View
Assign Close Help
For Help, press F1
Modeling Mo Load 1 : WIND LOADING - FI Input Units: lb-in

URS

Job Colchester, CT | Project No. V25-183 | Page ____ of ____

Description Wind Loads applied to Antenna frame | Computed by MCJ | Date 2/2015 | Sheet ____ of ____

Checked by ____ | Date ____

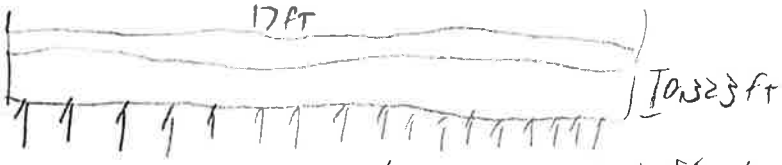
Reference

• Wind loads – Antenna frame (wind loading from TIA-222F w/ CSP design requirements)
(determine as dist. Load)

• 2.5 Sch 40 Pipe w/ ½" ice build = (2 x ½") + (2.875" O.D) = 3.875" ÷ 12 = 0.323ft

$q_z = [0.00256 \times [\frac{220}{33}]^{2/7} \times (90\,mph)^2] \times 1.69 = 60.258\,PSF$

(k_t; 90 mph V; 1.69 GH)



$q_z / 0.323ft \rightarrow 60.258 \frac{lb}{ft^2} \times 0.323ft = 19.463\ PLF$

• 2.0 Ch 40 Pipe w/ ½ ice build = (2 x ½") + (2.375" O.D.) = 3.375" O.D ÷ 12 = 0.281ft

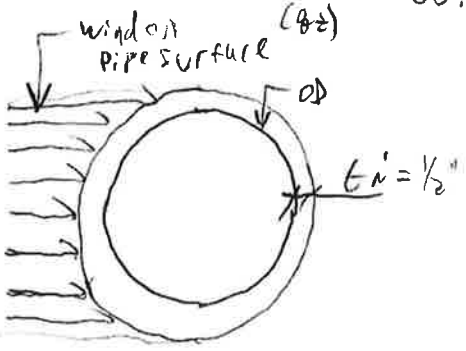
$q_z = 60.258\,PSF$

$60.258 \frac{lb}{ft^2} \times 0.281ft = 16.948\ PLF$

1.0 Ch 40 Pipe w/ ½ ice build = 2 x ½" = (2 x ½") + (1.315" O.D) = 2.315" ÷ 12 = 0.193ft

$q_z = 60.258\,PSF$

$60.258 \frac{lb}{ft^2} \times 0.193ft = 11.625\ PLF$



URS

Job Colchester, CT | Project No. V25-183 | Page ____ of ____

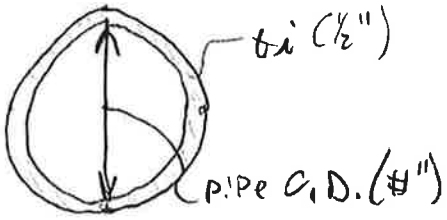
Description Ice loads applied to Antenna frame | Computed by MCD | Date 2/2015 | Sheet ____ of ____

Checked by ____ | Date ____

Reference

• Ice loads (determined as dist. Load)

Ice density = 56 pcf



For 2.5 Sch 40 Pipe:

- Area ice = $\frac{5.3014\ in^2}{144\ in^2/ft^2} \times 56\ \frac{lb}{ft^3} = 2.062\ \frac{lb}{ft}$

For 2.0 Sch 40 Pipe:

- Area ice = $\frac{4.5160\ in^2}{144\ in^2/ft^2} \times 56\ \frac{lb}{ft^3} = 1.756\ \frac{lb}{ft}$

For 1.0 Sch 40 Pipe:

- Area ice = $\frac{2.8510\ in^2}{144\ in^2/ft^2} \times 56\ \frac{lb}{ft^3} = 1.109\ \frac{lb}{ft}$

URS

Job Colchester, CT | Project No. V25-185 | Page ____ of ____

Description Antenna Loading on Support Pipe 5 | Computed by MCD | Date 2/2015 | Sheet ____ of ____

Checked by ____ | Date ____

Pipe 1 (Verw-AWS Antennas)	wt Antenna w/ice (lb)	Antenna ice volume (cf)	Density ice (pcf)	Reference Wt. antenna w/ice (lbs)
(1) HBXX-6517DS-VTM	43	0.616	56	77.42
(1) RRH_AWS	42	0.178	56	520
(1) Distribution Box	44	0.342	56	63.137
				193 lbs

Wind on Antenna:
Surface area w/ Ice = 76" x 13" = 988 in²/144 in²/ft² = 6.861 sf x 60.28 PSF = 413.588 lb (front)

Distribute Load on Pipe (height) = 9.847 lb/in (42")

Pipe 2 (Verw-LTE Antennas)	wt Antenna w/o ice (lb)	Antenna ice volume (cf)	Density ice (pcf)	Wt. antenna w/ice (lbs)
(1) LNX-6514DS-VTM	31.3	0.621	56	66

Wind on Antenna
Surface area w/ice = 74" x 13" = 962 in²/144 in²/ft² = 6.681 sf x 60.28 PSF = 402.704 lb

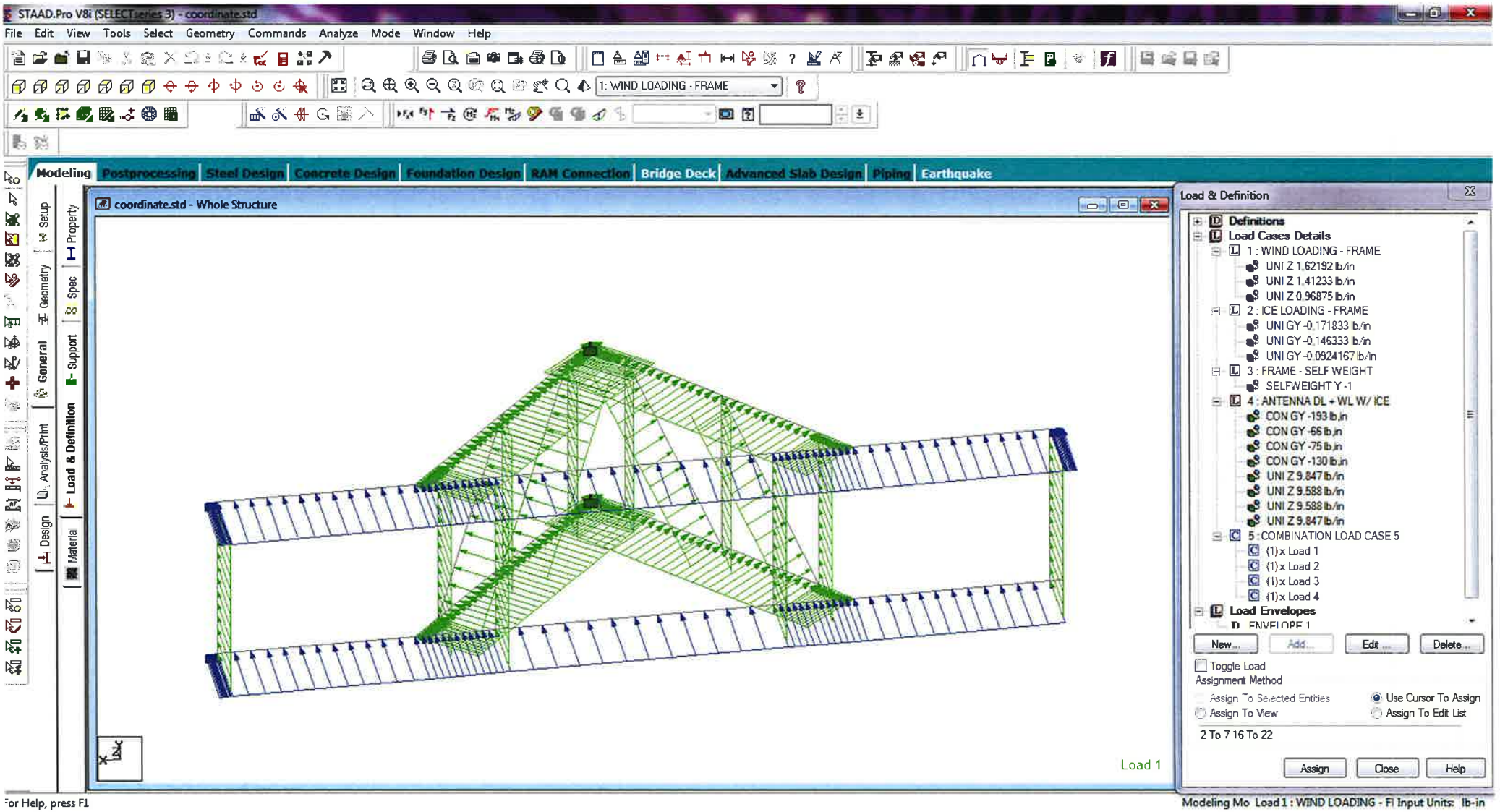
Distribute load on Pipe (42" length) = 9.588 lb/in

