



56 Prospect Street,  
P.O. Box 270  
Hartford, CT 06103

Kathleen M. Shanley  
Manager – Transmission Siting  
Tel: (860) 728-4527

January 8, 2021

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

**RE: Notice of Exempt Modification  
Eversource Site # ES-018 Colchester  
268 Windham Avenue (AKA 11 Munn Road or 112 Munn Road), Colchester, CT 06415  
Latitude: 41-35-33.5 N / Longitude: 72-19-16.2 W**

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy (“Eversource”) currently maintains multiple antennas mounted at various heights on an existing 320-foot self-support tower located at 268 Windham Avenue in Colchester. See [Attachment A](#), Parcel Map and Property Card. The tower and property are owned by the State of Connecticut Department of Emergency Services and Public Protection (“DESPP”). Eversource and DESPP have entered into an agreement allowing the modification of Eversource’s equipment on the DESPP tower. See [Attachment B](#), Letter of Authorization. Eversource plans to install two 3-foot 8-inch tall omni-directional antennas to be mounted at 142 feet and 160 feet above ground level (“AGL”) and two 7/8-inch diameter coaxial cables. There will be no changes to the area of the fenced compound, the tower or the existing antennas and equipment currently mounted on the tower. The antennas will be mounted to the existing tower on new 4-foot stand-off mounts. See [Attachment C](#), Mount Analysis. The tower and existing and proposed equipment are depicted on [Attachment D](#), Construction Drawings, dated November 4, 2020 and [Attachment E](#), Structural Analysis, dated May 21, 2020. The tower replaced a 180’ tall tower, previously under the Council’s jurisdiction, in 1985 through an exempt modification.<sup>1</sup>

The proposed installation is part of Eversource’s program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies (“R.C.S.A.”) §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A §

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<sup>1</sup> The replacement tower was exempt from consideration as a facility under Connecticut regulations as it constituted a major action under the National Environmental Policy Act.

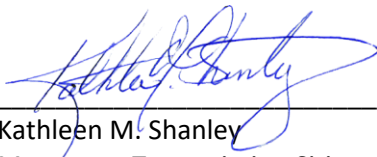
16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to Mary Bylone, First Selectman for the Town of Colchester and Matthew Bordeaux, Town Planner for the Town of Colchester, via private carrier. Proof of delivery is attached. See Attachment E, Proof of Delivery of Notice.

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. There will be no change to the height of the existing tower.
2. The proposed modifications will not require an extension of the site boundary.
3. The proposed modification 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 new antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated November 30, 2020 (Attachment G – Power Density Report)<sup>2</sup>.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Eversource respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2). One original copy of this notice is enclosed.

Communications regarding this Notice of Exempt Modification should be directed to Kathleen Shanley at (860) 728-4527.

By:   
Kathleen M. Shanley  
Manager – Transmission Siting

cc: Honorable Mary Bylone, First Selectman, Town of Colchester  
Matthew Bordeaux, Town Planner, Town of Colchester  
DESPP

#### Attachments

- A. Parcel Map and Property Card
- B. Letter of Authorization
- C. Mount Analysis
- D. Construction Drawings
- E. Structural Analysis
- F. Proof of Delivery of Notice
- G. Power Density Report

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<sup>2</sup> Any receive-only antennas are not included in the Power Density Report, as they are irrelevant in terms of the % MPE calculations.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD



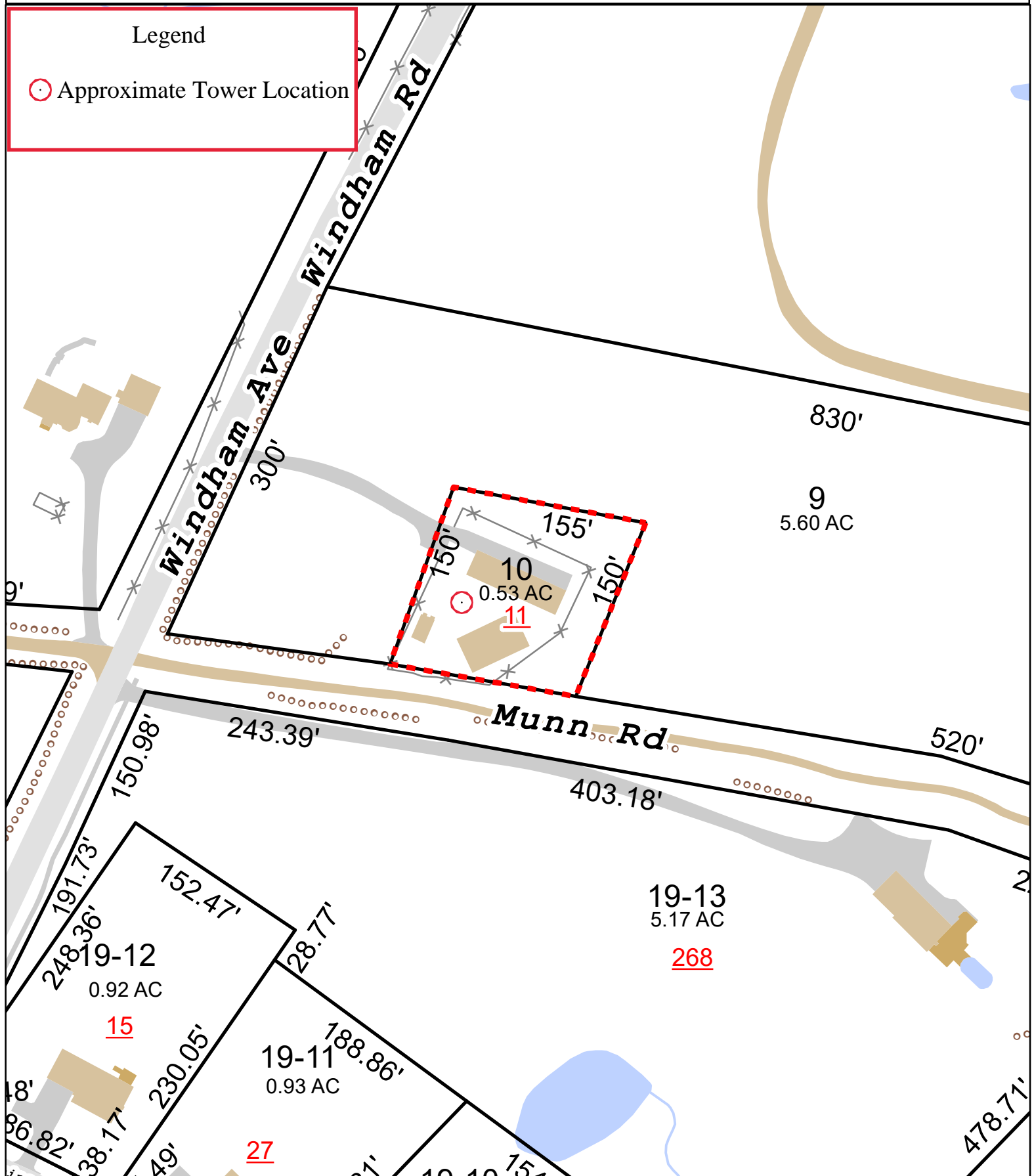
# Town of Colchester, Connecticut - Assessment Parcel Map

Parcel: 06-04-010-000

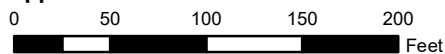
Address: 11 MUNN RD

## Legend

○ Approximate Tower Location



Approximate Scale: 1 inch = 100 feet



Map Produced: January 2020 / Grand List: 2019

Disclaimer: This map is for informational purposes only. All information is subject to verification by any user. The Town of Colchester and its mapping contractors assume no legal responsibility for the information contained herein.



# Town of Colchester, CT

## Property Listing Report

Map Block Lot

06-04/010-000

Account

C0515000

PID

5602

### Property Information

Property Location	11 MUNN RD
Owner	CONNECTICUT STATE OF
Co-Owner	
Mailing Address	165 CAPITOL AVE HARTFORD CT 06106
Land Use	901V State MDL-00
Land Class	E
Zoning Code	R60
Census Tract	NA
Sub Lot	
Neighborhood	NA
Acreege	0.53
Utilities	
Lot Setting/Desc	NA NA
Survey Map	
Additional Info	

### Photo



### Sketch

### Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	



# Town of Colchester, CT

Property Listing Report

Map Block Lot **06-04/010-000**

Account

**C0515000**

## Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	<b>0</b>	<b>0</b>
Extras	<b>0</b>	<b>0</b>
Outbuildings	<b>0</b>	<b>0</b>
Land	<b>49800</b>	<b>34900</b>
<b>Total</b>	<b>49800</b>	<b>34900</b>

## Outbuilding and Extra Items

Type	Description

## Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
<b>Total Area</b>		<b>0</b>

## Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
CONNECTICUT STATE OF	0082/0250		0

ATTACHMENT B – LETTER OF AUTHORIZATION



**STATE OF CONNECTICUT**  
**DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION**

February 4, 2020

Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

Re: **Letter of Authorization** – Co-location on Connecticut State Police tower  
Property address: 268 Windham Ave., Colchester, CT  
Latitude: 41-35-33” Longitude: 72-19-18”

To Whom It May Concern:

Eversource Energy (Eversource) has an Agreement with the Connecticut Department of Emergency Services and Public Protection (DESPP) to co-locate its communications equipment on the DESPP tower located at 268 Windham Ave., Colchester, Connecticut.

Eversource shall be required by the terms of the agreement to seek and obtain all necessary permits and approvals. As a duly authorized representative of the DESPP, permission is hereby granted to Eversource and agents thereof, for the purpose of consummating any applications necessary to gain the required approvals from the State of Connecticut.

Any fees or charges associated with all applications or permits and any conditions placed on the applicant shall be the sole responsibility of Eversource.

Yours truly,

Brian Benito  
Planning Specialist  
State Of Connecticut  
Department of Emergency Services and Public Protection  
CTS Unit  
860-685-8297  
brian.benito@ct.gov

*1111 Country Club Road  
Middletown, CT 06457  
Phone: (860) 685-8280/Fax: (860) 685-8345  
An Affirmative Action/Equal Employment Opportunity Employer*



ATTACHMENT C – MOUNT ANALYSIS

November 30, 2020

**MOUNT EVALUATION LETTER**

**Site Number:** 105094  
**Site Name:** COLCHESTER CSP  
**Site Data:** 268 Windham Ave.  
 Colchester, CT 06415  
**Latitude:** 41° 35' 33.5"  
**Longitude:** -72° 19' 16.2"

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Based on our evaluation we have determined the proposed antenna mounting system to be: **SUFFICIENT**

<b>Structure Rating (max from all components) =</b>	17.1%
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<b>Proposed Mounting System</b>	
SitePro 1 (USF-4U) 48" Ultimate Universal Stand-off Frame	

The proposed mounting system will be capable of supporting the proposed equipment, under the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the proposed antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Josh Riley in our Overland Park Office at 913-458-2522 if you have any questions or comments.

Sincerely,  
 Black & Veatch Corporation

Prepared By: JooHwan Jung  
 Submitted By: Josh Riley, P.E.



12/01/2020



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2. ANALYSIS CRITERIA SUMMARY
3. REFERENCES
4. ASSUMPTIONS
5. RESULTS SUMMARY

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APPENDIX 2: RISA PRINTOUTS

APPENDIX 3: ATTACHMENTS



**1. LOADING SUMMARY**

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	163	160	1	Omni	Telewave	ANT220F2
Eversource	1	-	145	142	1	Omni	Telewave	ANT220F2

This analysis analyzes the worst-case scenario for the proposed Site Pro 1 USF-4U stand off frame. Both levels are deemed sufficient.



## 2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 2" radial ice thickness
EXPOSURE CATEGORY	C
RISK CATEGORY	III
TOPO CATEGORY	Hill
CREST HEIGHT	66.5 ft

## 3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & 2018 Connecticut State Building Code
- Antenna Mount Assembly Drawing (Model: USF-4U) by SitePro 1, dated 02/16/2011

## 4. ASSUMPTIONS

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch should be notified to determine the effect on the structural integrity of the antenna mounting system.

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:
 

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325



**5. RESULTS SUMMARY**

Name	Bending Stress Ratio		Shear Stress Ratio	
Arm: HSS3X3X3/16	14.2%	Pass	2.9%	Pass
Bracing: Pipe 2.0 Std	17.1%	Pass	2.2%	Pass
Mount Pipe: Pipe 3.0 Std	8.6%	Pass	3.9%	Pass

\*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9\*Fy)

\*\*Capacity rating per TIA-222-H Section 15.5.



**BLACK & VEATCH**

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*November 30, 2020*

*COLCHESTER CSP*

**APPENDIX 1:  
MOUNT ANALYSIS REPORT**



**BLACK & VEATCH**

Client: Eversource

Site Name: COLCHESTER CSP (105094)

Computed By: JooHwan Jung

Date: 11/30/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/30/2020

**Dead and Live Loads**

Maintenance Live Load:  $L_V = 250$  lb

Installation Live Load:  $L_M = 0$  lb

Appurtenance Dead Loads	
Name	Weight (lb)
ANT220F2	11







**BLACK & VEATCH**

Client: Eversource  
 Site Name: COLCHESTER CSP (105094)

Computed By: JooHwan Jung

Date: 11/30/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/30/2020

**Member Wind Loading**

Exposure Category = C  
 Risk Category = III  
 Topographic Category = 1  
 Basic Wind Speed, V = 140 mph  
 Height Above Ground, z = 163 ft  
 Crest Height, H = 66.5 ft  
 Velocity Pressure Coefficient,  $K_z$  = 1.40  
 Topographic Factor,  $K_{zt}$  = 1.01  
 Wind Directionality Factor,  $K_d$  = 0.95  
 Shielding Factor,  $K_a$  = 0.90  
 Ground Elevation Factor,  $K_e$  = 1.000  
 Wind Velocity Pressure,  $q_z$  = 67.39 psf  
 Gust Effect Factor,  $G_h$  = 1.00

**Equations**

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.0005z^2}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_A = q_z G_h (EPA)$$

$$F_M = q_z G_h C_f D_p$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Wind Loads					
Name	Depth (ft)	Width (ft)	$C_f$	$D_p$ (ft)	$F_M$ (lb)
Arm: HSS3X3X3/16	0.25	0.25	2	0.25	33.69
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	16.00
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	23.59



Client: Eversource  
 Site Name: COLCHESTER CSP (105094)

Computed By: JooHwan Jung

Date: 11/30/2020

Verified By: JW

**BLACK & VEATCH**

Title: MOUNT ANALYSIS REPORT

Date: 11/30/2020

**Appurtenance Ice Dead Loading**

Exposure Category = C  
 Risk Category = III  
 Topographic Category = 1  
 Height Above Ground, z = 163 ft  
 Crest Height, H = 66.5 ft  
 Design Ice Thickness, T<sub>i</sub> = 2.00 in  
 Importance Factor, I = 1.15  
 Topographic Factor, K<sub>zt</sub> = 1.01  
 Height Escalation Factor, K<sub>iz</sub> = 1.17  
 Factored Ice Thickness, T<sub>iz</sub> = 2.71 in  
 Grating Ice Dead Load, D<sub>Gice</sub> = 12.63 psf

**Equations**

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{u \cdot 10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{u \cdot 30}$$

$$DL_{ice} = [(H_{ice} * D_{ice} * W_{ice}) - (H * W * D)] * 56pcf$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

**Appurtenance Ice Dead Loads**

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V <sub>ice</sub> (ft <sup>3</sup> )	DL <sub>ice</sub> (lb)
ANT220F2	4.12	0.68	0.68	1.71	95.88



**BLACK & VEATCH**

Client: Eversource  
 Site Name: COLCHESTER CSP (105094)

Computed By: Joohwan Jung

Date: 11/30/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/30/2020

**Member Ice Dead Loading**

Exposure Category = C  
 Risk Category = III  
 Topographic Category = 1  
 Height Above Ground, z = 163 ft  
 Crest Height, H = 66.5 ft  
 Design Ice Thickness, T<sub>i</sub> = 2.00 in  
 Importance Factor, I = 1.15  
 Topographic Factor, K<sub>zt</sub> = 1.01  
 Height Escalation Factor, K<sub>iz</sub> = 1.17  
 Factored Ice Thickness, T<sub>iz</sub> = 2.71 in  
 Grating Ice Dead Load, D<sub>Gice</sub> = 12.63 psf

**Equations**

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

$$A_{iz} = \pi i T_{iz} (D_c + T_{iz})$$

$$DL_{ice} = A_{iz} \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

2.6.10

**Member Ice Dead Loads**

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft <sup>2</sup> )	DL <sub>ice</sub> (lb/ft)
Arm: HSS3X3X3/16	0.70	0.70	0.35	0.41	22.97
Bracing: Pipe 2.0 Std	0.65		0.20	0.30	16.80
Mount Pipe: Pipe 3.0 Std	0.74		0.29	0.37	20.51





Client: Eversource  
 Site Name: COLCHESTER CSP (105094)

Computed By: JooHwan Jung

Date: 11/30/2020

Verified By: JW

**BLACK & VEATCH**

Title: MOUNT ANALYSIS REPORT

Date: 11/30/2020

**Member Ice Wind Loading**

Exposure Category = C  
 Risk Category = III  
 Topographic Category = 1  
 Ice Wind Speed,  $V_{ice}$  = 50 mph  
 Height Above Ground,  $z$  = 163 ft  
 Crest Height,  $H$  = 66.5 ft  
 Velocity Pressure Coefficient,  $K_z$  = 1.40 psf  
 Topographic Factor,  $K_{zt}$  = 1.01  
 Wind Directionality Factor,  $K_d$  = 0.95  
 Shielding Factor,  $K_a$  = 0.90  
 Ground Elevation Factory,  $K_e$  = 1.000  
 Ice Wind Velocity Pressure,  $q_{z(ice)}$  = 8.596  
 Factored Ice Thickness,  $T_{iz}$  = 2.71 in  
 Gust Effect Factor,  $G_h$  = 1

**Equations**

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.00003z^2}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$$

$$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

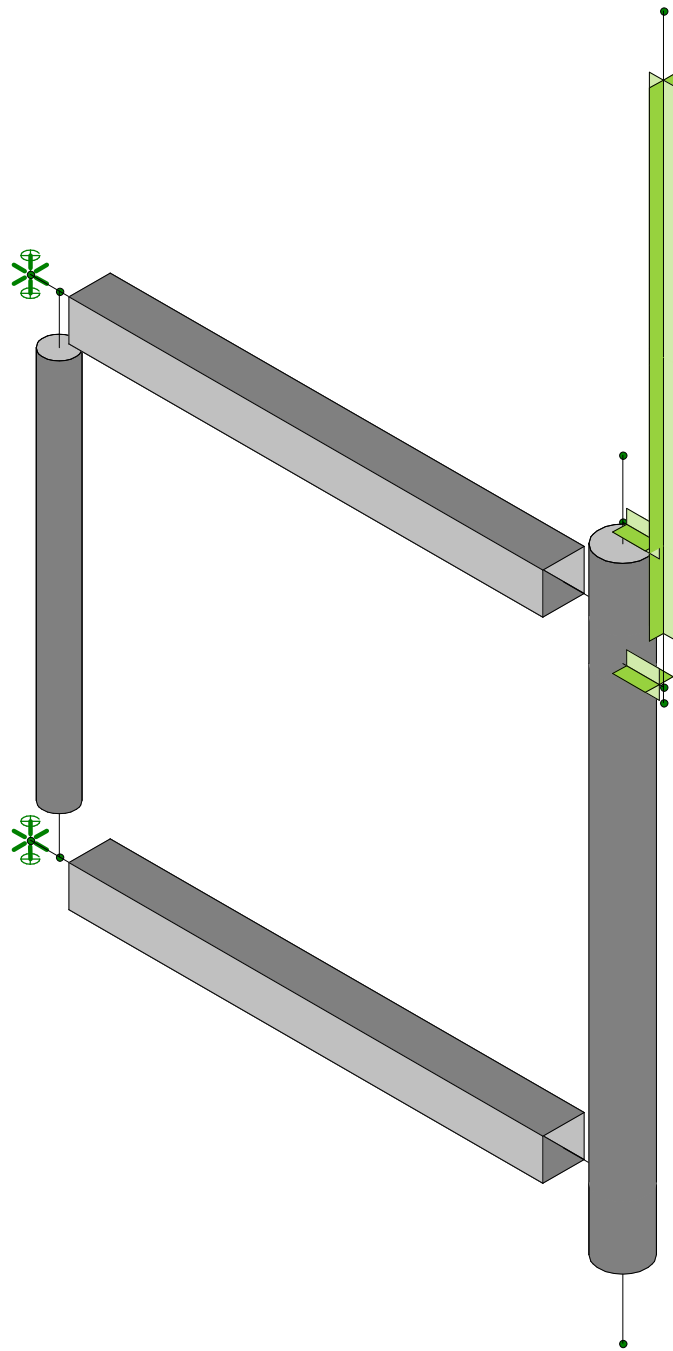
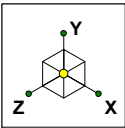
2.6.11.6

2.6.11.2

2.6.11.2

Member Ice Wind Loads					
Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	$C_f$	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Arm: HSS3X3X3/16	0.70	0.70	2	0.70	12.05
Bracing: Pipe 2.0 Std	0.65		1.2	0.65	6.69
Mount Pipe: Pipe 3.0 Std	0.74		1.2	0.74	7.66

**APPENDIX 2:  
RISA PRINTOUTS**



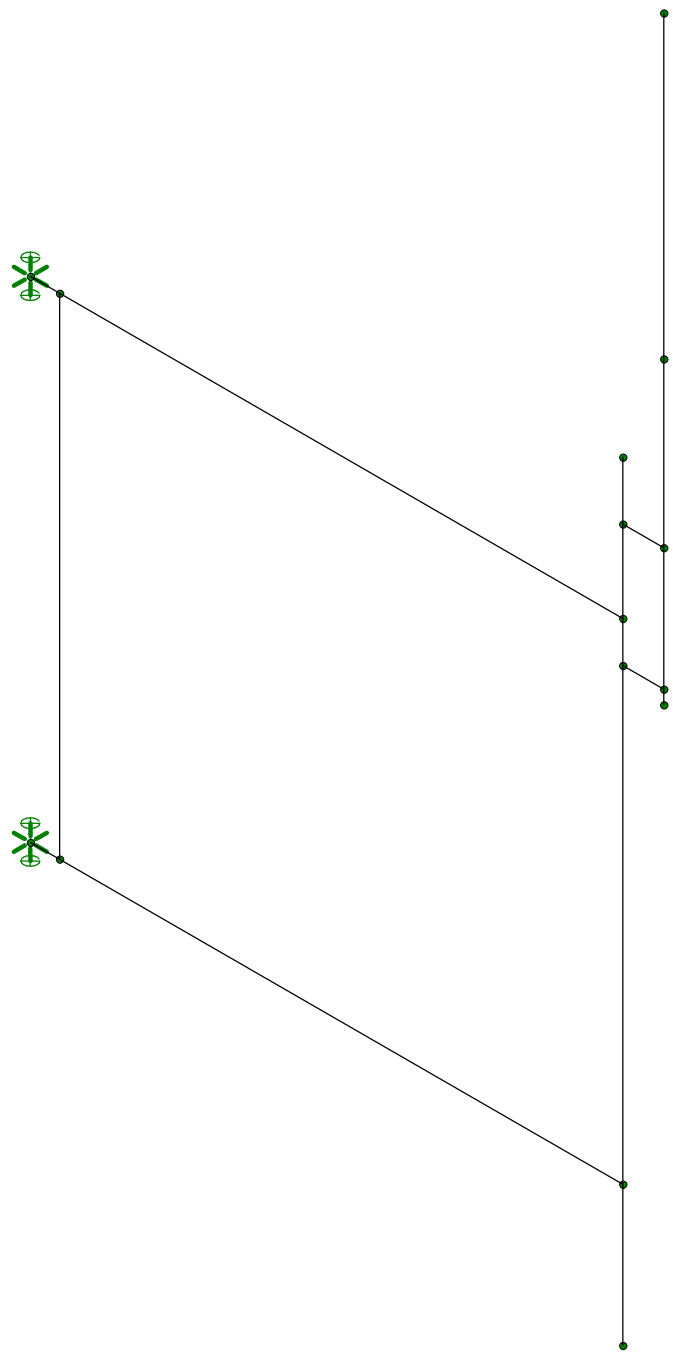
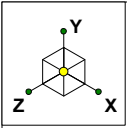
Envelope Only Solution

Black & Veatch
Joochan Jung
405025.2021.2200

ChurchHill LCD USF-4U Model_163ft
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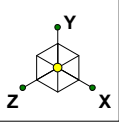
SK - 1
Nov 24, 2020 at 10:24 AM
COLCHESTER CSP USF-4U Mod...



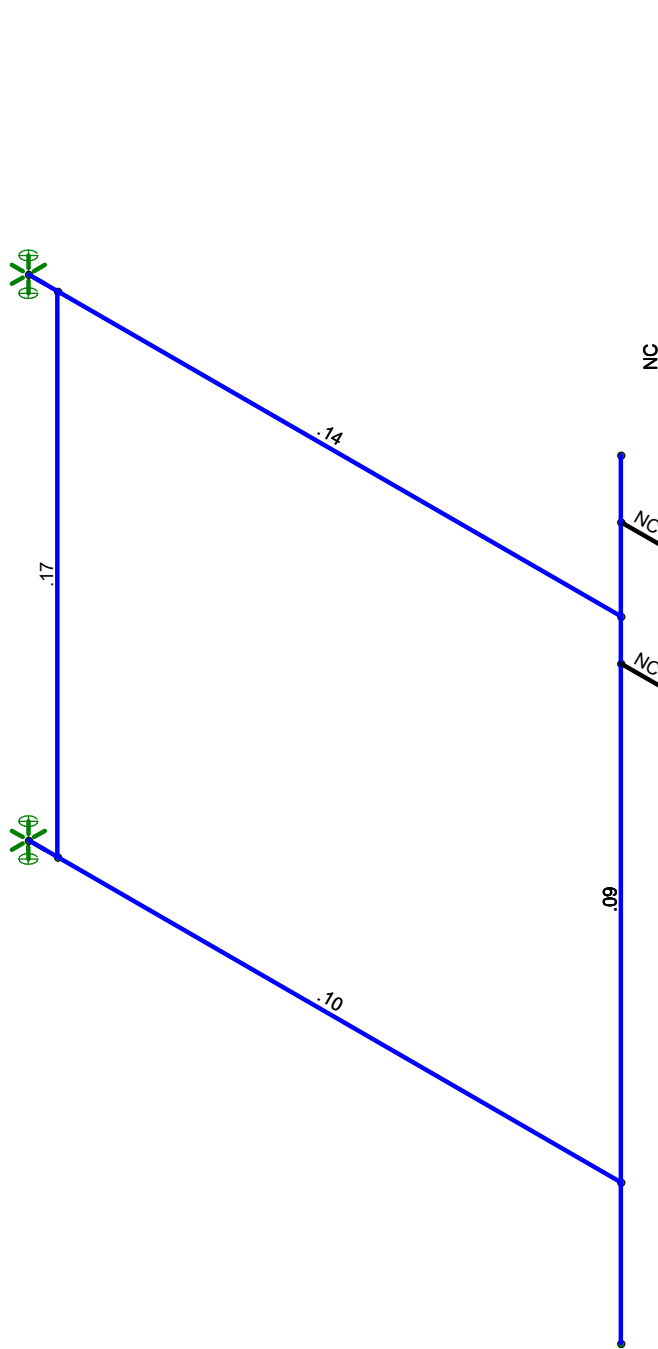


Envelope Only Solution

Black & Veatch	ChurchHill LCD USF-4U Model_163ft	SK - 2
JooHwan Jung		Nov 24, 2020 at 10:24 AM
405025.2021.2200		COLCHESTER CSP USF-4U Mod...

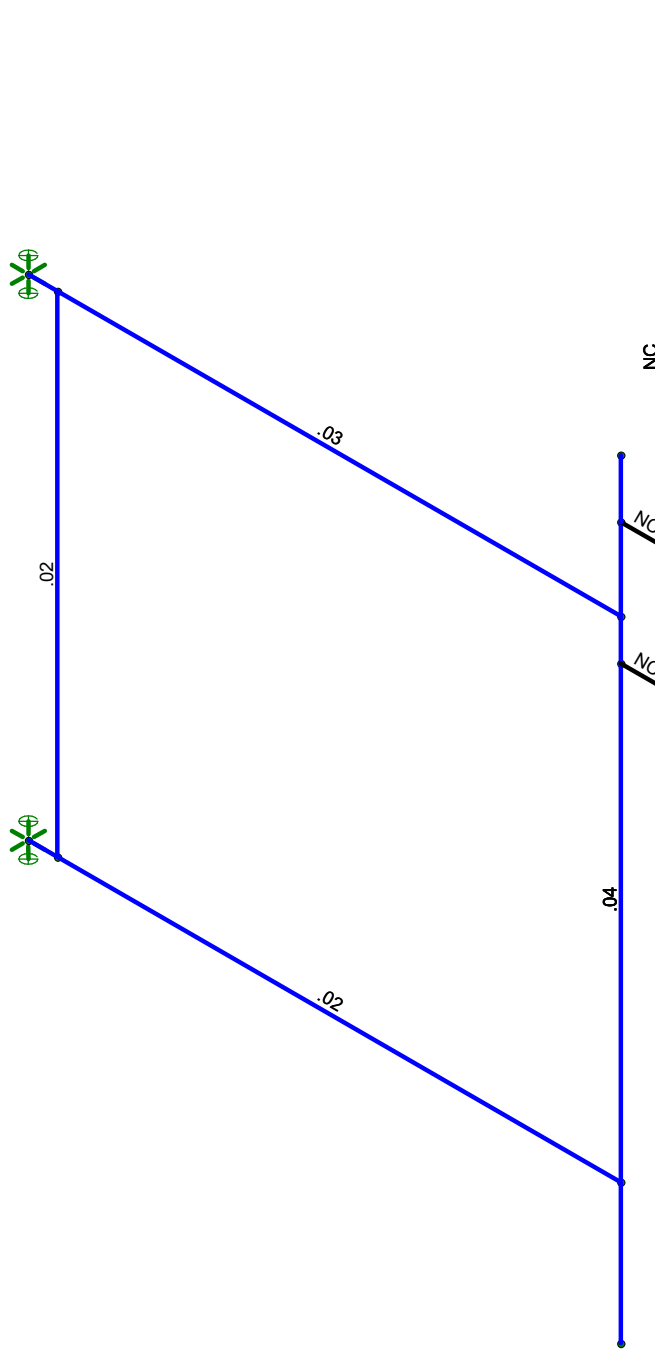
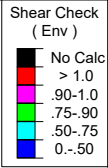
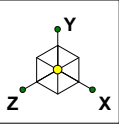


Code Check ( Env )	
Black	No Calc
Red	> 1.0
Pink	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

Black & Veatch	ChurchHill LCD USF-4U Model_163ft	SK - 3
Joochan Jung		Nov 24, 2020 at 10:24 AM
405025.2021.2200		COLCHESTER CSP USF-4U Mod...

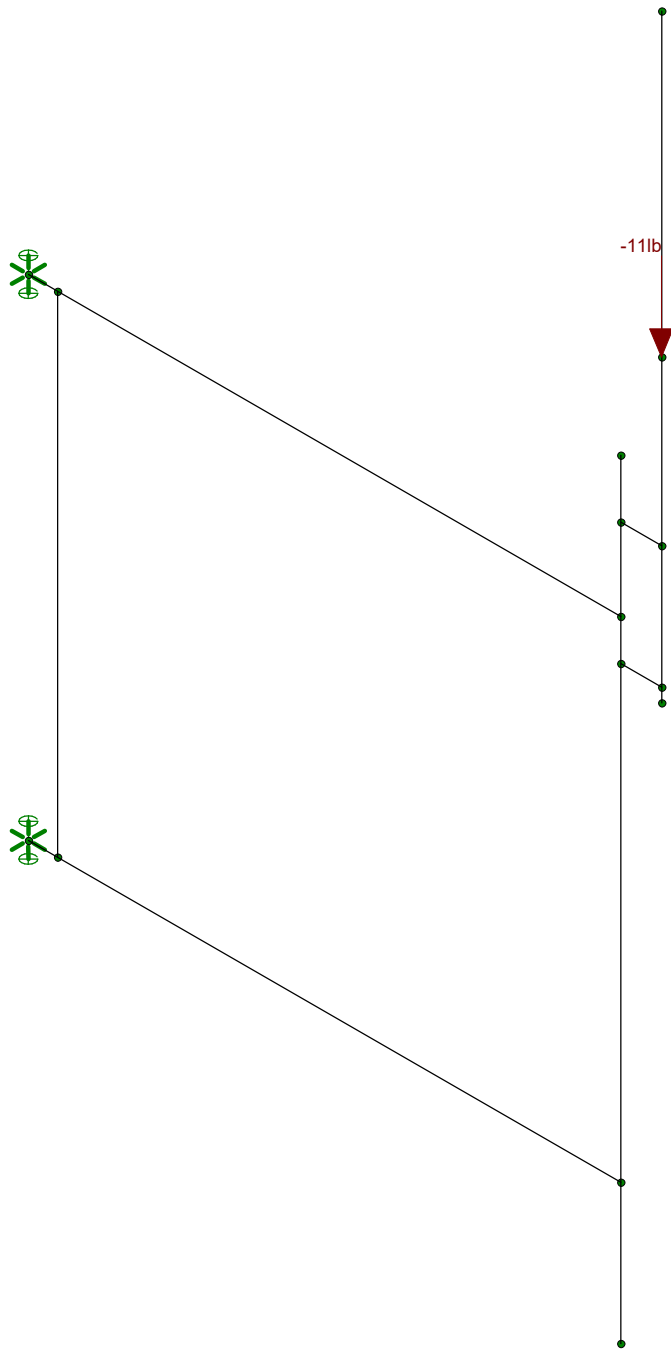
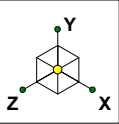


Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

Black & Veatch  
JooHwan Jung  
405025.2021.2200

ChurchHill LCD USF-4U Model\_163ft

SK - 4  
Nov 24, 2020 at 10:24 AM  
COLCHESTER CSP USF-4U Mod...



Loads: BLC 1, DL  
Envelope Only Solution

Black & Veatch  
Joochan Jung  
405025.2021.2200

ChurchHill LCD USF-4U Model\_163ft

SK - 5  
Nov 24, 2020 at 10:24 AM  
COLCHESTER CSP USF-4U Mod...

**(Global) Model Settings**

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

### (Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

### Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Arm	HSS3X3X3	Beam	SquareTube	A53 Gr.B	Typical	1.89	2.46	2.46	4.03
2	Bracing	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	Mount Pipe	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69

### General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen_Conc3NW	3155	1372	.15	.6	.145
2	gen_Conc4NW	3644	1584	.15	.6	.145
3	gen_Conc3LW	2085	906	.15	.6	.11
4	gen_Conc4LW	2408	1047	.15	.6	.11
5	gen_Alum	10100	4077	.3	1.29	.173
6	gen_Steel	29000	11154	.3	.65	.49
7	gen_Plywood	1800	38	0	.3	.035
8	RIGID	1e+6		.3	0	0

### Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction		Reaction	
2	N3	Reaction	Reaction	Reaction		Reaction	

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Arm	Beam	SquareTube	A53 Gr.B	Typical
2	M2	N3	N4			Arm	Beam	SquareTube	A53 Gr.B	Typical
3	M3	N5	N6			Bracing	Column	Pipe	A53 Gr.B	Typical
4	M4	N7	N8			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
5	M5	N9	N10			RIGID	None	None	RIGID	Typical
6	M6	N12	N13			RIGID	None	None	RIGID	Typical
7	M7	N15	N14			RIGID	None	None	RIGID	Typical

### Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None

### Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Arm	43.5			Lbyy						Lateral
2	M2	Arm	43.5			Lbyy						Lateral
3	M3	Bracing	36									Lateral
4	M4	Mount Pipe	56.5									Lateral

### Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
1	DL	DL		-1		1			
2	Maintenance LL - LV	LL				1			
3	Installation LL - LM	LL				1			
4	Wind - 0 Deg (X)	WL				1		4	
5	Wind - 30 Deg (X)	WL				1		4	
6	Wind - 60 Deg (X)	WL				1		4	
7	Wind - 90 Deg (X)	WL				1		4	
8	Wind - 120 Deg (X)	WL				1		4	
9	Wind - 150 Deg (X)	WL				1		4	
10	Wind - 180 Deg (X)	WL				1		4	
11	Wind - 210 Deg (X)	WL				1		4	
12	Wind - 240 Deg (X)	WL				1		4	
13	Wind - 270 Deg (X)	WL				1		4	
14	Wind - 300 Deg (X)	WL				1		4	
15	Wind - 330 Deg (X)	WL				1		4	
16	Wind - 0 Deg (Z)	WL				1		4	
17	Wind - 30 Deg (Z)	WL				1		4	
18	Wind - 60 Deg (Z)	WL				1		4	



**Basic Load Cases (Continued)**

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me... Surface(...
19 Wind - 90 Deg (Z)	WL				1		4
20 Wind - 120 Deg (Z)	WL				1		4
21 Wind - 150 Deg (Z)	WL				1		4
22 Wind - 180 Deg (Z)	WL				1		4
23 Wind - 210 Deg (Z)	WL				1		4
24 Wind - 240 Deg (Z)	WL				1		4
25 Wind - 270 Deg (Z)	WL				1		4
26 Wind - 300 Deg (Z)	WL				1		4
27 Wind - 330 Deg (Z)	WL				1		4
28 Ice DL	DL				1		4
29 Ice Wind - 0 Deg (X)	WL				1		4
30 Ice Wind - 30 Deg (X)	WL				1		4
31 Ice Wind - 60 Deg (X)	WL				1		4
32 Ice Wind - 90 Deg (X)	WL				1		4
33 Ice Wind - 120 Deg (X)	WL				1		4
34 Ice Wind - 150 Deg (X)	WL				1		4
35 Ice Wind - 180 Deg (X)	WL				1		4
36 Ice Wind - 210 Deg (X)	WL				1		4
37 Ice Wind - 240 Deg (X)	WL				1		4
38 Ice Wind - 270 Deg (X)	WL				1		4
39 Ice Wind - 300 Deg (X)	WL				1		4
40 Ice Wind - 330 Deg (X)	WL				1		4
41 Ice Wind - 0 Deg (Z)	WL				1		4
42 Ice Wind - 30 Deg (Z)	WL				1		4
43 Ice Wind - 60 Deg (Z)	WL				1		4
44 Ice Wind - 90 Deg (Z)	WL				1		4
45 Ice Wind - 120 Deg (Z)	WL				1		4
46 Ice Wind - 150 Deg (Z)	WL				1		4
47 Ice Wind - 180 Deg (Z)	WL				1		4
48 Ice Wind - 210 Deg (Z)	WL				1		4
49 Ice Wind - 240 Deg (Z)	WL				1		4
50 Ice Wind - 270 Deg (Z)	WL				1		4
51 Ice Wind - 300 Deg (Z)	WL				1		4
52 Ice Wind - 330 Deg (Z)	WL				1		4

**Load Combinations**

Description	S...PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1 WIND LOAD COMBOS (140 MPH)																		
2 1.2DL + WL (0 DEG)	Y...	Y		1	1.2	4	1	16	1									
3 1.2DL + WL (30 DEG)	Y...	Y		1	1.2	5	1	17	1									
4 1.2DL + WL (60 DEG)	Y...	Y		1	1.2	6	1	18	1									
5 1.2DL + WL (90 DEG)	Y...	Y		1	1.2	7	1	19	1									
6 1.2DL + WL (120 DEG)	Y...	Y		1	1.2	8	1	20	1									
7 1.2DL + WL (150 DEG)	Y...	Y		1	1.2	9	1	21	1									
8 1.2DL + WL (180 DEG)	Y...	Y		1	1.2	10	1	22	1									
9 1.2DL + WL (210 DEG)	Y...	Y		1	1.2	11	1	23	1									
10 1.2DL + WL (240 DEG)	Y...	Y		1	1.2	12	1	24	1									
11 1.2DL + WL (270 DEG)	Y...	Y		1	1.2	13	1	25	1									
12 1.2DL + WL (300 DEG)	Y...	Y		1	1.2	14	1	26	1									
13 1.2DL + WL (330 DEG)	Y...	Y		1	1.2	15	1	27	1									
14																		
15 MOUNT LOAD COMBOS (30 MPH)																		
16 1.4DL	Y...	Y		1	1.4													
17 1.2DL + 1.5LV	Y...	Y		1	1.2	2	1.5											
18 1.2DL + 1.5LM + WL (0 DEG)	Y...	Y		1	1.2	3	1.5	4	.046	16	.046							





**Load Combinations (Continued)**

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
19	1.2DL + 1.5LM + WL (30 DEG)	Y...	Y		1	1.2	3	1.5	5	.046	17	.046								
20	1.2DL + 1.5LM + WL (60 DEG)	Y...	Y		1	1.2	3	1.5	6	.046	18	.046								
21	1.2DL + 1.5LM + WL (90 DEG)	Y...	Y		1	1.2	3	1.5	7	.046	19	.046								
22	1.2DL + 1.5LM + WL (120 DEG)	Y...	Y		1	1.2	3	1.5	8	.046	20	.046								
23	1.2DL + 1.5LM + WL (150 DEG)	Y...	Y		1	1.2	3	1.5	9	.046	21	.046								
24	1.2DL + 1.5LM + WL (180 DEG)	Y...	Y		1	1.2	3	1.5	10	.046	22	.046								
25	1.2DL + 1.5LM + WL (210 DEG)	Y...	Y		1	1.2	3	1.5	11	.046	23	.046								
26	1.2DL + 1.5LM + WL (240 DEG)	Y...	Y		1	1.2	3	1.5	12	.046	24	.046								
27	1.2DL + 1.5LM + WL (270 DEG)	Y...	Y		1	1.2	3	1.5	13	.046	25	.046								
28	1.2DL + 1.5LM + WL (300 DEG)	Y...	Y		1	1.2	3	1.5	14	.046	26	.046								
29	1.2DL + 1.5LM + WL (330 DEG)	Y...	Y		1	1.2	3	1.5	15	.046	27	.046								
30																				
31	ICE LOAD COMBOS (2", 50 MPH)																			
32	1.2DL + Ice DL + Ice WL (0 DEG)	Y...	Y		1	1.2	28	1	29	1	41	1								
33	1.2DL + Ice DL + Ice WL (30 DEG)	Y...	Y		1	1.2	28	1	30	1	42	1								
34	1.2DL + Ice DL + Ice WL (60 DEG)	Y...	Y		1	1.2	28	1	31	1	43	1								
35	1.2DL + Ice DL + Ice WL (90 DEG)	Y...	Y		1	1.2	28	1	32	1	44	1								
36	1.2DL + Ice DL + Ice WL (120 DEG)	Y...	Y		1	1.2	28	1	33	1	45	1								
37	1.2DL + Ice DL + Ice WL (150 DEG)	Y...	Y		1	1.2	28	1	34	1	46	1								
38	1.2DL + Ice DL + Ice WL (180 DEG)	Y...	Y		1	1.2	28	1	35	1	47	1								
39	1.2DL + Ice DL + Ice WL (210 DEG)	Y...	Y		1	1.2	28	1	36	1	48	1								
40	1.2DL + Ice DL + Ice WL (240 DEG)	Y...	Y		1	1.2	28	1	37	1	49	1								
41	1.2DL + Ice DL + Ice WL (270 DEG)	Y...	Y		1	1.2	28	1	38	1	50	1								
42	1.2DL + Ice DL + Ice WL (300 DEG)	Y...	Y		1	1.2	28	1	39	1	51	1								
43	1.2DL + Ice DL + Ice WL (330 DEG)	Y...	Y		1	1.2	28	1	40	1	52	1								
44																				

**Envelope Joint Reactions**

Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC	
1	N1	max	231.833	2	281.674	38	331.629	5	0	43	729.327	11	0	43
2		min	-552.818	17	-.254	2	-331.629	11	0	2	-729.327	5	0	2
3	N3	max	552.818	17	287.48	32	158.331	5	0	43	460.101	11	0	43
4		min	-58.791	8	2.687	8	-158.331	11	0	2	-460.101	5	0	2
5	Totals:	max	489.962	2	530.83	38	489.96	5						
6		min	-489.962	8	121.445	2	-489.96	11						

**Envelope AISC 15th(360-16): LRFD Steel Code Checks**

Member	Shape	Code Check	Loc[in]	LC	Shear..	Loc[...]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...Cb	Eqn	
1	M1	HSS3X3X3	.142	0	11	.029	2.266	z	11	55265....	59535	5171.25	5171.25	2...H1-1b
2	M2	HSS3X3X3	.099	43.5	17	.018	0	y	32	55265....	59535	5171.25	5171.25	2...H1-1b
3	M3	PIPE 2.0	.171	0	17	.022	0		17	28843....	32130	1871.6...	1871.6...	2...H1-1b
4	M4	PIPE 3.0	.086	45.906	17	.039	10.5...		17	57908....	65205	5748.75	5748.75	1...H1-1b

**APPENDIX 3:  
ATTACHMENTS**

# ANT220F2DIN

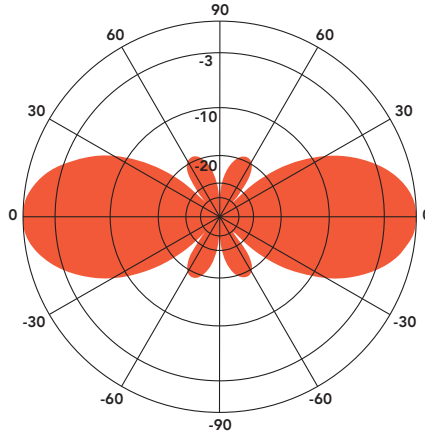
## FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

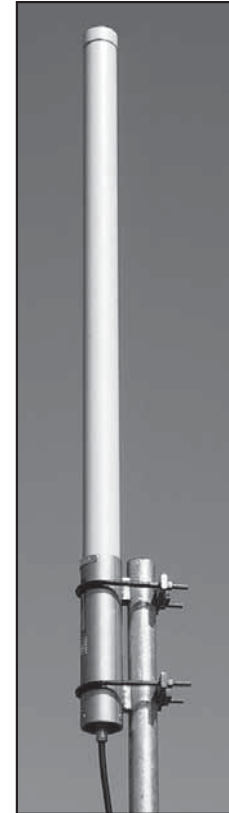
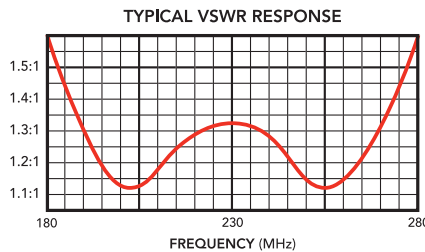
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.

**ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.**

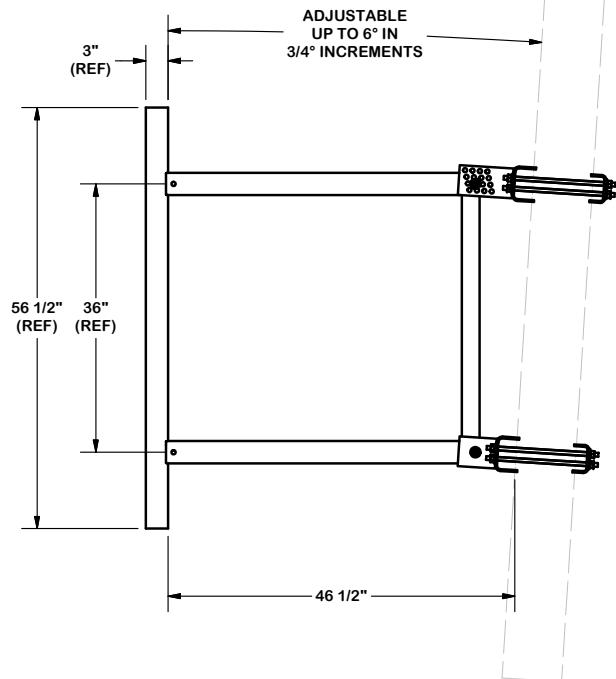
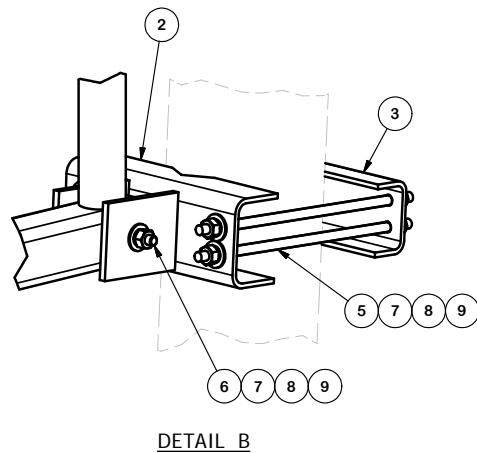
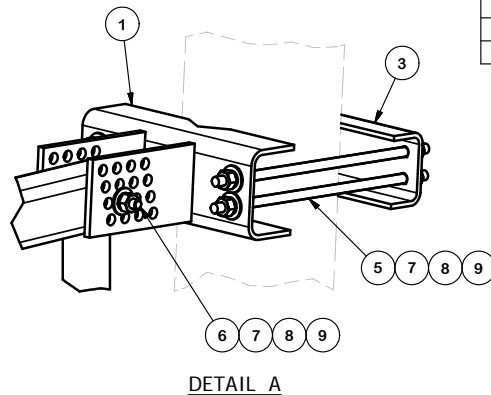
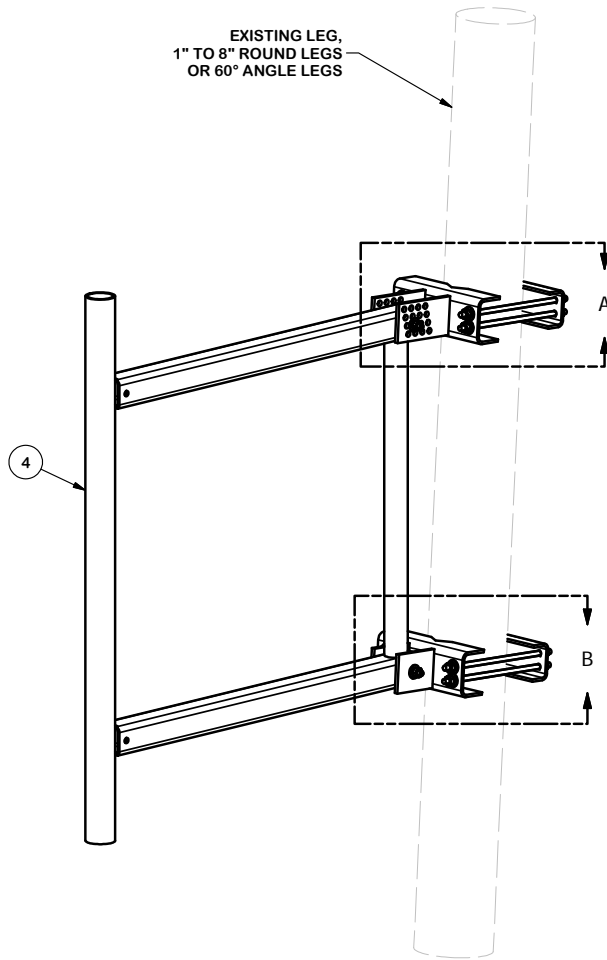


ANT220F2 - 230 MHz  
Vertical Plane  
Gain = 2.58 dBd



SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	Dimensions (L x base diam.) in.	44 x 2.75
Gain	2.5 dBd	Tower weight (antenna + clamps)	11 lb.
Power rating (typ.)	500 watts	Shipping weight	14 lb.
Impedance	50 ohms	Wind rating / with 0.5" ice	200 / 150 MPH
VSWR	1.5:1 or less	Maximum exposed area	1.1 ft. <sup>2</sup>
Pattern	Omnidirectional	Lateral thrust at 100 MPH	44 lb.
Vertical beamwidth	38°	Bending moment at top clamp	47 ft. lb.
Termination	7-16 DIN-F	(100 MPH, 40 PSF flat plate equiv.)	

EXISTING LEG,  
1" TO 8" ROUND LEGS  
OR 60° ANGLE LEGS



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	CFM	UPPER GATE FOOT WELDMENT		13.90	13.90
2	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
3	2	GBB	GATE BACKING BAR		4.53	9.06
4	1	4PBG	48" PIPE MOUNT STANDOFF ARM		113.96	113.96
5	8	G12R-12	1/2" x 12" GALV. THREADED ROD		0.67	5.35
5	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84	6.69
6	2	A1205	1/2" x 5" A325 HDG BOLT		0.34	0.69
7	18	G12FW	1/2" HDG USS FLATWASHER		0.03	0.61
8	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
9	18	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.29
					TOTAL WT. #	164.53

**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

48" ULTIMATE UNIVERSAL  
 STANDOFF FRAME

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 2/16/2011

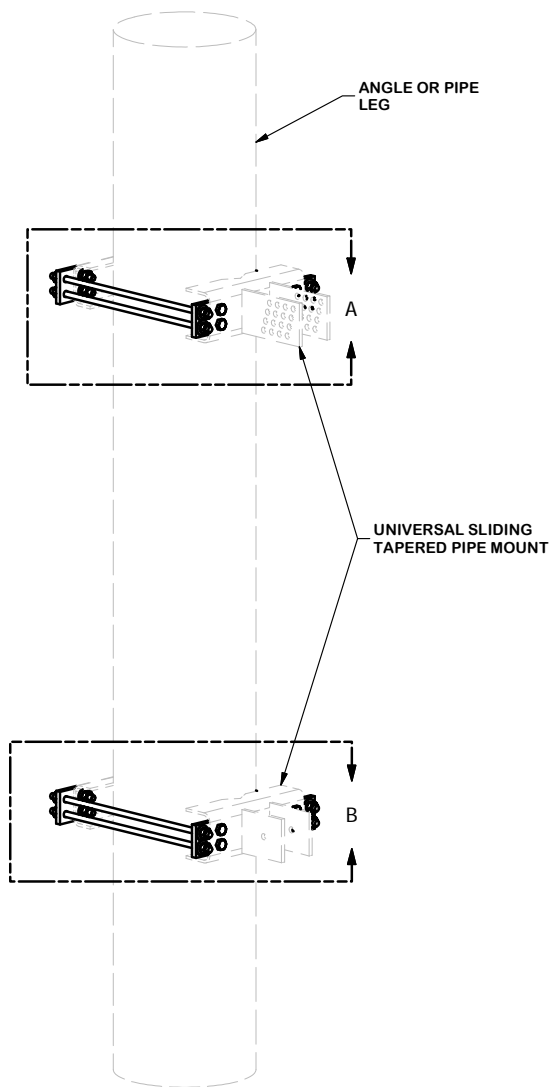


Engineering  
 Support Team:  
 1-888-753-7446

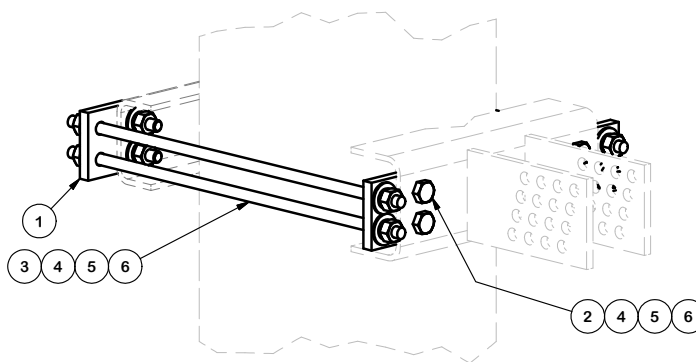
Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO.	USF-4U	PAGE
DWG. NO.	USF-4U	1 OF 1

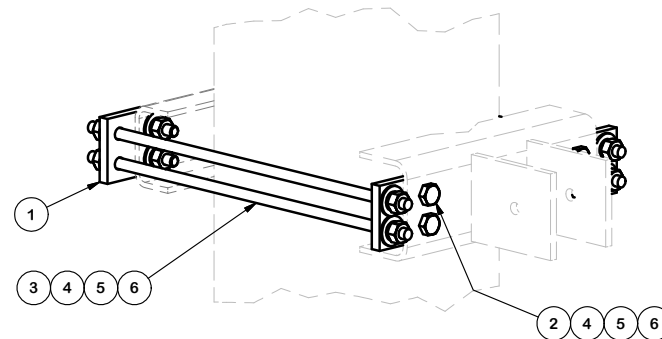
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 10.75" ± DIAMETER ROUND LEG WITH L8x8x1/2 REINFORCEMENT



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	230044	LARGE LEG ADAPTER, UNIVERSAL SLIDING TAPERED PIPE MOUNT, ADJUSTABLE PLATE	15 in	6.11	24.43
2	16	G1202	1/2" x 2" HDG HEX BOLT GR5	2 in	0.18	2.81
3	8	G12R-20	1/2" x 20" GALV. THREADED ROD		1.12	8.92
4	32	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	1.09
5	32	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.44
6	32	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	2.29
TOTAL WT. #						41.44



DETAIL A  
UPPER MOUNTING BRACKET



DETAIL B  
LOWER MOUNTING BRACKET

**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

LARGE LEG ADAPTER KIT,  
 UNIVERSAL SLIDING TAPERED PIPE MOUNT,  
 8" TO 12-3/4" OD ROUND LEGS

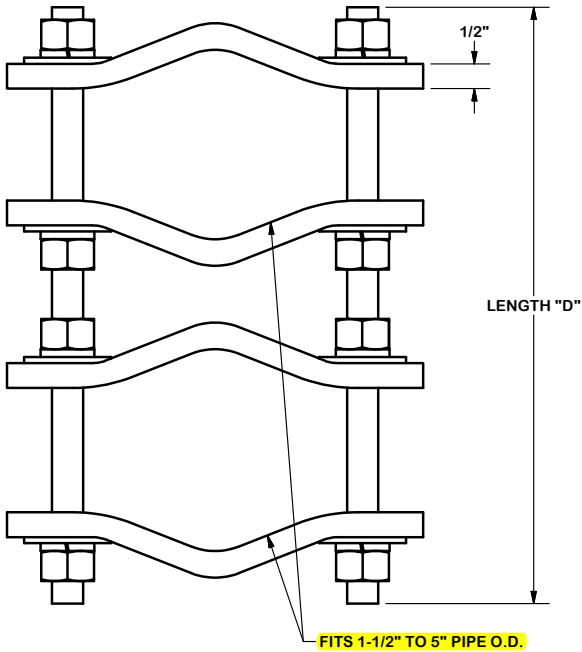
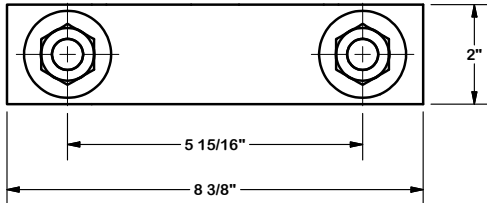
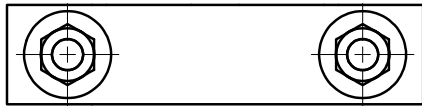
CPD NO. 4711	DRAWN BY RCH 4/21/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 4/22/2010		



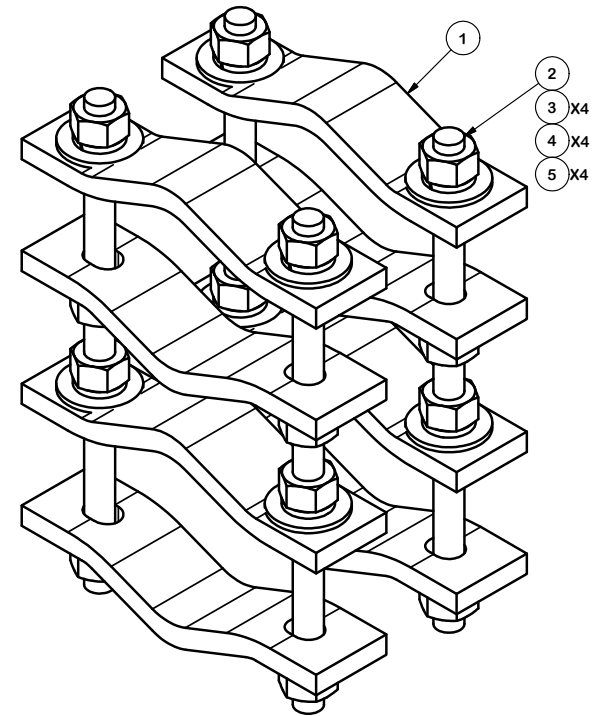
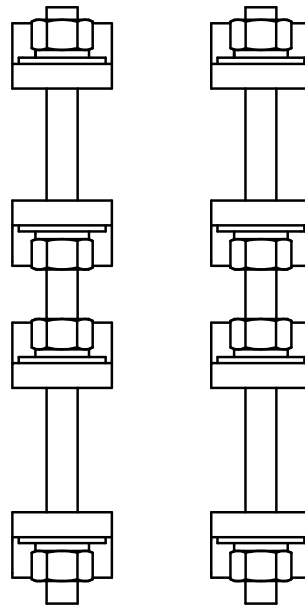
Engineering Support Team:  
 1-888-753-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO. TAM-LL
DWG. NO. TAM-LL



FITS 1-1/2" TO 5" PIPE O.D.



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE

ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
 PIPE TO PIPE CLAMP SET  
 1-1/2" TO 5" PIPE  
 1/2" THICK CLAMP

**SITE PRO 1**  
 Engineering Support Team:  
 1-888-753-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 8/21/2012	
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER
	CHECKED BY	
	CEK 1/22/2013	

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

ATTACHMENT D – CONSTRUCTION DRAWINGS



## COLCHESTER CSP 268 WINDHAM AVE (AKA 112 MUNN RD) COLCHESTER, CT 06415

**EVERSOURCE**  
ENERGY

107 SELDEN STREET  
BERLIN, CT 06037  
PHONE: (800) 286-2000



**BLACK & VEATCH**

6800 W 115TH ST, SUITE 2292  
OVERLAND PARK, KS 66211  
PHONE: (913) 458-2522

### PROJECT SUMMARY

- THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:
1. INSTALL (2) NEW OMNI/WHIP ANTENNAS, (1) AT ELEVATION 164'-4 1/4"± AGL AND (1) AT ELEVATION 146'-4 1/4"± AGL
  2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING EQUIPMENT ROOM
  3. INSTALL NEW 448 AH BATTERIES AND RELOCATE EXISTING BATTERIES TO BRANFORD 11J

### GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)  
2017 NATIONAL ELECTRIC CODE  
TIA-222-H

### GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

### SITE INFORMATION

SITE NAME: COLCHESTER CSP  
SITE ID NUMBER: 105094  
SITE ADDRESS: 268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415  
MAP: 06  
BLOCK: 04  
LOT: 010 -100/TWR  
ZONE: R60  
LATITUDE: 41° 35' 33.5" N  
LONGITUDE: 72° 19' 16.2" W  
ELEVATION: 605'± AMSL  
FEMA/FIRM DESIGNATION: X  
ACREAGE: 0.53± AC (BOOK: 0082, PAGE: 0250)

### CONTACT INFORMATION

**APPLICANTS:**  
EVERSOURCE ENERGY  
107 SELDEN STREET  
BERLIN, CT 06037  
**POWER PROVIDER:**  
EVERSOURCE ENERGY  
(800) 286-2000  
**PROPERTY OWNER:**  
STATE OF CONNECTICUT  
165 CAPITOL AVE  
HARTFORD CT 06106  
**TELCO PROVIDER:**  
FRONTIER  
(800) 921-8102  
**EVERSOURCE ENERGY**  
**PROJECT MANAGER:**  
NIKOLL PRECI  
(860) 655-3079  
**CALL BEFORE YOU DIG:**  
(800) 922-4455

### LOCATION MAP



### DESIGN TYPE

SITE UPGRADE  
SELF-SUPPORT TOWER

### DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	TOWER ELEVATION
G-1	GROUNDING DETAILS
N-1	NOTES & SPECIFICATIONS
N-2	NOTES & SPECIFICATIONS
N-3	NOTES & SPECIFICATIONS

### DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

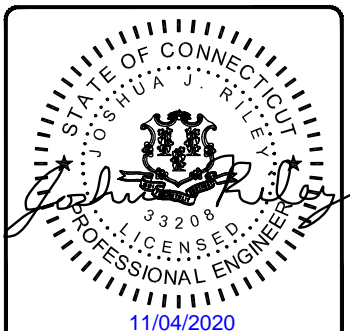


**UNDERGROUND SERVICE ALERT**  
**UTILITIES PROTECTION CENTER, INC.**  
811

48 HOURS BEFORE YOU DIG

PROJECT NO: 405025  
DRAWN BY: TYW  
CHECKED BY: TH

REV	DATE	DESCRIPTION
0	11/04/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

COLCHESTER CSP  
268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

SHEET TITLE  
TITLE SHEET

SHEET NUMBER  
**T-1**



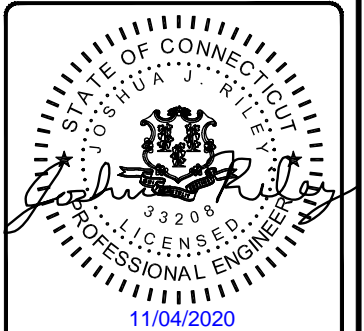


PROJECT NO: 405025

DRAWN BY: TYW

CHECKED BY: TH

REV	DATE	DESCRIPTION
0	11/04/20	ISSUED FOR FILING

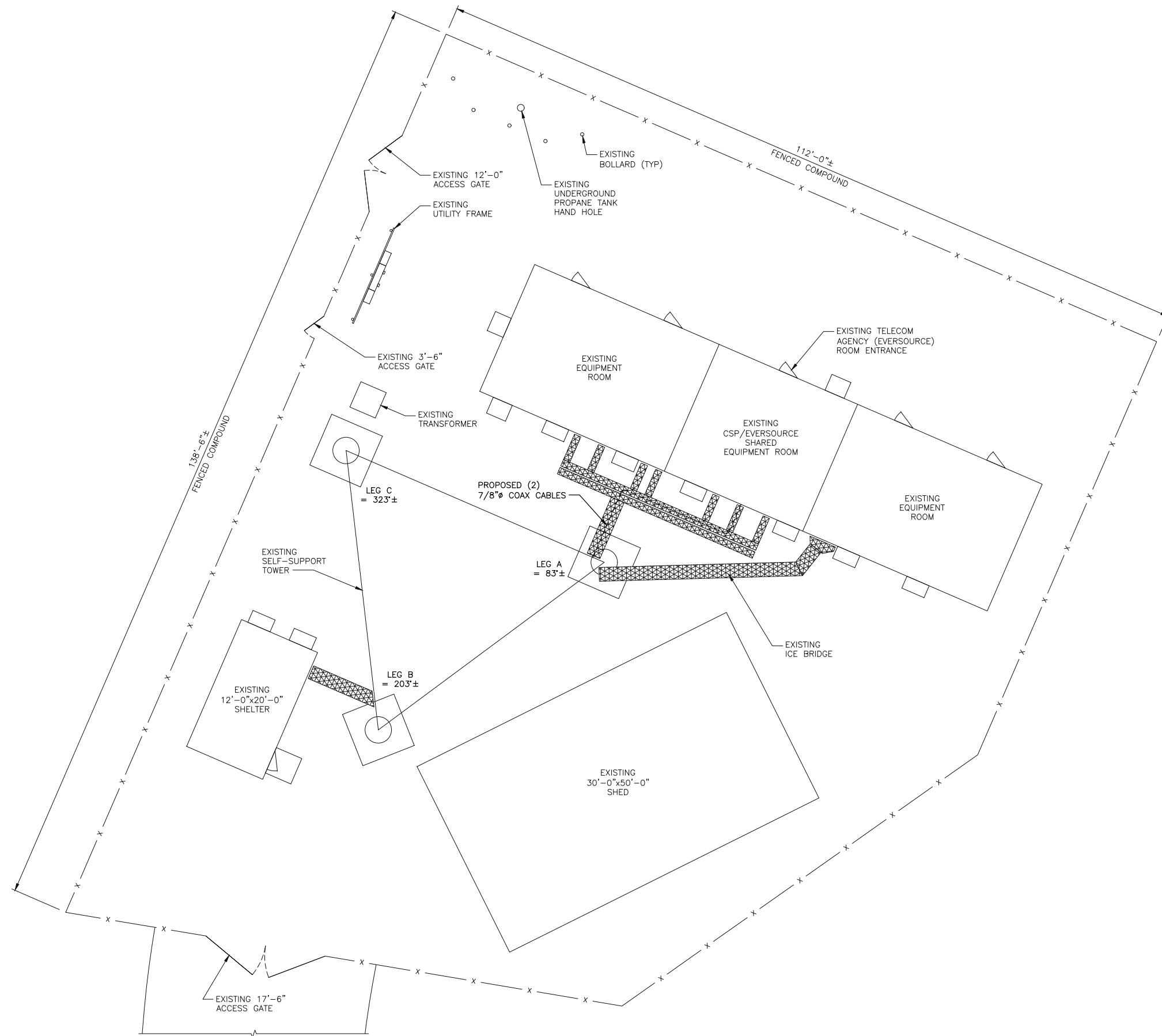


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COLCHESTER CSP  
268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

SHEET TITLE  
SITE PLAN

SHEET NUMBER  
**C-1**



**SITE PLAN**  
NO SCALE



TOP OF EXISTING TOWER  
ELEVATION 320'-0"± AGL  
EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 315'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 284'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 274'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 264'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 253'-0"± AGL  
EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 248'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 234'-0"± AGL

EXISTING EVERSOURCE ANTENNA  
RAD CL ELEVATION 174'-0"± AGL  
EXISTING EVERSOURCE ANTENNA  
RAD CL ELEVATION 168'-0"± AGL

TOP OF PROPOSED EVERSOURCE  
OMNI/WHIP ANTENNA  
ELEVATION 164'-4 1/4"± AGL  
RX RAD CL ELEVATION 163'-0"± AGL  
(ANTENNA MECHANICAL LENGTH 3'-8")

TOP OF PROPOSED EVERSOURCE  
OMNI/WHIP ANTENNA  
ELEVATION 146'-4 1/4"± AGL  
TX RAD CL ELEVATION 145'-0"± AGL  
(ANTENNA MECHANICAL LENGTH 3'-8")

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 111'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 102'-0"± AGL

PROPOSED (2) 7/8"Ø  
COAX CABLES ROUTED  
TO PROPOSED OMNIS

EXISTING GRADE  
ELEVATION 605'-0"± AMSL

TOWER ELEVATION FACE AC  
NO SCALE

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 315'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 296'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 245'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 229'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 196'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 153'-0"± AGL

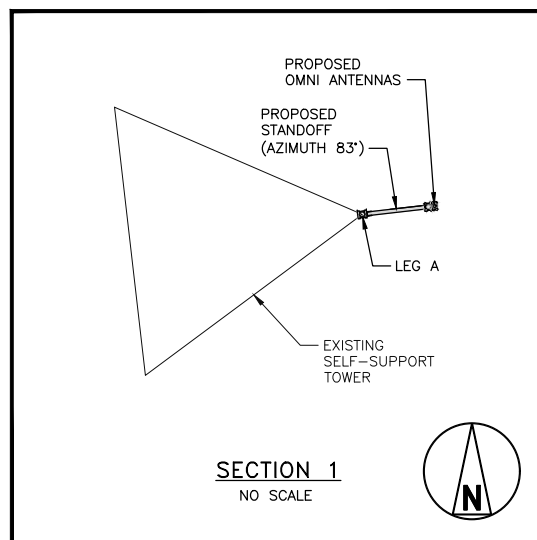
EXISTING ICE SHIELD (NON-EVERSOURCE)  
RAD CL ELEVATION 116'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 104'-0"± AGL

**NOTES**

1. RESERVED TOWER LOADING  
NOT SHOWN PER CLIENT  
REQUEST BUT WAS  
CONSIDERED IN TOWER  
ANALYSIS REPORT.

2. BLACK & VEATCH HAS NOT  
EVALUATED THE EXISTING  
STRUCTURE FOR THIS SITE  
AND ASSUMES NO  
RESPONSIBILITY FOR ITS  
STRUCTURAL INTEGRITY.  
REFER TO THE STRUCTURAL  
ANALYSIS BY OTHERS PRIOR  
TO ANY CONSTRUCTION.



321'-6"± AGL  
TOTAL HEIGHT WITH APPURTENANCES

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 315'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 296'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 245'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 229'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 196'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 153'-0"± AGL

EXISTING ICE SHIELD (NON-EVERSOURCE)  
RAD CL ELEVATION 116'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 104'-0"± AGL

EXISTING GRADE  
ELEVATION 605'-0"± AMSL

TOWER ELEVATION FACE CB  
NO SCALE

TOP OF EXISTING ANTENNA (NON-EVERSOURCE)  
ELEVATION 321'-6"± AGL  
TOP OF EXISTING TOWER  
ELEVATION 320'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 297'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 287'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 272'-0"± AGL

EXISTING ANTENNAS (NON-EVERSOURCE)  
RAD CL ELEVATION 250'-0"± AGL

EXISTING EVERSOURCE ANTENNA  
RAD CL ELEVATION 185'-0"± AGL

EXISTING ICE SHIELD (NON-EVERSOURCE)  
RAD CL ELEVATION 161'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 150'-0"± AGL

EXISTING EVERSOURCE ANTENNA  
RAD CL ELEVATION 135'-0"± AGL  
EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 135'-0"± AGL

EXISTING ICE SHIELD (NON-EVERSOURCE)  
RAD CL ELEVATION 116'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 112'-0"± AGL

EXISTING ANTENNA (NON-EVERSOURCE)  
RAD CL ELEVATION 89'-0"± AGL

**EVERSOURCE**  
ENERGY

107 SELDEN STREET  
BERLIN, CT 06037  
PHONE: (800) 286-2000

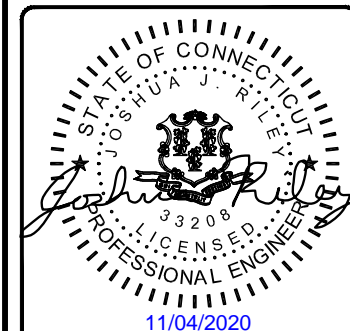


**BLACK & VEATCH**

6800 W 115TH ST, SUITE 2292  
OVERLAND PARK, KS 66211  
PHONE: (913) 458-2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

REV	DATE	DESCRIPTION
0	11/04/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

COLCHESTER CSP  
268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

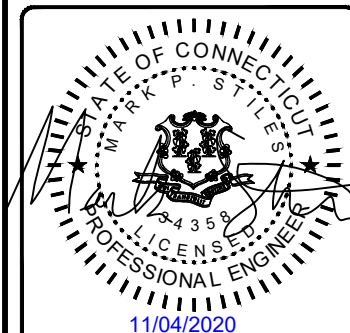
SHEET TITLE  
TOWER ELEVATION

SHEET NUMBER  
**C-2**



PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

REV	DATE	DESCRIPTION
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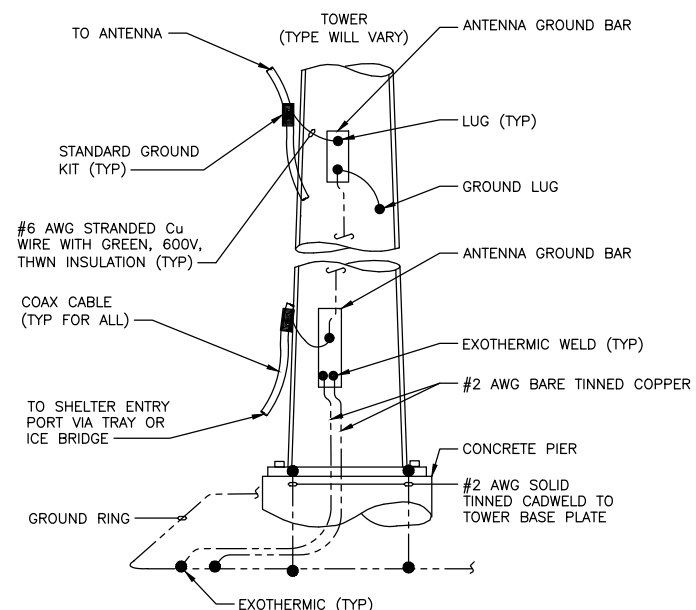


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COLCHESTER CSP  
268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

SHEET TITLE  
**GROUNDING  
DETAILS**

SHEET NUMBER  
**G-1**

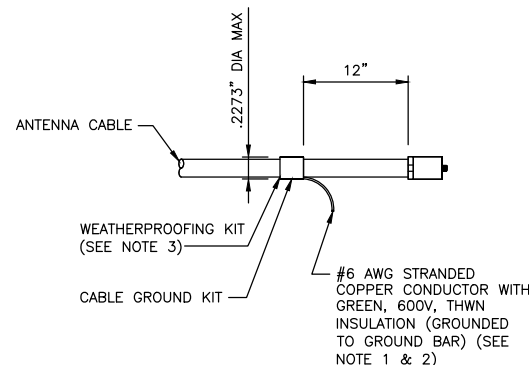


**NOTE**

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

**ANTENNA CABLE GROUNDING**

NO SCALE

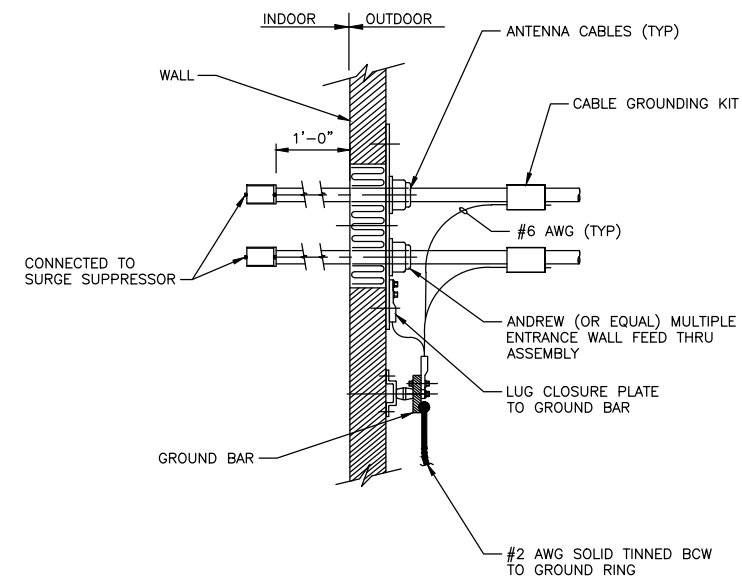


**NOTES**

- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
- GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
- WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

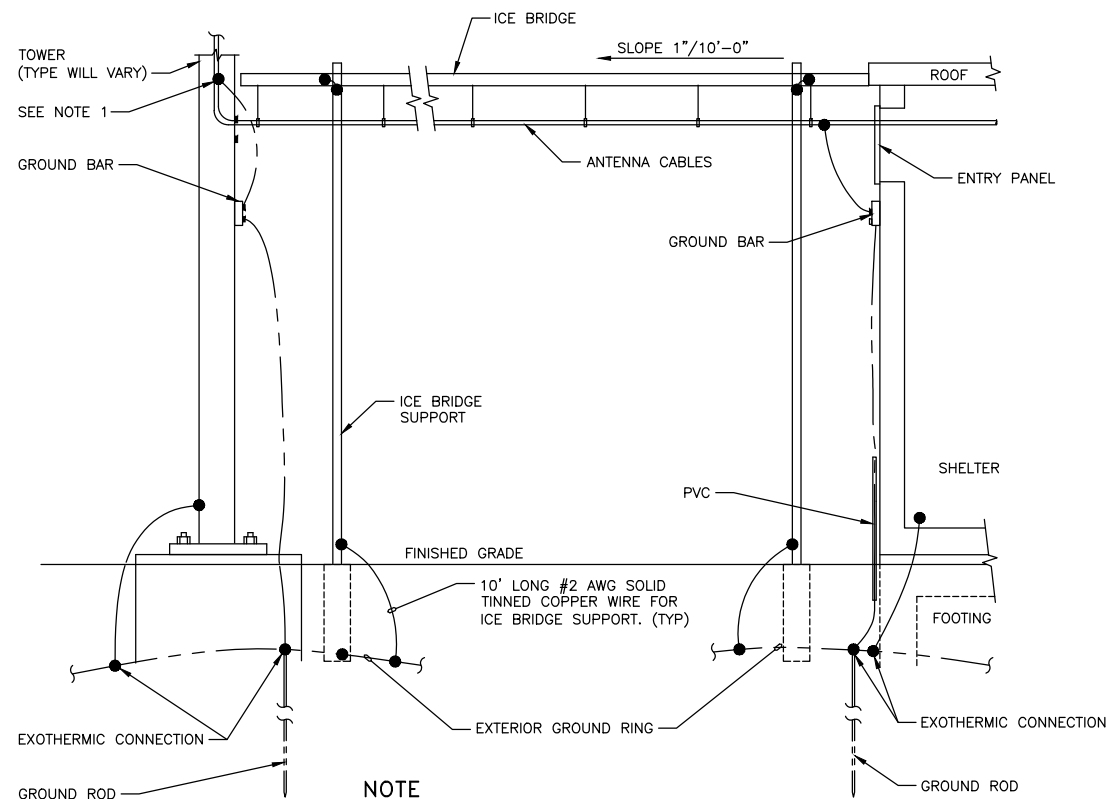
**CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE**

NO SCALE



**CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY**

NO SCALE



**NOTE**

1. PROVIDE GROUND KIT 6" BEFORE TURN

**ICE BRIDGE AND ANTENNA CABLE DETAIL**

NO SCALE

**DESIGN BASIS**

- 1. GOVERNING CODE: 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS).

**GENERAL CONDITIONS**

- 1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES, PERMIT CONDITIONS AND SAFETY CODES DURING CONSTRUCTION.
- 2. THE ENGINEER IS NOT: A GUARANTOR OF THE INSTALLING CONTRACTOR'S WORK; RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE WORK SITE; IN CONTROL OF THE SAFETY OR ADEQUACY OF ANY BUILDING COMPONENT, SCAFFOLDING OR SUPERINTENDING THE WORK.
- 3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.
- 4. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THIS COMPLETE PLAN SET AND VERIFY THE EXISTING CONDITIONS SHOWN IN THESE PLANS AS THEY RELATE TO THE WORK PRIOR TO SUBMITTING PRICE. SIGNIFICANT DEVIATIONS FROM WHAT IS SHOWN AFFECTING THE WORK SHALL BE REPORTED IMMEDIATELY TO THE CONSTRUCTION MANAGER.
- 5. DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.
- 6. EXISTING ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING, AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.
- 7. THE CONTRACTOR SHALL DILIGENTLY PROTECT THE EXISTING BUILDING/SITE CONDITIONS AND THOSE OF ANY ADJOINING BUILDING/SITES AND RESTORE ANY DAMAGE CAUSED BY HIS ACTIVITIES TO THE PRE-CONSTRUCTION CONDITION.
- 8. THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.
- 9. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEEPED AND MADE CLEAN AT THE END OF EACH WORK DAY.
- 10. THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.
- 11. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER IF ASBESTOS IS ENCOUNTERED DURING THE EXECUTION OF HIS WORK. THE CONTRACTOR SHALL CEASE ALL ACTIVITIES WHERE THE ASBESTOS MATERIAL IS FOUND UNTIL NOTIFIED BY THE CONSTRUCTION MANAGER TO RESUME OPERATIONS.

**THERMAL & MOISTURE PROTECTION**

- 1. FIRE-STOP ALL PENETRATIONS FOR ELECTRICAL CONDUITS OR WAVEGUIDE CABLING THROUGH BUILDING WALLS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED WITH ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ASTM E814.
- 2. HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER FILL, VOID OR CAVITY MATERIAL OR ACCEPTED EQUAL SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED UNDERWRITERS LABORATORIES (UL) SYSTEM NUMBER.
- 3. FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.
- 4. FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE CONCEALING SUCH PENETRATIONS. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.
- 5. ANY BUILDING ROOF PENETRATION AND/OR RESTORATION SHALL BE PERFORMED SO THAT THE ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.
- 6. ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.
- 7. WHERE CONDUIT AND CABLES PENETRATES FIRE RATED WALLS AND FLOORS, FIRE GROUT ALL PENETRATIONS IN ORDER TO MAINTAIN THE FIRE RATING USING A LISTED FIRE SEALING DEVICE OR GROUT.
- 8. CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

**SUBMITTALS**

- 1. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
- 2. CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.
- 3. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- 4. ALL STEEL MATERIAL EXPOSED TO WEATHER SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 " ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS.
- 5. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS FOR REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

**STEEL**

- 1. MATERIAL:  
WIDE FLANGE: ASTM A572, GR 50  
TUBING: ASTM A500, GR C  
PIPE: ASTM A53, GR B AND ASTM 572, GR 50  
ANGLE: ASTM A570, GR 50 AND ASTM A36  
BOLTS: ASTM A325  
GRATING: TYPE GW-2 (1"x3/16" BARS)  
MISC. MATERIAL: ASTM A36  
  
ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.
- 2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.
- 3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.
- 4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.
- 5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.
- 6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

**SITE GENERAL**

- 1. CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.
- 2. THESE PLANS DEPICT KNOWN UNDERGROUND STRUCTURES, CONDUITS, AND/OR PIPELINES. THE LOCATIONS FOR THESE ELEMENTS ARE BASED UPON THE VARIOUS RECORD DRAWINGS AVAILABLE. THE CONTRACTOR IS HEREBY ADVISED THAT THESE DRAWINGS MAY NOT ACCURATELY DEPICT AS-BUILT LOCATIONS AND OTHER UNKNOWN STRUCTURES. THE CONTRACTOR SHALL THEREFORE DETERMINE THE EXACT LOCATION OF EXISTING UNDERGROUND ELEMENTS AND EXCAVATE WITH CARE AFTER CALLING MARKOUT SERVICE AT 1-800-272-4480 48 HOURS BEFORE DIGGING, DRILLING OR BLASTING.
- 3. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UTILITIES WHERE ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION, SHALL BE RELOCATED AS DIRECTED BY ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL HAND DIG UTILITIES AS NEEDED. CONTRACTOR SHALL PROVIDE, BUT IS NOT LIMITED TO, APPROPRIATE A) FALL PROTECTION, B) CONFINED SPACE ENTRY, C) ELECTRICAL SAFETY, AND D) TRENCHING AND EXCAVATION.
- 4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- 5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, OR OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.
- 6. CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.
- 7. CONTRACTOR SHALL PROTECT EXISTING PAVED AND GRAVEL SURFACES, CURBS, LANDSCAPE AND STRUCTURES AND RESTORE SITE OR PRE-CONSTRUCTION CONDITION WITH AS GOOD, OR BETTER, MATERIALS. NEW MATERIALS SHALL MATCH EXISTING THICKNESS AND TYPE.
- 8. THE CONTRACTOR SHALL SHORE ALL TRENCH EXCAVATIONS GREATER THAN 5 FEET IN DEPTH OR LESS WHERE SOIL CONDITIONS ARE DEEMED UNSTABLE. ALL SHEETING AND/OR SHORING METHODS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.
- 9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING GROUNDWATER LEVELS IN THE VICINITY OF EXCAVATIONS TO PROTECT ADJACENT PROPERTIES AND NEW WORK. GROUNDWATER SHALL BE DRAINED IN ACCORDANCE WITH LOCAL SEDIMENTATION AND EROSION CONTROL GUIDELINES.



107 SELDEN STREET  
BERLIN, CT 06037  
PHONE: (800) 286-2000



**BLACK & VEATCH**

6800 W 115TH ST, SUITE 2292  
OVERLAND PARK, KS 66211  
PHONE: (913) 458-2522

PROJECT NO: 405025

DRAWN BY: TYW

CHECKED BY: TH

REV	DATE	DESCRIPTION
0	11/04/20	ISSUED FOR FILING



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

COLCHESTER CSP  
268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

SHEET TITLE  
**NOTES  
& SPECIFICATIONS**

SHEET NUMBER  
**N-1**

**ELECTRICAL**

- CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
- ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.
- CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
- ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
- CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
- ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
- PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.
- ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
- CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
- ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. -AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.

**GROUNDING**

- #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
- #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
- ALL LUGS SHALL BE 2-HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN - 54856BE, #2 SOLID - 54856BE, AND #6 THWN - 54852BE).
- ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18-8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT-FLAT WASHER-BUSS-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT IN THAT EXACT ORDER. BACK-TO-BACK LUGGING, BOLT-FLAT WASHER-LUG-BUSS-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS-LUG-LUG, IS NOT ACCEPTABLE.
- WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT-FLAT WASHER-STEEL-DRAGON TOOTH WASHER-LUG-FLAT WASHER-BELLEVILLE WASHER-NUT.
- ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR-SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.
- THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
- ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
- BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
- GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2-HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
- FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
- GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE-DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.
- MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
- ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

**ANTENNA & CABLE NOTES**

- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER COORDINATE LENGTH OF JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.
- AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM/SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.
- ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
  - AT THE ANTENNAS.
  - AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
  - JUMPER CABLES AT THE EQUIPMENT ENTER.
- SYSTEM INSTALLATION:  
THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
  - ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
  - WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
  - 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.
- MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
  - 7/8 INCH, RMIN = 15 INCHES
  - 1 5/8 INCH, RMIN = 25 INCHES
- CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.
- ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
- CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
- CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.



107 SELDEN STREET  
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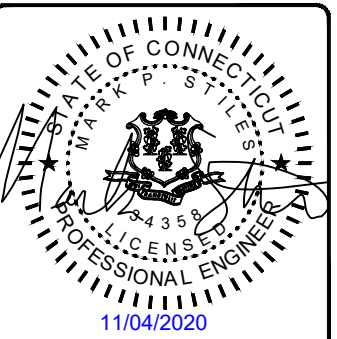


**BLACK & VEATCH**

6800 W 115TH ST, SUITE 2292  
OVERLAND PARK, KS 66211  
PHONE: (913) 458-2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	TH

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268 WINDHAM AVE (AKA 112 MUNN RD)  
COLCHESTER, CT 06415

SHEET TITLE  
**NOTES  
& SPECIFICATIONS**

SHEET NUMBER  
**N-2**

**SYMBOLS**

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⊕	5/8"Øx10'-0" COPPER CLAD STEEL GROUND ROD.
⊕	TEST GROUND ROD WITH INSPECTION SLEEVE
---	GROUNDING CONDUCTOR
Ⓐ	KEY NOTES
— X — X — X — X — X —	CHAINLINK FENCE
— □ — □ — □ — □ — □ —	WOOD FENCE
---	LEASE AREA
▨	ICE BRIDGE
▧	CABLE TRAY
— G — G — G — G — G —	GAS LINE
— E/T — E/T — E/T — E/T —	UNDERGROUND ELECTRICAL/TELCO
— E/C — E/C — E/C — E/C —	UNDERGROUND ELECTRICAL/CONTROL
— E — E — E — E — E —	UNDERGROUND ELECTRICAL
— T — T — T — T — T —	UNDERGROUND TELCO
---	PROPERTY LINE (PL)

**ABBREVIATIONS**

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

**EVERSOURCE ENERGY**

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BERLIN, CT 06037  
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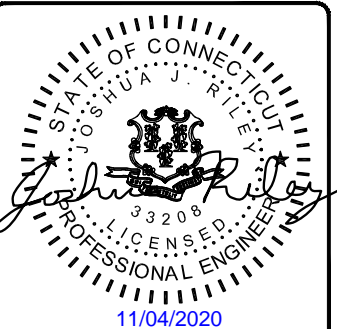


**BLACK & VEATCH**

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COLCHESTER, CT 06415

SHEET TITLE  
**NOTES & SPECIFICATIONS**

SHEET NUMBER  
**N-3**

# REFERENCE CUTSHEETS

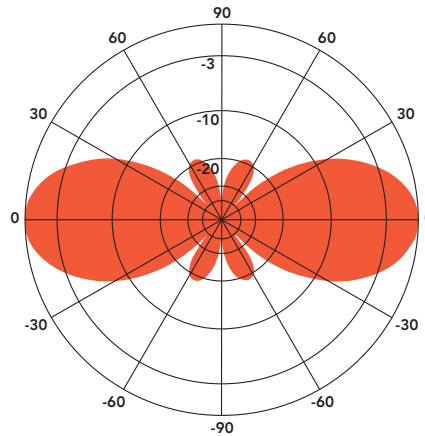
# ANT220F2DIN

## FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

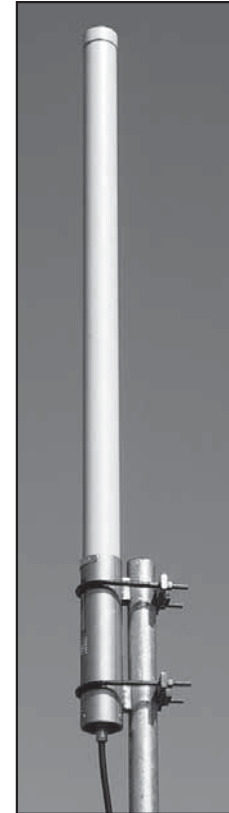
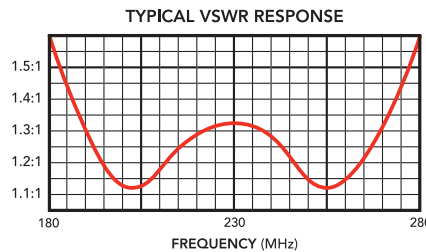
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz  
Vertical Plane  
Gain = 2.58 dBd

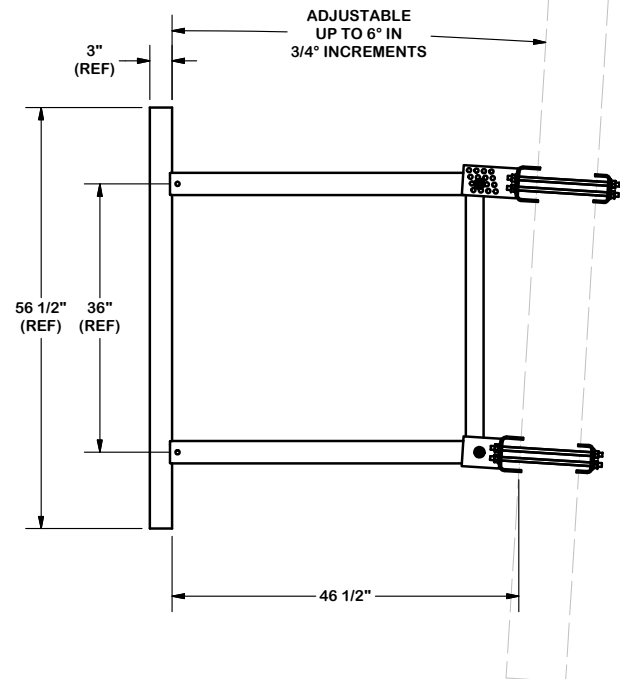
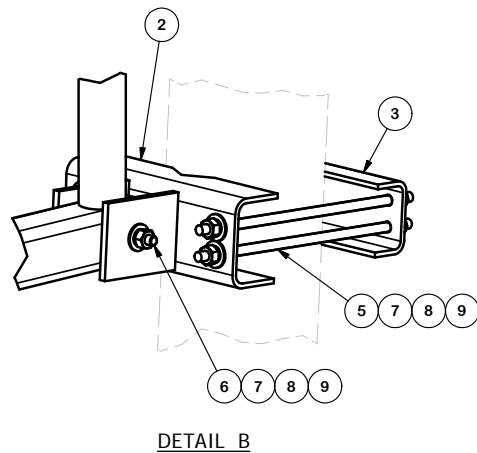
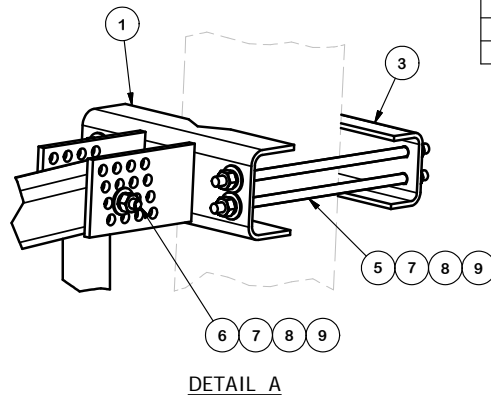
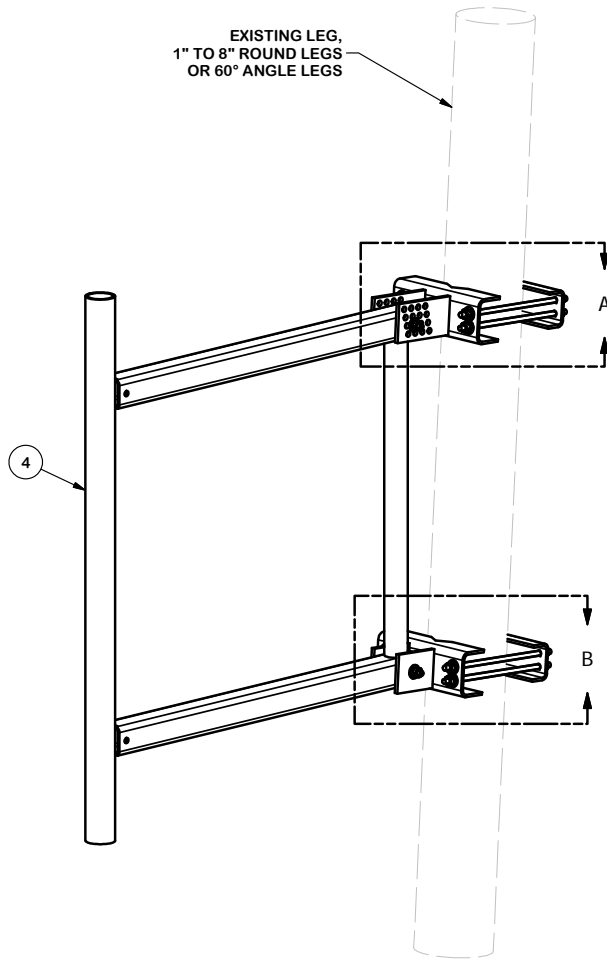


**ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.**

SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	Dimensions (L x base diam.) in.	44 x 2.75
Gain	2.5 dBd	Tower weight (antenna + clamps)	11 lb.
Power rating (typ.)	500 watts	Shipping weight	14 lb.
Impedance	50 ohms	Wind rating / with 0.5" ice	200 / 150 MPH
VSWR	1.5:1 or less	Maximum exposed area	1.1 ft. <sup>2</sup>
Pattern	Omnidirectional	Lateral thrust at 100 MPH	44 lb.
Vertical beamwidth	38°	Bending moment at top clamp	47 ft. lb.
Termination	7-16 DIN-F	(100 MPH, 40 PSF flat plate equiv.)	



EXISTING LEG,  
1" TO 8" ROUND LEGS  
OR 60° ANGLE LEGS



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	CFM	UPPER GATE FOOT WELDMENT		13.90	13.90
2	1	CFS	LOWER GATE FOOT WELDMENT		12.72	12.72
3	2	GBB	GATE BACKING BAR		4.53	9.06
4	1	4PBG	48" PIPE MOUNT STANDOFF ARM		113.96	113.96
5	8	G12R-12	1/2" x 12" GALV. THREADED ROD		0.67	5.35
5	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84	6.69
6	2	A1205	1/2" x 5" A325 HDG BOLT		0.34	0.69
7	18	G12FW	1/2" HDG USS FLATWASHER		0.03	0.61
8	18	G12LW	1/2" HDG LOCKWASHER		0.01	0.25
9	18	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.29
					TOTAL WT. #	164.53

**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

48" ULTIMATE UNIVERSAL  
 STANDOFF FRAME

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 2/16/2011

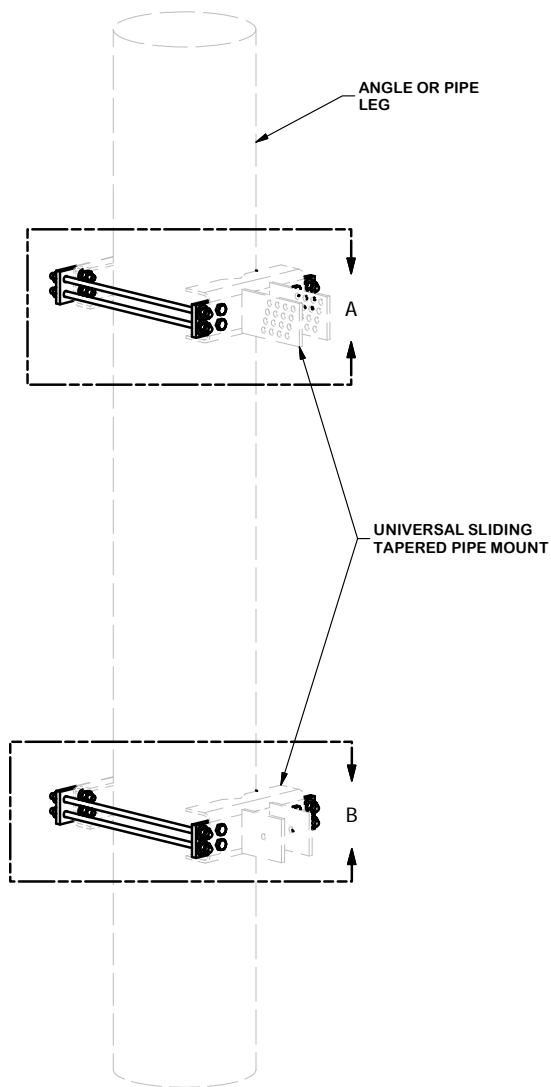


Engineering  
 Support Team:  
 1-888-753-7446

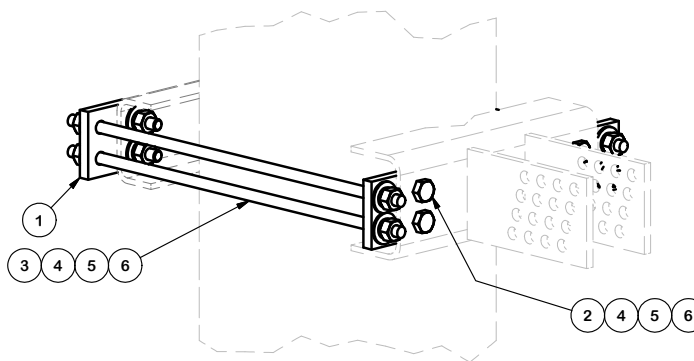
Locations:  
 New York, NY  
 Atlanta, GA  
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 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO.	USF-4U	PAGE
DWG. NO.	USF-4U	1 OF 1

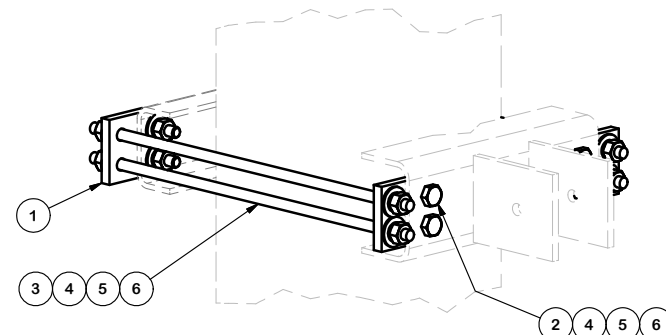
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 10.75" ± DIAMETER ROUND LEG WITH L8x8x1/2 REINFORCEMENT



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	230044	LARGE LEG ADAPTER, UNIVERSAL SLIDING TAPERED PIPE MOUNT, ADJUSTABLE PLATE	15 in	6.11	24.43
2	16	G1202	1/2" x 2" HDG HEX BOLT GR5	2 in	0.18	2.81
3	8	G12R-20	1/2" x 20" GALV. THREADED ROD		1.12	8.92
4	32	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	1.09
5	32	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.44
6	32	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	2.29
TOTAL WT. #						41.44



DETAIL A  
UPPER MOUNTING BRACKET



DETAIL B  
LOWER MOUNTING BRACKET

**TOLERANCE NOTES**

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
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DESCRIPTION  
 LARGE LEG ADAPTER KIT,  
 UNIVERSAL SLIDING TAPERED PIPE MOUNT,  
 8" TO 12-3/4" OD ROUND LEGS

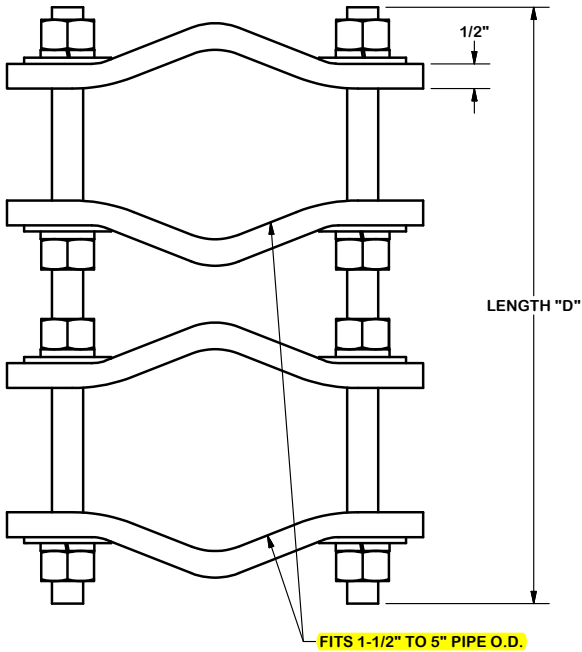
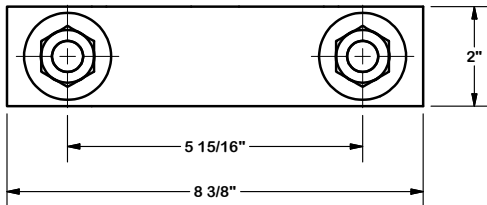
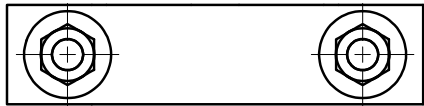
CPD NO. 4711	DRAWN BY RCH 4/21/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 4/22/2010		



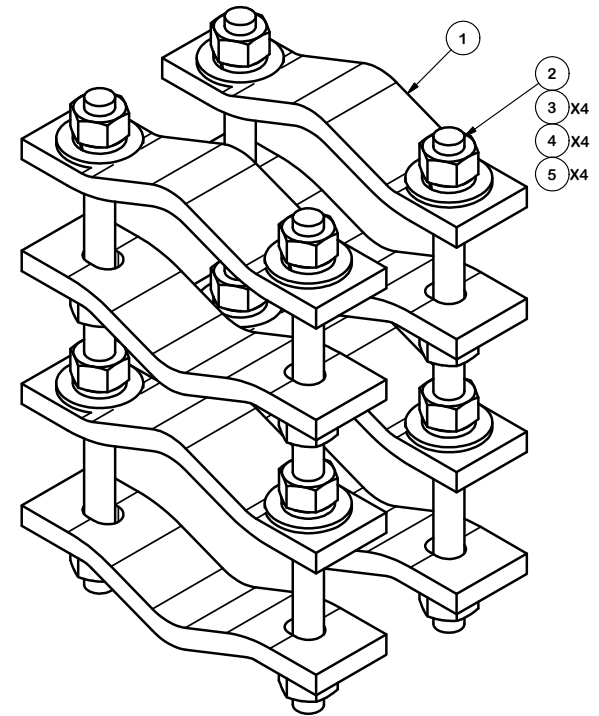
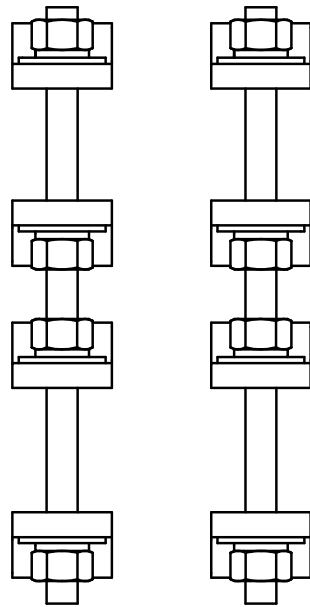
Engineering Support Team:  
 1-888-753-7446

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

PART NO. TAM-LL	1 OF 1
DWG. NO. TAM-LL	



FITS 1-1/2" TO 5" PIPE O.D.



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE

ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION  
 PIPE TO PIPE CLAMP SET  
 1-1/2" TO 5" PIPE  
 1/2" THICK CLAMP



Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX  
 Engineering Support Team:  
 1-888-753-7446

CPD NO.	DRAWN BY	ENG. APPROVAL
81	KC8 8/21/2012	CEK 1/22/2013
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

ATTACHMENT E – STRUCTURAL ANALYSIS



Submitted to  
Eversource Energy  
107 Selden Street  
Berlin, CT 06037

Submitted by  
AECOM  
500 Enterprise Drive,  
Suite 3B  
Rocky Hill, CT 06067  
May 21, 2020

Empire Telecom USA, LLC  
16 Esquire Road  
Billerica, MA 01862

Verizon Wireless  
20 Alexander Drive  
Wallingford, CT 06492

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



**EVERSOURCE**  
ENERGY



**verizon**



Site Name : Connecticut State Police Tower # 50  
AT&T Site Number : CT2284  
Site Address: 112 Munn Road  
Colchester, Connecticut

60626930 Revision 1  
EVS-010 / VZ5-217 / EMP-008

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**1. EXECUTIVE SUMMARY**

This report summarizes the structural analysis and modification of the 320' Self-supporting lattice tower located at 112 Munn Road in Colchester, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which include the TIA-222-H<sup>1</sup> Standard, 2018 International Building Code, the 2018 Connecticut State Building Code Amendments, the AISC<sup>2</sup> Load Resistance Factor Design (LRFD), the ASCE 7<sup>3</sup> design Code, and the Connecticut State Police Requirements which include the TIA/EIA-222-F<sup>4</sup>.

The antenna loading considered in the analysis consists of all the existing antennas, transmission lines and ancillary items as outlined in the Introduction Section of this report.

The proposed Eversource, AT&T & Verizon Wireless (VZW) antenna upgrades are listed below:

Proposed Antennas	Carrier	Antenna Center Elevation
<b><u>Remove:</u></b>		
(6) SBNHH-1D65B Panel Antennas (3) Nokia 2x60-700 MHz RRH Units (3) Nokia 2x90-AWS RRH Units	VZW (Existing)	@ 220'
<b><u>Install:</u></b>		
(6) Commscope JAHH-65B-R3B Panels (2 per Sector) (3) Commscope BSAMNT-SBS-2-2 Panel Mounts for JAHH Panels (3) Samsung B2/B66A RRH-BR049 (RFV01U-D1A) RRH Units (3) Samsung B5/B13 RRH-BR04C (RFV01UD2A) RRH Units (3) Commscope CBC78T-DS-43-2X Diplexer Units	VZW (Proposed)	@ 220'
(2) CCI HPA-65R-BUU-H8 Panel Antennas (1 Alpha Sector, 1 Beta Sector) (1) CCI HPA-65R-BUU-H6 Panel Antenna (1 Gamma Sector) (3) Ericsson RRUS-11 RRH Units (3) Ericsson RRUS-32 B2 RRH Units (1) Raycap DC6 Surge Arrestor Unit (3) SitePro1 Sector Frame Stiff Arm Kit (Part # STK-U) attaching to Existing Mount Assembly	AT&T (Proposed)	@ 200'
(1) Telewave ANT220F2 Omni Antenna (Centerline Elevation @ 163') (1) SitePro1 Mount (Part # USF-4U – Mounted at Centerline Elevation 160') (1) RFS 7/8" Coaxial Cable (Proposed Feedline Length = 191')	Eversource (Proposed)	160' – 163'
(1) Telewave ANT220F2 Omni Antenna (Centerline Elevation @ 145') (1) SitePro1 Mount (Part # USF-4U – Mounted at Centerline Elevation 142') (1) RFS 7/8" Coaxial Cable (Proposed Feedline Length = 173')	Eversource (Proposed)	142' – 145'

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version H); expected to be accepted State Standard prior to end of 2020.

2. AISC = American Institute of Steel Construction (15<sup>th</sup> Edition)

3. ASCE 7 = American Society of Civil Engineers - Standard 7 (2016 Edition)

4. TIA/EIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version F)

## 1. EXECUTIVE SUMMARY (continued):

The results of an initial structural analysis indicated that the existing tower did not have enough capacity for the proposed loading conditions above. The tower structure requires modifications shown on SK-1 and SK-2. **Once the modifications indicated on sheets SK-1 and SK-2 are performed, the modified structure, existing anchor bolts and previously modified foundation are considered structurally adequate with the existing and proposed antenna loading herein.**

Per the Department of Energy Services and Public Protection (DESPP) / Connecticut State Police (CSP) directive, required twist and sway for this location is permitted to be measured from service dishes. The maximum sway (deflection) after tower modification is 0.3642 degrees and the maximum twist (rotation) after tower modification is 0.2278 degrees. These combined figures, measured from CSP service dishes, are within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.

The maximum structural capacity calculated, after the tower structure has been modified, is **95.5 %**

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).
- 5) Previous structural analysis and tower modification performed by AECOM on behalf of AT&T, project number 60529362 / SAI-095, signed and sealed on February 6, 2017 (Note: analysis herein has considered modifications as stated within this analysis to have been constructed/installed).
- 6) Proposed antenna inventory update to AT&T antennas via Radio Frequency Data Sheet (RFDS), Dated May 12, 2017, along with associated construction drawings date October 19, 2017, obtained via e-mail dated March 20, 2018, with a follow-up inventory change obtained via e-mail dated August 21, 2019.
- 7) Proposed antenna inventory update to Verizon Wireless (VZW) antenna via RFDS, dated December 8, 2018, obtained via e-mail dated December 20, 2018.
- 8) Tower climb and antenna inventory performed by Eastern Communications Incorporated (dated November 27, 2019), on behalf of the Connecticut State Police, obtained via e-mail dated December 19, 2019.
- 9) Proposed antenna inventory for Eversource, obtained via e-mail dated February 7, 2020.
- 10) Previous structural analysis and evaluation performed by AECOM on behalf of Eversource, project number 60626930 / EVS-010, signed and sealed on May 14, 2020.
- 11) Antenna inventory as specified in Sections 2 and 6 of this report



1. **EXECUTIVE SUMMARY** *(continued)*:

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 contact Michael Egan at (860) 263-5817.

Sincerely,

**AECOM,**

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

RAS/mcd

cc: DJR – AECOM  
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 structural analysis was conducted in accordance with the following:

- 2018 International Building Code (compliant with the TIA-222-H design loads)
- 2015 International Building Code with 2018 Connecticut State Building Code amendments for a (Ultimate) wind speed of 140 mph (3-second gust)
- 2016 AISC Load Resistance Factor Design (LRFD)
- 2016 ASCE7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-H Standard.
- Connecticut State Police Requirements for a wind velocity under 90 MPH (fastest mile) and 90 mph (fastest mile) concurrent with 0.5 ice, analyzed under the TIA/EIA-222-F design Standard

The inventory together with the proposed Eversource, AT&T & VZW antenna arrangement is summarized in the table below:

<b>Antenna Type</b>	<b>Carrier</b>	<b>Mount</b>	<b>Antenna Centerline Elevation</b>	<b>Cable</b>
(1) Lightning Rod	Tower (existing)	Leg Mount	329'	N/A
(1) Lighted Beacon	Tower (existing)	Tower Mount	325'	(1) 1/2" coax cable
(1) PD-128 Omni/Dipole Antenna	ECI-1 CSP-2 (existing)	6' Side Arm Mount	325'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) BA-1012 Omni Antenna	ECI-2 CSP-1 (existing)	6' Side Arm Mount	320'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) ANT450F6 Antenna	ECI-3 (existing)	Pipe Mounted to tower Leg	318'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) SC479-HF1LDF Omni Antenna	ECI-4 CSP-52 (existing)	6' Side Arm Mount	300'	(1) 1-5/8" coax cable (AVA7-50A)
(1) PD-340 Dipole Antenna	ECI-5 CSP-4 (existing)	6' Side Arm Mount	290'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) DB-809T3 Omni Antenna	ECI-6 CSP-14 (existing)	<i>Shared with ECI-7 Mount</i>	286'	(1) 1-5/8" coax cable (AVA7-50A)
(1) (inverted) SC479-HF1LDF (D00I-E6085) Omni Antenna	ECI-7 CSP-53 (existing)	6' Side Arm Mount @ 284'	283'	(1) 1-5/8" coax cable (AVA7-50A)
(1) PD-440 Dipole Antenna	ECI-8 DEHMS-6 (existing)	6' Side Arm Mount @ 260'	264'	(1) 7/8" coax cable (LCF78-50JA-A7)

<b>Antenna Type</b>	<b>Carrier</b>	<b>Mount</b>	<b>Antenna Centerline Elevation</b>	<b>Cable</b>
(1) SC479-HF1LDF Omni Antenna	ECI-10 DEP-5 (existing)	<i>Shared with below T-Frame Mount</i>	251'	(1) 1-5/8" coax cable (AVA7-50A)
(1) PD-1142 Omni Antenna	ECI-14 DEHMS-7 (existing)	6' Side Arm Mount	248'	(1) 7/8" coax cable (LCF78-50JA-A7)
(2) (inverted) SC479-HF1LDF Omni Antennas (1) TMA Unit @ 247' (EL.)	ECI-11,12,13 CSP-16,17 (existing)	(1)T-Arm Frame Mount @ 246'	245'	(2) 1-5/8" coax cable (AVA7-50A) (1) 1/2" coax cable
(1) 531-70 Dipole Antenna	ECI-15 CSP-8 (existing)	6' Side Arm Mount	238'	(1) 7/8" coax cable (LCF78-50JA-A7)
<b>(6) JAHH-65B-R3B Panel Antennas (2 per Sector) (3) B2/B66A RRH-BR049 (RFV01U-D1A) RRH Unit (3) B5/B13 RRH-BR04C (RFV01U-D2A) RRH Unit (3) CBC78T-DS-43-2X Diplexer Units</b>	<b>VZW (Proposed)</b>	<b>(3) BSAMNT-SBS-2-2 Panel Mounts for JAHH Antennas Shared with Below Mount</b>	<b>220'</b>	<i>See Below Cables</i>
(3) LNX-6512DS-VTM (2) OVP-RC3DC-3315-PF-48 OVP Units	VZW (existing)	(3) T-Arms (existing)	220'	(6) 1 5/8" coax cables (existing) (2) HB158-1-08U8-S8J18 Fiber Optic Cable
(2) CCI HPA-65R-BUU-H8 (1A, 1B) (1) CCI HPA-65R-BUU-H6 (1C) (3) RRUS-11 RRH Units (3) RRUS-32 B2 RRH Units (1) DC6-48-60-0-8C Surge Arrestor	<b>AT&amp;T (Proposed)</b>	<b>(3) SitePro1 STK-U Mount Stiff-Arm Kits added to Existing Mounts (indicated below)</b>	<b>200'</b>	<i>See Below Cables</i>
(3) Powerwave 7770 Panel Antennas	AT&T (existing)	(3) T-Arm mounts with (1) Stiff-Arm connected to Tower Structure	200'	(6) 1 5/8" coax cables (1) Fiber Optic Cable & (2) DC Cables within 2" Flex Conduit
(1) 1151-3N Omni Antenna	ECI-50 NEU-32 (existing)	4' Side Arm Mount	179'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) DB586-Y Omni Antenna	ECI-51 NEU-48 (existing)	<i>Shared with Below Mount</i>	177'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) TTA Unit	ECI-52 NEU-49 (existing)	<i>Shared with Below Mount</i>	176'	(1) 1/2" coax cable (LDF4-50A)

<b>Antenna Type</b>	<b>Carrier</b>	<b>Mount</b>	<b>Antenna Centerline Elevation</b>	<b>Cable</b>
(1) (inverted) DB586-Y Omni Antenna	ECI-53 NEU-50 (existing)	6' Side Arm Mount @ 176'	175'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) Small Lighted Tower Beacon Light	ECI-54 Tower (existing)	Mounted to Leg	168'	(1) 3/8" coax cable
(1) Small Lighted Tower Beacon Light	ECI-55 Tower (existing)	Mounted to Leg	165'	(1) 3/8" coax cable
(1) Small Lighted Tower Beacon Light	ECI-56 Tower (existing)	Mounted to Leg	164'	(1) 3/8" coax cable
<b>(1) Telewave ANT220F2 Omni Antenna</b>	<b>Eversource (Proposed)</b>	<b>(1) SitePro1 USF-4U Mount @ Elevation 160'</b>	<b>163'</b>	<b>(1) LCF78-50JA-A7</b>
(1) ANT450F6 Antenna	ECI-57 CSP (existing)	Pipe Mounted to Leg	154'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) 6' Dish with Radome (PAR6-59W-PXA)	ECI-58 CSP (existing)	Pipe Mounted to Leg	154'	(1) EW63 elliptical cable
<b>(1) Telewave ANT220F2 Omni Antenna</b>	<b>Eversource (Proposed)</b>	<b>(1) SitePro1 USF-4U Mount @ Elevation 142'</b>	<b>145'</b>	<b>(1) LCF78-50JA-A7</b>
(1) PD-156S Yagi Antenna	ECI-60 "DEAD" Carrier (existing)	Shared with ECI-59 Mount	139'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) DB-212 Dipole Antenna	ECI-59 NEU-33 (existing)	4' Side Arm Mount	139'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) 3' Ice Shield (for ECI-61 Dish)	ECI-61 CSP (existing)	Pipe Mounted to Leg	117'	N/A

<i>Antenna Type</i>	<i>Carrier</i>	<i>Mount</i>	<i>Antenna Centerline Elevation</i>	<i>Cable</i>
(1) Ice Shield (for ECI-63 Dish)	ECI-63 CSP (existing)	Pipe Mounted to Leg	115'	N/A
(1) 3' Dish with Radome	ECI-61 CSP-13 (existing)	Pipe Mount to Leg	112'	(1) EW90 coax cable
(1) 8' "Drum" Dish Antenna w/ Shroud	ECI-63 CSP (existing)	Pipe mounted to Leg	107'	(1) EW63 Elliptical Cable
(1) PD-458 Omni Antenna	ECI-62 CTT-18 (existing)	4' Side Arm Mount	106'	(1) 7/8" coax cable (LCF78-50JA-A7)
(1) PD-688 Yagi Antenna	ECI-66 FBI-31 (existing)	Pipe Mount to Leg	94'	(1) 7/8" coax cable (LCF78-50JA-A7)

**Notes:** Antenna ID numbering (ECI-#) obtained from Tower Existing Inventory via tower climb, performed by Eastern Communications, Inc. dated November 27, 2019. CSP numbering and elevations provided by CSP inventory obtained via e-mail dated December 19, 2019.

This structural analysis of the communications tower was performed by AECOM, on behalf of AT&T, Eversource and Verizon Wireless (VZW). The purpose of this analysis was to investigate the structural integrity of the modified tower and the previously modified foundation for existing and proposed antenna loads in compliance with the 2018 Connecticut State Building Code and the forthcoming TIA-222-H Standard. This analysis was conducted to evaluate stress on the tower and the effect 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 TIA-222-H–Structural Standard for Antenna Towers and Antenna Supporting Structures and Antennas, the 2015 International Building Code with 2018 Connecticut State Building Code Amendments, the 2018 International Building Code (in compliance with the TIA-222-H Standard) and the American Institute of Steel Construction (AISC) Manual of Steel Construction – Load Resistance Factor Design (LRFD).

The structural analysis was conducted using TNX Tower version 8.0.5.0 and used the following conditions for this tower review (following the TIA-222-H Standard):

- Structure Class 3 – (Essential Communications)
  - NOTE: ASCE 7 and CT State Building Code Applied Risk Category 4 for design wind loads (see below)
- Topographic Category 3 – (Tower location on top of hill – rolling wind conditions considered)
  - Crest Height used for analysis: (approximate elevations listed below)
    - Tower Base Elevation = 590 feet
    - High point (2 mile Radius) = 637 feet (Ref. Peak of hill near Amston Lake)
    - Low Point (2 mile Radius) = 410 feet (Ref. Bench mark Elevation near local Cemetery)
    - “H” = (Avg of High/Low) – Base Elevation =  $(637+410)/2 - 590 = \underline{66.5}$  feet
- Exposure Class C – (Open Terrain with scattered obstructions)
- Load Conditions:
  - Two load conditions were evaluated as shown which were compared to design stresses according to AISC and TIA-222-H Standard.

Basic Wind Speed:

- IBC 2018 w/ 2018 CT State Building Code Amendment:
  - (2018) IBC Section 1609.1.1 – Determination of Wind Loads – Exception 5 “Designs using TIA-222” applies for determination of Design Wind Load obtained as “V.ult” are to be converted to “V.asd” when applying the TIA-222-H design Standard (under Section 1609.3) for Basic Wind Speed.
  - (2018) CT State Building Code Amendment to the IBC Section 1609.3 wind loads are obtained from Appendix N of the State Building Code.
    - **V.ult = 140 mph** (3-Second Gust) Wind Design Parameter for the Town of Colchester, Connecticut for Risk Category four (IV) for essential communications (Connecticut State Police). NOTE: Because the State of Connecticut has not officially published the design wind-speeds, use of the State of Connecticut wind-speeds per municipality (indicated above).

**LOAD CONDITION 1 = 140 MPH (3-SECOND GUST) WIND LOAD (WITHOUT ICE) + TOWER DEAD LOAD**

Load Condition 2 = 50 mph (3-second gust) Wind Load (with ice) + Ice Load + Tower Dead Load

Ice thickness used for this analysis is **1.00 inch** (assumed to start at the base of the tower) and is considered to increase in thickness with height. The initial ice thickness for design is referenced in the Annex of TIA-222-H and follows the same design criteria as the ASCE 7 (2016) Standard.

The load condition below implements the design requirements of the Department of Energy Services and Public Protection (DESPP) / Connecticut State Police (CSP) for the tower structures deflection limits with the allowable limit of the combination of the tower’s sway (deflection) and twist (rotation) under the TIA/EIA-222-F design Standard. This design limit required the combined value of sway (deflection) and twist (rotation) to be under 0.75 degrees following the TIA/EIA-222-F design Standard.

### 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS (cont.)

Load Condition 3 = 90 mph (fastest mile) Wind Load (with Ice) + Ice Load + Dead Load

Seismic event consideration factors/values for design:

- $S_s = 0.174$  (2018 CT State Building Code – Location Specific Value)
- $S_1 = 0.061$  (2018 CT State Building Code – Location Specific Value)
- Site Classification = “D”
- Seismic Design Category = “B” – (2018 International Building Code)
- $F_a = 1.6$  (Obtained from TIA-222-H Table 2-11 Considering above conditions)
- $F_v = 2.4$  (Obtained from TIA-222-H Table 2-12 Considering above conditions)

NOTE: TIA-222-H Section 9.8 require  $S_s$  values to be greater than 1.0 to be applied for analysis. Due to the  $S_s$  value below this threshold, the seismic base shear calculation is omitted from this structural analysis report.

Strength Limit State Load Combinations (TIA-222-H Section 2.3.2):

The structural analysis herein has considered the following load combinations within the analysis:

1. **1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.6 Wind load without ice**
2. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Dead weight of ice due to factored ice thickness + 1.0 Concurrent wind load with factored ice thickness + 1.0 Load effects due to temperature
3. 1.2 Dead Load Tower structure + 1.0 Dead Load Guy Assemblies + 1.0 Earthquake Load

NOTE 1: The above **bolded** load combination is considered to create the governing design loads per the results of the analysis.

NOTE 2: The above “Dead Load Guy Assemblies” are not considered as part of the analysis and are considered as a value of zero.

NOTE 3: The “Load effects due to temperature” do not apply for structures that are self-sustaining (from the TIA-222-H Standard)

#### 4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the existing tower structure were evaluated to compare with strength design in accordance with AISC (LRFD). The results of an initial analysis indicated the existing tower did not have enough capacity to support the proposed loading conditions. The tower structure requires modifications shown on SK-1 and SK-2. Once the modifications indicated on sheets SK-1 and SK-2 are performed, the modified structure along with the existing foundation and anchor bolts are considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein.

The combined values for the tower sway (deflection) and the tower twist (rotation) are permitted for the site and this loading conditions, as requested by the Department of Energy Services and Public Protection (DESPP) / Connecticut State Police (CSP). The tower deflection (sway) is 0.3642 degrees and the tower rotation (twist) 0.2278 degrees with a wind velocity of 90 mph with 0.5" ice measured from DESPP / CSP Service Dish antennas. The tower deflection and rotation ARE within the Connecticut State Police specification of 0.75 degrees of combined deflection (sway) and rotation (twist) for their requested criteria. The DESPP / CSP retains the right to update the requirements of tower Twist and Sway for this site and shall be coordinated with the Department prior to any antenna equipment installation.

#### Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail
Leg (T16)	ROHN 12 EH w/ L8x8x1/2 w/ (2) / Compression / 30' – 60'	64.9	Pass
Diagonal (T15)	ROHN 3 XXS (3.5" O.D.x0.600") / Compression / 60' – 80'	95.4	Pass
Horizontal (T16)	ROHN 3.5 EH (4.0" O.D.x0.318") / Compression	91.6	Pass
Top Grit (T1)	L1-3/4x1-3/4x3/16 / Compression / 300' – 320"	3.6	Pass
Redundant Horizontal Bracing (T17)	ROHN 1.5 STD (P1.9x0.145") / Compression / 0'-30'	95.5	Pass
Redundant Diagonal Bracing (T17)	ROHN 2 EH (P2.5x0.218") / Compression / 0'-30'	81.7	Pass
Inner Bracing (T17)	ROHN 3 STD (P3.2x0.216") / Compression / 0'-30'	0.6	Pass
Bolt Checks(T10)	@ Diagonal Connection (Member Bearing) (1) A325X 7/8" Dia. / 160' – 170'	93.5	Pass



**4. FINDINGS AND EVALUATION (cont.)**

**Foundation Summary**

<b>Component</b>	<b>Required</b>	<b>Computed</b>	<b>% Capacity</b>	<b>Pass/Fail</b>
Anchor Rod Capacity (TIA-222-H – 4.9.9 Addendum. 1)	Ratio < 1.0	0.53	53.0	Pass
Foundation – Drilled Pier Soil Failure Cone Uplift Capacity	1088.63 (Factored Resistance)	740.586	68.0	Pass
Foundation – Drilled Pier Bearing Capacity	1442.54 kip (Factored Resistance)	1296.83	89.9	Pass
Foundation – Drilled Pier Uplift Capacity	865.26 kip (Factored Resistance)	740.586	85.6	Pass
<b>Structure Rating (Maximum from all Components) =</b>			<b>95.5</b>	<b>Pass</b>

**Maximum Deformations – Proposed Condition**

TIA-222-H Section 2.8.2 - Limit State Deformations

1. A rotation of 4 degrees about the vertical axis (twist) or any horizontal axis (sway) of the structure
2. A horizontal displacement (in feet) of 3% of the height of the structure.

<b>Load Case Description</b>	<b>Current</b>		<b>Allowable</b>	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.5102	1.90	4.0	9.6

**Tower Twist & Sway at Top Service Dish (Connecticut State Police Requirements – TIA/EIA-222-F):**

<b>Description</b>	<b>Current</b>	<b>Total</b>	<b>Allowable</b>
Tower Twist (degrees)	0.3642	0.5920	0.750
Tower Sway (degrees)	0.2278		

*NOTE: Above combined Twist and Sway results are from the maximum results of current DESPP / CSP Service Dish antennas as permitted from the Department. The DESPP / CSP reserves the right to update the requirements of tower Twist and Sway for this site and shall be coordinated with the Department prior to any antenna equipment installation.*

## 5. CONCLUSIONS

The results of an initial structural analysis indicated that the existing tower did not have enough capacity for the proposed loading conditions above. The tower structure requires modifications shown on SK-1 and SK-2. **Once the modifications indicated on sheets SK-1 and SK-2 are performed, the modified structure, existing anchor bolts and previously modifies foundation are considered structurally adequate with the existing and proposed antenna loading herein.**

Per the Department of Energy Services and Public Protection (DESPP) / Connecticut State Police (CSP) directive, required twist and sway for this location is permitted to be measured from service dishes. The maximum sway (deflection) after tower modification is 0.3642 degrees and the maximum twist (rotation) after tower modification is 0.2278 degrees. These combined figures, measured from CSP service dishes, are within the Connecticut State Police requirement of 0.75 degrees for combined twist (rotation) and sway (deflection) with the load classification specified herein.

The maximum structural capacity calculated, after the tower structure has been modified, is **95.5 %**

### **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 defects 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 tower owner shall refer to TIA-222-H Section 14 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. It is also recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions

## 6. DRAWINGS AND DATA

## REINFORCEMENT DRAWINGS SK-1 AND SK-2

## GENERAL CONSTRUCTION NOTES

- ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
- 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 SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
- 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 OR WRITTEN IN SPECIFICATIONS.
- 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.
- 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.
- 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.
- INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING 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.
- THE REINFORCEMENT OF PORTIONS OF THIS TOWER STRUCTURE MAY AFFECT CRITICAL CONNECTICUT STATE POLICE ANTENNAS. NO MOVEMENT, ALTERATION, OR DISCONNECTION OF CONNECTICUT STATE POLICE ANTENNAS MAY OCCUR WITHOUT THE NOTIFICATION AND APPROVAL OF THE CONNECTICUT STATE POLICE. CONTACT THE NETWORK CONTROL CENTER AT 860-865-8008.
- TOWER REINFORCING WORK AFFECTING CRITICAL CONNECTICUT STATE POLICE ANTENNAS MAY BE REQUIRED TO BE CONDUCTED AT TIMES AS DETERMINED BY THE REQUIREMENTS OF THE CONNECTICUT STATE POLICE.
- IT SHALL BE MANDATORY TO USE STEEL MATERIALS PLANNED FOR CONSTRUCTION THAT ARE MANUFACTURED IN THE UNITED STATES OF AMERICA. MATERIAL SPECIFICATION DOCUMENTS SHALL BE MADE AVAILABLE TO VERIFY STEEL FABRICATION PRIOR TO PURCHASE AND IMPLEMENTATION. DEVIATIONS SHALL REQUIRE EXPRESSED WRITTEN PERMISSION FROM THE ENGINEER AND CONNECTICUT STATE POLICE.
- 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.
- 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.
- SHOP DRAWINGS ARE REQUIRED. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS ON THE TOWER AND INCLUDE THE GATHERED INFORMATION ON THE SHOP DRAWINGS. NOTE ANY DISCREPANCIES ENCOUNTERED ON THE SHOP DRAWINGS. NO FABRICATION OR INSTALLATION OF STEEL SHALL OCCUR PRIOR TO THE RECEIPT AND APPROVAL OF SHOP DRAWINGS.
- 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.
- 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.
- 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.
- CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING 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.

## STRUCTURAL NOTES

### STRUCTURAL STEEL MATERIAL NOTES:

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 LEG, HORIZONTAL, DIAGONAL PIPE MEMBERS).... 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. REFER TO NOTE 13

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 NOTES:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8", 7/8" & 1" DIA. A325X & A490X BOLTS, A563 NUTS AND F436 WASHERS, ALL GALVANIZED. BEVELED WASHERS SHALL BE USED ON BEAM FLANGES HAVING A SLOPE GREATER THAN 1:20.

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.

### 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 CONNECTICUT STATE POLICE, BUILDING OFFICIAL, ENGINEER OF RECORD AND CONTRACTOR.

PROJECT NO.  
60626930  
 Designed by:  
MCD  
 Drawn by:  
GAT  
 Checked by:  
MJE  
 Approved by:  
RAS

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



SITE ADDRESS:  
112 MUNN ROAD  
COLCHESTER, CONNECTICUT 06415

REV.	DATE:	DESCRIPTION

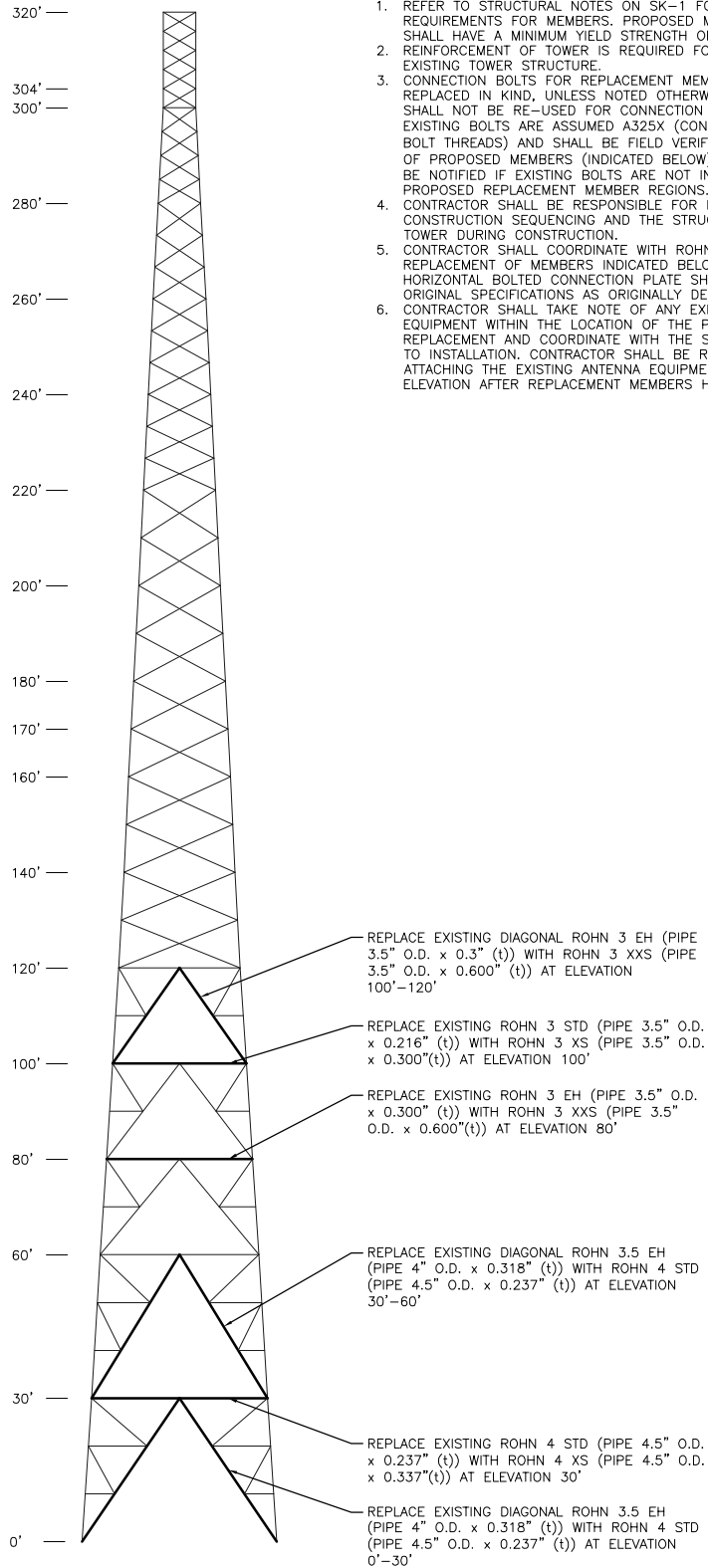
Scale: AS NOTED      Date: 05/21/20

Job No.      File No.

Dwg. No.  
**SK-1**  
 Dwg. 1 of 2

## STRUCTURAL NOTES

1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR MEMBERS. PROPOSED MEMBERS AS INDICATED SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI.
2. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
3. CONNECTION BOLTS FOR REPLACEMENT MEMBERS SHALL BE REPLACED IN KIND, UNLESS NOTED OTHERWISE. EXISTING BOLTS SHALL NOT BE RE-USED FOR CONNECTION REPLACEMENT MEMBERS. EXISTING BOLTS ARE ASSUMED A325X (CONNECTION NOT BEARING ON BOLT THREADS) AND SHALL BE FIELD VERIFIED BEFORE REPLACEMENT OF PROPOSED MEMBERS (INDICATED BELOW). THE ENGINEER SHALL BE NOTIFIED IF EXISTING BOLTS ARE NOT INSTALLED AS A325X IN PROPOSED REPLACEMENT MEMBER REGIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE CONSTRUCTION SEQUENCING AND THE STRUCTURAL INTEGRITY OF THE TOWER DURING CONSTRUCTION.
5. CONTRACTOR SHALL COORDINATE WITH ROHN, INC. FOR THE REPLACEMENT OF MEMBERS INDICATED BELOW. DIAGONAL AND HORIZONTAL BOLTED CONNECTION PLATE SHALL CONFORM TO THE ORIGINAL SPECIFICATIONS AS ORIGINALLY DESIGNED FROM ROHN INC.
6. CONTRACTOR SHALL TAKE NOTE OF ANY EXISTING ANTENNA EQUIPMENT WITHIN THE LOCATION OF THE PROPOSED MEMBER REPLACEMENT AND COORDINATE WITH THE SPECIFIC CARRIER PRIOR TO INSTALLATION. CONTRACTOR SHALL BE RESPONSIBLE FOR ATTACHING THE EXISTING ANTENNA EQUIPMENT AS CLOSE TO EXISTING ELEVATION AFTER REPLACEMENT MEMBERS HAVE BEEN INSTALLED.



**1** TOWER ELEVATION  
SK-2 SCALE: 1" = 40'-0"

PROJECT NO.  
60626930  
Designed by:  
MCD  
Drawn by:  
GAT  
Checked by:  
MJE  
Approved by:  
RAS

**AECOM**  
500 ENTERPRISE DRIVE  
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(860)-529-8882



SITE ADDRESS:  
112 MUNN ROAD  
COLCHESTER, CONNECTICUT 06415

REV.	DATE:	DESCRIPTION

Scale: AS NOTED Date: 05/21/20

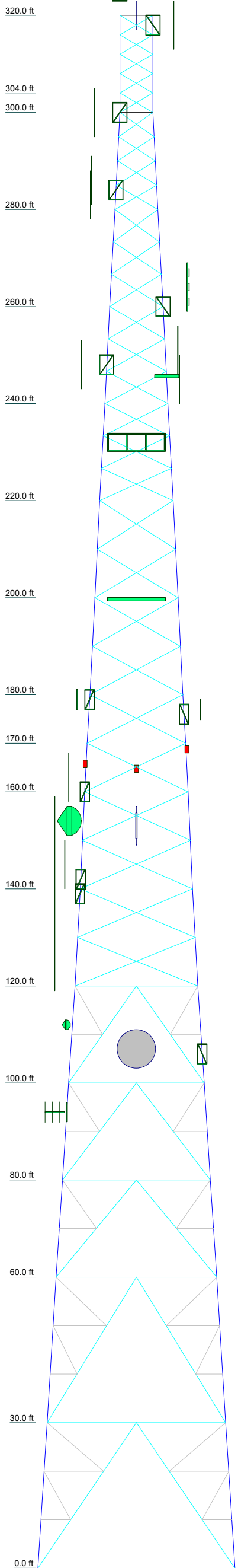
Job No. File No.