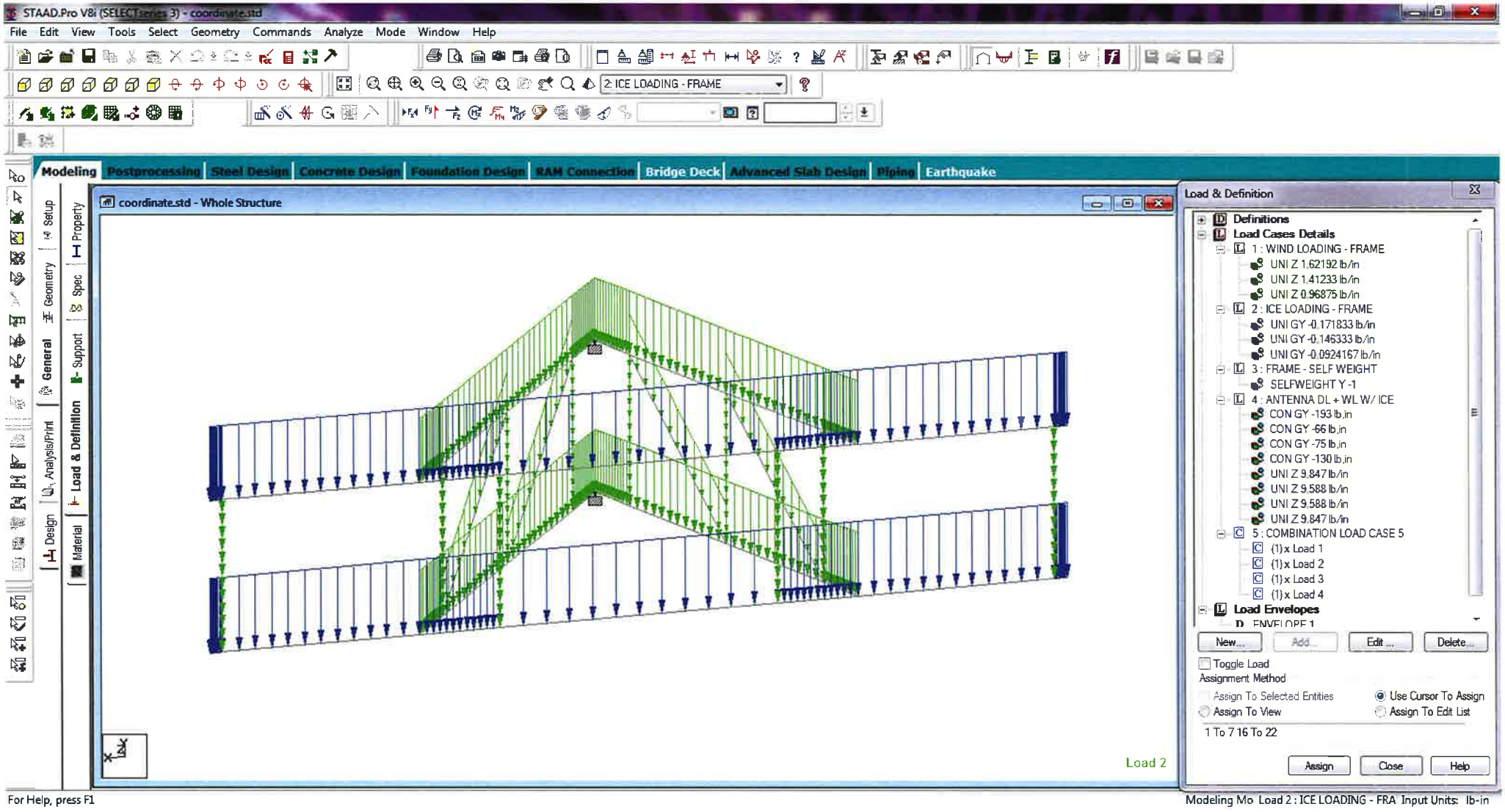
Pipe 3 (Verw-850 MHz Antennas)	wt antenna w/o ice (lb)	Antenna ice volume (cf)	Density ice (pcf)	Wt. antenna w/ice (lbs)
(1) LNX-6514DS-VTM	31.3	0.621	56	66
(2) Diplexer units	31.3 x 2	(0.025) x 2	56	9
				75 lbs

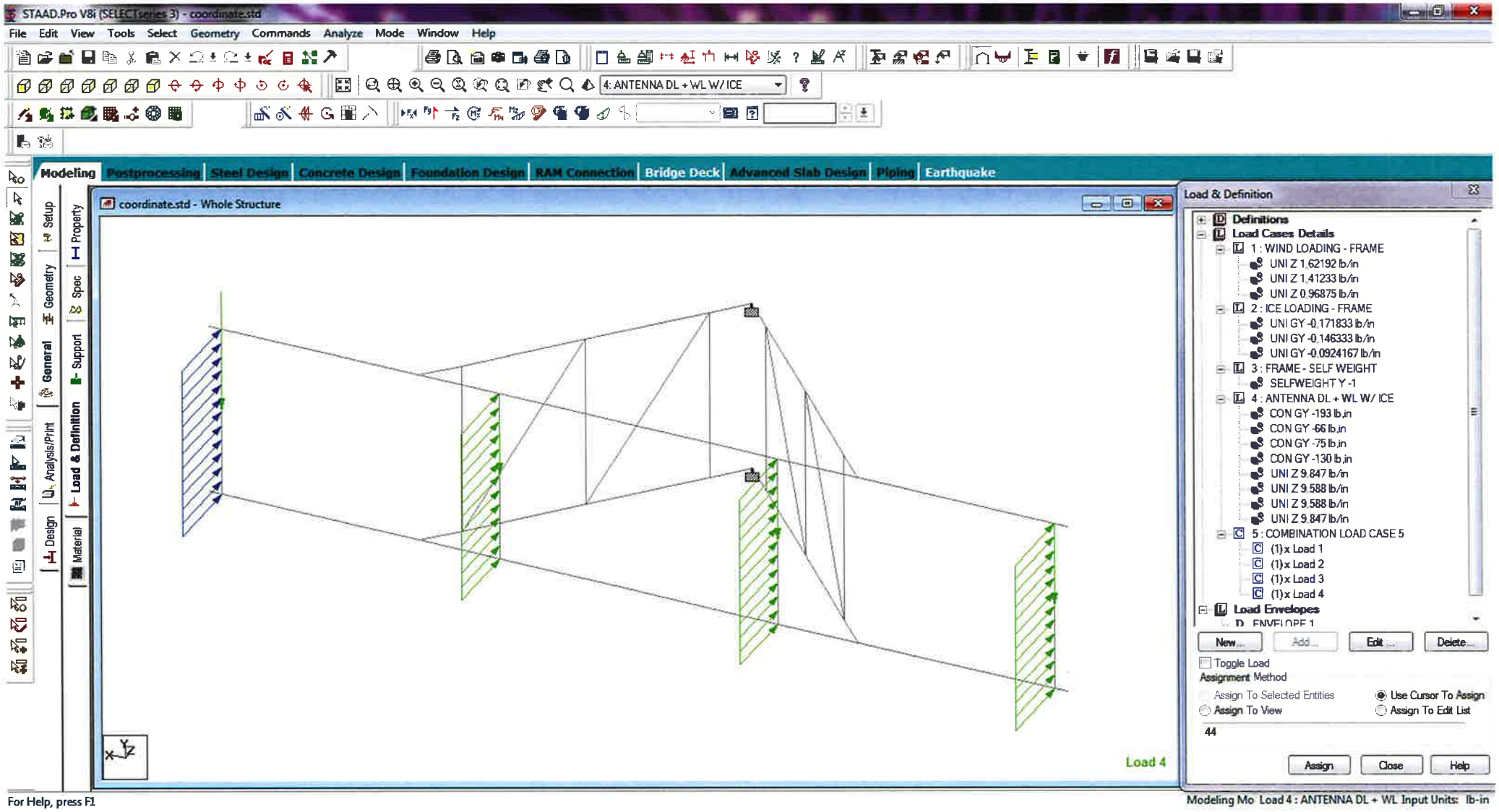
Surface area w/ ice (See Pipe 2) → 9.588 lb/in wind on antenna w/ ice