Dwg. No.  
**SK-2**  
Dwg. 2 of 2

## TNX TOWER INPUT / OUTPUT SUMMARY



Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17		
Legs	ROHN 5 EH	ROHN 6 EH	ROHN 8 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 12 EH w/ angle 8x8x0.5	ROHN 4 EH	ROHN 3 XXS	ROHN 3 STD	ROHN 3.5 EH	ROHN 1.5 STD	ROHN 2.5 STD	ROHN 4 EH	ROHN 3.5 EH	ROHN 1.5 STD	ROHN 2.5 STD	ROHN 4 EH	ROHN 3.5 EH	ROHN 1.5 STD	ROHN 2.5 STD
Leg Grade	L1 3/4x1 3/4x3/16	L2x2x1/4	L2 1/2x2 1/2x1/4	L3x3x1/4	L4x4x3/8	L5x5x1/2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Diagonals	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Diagonal Grade	L1 3/4x1 3/4x3/16	L2x2x1/4	L2 1/2x2 1/2x1/4	L3x3x1/4	L4x4x3/8	L5x5x1/2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Top Girts	L1 3/4x1 3/4x3/16	L2x2x1/4	L2 1/2x2 1/2x1/4	L3x3x1/4	L4x4x3/8	L5x5x1/2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Horizontals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Red. Horizontals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Red. Diagonals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Red. Hips	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Inner Bracing	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Face Width (ft)	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69	40.69
# Panels @ (ft)	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4	5 @ 4
Weight (lb)	1442.1	348.7	2498.3	5997.7	9408.2	6484.4	6406.0	7298.6	3730.8	3785.3	9668.6	9975.3	9144.9	8975.5	11450.5	15115.4	17941.9	17941.9	17941.9



**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (Lightning Rod)	329	PIROD 12' Lightweight T-Frame (ATI)	200
Dual Lights (Beacon)	327	PIROD 12' Lightweight T-Frame (ATI)	200
PD128-1 (ECI-1)	325	7770.00 (ATI)	200
6' Side Mount Standoff (ECI-1)	325	HPA-65R-BUJ-H8 Panel (ATI)	200
BA1012-0 (ECI-2)	320	RRUS-32 (ATI)	200
6' Side Mount Standoff (ECI-2)	320	RRUS-11 (ATI)	200
ANT450F6 (ECI-3)	318	7770.00 (ATI)	200
4x4" Pipe Mount (ECI-3)	318	HPA-65R-BUJ-H8 Panel (ATI)	200
SC479-HF1LDF (ECI-4)	300	RRUS-32 (ATI)	200
6' Side Mount Standoff (ECI-4)	300	RRUS-11 (ATI)	200
PD340-1 (ECI-5)	290	7770.00 (ATI)	200
6' Side Mount Standoff (ECI-5)	290	HPA-65R-BUJ-H6 Panel (ATI)	200
DB809T3E-XC (ECI-6)	286	RRUS-32 (ATI)	200
6' Side Mount Standoff (ECI-7)	284	RRUS-11 (ATI)	200
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-7)	283	DC6-48-60-0-8C Squid / Surge Arrestor (ATI)	200
PD440-2 (ECI-8)	264	STK-U Stiffener Side Arm Attachment (ATI)	200
6' Side Mount Standoff (ECI-8)	260	STK-U Stiffener Side Arm Attachment (ATI)	200
SC479-HF1LDF (ECI-10)	251	STK-U Stiffener Side Arm Attachment (ATI)	200
PD1142-1 (ECI-14)	248	STK-U Stiffener Side Arm Attachment (ATI)	200
6' Side Mount Standoff (ECI-14)	248	STK-U Stiffener Side Arm Attachment (ATI)	200
430-94C-09168-M-11048 TTA (ECI-11)	247	STK-U Stiffener Side Arm Attachment (ATI)	200
Sabre T-Boom (1) (ECI-10,11,12,13)	246	DB586-Y (ECI-50)	179
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-13)	245	Pirod 4' Side Mount Standoff (1) (ECI-50)	179
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-12)	245	DB586-Y (ECI-51)	177
6' Side Mount Standoff (ECI-15)	238	430-94C-09168-M-11048 TTA (ECI-52)	176
531-70HD Exposed Dipole Antenna (ECI-15)	238	Pirod 4' Side Mount Standoff (1) (ECI-53,52,51)	176
Valmont VFA-10-U V-Frame (Verizon)	232	DB586-Y (Inverted) (ECI-53)	175
Valmont VFA-10-U V-Frame (Verizon)	232	L-810 Obstruction Lighting (1) (ECI-54)	168
Valmont VFA-10-U V-Frame (Verizon)	232	L-810 Obstruction Lighting (1) (ECI-55)	165
JAHH-65B-R3B Panel Antenna (Verizon-AWS)	232	L-810 Obstruction Lighting (1) (ECI-56)	164
JAHH-65B-R3B Panel Antenna (Verizon-PCS)	232	Telewave ANT220F2 - Omni Antenna (Eversource (Proposed))	163
LNx-6512DS-VTM (Verizon-850)	232	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed))	160
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS)	232	5'3"x4" Pipe Mount (ECI-58a (Dish Support))	154
RFV01U-D1A RRH Unit (Verizon RRH)	232	Commscope PAR6-59W-PXA/A (ECI-58)	154
RFV01U-D2A RRH Unit (Verizon RRH)	232	ANT450F6 (ECI-57)	153
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	232	5'3"x4" Pipe Mount (ECI-57)	153
JAHH-65B-R3B Panel Antenna (Verizon-AWS)	232	Telewave ANT220F2 - Omni Antenna (Eversource (Proposed))	145
JAHH-65B-R3B Panel Antenna (Verizon-PCS)	232	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed))	142
LNx-6512DS-VTM (Verizon-850)	232	PD156S (ECI-60)	139
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS)	232	DB212-1 (ECI-59)	139
RFV01U-D1A RRH Unit (Verizon RRH)	232	4' Side Mount Standoff (ECI-60 .59)	139
RFV01U-D2A RRH Unit (Verizon RRH)	232	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-61a)	117
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	232	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-63a (Dish Ice Shield))	115
JAHH-65B-R3B Panel Antenna (Verizon-AWS)	232	5'3"x4" Pipe Mount (ECI-61a (Dish Support))	112
JAHH-65B-R3B Panel Antenna (Verizon-PCS)	232	Andrew 2' w/Radome (ECI-61)	112
LNx-6512DS-VTM (Verizon-850)	232	5'3"x4" Pipe Mount (ECI-63 (Dish Support))	107
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS)	232	PA8-65 (ECI-63)	107
RFV01U-D1A RRH Unit (Verizon RRH)	232	PD458 (ECI-62)	106
RFV01U-D2A RRH Unit (Verizon RRH)	232	Pirod 4' Side Mount Standoff (1) (ECI-62)	106
CBC78T-DS-43-2X Diplexer (Verizon)	232	PD688S-4 (ECI-66)	94
CBC78T-DS-43-2X Diplexer (Verizon)	232	4'x4" Pipe Mount (ECI-66)	94
CBC78T-DS-43-2X Diplexer (Verizon)	232		
PIROD 12' Lightweight T-Frame (ATI)	200		

**MATERIAL STRENGTH**

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

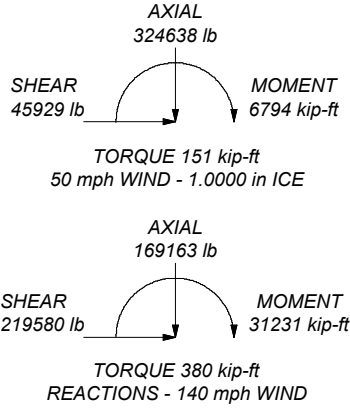
**TOWER DESIGN NOTES**

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 3 with Crest Height of 66.50 ft
7. P-Delta Displacement Effects are not applicable to this tower for this case (TIA-222-H Section 3.5)
8. TOWER RATING: 95.5%

ALL REACTIONS ARE FACTORED

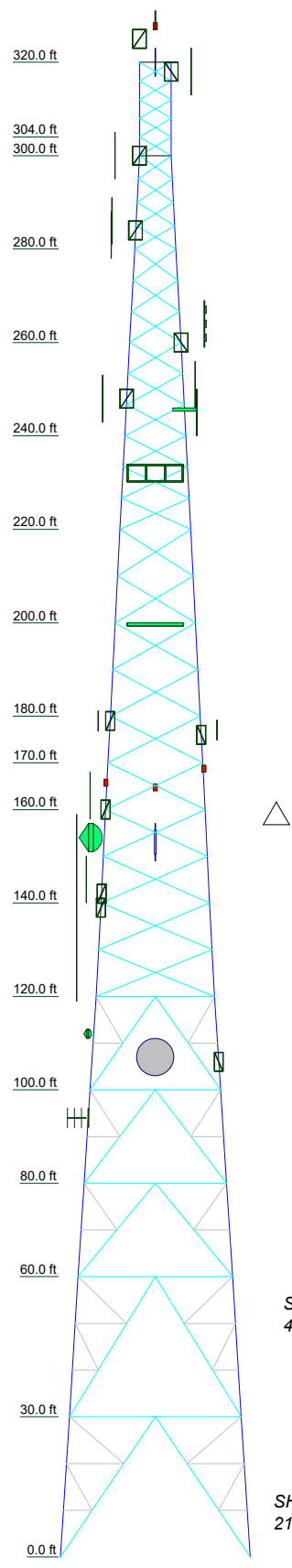
MAX. CORNER REACTIONS AT BASE:  
 DOWN: 942660 lb  
 SHEAR: 129314 lb

UPLIFT: -740586 lb  
 SHEAR: 106386 lb



<b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job: 320' Rohn SSMVM</b>	
	Project: <b>CSP Tower - Colchester, CT</b>	
	Client: <b>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</b>	Drawn by: <b>MCD</b>
	Code: <b>TIA-222-H</b>	Date: <b>05/18/20</b>
	Path:	Scale: <b>NTS</b> Dwg No. <b>E-1</b>

Section	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1	
Legs	A	ROHN 12 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	
Leg Grade																		
Diagonals		ROHN 4 EH	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	
Diagonal Grade																		
Top Girts																		
Horizontals		ROHN 4 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	
Red. Horizontals		P1.5x.145	ROHN 1.5 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	ROHN 2 STD	
Red. Diagonals		ROHN 2.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD	
Red. Hips																		
Inner Bracing																		
Face Width (ft)	40.89	36.8	33.14	30.47	27.97	25.39	23.21	21.3	20.28	19.22	17.09	15.09	13.08	11.04	8.85		6.81	
# Panels @ (ft)		2 @ 30	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	3 @ 20	
Weight (lb)	125382.3	17941.9	15115.4	11450.5	9875.5	9144.9	9975.3	9008.6	3795.3	3750.8	7298.6	6409.0	6494.4	5409.2	5907.7	2498.3	340.7	1442.1



**SYMBOL LIST**

MARK	SIZE	MARK	SIZE
A	ROHN 12 EHS w Angle 8x8x0.625	D	N.A.
B	L1 3/4x1 3/4x3/16	E	ROHN 1.5 STD
C	L2 1/2x2 1/2x1/4		

**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

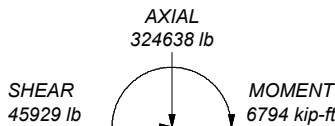
1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 3 with Crest Height of 66.50 ft
7. P-Delta Displacement Effects are not applicable to this tower for this case (TIA-222-H Section 3.5)
8. TOWER RATING: 95.5%

ALL REACTIONS ARE FACTORED

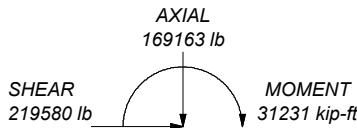
MAX. CORNER REACTIONS AT BASE:

DOWN: 942660 lb  
SHEAR: 129314 lb

UPLIFT: -740586 lb  
SHEAR: 106386 lb



TORQUE 151 kip-ft  
50 mph WIND - 1.0000 in ICE



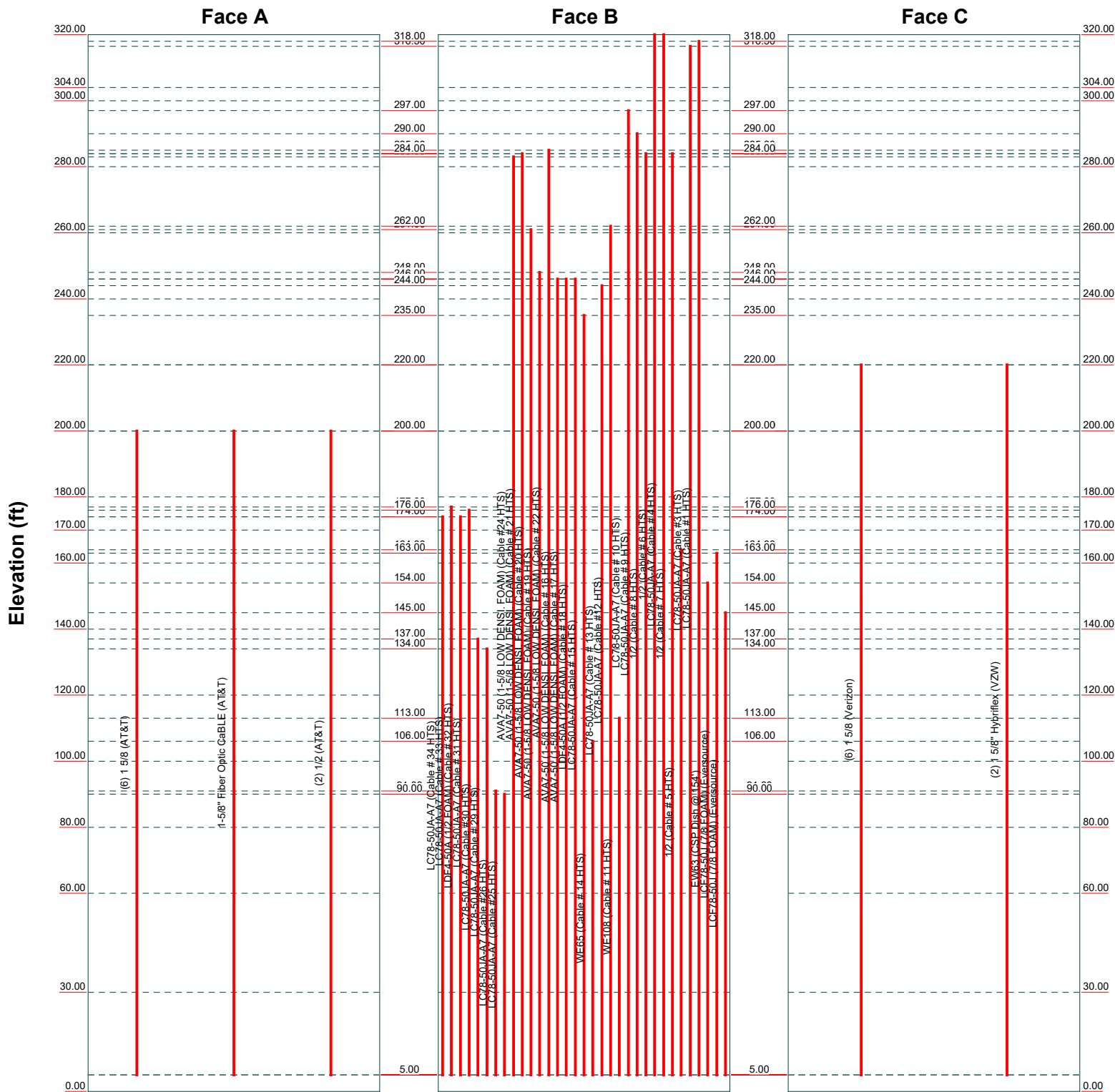
TORQUE 380 kip-ft  
REACTIONS - 140 mph WIND

<p><b>AECOM</b></p> <p>500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	Job: <b>320' Rohn SSVMW</b>
	Project: <b>CSP Tower - Colchester, CT</b>
	Client: <b>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</b>
	Code: <b>TIA-222-H</b>
	Path: <b>C:\projects\320' Rohn SSVMW\320' Rohn SSVMW.dwg</b>
Drawn by: <b>MCD</b>	App'd:
Date: <b>05/18/20</b>	Scale: <b>NTS</b>
	Dwg No. <b>E-1</b>

## TNX TOWER FEEDLINE DISTRIBUTION CHART

# Feed Line Distribution Chart 0' - 320'

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

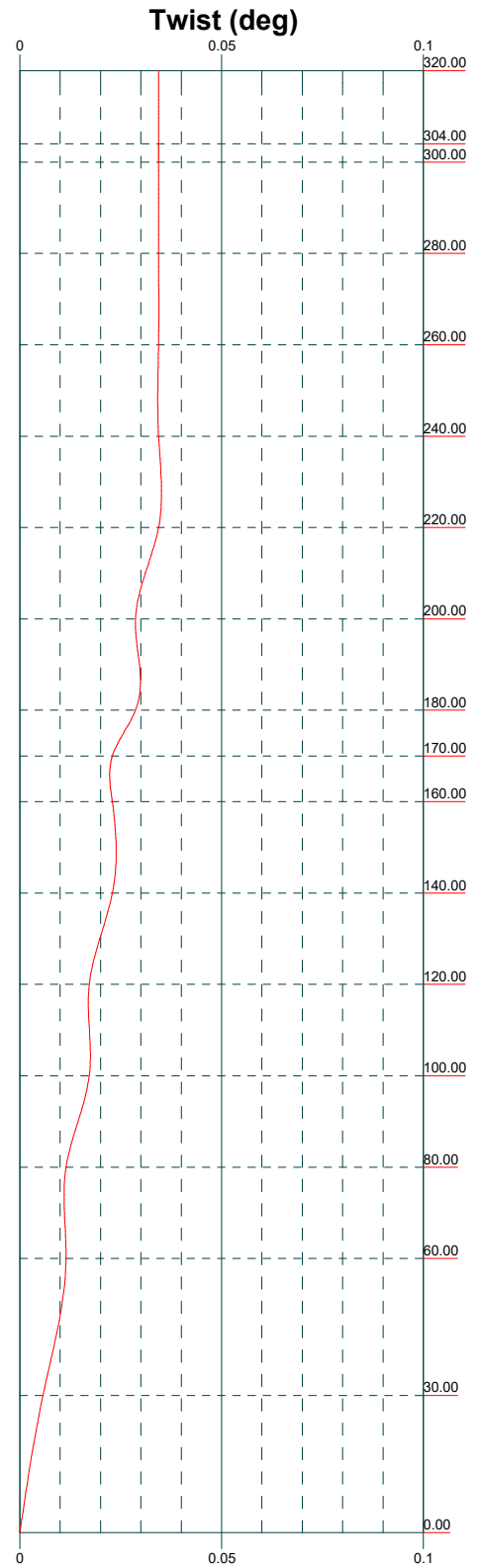
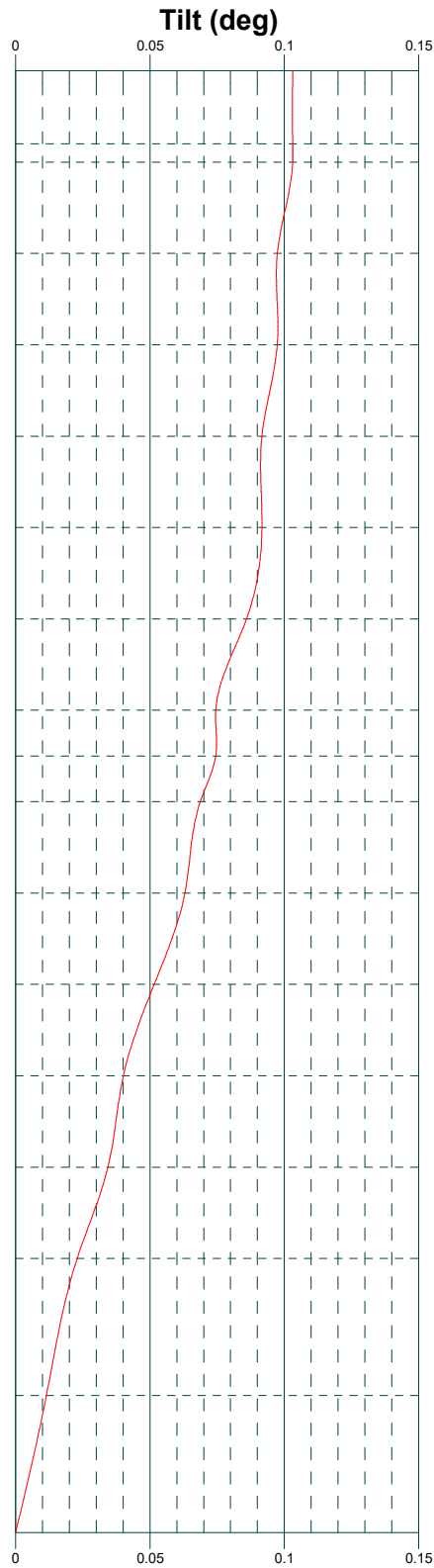
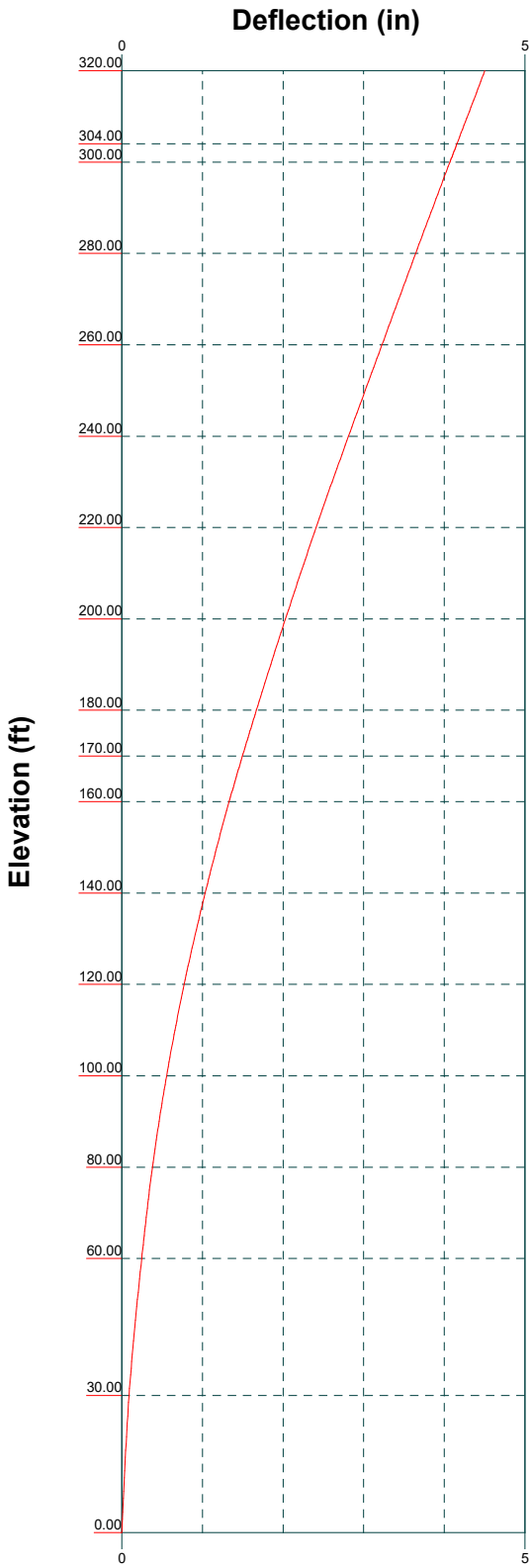


<b>AECOM</b>		Job: <b>320' Rohn SSVMW</b>	
500 Enterprise Drive, Suite 3B		Project: <b>CSP Tower - Colchester, CT</b>	
Rocky Hill, CT		Client: <b>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</b>	Drawn by: <b>MCD</b> App'd:
Phone: 860-263-5800		Code: <b>TIA-222-H</b>	Date: <b>05/18/20</b> Scale: <b>NTS</b>
FAX: 860-812-2094		Path:	Dwg No. <b>E-7</b>

## TNX TOWER FEEDLINE PLAN



## **TNX TOWER DEFLECTION, TILT, AND TWIST**



<p><b>AECOM</b>                  500 Enterprise Drive, Suite 3B                  Rocky Hill, CT                  Phone: 860-263-5800                  FAX: 860-812-2094</p>	<p>Job: <b>320' Rohn SSVMW</b></p>		
	<p>Project: <b>CSP Tower - Colchester, CT</b></p>		
	<p>Client: <b>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</b></p>	<p>Drawn by: <b>MCD</b></p>	<p>App'd:</p>
	<p>Code: <b>TIA-222-H</b></p>	<p>Date: <b>05/18/20</b></p>	<p>Scale: <b>NTS</b></p>
	<p>Path:</p>	<p>Dwg No. <b>E-5</b></p>	



## TNX TOWER DETAILED OUTPUT

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 1 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

## 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-222-H standard.

The following design criteria apply:

Tower base elevation above sea level: 0.00 ft.

Basic wind speed of 140 mph.

Risk Category III.

Exposure Category C.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 3.

Crest Height: 66.50 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

P-Delta Displacement Effects are not applicable to this tower for this case (TIA-222-H Section 3.5).

Pressures are calculated at each section.

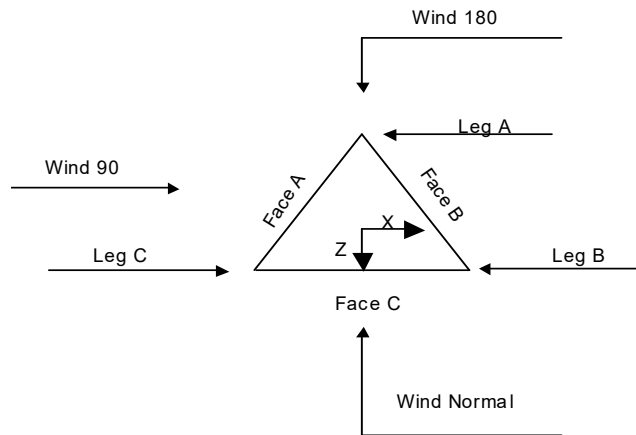
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>√ SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul>	<ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>√ SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>√ Include Angle Block Shear Check</li> <li>Use TIA-222-H Bracing Resist. Exemption</li> <li>Use TIA-222-H Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul>
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<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 2 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD



**Triangular Tower**

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	320.00-304.00			6.81	1	16.00
T2	304.00-300.00			6.81	1	4.00
T3	300.00-280.00			6.81	1	20.00
T4	280.00-260.00			8.85	1	20.00
T5	260.00-240.00			11.04	1	20.00
T6	240.00-220.00			13.08	1	20.00
T7	220.00-200.00			15.09	1	20.00
T8	200.00-180.00			17.09	1	20.00
T9	180.00-170.00			19.22	1	10.00
T10	170.00-160.00			20.26	1	10.00
T11	160.00-140.00			21.30	1	20.00
T12	140.00-120.00			23.21	1	20.00
T13	120.00-100.00			25.39	1	20.00
T14	100.00-80.00			27.97	1	20.00
T15	80.00-60.00			30.47	1	20.00
T16	60.00-30.00			33.14	1	30.00
T17	30.00-0.00			36.80	1	30.00

**Tower Section Geometry (cont'd)**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	3 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

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	320.00-304.00	4.00	X Brace	No	No	0.0000	0.0000
T2	304.00-300.00	4.00	X Brace	No	No	0.0000	0.0000
T3	300.00-280.00	5.00	X Brace	No	No	0.0000	0.0000
T4	280.00-260.00	6.67	X Brace	No	No	0.0000	0.0000
T5	260.00-240.00	6.67	X Brace	No	No	0.0000	0.0000
T6	240.00-220.00	6.67	X Brace	No	No	0.0000	0.0000
T7	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T8	200.00-180.00	10.00	X Brace	No	No	0.0000	0.0000
T9	180.00-170.00	10.00	X Brace	No	No	0.0000	0.0000
T10	170.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T11	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T12	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T13	120.00-100.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T14	100.00-80.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T15	80.00-60.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T16	60.00-30.00	30.00	K2 Down	No	Yes	0.0000	0.0000
T17	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 320.00-304.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 304.00-300.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 300.00-280.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 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)
T5 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)
T6 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)
T7 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)
T8 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)
T9 180.00-170.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T10 170.00-160.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T11 160.00-140.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x1/2	A572-50 (50 ksi)
T12 140.00-120.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x1/2	A572-50 (50 ksi)
T13 120.00-100.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T14 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)
T15 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)
T16 60.00-30.00	Arbitrary Shape	ROHN 12 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 4 EH	A572-50 (50 ksi)
T17 30.00-0.00	Arbitrary Shape	ROHN 12 EHS w Angle	A572-50	Pipe	ROHN 4 EH	A572-50

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 4 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
		8x8x0.625	(50 ksi)			(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 320.00-304.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 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
T13 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T14 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T15 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T16 60.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)
T17 30.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 4 EH	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
T13 120.00-100.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T14 100.00-80.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T15 80.00-60.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T16 60.00-30.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T17 30.00-0.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	5 of 95
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### Tower Section Geometry (cont'd)

Tower Elevation	Redundant Bracing Grade	Redundant Type	Redundant Size	K Factor
ft				
T13 120.00-100.00	A572-50 (50 ksi)	Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe	1 1 1
T14 100.00-80.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe Pipe	1 1 1 1
T15 80.00-60.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe Pipe	1 1 1 1
T16 60.00-30.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Horizontal (2) Diagonal (1) Diagonal (2) Hip (1) Hip (2)	Pipe Pipe Pipe Pipe Pipe Pipe Pipe	1 1 1 1 1 1 1
T17 30.00-0.00	A572-50 (50 ksi)	Hip Diagonal (1) Hip Diagonal (2) Horizontal (1) Horizontal (2) Diagonal (1) Diagonal (2) Hip (1) Hip (2) Hip Diagonal (1) Hip Diagonal (2)	Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe	1 1 1 1 1 1 1 1 1 1

### Tower Section Geometry (cont'd)

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	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
T1 320.00-304.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 304.00-300.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 300.00-280.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 280.00-260.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 260.00-240.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 240.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8	0.00	0.0000	A36	1	1	1	36.0000	36.0000	36.0000







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**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1	Flange	1.0000	0	0.6250	1	0.6250	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
320.00-304.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T2	Flange	1.0000	6	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
304.00-300.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T3	Flange	1.0000	8	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
300.00-280.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T4	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
280.00-260.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T5	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
260.00-240.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T6	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
240.00-220.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T7	Flange	1.0000	12	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
220.00-200.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T8	Flange	1.0000	12	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
200.00-180.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T9	Flange	1.0000	12	0.8750	1	0.6250	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
180.00-170.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T10	Flange	1.0000	0	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
170.00-160.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T11	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	
T12	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	
T13	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	
T14	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	
T15	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	
T16	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	
T17	Flange	1.0000	24	0.8750	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
30.00-0.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	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	No	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.42	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon)	C	No	No	Ar (CaAa)	220.00 - 5.00	0.0000	-0.4	6	6	1.9800	1.9800		1.04
1 5/8" Hybriflex (VZW)	C	No	No	Ar (CaAa)	220.00 - 5.00	0.0000	-0.46	2	2	1.6000	1.6000		1.85
LC78-50JA-A	B	No	No	Ar (CaAa)	174.00 -	0.0000	0.48	1	1	1.0900	1.0900		0.28



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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
HTS) AVA7-50 (1-5/8 LOW DENSL FOAM) (Cable # 16 HTS)	B	No	No	Ar (CaAa)	246.00 - 5.00	0.0000	0.38	1	1	1.9800	1.9800		0.72
HTS) AVA7-50 (1-5/8 LOW DENSL FOAM) (Cable # 17 HTS)	B	No	No	Ar (CaAa)	246.00 - 5.00	3.0000	0.38	1	1	1.9800	1.9800		0.72
HTS) LDF4-50A (1/2 FOAM) (Cable # 18 HTS)	B	No	No	Ar (CaAa)	246.00 - 5.00	6.0000	0.38	1	1	0.6300	0.6300		0.15
HTS) LC78-50JA-A 7 (Cable # 15 HTS)	B	No	No	Ar (CaAa)	235.00 - 5.00	0.0000	0.37	1	1	1.0900	1.0900		0.28
HTS) WE65 (Cable # 14 HTS)	B	No	No	Af (CaAa)	106.00 - 5.00	3.0000	0.37	1	1	1.5836	1.5836		0.53
HTS) LC78-50JA-A 7 (Cable # 13 HTS)	B	No	No	Ar (CaAa)	244.00 - 5.00	0.0000	0.36	1	1	1.0900	1.0900		0.28
HTS) LC78-50JA-A 7 (Cable #12 HTS)	B	No	No	Ar (CaAa)	262.00 - 5.00	0.0000	0.35	1	1	1.0900	1.0900		0.28
HTS) WE108 (Cable # 11 HTS)	B	No	No	Af (CaAa)	113.00 - 5.00	3.0000	0.35	1	1	1.0149	1.0149		0.35
HTS) LC78-50JA-A 7 (Cable # 10 HTS)	B	No	No	Ar (CaAa)	297.00 - 5.00	0.0000	0.34	1	1	1.0900	1.0900		0.28
HTS) LC78-50JA-A 7 (Cable # 9 HTS)	B	No	No	Ar (CaAa)	290.00 - 5.00	0.0000	0.33	1	1	1.0900	1.0900		0.28
HTS) 1/2 (Cable # 8 HTS)	B	No	No	Ar (CaAa)	284.00 - 5.00	3.0000	0.33	1	1	0.5800	0.5800		0.25
HTS) 1/2 (Cable # 6 HTS)	B	No	No	Ar (CaAa)	320.00 - 5.00	6.0000	0.33	1	1	0.5800	0.5800		0.25
HTS) LC78-50JA-A 7 (Cable # 4 HTS)	B	No	No	Ar (CaAa)	320.00 - 5.00	0.0000	0.32	1	1	1.0900	1.0900		0.28
HTS) 1/2 (Cable # 7 HTS)	B	No	No	Ar (CaAa)	284.00 - 5.00	3.0000	0.32	1	1	0.5800	0.5800		0.25
HTS) 1/2 (Cable # 5 HTS)	B	No	No	Ar (CaAa)	164.00 - 5.00	6.0000	0.32	1	1	0.5800	0.5800		0.25
HTS) LC78-50JA-A	B	No	No	Ar (CaAa)	316.50 -	0.0000	0.31	1	1	1.0900	1.0900		0.28

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	<p><b>Client</b></p> <p style="text-align: center;">VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</p>	<p><b>Designed by</b></p> <p style="text-align: center;">MCD</p>

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Per Row	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7 (Cable #3 HTS)					5.00								
LC78-50JA-A	B	No	No	Ar (CaAa)	318.00 - 5.00	0.0000	0.29	1	1	1.0900	1.0900		0.28
7 (Cable #1 HTS) * CSP Proposed Cables EW63 (CSP Dish @ 154')	B	No	No	Af (CaAa)	154.00 - 5.00	0.0000	0.29	1	1	1.5742	1.5742		0.51
1-5/8" Fiber Optic CaBLE (AT&T)	A	No	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.37	1	1	1.9800	1.9800		1.85
1/2 (AT&T) * Eversource LCF78-50J (7/8 FOAM) (Eversource) LCF78-50J (7/8 FOAM) (Eversource)	A	No	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.35	2	2	0.5800	0.5800		0.25
	B	No	No	Ar (CaAa)	163.00 - 5.00	0.0000	0.27	1	1	1.1000	1.1000		0.53
	B	No	No	Ar (CaAa)	145.00 - 5.00	0.0000	0.26	1	1	1.1000	1.1000		0.53

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight lb
T1	320.00-304.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	5.561	0.000	15.90
		C	0.000	0.000	0.000	0.000	0.00
T2	304.00-300.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.540	0.000	4.36
		C	0.000	0.000	0.000	0.000	0.00
T3	300.00-280.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	13.483	0.000	40.00
		C	0.000	0.000	0.000	0.000	0.00
T4	280.00-260.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.676	0.000	87.48
		C	0.000	0.000	0.000	0.000	0.00
T5	260.00-240.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	37.174	0.000	122.62
		C	0.000	0.000	0.000	0.000	0.00
T6	240.00-220.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	49.355	0.000	162.20
		C	0.000	0.000	0.000	0.000	0.00
T7	220.00-200.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	49.900	0.000	163.60
		C	0.000	0.000	30.160	0.000	198.80
T8	200.00-180.00	A	0.000	0.000	30.040	0.000	171.80
		B	0.000	0.000	49.900	0.000	163.60
		C	0.000	0.000	30.160	0.000	198.80
T9	180.00-170.00	A	0.000	0.000	15.020	0.000	85.90

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Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T10	170.00-160.00	B	0.000	0.000	27.055	0.000	87.16
		C	0.000	0.000	15.080	0.000	99.40
		A	0.000	0.000	15.020	0.000	85.90
T11	160.00-140.00	B	0.000	0.000	29.412	0.000	94.29
		C	0.000	0.000	15.080	0.000	99.40
		A	0.000	0.000	30.040	0.000	171.80
T12	140.00-120.00	B	0.000	0.000	65.283	0.000	208.79
		C	0.000	0.000	30.160	0.000	198.80
		A	0.000	0.000	30.040	0.000	171.80
T13	120.00-100.00	B	0.000	0.000	71.886	0.000	228.48
		C	0.000	0.000	30.160	0.000	198.80
		A	0.000	0.000	30.040	0.000	171.80
T14	100.00-80.00	B	0.000	0.000	76.650	0.000	238.73
		C	0.000	0.000	30.160	0.000	198.80
		A	0.000	0.000	30.040	0.000	171.80
T15	80.00-60.00	B	0.000	0.000	83.818	0.000	254.48
		C	0.000	0.000	30.160	0.000	198.80
		A	0.000	0.000	30.040	0.000	171.80
T16	60.00-30.00	B	0.000	0.000	85.889	0.000	259.80
		C	0.000	0.000	30.160	0.000	198.80
		A	0.000	0.000	45.060	0.000	257.70
T17	30.00-0.00	B	0.000	0.000	128.833	0.000	389.70
		C	0.000	0.000	45.240	0.000	298.20
		A	0.000	0.000	37.550	0.000	214.75
		B	0.000	0.000	107.361	0.000	324.75
		C	0.000	0.000	37.700	0.000	248.50

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T1	320.00-304.00	A	1.440	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	22.405	0.000	261.85
		C		0.000	0.000	0.000	0.000	0.00
T2	304.00-300.00	A	1.435	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	6.132	0.000	71.62
		C		0.000	0.000	0.000	0.000	0.00
T3	300.00-280.00	A	1.429	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	49.786	0.000	592.40
		C		0.000	0.000	0.000	0.000	0.00
T4	280.00-260.00	A	1.419	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	89.970	0.000	1098.70
		C		0.000	0.000	0.000	0.000	0.00
T5	260.00-240.00	A	1.408	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	118.862	0.000	1465.07
		C		0.000	0.000	0.000	0.000	0.00
T6	240.00-220.00	A	1.397	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	154.126	0.000	1898.59
		C		0.000	0.000	0.000	0.000	0.00
T7	220.00-200.00	A	1.385	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	155.138	0.000	1897.96
		C		0.000	0.000	84.362	0.000	1118.41
T8	200.00-180.00	A	1.372	0.000	0.000	85.834	0.000	1097.47
		B		0.000	0.000	154.148	0.000	1873.34
		C		0.000	0.000	84.196	0.000	1110.86
T9	180.00-170.00	A	1.361	0.000	0.000	42.830	0.000	545.46
		B		0.000	0.000	84.506	0.000	1014.93

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	13 of 95
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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T10	170.00-160.00	C		0.000	0.000	42.033	0.000	552.45
		A	1.354	0.000	0.000	42.771	0.000	543.21
		B		0.000	0.000	93.607	0.000	1112.03
		C		0.000	0.000	41.988	0.000	550.41
T11	160.00-140.00	A	1.343	0.000	0.000	85.358	0.000	1079.51
		B		0.000	0.000	204.733	0.000	2407.81
		C		0.000	0.000	83.838	0.000	1094.54
T12	140.00-120.00	A	1.329	0.000	0.000	85.111	0.000	1070.23
		B		0.000	0.000	223.633	0.000	2603.25
		C		0.000	0.000	83.653	0.000	1086.09
T13	120.00-100.00	A	1.315	0.000	0.000	84.874	0.000	1061.34
		B		0.000	0.000	234.150	0.000	2697.30
		C		0.000	0.000	83.474	0.000	1078.00
T14	100.00-80.00	A	1.303	0.000	0.000	84.672	0.000	1053.80
		B		0.000	0.000	250.822	0.000	2860.17
		C		0.000	0.000	83.322	0.000	1071.12
T15	80.00-60.00	A	1.295	0.000	0.000	84.548	0.000	1049.17
		B		0.000	0.000	256.871	0.000	2914.85
		C		0.000	0.000	83.229	0.000	1066.90
T16	60.00-30.00	A	1.298	0.000	0.000	126.883	0.000	1576.02
		B		0.000	0.000	385.783	0.000	4383.52
		C		0.000	0.000	124.889	0.000	1602.42
T17	30.00-0.00	A	1.303	0.000	0.000	105.842	0.000	1317.33
		B		0.000	0.000	322.322	0.000	3672.72
		C		0.000	0.000	104.154	0.000	1338.97

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
T1	320.00-304.00	2.5585	0.7653	5.6337	1.5661
T2	304.00-300.00	2.9423	0.8782	6.2954	1.7537
T3	300.00-280.00	5.1025	1.7459	10.0743	3.1831
T4	280.00-260.00	5.9278	2.4135	13.9763	5.1940
T5	260.00-240.00	8.6793	3.7103	19.0753	7.4793
T6	240.00-220.00	11.2158	4.8855	24.0367	9.6748
T7	220.00-200.00	18.8855	10.7084	35.8552	18.7814
T8	200.00-180.00	10.5945	13.5306	20.1939	22.9916
T9	180.00-170.00	12.1987	14.8386	23.4962	25.3656
T10	170.00-160.00	13.6862	15.8268	26.6700	27.1187
T11	160.00-140.00	14.7151	15.8660	28.9029	27.6923
T12	140.00-120.00	16.8966	17.2119	32.9481	30.0279
T13	120.00-100.00	24.6974	23.3249	42.0482	36.3965
T14	100.00-80.00	28.6992	25.8171	47.7485	39.8986
T15	80.00-60.00	29.1100	26.0679	50.1565	41.7015
T16	60.00-30.00	31.4614	28.1866	54.0369	44.9527
T17	30.00-0.00	29.4550	26.5187	52.4688	43.8449

### Shielding Factor Ka

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<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T1	31		1/2 304.00 - 320.00	0.6000	0.6000
T1	32	LC78-50JA-A7	304.00 - 320.00	0.6000	0.6000
T1	35	LC78-50JA-A7	304.00 - 316.50	0.6000	0.6000
T1	36	LC78-50JA-A7	304.00 - 318.00	0.6000	0.6000
T2	31		1/2 300.00 - 304.00	0.6000	0.6000
T2	32	LC78-50JA-A7	300.00 - 304.00	0.6000	0.6000
T2	35	LC78-50JA-A7	300.00 - 304.00	0.6000	0.6000
T2	36	LC78-50JA-A7	300.00 - 304.00	0.6000	0.6000
T3	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	280.00 - 283.00	0.6000	0.6000
T3	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	280.00 - 284.00	0.6000	0.6000
T3	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	280.00 - 285.00	0.6000	0.6000
T3	28	LC78-50JA-A7	280.00 - 297.00	0.6000	0.6000
T3	29	LC78-50JA-A7	280.00 - 290.00	0.6000	0.6000
T3	30		1/2 280.00 - 284.00	0.6000	0.6000
T3	31		1/2 280.00 - 300.00	0.6000	0.6000
T3	32	LC78-50JA-A7	280.00 - 300.00	0.6000	0.6000
T3	33		1/2 280.00 - 284.00	0.6000	0.6000
T3	35	LC78-50JA-A7	280.00 - 300.00	0.6000	0.6000
T3	36	LC78-50JA-A7	280.00 - 300.00	0.6000	0.6000
T4	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	260.00 - 280.00	0.6000	0.6000
T4	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	260.00 - 280.00	0.6000	0.6000
T4	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	260.00 - 261.00	0.6000	0.6000
T4	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	260.00 - 280.00	0.6000	0.6000
T4	26	LC78-50JA-A7	260.00 - 262.00	0.6000	0.6000
T4	28	LC78-50JA-A7	260.00 - 280.00	0.6000	0.6000
T4	29	LC78-50JA-A7	260.00 - 280.00	0.6000	0.6000
T4	30		1/2 260.00 - 280.00	0.6000	0.6000
T4	31		1/2 260.00 - 280.00	0.6000	0.6000
T4	32	LC78-50JA-A7	260.00 - 280.00	0.6000	0.6000
T4	33		1/2 260.00 - 280.00	0.6000	0.6000
T4	35	LC78-50JA-A7	260.00 - 280.00	0.6000	0.6000

<b>Job</b>	320' Rohn SSMW	<b>Page</b>	15 of 95
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T4	36	LC78-50JA-A7	260.00 - 280.00	0.6000	0.6000
T5	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 260.00	0.6000	0.6000
T5	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 260.00	0.6000	0.6000
T5	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 260.00	0.6000	0.6000
T5	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 248.00	0.6000	0.6000
T5	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 260.00	0.6000	0.6000
T5	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 246.00	0.6000	0.6000
T5	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	240.00 - 246.00	0.6000	0.6000
T5	22	LDF4-50A (1/2 FOAM)	240.00 - 246.00	0.6000	0.6000
T5	25	LC78-50JA-A7	240.00 - 244.00	0.6000	0.6000
T5	26	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T5	28	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T5	29	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T5	30	1/2	240.00 - 260.00	0.6000	0.6000
T5	31	1/2	240.00 - 260.00	0.6000	0.6000
T5	32	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T5	33	1/2	240.00 - 260.00	0.6000	0.6000
T5	35	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T5	36	LC78-50JA-A7	240.00 - 260.00	0.6000	0.6000
T6	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	220.00 - 240.00	0.6000	0.6000
T6	22	LDF4-50A (1/2 FOAM)	220.00 - 240.00	0.6000	0.6000
T6	23	LC78-50JA-A7	220.00 - 235.00	0.6000	0.6000
T6	25	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T6	26	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T6	28	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000



<b>Job</b>	320' Rohn SSMW	<b>Page</b>	16 of 95
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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T6	29	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T6	30	1/2	220.00 - 240.00	0.6000	0.6000
T6	31	1/2	220.00 - 240.00	0.6000	0.6000
T6	32	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T6	33	1/2	220.00 - 240.00	0.6000	0.6000
T6	35	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T6	36	LC78-50JA-A7	220.00 - 240.00	0.6000	0.6000
T7	2	1 5/8	200.00 - 220.00	0.6000	0.6000
T7	3	1 5/8" Hybriflex	200.00 - 220.00	0.6000	0.6000
T7	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	200.00 - 220.00	0.6000	0.6000
T7	22	LDF4-50A (1/2 FOAM)	200.00 - 220.00	0.6000	0.6000
T7	23	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	25	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	26	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	28	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	29	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	30	1/2	200.00 - 220.00	0.6000	0.6000
T7	31	1/2	200.00 - 220.00	0.6000	0.6000
T7	32	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	33	1/2	200.00 - 220.00	0.6000	0.6000
T7	35	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T7	36	LC78-50JA-A7	200.00 - 220.00	0.6000	0.6000
T8	1	1 5/8	180.00 - 200.00	0.6000	0.6000
T8	2	1 5/8	180.00 - 200.00	0.6000	0.6000
T8	3	1 5/8" Hybriflex	180.00 - 200.00	0.6000	0.6000

<b>Job</b>	320' Rohn SSMW	<b>Page</b>	17 of 95
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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T8	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	180.00 - 200.00	0.6000	0.6000
T8	22	LDF4-50A (1/2 FOAM)	180.00 - 200.00	0.6000	0.6000
T8	23	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	25	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	26	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	28	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	29	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	30	1/2	180.00 - 200.00	0.6000	0.6000
T8	31	1/2	180.00 - 200.00	0.6000	0.6000
T8	32	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	33	1/2	180.00 - 200.00	0.6000	0.6000
T8	35	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	36	LC78-50JA-A7	180.00 - 200.00	0.6000	0.6000
T8	41	1-5/8" Fiber Optic CaBLE	180.00 - 200.00	0.6000	0.6000
T8	42	1/2	180.00 - 200.00	0.6000	0.6000
T9	1	1 5/8	170.00 - 180.00	0.6000	0.6000
T9	2	1 5/8	170.00 - 180.00	0.6000	0.6000
T9	3	1 5/8" Hybriflex	170.00 - 180.00	0.6000	0.6000
T9	4	LC78-50JA-A7	170.00 - 174.00	0.6000	0.6000
T9	5	LC78-50JA-A7	170.00 - 177.00	0.6000	0.6000
T9	6	LDF4-50A (1/2 FOAM)	170.00 - 174.00	0.6000	0.6000
T9	7	LC78-50JA-A7	170.00 - 176.00	0.6000	0.6000
T9	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000

<b>Job</b>	320' Rohn SSMW	<b>Page</b>	18 of 95
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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T9	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	170.00 - 180.00	0.6000	0.6000
T9	22	LDF4-50A (1/2 FOAM)	170.00 - 180.00	0.6000	0.6000
T9	23	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	25	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	26	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	28	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	29	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	30	1/2	170.00 - 180.00	0.6000	0.6000
T9	31	1/2	170.00 - 180.00	0.6000	0.6000
T9	32	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	33	1/2	170.00 - 180.00	0.6000	0.6000
T9	35	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	36	LC78-50JA-A7	170.00 - 180.00	0.6000	0.6000
T9	41	1-5/8" Fiber Optic CaBLE	170.00 - 180.00	0.6000	0.6000
T9	42	1/2	170.00 - 180.00	0.6000	0.6000
T10	1	1 5/8	160.00 - 170.00	0.6000	0.6000
T10	2	1 5/8	160.00 - 170.00	0.6000	0.6000
T10	3	1 5/8" Hybriflex	160.00 - 170.00	0.6000	0.6000
T10	4	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	5	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	6	LDF4-50A (1/2 FOAM)	160.00 - 170.00	0.6000	0.6000
T10	7	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSMW	<b>Page</b> 19 of 95
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	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T10	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	160.00 - 170.00	0.6000	0.6000
T10	22	LDF4-50A (1/2 FOAM)	160.00 - 170.00	0.6000	0.6000
T10	23	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	25	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	26	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	28	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	29	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	30	1/2	160.00 - 170.00	0.6000	0.6000
T10	31	1/2	160.00 - 170.00	0.6000	0.6000
T10	32	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	33	1/2	160.00 - 170.00	0.6000	0.6000
T10	34	1/2	160.00 - 164.00	0.6000	0.6000
T10	35	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	36	LC78-50JA-A7	160.00 - 170.00	0.6000	0.6000
T10	41	1-5/8" Fiber Optic CaBLE	160.00 - 170.00	0.6000	0.6000
T10	42	1/2	160.00 - 170.00	0.6000	0.6000
T10	44	LCF78-50J (7/8 FOAM)	160.00 - 163.00	0.6000	0.6000
T11	1	1 5/8	140.00 - 160.00	0.6000	0.6000
T11	2	1 5/8	140.00 - 160.00	0.6000	0.6000
T11	3	1 5/8" Hybriflex	140.00 - 160.00	0.6000	0.6000
T11	4	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	5	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	6	LDF4-50A (1/2 FOAM)	140.00 - 160.00	0.6000	0.6000
T11	7	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000
T11	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	140.00 - 160.00	0.6000	0.6000

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<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T11	22	LDF4-50A (1/2 FOAM)	140.00 - 160.00	0.6000	0.6000
T11	23	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	25	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	26	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	28	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	29	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	30	1/2	140.00 - 160.00	0.6000	0.6000
T11	31	1/2	140.00 - 160.00	0.6000	0.6000
T11	32	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	33	1/2	140.00 - 160.00	0.6000	0.6000
T11	34	1/2	140.00 - 160.00	0.6000	0.6000
T11	35	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	36	LC78-50JA-A7	140.00 - 160.00	0.6000	0.6000
T11	39	EW63	140.00 - 154.00	0.6000	0.6000
T11	41	1-5/8" Fiber Optic CaBLE	140.00 - 160.00	0.6000	0.6000
T11	42	1/2	140.00 - 160.00	0.6000	0.6000
T11	44	LCF78-50J (7/8 FOAM)	140.00 - 160.00	0.6000	0.6000
T11	45	LCF78-50J (7/8 FOAM)	140.00 - 145.00	0.6000	0.6000
T12	1	1 5/8	120.00 - 140.00	0.6000	0.6000
T12	2	1 5/8	120.00 - 140.00	0.6000	0.6000
T12	3	1 5/8" Hybriflex	120.00 - 140.00	0.6000	0.6000
T12	4	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	5	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	6	LDF4-50A (1/2 FOAM)	120.00 - 140.00	0.6000	0.6000
T12	7	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	8	LC78-50JA-A7	120.00 - 137.00	0.6000	0.6000
T12	9	LC78-50JA-A7	120.00 - 134.00	0.6000	0.6000
T12	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000