Pipe 4 (Verw-PCS Antennas)	wt Antenna w/o ice (lb)	Antenna ice volume (cf)	Density ice (pcf)	Wt. Antenna w/ice (lbs)
(1) HBXX-6517DS-VTM	43	0.616	56	77.42
(1) RRH_PCS	42	0.178	56	520
				130 lbs

Surface Area (See Pipe 1) → 9.847 lb/in


STAAD.Pro V8i (SELECTseries 3) - coordinate.std
File Edit View Tools Select Geometry Commands Analyze Mode Window Help
1: WIND LOADING - FRAME
Modeling Postprocessing Steel Design Concrete Design Foundation Design RAM Connection Bridge Deck Advanced Slab Design Piping Earthquake
General Geometry Setup Property Spec Support Load & Definition Analysis/Print Design Material
coordinate.std - Whole Structure
Load 1
Load & Definition
Definitions
Load Cases Details
1 : WIND LOADING - FRAME
UNI Z 1.62192 lb/in
UNI Z 1.41233 lb/in
UNI Z 0.96875 lb/in
2 : ICE LOADING - FRAME
UNI GY -0.171833 lb/in
UNI GY -0.146333 lb/in
UNI GY -0.0924167 lb/in
3 : FRAME - SELF WEIGHT
SELFWEIGHT Y -1
4 : ANTENNA DL + WL W/ ICE
CON GY -193 lb,in
CON GY -66 lb,in
CON GY -75 lb,in
CON GY -130 lb,in
UNI Z 9.847 lb/in
UNI Z 9.588 lb/in
UNI Z 9.588 lb/in
UNI Z 9.847 lb/in
5 : COMBINATION LOAD CASE 5
(1) x Load 1
(1) x Load 2
(1) x Load 3
(1) x Load 4
Load Envelopes
ENVELOPE 1
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Entities
Use Cursor To Assign
Assign To View
Assign To Edit List
2 To 7 16 To 22
Assign Close Help
For Help, press F1
Modeling Mo Load 1 : WIND LOADING - FI Input Units: lb-in


STAAD.Pro V8i (SELECTseries 3) - coordinate.std
File Edit View Tools Select Geometry Commands Analyze Mode Window Help
2: ICE LOADING - FRAME
Modeling Postprocessing Steel Design Concrete Design Foundation Design RAM Connection Bridge Deck Advanced Slab Design Piping Earthquake
Property Setup Geometry Spec General Support Load & Definition Analysis/Print Design Material
coordinate.std - Whole Structure
Load 2
Load & Definition
Definitions
Load Cases Details
1 : WIND LOADING - FRAME
UNI Z 1.62192 lb/in
UNI Z 1.41233 lb/in
UNI Z 0.96875 lb/in
2 : ICE LOADING - FRAME
UNI GY -0.171833 lb/in
UNI GY -0.146333 lb/in
UNI GY -0.0924167 lb/in
3 : FRAME - SELF WEIGHT
SELFWEIGHT Y -1
4 : ANTENNA DL + WL W/ ICE
CON GY -193 lb,in
CON GY -66 lb,in
CON GY -75 lb,in
CON GY -130 lb,in
UNI Z 9.847 lb/in
UNI Z 9.588 lb/in
UNI Z 9.588 lb/in
UNI Z 9.847 lb/in
5 : COMBINATION LOAD CASE 5
(1)x Load 1
(1)x Load 2
(1)x Load 3
(1)x Load 4
Load Envelopes
New... Add... Edit ... Delete...
Toggle Load
Assignment Method
Assign To Selected Entities
Use Cursor To Assign
Assign To View
Assign To Edit List
1 To 7 16 To 22
Assign Close Help
For Help, press F1
Modeling Mo Load 2 : ICE LOADING - FRA Input Units: lb-in