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<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T12	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	120.00 - 140.00	0.6000	0.6000
T12	22	LDF4-50A (1/2 FOAM)	120.00 - 140.00	0.6000	0.6000
T12	23	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	25	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	26	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	28	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	29	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	30	1/2	120.00 - 140.00	0.6000	0.6000
T12	31	1/2	120.00 - 140.00	0.6000	0.6000
T12	32	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	33	1/2	120.00 - 140.00	0.6000	0.6000
T12	34	1/2	120.00 - 140.00	0.6000	0.6000
T12	35	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	36	LC78-50JA-A7	120.00 - 140.00	0.6000	0.6000
T12	39	EW63	120.00 - 140.00	0.6000	0.6000
T12	41	1-5/8" Fiber Optic CaBLE	120.00 - 140.00	0.6000	0.6000
T12	42	1/2	120.00 - 140.00	0.6000	0.6000
T12	44	LCF78-50J (7/8 FOAM)	120.00 - 140.00	0.6000	0.6000
T12	45	LCF78-50J (7/8 FOAM)	120.00 - 140.00	0.6000	0.6000
T13	1	1 5/8	100.00 - 120.00	0.6000	0.6000
T13	2	1 5/8	100.00 - 120.00	0.6000	0.6000
T13	3	1 5/8" Hybriflex	100.00 - 120.00	0.6000	0.6000
T13	4	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	5	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	6	LDF4-50A (1/2 FOAM)	100.00 - 120.00	0.6000	0.6000
T13	7	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	8	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	9	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000

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<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T13	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	100.00 - 120.00	0.6000	0.6000
T13	22	LDF4-50A (1/2 FOAM)	100.00 - 120.00	0.6000	0.6000
T13	23	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	24	WE65	100.00 - 106.00	0.6000	0.6000
T13	25	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	26	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	27	WE108	100.00 - 113.00	0.6000	0.6000
T13	28	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	29	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	30	1/2	100.00 - 120.00	0.6000	0.6000
T13	31	1/2	100.00 - 120.00	0.6000	0.6000
T13	32	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	33	1/2	100.00 - 120.00	0.6000	0.6000
T13	34	1/2	100.00 - 120.00	0.6000	0.6000
T13	35	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	36	LC78-50JA-A7	100.00 - 120.00	0.6000	0.6000
T13	39	EW63	100.00 - 120.00	0.6000	0.6000
T13	41	1-5/8" Fiber Optic CaBLE	100.00 - 120.00	0.6000	0.6000
T13	42	1/2	100.00 - 120.00	0.6000	0.6000
T13	44	LCF78-50J (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T13	45	LCF78-50J (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T14	1	1 5/8	80.00 - 100.00	0.6000	0.6000
T14	2	1 5/8	80.00 - 100.00	0.6000	0.6000
T14	3	1 5/8" Hybriflex	80.00 - 100.00	0.6000	0.6000
T14	4	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	5	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	6	LDF4-50A (1/2 FOAM)	80.00 - 100.00	0.6000	0.6000
T14	7	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	8	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	9	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	12	LC78-50JA-A7	80.00 - 91.00	0.6000	0.6000

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	23 of 95
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T14	13	LC78-50JA-A7	80.00 - 90.00	0.6000	0.6000
T14	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	80.00 - 100.00	0.6000	0.6000
T14	22	LDF4-50A (1/2 FOAM)	80.00 - 100.00	0.6000	0.6000
T14	23	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	24	WE65	80.00 - 100.00	0.6000	0.6000
T14	25	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	26	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	27	WE108	80.00 - 100.00	0.6000	0.6000
T14	28	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	29	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	30	1/2	80.00 - 100.00	0.6000	0.6000
T14	31	1/2	80.00 - 100.00	0.6000	0.6000
T14	32	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	33	1/2	80.00 - 100.00	0.6000	0.6000
T14	34	1/2	80.00 - 100.00	0.6000	0.6000
T14	35	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	36	LC78-50JA-A7	80.00 - 100.00	0.6000	0.6000
T14	39	EW63	80.00 - 100.00	0.6000	0.6000
T14	41	1-5/8" Fiber Optic CaBLE	80.00 - 100.00	0.6000	0.6000
T14	42	1/2	80.00 - 100.00	0.6000	0.6000
T14	44	LCF78-50J (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T14	45	LCF78-50J (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T15	1	1 5/8	60.00 - 80.00	0.6000	0.6000
T15	2	1 5/8	60.00 - 80.00	0.6000	0.6000
T15	3	1 5/8" Hybriflex	60.00 - 80.00	0.6000	0.6000
T15	4	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	5	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	6	LDF4-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T15	7	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	8	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	9	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	12	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	13	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	60.00 - 80.00	0.6000	0.6000
T15	22	LDF4-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T15	23	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000



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<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T15	24	WE65	60.00 - 80.00	0.6000	0.6000
T15	25	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	26	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	27	WE108	60.00 - 80.00	0.6000	0.6000
T15	28	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	29	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	30	1/2	60.00 - 80.00	0.6000	0.6000
T15	31	1/2	60.00 - 80.00	0.6000	0.6000
T15	32	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	33	1/2	60.00 - 80.00	0.6000	0.6000
T15	34	1/2	60.00 - 80.00	0.6000	0.6000
T15	35	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	36	LC78-50JA-A7	60.00 - 80.00	0.6000	0.6000
T15	39	EW63	60.00 - 80.00	0.6000	0.6000
T15	41	1-5/8" Fiber Optic CaBLE	60.00 - 80.00	0.6000	0.6000
T15	42	1/2	60.00 - 80.00	0.6000	0.6000
T15	44	LCF78-50J (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T15	45	LCF78-50J (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T16	1	1 5/8	30.00 - 60.00	0.6000	0.6000
T16	2	1 5/8	30.00 - 60.00	0.6000	0.6000
T16	3	1 5/8" Hybriflex	30.00 - 60.00	0.6000	0.6000
T16	4	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	5	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	6	LDF4-50A (1/2 FOAM)	30.00 - 60.00	0.6000	0.6000
T16	7	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	8	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	9	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	12	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	13	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	30.00 - 60.00	0.6000	0.6000
T16	22	LDF4-50A (1/2 FOAM)	30.00 - 60.00	0.6000	0.6000
T16	23	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	24	WE65	30.00 - 60.00	0.6000	0.6000
T16	25	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	26	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	27	WE108	30.00 - 60.00	0.6000	0.6000
T16	28	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	29	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	30	1/2	30.00 - 60.00	0.6000	0.6000
T16	31	1/2	30.00 - 60.00	0.6000	0.6000
T16	32	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	33	1/2	30.00 - 60.00	0.6000	0.6000
T16	34	1/2	30.00 - 60.00	0.6000	0.6000
T16	35	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	36	LC78-50JA-A7	30.00 - 60.00	0.6000	0.6000
T16	39	EW63	30.00 - 60.00	0.6000	0.6000
T16	41	1-5/8" Fiber Optic CaBLE	30.00 - 60.00	0.6000	0.6000
T16	42	1/2	30.00 - 60.00	0.6000	0.6000
T16	44	LCF78-50J (7/8 FOAM)	30.00 - 60.00	0.6000	0.6000

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSMW	<b>Page</b> 25 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
T16	45	LCF78-50J (7/8 FOAM)	30.00 - 60.00	0.6000	0.6000
T17	1	1 5/8	5.00 - 30.00	0.6000	0.6000
T17	2	1 5/8	5.00 - 30.00	0.6000	0.6000
T17	3	1 5/8" Hybriflex	5.00 - 30.00	0.6000	0.6000
T17	4	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	5	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	6	LDF4-50A (1/2 FOAM)	5.00 - 30.00	0.6000	0.6000
T17	7	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	8	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	9	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	12	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	13	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	14	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	15	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	16	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	18	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	19	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	20	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	21	AVA7-50 (1-5/8 LOW DENS. FOAM)	5.00 - 30.00	0.6000	0.6000
T17	22	LDF4-50A (1/2 FOAM)	5.00 - 30.00	0.6000	0.6000
T17	23	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	24	WE65	5.00 - 30.00	0.6000	0.6000
T17	25	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	26	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	27	WE108	5.00 - 30.00	0.6000	0.6000
T17	28	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	29	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	30	1/2	5.00 - 30.00	0.6000	0.6000
T17	31	1/2	5.00 - 30.00	0.6000	0.6000
T17	32	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	33	1/2	5.00 - 30.00	0.6000	0.6000
T17	34	1/2	5.00 - 30.00	0.6000	0.6000
T17	35	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	36	LC78-50JA-A7	5.00 - 30.00	0.6000	0.6000
T17	39	EW63	5.00 - 30.00	0.6000	0.6000
T17	41	1-5/8" Fiber Optic CaBLE	5.00 - 30.00	0.6000	0.6000
T17	42	1/2	5.00 - 30.00	0.6000	0.6000
T17	44	LCF78-50J (7/8 FOAM)	5.00 - 30.00	0.6000	0.6000
T17	45	LCF78-50J (7/8 FOAM)	5.00 - 30.00	0.6000	0.6000

## Discrete Tower Loads

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	26 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb

\* CSP Antenna Inventory -  
via Eastern Communications

Climb/Mapping									
PD688S-4 (ECI-66)	C	From Leg	0.50	0.0000	94.00	No Ice	0.35	0.35	3.75
			0.00			1/2" Ice	0.63	0.63	4.88
			0.00			1" Ice	0.91	0.91	6.00
4'x4" Pipe Mount (ECI-66)	C	From Leg	0.00	0.0000	94.00	No Ice	1.03	1.03	44.00
			0.00			1/2" Ice	1.58	1.58	56.99
			0.00			1" Ice	1.84	1.84	73.03
Pirod 4' Side Mount Standoff (1) (ECI-62)	B	From Leg	0.00	0.0000	106.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
PD458 (ECI-62)	B	From Leg	3.00	0.0000	106.00	No Ice	2.88	2.88	20.00
			0.00			1/2" Ice	4.34	4.34	46.22
			0.00			1" Ice	5.83	5.83	77.59
5'3"x4" Pipe Mount (ECI-63 (Dish Support))	A	From Leg	0.00	0.0000	107.00	No Ice	1.39	1.39	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00			1" Ice	2.54	2.54	94.43
8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-63a (Dish Ice Shield))	A	From Leg	0.00	0.0000	115.00	No Ice	8.34	4.76	400.00
			0.00			1/2" Ice	11.01	6.71	756.25
			0.00			1" Ice	13.59	8.62	1103.65
3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-61a)	C	From Leg	0.00	0.0000	117.00	No Ice	8.34	4.76	400.00
			0.00			1/2" Ice	11.01	6.71	756.25
			0.00			1" Ice	13.59	8.62	1103.65
5'3"x4" Pipe Mount (ECI-61a (Dish Support))	C	From Leg	0.00	0.0000	112.00	No Ice	1.39	1.39	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00			1" Ice	2.54	2.54	94.43
DB212-1 (ECI-59)	C	From Leg	6.00	0.0000	139.00	No Ice	4.40	4.40	31.00
			0.00			1/2" Ice	8.42	8.42	70.21
			0.00			1" Ice	12.45	12.45	134.11
4' Side Mount Standoff (ECI-60 & 59)	C	From Leg	0.00	0.0000	139.00	No Ice	6.50	6.50	100.00
			0.00			1/2" Ice	8.50	8.50	170.00
			0.00			1" Ice	10.50	10.50	240.00
PD156S (ECI-60)	C	From Leg	6.00	0.0000	139.00	No Ice	0.44	0.44	5.00
			0.00			1/2" Ice	0.79	0.79	6.50
			0.00			1" Ice	1.14	1.14	8.00
5'3"x4" Pipe Mount (ECI-58a (Dish Support))	C	From Leg	0.00	0.0000	154.00	No Ice	1.37	1.37	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00			1" Ice	2.54	2.54	94.43
ANT450F6 (ECI-57)	A	From Leg	0.50	0.0000	153.00	No Ice	1.90	1.90	8.00
			0.00			1/2" Ice	2.73	2.73	22.34
			0.00			1" Ice	3.40	3.40	41.96
5'3"x4" Pipe Mount (ECI-57)	A	From Leg	0.00	0.0000	153.00	No Ice	1.37	1.37	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00			1" Ice	2.54	2.54	94.43
L-810 Obstruction Lighting (1) (ECI-56)	A	From Leg	0.25	0.0000	164.00	No Ice	0.36	0.36	6.65
			0.00			1/2" Ice	0.52	0.52	12.44
			0.00			1" Ice	0.70	0.70	19.93
L-810 Obstruction Lighting (1) (ECI-54)	B	From Leg	0.25	0.0000	168.00	No Ice	0.36	0.36	6.65
			0.00			1/2" Ice	0.52	0.52	12.44
			0.00			1" Ice	0.70	0.70	19.93
L-810 Obstruction Lighting (1) (ECI-55)	C	From Leg	0.25	0.0000	165.00	No Ice	0.36	0.36	6.65
			0.00			1/2" Ice	0.52	0.52	12.44
			0.00			1" Ice	0.70	0.70	19.93
DB586-Y (inverted) (ECI-53)	B	From Leg	4.00	0.0000	175.00	No Ice	1.01	1.01	8.25
			0.00			1/2" Ice	1.28	1.28	16.59
			0.00			1" Ice	1.56	1.56	28.01

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	27 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
Pirod 4' Side Mount Standoff (1) (ECI-53,52,51)	B	From Leg	0.00	0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
430-94C-09168-M-11048 TTA (ECI-52)	B	From Leg	2.00	0.00	0.0000	176.00	No Ice 1/2" Ice 1" Ice	1.63 1.81 1.99	0.95 1.09 1.24	30.00 37.44 52.22
DB586-Y (ECI-51)	B	From Leg	4.00	0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	1.01 1.28 1.56	1.01 1.28 1.56	8.25 16.59 28.01
DB586-Y (ECI-50)	C	From Leg	3.00	0.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	1.01 1.28 1.56	1.01 1.28 1.56	8.25 16.59 28.01
Pirod 4' Side Mount Standoff (1) (ECI-50)	C	From Leg	0.00	0.00	0.0000	179.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	50.00 89.00 128.00
531-70HD Exposed Dipole Antenna (ECI-15)	A	From Leg	6.00	0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice	5.91 7.68 9.47	5.91 7.68 9.47	50.00 79.03 125.80
6' Side Mount Standoff (ECI-15)	A	From Leg	0.00	0.00	0.0000	238.00	No Ice 1/2" Ice 1" Ice	6.50 8.50 10.50	6.50 8.50 10.50	100.00 170.00 240.00
PD1142-1 (ECI-14)	C	From Leg	6.00	0.00	0.0000	248.00	No Ice 1/2" Ice 1" Ice	1.32 3.21 5.12	1.32 3.21 5.12	10.00 23.85 49.42
6' Side Mount Standoff (ECI-14)	C	From Leg	0.00	0.00	0.0000	248.00	No Ice 1/2" Ice 1" Ice	6.50 8.50 10.50	6.50 8.50 10.50	100.00 170.00 240.00
SC479-HF1LDF(D00I-E6085) ) (Inverted) (ECI-13)	B	From Leg	3.00	0.00	0.0000	245.00	No Ice 1/2" Ice 1" Ice	5.06 6.54 8.04	5.06 6.54 8.04	34.00 69.82 114.98
SC479-HF1LDF(D00I-E6085) ) (Inverted) (ECI-12)	B	From Leg	3.00	0.00	0.0000	245.00	No Ice 1/2" Ice 1" Ice	5.06 6.54 8.04	5.06 6.54 8.04	34.00 69.82 114.98
Sabre T-Boom (1) (ECI-10,11,12,13)	B	From Leg	0.00	0.00	0.0000	246.00	No Ice 1/2" Ice 1" Ice	35.40 46.90 58.40	35.40 46.90 58.40	471.00 690.00 909.00
430-94C-09168-M-11048 TTA (ECI-11)	B	From Leg	2.00	0.00	0.0000	247.00	No Ice 1/2" Ice 1" Ice	1.63 1.81 1.99	0.95 1.09 1.24	30.00 37.44 52.22
SC479-HF1LDF (ECI-10)	B	From Leg	3.00	0.00	0.0000	251.00	No Ice 1/2" Ice 1" Ice	3.90 6.54 8.04	3.90 6.54 8.04	34.00 69.82 114.98
6' Side Mount Standoff (ECI-8)	B	From Leg	0.00	0.00	0.0000	260.00	No Ice 1/2" Ice 1" Ice	6.50 8.50 10.50	6.50 8.50 10.50	100.00 170.00 240.00
PD440-2 (ECI-8)	B	From Leg	6.00	0.00	0.0000	264.00	No Ice 1/2" Ice 1" Ice	1.38 2.48 3.59	1.38 2.48 3.59	19.00 24.70 30.40
SC479-HF1LDF(D00I-E6085) ) (Inverted) (ECI-7)	C	From Leg	6.00	0.00	0.0000	283.00	No Ice 1/2" Ice 1" Ice	5.06 6.54 8.04	5.06 6.54 8.04	34.00 69.82 114.98
6' Side Mount Standoff (ECI-7)	C	From Leg	0.00	0.00	0.0000	284.00	No Ice 1/2" Ice 1" Ice	6.50 8.50 10.50	6.50 8.50 10.50	100.00 170.00 240.00
DB809T3E-XC (ECI-6)	C	From Leg	6.00	0.00	0.0000	286.00	No Ice 1/2" Ice 1" Ice	3.77 5.70 7.17	3.77 5.70 7.17	39.00 69.70 109.50

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	28 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
PD340-1 (ECI-5)	A	From Leg	6.00	0.00	0.0000	290.00	No Ice 3.30	3.30	40.00
			0.00	0.00			1/2" Ice 5.94	5.94	52.00
			0.00	0.00			1" Ice 8.58	8.58	64.00
6' Side Mount Standoff (ECI-5)	A	From Leg	0.00	0.00	0.0000	290.00	No Ice 6.50	6.50	100.00
			0.00	0.00			1/2" Ice 8.50	8.50	170.00
			0.00	0.00			1" Ice 10.50	10.50	240.00
SC479-HF1LDF (ECI-4)	C	From Leg	6.00	0.00	0.0000	300.00	No Ice 3.82	3.82	34.00
			0.00	0.00			1/2" Ice 6.54	6.54	69.82
			0.00	0.00			1" Ice 8.04	8.04	114.98
6' Side Mount Standoff (ECI-4)	C	From Leg	0.00	0.00	0.0000	300.00	No Ice 6.50	6.50	100.00
			0.00	0.00			1/2" Ice 8.50	8.50	170.00
			0.00	0.00			1" Ice 10.50	10.50	240.00
ANT450F6 (ECI-3)	B	From Leg	5.00	0.00	0.0000	318.00	No Ice 1.90	1.90	8.00
			0.00	0.00			1/2" Ice 2.73	2.73	22.34
			0.00	0.00			1" Ice 3.40	3.40	41.96
4'x4" Pipe Mount (ECI-3)	B	From Leg	0.00	0.00	0.0000	318.00	No Ice 0.98	0.98	44.00
			0.00	0.00			1/2" Ice 1.58	1.58	56.99
			0.00	0.00			1" Ice 1.84	1.84	73.03
BA1012-0 (ECI-2)	A	From Leg	6.00	0.00	0.0000	320.00	No Ice 0.47	0.47	2.20
			0.00	0.00			1/2" Ice 0.96	0.96	6.61
			0.00	0.00			1" Ice 1.31	1.31	14.14
6' Side Mount Standoff (ECI-2)	A	From Leg	0.00	0.00	0.0000	320.00	No Ice 6.50	6.50	100.00
			0.00	0.00			1/2" Ice 8.50	8.50	170.00
			0.00	0.00			1" Ice 10.50	10.50	240.00
PD128-1 (ECI-1)	C	From Leg	6.00	0.00	0.0000	325.00	No Ice 1.00	1.00	13.00
			0.00	0.00			1/2" Ice 1.80	1.80	16.90
			0.00	0.00			1" Ice 2.60	2.60	20.80
6' Side Mount Standoff (ECI-1)	C	From Leg	0.00	0.00	0.0000	325.00	No Ice 6.50	6.50	100.00
			0.00	0.00			1/2" Ice 8.50	8.50	170.00
			0.00	0.00			1" Ice 10.50	10.50	240.00
Dual Lights (Beacon)	A	None			0.0000	327.00	No Ice 4.00	4.00	250.00
							1/2" Ice 4.80	4.80	400.00
							1" Ice 5.60	5.60	550.00
Lightning Rod 5/8x4' (Lightning Rod)	C	None			0.0000	329.00	No Ice 0.25	0.25	31.00
							1/2" Ice 0.66	0.66	33.82
							1" Ice 0.97	0.97	39.29
* VZW Proposed 12/07/2018									
Valmont VFA-10-U V-Frame (Verizon)	A	None			0.0000	232.00	No Ice 7.95	4.45	285.00
							1/2" Ice 8.33	4.74	343.57
							1" Ice 8.71	5.04	407.08
Valmont VFA-10-U V-Frame (Verizon)	B	None			0.0000	232.00	No Ice 7.95	4.45	285.00
							1/2" Ice 8.33	4.74	343.57
							1" Ice 8.71	5.04	407.08
Valmont VFA-10-U V-Frame (Verizon)	C	None			0.0000	232.00	No Ice 7.95	4.45	285.00
							1/2" Ice 8.33	4.74	343.57
							1" Ice 8.71	5.04	407.08
JAHH-65B-R3B Panel Antenna (Verizon-AWS)	A	From Leg	5.00	6.00	0.0000	232.00	No Ice 9.66	5.98	126.30
			0.00	0.00			1/2" Ice 10.22	6.44	184.38
			0.00	0.00			1" Ice 10.79	6.91	248.75
JAHH-65B-R3B Panel Antenna (Verizon-PCS)	A	From Leg	5.00	5.50	0.0000	232.00	No Ice 9.66	5.98	126.30
			0.00	0.00			1/2" Ice 10.22	6.44	184.38
			0.00	0.00			1" Ice 10.79	6.91	248.75
LNx-6512DS-VTM (Verizon-850)	A	From Leg	5.00	-3.00	0.0000	232.00	No Ice 5.61	3.30	30.00
			0.00	0.00			1/2" Ice 6.01	3.66	63.32
			0.00	0.00			1" Ice 6.41	4.04	102.51
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2))	A	From Leg	5.00	6.00	0.0000	232.00	No Ice 3.78	3.56	116.83
							1/2" Ice 4.84	4.62	175.06

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	29 of 95
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight	
			Horz	Vert			Front	Side		
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
(Verizon-PCS/AWS)			0.00				1" Ice	5.64	5.41	240.44
RFV01U-D1A RRH Unit	A	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.25	97.50
(Verizon RRH)			0.00				1/2" Ice	2.05	1.39	115.84
			0.00				1" Ice	2.22	1.54	136.97
RFV01U-D2A RRH Unit	A	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.01	82.00
(Verizon RRH)			0.00				1/2" Ice	2.05	1.14	98.43
			0.00				1" Ice	2.22	1.28	117.53
DB-B1-6C-12AB-0Z /	A	From Leg	5.00		0.0000	232.00	No Ice	4.42	2.90	32.00
DC-3315-PF-48 Dist. Box			0.00				1/2" Ice	4.72	3.16	63.48
(Verizon)			0.00				1" Ice	5.02	3.43	98.72
JAHH-65B-R3B Panel	B	From Leg	5.00		0.0000	232.00	No Ice	9.66	5.98	126.30
Antenna			6.00				1/2" Ice	10.22	6.44	184.38
(Verizon-AWS)			0.00				1" Ice	10.79	6.91	248.75
JAHH-65B-R3B Panel	B	From Leg	5.00		0.0000	232.00	No Ice	9.66	5.98	126.30
Antenna			5.50				1/2" Ice	10.22	6.44	184.38
(Verizon-PCS)			0.00				1" Ice	10.79	6.91	248.75
LNx-6512DS-VTM	B	From Leg	5.00		0.0000	232.00	No Ice	5.61	3.30	30.00
(Verizon-850)			-3.00				1/2" Ice	6.01	3.66	63.32
			0.00				1" Ice	6.41	4.04	102.51
BSAMNT-SBS-2-2 (JAHH	B	From Leg	5.00		0.0000	232.00	No Ice	3.78	3.56	116.83
Antenna Bracket (for 2))			6.00				1/2" Ice	4.84	4.62	175.06
(Verizon-PCS/AWS)			0.00				1" Ice	5.64	5.41	240.44
RFV01U-D1A RRH Unit	B	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.25	97.50
(Verizon RRH)			0.00				1/2" Ice	2.05	1.39	115.84
			0.00				1" Ice	2.22	1.54	136.97
RFV01U-D2A RRH Unit	B	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.01	82.00
(Verizon RRH)			0.00				1/2" Ice	2.05	1.14	98.43
			0.00				1" Ice	2.22	1.28	117.53
DB-B1-6C-12AB-0Z /	B	From Leg	5.00		0.0000	232.00	No Ice	4.42	2.90	32.00
DC-3315-PF-48 Dist. Box			0.00				1/2" Ice	4.72	3.16	63.48
(Verizon)			0.00				1" Ice	5.02	3.43	98.72
JAHH-65B-R3B Panel	C	From Leg	5.00		0.0000	232.00	No Ice	9.66	5.98	126.30
Antenna			6.00				1/2" Ice	10.22	6.44	184.38
(Verizon-AWS)			0.00				1" Ice	10.79	6.91	248.75
JAHH-65B-R3B Panel	C	From Leg	5.00		0.0000	232.00	No Ice	9.66	5.98	126.30
Antenna			5.50				1/2" Ice	10.22	6.44	184.38
(Verizon-PCS)			0.00				1" Ice	10.79	6.91	248.75
LNx-6512DS-VTM	C	From Leg	5.00		0.0000	232.00	No Ice	5.61	3.30	30.00
(Verizon-850)			-3.00				1/2" Ice	6.01	3.66	63.32
			0.00				1" Ice	6.41	4.04	102.51
BSAMNT-SBS-2-2 (JAHH	C	From Leg	5.00		0.0000	232.00	No Ice	3.78	3.56	116.83
Antenna Bracket (for 2))			6.00				1/2" Ice	4.84	4.62	175.06
(Verizon-PCS/AWS)			0.00				1" Ice	5.64	5.41	240.44
RFV01U-D1A RRH Unit	C	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.25	97.50
(Verizon RRH)			0.00				1/2" Ice	2.05	1.39	115.84
			0.00				1" Ice	2.22	1.54	136.97
RFV01U-D2A RRH Unit	C	From Leg	5.00		0.0000	232.00	No Ice	1.88	1.01	82.00
(Verizon RRH)			0.00				1/2" Ice	2.05	1.14	98.43
			0.00				1" Ice	2.22	1.28	117.53
CBC78T-DS-43-2X Diplexer	A	From Leg	5.00		0.0000	232.00	No Ice	0.37	0.51	22.00
(Verizon)			0.00				1/2" Ice	0.45	0.60	28.34
			0.00				1" Ice	0.53	0.70	36.37
CBC78T-DS-43-2X Diplexer	B	From Leg	5.00		0.0000	232.00	No Ice	0.37	0.51	22.00
(Verizon)			0.00				1/2" Ice	0.45	0.60	28.34
			0.00				1" Ice	0.53	0.70	36.37
CBC78T-DS-43-2X Diplexer	C	From Leg	5.00		0.0000	232.00	No Ice	0.37	0.51	22.00
(Verizon)			0.00				1/2" Ice	0.45	0.60	28.34

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	30 of 95
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	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
			0.00			1" Ice	0.53	0.70	36.37	
* VZW Proposed 12/07/2018										
*** EMP-005 AT&T										
Inventory 08/2019 Updates										
PiROD 12' Lightweight T-Frame (AT&T)	A	None			0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.20 16.20 22.20	10.20 16.20 22.20	253.00 355.00 457.00
PiROD 12' Lightweight T-Frame (AT&T)	B	None			0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.20 16.20 22.20	10.20 16.20 22.20	253.00 355.00 457.00
PiROD 12' Lightweight T-Frame (AT&T)	C	None			0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.20 16.20 22.20	10.20 16.20 22.20	253.00 355.00 457.00
7770.00 (AT&T)	A	From Leg	3.00 -6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.03 10.61 11.20	5.60 6.15 6.71	20.00 70.47 130.07
HPA-65R-BUU-H8 Panel (AT&T)	A	From Leg	3.00 6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	12.99 13.69 14.40	7.48 8.06 8.64	68.00 140.41 220.44
RRUS-32 (AT&T)	A	From Leg	3.00 6.00 1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	3.20 3.46 3.73	1.85 2.08 2.31	60.00 81.11 105.42
RRUS-11 (AT&T)	A	From Leg	3.00 6.00 -1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	2.99 3.23 3.47	1.25 1.41 1.59	50.00 69.57 92.08
7770.00 (AT&T)	B	From Leg	3.00 -6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.03 10.61 11.20	5.60 6.15 6.71	20.00 70.47 130.07
HPA-65R-BUU-H8 Panel (AT&T)	B	From Leg	3.00 6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	12.99 13.69 14.40	7.48 8.06 8.64	68.00 140.41 220.44
RRUS-32 (AT&T)	B	From Leg	3.00 6.00 1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	3.20 3.46 3.73	1.85 2.08 2.31	60.00 81.11 105.42
RRUS-11 (AT&T)	B	From Leg	3.00 6.00 -1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	2.99 3.23 3.47	1.25 1.41 1.59	50.00 69.57 92.08
7770.00 (AT&T)	C	From Leg	3.00 -6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.03 10.61 11.20	5.60 6.15 6.71	20.00 70.47 130.07
HPA-65R-BUU-H6 Panel (AT&T)	C	From Leg	3.00 6.00 0.00		0.0000	200.00	No Ice 1/2" Ice 1" Ice	10.12 10.69 11.26	5.49 5.94 6.41	48.00 105.33 168.95
RRUS-32 (AT&T)	B	From Leg	3.00 6.00 1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	3.20 3.46 3.73	1.85 2.08 2.31	60.00 81.11 105.42
RRUS-11 (AT&T)	B	From Leg	3.00 6.00 -1.50		0.0000	200.00	No Ice 1/2" Ice 1" Ice	2.99 3.23 3.47	1.25 1.41 1.59	50.00 69.57 92.08
DC6-48-60-0-8C Squid / Surge Arrestor (AT&T)	C	None			0.0000	200.00	No Ice 1/2" Ice 1" Ice	1.79 2.02 2.27	1.79 2.02 2.27	27.00 47.39 70.57
STK-U Stiffener Side Arm Attachment (AT&T)	A	None			0.0000	200.00	No Ice 1/2" Ice 1" Ice	0.07 0.11 0.16	4.01 5.00 6.01	63.79 95.84 138.17
STK-U Stiffener Side Arm Attachment	B	None			0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00	63.79 95.84

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	31 of 95
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
(AT&T)						1" Ice	0.16	6.01	138.17
STK-U Stiffener Side Arm Attachment	C	None		0.0000	200.00	No Ice	0.07	4.01	63.79
(AT&T)						1/2" Ice	0.11	5.00	95.84
STK-U Stiffener Side Arm Attachment	A	None		0.0000	200.00	1" Ice	0.16	6.01	138.17
(AT&T)						No Ice	0.07	4.01	63.79
STK-U Stiffener Side Arm Attachment	B	None		0.0000	200.00	1/2" Ice	0.11	5.00	95.84
(AT&T)						1" Ice	0.16	6.01	138.17
STK-U Stiffener Side Arm Attachment	C	None		0.0000	200.00	No Ice	0.07	4.01	63.79
(AT&T)						1/2" Ice	0.11	5.00	95.84
STK-U Stiffener Side Arm Attachment						1" Ice	0.16	6.01	138.17
*** EMP-005 AT&T Inventory 08/2019 Updates									
* Eversource Proposed									
Telewave ANT220F2 - Omni Antenna	C	From Leg	4.00	0.0000	163.00	No Ice	1.03	1.03	14.00
(Eversource (Proposed))			0.00			1/2" Ice	1.29	1.29	22.80
Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	C	From Leg	0.00	0.0000	160.00	1" Ice	1.56	1.56	34.62
(Eversource (Proposed))			0.00			No Ice	2.48	5.14	165.00
Telewave ANT220F2 - Omni Antenna	C	From Leg	4.00	0.0000	145.00	1/2" Ice	3.25	6.91	318.00
(Eversource (Proposed))			0.00			1" Ice	4.03	8.67	474.00
Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	C	From Leg	0.00	0.0000	142.00	No Ice	1.03	1.03	14.00
(Eversource (Proposed))			0.00			1/2" Ice	1.29	1.29	22.80
Telewave ANT220F2 - Omni Antenna	C	From Leg	4.00	0.0000	145.00	1" Ice	1.56	1.56	34.62
(Eversource (Proposed))			0.00			No Ice	2.48	5.14	165.00
Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	C	From Leg	0.00	0.0000	142.00	1/2" Ice	3.25	6.91	318.00
(Eversource (Proposed))			0.00			1" Ice	4.03	8.67	474.00

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				ft	°	°	ft	ft	ft <sup>2</sup>	lb	
* CSP Inventory from HighTower Solutions											
Climb											
PA8-65 (ECI-63)	A	Paraboloid w/Shroud (HP)	From Leg	0.50	Worst		107.00	8.00	No Ice	50.27	285.00
				0.00					1/2" Ice	51.29	548.30
				0.00					1" Ice	52.31	811.60
Andrew 2' w/Radome (ECI-61)	C	Paraboloid w/Radome	From Leg	0.50	Worst		112.00	2.00	No Ice	3.14	70.00
				0.00					1/2" Ice	3.41	282.00
				0.00					1" Ice	3.68	494.00
* CSP Proposed											
Commscope											
PAR6-59W-PXA/A (ECI-58)	C	Paraboloid w/Radome	From Leg	0.50	Worst		154.00	6.00	No Ice	28.27	310.00
				0.00					1/2" Ice	29.07	460.00
				0.00					1" Ice	29.86	610.00



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### 222-H Verification Constants

Constant	Value
K <sub>d</sub>	0.85
Ice Thickness Importance Factor	1.15
Z <sub>r</sub>	900
α	9.5
K <sub>zmin</sub>	0.85
K <sub>c</sub>	1
K <sub>i</sub>	0.53
f	2
K <sub>e</sub>	1

### 222-H Section Verification ArRr By Element

Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A <sub>r</sub>	A <sub>r</sub> w/Ice	A <sub>r</sub> R <sub>r</sub>	A <sub>r</sub> R <sub>r</sub> w/Ice
ft								ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
T1 320.00-304.00	1	ROHN 5 EH	82.308	44.611	C	0.209	0.397	7.417	11.257	3.346	7.145
	1	ROHN 5 EH	82.308	44.611	A	0.209	0.397	7.417	11.257	3.346	7.145
	2	ROHN 5 EH	82.308	44.611	C	0.209	0.397	7.417	11.257	3.346	7.145
	2	ROHN 5 EH	82.308	44.611	B	0.209	0.397	7.417	11.257	3.346	7.145
	3	ROHN 5 EH	82.308	44.611	B	0.209	0.397	7.417	11.257	3.346	7.145
	3	ROHN 5 EH	82.308	44.611	A	0.209	0.397	7.417	11.257	3.346	7.145
								Sum:	14.835	22.513	6.692
								14.835	22.513	6.692	14.291
								14.835	22.513	6.692	14.291
T2 304.00-300.00	31	ROHN 5 EH	82.028	44.41	C	0.201	0.376	1.854	2.811	0.828	1.760
	31	ROHN 5 EH	82.028	44.41	A	0.201	0.376	1.854	2.811	0.828	1.760
	32	ROHN 5 EH	82.028	44.41	C	0.201	0.376	1.854	2.811	0.828	1.760
	32	ROHN 5 EH	82.028	44.41	B	0.201	0.376	1.854	2.811	0.828	1.760
	33	ROHN 5 EH	82.028	44.41	B	0.201	0.376	1.854	2.811	0.828	1.760
	33	ROHN 5 EH	82.028	44.41	A	0.201	0.376	1.854	2.811	0.828	1.760
								Sum:	3.709	5.622	1.656
								3.709	5.622	1.656	3.520
								3.709	5.622	1.656	3.520
T3 300.00-280.00	40	ROHN 6 EH	97.274	49.73	C	0.207	0.361	11.061	15.833	4.976	9.821
	40	ROHN 6 EH	97.274	49.73	A	0.207	0.361	11.061	15.833	4.976	9.821
	41	ROHN 6 EH	97.274	49.73	C	0.207	0.361	11.061	15.833	4.976	9.821
	41	ROHN 6 EH	97.274	49.73	B	0.207	0.361	11.061	15.833	4.976	9.821
	42	ROHN 6 EH	97.274	49.73	B	0.207	0.361	11.061	15.833	4.976	9.821
	42	ROHN 6 EH	97.274	49.73	A	0.207	0.361	11.061	15.833	4.976	9.821
								Sum:	22.122	31.667	9.951
								22.122	31.667	9.951	19.642
								22.122	31.667	9.951	19.642
T4 280.00-260.00								Sum:	0.000	0.000	0.000
									0.000	0.000	0.000
									0.000	0.000	0.000
T5 260.00-240.00								Sum:	0.000	0.000	0.000
									0.000	0.000	0.000
									0.000	0.000	0.000
T6 240.00-220.00								Sum:	0.000	0.000	0.000
									0.000	0.000	0.000
									0.000	0.000	0.000
T7								Sum:	0.000	0.000	0.000
									0.000	0.000	0.000
									0.000	0.000	0.000

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Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A <sub>r</sub>	A <sub>r</sub> w/Ice	A <sub>r</sub> R <sub>r</sub>	A <sub>r</sub> R <sub>r</sub> w/Ice	
ft								ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	
220.00-200.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T8				A		Sum:	0.000	0.000	0.000	0.000	
200.00-180.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T9				A		Sum:	0.000	0.000	0.000	0.000	
180.00-170.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T10				A		Sum:	0.000	0.000	0.000	0.000	
170.00-160.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T11				A		Sum:	0.000	0.000	0.000	0.000	
160.00-140.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T12				A		Sum:	0.000	0.000	0.000	0.000	
140.00-120.00					B			0.000	0.000	0.000	0.000	
					C			0.000	0.000	0.000	0.000	
	T13	214	ROHN 3 STD	47.3	29.584	C	0.131	0.181	7.130	12.487	3.797	7.135
120.00-100.00		215	ROHN 3 XXS	47.3	29.584	C	0.131	0.181	6.882	12.051	3.664	6.886
		216	ROHN 1.5 STD	25.677	21.861	C	0.131	0.181	0.930	2.218	0.526	1.267
		217	ROHN 2 STD	32.097	24.154	C	0.131	0.181	2.092	4.407	1.183	2.518
		218	ROHN 3 XXS	47.3	29.584	C	0.131	0.181	6.882	12.051	3.664	6.886
		219	ROHN 1.5 STD	25.677	21.861	C	0.131	0.181	0.930	2.218	0.526	1.267
		220	ROHN 2 STD	32.097	24.154	C	0.131	0.181	2.092	4.407	1.183	2.518
		221	ROHN 3 STD	47.3	29.584	B	0.131	0.181	7.130	12.487	3.797	7.135
		222	ROHN 3 XXS	47.3	29.584	B	0.131	0.181	6.882	12.051	3.664	6.886
		223	ROHN 1.5 STD	25.677	21.861	B	0.131	0.181	0.930	2.218	0.526	1.267
		224	ROHN 2 STD	32.097	24.154	B	0.131	0.181	2.092	4.407	1.183	2.518
		225	ROHN 3 XXS	47.3	29.584	B	0.131	0.181	6.882	12.051	3.664	6.886
		226	ROHN 1.5 STD	25.677	21.861	B	0.131	0.181	0.930	2.218	0.526	1.267
		227	ROHN 2 STD	32.097	24.154	B	0.131	0.181	2.092	4.407	1.183	2.518
		230	ROHN 3 STD	47.3	29.584	A	0.131	0.181	7.130	12.487	3.797	7.135
		231	ROHN 3 XXS	47.3	29.584	A	0.131	0.181	6.882	12.051	3.664	6.886
		232	ROHN 1.5 STD	25.677	21.861	A	0.131	0.181	0.930	2.218	0.526	1.267
		233	ROHN 2 STD	32.097	24.154	A	0.131	0.181	2.092	4.407	1.183	2.518
		234	ROHN 3 XXS	47.3	29.584	A	0.131	0.181	6.882	12.051	3.664	6.886
		235	ROHN 1.5 STD	25.677	21.861	A	0.131	0.181	0.930	2.218	0.526	1.267
		236	ROHN 2 STD	32.097	24.154	A	0.131	0.181	2.092	4.407	1.183	2.518
					A		Sum:	26.937	49.840	14.546	28.479	
					B			26.937	49.840	14.546	28.479	
					C			26.937	49.840	14.546	28.479	
	T14	247	ROHN 3 EH	47.038	29.305	C	0.122	0.17	7.883	13.751	4.196	7.837
100.00-80.00		248	ROHN 3 XXS	47.038	29.305	C	0.122	0.17	7.109	12.401	3.784	7.068
		249	P1.5x.145	25.535	21.625	C	0.122	0.17	1.033	2.448	0.584	1.395
		250	ROHN 2 EH	31.986	23.929	C	0.122	0.17	2.178	4.563	1.232	2.601
		251	ROHN 3 XXS	47.038	29.305	C	0.122	0.17	7.109	12.401	3.784	7.068
		252	P1.5x.145	25.535	21.625	C	0.122	0.17	1.033	2.448	0.584	1.395
		253	ROHN 2 EH	31.986	23.929	C	0.122	0.17	2.178	4.563	1.232	2.601
		254	ROHN 3 EH	47.038	29.305	B	0.122	0.17	7.883	13.751	4.196	7.837
		255	ROHN 3 XXS	47.038	29.305	B	0.122	0.17	7.109	12.401	3.784	7.068
		256	P1.5x.145	25.535	21.625	B	0.122	0.17	1.033	2.448	0.584	1.395
		257	ROHN 2 EH	31.986	23.929	B	0.122	0.17	2.178	4.563	1.232	2.601
		258	ROHN 3 XXS	47.038	29.305	B	0.122	0.17	7.109	12.401	3.784	7.068
		259	P1.5x.145	25.535	21.625	B	0.122	0.17	1.033	2.448	0.584	1.395
		260	ROHN 2 EH	31.986	23.929	B	0.122	0.17	2.178	4.563	1.232	2.601
		263	ROHN 3 EH	47.038	29.305	A	0.122	0.17	7.883	13.751	4.196	7.837
		264	ROHN 3 XXS	47.038	29.305	A	0.122	0.17	7.109	12.401	3.784	7.068
		265	P1.5x.145	25.535	21.625	A	0.122	0.17	1.033	2.448	0.584	1.395

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	34 of 95
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A <sub>r</sub>	A <sub>r</sub> w/Ice	A <sub>r</sub> R <sub>r</sub>	A <sub>r</sub> R <sub>r</sub> w/Ice
ft								ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
T15 80.00-60.00	266	ROHN 2 EH	31.986	23.929	A	0.122	0.17	2.178	4.563	1.232	2.601
	267	ROHN 3 XXS	47.038	29.305	A	0.122	0.17	7.109	12.401	3.784	7.068
	268	P1.5x.145	25.535	21.625	A	0.122	0.17	1.033	2.448	0.584	1.395
	269	ROHN 2 EH	31.986	23.929	A	0.122	0.17	2.178	4.563	1.232	2.601
					A		Sum:	28.523	52.577	15.395	29.965
					B			28.523	52.577	15.395	29.965
					C			28.523	52.577	15.395	29.965
	280	ROHN 3 XXS	47.101	29.273	C	0.127	0.173	8.612	14.987	4.588	8.546
	281	ROHN 3 XXS	47.101	29.273	C	0.127	0.173	7.336	12.766	3.908	7.280
	282	ROHN 2 STD	31.961	23.866	C	0.127	0.173	1.402	2.932	0.793	1.672
	283	ROHN 2 EH	32.029	23.89	C	0.127	0.173	2.253	4.705	1.274	2.683
	284	ROHN 3 XXS	47.101	29.273	C	0.127	0.173	7.336	12.766	3.908	7.280
	285	ROHN 2 STD	31.961	23.866	C	0.127	0.173	1.402	2.932	0.793	1.672
	286	ROHN 2 EH	32.029	23.89	C	0.127	0.173	2.253	4.705	1.274	2.683
	287	ROHN 3 XXS	47.101	29.273	B	0.127	0.173	8.612	14.987	4.588	8.546
	288	ROHN 3 XXS	47.101	29.273	B	0.127	0.173	7.336	12.766	3.908	7.280
	289	ROHN 2 STD	31.961	23.866	B	0.127	0.173	1.402	2.932	0.793	1.672
	290	ROHN 2 EH	32.029	23.89	B	0.127	0.173	2.253	4.705	1.274	2.683
	291	ROHN 3 XXS	47.101	29.273	B	0.127	0.173	7.336	12.766	3.908	7.280
	292	ROHN 2 STD	31.961	23.866	B	0.127	0.173	1.402	2.932	0.793	1.672
	293	ROHN 2 EH	32.029	23.89	B	0.127	0.173	2.253	4.705	1.274	2.683
	296	ROHN 3 XXS	47.101	29.273	A	0.127	0.173	8.612	14.987	4.588	8.546
	297	ROHN 3 XXS	47.101	29.273	A	0.127	0.173	7.336	12.766	3.908	7.280
	298	ROHN 2 STD	31.961	23.866	A	0.127	0.173	1.402	2.932	0.793	1.672
	299	ROHN 2 EH	32.029	23.89	A	0.127	0.173	2.253	4.705	1.274	2.683
	300	ROHN 3 XXS	47.101	29.273	A	0.127	0.173	7.336	12.766	3.908	7.280
	301	ROHN 2 STD	31.961	23.866	A	0.127	0.173	1.402	2.932	0.793	1.672
	302	ROHN 2 EH	32.029	23.89	A	0.127	0.173	2.253	4.705	1.274	2.683
					A		Sum:	30.595	55.793	16.540	31.817
					B			30.595	55.793	16.540	31.817
					C			30.595	55.793	16.540	31.817
	T16 60.00-30.00	313	ROHN 3.5 EH	54.877	32.316	C	0.122	0.165	10.693	17.630	5.348
314		ROHN 4 EH	61.736	34.766	C	0.122	0.165	12.823	20.219	6.052	11.509
315		ROHN 1.5 STD	26.067	22.026	C	0.122	0.165	0.790	1.870	0.447	1.065
316		ROHN 2 XXS	32.583	24.354	C	0.122	0.165	2.081	4.356	1.176	2.479
317		ROHN 2 EH	32.652	24.378	C	0.122	0.165	1.972	4.123	1.115	2.347
318		ROHN 2.5 STD	39.443	26.804	C	0.122	0.165	3.288	6.256	1.853	3.561
319		ROHN 4 EH	61.736	34.766	C	0.122	0.165	12.823	20.219	6.052	11.509
320		ROHN 1.5 STD	26.067	22.026	C	0.122	0.165	0.790	1.870	0.447	1.065
321		ROHN 2 XXS	32.583	24.354	C	0.122	0.165	2.081	4.356	1.176	2.479
322		ROHN 2 EH	32.652	24.378	C	0.122	0.165	1.972	4.123	1.115	2.347
323		ROHN 2.5 STD	39.443	26.804	C	0.122	0.165	3.288	6.256	1.853	3.561
324		ROHN 3.5 EH	54.877	32.316	B	0.122	0.165	10.693	17.630	5.348	10.036
325		ROHN 4 EH	61.736	34.766	B	0.122	0.165	12.823	20.219	6.052	11.509
326		ROHN 1.5 STD	26.067	22.026	B	0.122	0.165	0.790	1.870	0.447	1.065
327		ROHN 2 XXS	32.583	24.354	B	0.122	0.165	2.081	4.356	1.176	2.479
328		ROHN 2 EH	32.652	24.378	B	0.122	0.165	1.972	4.123	1.115	2.347
329		ROHN 2.5 STD	39.443	26.804	B	0.122	0.165	3.288	6.256	1.853	3.561
330		ROHN 4 EH	61.736	34.766	B	0.122	0.165	12.823	20.219	6.052	11.509
331		ROHN 1.5 STD	26.067	22.026	B	0.122	0.165	0.790	1.870	0.447	1.065
332		ROHN 2 XXS	32.583	24.354	B	0.122	0.165	2.081	4.356	1.176	2.479
333		ROHN 2 EH	32.652	24.378	B	0.122	0.165	1.972	4.123	1.115	2.347
334		ROHN 2.5 STD	39.443	26.804	B	0.122	0.165	3.288	6.256	1.853	3.561
339		ROHN 3.5 EH	54.877	32.316	A	0.122	0.165	10.693	17.630	5.348	10.036
340		ROHN 4 EH	61.736	34.766	A	0.122	0.165	12.823	20.219	6.052	11.509
341		ROHN 1.5 STD	26.067	22.026	A	0.122	0.165	0.790	1.870	0.447	1.065
342		ROHN 2 XXS	32.583	24.354	A	0.122	0.165	2.081	4.356	1.176	2.479
343		ROHN 2 EH	32.652	24.378	A	0.122	0.165	1.972	4.123	1.115	2.347
344		ROHN 2.5 STD	39.443	26.804	A	0.122	0.165	3.288	6.256	1.853	3.561
345		ROHN 4 EH	61.736	34.766	A	0.122	0.165	12.823	20.219	6.052	11.509