STAAD.Pro V8i (SELECTseries 3) - coordinate.std
File Edit View Tools Select Geometry Commands Analyze Mode Window Help
4: ANTENNA DL + WL W/ ICE
Modeling Postprocessing Steel Design Concrete Design Foundation Design RAM Connection Bridge Deck Advanced Slab Design Piping Earthquake
Setup Geometry General Analysis/Print Design
Property Spec Support Load & Definition Material
coordinate.std - Whole Structure
Load & Definition
Definitions
Load Cases Details
1 : WIND LOADING - FRAME
UNI Z 1.62192 lb/in
UNI Z 1.41233 lb/in
UNI Z 0.96875 lb/in
2 : ICE LOADING - FRAME
UNI GY -0.171833 lb/in
UNI GY -0.146333 lb/in
UNI GY -0.0924167 lb/in
3 : FRAME - SELF WEIGHT
SELFWEIGHT Y -1
4 : ANTENNA DL + WL W/ ICE
CON GY -193 lb,in
CON GY -66 lb,in
CON GY -75 lb,in
CON GY -130 lb,in
UNI Z 9.847 lb/in
UNI Z 9.588 lb/in
UNI Z 9.588 lb/in
UNI Z 9.847 lb/in
5 : COMBINATION LOAD CASE 5
(1)x Load 1
(1)x Load 2
(1)x Load 3
(1)x Load 4
Load Envelopes
New... Add... Edit... Delete...
Toggle Load
Assignment Method
Assign To Selected Entities
Use Cursor To Assign
Assign To View
Assign To Edit List
44
Assign Close Help
Load 4
For Help, press F1
Modeling Mo Load 4 : ANTENNA DL + WL Input Units: lb-in

```
*****************************************************
*                                                   *
*           STAAD.Pro V8i SELECTseries3             *
*           Version  20.07.08.22                    *
*           Proprietary Program of                  *
*           Bentley Systems, Inc.                   *
*           Date=    FEB 11, 2015                   *
*           Time=     9:34:36                       *
*                                                   *
*      USER ID: URS Corporation                     *
*****************************************************
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```
    1. STAAD SPACE
INPUT FILE: coordinate.STD
    2. START JOB INFORMATION
    3. ENGINEER DATE 05-FEB-15
    4. END JOB INFORMATION
    5. INPUT WIDTH 79
    6. UNIT INCHES POUND
    7. JOINT COORDINATES
    8. 1 0 0 0; 2 3 0 0; 3 49.875 0 0; 4 69 0 0; 5 135 0 0; 6 154.125 0 0; 7 201 0 0
    9. 8 204 0 0; 9 56.5991 0 7.5142; 10 75.9375 0 29.125; 11 95.2759 0 50.736
   10. 12 102 0 58.25; 13 108.724 0 50.7358; 14 128.063 0 29.125; 15 147.401 0 7.5142
   11. 16 0 41 0; 17 3 41 0; 18 49.875 41 0; 19 69 41 0; 20 135 41 0; 21 154.125 41 0
   12. 22 201 41 0; 23 204 41 0; 24 56.5991 41 7.5142; 25 75.9375 41 29.125
   13. 26 95.2759 41 50.736; 27 102 41 58.25; 28 108.724 41 50.7358
   14. 29 128.063 41 29.125; 30 147.401 41 7.5142
   15. MEMBER INCIDENCES
   16. 1 1 2; 2 2 3; 3 3 4; 4 4 5; 5 5 6; 6 6 7; 7 7 8; 8 3 9; 9 9 10; 10 10 11
   17. 11 11 12; 12 12 13; 13 13 14; 14 14 15; 15 15 6; 16 16 17; 17 17 18; 18 18 19
   18. 19 19 20; 20 20 21; 21 21 22; 22 22 23; 23 18 24; 24 24 25; 25 25 26; 26 26 27
   19. 27 27 28; 28 28 29; 29 29 30; 30 30 21; 31 9 24; 32 9 25; 33 25 10; 34 10 26
   20. 35 26 11; 36 13 28; 37 28 14; 38 14 29; 39 29 15; 40 15 30; 41 2 17; 42 4 19
   21. 43 5 20; 44 7 22
   22. DEFINE MATERIAL START
   23. ISOTROPIC STEEL
   24. E 2.9E+007
   25. POISSON 0.3
   26. DENSITY 0.283
   27. ALPHA 6E-006
   28. DAMP 0.03
   29. TYPE STEEL
   30. STRENGTH FY 36000 FU 58000 RY 1.5 RT 1.2
   31. END DEFINE MATERIAL
   32. MEMBER PROPERTY AMERICAN
   33. 1 TO 7 16 TO 22 TABLE ST PIPS25
   34. 41 TO 44 TABLE ST PIPS20
   35. 8 TO 15 23 TO 31 40 TABLE ST PIPS20
   36. 32 TO 39 TABLE ST PIPS10
   37. CONSTANTS
   38. BETA 0 MEMB 15
   39. MATERIAL STEEL ALL
   40. SUPPORTS
```

```
41. 12 27 FIXED
42. LOAD 1 LOADTYPE NONE  TITLE WIND LOADING - FRAME
43. MEMBER LOAD
44. 2 TO 7 16 TO 22 UNI Z 1.62192
45. 8 TO 15 23 TO 31 40 TO 44 UNI Z 1.41233
46. 32 TO 39 UNI Z 0.96875
47. LOAD 2 LOADTYPE NONE  TITLE ICE LOADING - FRAME
48. MEMBER LOAD
49. 1 TO 7 16 TO 22 UNI GY -0.171833
50. 8 TO 15 23 TO 31 40 TO 44 UNI GY -0.146333
51. 32 TO 39 UNI GY -0.0924167
52. LOAD 3 LOADTYPE NONE  TITLE FRAME - SELF WEIGHT
53. SELFWEIGHT Y -1
54. LOAD 4 LOADTYPE NONE  TITLE ANTENNA DL + WL W/ ICE
55. MEMBER LOAD
56. 44 CON GY -193
57. 43 CON GY -66
58. 42 CON GY -75
59. 41 CON GY -130
60. UNIT FEET POUND
61. 44 UNI Z 118.164
62. 43 UNI Z 115.056
63. 42 UNI Z 115.056
64. 41 UNI Z 118.164
65. UNIT INCHES POUND
66. LOAD COMB 5 COMBINATION LOAD CASE 5
67. 1 1.0 2 1.0 3 1.0 4 1.0
68. PERFORM ANALYSIS PRINT ALL
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P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 30/ 44/ 2

SOLVER USED IS THE OUT-OF-CORE BASIC SOLVER

ORIGINAL/FINAL BAND-WIDTH= 16/ 6/ 42 DOF
TOTAL PRIMARY LOAD CASES = 4, TOTAL DEGREES OF FREEDOM = 168
SIZE OF STIFFNESS MATRIX = 8 DOUBLE KILO-WORDS
REQRD/AVAIL. DISK SPACE = 12.1/ 138468.3 MB

LOADING 1 LOADTYPE NONE TITLE WIND LOADING - FRAME

MEMBER LOAD - UNIT POUN INCH

MEMBER	UDL	L1	L2	CON	L	LIN1	LIN2
2	1.6219 Z	0.00	46.88				
3	1.6219 Z	0.00	19.12				
4	1.6219 Z	0.00	66.00				
5	1.6219 Z	0.00	19.12				
6	1.6219 Z	0.00	46.88				
7	1.6219 Z	0.00	3.00				
16	1.6219 Z	0.00	3.00				
17	1.6219 Z	0.00	46.88				
18	1.6219 Z	0.00	19.12				
19	1.6219 Z	0.00	66.00				
20	1.6219 Z	0.00	19.12				
21	1.6219 Z	0.00	46.88				
22	1.6219 Z	0.00	3.00				
8	1.4123 Z	0.00	10.08				
9	1.4123 Z	0.00	29.00				
10	1.4123 Z	0.00	29.00				
11	1.4123 Z	0.00	10.08				
12	1.4123 Z	0.00	10.08				
13	1.4123 Z	0.00	29.00				
14	1.4123 Z	0.00	29.00				
15	1.4123 Z	0.00	10.08				
23	1.4123 Z	0.00	10.08				
24	1.4123 Z	0.00	29.00				
25	1.4123 Z	0.00	29.00				
26	1.4123 Z	0.00	10.08				
27	1.4123 Z	0.00	10.08				
28	1.4123 Z	0.00	29.00				
29	1.4123 Z	0.00	29.00				
30	1.4123 Z	0.00	10.08				
31	1.4123 Z	0.00	41.00				
40	1.4123 Z	0.00	41.00				
41	1.4123 Z	0.00	41.00				
42	1.4123 Z	0.00	41.00				
43	1.4123 Z	0.00	41.00				
44	1.4123 Z	0.00	41.00				
32	0.9688 Z	0.00	50.22				
33	0.9688 Z	0.00	41.00				
34	0.9688 Z	0.00	50.22				
35	0.9688 Z	0.00	41.00				
36	0.9688 Z	0.00	41.00				
37	0.9688 Z	0.00	50.22				
38	0.9688 Z	0.00	41.00				
39	0.9688 Z	0.00	50.22				

LOADING 2 LOADTYPE NONE TITLE ICE LOADING - FRAME

MEMBER LOAD - UNIT POUN INCH

MEMBER	UDL	L1	L2	CON	L	LIN1	LIN2
1	-0.1718 GY	0.00	3.00				
2	-0.1718 GY	0.00	46.88				
3	-0.1718 GY	0.00	19.12				
4	-0.1718 GY	0.00	66.00				
5	-0.1718 GY	0.00	19.12				
6	-0.1718 GY	0.00	46.88				
7	-0.1718 GY	0.00	3.00				
16	-0.1718 GY	0.00	3.00				
17	-0.1718 GY	0.00	46.88				
18	-0.1718 GY	0.00	19.12				
19	-0.1718 GY	0.00	66.00				
20	-0.1718 GY	0.00	19.12				
21	-0.1718 GY	0.00	46.88				
22	-0.1718 GY	0.00	3.00				
8	-0.1463 GY	0.00	10.08				
9	-0.1463 GY	0.00	29.00				
10	-0.1463 GY	0.00	29.00				
11	-0.1463 GY	0.00	10.08				
12	-0.1463 GY	0.00	10.08				
13	-0.1463 GY	0.00	29.00				
14	-0.1463 GY	0.00	29.00				
15	-0.1463 GY	0.00	10.08				
23	-0.1463 GY	0.00	10.08				
24	-0.1463 GY	0.00	29.00				
25	-0.1463 GY	0.00	29.00				
26	-0.1463 GY	0.00	10.08				
27	-0.1463 GY	0.00	10.08				
28	-0.1463 GY	0.00	29.00				
29	-0.1463 GY	0.00	29.00				
30	-0.1463 GY	0.00	10.08				
31	-0.1463 GY	0.00	41.00				
40	-0.1463 GY	0.00	41.00				
41	-0.1463 GY	0.00	41.00				
42	-0.1463 GY	0.00	41.00				
43	-0.1463 GY	0.00	41.00				
44	-0.1463 GY	0.00	41.00				
32	-0.0924 GY	0.00	50.22				
33	-0.0924 GY	0.00	41.00				
34	-0.0924 GY	0.00	50.22				
35	-0.0924 GY	0.00	41.00				
36	-0.0924 GY	0.00	41.00				
37	-0.0924 GY	0.00	50.22				
38	-0.0924 GY	0.00	41.00				
39	-0.0924 GY	0.00	50.22				

LOADING 3 LOADTYPE NONE TITLE FRAME - SELF WEIGHT

SELFWEIGHT Y -1.000

ACTUAL WEIGHT OF THE STRUCTURE = 389.191 POUN

LOADING 4 LOADTYPE NONE TITLE ANTENNA DL + WL W/ ICE

MEMBER LOAD - UNIT POUN INCH

MEMBER	UDL	L1	L2	CON	L	LIN1	LIN2
44				-193.0000 GY	20.50		
43				-66.0000 GY	20.50		
42				-75.0000 GY	20.50		
41				-130.0000 GY	20.50		

MEMBER LOAD - UNIT POUN FEET

MEMBER	UDL	L1	L2	CON	L	LIN1	LIN2
44	118.1640 Z	0.00	3.42				
43	115.0560 Z	0.00	3.42				
42	115.0560 Z	0.00	3.42				
41	118.1640 Z	0.00	3.42				

MEMBER LOAD - UNIT POUN INCH

MEMBER	UDL	L1	L2	CON	L	LIN1	LIN2

FOR LOADING - 1

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
2	0.00000E+00	0.00000E+00	6.69665E+01	1.97844E+02	-2.96982E+02	0.00000E+00
3	-5.30627E+00	0.00000E+00	5.82717E+01	0.00000E+00	2.35579E+02	0.00000E+00
4	0.00000E+00	0.00000E+00	9.79857E+01	1.97844E+02	-5.39320E+02	0.00000E+00
5	0.00000E+00	0.00000E+00	9.79857E+01	1.97844E+02	5.39320E+02	0.00000E+00
6	5.30627E+00	0.00000E+00	5.82716E+01	0.00000E+00	-2.35579E+02	0.00000E+00
7	0.00000E+00	0.00000E+00	6.93994E+01	1.97844E+02	2.95766E+02	0.00000E+00
8	0.00000E+00	0.00000E+00	2.43288E+00	0.00000E+00	1.21644E+00	0.00000E+00
9	-3.86941E+01	0.00000E+00	6.35782E+01	3.08687E+02	-2.04585E+02	1.23868E+02
10	-4.86489E+01	0.00000E+00	6.33925E+01	2.46549E+02	-1.17573E+02	1.23869E+02
11	-2.05671E+01	0.00000E+00	3.82638E+01	1.35706E+02	8.70155E+01	0.00000E+00
12	1.39777E-04	0.00000E+00	9.49658E+00	0.00000E+00	-1.93518E-04	0.00000E+00
13	2.05671E+01	0.00000E+00	3.82642E+01	1.35706E+02	-8.70170E+01	0.00000E+00
14	4.86485E+01	0.00000E+00	6.33930E+01	2.46551E+02	1.17578E+02	-1.23867E+02

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
15	3.86942E+01	0.00000E+00	6.35776E+01	3.08686E+02	2.04582E+02	-1.23869E+02
16	0.00000E+00	0.00000E+00	2.43288E+00	0.00000E+00	-1.21644E+00	0.00000E+00
17	0.00000E+00	0.00000E+00	6.93994E+01	-1.97844E+02	-2.95766E+02	0.00000E+00
18	-5.30627E+00	0.00000E+00	5.82717E+01	0.00000E+00	2.35579E+02	0.00000E+00
19	0.00000E+00	0.00000E+00	9.79857E+01	-1.97844E+02	-5.39320E+02	0.00000E+00
20	0.00000E+00	0.00000E+00	9.79857E+01	-1.97844E+02	5.39320E+02	0.00000E+00
21	5.30627E+00	0.00000E+00	5.82716E+01	0.00000E+00	-2.35579E+02	0.00000E+00
22	0.00000E+00	0.00000E+00	6.93994E+01	-1.97844E+02	2.95766E+02	0.00000E+00
23	0.00000E+00	0.00000E+00	2.43288E+00	0.00000E+00	1.21644E+00	0.00000E+00
24	-2.05671E+01	0.00000E+00	4.73572E+01	-1.97844E+02	-8.70141E+01	0.00000E+00
25	-4.86488E+01	0.00000E+00	6.33925E+01	-2.46549E+02	1.17570E+02	-1.23868E+02
26	-3.86942E+01	0.00000E+00	5.44847E+01	-2.46549E+02	2.04588E+02	-1.23869E+02
27	1.39777E-04	0.00000E+00	9.49658E+00	0.00000E+00	-1.93518E-04	0.00000E+00
28	3.86939E+01	0.00000E+00	5.44855E+01	-2.46551E+02	-2.04590E+02	1.23867E+02
29	4.86487E+01	0.00000E+00	6.33925E+01	-2.46547E+02	-1.17565E+02	1.23869E+02
30	2.05671E+01	0.00000E+00	4.73568E+01	-1.97844E+02	8.70124E+01	0.00000E+00

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 1
LOADTYPE NONE TITLE WIND LOADING - FRAME

CENTER OF FORCE BASED ON Z FORCES ONLY (INCH).
(FORCES IN NON-GLOBAL DIRECTIONS WILL INVALIDATE RESULTS)