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 35 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
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Section Elevation <i>ft</i>	Elem. Num.	Size	C	C w/Ice	F a c e	e	e w/Ice	A <sub>r</sub> <i>ft</i> <sup>2</sup>	A <sub>r</sub> w/Ice <i>ft</i> <sup>2</sup>	A <sub>r</sub> R <sub>r</sub> <i>ft</i> <sup>2</sup>	A <sub>r</sub> R <sub>r</sub> w/Ice <i>ft</i> <sup>2</sup>
T17 30.00-0.00	346	ROHN 1.5 STD	26.067	22.026	A	0.122	0.165	0.790	1.870	0.447	1.065
	347	ROHN 2 XXS	32.583	24.354	A	0.122	0.165	2.081	4.356	1.176	2.479
	348	ROHN 2 EH	32.652	24.378	A	0.122	0.165	1.972	4.123	1.115	2.347
	349	ROHN 2.5 STD	39.443	26.804	A	0.122	0.165	3.288	6.256	1.853	3.561
					A		Sum:	52.602	91.278	26.633	51.957
					B			52.602	91.278	26.633	51.957
					C			52.602	91.278	26.633	51.957
	364	ROHN 4 EH	64.741	36.51	C	0.117	0.158	13.402	21.161	6.136	12.028
	365	ROHN 4 EH	64.741	36.51	C	0.117	0.158	13.245	20.914	6.065	11.887
	366	P1.5x.145	27.335	23.151	C	0.117	0.158	0.887	2.103	0.501	1.196
	367	ROHN 2.5 EH	41.363	28.16	C	0.117	0.158	2.812	5.360	1.561	3.046
	368	ROHN 2.5 STD	41.363	28.16	C	0.117	0.158	2.470	4.708	1.371	2.676
	369	ROHN 2.5 STD	41.363	28.16	C	0.117	0.158	3.506	6.683	1.946	3.799
	370	ROHN 4 EH	64.741	36.51	C	0.117	0.158	13.245	20.914	6.065	11.887
	371	P1.5x.145	27.335	23.151	C	0.117	0.158	0.887	2.103	0.501	1.196
	372	ROHN 2.5 EH	41.363	28.16	C	0.117	0.158	2.812	5.360	1.561	3.046
	373	ROHN 2.5 STD	41.363	28.16	C	0.117	0.158	2.470	4.708	1.371	2.676
	374	ROHN 2.5 STD	41.363	28.16	C	0.117	0.158	3.506	6.683	1.946	3.799
	375	ROHN 4 EH	64.741	36.51	B	0.117	0.158	13.402	21.161	6.136	12.028
	376	ROHN 4 EH	64.741	36.51	B	0.117	0.158	13.245	20.914	6.065	11.887
	377	P1.5x.145	27.335	23.151	B	0.117	0.158	0.887	2.103	0.501	1.196
	378	ROHN 2.5 EH	41.363	28.16	B	0.117	0.158	2.812	5.360	1.561	3.046
	379	ROHN 2.5 STD	41.363	28.16	B	0.117	0.158	2.470	4.708	1.371	2.676
	380	ROHN 2.5 STD	41.363	28.16	B	0.117	0.158	3.506	6.683	1.946	3.799
	381	ROHN 4 EH	64.741	36.51	B	0.117	0.158	13.245	20.914	6.065	11.887
	382	P1.5x.145	27.335	23.151	B	0.117	0.158	0.887	2.103	0.501	1.196
	383	ROHN 2.5 EH	41.363	28.16	B	0.117	0.158	2.812	5.360	1.561	3.046
	384	ROHN 2.5 STD	41.363	28.16	B	0.117	0.158	2.470	4.708	1.371	2.676
	385	ROHN 2.5 STD	41.363	28.16	B	0.117	0.158	3.506	6.683	1.946	3.799
	390	ROHN 4 EH	64.741	36.51	A	0.117	0.158	13.402	21.161	6.136	12.028
	391	ROHN 4 EH	64.741	36.51	A	0.117	0.158	13.245	20.914	6.065	11.887
	392	P1.5x.145	27.335	23.151	A	0.117	0.158	0.887	2.103	0.501	1.196
	393	ROHN 2.5 EH	41.363	28.16	A	0.117	0.158	2.812	5.360	1.561	3.046
	394	ROHN 2.5 STD	41.363	28.16	A	0.117	0.158	2.470	4.708	1.371	2.676
	395	ROHN 2.5 STD	41.363	28.16	A	0.117	0.158	3.506	6.683	1.946	3.799
	396	ROHN 4 EH	64.741	36.51	A	0.117	0.158	13.245	20.914	6.065	11.887
	397	P1.5x.145	27.335	23.151	A	0.117	0.158	0.887	2.103	0.501	1.196
	398	ROHN 2.5 EH	41.363	28.16	A	0.117	0.158	2.812	5.360	1.561	3.046
	399	ROHN 2.5 STD	41.363	28.16	A	0.117	0.158	2.470	4.708	1.371	2.676
	400	ROHN 2.5 STD	41.363	28.16	A	0.117	0.158	3.506	6.683	1.946	3.799
				A		Sum:	59.240	100.698	29.025	57.236	
				B			59.240	100.698	29.025	57.236	
				C			59.240	100.698	29.025	57.236	

**222-H Section Verification Tables - No Ice**

Section Elevation <i>ft</i>	<i>z<sub>wind</sub></i> <i>ft</i>	<i>z<sub>ice</sub></i> <i>ft</i>	<i>K<sub>z</sub></i>	<i>K<sub>h</sub></i>	<i>K<sub>st</sub></i>	<i>t<sub>z</sub></i> <i>in</i>	<i>q<sub>z</sub></i> <i>psf</i>	<i>F a c e</i>	<i>e</i>	<i>A<sub>r</sub>R<sub>r</sub></i> <i>ft</i> <sup>2</sup>
T1 320.00-304.00	312.00		1.608	11890.1	1		69	A	0.209	6.692
								B	0.209	6.692
								C	0.209	6.692

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 36 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
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Section Elevation	$z_{wind}$	$z_{ice}$	$K_z$	$K_h$	$K_{zt}$	$t_z$	$q_z$	$F_{ac}$	$e$	$A_r R_r$
ft	ft	ft				in	psf	e		ft <sup>2</sup>
T2 304.00-300.00	302.00		1.597	8801.76	1		68	A B C	0.201 0.201 0.201	1.656 1.656 1.656
T3 300.00-280.00	290.00		1.584	6135.24	1		68	A B C	0.207 0.207 0.207	9.951 9.951 9.951
T4 280.00-260.00	270.00		1.56	3362.03	1		67	A B C	0.237 0.237 0.237	0.000 0.000 0.000
T5 260.00-240.00	250.00		1.535	1842.35	1.001		66	A B C	0.219 0.219 0.219	0.000 0.000 0.000
T6 240.00-220.00	230.00		1.508	1009.58	1.001		64	A B C	0.223 0.223 0.223	0.000 0.000 0.000
T7 220.00-200.00	210.00		1.48	553.239	1.002		63	A B C	0.181 0.181 0.181	0.000 0.000 0.000
T8 200.00-180.00	190.00		1.449	303.168	1.003		62	A B C	0.187 0.187 0.187	0.000 0.000 0.000
T9 180.00-170.00	175.00		1.424	193.09	1.005		61	A B C	0.177 0.177 0.177	0.000 0.000 0.000
T10 170.00-160.00	165.00		1.406	142.937	1.007		60	A B C	0.171 0.171 0.171	0.000 0.000 0.000
T11 160.00-140.00	150.00		1.378	91.038	1.012		59	A B C	0.181 0.181 0.181	0.000 0.000 0.000
T12 140.00-120.00	130.00		1.337	49.888	1.021		58	A B C	0.173 0.173 0.173	0.000 0.000 0.000
T13 120.00-100.00	110.00		1.291	27.338	1.039		57	A B C	0.131 0.131 0.131	14.546 14.546 14.546
T14 100.00-80.00	90.00		1.238	14.981	1.072		57	A B C	0.122 0.122 0.122	15.395 15.395 15.395
T15 80.00-60.00	70.00		1.174	8.209	1.133		57	A B C	0.127 0.127 0.127	16.540 16.540 16.540
T16 60.00-30.00	45.00		1.07	3.87	1.293		59	A B C	0.122 0.122 0.122	26.633 26.633 26.633
T17 30.00-0.00	15.00		0.85	1.57	1.789		65	A B C	0.117 0.117 0.117	29.025 29.025 29.025

### 222-H Section Verification Tables - Ice

Section Elevation	$z_{wind}$	$z_{ice}$	$K_z$	$K_h$	$K_{zt}$	$t_z$	$q_z$	$F_{ac}$	$e$	$A_r R_r$
ft	ft	ft				in	psf	e		ft <sup>2</sup>
T1 320.00-304.00	312.00	312.00	1.608	11890.1	1	1.4397	9	A B	0.397 0.397	24.226 24.226

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	37 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
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Section Elevation	$z_{wind}$	$z_{ice}$	$K_z$	$K_h$	$K_{zt}$	$t_z$	$q_z$	$F_{ac}$	$e$	$A,R_r$
ft	ft	ft				in	psf	e		ft <sup>2</sup>
T2 304.00-300.00	302.00	302.00	1.597	8801.76	1	1.4350	9	C A B C	0.397 0.376 0.376 0.376	24.226 5.724 5.724 5.724
T3 300.00-280.00	290.00	290.00	1.584	6135.24	1	1.4293	9	A B C	0.361 0.361 0.361	30.809 30.809 30.809
T4 280.00-260.00	270.00	270.00	1.56	3362.03	1	1.4192	8	A B C	0.331 0.331 0.331	9.458 9.458 9.458
T5 260.00-240.00	250.00	250.00	1.535	1842.35	1.001	1.4084	8	A B C	0.307 0.307 0.307	10.777 10.777 10.777
T6 240.00-220.00	230.00	230.00	1.508	1009.58	1.001	1.3969	8	A B C	0.307 0.307 0.307	12.230 12.230 12.230
T7 220.00-200.00	210.00	210.00	1.48	553.239	1.002	1.3847	8	A B C	0.245 0.245 0.245	9.623 9.623 9.623
T8 200.00-180.00	190.00	190.00	1.449	303.168	1.003	1.3717	8	A B C	0.246 0.246 0.246	10.500 10.500 10.500
T9 180.00-170.00	175.00	175.00	1.424	193.09	1.005	1.3614	8	A B C	0.235 0.235 0.235	5.560 5.560 5.560
T10 170.00-160.00	165.00	165.00	1.406	142.937	1.007	1.3543	8	A B C	0.228 0.228 0.228	5.765 5.765 5.765
T11 160.00-140.00	150.00	150.00	1.378	91.038	1.012	1.3434	8	A B C	0.236 0.236 0.236	12.176 12.176 12.176
T12 140.00-120.00	130.00	130.00	1.337	49.888	1.021	1.3288	7	A B C	0.226 0.226 0.226	12.970 12.970 12.970
T13 120.00-100.00	110.00	110.00	1.291	27.338	1.039	1.3147	7	A B C	0.181 0.181 0.181	28.479 28.479 28.479
T14 100.00-80.00	90.00	90.00	1.238	14.981	1.072	1.3027	7	A B C	0.17 0.17 0.17	29.965 29.965 29.965
T15 80.00-60.00	70.00	70.00	1.174	8.209	1.133	1.2953	7	A B C	0.173 0.173 0.173	31.817 31.817 31.817
T16 60.00-30.00	45.00	45.00	1.07	3.87	1.293	1.2977	8	A B C	0.165 0.165 0.165	51.957 51.957 51.957
T17 30.00-0.00	15.00	15.00	0.85	1.57	1.789	1.3028	8	A B C	0.158 0.158 0.158	57.236 57.236 57.236

### 222-H Section Verification Tables - Service

Section Elevation	$z_{wind}$	$z_{ice}$	$K_z$	$K_h$	$K_{zt}$	$t_z$	$q_z$	$F_{ac}$	$e$	$A,R_r$
ft	ft	ft				in	psf	e		ft <sup>2</sup>
T1 320.00-304.00	312.00		1.608	11890.1	1		13	A	0.209	6.692

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 38 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section Elevation	$z_{wind}$	$z_{ice}$	$K_z$	$K_h$	$K_{zt}$	$t_z$	$q_z$	$F$ $a$ $c$ $e$	$e$	$A_e R_r$
ft	ft	ft				in	psf			ft <sup>2</sup>
T2 304.00-300.00	302.00		1.597	8801.76	1		13	B C A	0.209 0.209 0.201	6.692 6.692 1.656
								B C	0.201 0.201	1.656 1.656
T3 300.00-280.00	290.00		1.584	6135.24	1		12	A B C	0.207 0.207 0.207	9.951 9.951 9.951
T4 280.00-260.00	270.00		1.56	3362.03	1		12	A B C	0.237 0.237 0.237	0.000 0.000 0.000
T5 260.00-240.00	250.00		1.535	1842.35	1.001		12	A B C	0.219 0.219 0.219	0.000 0.000 0.000
T6 240.00-220.00	230.00		1.508	1009.58	1.001		12	A B C	0.223 0.223 0.223	0.000 0.000 0.000
T7 220.00-200.00	210.00		1.48	553.239	1.002		12	A B C	0.181 0.181 0.181	0.000 0.000 0.000
T8 200.00-180.00	190.00		1.449	303.168	1.003		11	A B C	0.187 0.187 0.187	0.000 0.000 0.000
T9 180.00-170.00	175.00		1.424	193.09	1.005		11	A B C	0.177 0.177 0.177	0.000 0.000 0.000
T10 170.00-160.00	165.00		1.406	142.937	1.007		11	A B C	0.171 0.171 0.171	0.000 0.000 0.000
T11 160.00-140.00	150.00		1.378	91.038	1.012		11	A B C	0.181 0.181 0.181	0.000 0.000 0.000
T12 140.00-120.00	130.00		1.337	49.888	1.021		11	A B C	0.173 0.173 0.173	0.000 0.000 0.000
T13 120.00-100.00	110.00		1.291	27.338	1.039		11	A B C	0.131 0.131 0.131	14.546 14.546 14.546
T14 100.00-80.00	90.00		1.238	14.981	1.072		10	A B C	0.122 0.122 0.122	15.395 15.395 15.395
T15 80.00-60.00	70.00		1.174	8.209	1.133		10	A B C	0.127 0.127 0.127	16.540 16.540 16.540
T16 60.00-30.00	45.00		1.07	3.87	1.293		11	A B C	0.122 0.122 0.122	26.633 26.633 26.633
T17 30.00-0.00	15.00		0.85	1.57	1.789		12	A B C	0.117 0.117 0.117	29.025 29.025 29.025

### Tower Pressures - No Ice

$$G_H = 0.850$$

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 39 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> psf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
T1 320.00-304.00	312.00	1.608	69	116.377	A	9.512	14.835	14.835	60.93	0.000	0.000
					B	9.512	14.835		60.93	5.561	0.000
					C	9.512	14.835		60.93	0.000	0.000
T2 304.00-300.00	302.00	1.597	68	29.094	A	2.147	3.709	3.709	63.34	0.000	0.000
					B	2.147	3.709		63.34	1.540	0.000
					C	2.147	3.709		63.34	0.000	0.000
T3 300.00-280.00	290.00	1.584	68	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
					B	12.596	22.122		63.72	13.483	0.000
					C	12.596	22.122		63.72	0.000	0.000
T4 280.00-260.00	270.00	1.56	67	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
					B	51.464	0.000		73.43	26.676	0.000
					C	51.464	0.000		73.43	0.000	0.000
T5 260.00-240.00	250.00	1.535	66	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
					B	56.868	0.000		66.43	37.174	0.000
					C	56.868	0.000		66.43	0.000	0.000
T6 240.00-220.00	230.00	1.508	64	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
					B	66.901	0.000		56.46	49.355	0.000
					C	66.901	0.000		56.46	0.000	0.000
T7 220.00-200.00	210.00	1.48	63	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
					B	61.588	0.000		61.34	49.900	0.000
					C	61.588	0.000		61.34	30.160	0.000
T8 200.00-180.00	190.00	1.449	62	385.076	A	71.846	0.000	45.633	63.52	30.040	0.000
					B	71.846	0.000		63.52	49.900	0.000
					C	71.846	0.000		63.52	30.160	0.000
T9 180.00-170.00	175.00	1.424	61	208.387	A	36.864	0.000	22.815	61.89	15.020	0.000
					B	36.864	0.000		61.89	27.055	0.000
					C	36.864	0.000		61.89	15.080	0.000
T10 170.00-160.00	165.00	1.406	60	218.787	A	37.492	0.000	22.815	60.85	15.020	0.000
					B	37.492	0.000		60.85	29.412	0.000
					C	37.492	0.000		60.85	15.080	0.000
T11 160.00-140.00	150.00	1.378	59	467.070	A	84.562	0.000	45.617	53.94	30.040	0.000
					B	84.562	0.000		53.94	65.283	0.000
					C	84.562	0.000		53.94	30.160	0.000
T12 140.00-120.00	130.00	1.337	58	507.978	A	87.738	0.000	45.637	52.02	30.040	0.000
					B	87.738	0.000		52.02	71.886	0.000
					C	87.738	0.000		52.02	30.160	0.000
T13 120.00-100.00	110.00	1.291	57	555.591	A	45.673	26.937	45.673	62.90	30.040	0.000
					B	45.673	26.937		62.90	76.650	0.000
					C	45.673	26.937		62.90	30.160	0.000
T14 100.00-80.00	90.00	1.238	57	606.388	A	45.666	28.523	45.666	61.55	30.040	0.000
					B	45.666	28.523		61.55	83.818	0.000
					C	45.666	28.523		61.55	30.160	0.000
T15 80.00-60.00	70.00	1.174	57	662.098	A	53.708	30.595	53.708	63.71	30.040	0.000
					B	53.708	30.595		63.71	85.889	0.000
					C	53.708	30.595		63.71	30.160	0.000
T16 60.00-30.00	45.00	1.07	59	1088.08	A	80.523	52.602	80.523	60.49	45.060	0.000
				3	B	80.523	52.602		60.49	128.833	0.000
					C	80.523	52.602		60.49	45.240	0.000
T17 30.00-0.00	15.00	0.85	65	1202.12	A	81.480	59.240	81.480	57.90	37.550	0.000
				2	B	81.480	59.240		57.90	107.361	0.000
					C	81.480	59.240		57.90	37.700	0.000

**Tower Pressure - With Ice**

$G_H = 0.850$



<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	40 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	z	Kz	qz	tz	AG	F a c e	AF	AR	Aleg	Leg %	CAAI In Face ft <sup>2</sup>	CAAI Out Face ft <sup>2</sup>
ft	ft		psf	in	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>			
T1 320.00-304.00	312.00	1.608	9	1.4397	120.217	A	9.512	38.165	22.513	47.22	0.000	0.000
						B	9.512	38.165		47.22	22.405	0.000
						C	9.512	38.165		47.22	0.000	0.000
T2 304.00-300.00	302.00	1.597	9	1.4350	30.051	A	2.147	9.143	5.622	49.80	0.000	0.000
						B	2.147	9.143		49.80	6.132	0.000
						C	2.147	9.143		49.80	0.000	0.000
T3 300.00-280.00	290.00	1.584	9	1.4293	172.426	A	12.596	49.670	31.667	50.86	0.000	0.000
						B	12.596	49.670		50.86	49.786	0.000
						C	12.596	49.670		50.86	0.000	0.000
T4 280.00-260.00	270.00	1.56	8	1.4192	221.567	A	57.784	15.527	44.108	60.16	0.000	0.000
						B	57.784	15.527		60.16	89.970	0.000
						C	57.784	15.527		60.16	0.000	0.000
T5 260.00-240.00	250.00	1.535	8	1.4084	263.827	A	63.139	17.925	44.048	54.34	0.000	0.000
						B	63.139	17.925		54.34	118.862	0.000
						C	63.139	17.925		54.34	0.000	0.000
T6 240.00-220.00	230.00	1.508	8	1.3969	304.288	A	73.120	20.343	43.995	47.07	0.000	0.000
						B	73.120	20.343		47.07	154.126	0.000
						C	73.120	20.343		47.07	0.000	0.000
T7 220.00-200.00	210.00	1.48	8	1.3847	344.347	A	67.752	16.487	43.940	52.16	0.000	0.000
						B	67.752	16.487		52.16	155.138	0.000
						C	67.752	16.487		52.16	84.362	0.000
T8 200.00-180.00	190.00	1.449	8	1.3717	389.655	A	77.954	17.978	51.741	53.94	85.834	0.000
						B	77.954	17.978		53.94	154.148	0.000
						C	77.954	17.978		53.94	84.196	0.000
T9 180.00-170.00	175.00	1.424	8	1.3614	210.660	A	39.895	9.563	25.845	52.26	42.830	0.000
						B	39.895	9.563		52.26	84.506	0.000
						C	39.895	9.563		52.26	42.033	0.000
T10 170.00-160.00	165.00	1.406	8	1.3543	221.048	A	40.507	9.939	25.830	51.20	42.771	0.000
						B	40.507	9.939		51.20	93.607	0.000
						C	40.507	9.939		51.20	41.988	0.000
T11 160.00-140.00	150.00	1.378	8	1.3434	471.554	A	90.542	20.928	51.596	46.29	85.358	0.000
						B	90.542	20.928		46.29	204.733	0.000
						C	90.542	20.928		46.29	83.838	0.000
T12 140.00-120.00	130.00	1.337	7	1.3288	512.414	A	93.655	22.377	51.555	44.43	85.111	0.000
						B	93.655	22.377		44.43	223.633	0.000
						C	93.655	22.377		44.43	83.653	0.000
T13 120.00-100.00	110.00	1.291	7	1.3147	559.982	A	51.533	49.840	51.533	50.83	84.874	0.000
						B	51.533	49.840		50.83	234.150	0.000
						C	51.533	49.840		50.83	83.474	0.000
T14 100.00-80.00	90.00	1.238	7	1.3027	610.739	A	51.471	52.577	51.471	49.47	84.672	0.000
						B	51.471	52.577		49.47	250.822	0.000
						C	51.471	52.577		49.47	83.322	0.000
T15 80.00-60.00	70.00	1.174	7	1.2953	666.426	A	59.482	55.793	59.482	51.60	84.548	0.000
						B	59.482	55.793		51.60	256.871	0.000
						C	59.482	55.793		51.60	83.229	0.000
T16 60.00-30.00	45.00	1.07	8	1.2977	1094.584	A	89.196	91.278	89.196	49.42	126.883	0.000
						B	89.196	91.278		49.42	385.783	0.000
						C	89.196	91.278		49.42	124.889	0.000
T17 30.00-0.00	15.00	0.85	8	1.3028	1208.649	A	90.189	100.698	90.189	47.25	105.842	0.000
						B	90.189	100.698		47.25	322.322	0.000
						C	90.189	100.698		47.25	104.154	0.000

### Tower Pressure - Service

$G_H = 0.850$

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 41 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section Elevation <i>ft</i>	<i>z</i> <i>ft</i>	<i>K<sub>Z</sub></i>	<i>q<sub>z</sub></i> <i>psf</i>	<i>A<sub>G</sub></i> <i>ft<sup>2</sup></i>	<i>F<sub>a</sub></i> <i>c</i> <i>e</i>	<i>A<sub>F</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>R</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>leg</sub></i> <i>ft<sup>2</sup></i>	<i>Leg</i> <i>%</i>	<i>C<sub>AA</sub></i> <i>In</i> <i>Face</i> <i>ft<sup>2</sup></i>	<i>C<sub>AA</sub></i> <i>Out</i> <i>Face</i> <i>ft<sup>2</sup></i>
T1 320.00-304.00	312.00	1.608	13	116.377	A	9.512	14.835	14.835	60.93	0.000	0.000
					B	9.512	14.835		60.93	5.561	0.000
					C	9.512	14.835		60.93	0.000	0.000
T2 304.00-300.00	302.00	1.597	13	29.094	A	2.147	3.709	3.709	63.34	0.000	0.000
					B	2.147	3.709		63.34	1.540	0.000
					C	2.147	3.709		63.34	0.000	0.000
T3 300.00-280.00	290.00	1.584	12	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
					B	12.596	22.122		63.72	13.483	0.000
					C	12.596	22.122		63.72	0.000	0.000
T4 280.00-260.00	270.00	1.56	12	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
					B	51.464	0.000		73.43	26.676	0.000
					C	51.464	0.000		73.43	0.000	0.000
T5 260.00-240.00	250.00	1.535	12	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
					B	56.868	0.000		66.43	37.174	0.000
					C	56.868	0.000		66.43	0.000	0.000
T6 240.00-220.00	230.00	1.508	12	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
					B	66.901	0.000		56.46	49.355	0.000
					C	66.901	0.000		56.46	0.000	0.000
T7 220.00-200.00	210.00	1.48	12	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
					B	61.588	0.000		61.34	49.900	0.000
					C	61.588	0.000		61.34	30.160	0.000
T8 200.00-180.00	190.00	1.449	11	385.076	A	71.846	0.000	45.633	63.52	30.040	0.000
					B	71.846	0.000		63.52	49.900	0.000
					C	71.846	0.000		63.52	30.160	0.000
T9 180.00-170.00	175.00	1.424	11	208.387	A	36.864	0.000	22.815	61.89	15.020	0.000
					B	36.864	0.000		61.89	27.055	0.000
					C	36.864	0.000		61.89	15.080	0.000
T10 170.00-160.00	165.00	1.406	11	218.787	A	37.492	0.000	22.815	60.85	15.020	0.000
					B	37.492	0.000		60.85	29.412	0.000
					C	37.492	0.000		60.85	15.080	0.000
T11 160.00-140.00	150.00	1.378	11	467.070	A	84.562	0.000	45.617	53.94	30.040	0.000
					B	84.562	0.000		53.94	65.283	0.000
					C	84.562	0.000		53.94	30.160	0.000
T12 140.00-120.00	130.00	1.337	11	507.978	A	87.738	0.000	45.637	52.02	30.040	0.000
					B	87.738	0.000		52.02	71.886	0.000
					C	87.738	0.000		52.02	30.160	0.000
T13 120.00-100.00	110.00	1.291	11	555.591	A	45.673	26.937	45.673	62.90	30.040	0.000
					B	45.673	26.937		62.90	76.650	0.000
					C	45.673	26.937		62.90	30.160	0.000
T14 100.00-80.00	90.00	1.238	10	606.388	A	45.666	28.523	45.666	61.55	30.040	0.000
					B	45.666	28.523		61.55	83.818	0.000
					C	45.666	28.523		61.55	30.160	0.000
T15 80.00-60.00	70.00	1.174	10	662.098	A	53.708	30.595	53.708	63.71	30.040	0.000
					B	53.708	30.595		63.71	85.889	0.000
					C	53.708	30.595		63.71	30.160	0.000
T16 60.00-30.00	45.00	1.07	11	1088.08	A	80.523	52.602	80.523	60.49	45.060	0.000
				3	B	80.523	52.602		60.49	128.833	0.000
					C	80.523	52.602		60.49	45.240	0.000
T17 30.00-0.00	15.00	0.85	12	1202.12	A	81.480	59.240	81.480	57.90	37.550	0.000
				2	B	81.480	59.240		57.90	107.361	0.000
					C	81.480	59.240		57.90	37.700	0.000

**Tower Forces - No Ice - Wind Normal To Face**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	42 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	69	1	1	16.204	2618.40	163.65	C
			B	0.209	2.566		1	1	16.204			
			C	0.209	2.566		1	1	16.204			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	68	1	1	3.803	624.23	156.06	C
			B	0.201	2.592		1	1	3.803			
			C	0.201	2.592		1	1	3.803			
T3 300.00-280.00	40.00	2496.34	A	0.207	2.573	68	1	1	22.547	3795.03	189.75	C
			B	0.207	2.573		1	1	22.547			
			C	0.207	2.573		1	1	22.547			
T4 280.00-260.00	87.48	5067.66	A	0.237	2.476	67	1	1	51.464	8113.90	405.69	C
			B	0.237	2.476		1	1	51.464			
			C	0.237	2.476		1	1	51.464			
T5 260.00-240.00	122.62	5409.17	A	0.219	2.532	66	1	1	56.868	9259.42	462.97	C
			B	0.219	2.532		1	1	56.868			
			C	0.219	2.532		1	1	56.868			
T6 240.00-220.00	162.20	6484.36	A	0.223	2.52	64	1	1	66.901	10848.52	542.43	C
			B	0.223	2.52		1	1	66.901			
			C	0.223	2.52		1	1	66.901			
T7 220.00-200.00	362.40	6406.00	A	0.181	2.66	63	1	1	61.588	11384.48	569.22	C
			B	0.181	2.66		1	1	61.588			
			C	0.181	2.66		1	1	61.588			
T8 200.00-180.00	534.20	7298.65	A	0.187	2.641	62	1	1	71.846	13483.50	674.18	C
			B	0.187	2.641		1	1	71.846			
			C	0.187	2.641		1	1	71.846			
T9 180.00-170.00	272.46	3730.84	A	0.177	2.675	61	1	1	36.864	6897.89	689.79	C
			B	0.177	2.675		1	1	36.864			
			C	0.177	2.675		1	1	36.864			
T10 170.00-160.00	279.59	3785.29	A	0.171	2.694	60	1	1	37.492	7022.55	702.26	C
			B	0.171	2.694		1	1	37.492			
			C	0.171	2.694		1	1	37.492			
T11 160.00-140.00	579.39	9608.59	A	0.181	2.661	59	1	1	84.562	15179.59	758.98	C
			B	0.181	2.661		1	1	84.562			
			C	0.181	2.661		1	1	84.562			
T12 140.00-120.00	599.08	9975.29	A	0.173	2.69	58	1	1	87.738	15611.31	780.57	C
			B	0.173	2.69		1	1	87.738			
			C	0.173	2.69		1	1	87.738			
T13 120.00-100.00	609.33	9144.95	A	0.131	2.844	57	1	1	60.219	12324.59	616.23	C
			B	0.131	2.844		1	1	60.219			
			C	0.131	2.844		1	1	60.219			
T14 100.00-80.00	625.08	9675.54	A	0.122	2.876	57	1	1	61.061	12604.51	630.23	C
			B	0.122	2.876		1	1	61.061			
			C	0.122	2.876		1	1	61.061			
T15 80.00-60.00	630.40	11450.50	A	0.127	2.857	57	1	1	70.248	13907.81	695.39	C
			B	0.127	2.857		1	1	70.248			
			C	0.127	2.857		1	1	70.248			
T16 60.00-30.00	945.60	15115.36	A	0.122	2.876	59	1	1	107.156	22039.49	734.65	C
			B	0.122	2.876		1	1	107.156			
			C	0.122	2.876		1	1	107.156			
T17 30.00-0.00	788.00	17941.94	A	0.117	2.896	65	1	1	110.505	23685.38	789.51	C
			B	0.117	2.896		1	1	110.505			
			C	0.117	2.896		1	1	110.505			
Sum Weight:	6658.09	125382.28						OTM	25542.37 kip-ft	189400.61		

**Tower Forces - No Ice - Wind 45 To Face**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 43 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	69	0.825	1	14.539	2369.39	148.09	C
			B	0.209	2.566		0.825	1	14.539			
			C	0.209	2.566		0.825	1	14.539			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	68	0.825	1	3.427	567.84	141.96	C
			B	0.201	2.592		0.825	1	3.427			
			C	0.201	2.592		0.825	1	3.427			
T3 300.00-280.00	40.00	2496.34	A	0.207	2.573	68	0.825	1	20.343	3469.43	173.47	C
			B	0.207	2.573		0.825	1	20.343			
			C	0.207	2.573		0.825	1	20.343			
T4 280.00-260.00	87.48	5067.66	A	0.237	2.476	67	0.825	1	42.458	6852.42	342.62	C
			B	0.237	2.476		0.825	1	42.458			
			C	0.237	2.476		0.825	1	42.458			
T5 260.00-240.00	122.62	5409.17	A	0.219	2.532	66	0.825	1	46.916	7856.34	392.82	C
			B	0.219	2.532		0.825	1	46.916			
			C	0.219	2.532		0.825	1	46.916			
T6 240.00-220.00	162.20	6484.36	A	0.223	2.52	64	0.825	1	55.194	9233.67	461.68	C
			B	0.223	2.52		0.825	1	55.194			
			C	0.223	2.52		0.825	1	55.194			
T7 220.00-200.00	362.40	6406.00	A	0.181	2.66	63	0.825	1	50.810	9843.96	492.20	C
			B	0.181	2.66		0.825	1	50.810			
			C	0.181	2.66		0.825	1	50.810			
T8 200.00-180.00	534.20	7298.65	A	0.187	2.641	62	0.825	1	59.273	11733.17	586.66	C
			B	0.187	2.641		0.825	1	59.273			
			C	0.187	2.641		0.825	1	59.273			
T9 180.00-170.00	272.46	3730.84	A	0.177	2.675	61	0.825	1	30.413	6002.24	600.22	C
			B	0.177	2.675		0.825	1	30.413			
			C	0.177	2.675		0.825	1	30.413			
T10 170.00-160.00	279.59	3785.29	A	0.171	2.694	60	0.825	1	30.931	6114.55	611.46	C
			B	0.171	2.694		0.825	1	30.931			
			C	0.171	2.694		0.825	1	30.931			
T11 160.00-140.00	579.39	9608.59	A	0.181	2.661	59	0.825	1	69.763	13189.24	659.46	C
			B	0.181	2.661		0.825	1	69.763			
			C	0.181	2.661		0.825	1	69.763			
T12 140.00-120.00	599.08	9975.29	A	0.173	2.69	58	0.825	1	72.384	13566.16	678.31	C
			B	0.173	2.69		0.825	1	72.384			
			C	0.173	2.69		0.825	1	72.384			
T13 120.00-100.00	609.33	9144.95	A	0.131	2.844	57	0.825	1	52.226	11218.90	560.95	C
			B	0.131	2.844		0.825	1	52.226			
			C	0.131	2.844		0.825	1	52.226			
T14 100.00-80.00	625.08	9675.54	A	0.122	2.876	57	0.825	1	53.069	11498.90	574.95	C
			B	0.122	2.876		0.825	1	53.069			
			C	0.122	2.876		0.825	1	53.069			
T15 80.00-60.00	630.40	11450.50	A	0.127	2.857	57	0.825	1	60.850	12612.70	630.63	C
			B	0.127	2.857		0.825	1	60.850			
			C	0.127	2.857		0.825	1	60.850			
T16 60.00-30.00	945.60	15115.36	A	0.122	2.876	59	0.825	1	93.064	20007.96	666.93	C
			B	0.122	2.876		0.825	1	93.064			
			C	0.122	2.876		0.825	1	93.064			
T17 30.00-0.00	788.00	17941.94	A	0.117	2.896	65	0.825	1	96.246	21408.56	713.62	C
			B	0.117	2.896		0.825	1	96.246			
			C	0.117	2.896		0.825	1	96.246			
Sum Weight:	6658.09	125382.28						OTM	22326.02 kip-ft	167545.42		

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	44 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

### Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	69	0.8	1	14.302	2333.81	145.86	C
			B	0.209	2.566		0.8	1	14.302			
			C	0.209	2.566		0.8	1	14.302			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	68	0.8	1	3.373	559.79	139.95	C
			B	0.201	2.592		0.8	1	3.373			
			C	0.201	2.592		0.8	1	3.373			
T3 300.00-280.00	40.00	2496.34	A	0.207	2.573	68	0.8	1	20.028	3422.91	171.15	C
			B	0.207	2.573		0.8	1	20.028			
			C	0.207	2.573		0.8	1	20.028			
T4 280.00-260.00	87.48	5067.66	A	0.237	2.476	67	0.8	1	41.171	6672.21	333.61	C
			B	0.237	2.476		0.8	1	41.171			
			C	0.237	2.476		0.8	1	41.171			
T5 260.00-240.00	122.62	5409.17	A	0.219	2.532	66	0.8	1	45.494	7655.90	382.79	C
			B	0.219	2.532		0.8	1	45.494			
			C	0.219	2.532		0.8	1	45.494			
T6 240.00-220.00	162.20	6484.36	A	0.223	2.52	64	0.8	1	53.521	9002.97	450.15	C
			B	0.223	2.52		0.8	1	53.521			
			C	0.223	2.52		0.8	1	53.521			
T7 220.00-200.00	362.40	6406.00	A	0.181	2.66	63	0.8	1	49.270	9623.88	481.19	C
			B	0.181	2.66		0.8	1	49.270			
			C	0.181	2.66		0.8	1	49.270			
T8 200.00-180.00	534.20	7298.65	A	0.187	2.641	62	0.8	1	57.477	11483.12	574.16	C
			B	0.187	2.641		0.8	1	57.477			
			C	0.187	2.641		0.8	1	57.477			
T9 180.00-170.00	272.46	3730.84	A	0.177	2.675	61	0.8	1	29.491	5874.29	587.43	C
			B	0.177	2.675		0.8	1	29.491			
			C	0.177	2.675		0.8	1	29.491			
T10 170.00-160.00	279.59	3785.29	A	0.171	2.694	60	0.8	1	29.994	5984.84	598.48	C
			B	0.171	2.694		0.8	1	29.994			
			C	0.171	2.694		0.8	1	29.994			
T11 160.00-140.00	579.39	9608.59	A	0.181	2.661	59	0.8	1	67.649	12904.91	645.25	C
			B	0.181	2.661		0.8	1	67.649			
			C	0.181	2.661		0.8	1	67.649			
T12 140.00-120.00	599.08	9975.29	A	0.173	2.69	58	0.8	1	70.190	13274.00	663.70	C
			B	0.173	2.69		0.8	1	70.190			
			C	0.173	2.69		0.8	1	70.190			
T13 120.00-100.00	609.33	9144.95	A	0.131	2.844	57	0.8	1	51.085	11060.95	553.05	C
			B	0.131	2.844		0.8	1	51.085			
			C	0.131	2.844		0.8	1	51.085			
T14 100.00-80.00	625.08	9675.54	A	0.122	2.876	57	0.8	1	51.928	11340.96	567.05	C
			B	0.122	2.876		0.8	1	51.928			
			C	0.122	2.876		0.8	1	51.928			
T15 80.00-60.00	630.40	11450.50	A	0.127	2.857	57	0.8	1	59.507	12427.68	621.38	C
			B	0.127	2.857		0.8	1	59.507			
			C	0.127	2.857		0.8	1	59.507			
T16 60.00-30.00	945.60	15115.36	A	0.122	2.876	59	0.8	1	91.051	19717.74	657.26	C
			B	0.122	2.876		0.8	1	91.051			
			C	0.122	2.876		0.8	1	91.051			
T17 30.00-0.00	788.00	17941.94	A	0.117	2.896	65	0.8	1	94.209	21083.30	702.78	C
			B	0.117	2.896		0.8	1	94.209			
			C	0.117	2.896		0.8	1	94.209			
Sum Weight:	6658.09	125382.28						OTM	21866.54 kip-ft	164423.25		

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 45 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

**Tower Forces - No Ice - Wind 90 To Face**

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	69	0.85	1	14.777	2404.96	150.31	C
			B	0.209	2.566		0.85	1	14.777			
			C	0.209	2.566		0.85	1	14.777			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	68	0.85	1	3.481	575.90	143.97	C
			B	0.201	2.592		0.85	1	3.481			
			C	0.201	2.592		0.85	1	3.481			
T3 300.00-280.00	40.00	2496.34	A	0.207	2.573	68	0.85	1	20.658	3515.94	175.80	C
			B	0.207	2.573		0.85	1	20.658			
			C	0.207	2.573		0.85	1	20.658			
T4 280.00-260.00	87.48	5067.66	A	0.237	2.476	67	0.85	1	43.745	7032.63	351.63	C
			B	0.237	2.476		0.85	1	43.745			
			C	0.237	2.476		0.85	1	43.745			
T5 260.00-240.00	122.62	5409.17	A	0.219	2.532	66	0.85	1	48.338	8056.78	402.84	C
			B	0.219	2.532		0.85	1	48.338			
			C	0.219	2.532		0.85	1	48.338			
T6 240.00-220.00	162.20	6484.36	A	0.223	2.52	64	0.85	1	56.866	9464.36	473.22	C
			B	0.223	2.52		0.85	1	56.866			
			C	0.223	2.52		0.85	1	56.866			
T7 220.00-200.00	362.40	6406.00	A	0.181	2.66	63	0.85	1	52.350	10064.03	503.20	C
			B	0.181	2.66		0.85	1	52.350			
			C	0.181	2.66		0.85	1	52.350			
T8 200.00-180.00	534.20	7298.65	A	0.187	2.641	62	0.85	1	61.069	11983.22	599.16	C
			B	0.187	2.641		0.85	1	61.069			
			C	0.187	2.641		0.85	1	61.069			
T9 180.00-170.00	272.46	3730.84	A	0.177	2.675	61	0.85	1	31.334	6130.19	613.02	C
			B	0.177	2.675		0.85	1	31.334			
			C	0.177	2.675		0.85	1	31.334			
T10 170.00-160.00	279.59	3785.29	A	0.171	2.694	60	0.85	1	31.869	6244.27	624.43	C
			B	0.171	2.694		0.85	1	31.869			
			C	0.171	2.694		0.85	1	31.869			
T11 160.00-140.00	579.39	9608.59	A	0.181	2.661	59	0.85	1	71.877	13473.58	673.68	C
			B	0.181	2.661		0.85	1	71.877			
			C	0.181	2.661		0.85	1	71.877			
T12 140.00-120.00	599.08	9975.29	A	0.173	2.69	58	0.85	1	74.577	13858.33	692.92	C
			B	0.173	2.69		0.85	1	74.577			
			C	0.173	2.69		0.85	1	74.577			
T13 120.00-100.00	609.33	9144.95	A	0.131	2.844	57	0.85	1	53.368	11376.86	568.84	C
			B	0.131	2.844		0.85	1	53.368			
			C	0.131	2.844		0.85	1	53.368			
T14 100.00-80.00	625.08	9675.54	A	0.122	2.876	57	0.85	1	54.211	11656.85	582.84	C
			B	0.122	2.876		0.85	1	54.211			
			C	0.122	2.876		0.85	1	54.211			
T15 80.00-60.00	630.40	11450.50	A	0.127	2.857	57	0.85	1	62.192	12797.71	639.89	C
			B	0.127	2.857		0.85	1	62.192			
			C	0.127	2.857		0.85	1	62.192			
T16 60.00-30.00	945.60	15115.36	A	0.122	2.876	59	0.85	1	95.078	20298.18	676.61	C
			B	0.122	2.876		0.85	1	95.078			
			C	0.122	2.876		0.85	1	95.078			
T17 30.00-0.00	788.00	17941.94	A	0.117	2.896	65	0.85	1	98.283	21733.82	724.46	C
			B	0.117	2.896		0.85	1	98.283			
			C	0.117	2.896		0.85	1	98.283			
Sum Weight:	6658.09	125382.28						OTM	22785.50 kip-ft	170667.59		

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	46 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

### Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1	261.85	3479.11	A	0.397	2.071	9	1	1	33.738	619.55	38.72	C
320.00-304.00			B	0.397	2.071		1	1	33.738			
			C	0.397	2.071		1	1	33.738			
T2	71.62	821.79	A	0.376	2.114	9	1	1	7.871	150.08	37.52	C
304.00-300.00			B	0.376	2.114		1	1	7.871			
			C	0.376	2.114		1	1	7.871			
T3	592.40	5152.34	A	0.361	2.146	9	1	1	43.405	901.03	45.05	C
300.00-280.00			B	0.361	2.146		1	1	43.405			
			C	0.361	2.146		1	1	43.405			
T4	1098.70	9553.22	A	0.331	2.217	8	1	1	67.242	1465.24	73.26	C
280.00-260.00			B	0.331	2.217		1	1	67.242			
			C	0.331	2.217		1	1	67.242			
T5	1465.07	10434.30	A	0.307	2.277	8	1	1	73.915	1701.59	85.08	C
260.00-240.00			B	0.307	2.277		1	1	73.915			
			C	0.307	2.277		1	1	73.915			
T6	1898.59	12452.94	A	0.307	2.277	8	1	1	85.350	2002.42	100.12	C
240.00-220.00			B	0.307	2.277		1	1	85.350			
			C	0.307	2.277		1	1	85.350			
T7	3016.37	11683.11	A	0.245	2.454	8	1	1	77.376	2286.43	114.32	C
220.00-200.00			B	0.245	2.454		1	1	77.376			
			C	0.245	2.454		1	1	77.376			
T8	4081.67	13202.41	A	0.246	2.449	8	1	1	88.454	2763.75	138.19	C
200.00-180.00			B	0.246	2.449		1	1	88.454			
			C	0.246	2.449		1	1	88.454			
T9	2112.84	6756.36	A	0.235	2.484	8	1	1	45.455	1420.22	142.02	C
180.00-170.00			B	0.235	2.484		1	1	45.455			
			C	0.235	2.484		1	1	45.455			
T10	2205.64	6858.43	A	0.228	2.504	8	1	1	46.272	1460.30	146.03	C
170.00-160.00			B	0.228	2.504		1	1	46.272			
			C	0.228	2.504		1	1	46.272			
T11	4581.87	16563.91	A	0.236	2.479	8	1	1	102.718	3088.60	154.43	C
160.00-140.00			B	0.236	2.479		1	1	102.718			
			C	0.236	2.479		1	1	102.718			
T12	4759.58	17156.52	A	0.226	2.51	7	1	1	106.625	3177.75	158.89	C
140.00-120.00			B	0.226	2.51		1	1	106.625			
			C	0.226	2.51		1	1	106.625			
T13	4836.64	15024.43	A	0.181	2.661	7	1	1	80.012	2819.23	140.96	C
120.00-100.00			B	0.181	2.661		1	1	80.012			
			C	0.181	2.661		1	1	80.012			
T14	4985.09	15674.17	A	0.17	2.698	7	1	1	81.435	2890.06	144.50	C
100.00-80.00			B	0.17	2.698		1	1	81.435			
			C	0.17	2.698		1	1	81.435			
T15	5030.92	18017.30	A	0.173	2.689	7	1	1	91.299	3077.90	153.90	C
80.00-60.00			B	0.173	2.689		1	1	91.299			
			C	0.173	2.689		1	1	91.299			
T16	7561.96	25360.00	A	0.165	2.717	8	1	1	141.153	4898.66	163.29	C
60.00-30.00			B	0.165	2.717		1	1	141.153			
			C	0.165	2.717		1	1	141.153			
T17	6329.02	28872.58	A	0.158	2.743	8	1	1	147.426	5088.95	169.63	C
30.00-0.00			B	0.158	2.743		1	1	147.426			
			C	0.158	2.743		1	1	147.426			
Sum Weight:	54889.82	217062.94						OTM	5235.09 kip-ft	39811.78		

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	47 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

### Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	261.85	3479.11	A	0.397	2.071	9	0.825	1	32.074	593.92	37.12	C
			B	0.397	2.071		0.825		32.074			
			C	0.397	2.071		0.825		32.074			
T2 304.00-300.00	71.62	821.79	A	0.376	2.114	9	0.825	1	7.495	144.22	36.05	C
			B	0.376	2.114		0.825		7.495			
			C	0.376	2.114		0.825		7.495			
T3 300.00-280.00	592.40	5152.34	A	0.361	2.146	9	0.825	1	41.201	866.38	43.32	C
			B	0.361	2.146		0.825		41.201			
			C	0.361	2.146		0.825		41.201			
T4 280.00-260.00	1098.70	9553.22	A	0.331	2.217	8	0.825	1	57.130	1303.47	65.17	C
			B	0.331	2.217		0.825		57.130			
			C	0.331	2.217		0.825		57.130			
T5 260.00-240.00	1465.07	10434.30	A	0.307	2.277	8	0.825	1	62.866	1522.94	76.15	C
			B	0.307	2.277		0.825		62.866			
			C	0.307	2.277		0.825		62.866			
T6 240.00-220.00	1898.59	12452.94	A	0.307	2.277	8	0.825	1	72.554	1799.00	89.95	C
			B	0.307	2.277		0.825		72.554			
			C	0.307	2.277		0.825		72.554			
T7 220.00-200.00	3016.37	11683.11	A	0.245	2.454	8	0.825	1	65.519	2087.01	104.35	C
			B	0.245	2.454		0.825		65.519			
			C	0.245	2.454		0.825		65.519			
T8 200.00-180.00	4081.67	13202.41	A	0.246	2.449	8	0.825	1	74.812	2539.17	126.96	C
			B	0.246	2.449		0.825		74.812			
			C	0.246	2.449		0.825		74.812			
T9 180.00-170.00	2112.84	6756.36	A	0.235	2.484	8	0.825	1	38.473	1305.41	130.54	C
			B	0.235	2.484		0.825		38.473			
			C	0.235	2.484		0.825		38.473			
T10 170.00-160.00	2205.64	6858.43	A	0.228	2.504	8	0.825	1	39.183	1344.00	134.40	C
			B	0.228	2.504		0.825		39.183			
			C	0.228	2.504		0.825		39.183			
T11 160.00-140.00	4581.87	16563.91	A	0.236	2.479	8	0.825	1	86.873	2835.33	141.77	C
			B	0.236	2.479		0.825		86.873			
			C	0.236	2.479		0.825		86.873			
T12 140.00-120.00	4759.58	17156.52	A	0.226	2.51	7	0.825	1	90.235	2917.89	145.89	C
			B	0.226	2.51		0.825		90.235			
			C	0.226	2.51		0.825		90.235			
T13 120.00-100.00	4836.64	15024.43	A	0.181	2.661	7	0.825	1	70.994	2670.36	133.52	C
			B	0.181	2.661		0.825		70.994			
			C	0.181	2.661		0.825		70.994			
T14 100.00-80.00	4985.09	15674.17	A	0.17	2.698	7	0.825	1	72.428	2740.95	137.05	C
			B	0.17	2.698		0.825		72.428			
			C	0.17	2.698		0.825		72.428			
T15 80.00-60.00	5030.92	18017.30	A	0.173	2.689	7	0.825	1	80.890	2905.71	145.29	C
			B	0.173	2.689		0.825		80.890			
			C	0.173	2.689		0.825		80.890			
T16 60.00-30.00	7561.96	25360.00	A	0.165	2.717	8	0.825	1	125.544	4627.43	154.25	C
			B	0.165	2.717		0.825		125.544			
			C	0.165	2.717		0.825		125.544			
T17 30.00-0.00	6329.02	28872.58	A	0.158	2.743	8	0.825	1	131.643	4784.58	159.49	C
			B	0.158	2.743		0.825		131.643			
			C	0.158	2.743		0.825		131.643			
Sum Weight:	54889.82	217062.94						OTM	4825.92 kip-ft	36987.74		



<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 48 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

### Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	261.85	3479.11	A	0.397	2.071	9	0.8	1	31.836	590.25	36.89	C
			B	0.397	2.071		0.8	1	31.836			
			C	0.397	2.071		0.8	1	31.836			
T2 304.00-300.00	71.62	821.79	A	0.376	2.114	9	0.8	1	7.441	143.38	35.84	C
			B	0.376	2.114		0.8	1	7.441			
			C	0.376	2.114		0.8	1	7.441			
T3 300.00-280.00	592.40	5152.34	A	0.361	2.146	9	0.8	1	40.886	861.43	43.07	C
			B	0.361	2.146		0.8	1	40.886			
			C	0.361	2.146		0.8	1	40.886			
T4 280.00-260.00	1098.70	9553.22	A	0.331	2.217	8	0.8	1	55.686	1280.36	64.02	C
			B	0.331	2.217		0.8	1	55.686			
			C	0.331	2.217		0.8	1	55.686			
T5 260.00-240.00	1465.07	10434.30	A	0.307	2.277	8	0.8	1	61.287	1497.42	74.87	C
			B	0.307	2.277		0.8	1	61.287			
			C	0.307	2.277		0.8	1	61.287			
T6 240.00-220.00	1898.59	12452.94	A	0.307	2.277	8	0.8	1	70.726	1769.94	88.50	C
			B	0.307	2.277		0.8	1	70.726			
			C	0.307	2.277		0.8	1	70.726			
T7 220.00-200.00	3016.37	11683.11	A	0.245	2.454	8	0.8	1	63.825	2058.52	102.93	C
			B	0.245	2.454		0.8	1	63.825			
			C	0.245	2.454		0.8	1	63.825			
T8 200.00-180.00	4081.67	13202.41	A	0.246	2.449	8	0.8	1	72.863	2507.09	125.35	C
			B	0.246	2.449		0.8	1	72.863			
			C	0.246	2.449		0.8	1	72.863			
T9 180.00-170.00	2112.84	6756.36	A	0.235	2.484	8	0.8	1	37.476	1289.01	128.90	C
			B	0.235	2.484		0.8	1	37.476			
			C	0.235	2.484		0.8	1	37.476			
T10 170.00-160.00	2205.64	6858.43	A	0.228	2.504	8	0.8	1	38.171	1327.38	132.74	C
			B	0.228	2.504		0.8	1	38.171			
			C	0.228	2.504		0.8	1	38.171			
T11 160.00-140.00	4581.87	16563.91	A	0.236	2.479	8	0.8	1	84.609	2799.14	139.96	C
			B	0.236	2.479		0.8	1	84.609			
			C	0.236	2.479		0.8	1	84.609			
T12 140.00-120.00	4759.58	17156.52	A	0.226	2.51	7	0.8	1	87.894	2880.76	144.04	C
			B	0.226	2.51		0.8	1	87.894			
			C	0.226	2.51		0.8	1	87.894			
T13 120.00-100.00	4836.64	15024.43	A	0.181	2.661	7	0.8	1	69.705	2649.09	132.45	C
			B	0.181	2.661		0.8	1	69.705			
			C	0.181	2.661		0.8	1	69.705			
T14 100.00-80.00	4985.09	15674.17	A	0.17	2.698	7	0.8	1	71.141	2719.65	135.98	C
			B	0.17	2.698		0.8	1	71.141			
			C	0.17	2.698		0.8	1	71.141			
T15 80.00-60.00	5030.92	18017.30	A	0.173	2.689	7	0.8	1	79.403	2881.11	144.06	C
			B	0.173	2.689		0.8	1	79.403			
			C	0.173	2.689		0.8	1	79.403			
T16 60.00-30.00	7561.96	25360.00	A	0.165	2.717	8	0.8	1	123.314	4588.69	152.96	C
			B	0.165	2.717		0.8	1	123.314			
			C	0.165	2.717		0.8	1	123.314			
T17 30.00-0.00	6329.02	28872.58	A	0.158	2.743	8	0.8	1	129.388	4741.10	158.04	C
			B	0.158	2.743		0.8	1	129.388			
			C	0.158	2.743		0.8	1	129.388			
Sum Weight:	54889.82	217062.94						OTM	4767.46	36584.30		

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 49 of 95
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 12:07:36 05/18/20
	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
ft	lb	lb							kip-ft			

### Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	261.85	3479.11	A	0.397	2.071	9	0.85	1	32.312	597.58	37.35	C
			B	0.397	2.071		0.85	1	32.312			
			C	0.397	2.071		0.85	1	32.312			
T2 304.00-300.00	71.62	821.79	A	0.376	2.114	9	0.85	1	7.549	145.05	36.26	C
			B	0.376	2.114		0.85	1	7.549			
			C	0.376	2.114		0.85	1	7.549			
T3 300.00-280.00	592.40	5152.34	A	0.361	2.146	9	0.85	1	41.516	871.33	43.57	C
			B	0.361	2.146		0.85	1	41.516			
			C	0.361	2.146		0.85	1	41.516			
T4 280.00-260.00	1098.70	9553.22	A	0.331	2.217	8	0.85	1	58.575	1326.58	66.33	C
			B	0.331	2.217		0.85	1	58.575			
			C	0.331	2.217		0.85	1	58.575			
T5 260.00-240.00	1465.07	10434.30	A	0.307	2.277	8	0.85	1	64.444	1548.46	77.42	C
			B	0.307	2.277		0.85	1	64.444			
			C	0.307	2.277		0.85	1	64.444			
T6 240.00-220.00	1898.59	12452.94	A	0.307	2.277	8	0.85	1	74.382	1828.06	91.40	C
			B	0.307	2.277		0.85	1	74.382			
			C	0.307	2.277		0.85	1	74.382			
T7 220.00-200.00	3016.37	11683.11	A	0.245	2.454	8	0.85	1	67.213	2115.49	105.77	C
			B	0.245	2.454		0.85	1	67.213			
			C	0.245	2.454		0.85	1	67.213			
T8 200.00-180.00	4081.67	13202.41	A	0.246	2.449	8	0.85	1	76.761	2571.25	128.56	C
			B	0.246	2.449		0.85	1	76.761			
			C	0.246	2.449		0.85	1	76.761			
T9 180.00-170.00	2112.84	6756.36	A	0.235	2.484	8	0.85	1	39.471	1321.81	132.18	C
			B	0.235	2.484		0.85	1	39.471			
			C	0.235	2.484		0.85	1	39.471			
T10 170.00-160.00	2205.64	6858.43	A	0.228	2.504	8	0.85	1	40.196	1360.61	136.06	C
			B	0.228	2.504		0.85	1	40.196			
			C	0.228	2.504		0.85	1	40.196			
T11 160.00-140.00	4581.87	16563.91	A	0.236	2.479	8	0.85	1	89.136	2871.51	143.58	C
			B	0.236	2.479		0.85	1	89.136			
			C	0.236	2.479		0.85	1	89.136			
T12 140.00-120.00	4759.58	17156.52	A	0.226	2.51	7	0.85	1	92.577	2955.01	147.75	C
			B	0.226	2.51		0.85	1	92.577			
			C	0.226	2.51		0.85	1	92.577			
T13 120.00-100.00	4836.64	15024.43	A	0.181	2.661	7	0.85	1	72.282	2691.62	134.58	C
			B	0.181	2.661		0.85	1	72.282			
			C	0.181	2.661		0.85	1	72.282			
T14 100.00-80.00	4985.09	15674.17	A	0.17	2.698	7	0.85	1	73.715	2762.25	138.11	C
			B	0.17	2.698		0.85	1	73.715			
			C	0.17	2.698		0.85	1	73.715			
T15 80.00-60.00	5030.92	18017.30	A	0.173	2.689	7	0.85	1	82.377	2930.31	146.52	C
			B	0.173	2.689		0.85	1	82.377			
			C	0.173	2.689		0.85	1	82.377			
T16	7561.96	25360.00	A	0.165	2.717	8	0.85	1	127.774	4666.18	155.54	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	50 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
60.00-30.00			B	0.165	2.717		0.85	1	127.774			
			C	0.165	2.717		0.85	1	127.774			
T17	6329.02	28872.58	A	0.158	2.743	8	0.85	1	133.898	4828.06	160.94	C
30.00-0.00			B	0.158	2.743		0.85	1	133.898			
			C	0.158	2.743		0.85	1	133.898			
Sum Weight:	54889.82	217062.94						OTM	4884.37 kip-ft	37391.17		

### Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1	15.90	1442.07	A	0.209	2.566	13	1	1	16.204	480.93	30.06	C
320.00-304.00			B	0.209	2.566		1	1	16.204			
			C	0.209	2.566		1	1	16.204			
T2	4.36	349.72	A	0.201	2.592	13	1	1	3.803	114.65	28.66	C
304.00-300.00			B	0.201	2.592		1	1	3.803			
			C	0.201	2.592		1	1	3.803			
T3	40.00	2496.34	A	0.207	2.573	12	1	1	22.547	697.05	34.85	C
300.00-280.00			B	0.207	2.573		1	1	22.547			
			C	0.207	2.573		1	1	22.547			
T4	87.48	5067.66	A	0.237	2.476	12	1	1	51.464	1490.31	74.52	C
280.00-260.00			B	0.237	2.476		1	1	51.464			
			C	0.237	2.476		1	1	51.464			
T5	122.62	5409.17	A	0.219	2.532	12	1	1	56.868	1700.71	85.04	C
260.00-240.00			B	0.219	2.532		1	1	56.868			
			C	0.219	2.532		1	1	56.868			
T6	162.20	6484.36	A	0.223	2.52	12	1	1	66.901	1992.59	99.63	C
240.00-220.00			B	0.223	2.52		1	1	66.901			
			C	0.223	2.52		1	1	66.901			
T7	362.40	6406.00	A	0.181	2.66	12	1	1	61.588	2091.03	104.55	C
220.00-200.00			B	0.181	2.66		1	1	61.588			
			C	0.181	2.66		1	1	61.588			
T8	534.20	7298.65	A	0.187	2.641	11	1	1	71.846	2476.56	123.83	C
200.00-180.00			B	0.187	2.641		1	1	71.846			
			C	0.187	2.641		1	1	71.846			
T9	272.46	3730.84	A	0.177	2.675	11	1	1	36.864	1266.96	126.70	C
180.00-170.00			B	0.177	2.675		1	1	36.864			
			C	0.177	2.675		1	1	36.864			
T10	279.59	3785.29	A	0.171	2.694	11	1	1	37.492	1289.86	128.99	C
170.00-160.00			B	0.171	2.694		1	1	37.492			
			C	0.171	2.694		1	1	37.492			
T11	579.39	9608.59	A	0.181	2.661	11	1	1	84.562	2788.09	139.40	C
160.00-140.00			B	0.181	2.661		1	1	84.562			
			C	0.181	2.661		1	1	84.562			
T12	599.08	9975.29	A	0.173	2.69	11	1	1	87.738	2867.38	143.37	C
140.00-120.00			B	0.173	2.69		1	1	87.738			
			C	0.173	2.69		1	1	87.738			
T13	609.33	9144.95	A	0.131	2.844	11	1	1	60.219	2263.70	113.19	C
120.00-100.00			B	0.131	2.844		1	1	60.219			
			C	0.131	2.844		1	1	60.219			
T14	625.08	9675.54	A	0.122	2.876	10	1	1	61.061	2315.11	115.76	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	51 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
100.00-80.00			B	0.122	2.876		1	1	61.061			
			C	0.122	2.876		1	1	61.061			
T15	630.40	11450.50	A	0.127	2.857	10	1	1	70.248	2554.50	127.72	C
80.00-60.00			B	0.127	2.857		1	1	70.248			
			C	0.127	2.857		1	1	70.248			
T16	945.60	15115.36	A	0.122	2.876	11	1	1	107.156	4048.07	134.94	C
60.00-30.00			B	0.122	2.876		1	1	107.156			
			C	0.122	2.876		1	1	107.156			
T17	788.00	17941.94	A	0.117	2.896	12	1	1	110.505	4350.38	145.01	C
30.00-0.00			B	0.117	2.896		1	1	110.505			
			C	0.117	2.896		1	1	110.505			
Sum Weight:	6658.09	125382.28						OTM	4691.46 kip-ft	34787.87		

### Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1	15.90	1442.07	A	0.209	2.566	13	0.825	1	14.539	435.19	27.20	C
320.00-304.00			B	0.209	2.566		0.825	1	14.539			
			C	0.209	2.566		0.825	1	14.539			
T2	4.36	349.72	A	0.201	2.592	13	0.825	1	3.427	104.30	26.07	C
304.00-300.00			B	0.201	2.592		0.825	1	3.427			
			C	0.201	2.592		0.825	1	3.427			
T3	40.00	2496.34	A	0.207	2.573	12	0.825	1	20.343	637.24	31.86	C
300.00-280.00			B	0.207	2.573		0.825	1	20.343			
			C	0.207	2.573		0.825	1	20.343			
T4	87.48	5067.66	A	0.237	2.476	12	0.825	1	42.458	1258.61	62.93	C
280.00-260.00			B	0.237	2.476		0.825	1	42.458			
			C	0.237	2.476		0.825	1	42.458			
T5	122.62	5409.17	A	0.219	2.532	12	0.825	1	46.916	1443.00	72.15	C
260.00-240.00			B	0.219	2.532		0.825	1	46.916			
			C	0.219	2.532		0.825	1	46.916			
T6	162.20	6484.36	A	0.223	2.52	12	0.825	1	55.194	1695.98	84.80	C
240.00-220.00			B	0.223	2.52		0.825	1	55.194			
			C	0.223	2.52		0.825	1	55.194			
T7	362.40	6406.00	A	0.181	2.66	12	0.825	1	50.810	1808.07	90.40	C
220.00-200.00			B	0.181	2.66		0.825	1	50.810			
			C	0.181	2.66		0.825	1	50.810			
T8	534.20	7298.65	A	0.187	2.641	11	0.825	1	59.273	2155.07	107.75	C
200.00-180.00			B	0.187	2.641		0.825	1	59.273			
			C	0.187	2.641		0.825	1	59.273			
T9	272.46	3730.84	A	0.177	2.675	11	0.825	1	30.413	1102.45	110.25	C
180.00-170.00			B	0.177	2.675		0.825	1	30.413			
			C	0.177	2.675		0.825	1	30.413			
T10	279.59	3785.29	A	0.171	2.694	11	0.825	1	30.931	1123.08	112.31	C
170.00-160.00			B	0.171	2.694		0.825	1	30.931			
			C	0.171	2.694		0.825	1	30.931			
T11	579.39	9608.59	A	0.181	2.661	11	0.825	1	69.763	2422.51	121.13	C
160.00-140.00			B	0.181	2.661		0.825	1	69.763			
			C	0.181	2.661		0.825	1	69.763			
T12	599.08	9975.29	A	0.173	2.69	11	0.825	1	72.384	2491.74	124.59	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	52 of 95
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	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
140.00-120.00			B	0.173	2.69		0.825	1	72.384			
			C	0.173	2.69		0.825	1	72.384			
T13	609.33	9144.95	A	0.131	2.844	11	0.825	1	52.226	2060.61	103.03	C
120.00-100.00			B	0.131	2.844		0.825	1	52.226			
			C	0.131	2.844		0.825	1	52.226			
T14	625.08	9675.54	A	0.122	2.876	10	0.825	1	53.069	2112.04	105.60	C
100.00-80.00			B	0.122	2.876		0.825	1	53.069			
			C	0.122	2.876		0.825	1	53.069			
T15	630.40	11450.50	A	0.127	2.857	10	0.825	1	60.850	2316.62	115.83	C
80.00-60.00			B	0.127	2.857		0.825	1	60.850			
			C	0.127	2.857		0.825	1	60.850			
T16	945.60	15115.36	A	0.122	2.876	11	0.825	1	93.064	3674.93	122.50	C
60.00-30.00			B	0.122	2.876		0.825	1	93.064			
			C	0.122	2.876		0.825	1	93.064			
T17	788.00	17941.94	A	0.117	2.896	12	0.825	1	96.246	3932.18	131.07	C
30.00-0.00			B	0.117	2.896		0.825	1	96.246			
			C	0.117	2.896		0.825	1	96.246			
Sum Weight:	6658.09	125382.28						OTM	4100.70 kip-ft	30773.65		

### Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
T1	15.90	1442.07	A	0.209	2.566	13	0.8	1	14.302	428.66	26.79	C
320.00-304.00			B	0.209	2.566		0.8	1	14.302			
			C	0.209	2.566		0.8	1	14.302			
T2	4.36	349.72	A	0.201	2.592	13	0.8	1	3.373	102.82	25.70	C
304.00-300.00			B	0.201	2.592		0.8	1	3.373			
			C	0.201	2.592		0.8	1	3.373			
T3	40.00	2496.34	A	0.207	2.573	12	0.8	1	20.028	628.70	31.43	C
300.00-280.00			B	0.207	2.573		0.8	1	20.028			
			C	0.207	2.573		0.8	1	20.028			
T4	87.48	5067.66	A	0.237	2.476	12	0.8	1	41.171	1225.51	61.28	C
280.00-260.00			B	0.237	2.476		0.8	1	41.171			
			C	0.237	2.476		0.8	1	41.171			
T5	122.62	5409.17	A	0.219	2.532	12	0.8	1	45.494	1406.19	70.31	C
260.00-240.00			B	0.219	2.532		0.8	1	45.494			
			C	0.219	2.532		0.8	1	45.494			
T6	162.20	6484.36	A	0.223	2.52	12	0.8	1	53.521	1653.61	82.68	C
240.00-220.00			B	0.223	2.52		0.8	1	53.521			
			C	0.223	2.52		0.8	1	53.521			
T7	362.40	6406.00	A	0.181	2.66	12	0.8	1	49.270	1767.65	88.38	C
220.00-200.00			B	0.181	2.66		0.8	1	49.270			
			C	0.181	2.66		0.8	1	49.270			
T8	534.20	7298.65	A	0.187	2.641	11	0.8	1	57.477	2109.14	105.46	C
200.00-180.00			B	0.187	2.641		0.8	1	57.477			
			C	0.187	2.641		0.8	1	57.477			
T9	272.46	3730.84	A	0.177	2.675	11	0.8	1	29.491	1078.95	107.90	C
180.00-170.00			B	0.177	2.675		0.8	1	29.491			
			C	0.177	2.675		0.8	1	29.491			
T10	279.59	3785.29	A	0.171	2.694	11	0.8	1	29.994	1099.26	109.93	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	53 of 95
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	12:07:36 05/18/20
	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
170.00-160.00			B	0.171	2.694		0.8	1	29.994			
			C	0.171	2.694		0.8	1	29.994			
T11	579.39	9608.59	A	0.181	2.661	11	0.8	1	67.649	2370.29	118.51	C
160.00-140.00			B	0.181	2.661		0.8	1	67.649			
			C	0.181	2.661		0.8	1	67.649			
T12	599.08	9975.29	A	0.173	2.69	11	0.8	1	70.190	2438.08	121.90	C
140.00-120.00			B	0.173	2.69		0.8	1	70.190			
			C	0.173	2.69		0.8	1	70.190			
T13	609.33	9144.95	A	0.131	2.844	11	0.8	1	51.085	2031.60	101.58	C
120.00-100.00			B	0.131	2.844		0.8	1	51.085			
			C	0.131	2.844		0.8	1	51.085			
T14	625.08	9675.54	A	0.122	2.876	10	0.8	1	51.928	2083.03	104.15	C
100.00-80.00			B	0.122	2.876		0.8	1	51.928			
			C	0.122	2.876		0.8	1	51.928			
T15	630.40	11450.50	A	0.127	2.857	10	0.8	1	59.507	2282.64	114.13	C
80.00-60.00			B	0.127	2.857		0.8	1	59.507			
			C	0.127	2.857		0.8	1	59.507			
T16	945.60	15115.36	A	0.122	2.876	11	0.8	1	91.051	3621.63	120.72	C
60.00-30.00			B	0.122	2.876		0.8	1	91.051			
			C	0.122	2.876		0.8	1	91.051			
T17	788.00	17941.94	A	0.117	2.896	12	0.8	1	94.209	3872.44	129.08	C
30.00-0.00			B	0.117	2.896		0.8	1	94.209			
			C	0.117	2.896		0.8	1	94.209			
Sum Weight:	6658.09	125382.28						OTM	4016.30 kip-ft	30200.19		

### Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	q <sub>z</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb				psf			ft <sup>2</sup>	lb	plf	
T1	15.90	1442.07	A	0.209	2.566	13	0.85	1	14.777	441.73	27.61	C
320.00-304.00			B	0.209	2.566		0.85	1	14.777			
			C	0.209	2.566		0.85	1	14.777			
T2	4.36	349.72	A	0.201	2.592	13	0.85	1	3.481	105.78	26.44	C
304.00-300.00			B	0.201	2.592		0.85	1	3.481			
			C	0.201	2.592		0.85	1	3.481			
T3	40.00	2496.34	A	0.207	2.573	12	0.85	1	20.658	645.78	32.29	C
300.00-280.00			B	0.207	2.573		0.85	1	20.658			
			C	0.207	2.573		0.85	1	20.658			
T4	87.48	5067.66	A	0.237	2.476	12	0.85	1	43.745	1291.71	64.59	C
280.00-260.00			B	0.237	2.476		0.85	1	43.745			
			C	0.237	2.476		0.85	1	43.745			
T5	122.62	5409.17	A	0.219	2.532	12	0.85	1	48.338	1479.82	73.99	C
260.00-240.00			B	0.219	2.532		0.85	1	48.338			
			C	0.219	2.532		0.85	1	48.338			
T6	162.20	6484.36	A	0.223	2.52	12	0.85	1	56.866	1738.35	86.92	C
240.00-220.00			B	0.223	2.52		0.85	1	56.866			
			C	0.223	2.52		0.85	1	56.866			
T7	362.40	6406.00	A	0.181	2.66	12	0.85	1	52.350	1848.50	92.42	C
220.00-200.00			B	0.181	2.66		0.85	1	52.350			
			C	0.181	2.66		0.85	1	52.350			
T8	534.20	7298.65	A	0.187	2.641	11	0.85	1	61.069	2201.00	110.05	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 54 of 95
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Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C <sub>F</sub>	q <sub>z</sub> psf	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
200.00-180.00			B	0.187	2.641		0.85	1	61.069			
			C	0.187	2.641		0.85	1	61.069			
T9	272.46	3730.84	A	0.177	2.675	11	0.85	1	31.334	1125.95	112.60	C
180.00-170.00			B	0.177	2.675		0.85	1	31.334			
			C	0.177	2.675		0.85	1	31.334			
T10	279.59	3785.29	A	0.171	2.694	11	0.85	1	31.869	1146.91	114.69	C
170.00-160.00			B	0.171	2.694		0.85	1	31.869			
			C	0.171	2.694		0.85	1	31.869			
T11	579.39	9608.59	A	0.181	2.661	11	0.85	1	71.877	2474.74	123.74	C
160.00-140.00			B	0.181	2.661		0.85	1	71.877			
			C	0.181	2.661		0.85	1	71.877			
T12	599.08	9975.29	A	0.173	2.69	11	0.85	1	74.577	2545.41	127.27	C
140.00-120.00			B	0.173	2.69		0.85	1	74.577			
			C	0.173	2.69		0.85	1	74.577			
T13	609.33	9144.95	A	0.131	2.844	11	0.85	1	53.368	2089.63	104.48	C
120.00-100.00			B	0.131	2.844		0.85	1	53.368			
			C	0.131	2.844		0.85	1	53.368			
T14	625.08	9675.54	A	0.122	2.876	10	0.85	1	54.211	2141.05	107.05	C
100.00-80.00			B	0.122	2.876		0.85	1	54.211			
			C	0.122	2.876		0.85	1	54.211			
T15	630.40	11450.50	A	0.127	2.857	10	0.85	1	62.192	2350.60	117.53	C
80.00-60.00			B	0.127	2.857		0.85	1	62.192			
			C	0.127	2.857		0.85	1	62.192			
T16	945.60	15115.36	A	0.122	2.876	11	0.85	1	95.078	3728.24	124.27	C
60.00-30.00			B	0.122	2.876		0.85	1	95.078			
			C	0.122	2.876		0.85	1	95.078			
T17	788.00	17941.94	A	0.117	2.896	12	0.85	1	98.283	3991.93	133.06	C
30.00-0.00			B	0.117	2.896		0.85	1	98.283			
			C	0.117	2.896		0.85	1	98.283			
Sum Weight:	6658.09	125382.28						OTM	4185.09 kip-ft	31347.11		

### Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M <sub>x</sub> kip-ft	Sum of Overturning Moments, M <sub>z</sub> kip-ft	Sum of Torques kip-ft
Leg Weight	73044.53					
Bracing Weight	52337.75					
Total Member Self-Weight	125382.28			41.10	-24.20	
Total Weight	140969.55			41.10	-24.20	
Wind 0 deg - No Ice		0.00	-219580.39	-31754.83	-24.20	302.27
Wind 30 deg - No Ice		100423.68	-173938.92	-25107.46	-14543.73	379.42
Wind 45 deg - No Ice		139812.83	-139812.83	-20167.72	-20233.01	380.12
Wind 60 deg - No Ice		168531.16	-97301.51	-14018.95	-24376.92	354.91
Wind 90 deg - No Ice		200847.37	0.00	41.10	-29063.25	235.30
Wind 120 deg - No Ice		190162.19	109790.19	15939.06	-27560.28	52.65
Wind 135 deg - No Ice		148643.66	148643.66	21549.52	-21532.61	-47.35
Wind 150 deg - No Ice		100423.68	173938.92	25189.66	-14543.73	-144.12
Wind 180 deg - No Ice		0.00	194603.03	28161.20	-24.20	-302.27
Wind 210 deg - No Ice		-100423.68	173938.92	25189.66	14495.33	-379.42
Wind 225 deg - No Ice		-139812.83	139812.83	20249.92	20184.62	-380.12
Wind 240 deg - No Ice		-190162.19	109790.19	15939.06	27511.88	-354.91

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSMW	<b>Page</b> 55 of 95
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	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Wind 270 deg - No Ice		-200847.37	0.00	41.10	29014.86	-235.30
Wind 300 deg - No Ice		-168531.16	-97301.51	-14018.95	24328.53	-52.65
Wind 315 deg - No Ice		-139812.83	-139812.83	-20167.72	20184.62	47.35
Wind 330 deg - No Ice		-100423.68	-173938.92	-25107.46	14495.33	144.12
Member Ice	91680.66					
Total Weight Ice	296443.88			303.26	-322.75	
Wind 0 deg - Ice		0.00	-45928.95	-6228.73	-322.75	118.70
Wind 30 deg - Ice		21754.17	-37679.33	-5049.88	-3413.38	150.09
Wind 45 deg - Ice		30479.77	-30479.77	-4026.23	-4652.23	150.82
Wind 60 deg - Ice		36980.56	-21350.73	-2728.92	-5574.64	141.27
Wind 90 deg - Ice		43508.34	0.00	303.26	-6504.02	94.59
Wind 120 deg - Ice		39775.63	22964.47	3569.25	-5979.62	22.57
Wind 135 deg - Ice		31620.85	31620.85	4798.08	-4817.56	-17.04
Wind 150 deg - Ice		21754.17	37679.33	5656.40	-3413.38	-55.50
Wind 180 deg - Ice		0.00	42701.47	6367.62	-322.75	-118.70
Wind 210 deg - Ice		-21754.17	37679.33	5656.40	2767.89	-150.09
Wind 225 deg - Ice		-30479.77	30479.77	4632.74	4006.74	-150.82
Wind 240 deg - Ice		-39775.63	22964.47	3569.25	5334.12	-141.27
Wind 270 deg - Ice		-43508.34	0.00	303.26	5858.52	-94.59
Wind 300 deg - Ice		-36980.56	-21350.73	-2728.92	4929.15	-22.57
Wind 315 deg - Ice		-30479.77	-30479.77	-4026.23	4006.74	17.04
Wind 330 deg - Ice		-21754.17	-37679.33	-5049.88	2767.89	55.50
Total Weight	140969.55			41.10	-24.20	
Wind 0 deg - Service		0.00	-40331.09	-5837.99	10.85	55.52
Wind 30 deg - Service		18445.17	-31947.97	-4617.04	-2656.01	69.69
Wind 45 deg - Service		25679.91	-25679.91	-3709.74	-3700.98	69.82
Wind 60 deg - Service		30954.70	-17871.71	-2580.38	-4462.10	65.19
Wind 90 deg - Service		36890.33	0.00	2.08	-5322.86	43.22
Wind 120 deg - Service		34927.75	20165.55	2922.12	-5046.80	9.67
Wind 135 deg - Service		27301.90	27301.90	3952.61	-3939.68	-8.70
Wind 150 deg - Service		18445.17	31947.97	4621.21	-2656.01	-26.47
Wind 180 deg - Service		0.00	35743.41	5167.00	10.85	-55.52
Wind 210 deg - Service		-18445.17	31947.97	4621.21	2677.70	-69.69
Wind 225 deg - Service		-25679.91	25679.91	3713.91	3722.67	-69.82
Wind 240 deg - Service		-34927.75	20165.55	2922.12	5068.49	-65.19
Wind 270 deg - Service		-36890.33	0.00	2.08	5344.55	-43.22
Wind 300 deg - Service		-30954.70	-17871.71	-2580.38	4483.80	-9.67
Wind 315 deg - Service		-25679.91	-25679.91	-3709.74	3722.67	8.70
Wind 330 deg - Service		-18445.17	-31947.97	-4617.04	2677.70	26.47

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice



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	<p><b>Client</b></p> <p>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</p>	<p><b>Designed by</b></p> <p>MCD</p>

<i>Comb. No.</i>	<i>Description</i>
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

## Maximum Member Forces

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	57 of 95
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft		
T1	320 - 304	Leg	Max Tension	29	5560.81	0.04	0.02		
			Max. Compression	24	-7158.84	-0.01	-0.00		
			Max. Mx	24	-1514.78	-0.14	-0.00		
			Max. My	3	328.15	-0.01	-0.17		
			Max. Vy	10	-475.10	0.00	0.00		
		Diagonal	Max. Vx	3	536.64	0.00	0.00		
			Max Tension	20	1340.49	0.00	0.00		
			Max. Compression	4	-1332.71	0.00	0.00		
			Max. Mx	40	327.23	0.02	-0.00		
			Max. My	20	-702.07	0.00	-0.00		
		Top Girt	Max. Vy	40	-20.09	0.02	-0.00		
			Max. Vx	20	0.12	0.00	-0.00		
			Max Tension	13	182.36	0.00	0.00		
			Max. Compression	8	-193.80	0.00	0.00		
T2	304 - 300	Leg	Max. Mx	34	-30.30	-0.05	0.00		
			Max. Vy	34	-32.08	0.00	0.00		
			Max Tension	29	7856.49	0.01	0.00		
			Max. Compression	24	-9868.54	0.32	-0.07		
			Max. Mx	24	-9868.54	0.32	-0.07		
		Diagonal	Max. My	2	-9841.92	0.09	0.31		
			Max. Vy	24	-137.12	0.32	-0.07		
			Max. Vx	2	-138.72	0.09	0.31		
			Max Tension	4	1557.70	0.00	0.00		
			Max. Compression	4	-1579.36	0.00	0.00		
		T3	300 - 280	Leg	Max. Mx	40	332.57	0.02	-0.00
					Max. My	19	1290.15	0.00	-0.00
					Max. Vy	40	-20.08	0.02	-0.00
					Max. Vx	19	0.04	0.00	0.00
Max Tension	29				21875.75	-0.16	-0.01		
Diagonal	Max. Compression			24	-27182.05	0.53	-0.00		
	Max. Mx			3	-26381.77	0.53	0.14		
	Max. My			32	-2347.87	-0.00	0.57		
	Max. Vy			2	331.75	0.31	-0.09		
	Max. Vx			16	-519.38	0.02	0.11		
Top Girt	Max Tension			4	3067.24	0.00	0.00		
	Max. Compression			2	-3094.91	0.00	0.00		
	Max. Mx			48	473.04	0.03	0.00		
	Max. My			35	403.14	0.03	0.00		
T4	280 - 260	Leg	Max. Vy	48	31.15	0.03	0.00		
			Max. Vx	35	-1.72	0.00	0.00		
			Max Tension	23	49.59	0.00	0.00		
			Max. Compression	28	-69.63	0.00	0.00		
			Max. Mx	34	-22.49	-0.07	0.00		
		Diagonal	Max. My	34	-20.76	0.00	0.00		
			Max. Vy	34	-38.34	0.00	0.00		
			Max. Vx	34	-1.13	0.00	0.00		
			Max Tension	29	40944.14	-0.33	0.00		
			Max. Compression	24	-51734.45	0.81	-0.11		
		Top Girt	Max. Mx	13	-50459.49	0.82	-0.03		
			Max. My	2	19430.11	-0.43	0.81		
			Max. Vy	3	-366.00	0.82	0.14		
			Max. Vx	20	-351.39	-0.02	0.55		
Max Tension	10		4727.40	0.00	0.00				
Max. Compression	12		-4796.71	0.00	0.00				
Max. Mx	43		756.06	0.06	-0.01				
Max. My	39		-1169.32	0.06	-0.01				
Max. Vy	43		46.35	0.06	-0.01				
Leg	Max. Vx	39	2.72	0.00	0.00				
	Max Tension	19	67823.87	-0.31	-0.36				
	Max. Compression	12	-87475.45	2.38	-0.08				
T5	260 - 240	Leg	Max. Mx	24	-86845.34	2.39	0.48		

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	240 - 220	Diagonal	Max. My	20	-7153.89	-0.00	2.96
			Max. Vy	28	-751.44	-0.31	-0.05
			Max. Vx	4	-1317.00	-0.02	0.43
			Max Tension	26	8221.24	0.00	0.00
			Max. Compression	24	-8485.37	0.00	0.00
			Max. Mx	43	930.06	0.09	0.01
			Max. My	37	-1547.57	0.09	-0.01
		Leg	Max. Vy	43	63.73	0.09	0.01
			Max. Vx	37	3.58	0.00	0.00
			Max Tension	9	108740.08	-1.06	0.02
			Max. Compression	12	-140782.81	2.49	0.02
			Max. Mx	3	-137503.27	2.49	-0.28
			Max. My	20	-7376.21	-0.00	2.96
			Max. Vy	28	-2230.91	-1.11	-0.07
T7	220 - 200	Diagonal	Max. Vx	4	-2199.34	-0.06	-0.54
			Max Tension	32	13356.61	0.00	0.00
			Max. Compression	32	-13340.73	0.00	0.00
			Max. Mx	38	1495.90	0.17	-0.02
			Max. My	36	-1362.50	0.15	-0.02
			Max. Vy	38	102.65	0.17	-0.02
			Max. Vx	36	5.65	0.00	0.00
		Leg	Max Tension	9	154356.83	-1.00	-0.19
			Max. Compression	12	-197088.03	2.20	-0.05
			Max. Mx	3	-161869.85	2.49	-0.28
			Max. My	4	-12211.58	-0.12	-2.77
			Max. Vy	25	578.35	2.49	0.26
			Max. Vx	4	-854.09	-0.12	-2.77
			Max Tension	32	16638.54	0.00	0.00
T8	200 - 180	Diagonal	Max. Compression	2	-17336.79	0.00	0.00
			Max. Mx	37	1988.01	0.25	-0.04
			Max. My	36	2424.80	0.24	-0.04
			Max. Vy	37	126.22	0.25	-0.04
			Max. Vx	36	7.25	0.00	0.00
			Max Tension	9	211192.74	-2.14	-0.12
			Max. Compression	12	-268188.30	3.20	-0.03
		Leg	Max. Mx	12	-268188.30	3.20	-0.03
			Max. My	4	-16729.75	-0.10	-3.19
			Max. Vy	28	-2977.71	-1.80	0.05
			Max. Vx	4	-3090.13	0.04	0.16
			Max Tension	32	21122.30	0.00	0.00
			Max. Compression	2	-21398.23	0.00	0.00
			Max. Mx	38	2312.35	0.31	-0.05
T9	180 - 170	Diagonal	Max. My	44	-2458.59	0.27	0.05
			Max. Vy	38	140.95	0.31	-0.05
			Max. Vx	44	-8.18	0.00	0.00
			Max Tension	19	241098.72	-2.81	0.14
			Max. Compression	12	-305049.56	2.06	-0.02
			Max. Mx	12	-303785.50	3.20	-0.03
			Max. My	20	-18358.01	0.00	2.13
		Leg	Max. Vy	3	741.31	3.19	-0.14
			Max. Vx	25	791.51	-1.60	2.09
			Max Tension	26	22538.90	0.00	0.00
			Max. Compression	24	-22966.30	0.00	0.00
			Max. Mx	43	2494.57	0.34	0.05
			Max. My	44	-3782.64	0.32	0.05
			Max. Vy	43	147.90	0.34	0.05
T10	170 - 160	Leg	Max. Vx	44	-8.29	0.00	0.00
			Max Tension	19	271340.19	-2.03	0.04
			Max. Compression	12	-342203.08	7.46	-0.23
			Max. Mx	12	-342203.08	7.46	-0.23
			Max. My	4	-21164.18	0.15	-5.30

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	59 of 95
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
T11	160 - 140	Diagonal	Max. Vy	2	-1057.53	7.45	-0.48			
			Max. Vx	25	-940.41	-3.54	5.11			
			Max Tension	26	23244.04	0.00	0.00			
			Max. Compression	24	-23824.32	0.00	0.00			
			Max. Mx	43	2479.56	0.37	0.05			
			Max. My	36	-2815.73	0.33	-0.05			
		Leg	Max. Vy	43	155.08	0.37	0.05			
			Max. Vx	36	8.57	0.00	0.00			
			Max Tension	19	335017.11	-2.30	-0.26			
			Max. Compression	12	-421749.57	5.97	-0.06			
			Max. Mx	12	-379951.12	7.46	-0.23			
			Max. My	4	-22007.85	0.15	-5.30			
			Max. Vy	2	1312.06	7.45	-0.48			
			Max. Vx	15	-1005.34	-1.70	-4.73			
Diagonal	Max Tension	26	28272.93	0.00	0.00					
	Max. Compression	24	-29160.72	0.00	0.00					
	Max. Mx	43	2903.01	0.62	0.08					
	Max. My	45	4017.97	0.61	0.08					
	Max. Vy	43	241.62	0.62	0.08					
	Max. Vx	45	-12.19	0.00	0.00					
T12	140 - 120	Leg	Max Tension	19	399043.02	-2.97	0.08			
			Max. Compression	12	-502759.06	-2.50	0.32			
			Max. Mx	12	-462356.20	5.97	-0.06			
			Max. My	10	-27250.50	-1.05	6.96			
			Max. Vy	2	1033.46	3.06	-0.08			
			Max. Vx	20	-1140.32	-0.20	5.72			
		Diagonal	Max Tension	26	29995.87	0.00	0.00			
			Max. Compression	24	-30916.27	0.00	0.00			
			Max. Mx	42	4915.78	0.73	-0.10			
			Max. My	45	3076.63	0.73	0.11			
			Max. Vy	42	263.06	0.73	-0.10			
			Max. Vx	45	-14.93	0.00	0.00			
			T13	120 - 100	Leg	Max Tension	19	409801.75	0.50	0.18
						Max. Compression	12	-519177.58	-15.28	0.48
Max. Mx	12	-518428.83				22.21	-0.11			
Max. My	20	-32358.18				-2.48	14.26			
Max. Vy	24	4917.88				22.18	-0.86			
Max. Vx	20	-2837.45				-2.48	14.26			
Diagonal	Max Tension	27			48086.93	-0.23	-0.04			
	Max. Compression	24			-50783.82	0.00	0.00			
	Max. Mx	16			22512.75	-0.37	0.05			
	Max. My	26			-49411.20	-0.15	-0.19			
	Max. Vy	42			-131.63	-0.32	-0.00			
	Max. Vx	26			15.19	-0.15	-0.19			
	Horizontal	Max Tension			26	26754.51	-0.19	0.00		
		Max. Compression			25	-27066.70	-0.19	-0.03		
Max. Mx		43	-1338.96	-0.37	-0.01					
Max. My		2	3536.51	-0.11	0.06					
Max. Vy		43	136.22	-0.37	-0.01					
Max. Vx		2	-4.92	0.00	0.00					
Redund Horz 1 Bracing	Max Tension	12	9017.86	0.00	0.00					
	Max. Compression	12	-9017.86	0.00	0.00					
	Max. Mx	34	1223.16	0.04	0.00					
	Max. Vy	34	-26.75	0.00	0.00					
Redund Diag 1 Bracing	Max Tension	12	8181.56	0.00	0.00					
	Max. Compression	12	-8181.56	0.00	0.00					
	Max. Mx	34	890.36	0.08	0.00					
Redund Hip 1	Max. Vy	34	-29.47	0.00	0.00					
	Max. Vx	34	-29.47	0.00	0.00					
	Max Tension	27	23.19	0.00	0.00					

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T14	100 - 80	Bracing	Max. Compression	10	-49.03	0.00	0.00
			Max. Mx	34	-20.79	0.04	0.00
			Max. Vy	34	26.75	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	2	98.62	0.00	0.00
			Max. Compression	18	-97.06	0.00	0.00
			Max. Mx	34	63.17	0.30	0.00
		Inner Bracing	Max. Vy	34	77.92	0.00	0.00
			Max Tension	27	7.51	0.00	0.00
			Max. Compression	2	-27.79	0.00	0.00
		Leg	Max. Mx	34	-19.45	0.34	0.00
			Max. Vy	34	-106.85	0.00	0.00
			Max Tension	19	464451.86	9.57	1.51
		Diagonal	Max. Compression	12	-589433.90	-17.70	-0.31
			Max. Mx	12	-588279.81	25.48	0.11
			Max. My	20	-36383.72	-2.71	14.87
			Max. Vy	12	4700.00	25.48	0.11
			Max. Vx	20	-2730.41	-2.71	14.87
			Max Tension	27	49547.23	-0.27	-0.04
			Max. Compression	24	-53199.63	0.00	0.00
			Max. Mx	26	18719.65	-0.42	0.05
			Max. My	26	-48713.47	-0.16	-0.18
			Max. Vy	43	143.17	-0.36	0.01
			Max. Vx	26	-14.36	-0.16	-0.18
			Horizontal	Max Tension	26	29223.73	-0.31
		Max. Compression		24	-30467.61	-0.36	-0.03
		Max. Mx		43	743.19	-0.53	-0.01
		Max. My		2	5687.95	-0.22	0.06
		Max. Vy		43	-177.28	-0.53	-0.01
		Redund Horz 1 Bracing	Max. Vx	2	-4.57	0.00	0.00
			Max Tension	12	10238.44	0.00	0.00
			Max. Compression	12	-10238.44	0.00	0.00
			Max. Mx	34	1367.05	0.05	0.00
			Max. Vy	34	29.23	0.00	0.00
			Max Tension	12	8683.21	0.00	0.00
		Redund Diag 1 Bracing	Max. Compression	12	-8683.21	0.00	0.00
			Max. Mx	34	927.65	0.11	0.00
			Max. Vy	34	37.97	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	27	21.08	0.00	0.00
			Max. Compression	2	-48.04	0.00	0.00
			Max. Mx	34	-21.46	0.05	0.00
		Redund Hip Diagonal 1 Bracing	Max. Vy	34	-29.23	0.00	0.00
			Max Tension	2	91.43	0.00	0.00
			Max. Compression	18	-91.08	0.00	0.00
			Max. Mx	34	62.80	0.34	0.00
			Max. Vy	34	-84.96	0.00	0.00
Max Tension	27		4.00	0.00	0.00		
Inner Bracing	Max. Compression	2	-27.56	0.00	0.00		
	Max. Mx	34	-21.07	0.41	0.00		
	Max. Vy	34	-117.08	0.00	0.00		
Leg	Max Tension	19	520587.93	11.42	1.74		
	Max. Compression	12	-661019.72	-24.37	-0.29		
	Max. Mx	12	-660593.98	33.36	0.21		
	Max. My	20	-40983.33	-3.86	20.53		
	Max. Vy	12	6220.59	33.36	0.21		
	Max. Vx	20	-3474.39	-3.86	20.53		
	Max. Vy	12	6220.59	33.36	0.21		

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T16	60 - 30	Diagonal	Max Tension	27	48472.57	-0.30	-0.04
			Max. Compression	24	-53145.46	0.00	0.00
		Horizontal	Max. Mx	26	22470.42	-0.43	0.04
			Max. My	26	-47627.31	-0.19	-0.16
			Max. Vy	43	155.52	-0.41	0.00
			Max. Vx	26	-12.66	0.00	0.00
			Max Tension	27	29908.38	-0.49	0.00
			Max. Compression	24	-31433.58	-0.72	-0.03
			Max. Mx	43	750.31	-0.92	-0.01
			Max. My	2	6187.62	-0.54	0.05
		Redund Horiz 1 Bracing	Max. Vy	43	-287.97	-0.92	-0.01
			Max. Vx	2	-3.32	0.00	0.00
			Max Tension	12	11487.45	0.00	0.00
		Redund Diag 1 Bracing	Max. Compression	12	-11487.45	0.00	0.00
			Max. Mx	34	1534.79	0.07	0.00
			Max. Vy	34	38.83	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	12	9186.98	0.00	0.00
			Max. Compression	12	-9186.98	0.00	0.00
			Max. Mx	34	966.49	0.13	0.00
		Redund Hip Diagonal 1 Bracing	Max. Vy	34	-41.29	0.00	0.00
			Max Tension	27	15.69	0.00	0.00
			Max. Compression	2	-47.06	0.00	0.00
		Inner Bracing	Max. Mx	34	-25.16	0.06	0.00
			Max. Vy	34	31.69	0.00	0.00
			Max Tension	2	93.77	0.00	0.00
		Leg	Max. Compression	47	-102.08	0.00	0.00
			Max. Mx	34	76.38	0.48	0.00
			Max. Vy	34	-113.44	0.00	0.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-31.26	0.00	0.00
			Max. Mx	34	-27.89	0.48	0.00
			Max. Vy	34	-127.12	0.00	0.00
			Max Tension	19	576220.65	15.44	1.82
			Max. Compression	12	-733001.56	6.15	0.31
			Max. Mx	12	-723548.72	37.54	0.38
			Max. My	4	-46808.12	-5.58	-36.87
			Max. Vy	12	6843.83	37.54	0.38
		Diagonal	Max. Vx	4	5536.99	-5.58	-36.87
			Max Tension	27	68306.43	-0.37	-0.08
			Max. Compression	24	-75010.27	0.00	0.00
Max. Mx	18		50379.42	-0.51	0.38		
Max. My	26		-70968.42	0.25	-0.68		
Horizontal	Max. Vy	24	-113.76	-0.33	0.43		
	Max. Vx	24	93.24	-0.33	0.43		
	Max Tension	10	34937.72	0.00	0.00		
	Max. Compression	25	-35097.16	-0.49	-0.04		
	Max. Mx	43	-1777.71	-0.88	-0.01		
	Max. My	3	-1810.63	-0.23	0.08		
	Max. Vy	43	246.92	-0.88	-0.01		
	Max. Vx	3	-4.74	0.00	0.00		
	Max Tension	12	12749.79	0.00	0.00		
	Max. Compression	12	-12749.79	0.00	0.00		
Redund Horiz 1 Bracing	Max. Mx	34	1733.48	0.03	0.00		
	Max. Vy	34	23.02	0.00	0.00		
	Max Tension	12	12749.79	0.00	0.00		
Redund Horiz 2 Bracing	Max Tension	12	12749.79	0.00	0.00		