X = 0.102308074E+03
Y = 0.205628364E+02
Z = 0.123282607E+02

***TOTAL APPLIED LOAD (POUN INCH) SUMMARY (LOADING 1)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 0.00
SUMMATION FORCE-Z = 1587.42

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 32641.95 MY= -162406.35 MZ= 0.01

***TOTAL REACTION LOAD(POUN INCH) SUMMARY (LOADING 1)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 0.00
SUMMATION FORCE-Z = -1587.42

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -32641.95 MY= 162406.36 MZ= -0.01

MAXIMUM DISPLACEMENTS (INCH /RADIANS) (LOADING 1)

	MAXIMUMS	AT NODE
X =	1.40253E-02	14
Y =	-1.27026E-03	21
Z =	7.61553E-02	23
RX=	-2.53847E-04	29
RY=	-1.76229E-03	23
RZ=	2.55437E-04	29

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (POUN INCH)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
12	0.00	0.00	9.50	0.00	0.00	0.00	
	-0.27	-15.96	777.54	202.95	-244.68	4.06	111111
27	0.00	0.00	9.50	0.00	0.00	0.00	
	0.27	15.96	790.89	-376.84	-244.37	6.91	111111

FOR LOADING - 2

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
1	0.00000E+00	-2.57750E-01	0.00000E+00	0.00000E+00	0.00000E+00	-1.28875E-01
2	0.00000E+00	-7.28491E+00	0.00000E+00	0.00000E+00	0.00000E+00	-3.13347E+01
3	0.00000E+00	-6.40826E+00	0.00000E+00	9.23963E-01	0.00000E+00	2.53992E+01
4	0.00000E+00	-1.03135E+01	0.00000E+00	0.00000E+00	0.00000E+00	-5.71378E+01
5	0.00000E+00	-1.03135E+01	0.00000E+00	0.00000E+00	0.00000E+00	5.71378E+01
6	0.00000E+00	-6.40826E+00	0.00000E+00	9.23957E-01	0.00000E+00	-2.53992E+01
7	0.00000E+00	-7.28491E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.13347E+01
8	0.00000E+00	-2.57750E-01	0.00000E+00	0.00000E+00	0.00000E+00	1.28875E-01
9	4.37698E-08	-8.17999E+00	4.89131E-08	1.50766E+01	0.00000E+00	-1.34913E+01
10	-1.61689E-08	-8.45878E+00	-1.80691E-08	8.35840E+00	0.00000E+00	-7.47937E+00
11	0.00000E+00	-4.75414E+00	0.00000E+00	-6.71859E+00	0.00000E+00	6.01203E+00
12	0.00000E+00	-1.47553E+00	0.00000E+00	-1.84788E+00	0.00000E+00	5.61816E-06
13	0.00000E+00	-4.75417E+00	0.00000E+00	-6.71855E+00	0.00000E+00	-6.01231E+00
14	-3.75374E-08	-8.45878E+00	4.19470E-08	8.35842E+00	0.00000E+00	7.48011E+00
15	-6.97595E-10	-8.17996E+00	7.79583E-10	1.50765E+01	0.00000E+00	1.34909E+01
16	0.00000E+00	-2.57750E-01	0.00000E+00	0.00000E+00	0.00000E+00	-1.28875E-01
17	0.00000E+00	-7.28491E+00	0.00000E+00	0.00000E+00	0.00000E+00	-3.13347E+01
18	0.00000E+00	-6.40826E+00	0.00000E+00	9.23963E-01	0.00000E+00	2.53992E+01
19	0.00000E+00	-1.03135E+01	0.00000E+00	0.00000E+00	0.00000E+00	-5.71378E+01
20	0.00000E+00	-1.03135E+01	0.00000E+00	0.00000E+00	0.00000E+00	5.71378E+01
21	0.00000E+00	-6.40826E+00	0.00000E+00	9.23957E-01	0.00000E+00	-2.53992E+01
22	0.00000E+00	-7.28491E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.13347E+01
23	0.00000E+00	-2.57750E-01	0.00000E+00	0.00000E+00	0.00000E+00	1.28875E-01
24	0.00000E+00	-5.85943E+00	0.00000E+00	6.71844E+00	0.00000E+00	-6.01199E+00
25	4.37698E-08	-8.45877E+00	4.89131E-08	-8.35809E+00	0.00000E+00	7.47929E+00
26	-1.61689E-08	-7.07471E+00	-1.80691E-08	-1.50769E+01	0.00000E+00	1.34914E+01
27	0.00000E+00	-1.47553E+00	0.00000E+00	-1.84788E+00	0.00000E+00	5.61816E-06
28	-3.75374E-08	-7.07474E+00	4.19470E-08	-1.50768E+01	0.00000E+00	-1.34919E+01
29	-6.97595E-10	-8.45876E+00	7.79583E-10	-8.35799E+00	0.00000E+00	-7.47863E+00
30	0.00000E+00	-5.85940E+00	0.00000E+00	6.71838E+00	0.00000E+00	6.01180E+00

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 2
LOADTYPE NONE TITLE ICE LOADING - FRAME

CENTER OF FORCE BASED ON Y FORCES ONLY (INCH).
(FORCES IN NON-GLOBAL DIRECTIONS WILL INVALIDATE RESULTS)

X = 0.102000032E+03
Y = 0.205000000E+02
Z = 0.138410958E+02

***TOTAL APPLIED LOAD (POUN INCH) SUMMARY (LOADING 2)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -185.58
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 2568.63 MY= 0.00 MZ= -18929.19

***TOTAL REACTION LOAD(POUN INCH) SUMMARY (LOADING 2)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 185.58
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -2568.63 MY= 0.00 MZ= 18929.19

MAXIMUM DISPLACEMENTS (INCH /RADIANS) (LOADING 2)

	MAXIMUMS	AT NODE
X =	5.12210E-05	10
Y =	-7.47798E-03	1
Z =	7.39377E-04	8
RX=	-5.85483E-05	28
RY=	1.10550E-05	2
RZ=	5.93426E-05	18

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (POUN INCH)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
12	0.00	-1.48	0.00	-1.85	0.00	0.00	
	0.00	-82.53	174.74	-486.52	0.02	0.01	111111
27	0.00	-1.48	0.00	-1.85	0.00	0.00	
	0.00	-100.10	-174.74	-586.99	-0.02	0.01	111111

FOR LOADING - 3
APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
1	0.00000E+00	-6.74955E-01	0.00000E+00	0.00000E+00	0.00000E+00	-3.37477E-01
2	0.00000E+00	-1.70226E+01	0.00000E+00	0.00000E+00	0.00000E+00	-8.20545E+01

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
3	0.00000E+00	-1.62758E+01	0.00000E+00	1.78689E+00	0.00000E+00	6.70777E+01
4	0.00000E+00	-2.49533E+01	0.00000E+00	0.00000E+00	0.00000E+00	-1.49624E+02
5	0.00000E+00	-2.49533E+01	0.00000E+00	0.00000E+00	0.00000E+00	1.49624E+02
6	0.00000E+00	-1.62758E+01	0.00000E+00	1.78688E+00	0.00000E+00	-6.70777E+01
7	0.00000E+00	-1.70226E+01	0.00000E+00	0.00000E+00	0.00000E+00	8.20545E+01
8	0.00000E+00	-6.74955E-01	0.00000E+00	0.00000E+00	0.00000E+00	3.37477E-01
9	1.16692E-08	-1.46006E+01	1.30404E-08	2.47666E+01	0.00000E+00	-2.21624E+01
10	-1.64958E-08	-1.41445E+01	-1.84343E-08	1.17739E+01	0.00000E+00	-1.05356E+01
11	0.00000E+00	-8.19900E+00	0.00000E+00	-1.29934E+01	0.00000E+00	1.16269E+01
12	0.00000E+00	-2.85360E+00	0.00000E+00	-3.57370E+00	0.00000E+00	1.07646E-05
13	0.00000E+00	-8.19905E+00	0.00000E+00	-1.29933E+01	0.00000E+00	-1.16275E+01
14	2.11427E-08	-1.41445E+01	-2.36264E-08	1.17739E+01	0.00000E+00	1.05369E+01
15	3.45559E-09	-1.46005E+01	-3.86172E-09	2.47665E+01	0.00000E+00	2.21618E+01
16	0.00000E+00	-6.74955E-01	0.00000E+00	0.00000E+00	0.00000E+00	-3.37477E-01
17	0.00000E+00	-1.70226E+01	0.00000E+00	0.00000E+00	0.00000E+00	-8.20545E+01
18	0.00000E+00	-1.62758E+01	0.00000E+00	1.78689E+00	0.00000E+00	6.70777E+01
19	0.00000E+00	-2.49533E+01	0.00000E+00	0.00000E+00	0.00000E+00	-1.49624E+02
20	0.00000E+00	-2.49533E+01	0.00000E+00	0.00000E+00	0.00000E+00	1.49624E+02
21	0.00000E+00	-1.62758E+01	0.00000E+00	1.78688E+00	0.00000E+00	-6.70777E+01
22	0.00000E+00	-1.70226E+01	0.00000E+00	0.00000E+00	0.00000E+00	8.20545E+01
23	0.00000E+00	-6.74955E-01	0.00000E+00	0.00000E+00	0.00000E+00	3.37477E-01
24	0.00000E+00	-1.13318E+01	0.00000E+00	1.29931E+01	0.00000E+00	-1.16269E+01
25	1.16692E-08	-1.41445E+01	1.30404E-08	-1.17733E+01	0.00000E+00	1.05355E+01
26	-1.64958E-08	-1.14678E+01	-1.84343E-08	-2.47670E+01	0.00000E+00	2.21625E+01
27	0.00000E+00	-2.85360E+00	0.00000E+00	-3.57370E+00	0.00000E+00	1.07646E-05
28	2.11427E-08	-1.14679E+01	-2.36264E-08	-2.47669E+01	0.00000E+00	-2.21634E+01
29	3.45559E-09	-1.41445E+01	-3.86172E-09	-1.17731E+01	0.00000E+00	-1.05343E+01
30	0.00000E+00	-1.13318E+01	0.00000E+00	1.29930E+01	0.00000E+00	1.16265E+01

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 3
LOADTYPE NONE TITLE FRAME - SELF WEIGHT

CENTER OF FORCE BASED ON Y FORCES ONLY (INCH).
(FORCES IN NON-GLOBAL DIRECTIONS WILL INVALIDATE RESULTS)

X = 0.102000025E+03
Y = 0.205000000E+02
Z = 0.112172067E+02

***TOTAL APPLIED LOAD (POUN INCH) SUMMARY (LOADING 3)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -389.19
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 4365.63 MY= 0.00 MZ= -39697.45

***TOTAL REACTION LOAD(POUN INCH) SUMMARY (LOADING 3)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 389.19
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -4365.63 MY= 0.00 MZ= 39697.45

MAXIMUM DISPLACEMENTS (INCH /RADIANS) (LOADING 3)

	MAXIMUMS	AT NODE
X =	1.08519E-04	10
Y =	-1.71665E-02	1
Z =	1.74482E-03	8
RX=	-1.38340E-04	6
RY=	2.68877E-05	1
RZ=	1.38575E-04	18

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (POUN INCH)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
12	0.00	-2.85	0.00	-3.57	0.00	0.00	
	0.00	-172.80	391.26	-1020.22	0.04	0.01	111111
27	0.00	-2.85	0.00	-3.57	0.00	0.00	
	0.00	-210.68	-391.26	-1235.63	-0.04	0.02	111111

FOR LOADING - 4
APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
2	0.00000E+00	-6.50000E+01	2.01864E+02	1.37940E+03	0.00000E+00	0.00000E+00
4	0.00000E+00	-3.75000E+01	1.96554E+02	1.34312E+03	0.00000E+00	0.00000E+00
5	0.00000E+00	-3.30000E+01	1.96554E+02	1.34312E+03	0.00000E+00	0.00000E+00
7	0.00000E+00	-9.65000E+01	2.01864E+02	1.37940E+03	0.00000E+00	0.00000E+00
17	0.00000E+00	-6.50000E+01	2.01864E+02	-1.37940E+03	0.00000E+00	0.00000E+00
19	0.00000E+00	-3.75000E+01	1.96554E+02	-1.34312E+03	0.00000E+00	0.00000E+00
20	0.00000E+00	-3.30000E+01	1.96554E+02	-1.34312E+03	0.00000E+00	0.00000E+00
22	0.00000E+00	-9.65000E+01	2.01864E+02	-1.37940E+03	0.00000E+00	0.00000E+00

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 4
LOADTYPE NONE TITLE ANTENNA DL + WL W/ ICE

CENTER OF FORCE BASED ON Y FORCES ONLY (INCH).
(FORCES IN NON-GLOBAL DIRECTIONS WILL INVALIDATE RESULTS)

X = 0.114801722E+03
Y = 0.205000000E+02
Z = 0.000000000E+00

CENTER OF FORCE BASED ON Z FORCES ONLY (INCH).
(FORCES IN NON-GLOBAL DIRECTIONS WILL INVALIDATE RESULTS)

X = 0.102000000E+03
Y = 0.205000000E+02
Z = 0.000000000E+00

***TOTAL APPLIED LOAD (POUN INCH) SUMMARY (LOADING 4)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -464.00
SUMMATION FORCE-Z = 1593.67

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 32670.24 MY= -162554.34 MZ= -53268.00

***TOTAL REACTION LOAD(POUN INCH) SUMMARY (LOADING 4)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 464.00
SUMMATION FORCE-Z = -1593.67

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -32670.24 MY= 162554.34 MZ= 53268.00

MAXIMUM DISPLACEMENTS (INCH /RADIANS) (LOADING 4)

	MAXIMUMS	AT NODE
X =	-2.83260E-02	14
Y =	-8.71318E-02	8
Z =	3.73601E-01	1
RX=	-1.41243E-03	16
RY=	-9.02051E-03	7
RZ=	-1.10899E-03	8

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (POUN INCH)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
12	0.00	0.00	0.00	0.00	0.00	0.00	
	-129.58	-212.28	1390.03	-1187.62	138.38	-283.22	111111
27	0.00	0.00	0.00	0.00	0.00	0.00	
	129.58	-251.72	203.64	-1519.34	-138.38	-344.15	111111

LOAD COMBINATION NO. 5
COMBINATION LOAD CASE 5

LOADING-	1.	2.	3.	4.
FACTOR -	1.00	1.00	1.00	1.00

********** END OF DATA FROM INTERNAL STORAGE **********

69. DEFINE ENVELOPE
70. 5 ENVELOPE 1

**WARNING: DEFAULT ENVELOP TYPE 'STRESS' FOR ENVELOP# 1 IS ASSUMED

71. END DEFINE ENVELOPE
72. FINISH

********** END OF THE STAAD.Pro RUN **********

**** DATE= FEB 11,2015 TIME= 9:34:37 ****

Beam Combined Axial and Bending Stresses Summary

Beam	L/C	Length (in)	Max Comp Stress (ksi)	Max Comp d (in)	Max Comp Corner	Max Tens Stress (ksi)	Max Tens d (in)	Max Tens Corner
1	5:COMBINATIC	3.000	0.003	3.000		-0.003	3.000	
2	5:COMBINATIC	46.875	12.955	46.875		-12.828	46.875	
3	5:COMBINATIC	19.125	8.091	0.000		-8.936	0.000	
4	5:COMBINATIC	66.000	2.052	66.000		-2.855	66.000	
5	5:COMBINATIC	19.125	8.720	19.125		-9.546	19.125	
6	5:COMBINATIC	46.875	13.477	0.000		-13.309	0.000	
7	5:COMBINATIC	3.000	0.008	0.000		-0.008	0.000	
8	5:COMBINATIC	10.083	10.308	0.000		-8.337	0.000	
9	5:COMBINATIC	29.000	6.963	0.000		-4.247	0.000	
10	5:COMBINATIC	29.000	2.971	29.000				
11	5:COMBINATIC	10.083	5.048	10.083		-1.609	10.083	
12	5:COMBINATIC	10.083	5.866	0.000		-2.039	0.000	
13	5:COMBINATIC	29.000	3.056	0.000				
14	5:COMBINATIC	29.000	7.209	29.000		-4.254	29.000	
15	5:COMBINATIC	10.083	10.342	10.083		-8.319	10.083	
16	5:COMBINATIC	3.000	0.008	3.000		-0.008	3.000	
17	5:COMBINATIC	46.875	12.630	46.875		-12.758	46.875	
18	5:COMBINATIC	19.125	7.160	0.000		-8.285	0.000	
19	5:COMBINATIC	66.000	2.052	66.000		-3.220	66.000	
20	5:COMBINATIC	19.125	7.311	19.125		-8.455	19.125	
21	5:COMBINATIC	46.875	12.654	0.000		-12.822	0.000	
22	5:COMBINATIC	3.000	0.008	0.000		-0.008	0.000	
23	5:COMBINATIC	10.083	10.536	0.000		-8.577	0.000	
24	5:COMBINATIC	29.000	7.174	0.000		-5.272	0.000	
25	5:COMBINATIC	29.000	2.408	29.000		-1.079	29.000	
26	5:COMBINATIC	10.083	4.256	10.083		-3.560	10.083	
27	5:COMBINATIC	10.083	4.814	0.000		-4.489	0.000	
28	5:COMBINATIC	29.000	1.898	0.000		-0.790	0.000	
29	5:COMBINATIC	29.000	7.047	29.000		-5.208	29.000	
30	5:COMBINATIC	10.083	10.263	10.083		-8.339	10.083	
31	5:COMBINATIC	41.000	2.527	0.000		-2.217	0.000	
32	5:COMBINATIC	50.220	1.170	0.000		-3.411	0.000	
33	5:COMBINATIC	41.000	1.818	41.000				
34	5:COMBINATIC	50.220	0.174	50.220		-2.627	50.220	
35	5:COMBINATIC	41.000	2.377	41.000		-1.413	41.000	
36	5:COMBINATIC	41.000	2.653	0.000		-1.486	0.000	
37	5:COMBINATIC	50.220				-2.984	0.000	
38	5:COMBINATIC	41.000	2.048	41.000				
39	5:COMBINATIC	50.219	0.830	50.219		-3.665	50.219	
40	5:COMBINATIC	41.000	3.045	0.000		-2.623	0.000	
41	5:COMBINATIC	41.000	4.281	0.000		-4.116	0.000	
42	5:COMBINATIC	41.000	3.383	20.500		-3.234	20.500	
43	5:COMBINATIC	41.000	3.390	23.917		-3.253	23.917	
44	5:COMBINATIC	41.000	5.555	0.000		-5.327	0.000	

URS

Job Colchester, CT | Project No. V85-183 | Page ____ of ____

Description Stress on Antenna frame results | Computed by MCD | Date 2/2015 | Sheet ____ of ____

Checked by ____ | Date ____

Reference

- From the attached output, the maximum stress member in compression is:

Beam #6, 2.5 SCH 40 PIPE @ length of 46.875:1

$$\frac{KL}{r} = \frac{1.0(46.875:1)}{0.947} = 49.498 \rightarrow \text{say } 50$$

(conservatively) assuming the material strength is equal to 36 ksi and following ASD (9th ED) table C-36,

$\sigma_{allowable} = 18.35 \text{ ksi} > 13,477$ calculated ∴ OK in compression

73.4%

- From the attached output, the maximum stress member in Tension;

ASD (9th) Ch. D-1 $\sigma_{allowable} = 0.6 \times 36 \text{ ksi} = 21.6 \text{ ksi} > 13,309$ calculated ∴ OK in tension

61.6%

- Results:

The Verizon load proposed in addition to the existing load on the existing antenna mount frame is considered structurally adequate for the tower mount

About AECOM

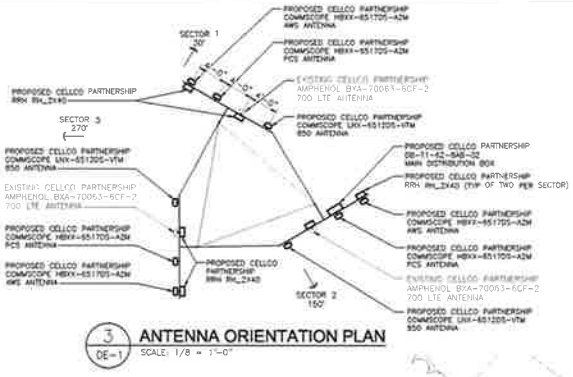
AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

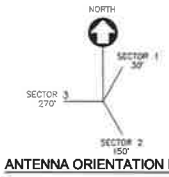
Address
Phone number
Other Contact Information

VERIZON (AKA: CELLCO PARTNERSHIP) ANTENNA LEGEND

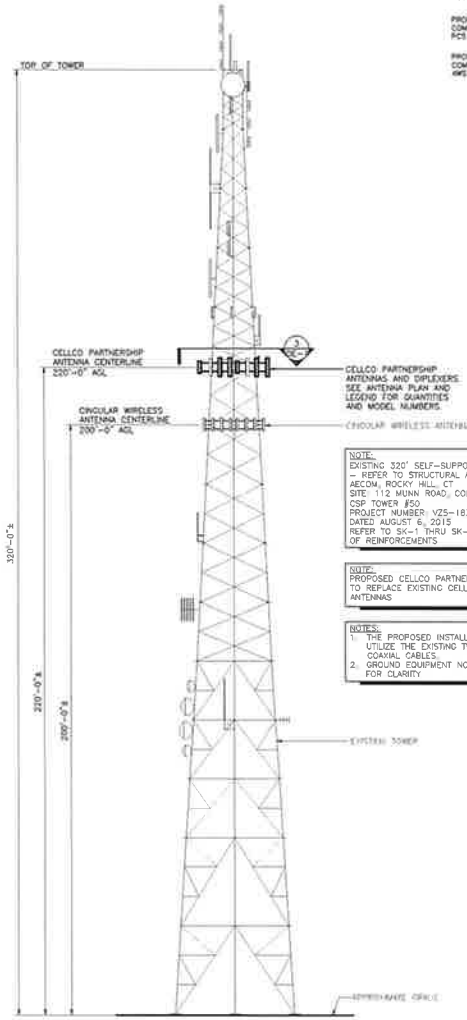
	ANTENNA MODEL	DIMENSIONS (LxWxD)	TOTAL	CENTERLINE
PROPOSED	850 ANTENNA COMMSCOPE LNX-6512DS-VTM	48.0"x11.9"x7.1"	3	SECTOR A – 220' SECTOR B – 220' SECTOR C – 220'
EXISTING TO REMAIN	700 LTE ANTENNA AMPHENOL BXA-70063-6CF-2	72.0"x11.9"x5.5"	1	
PROPOSED	PCS ANTENNA COMMSCOPE HBXX-6517DS-A2M	74.9"x12.0"x6.5"	3	
PROPOSED	AWS-LTE ANTENNA COMMSCOPE HBXX-6517DS-A2M	74.9"x12.0"x6.5"	3	



3 DE-1 **ANTENNA ORIENTATION PLAN**
SCALE: 1/8 = 1'-0"



ANTENNA ORIENTATION KEY

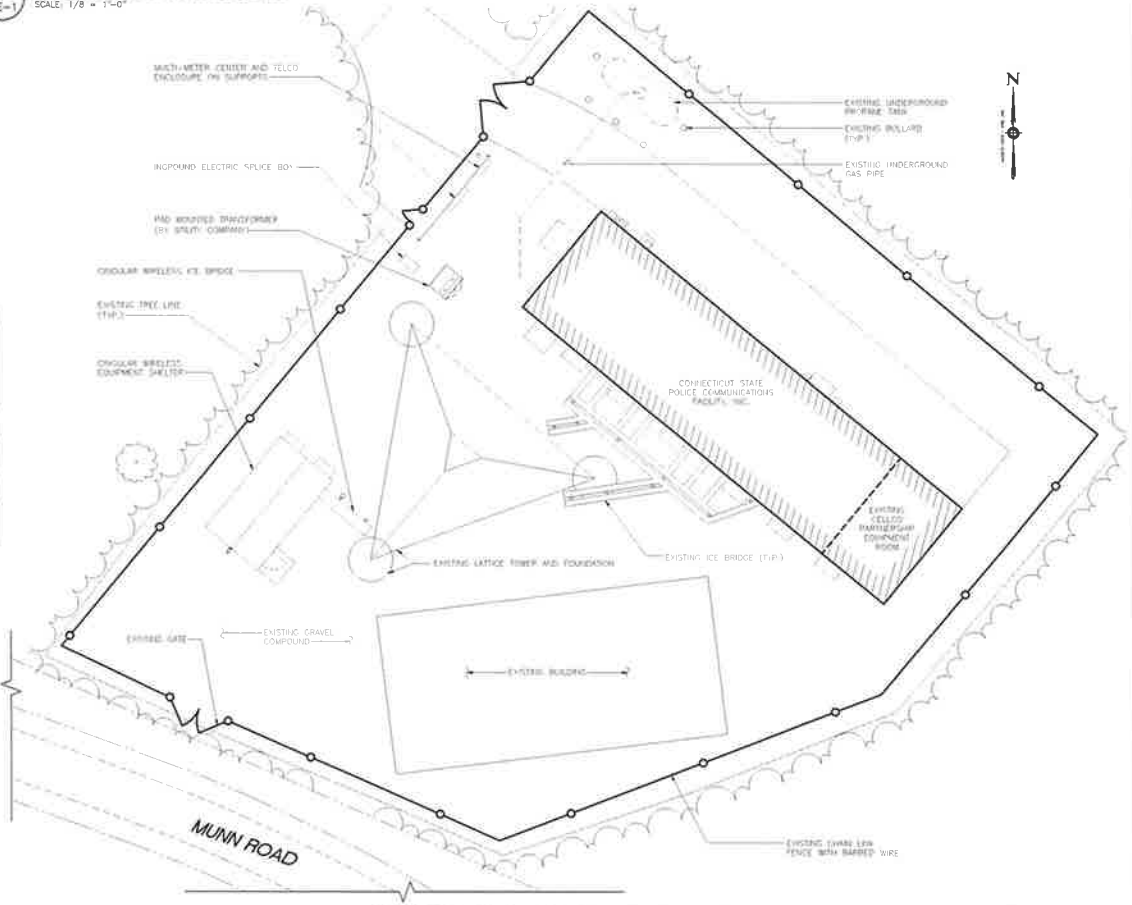


NOTE:
EXISTING 320' SELF-SUPPORTING TOWER – REFER TO STRUCTURAL ANALYSIS BY AECOM, ROCKY HILL, CT
SITE 112 MUNN ROAD, COLCHESTER, CT
CSP TOWER #50
PROJECT NUMBER: VZ5-183 REV. 2
DATED AUGUST 6, 2015
REFER TO SK-1 THRU SK-4 FOR DETAILS OF REINFORCEMENTS

NOTE:
PROPOSED CELLCO PARTNERSHIP ANTENNAS TO REPLACE EXISTING CELLCO PARTNERSHIP ANTENNAS

NOTES:
1. THE PROPOSED INSTALLATION WILL UTILIZE THE EXISTING TWELVE COAXIAL CABLES.
2. GROUND EQUIPMENT NOT SHOWN FOR CLARITY

2 DE-1 **TOWER ELEVATION**
SCALE: 1" = 20'-0"
0 10 20 40 60



1 DE-1 **PARTIAL SITE PLAN**
SCALE: 1" = 10'-0"
0 5 10 20 30

CELLCO PARTNERSHIP
DBA
verizon wireless

A&E FIRM
AECOM
500 ENTERPRISE DRIVE
SUITE 3B
ROCKY HILL, CONNECTICUT
1-(860)-529-8882

A&E SEAL

PROJECT NO: 35917432
JOB NO: VZ5-183
DRAWN BY: KAP
CHECKED BY: MJE

ISSUED FOR		
A	07-16-15	DESIGN EXHIBIT
B	07-31-15	DESIGN EXHIBIT

ANTENNA UPGRADE

COLCHESTER CT

WINDHAM AVE & MUNN ROAD
COLCHESTER, CONNECTICUT

SCALE: AS NOTED

PARTIAL SITE PLAN, ELEVATION AND ANTENNA PLAN

DE-1