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	12	-12749.79	0.00	0.00
			Max. Mx	34	1733.48	0.25	0.00
			Max. Vy	34	-92.06	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	12866.07	0.00	0.00
			Max. Compression	12	-12866.07	0.00	0.00
			Max. Mx	34	1670.30	0.08	0.00
			Max. Vy	34	29.25	0.00	0.00
		Redund Diag 2 Bracing	Max Tension	12	8343.82	0.00	0.00
			Max. Compression	12	-8343.82	0.00	0.00
			Max. Mx	34	1007.32	0.26	0.00
			Max. Vy	34	70.87	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	25	170.36	0.00	0.00
			Max. Compression	10	-175.83	0.00	0.00
			Max. Mx	34	-9.42	0.03	0.00
			Max. Vy	34	23.02	0.00	0.00
		Redund Hip 2 Bracing	Max Tension	25	70.64	0.00	0.00
			Max. Compression	10	-95.51	0.00	0.00
			Max. Mx	34	-26.66	0.16	0.00
			Max. Vy	34	56.40	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	2	355.70	0.00	0.00
			Max. Compression	26	-360.74	0.00	0.00
			Max. Mx	34	44.35	0.18	0.00
			Max. Vy	34	-50.73	0.00	0.00
		Redund Hip Diagonal 2 Bracing	Max Tension	8	121.92	0.00	0.00
			Max. Compression	24	-143.01	0.00	0.00
			Max. Mx	34	42.80	0.34	0.00
			Max. Vy	34	-75.86	0.00	0.00
		Inner Bracing	Max Tension	25	44.22	0.00	0.00
			Max. Compression	8	-60.20	0.00	0.00
			Max. Mx	34	-21.10	0.57	0.00
			Max. Vy	34	-138.41	0.00	0.00
T17	30 - 0	Leg	Max Tension	19	660100.96	14.44	5.02
			Max. Compression	12	-840602.01	4.53	0.39
			Max. Mx	12	-835570.26	33.50	0.55
			Max. My	4	-50787.04	-5.57	-36.86
			Max. Vy	12	3852.48	33.50	0.55
			Max. Vx	4	-5372.16	-5.57	-36.86
		Diagonal	Max Tension	27	69597.19	-0.30	-0.07
			Max. Compression	24	-73992.17	0.00	0.00
			Max. Mx	18	44073.53	-0.46	0.32
			Max. My	26	-71697.10	0.14	-0.62
			Max. Vy	47	114.83	-0.27	0.07
			Max. Vx	24	82.30	-0.35	0.40
		Horizontal	Max Tension	11	37602.54	0.00	0.00
			Max. Compression	24	-41666.25	-0.88	-0.06
			Max. Mx	43	75.18	-1.17	-0.02
			Max. My	2	10914.72	-0.59	0.11
			Max. Vy	43	-313.91	-1.17	-0.02
			Max. Vx	2	6.14	-0.59	0.11
		Redund Horz 1 Bracing	Max Tension	12	14642.70	0.00	0.00
			Max. Compression	12	-14642.70	0.00	0.00
			Max. Mx	34	2050.43	0.04	0.00
			Max. Vy	34	-25.64	0.00	0.00
		Redund Horz 2	Max Tension	12	14642.70	0.00	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Bracing	Max. Compression	12	-14642.70	0.00	0.00
			Max. Mx	34	2009.98	0.30	0.00
			Max. Vy	34	-97.22	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	13622.05	0.00	0.00
			Max. Compression	12	-13622.05	0.00	0.00
			Max. Mx	34	1495.69	0.11	0.00
			Max. Vy	34	37.41	0.00	0.00
		Redund Diag 2 Bracing	Max Tension	12	9151.97	0.00	0.00
			Max. Compression	12	-9151.97	0.00	0.00
			Max. Mx	34	1256.86	0.30	0.00
			Max. Vy	34	-79.09	0.00	0.00
		Redund Hip 1 Bracing	Max Tension	25	147.06	0.00	0.00
			Max. Compression	10	-157.40	0.00	0.00
			Max. Mx	34	-13.27	0.04	0.00
			Max. Vy	34	-25.64	0.00	0.00
		Redund Hip 2 Bracing	Max Tension	25	61.66	0.00	0.00
			Max. Compression	10	-89.81	0.00	0.00
			Max. Mx	34	-29.27	0.19	0.00
			Max. Vy	34	-62.81	0.00	0.00
		Redund Hip Diagonal 1 Bracing	Max Tension	2	322.57	0.00	0.00
			Max. Compression	26	-327.41	0.00	0.00
			Max. Mx	34	60.79	0.28	0.00
			Max. Vy	34	-74.96	0.00	0.00
		Redund Hip Diagonal 2 Bracing	Max Tension	8	118.01	0.00	0.00
			Max. Compression	24	-140.44	0.00	0.00
			Max. Mx	34	57.40	0.54	0.00
			Max. Vy	34	-112.18	0.00	0.00
		Inner Bracing	Max Tension	25	40.14	0.00	0.00
			Max. Compression	8	-62.56	0.00	0.00
			Max. Mx	34	-26.37	0.71	0.00
			Max. Vy	34	-154.05	0.00	0.00

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	24	941233.11	114498.12	-60257.08
	Max. H <sub>x</sub>	24	941233.11	114498.12	-60257.08
	Max. H <sub>z</sub>	7	-725346.34	-90380.52	51955.00
	Min. Vert	9	-739546.23	-94548.82	48798.33
	Min. H <sub>x</sub>	9	-739546.23	-94548.82	48798.33
	Min. H <sub>z</sub>	24	941233.11	114498.12	-60257.08
Leg B	Max. Vert	12	942660.34	-112367.47	-63996.74
	Max. H <sub>x</sub>	29	-738475.81	92393.22	52494.45
	Max. H <sub>z</sub>	33	-656038.05	75823.87	57870.91
	Min. Vert	29	-738475.81	92393.22	52494.45
	Min. H <sub>x</sub>	12	942660.34	-112367.47	-63996.74
	Min. H <sub>z</sub>	14	875188.89	-100782.77	-65284.11
Leg A	Max. Vert	2	939847.33	4301.48	129260.89



<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	64 of 95
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Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Max. H <sub>x</sub>	26	54988.22	16975.21	4988.02
	Max. H <sub>z</sub>	2	939847.33	4301.48	129260.89
	Min. Vert	19	-740585.57	-4276.54	-106299.85
	Min. H <sub>x</sub>	13	-401188.39	-18393.74	-58393.94
	Min. H <sub>z</sub>	19	-740585.57	-4276.54	-106299.85

## Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	140969.55	0.00	0.00	41.10	-24.20	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	169163.46	-0.00	-219580.40	-31131.85	-29.04	302.27
0.9 Dead+1.0 Wind 0 deg - No Ice	126872.60	-0.00	-219580.40	-31144.18	-21.78	302.27
1.2 Dead+1.0 Wind 30 deg - No Ice	169163.46	100423.69	-173938.94	-24596.15	-14258.11	379.43
0.9 Dead+1.0 Wind 30 deg - No Ice	126872.60	100423.69	-173938.94	-24608.48	-14250.85	379.43
1.2 Dead+1.0 Wind 45 deg - No Ice	169163.46	139812.84	-139812.84	-19752.71	-19831.07	380.12
0.9 Dead+1.0 Wind 45 deg - No Ice	126872.60	139812.84	-139812.84	-19765.04	-19823.81	380.12
1.2 Dead+1.0 Wind 60 deg - No Ice	169163.46	168531.18	-97301.52	-13725.91	-23888.43	354.92
0.9 Dead+1.0 Wind 60 deg - No Ice	126872.60	168531.18	-97301.52	-13738.24	-23881.18	354.92
1.2 Dead+1.0 Wind 90 deg - No Ice	169163.46	200847.38	-0.00	49.32	-28487.17	235.31
0.9 Dead+1.0 Wind 90 deg - No Ice	126872.60	200847.38	-0.00	36.99	-28479.92	235.31
1.2 Dead+1.0 Wind 120 deg - No Ice	169163.46	190162.21	109790.20	15639.91	-27032.72	52.65
0.9 Dead+1.0 Wind 120 deg - No Ice	126872.60	190162.21	109790.20	15627.58	-27025.47	52.65
1.2 Dead+1.0 Wind 135 deg - No Ice	169163.46	148643.67	148643.67	21135.00	-21114.72	-47.35
0.9 Dead+1.0 Wind 135 deg - No Ice	126872.60	148643.67	148643.67	21122.67	-21107.46	-47.35
1.2 Dead+1.0 Wind 150 deg - No Ice	169163.46	100423.69	173938.94	24694.79	-14258.11	-144.12
0.9 Dead+1.0 Wind 150 deg - No Ice	126872.60	100423.69	173938.94	24682.46	-14250.85	-144.12
1.2 Dead+1.0 Wind 180 deg - No Ice	169163.46	0.00	194603.04	27599.78	-29.04	-302.27
0.9 Dead+1.0 Wind 180 deg - No Ice	126872.60	0.00	194603.04	27587.45	-21.78	-302.27
1.2 Dead+1.0 Wind 210 deg - No Ice	169163.46	-100423.69	173938.94	24694.79	14200.03	-379.43
0.9 Dead+1.0 Wind 210 deg - No Ice	126872.60	-100423.69	173938.94	24682.46	14207.29	-379.43
1.2 Dead+1.0 Wind 225 deg - No Ice	169163.46	-139812.84	139812.84	19851.35	19772.99	-380.12
0.9 Dead+1.0 Wind 225 deg - No Ice	126872.60	-139812.84	139812.84	19839.02	19780.25	-380.12
1.2 Dead+1.0 Wind 240 deg - No Ice	169163.46	-190162.21	109790.20	15639.91	26974.65	-354.92

<p><b>tnxTower</b></p> <p><b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	65 of 95
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Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.0 Wind 240 deg - No Ice	126872.60	-190162.21	109790.20	15627.58	26981.91	-354.92
1.2 Dead+1.0 Wind 270 deg - No Ice	169163.46	-200847.38	0.00	49.32	28429.10	-235.31
0.9 Dead+1.0 Wind 270 deg - No Ice	126872.60	-200847.38	0.00	36.99	28436.36	-235.31
1.2 Dead+1.0 Wind 300 deg - No Ice	169163.46	-168531.18	-97301.52	-13725.91	23830.36	-52.65
0.9 Dead+1.0 Wind 300 deg - No Ice	126872.60	-168531.18	-97301.52	-13738.24	23837.62	-52.65
1.2 Dead+1.0 Wind 315 deg - No Ice	169163.46	-139812.84	-139812.84	-19752.71	19772.99	47.35
0.9 Dead+1.0 Wind 315 deg - No Ice	126872.60	-139812.84	-139812.84	-19765.04	19780.25	47.35
1.2 Dead+1.0 Wind 330 deg - No Ice	169163.46	-100423.69	-173938.93	-24596.15	14200.03	144.12
0.9 Dead+1.0 Wind 330 deg - No Ice	126872.60	-100423.69	-173938.93	-24608.48	14207.29	144.12
1.2 Dead+1.0 Ice+1.0 Temp	324637.79	0.00	0.00	311.48	-327.59	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	324637.79	0.00	-45928.95	-6042.34	-327.59	118.70
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	324637.79	21754.17	-37679.33	-4892.39	-3332.05	150.09
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	324637.79	30479.77	-30479.77	-3896.82	-4535.89	150.82
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	324637.79	36980.56	-21350.74	-2635.49	-5431.90	141.27
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	324637.79	43508.34	0.00	311.48	-6336.50	94.59
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	324637.79	39775.64	22964.47	3488.39	-5830.16	22.57
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	324637.79	31620.86	31620.86	4682.36	-4698.48	-17.04
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	324637.79	21754.17	37679.33	5515.35	-3332.05	-55.50
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	324637.79	0.00	42701.47	6205.42	-327.59	-118.70
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	324637.79	-21754.17	37679.33	5515.35	2676.86	-150.09
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	324637.79	-30479.77	30479.77	4519.77	3880.70	-150.82
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	324637.79	-39775.64	22964.47	3488.39	5174.97	-141.27
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	324637.79	-43508.34	0.00	311.48	5681.32	-94.59
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	324637.79	-36980.56	-21350.74	-2635.49	4776.71	-22.57
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	324637.79	-30479.77	-30479.77	-3896.82	3880.70	17.04
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	324637.79	-21754.17	-37679.33	-4892.39	2676.86	55.50
Dead+Wind 0 deg - Service	140969.55	-0.00	-40331.09	-5686.05	-24.20	55.52
Dead+Wind 30 deg - Service	140969.55	18445.17	-31947.97	-4485.62	-2637.70	69.69
Dead+Wind 45 deg - Service	140969.55	25679.91	-25679.91	-3596.01	-3661.30	69.82
Dead+Wind 60 deg - Service	140969.55	30954.71	-17871.71	-2489.04	-4406.54	65.19
Dead+Wind 90 deg - Service	140969.55	36890.34	-0.00	41.10	-5251.20	43.22
Dead+Wind 120 deg - Service	140969.55	34927.75	20165.55	2904.68	-4984.06	9.67
Dead+Wind 135 deg - Service	140969.55	27301.90	27301.90	3913.98	-3897.08	-8.70
Dead+Wind 150 deg - Service	140969.55	18445.17	31947.97	4567.82	-2637.70	-26.47
Dead+Wind 180 deg - Service	140969.55	0.00	35743.42	5101.39	-24.20	-55.52

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Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	140969.55	-18445.17	31947.97	4567.82	2589.30	-69.69
Dead+Wind 225 deg - Service	140969.55	-25679.91	25679.91	3678.21	3612.91	-69.82
Dead+Wind 240 deg - Service	140969.55	-34927.75	20165.55	2904.68	4935.66	-65.19
Dead+Wind 270 deg - Service	140969.55	-36890.34	0.00	41.10	5202.81	-43.22
Dead+Wind 300 deg - Service	140969.55	-30954.71	-17871.71	-2489.04	4358.14	-9.67
Dead+Wind 315 deg - Service	140969.55	-25679.91	-25679.91	-3596.01	3612.91	8.70
Dead+Wind 330 deg - Service	140969.55	-18445.17	-31947.97	-4485.62	2589.30	26.47

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-140969.55	0.00	-0.00	140969.55	-0.00	0.000%
2	0.00	-169163.46	-219580.38	0.00	169163.46	219580.40	0.000%
3	0.00	-126872.60	-219580.38	0.00	126872.60	219580.40	0.000%
4	100423.68	-169163.46	-173938.92	-100423.69	169163.46	173938.94	0.000%
5	100423.68	-126872.60	-173938.92	-100423.69	126872.60	173938.94	0.000%
6	139812.83	-169163.46	-139812.83	-139812.84	169163.46	139812.84	0.000%
7	139812.83	-126872.60	-139812.83	-139812.84	126872.60	139812.84	0.000%
8	168531.16	-169163.46	-97301.51	-168531.18	169163.46	97301.52	0.000%
9	168531.16	-126872.60	-97301.51	-168531.18	126872.60	97301.52	0.000%
10	200847.37	-169163.46	0.00	-200847.38	169163.46	0.00	0.000%
11	200847.37	-126872.60	0.00	-200847.38	126872.60	0.00	0.000%
12	190162.19	-169163.46	109790.19	-190162.21	169163.46	-109790.20	0.000%
13	190162.19	-126872.60	109790.19	-190162.21	126872.60	-109790.20	0.000%
14	148643.66	-169163.46	148643.66	-148643.67	169163.46	-148643.67	0.000%
15	148643.66	-126872.60	148643.66	-148643.67	126872.60	-148643.67	0.000%
16	100423.68	-169163.46	173938.92	-100423.69	169163.46	-173938.94	0.000%
17	100423.68	-126872.60	173938.92	-100423.69	126872.60	-173938.94	0.000%
18	-0.00	-169163.46	194603.03	-0.00	169163.46	-194603.04	0.000%
19	-0.00	-126872.60	194603.03	-0.00	126872.60	-194603.04	0.000%
20	-100423.68	-169163.46	173938.92	100423.69	169163.46	-173938.94	0.000%
21	-100423.68	-126872.60	173938.92	100423.69	126872.60	-173938.94	0.000%
22	-139812.83	-169163.46	139812.83	139812.84	169163.46	-139812.84	0.000%
23	-139812.83	-126872.60	139812.83	139812.84	126872.60	-139812.84	0.000%
24	-190162.19	-169163.46	109790.19	190162.21	169163.46	-109790.20	0.000%
25	-190162.19	-126872.60	109790.19	190162.21	126872.60	-109790.20	0.000%
26	-200847.37	-169163.46	0.00	200847.38	169163.46	-0.00	0.000%
27	-200847.37	-126872.60	0.00	200847.38	126872.60	-0.00	0.000%
28	-168531.16	-169163.46	-97301.51	168531.18	169163.46	97301.52	0.000%
29	-168531.16	-126872.60	-97301.51	168531.18	126872.60	97301.52	0.000%
30	-139812.83	-169163.46	-139812.83	139812.84	169163.46	139812.84	0.000%
31	-139812.83	-126872.60	-139812.83	139812.84	126872.60	139812.84	0.000%
32	-100423.68	-169163.46	-173938.92	100423.69	169163.46	173938.93	0.000%
33	-100423.68	-126872.60	-173938.92	100423.69	126872.60	173938.93	0.000%
34	0.00	-324637.79	0.00	-0.00	324637.79	-0.00	0.000%
35	-0.00	-324637.79	-45928.95	-0.00	324637.79	45928.95	0.000%
36	21754.17	-324637.79	-37679.33	-21754.17	324637.79	37679.33	0.000%
37	30479.77	-324637.79	-30479.77	-30479.77	324637.79	30479.77	0.000%
38	36980.56	-324637.79	-21350.73	-36980.56	324637.79	21350.74	0.000%
39	43508.34	-324637.79	0.00	-43508.34	324637.79	-0.00	0.000%
40	39775.63	-324637.79	22964.47	-39775.64	324637.79	-22964.47	0.000%
41	31620.85	-324637.79	31620.85	-31620.86	324637.79	-31620.86	0.000%
42	21754.17	-324637.79	37679.33	-21754.17	324637.79	-37679.33	0.000%
43	0.00	-324637.79	42701.47	-0.00	324637.79	-42701.47	0.000%
44	-21754.17	-324637.79	37679.33	21754.17	324637.79	-37679.33	0.000%
45	-30479.77	-324637.79	30479.77	30479.77	324637.79	-30479.77	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
46	-39775.63	-324637.79	22964.47	39775.64	324637.79	-22964.47	0.000%
47	-43508.34	-324637.79	0.00	43508.34	324637.79	-0.00	0.000%
48	-36980.56	-324637.79	-21350.73	36980.56	324637.79	21350.74	0.000%
49	-30479.77	-324637.79	-30479.77	30479.77	324637.79	30479.77	0.000%
50	-21754.17	-324637.79	-37679.33	21754.17	324637.79	37679.33	0.000%
51	0.00	-140969.55	-40331.09	0.00	140969.55	40331.09	0.000%
52	18445.17	-140969.55	-31947.97	-18445.17	140969.55	31947.97	0.000%
53	25679.91	-140969.55	-25679.91	-25679.91	140969.55	25679.91	0.000%
54	30954.70	-140969.55	-17871.71	-30954.71	140969.55	17871.71	0.000%
55	36890.33	-140969.55	0.00	-36890.34	140969.55	0.00	0.000%
56	34927.75	-140969.55	20165.55	-34927.75	140969.55	-20165.55	0.000%
57	27301.90	-140969.55	27301.90	-27301.90	140969.55	-27301.90	0.000%
58	18445.17	-140969.55	31947.97	-18445.17	140969.55	-31947.97	0.000%
59	-0.00	-140969.55	35743.41	-0.00	140969.55	-35743.42	0.000%
60	-18445.17	-140969.55	31947.97	18445.17	140969.55	-31947.97	0.000%
61	-25679.91	-140969.55	25679.91	25679.91	140969.55	-25679.91	0.000%
62	-34927.75	-140969.55	20165.55	34927.75	140969.55	-20165.55	0.000%
63	-36890.33	-140969.55	0.00	36890.34	140969.55	-0.00	0.000%
64	-30954.70	-140969.55	-17871.71	30954.71	140969.55	17871.71	0.000%
65	-25679.91	-140969.55	-25679.91	25679.91	140969.55	25679.91	0.000%
66	-18445.17	-140969.55	-31947.97	18445.17	140969.55	31947.97	0.000%

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	320 - 304	4.502	56	0.1021	0.0348
T2	304 - 300	4.157	56	0.1013	0.0353
T3	300 - 280	4.070	56	0.1007	0.0354
T4	280 - 260	3.645	56	0.0979	0.0365
T5	260 - 240	3.227	56	0.0962	0.0372
T6	240 - 220	2.812	56	0.0934	0.0353
T7	220 - 200	2.410	56	0.0891	0.0324
T8	200 - 180	2.030	56	0.0831	0.0299
T9	180 - 170	1.669	56	0.0769	0.0269
T10	170 - 160	1.497	56	0.0734	0.0252
T11	160 - 140	1.331	56	0.0696	0.0236
T12	140 - 120	1.034	56	0.0610	0.0215
T13	120 - 100	0.773	56	0.0516	0.0193
T14	100 - 80	0.556	56	0.0423	0.0161
T15	80 - 60	0.380	56	0.0326	0.0136
T16	60 - 30	0.247	51	0.0237	0.0113
T17	30 - 0	0.090	51	0.0108	0.0057

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
329.00	Lightning Rod 5/8x4'	56	4.502	0.1021	0.0348	Inf
327.00	Dual Lights	56	4.502	0.1021	0.0348	Inf

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	<b>Client</b>	VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b>	MCD

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
325.00	PD128-1	56	4.502	0.1021	0.0348	Inf
320.00	BA1012-0	56	4.502	0.1021	0.0348	Inf
318.00	ANT450F6	56	4.459	0.1020	0.0348	Inf
300.00	SC479-HF1LDF	56	4.070	0.1007	0.0354	375256
290.00	PD340-1	56	3.856	0.0992	0.0359	415459
286.00	DB809T3E-XC	56	3.772	0.0987	0.0361	512037
284.00	6' Side Mount Standoff	56	3.729	0.0984	0.0362	579229
283.00	SC479-HF1LDF(D00I-E6085) (Inverted)	56	3.708	0.0983	0.0363	615207
264.00	PD440-2	56	3.310	0.0965	0.0372	Inf
260.00	6' Side Mount Standoff	56	3.227	0.0962	0.0372	Inf
251.00	SC479-HF1LDF	56	3.039	0.0951	0.0367	757826
248.00	PD1142-1	56	2.977	0.0947	0.0364	611966
247.00	430-94C-09168-M-11048 TTA	56	2.956	0.0945	0.0362	575072
246.00	Sabre T-Boom (1)	56	2.935	0.0944	0.0361	542371
245.00	SC479-HF1LDF(D00I-E6085) (Inverted)	56	2.915	0.0942	0.0360	513190
238.00	531-70HD Exposed Dipole Antenna	56	2.771	0.0930	0.0350	358328
232.00	Valmont VFA-10-U V-Frame	56	2.649	0.0918	0.0341	269625
200.00	PiROD 12' Lightweight T-Frame	56	2.030	0.0831	0.0299	309773
179.00	DB586-Y	56	1.651	0.0765	0.0267	194869
177.00	DB586-Y	56	1.617	0.0759	0.0264	201627
176.00	PiROD 4' Side Mount Standoff (1)	56	1.599	0.0755	0.0262	206670
175.00	DB586-Y (inverted)	56	1.582	0.0752	0.0261	212421
168.00	L-810 Obstruction Lighting (1)	56	1.463	0.0726	0.0249	173985
165.00	L-810 Obstruction Lighting (1)	56	1.413	0.0715	0.0244	126642
164.00	L-810 Obstruction Lighting (1)	56	1.396	0.0711	0.0242	115480
163.00	Telewave ANT220F2 - Omni Antenna	56	1.380	0.0708	0.0240	106616
160.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	56	1.331	0.0696	0.0236	92189
154.00	Commscope PAR6-59W-PXA/A	56	1.237	0.0672	0.0228	101179
153.00	ANT450F6	56	1.222	0.0667	0.0227	104465
145.00	Telewave ANT220F2 - Omni Antenna	56	1.105	0.0633	0.0219	141121
142.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	56	1.062	0.0619	0.0217	159857
139.00	DB212-1	56	1.020	0.0606	0.0214	165857
117.00	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	56	0.738	0.0502	0.0188	98877
115.00	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	56	0.715	0.0493	0.0185	102064
112.00	Andrew 2' w/Radome	56	0.681	0.0479	0.0180	107643
107.00	PA8-65	56	0.627	0.0456	0.0172	118432
106.00	PiROD 4' Side Mount Standoff (1)	56	0.617	0.0451	0.0171	120855
94.00	PD688S-4	56	0.499	0.0394	0.0153	118773

### Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	320 - 304	24.344	12	0.5518	0.1892
T2	304 - 300	22.476	12	0.5472	0.1921
T3	300 - 280	22.009	12	0.5443	0.1927
T4	280 - 260	19.714	12	0.5284	0.1987

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T5	260 - 240	17.455	12	0.5187	0.2026
T6	240 - 220	15.218	12	0.5035	0.1922
T7	220 - 200	13.047	12	0.4805	0.1765
T8	200 - 180	10.997	12	0.4485	0.1629
T9	180 - 170	9.044	12	0.4153	0.1462
T10	170 - 160	8.112	12	0.3964	0.1374
T11	160 - 140	7.216	12	0.3761	0.1283
T12	140 - 120	5.610	12	0.3299	0.1169
T13	120 - 100	4.196	12	0.2790	0.1049
T14	100 - 80	3.021	12	0.2289	0.0879
T15	80 - 60	2.066	12	0.1763	0.0737
T16	60 - 30	1.345	2	0.1281	0.0611
T17	30 - 0	0.488	2	0.0582	0.0307

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
329.00	Lightning Rod 5/8x4'	12	24.344	0.5518	0.1892	Inf
327.00	Dual Lights	12	24.344	0.5518	0.1892	Inf
325.00	PD128-1	12	24.344	0.5518	0.1892	Inf
320.00	BA1012-0	12	24.344	0.5518	0.1892	Inf
318.00	ANT450F6	12	24.111	0.5516	0.1896	Inf
300.00	SC479-HF1LDF	12	22.009	0.5443	0.1927	71765
290.00	PD340-1	12	20.854	0.5359	0.1952	79646
286.00	DB809T3E-XC	12	20.397	0.5327	0.1966	98660
284.00	6' Side Mount Standoff	12	20.169	0.5311	0.1973	112002
283.00	SC479-HF1LDF(D00I-E6085) (Inverted)	12	20.055	0.5304	0.1976	119890
264.00	PD440-2	12	17.905	0.5207	0.2027	280963
260.00	6' Side Mount Standoff	12	17.455	0.5187	0.2026	302902
251.00	SC479-HF1LDF	12	16.444	0.5129	0.1997	144185
248.00	PD1142-1	12	16.108	0.5106	0.1979	116254
247.00	430-94C-09168-M-11048 TTA	12	15.996	0.5098	0.1973	109203
246.00	Sabre T-Boom (1)	12	15.885	0.5089	0.1966	102958
245.00	SC479-HF1LDF(D00I-E6085) (Inverted)	12	15.773	0.5081	0.1959	97389
238.00	531-70HD Exposed Dipole Antenna	12	14.996	0.5016	0.1906	67608
232.00	Valmont VFA-10-U V-Frame	12	14.337	0.4954	0.1858	50456
200.00	PiROD 12' Lightweight T-Frame	12	10.997	0.4485	0.1629	58716
179.00	DB586-Y	12	8.949	0.4135	0.1454	36447
177.00	DB586-Y	12	8.761	0.4098	0.1436	37746
176.00	PiROD 4' Side Mount Standoff (1)	12	8.667	0.4079	0.1428	38715
175.00	DB586-Y (inverted)	12	8.574	0.4060	0.1419	39823
168.00	L-810 Obstruction Lighting (1)	12	7.929	0.3925	0.1355	32463
165.00	L-810 Obstruction Lighting (1)	12	7.658	0.3865	0.1327	23488
164.00	L-810 Obstruction Lighting (1)	12	7.568	0.3844	0.1318	21388
163.00	Telewave ANT220F2 - Omni Antenna	12	7.479	0.3824	0.1309	19724
160.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	12	7.216	0.3761	0.1283	17022
154.00	Commscope PAR6-59W-PXA/A	12	6.710	0.3630	0.1241	18690
153.00	ANT450F6	12	6.628	0.3608	0.1235	19302
145.00	Telewave ANT220F2 - Omni Antenna	12	5.992	0.3421	0.1193	26147
142.00	Sitepro1 USF-4U Mount Assembly	12	5.762	0.3348	0.1179	29662

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
	(Ca = 1.4 assumed)					
139.00	DB212-1	12	5.535	0.3274	0.1164	30808
117.00	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	12	4.005	0.2715	0.1025	18342
115.00	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	12	3.880	0.2665	0.1009	18925
112.00	Andrew 2' w/Radome	12	3.698	0.2590	0.0983	19943
107.00	PA8-65	12	3.406	0.2466	0.0939	21908
106.00	Pirod 4' Side Mount Standoff (1)	12	3.350	0.2441	0.0930	22348
94.00	PD688S-4	12	2.710	0.2131	0.0831	21907

## Bolt Design Data

Section No.	Elevation	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
	ft			in							
T1	320	Diagonal	A325X	0.6250	1	1340.49	5811.33	0.231	✓	1	Member Block Shear
T2	304	Leg	A325N	1.0000	6	1309.41	54517.00	0.024	✓	1	Bolt Tension
		Diagonal	A325X	0.6250	1	1557.70	5811.33	0.268	✓	1	Member Block Shear
T3	300	Leg	A325N	1.0000	8	2734.47	54517.00	0.050	✓	1	Bolt Tension
		Diagonal	A325X	0.6250	1	3067.24	9107.81	0.337	✓	1	Member Block Shear
T4	280	Leg	A325N	1.0000	8	5118.02	54517.00	0.094	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	4727.40	11962.50	0.395	✓	1	Member Block Shear
T5	260	Leg	A325N	1.0000	8	8477.98	54517.00	0.156	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	8221.24	14137.50	0.582	✓	1	Member Bearing
T6	240	Leg	A325N	1.0000	8	13592.50	54517.00	0.249	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	13356.60	17671.90	0.756	✓	1	Member Bearing
T7	220	Leg	A325N	1.0000	12	12863.10	54517.00	0.236	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	1	16638.50	21206.30	0.785	✓	1	Member Bearing
T8	200	Leg	A325N	1.0000	12	17599.40	54517.00	0.323	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	1	21122.30	24862.50	0.850	✓	1	Member Bearing
T9	180	Leg	A325N	1.0000	12	20091.60	54517.00	0.369	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	1	22538.90	24862.50	0.907	✓	1	Member Bearing
T10	170	Diagonal	A325X	0.8750	1	23244.00	24862.50	0.935	✓	1	Member Bearing
T11	160	Leg	A325N	1.0000	12	27918.10	54517.00	0.512	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	1	29160.70	33824.30	0.862	✓	1	Bolt Shear
T12	140	Leg	A325N	1.0000	12	33253.60	54517.00	0.610	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	1	30916.30	33824.30	0.914	✓	1	Bolt Shear
T13	120	Leg	A325N	1.0000	12	34033.10	54517.00	0.624	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	3	16927.90	24850.50	0.681	✓	1	Bolt Shear
		Horizontal	A325X	0.7500	2	13533.40	24850.50	0.545	✓	1	Bolt Shear

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
T14	100	Leg	A325N	1.0000	16	28959.50	54517.00	0.531	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	3	17733.20	24850.50	0.714	✓	1	Bolt Shear
		Horizontal	A325X	0.7500	2	15233.80	24850.50	0.613	✓	1	Bolt Shear
T15	80	Leg	A325N	1.0000	16	32451.30	54517.00	0.595	✓	1	Bolt Tension
		Diagonal	A325X	0.7500	3	17715.20	24850.50	0.713	✓	1	Bolt Shear
		Horizontal	A325X	0.7500	2	15716.80	24850.50	0.632	✓	1	Bolt Shear
T16	60	Leg	A325N	1.0000	16	35364.10	54517.00	0.649	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	3	25003.40	33824.30	0.739	✓	1	Bolt Shear
		Horizontal	A325X	0.7500	2	17548.60	24850.50	0.706	✓	1	Bolt Shear
T17	30	Leg	A325N	1.0000	24	27162.40	54517.00	0.498	✓	1	Bolt Tension
		Diagonal	A325X	0.8750	3	24664.10	33824.30	0.729	✓	1	Bolt Shear
		Horizontal	A325X	0.7500	2	20833.10	24850.50	0.838	✓	1	Bolt Shear

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	ROHN 5 EH	16.00	4.00	26.1 K=1.00	6.1120	-7158.84	261674.00	0.027 <sup>1</sup> ✓
T2	304 - 300	ROHN 5 EH	4.00	4.00	26.1 K=1.00	6.1120	-9868.54	261674.00	0.038 <sup>1</sup> ✓
T3	300 - 280	ROHN 6 EH	20.03	5.01	27.4 K=1.00	8.4049	-27182.10	358043.00	0.076 <sup>1</sup> ✓
T4	280 - 260	ROHN 8 EH w/ angle 8x8x0.5	20.04	6.68	27.0 K=1.00	20.5036	-51734.40	874859.00	0.059 <sup>1</sup> ✓
T5	260 - 240	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0 K=1.00	20.5036	-87475.40	874884.00	0.100 <sup>1</sup> ✓
T6	240 - 220	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0 K=1.00	20.5036	-140783.00	874888.00	0.161 <sup>1</sup> ✓
T7	220 - 200	ROHN 8 EH w/ angle 8x8x0.5	20.03	10.02	40.4 K=1.00	20.5036	-197088.00	818638.00	0.241 <sup>1</sup> ✓
T8	200 - 180	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6 K=1.00	23.8453	-268188.00	982914.00	0.273 <sup>1</sup> ✓
T9	180 - 170	ROHN 10 EH w/ angle 8x8x0.5	10.02	10.02	34.6 K=1.00	23.8453	-305050.00	982929.00	0.310 <sup>1</sup> ✓
T10	170 - 160	ROHN 10 EH w/ angle 8x8x0.5	10.02	10.02	34.6 K=1.00	23.8453	-342203.00	982929.00	0.348 <sup>1</sup> ✓
T11	160 - 140	ROHN 10 EH w/ angle 8x8x0.5	20.03	10.02	34.6 K=1.00	23.8453	-421750.00	982978.00	0.429 <sup>1</sup> ✓
T12	140 - 120	ROHN 10 EH w/ angle	20.04	10.02	34.6	23.8453	-502759.00	982899.00	0.512 <sup>1</sup> ✓



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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
		8x8x0.5			K=1.00				✓
T13	120 - 100	ROHN 10 EH w/ angle 8x8x0.5	20.06	10.03	34.7 K=1.00	23.8453	-519178.00	982763.00	0.528 <sup>1</sup> ✓
T14	100 - 80	ROHN 10 EH w/ angle 8x8x0.5	20.05	10.03	34.7 K=1.00	23.8453	-589434.00	982792.00	0.600 <sup>1</sup> ✓
T15	80 - 60	ROHN 12 EH w/ angle 8x8x0.5	20.06	10.03	29.9 K=1.00	26.9670	-661020.00	1136630.00	0.582 <sup>1</sup> ✓
T16	60 - 30	ROHN 12 EH w/ angle 8x8x0.5	30.07	10.02	29.9 K=1.00	26.9670	-733002.00	1136700.00	0.645 <sup>1</sup> ✓
T17	30 - 0	ROHN 12 EHS w Angle 8x8x0.625	30.08	10.03	30.2 K=1.00	33.3120	-840602.00	1402320.00	0.599 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	L1 3/4x1 3/4x3/16	7.90	3.56	124.4 K=1.00	0.6211	-1332.71	11479.60	0.116 <sup>1</sup> ✓
T2	304 - 300	L1 3/4x1 3/4x3/16	7.90	3.56	124.4 K=1.00	0.6211	-1579.36	11479.60	0.138 <sup>1</sup> ✓
T3	300 - 280	L2x2x1/4	9.94	4.68	143.7 K=1.00	0.9380	-3094.91	13009.80	0.238 <sup>1</sup> ✓
T4	280 - 260	L2 1/2x2 1/2x1/4	12.59	5.83	142.4 K=1.00	1.1900	-4796.71	16785.10	0.286 <sup>1</sup> ✓
T5	260 - 240	L3x3x1/4	14.38	6.72	136.3 K=1.00	1.4400	-8485.37	22180.60	0.383 <sup>1</sup> ✓
T6	240 - 220	L4x4x5/16	16.19	7.64	116.9 K=1.01	2.4000	-13340.70	50268.80	0.265 <sup>1</sup> ✓
T7	220 - 200	L4x4x3/8	19.37	9.30	141.7 K=1.00	2.8600	-17336.80	40783.20	0.425 <sup>1</sup> ✓
T8	200 - 180	L4x4x3/8	21.20	10.21	155.6 K=1.00	2.8600	-21398.20	33828.90	0.633 <sup>1</sup> ✓
T9	180 - 170	L4x4x3/8	22.13	10.68	162.6 K=1.00	2.8600	-22966.30	30962.40	0.742 <sup>1</sup> ✓
T10	170 - 160	L4x4x3/8	23.06	11.15	169.7 K=1.00	2.8600	-23824.30	28413.70	0.838 <sup>1</sup> ✓
T11	160 - 140	L5x5x1/2	24.84	12.01	146.6 K=1.00	4.7500	-29160.70	63217.20	0.461 <sup>1</sup> ✓
T12	140 - 120	L5x5x1/2	26.78	13.03	159.0 K=1.00	4.7500	-30916.30	53762.80	0.575 <sup>1</sup> ✓
T13	120 - 100	ROHN 3 XXS	24.42	12.21	139.9 K=1.00	5.4664	-50783.80	63081.40	0.805 <sup>1</sup> ✓
T14	100 - 80	ROHN 3 XXS	25.15	12.58	144.1 K=1.00	5.4664	-53199.60	59442.80	0.895 <sup>1</sup> ✓
T15	80 - 60	ROHN 3 XXS	25.98	12.99	148.9 K=1.00	5.4664	-53145.50	55698.10	0.954 <sup>1</sup> ✓

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 4 EH	35.21	11.74	95.4 K=1.00	4.4074	-75010.30	101988.00	0.735 <sup>1</sup> ✓
T17	30 - 0	ROHN 4 EH	36.27	12.09	98.2 K=1.00	4.4074	-73992.20	97939.00	0.755 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 3 STD	25.39	12.22	126.1 K=1.00	2.2285	-27066.70	31679.40	0.854 <sup>1</sup> ✓
T14	100 - 80	ROHN 3 EH	27.97	13.51	142.7 K=1.00	3.0159	-30467.60	33455.50	0.911 <sup>1</sup> ✓
T15	80 - 60	ROHN 3 XXS	30.47	14.76	169.2 K=1.00	5.4664	-31433.60	43132.20	0.729 <sup>1</sup> ✓
T16	60 - 30	ROHN 3.5 EH	33.14	16.04	147.3 K=1.00	3.6784	-35097.20	38300.30	0.916 <sup>1</sup> ✓
T17	30 - 0	ROHN 4 EH	36.80	17.87	145.2 K=1.00	4.4074	-41666.30	47220.90	0.882 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	L1 3/4x1 3/4x3/16	6.81	6.35	182.6 K=0.82	0.6211	-193.80	5333.23	0.036 <sup>1</sup> ✓
T3	300 - 280	L2x2x1/4	6.81	6.35	166.0 K=0.85	0.9380	-69.63	9744.39	0.007 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 1.5 STD	6.35	5.88	113.3 K=1.00	0.7995	-9017.86	14083.10	0.640 <sup>1</sup>

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T14	100 - 80	P1.5x.145	6.99	6.52	125.7 K=1.00	0.7995	-10238.40	11432.70	0.896 <sup>1</sup> ✓
T15	80 - 60	ROHN 2 STD	7.62	7.09	108.0 K=1.00	1.0745	-11487.40	20598.10	0.558 <sup>1</sup> ✓
T16	60 - 30	ROHN 1.5 STD	5.52	4.99	96.2 K=1.00	0.7995	-12749.80	18282.30	0.697 <sup>1</sup> ✓
T17	30 - 0	P1.5x.145	6.13	5.60	108.0 K=1.00	0.7995	-14642.70	15339.00	0.955 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Horizontal (2) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 XXS	11.05	10.52	179.6 K=1.00	2.6559	-12749.80	18604.80	0.685 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 EH	12.27	11.74	152.4 K=1.00	2.2535	-14642.70	21919.90	0.668 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 2 STD	11.52	10.57	161.1 K=1.00	1.0745	-8181.56	9352.65	0.875 <sup>1</sup> ✓
T14	100 - 80	ROHN 2 EH	11.86	10.98	171.6 K=1.00	1.4807	-8683.21	11364.10	0.764 <sup>1</sup> ✓
T15	80 - 60	ROHN 2 EH	12.18	11.36	177.4 K=1.00	1.4807	-9186.98	10626.30	0.865 <sup>1</sup> ✓
T16	60 - 30	ROHN 2 EH	11.15	9.95	155.3 K=1.00	1.4807	-12866.10	13862.10	0.928 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	11.41	10.31	130.6 K=1.00	1.7040	-13622.00	22579.60	0.603 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Diagonal (2) Design Data (Compression)

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2.5 STD	14.46	13.72	173.8 K=1.00	1.7040	-8343.82	12742.30	0.655 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	15.33	14.63	185.3 K=1.00	1.7040	-9151.97	11206.60	0.817 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 1.5 STD	6.35	6.35	122.3 K=1.00	0.7995	-49.03	12066.60	0.004 <sup>1</sup> ✓
T14	100 - 80	ROHN 1.5 STD	6.99	6.99	134.8 K=1.00	0.7995	-48.04	9943.20	0.005 <sup>1</sup> ✓
T15	80 - 60	ROHN 1.5 STD	7.62	7.62	146.8 K=1.00	0.7995	-47.06	8378.50	0.006 <sup>1</sup> ✓
T16	60 - 30	ROHN 1.5 STD	5.52	5.52	106.5 K=1.00	0.7995	-175.83	15708.50	0.011 <sup>1</sup> ✓
T17	30 - 0	ROHN 1.5 STD	6.13	6.13	118.2 K=1.00	0.7995	-157.40	12924.00	0.012 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Hip (2) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 STD	11.05	11.05	168.4 K=1.00	1.0745	-95.51	8559.02	0.011 <sup>1</sup> ✓
T17	30 - 0	ROHN 2 STD	12.27	12.27	187.0 K=1.00	1.0745	-89.81	6941.18	0.013 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Hip Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 2.5 STD	15.15	15.15	191.9	1.7040	-97.06	10450.60	0.009 <sup>1</sup>

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T14	100 - 80	ROHN 2.5 STD	16.00	16.00	K=1.00 202.6	1.7040	-91.08	9375.46	0.010 <sup>1</sup> ✓
T15	80 - 60	ROHN 3 STD	16.88	16.88	K=1.00 174.1	2.2285	-102.08	16617.70	0.006 <sup>1</sup> ✓
T16	60 - 30	ROHN 2 STD	14.10	14.10	K=1.00 214.9	1.0745	-360.74	5254.92	0.069 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	14.88	14.88	K=1.00 188.4	1.7040	-327.42	10840.00	0.030 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Hip Diagonal (2) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 STD	17.91	17.91	K=1.00 273.1	1.0745	-143.01	3255.91	0.044 <sup>1</sup> ✓
T17	30 - 0	KL/R > 250 (C) - 357 ROHN 2.5 STD	19.28	19.28	K=1.00 244.2	1.7040	-140.44	6453.40	0.022 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 3 STD	12.69	12.69	K=1.00 130.9	2.2285	-27.79	29370.40	0.001 <sup>1</sup> ✓
T14	100 - 80	ROHN 3 STD	13.99	13.99	K=1.00 144.2	2.2285	-27.56	24201.90	0.001 <sup>1</sup> ✓
T15	80 - 60	ROHN 3 STD	15.24	15.24	K=1.00 157.1	2.2285	-31.26	20393.40	0.002 <sup>1</sup> ✓
T16	60 - 30	ROHN 3 STD	16.57	16.57	K=1.00 170.9	2.2285	-60.20	17239.70	0.003 <sup>1</sup> ✓
T17	30 - 0	ROHN 3 STD	18.40	18.40	K=1.00 189.8	2.2285	-62.56	13981.00	0.004 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

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## Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>lb</i>	$\phi P_n$ <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	ROHN 5 EH	16.00	4.00	26.1	6.1120	5560.81	275039.00	0.020 <sup>1</sup>
T2	304 - 300	ROHN 5 EH	4.00	4.00	26.1	6.1120	7856.49	275039.00	0.029 <sup>1</sup>
T3	300 - 280	ROHN 6 EH	20.03	5.01	27.4	8.4049	21875.70	378222.00	0.058 <sup>1</sup>
T4	280 - 260	ROHN 8 EH w/ angle 8x8x0.5	20.04	6.68	27.0	20.5036	40944.10	922662.00	0.044 <sup>1</sup>
T5	260 - 240	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0	20.5036	67823.90	922662.00	0.074 <sup>1</sup>
T6	240 - 220	ROHN 8 EH w/ angle 8x8x0.5	20.03	6.68	27.0	20.5036	108740.00	922662.00	0.118 <sup>1</sup>
T7	220 - 200	ROHN 8 EH w/ angle 8x8x0.5	20.03	10.02	40.4	20.5036	154357.00	922662.00	0.167 <sup>1</sup>
T8	200 - 180	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6	23.8453	211193.00	1073040.00	0.197 <sup>1</sup>
T9	180 - 170	ROHN 10 EH w/ angle 8x8x0.5	10.02	10.02	34.6	23.8453	241099.00	1073040.00	0.225 <sup>1</sup>
T10	170 - 160	ROHN 10 EH w/ angle 8x8x0.5	10.02	10.02	34.6	23.8453	271340.00	1073040.00	0.253 <sup>1</sup>
T11	160 - 140	ROHN 10 EH w/ angle 8x8x0.5	20.03	10.02	34.6	23.8453	335017.00	1073040.00	0.312 <sup>1</sup>
T12	140 - 120	ROHN 10 EH w/ angle 8x8x0.5	20.04	10.02	34.6	23.8453	399043.00	1073040.00	0.372 <sup>1</sup>
T13	120 - 100	ROHN 10 EH w/ angle 8x8x0.5	20.06	10.03	34.7	23.8453	409802.00	1073040.00	0.382 <sup>1</sup>
T14	100 - 80	ROHN 10 EH w/ angle 8x8x0.5	20.05	10.03	34.7	23.8453	464452.00	1073040.00	0.433 <sup>1</sup>
T15	80 - 60	ROHN 12 EH w/ angle 8x8x0.5	20.06	10.03	29.9	26.9670	520588.00	1213520.00	0.429 <sup>1</sup>
T16	60 - 30	ROHN 12 EH w/ angle 8x8x0.5	30.07	10.02	29.9	26.9670	576221.00	1213520.00	0.475 <sup>1</sup>
T17	30 - 0	ROHN 12 EHS w Angle 8x8x0.625	30.08	10.03	30.2	33.3120	660101.00	1499040.00	0.440 <sup>1</sup>

<sup>1</sup>  $P_u / \phi P_n$  controls

### Diagonal Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>lb</i>	$\phi P_n$ <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	L1 3/4x1 3/4x3/16	7.90	3.56	82.2	0.3604	1340.49	15675.30	0.086 <sup>1</sup>

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T2	304 - 300	L1 3/4x1 3/4x3/16	7.90	3.56	82.2	0.3604	1557.70	15675.30	0.099 <sup>1</sup>
T3	300 - 280	L2x2x1/4	9.94	4.68	94.6	0.5629	3067.24	24485.10	0.125 <sup>1</sup>
T4	280 - 260	L2 1/2x2 1/2x1/4	12.59	5.83	93.1	0.7284	4727.40	31687.00	0.149 <sup>1</sup>
T5	260 - 240	L3x3x1/4	14.38	6.72	88.5	0.9159	8221.24	44652.00	0.184 <sup>1</sup>
T6	240 - 220	L4x4x5/16	16.19	7.64	75.2	1.5949	13356.60	77752.40	0.172 <sup>1</sup>
T7	220 - 200	L4x4x3/8	19.37	9.30	92.1	1.8989	16638.50	92571.70	0.180 <sup>1</sup>
T8	200 - 180	L4x4x3/8	21.20	10.21	101.1	1.8637	21122.30	90857.80	0.232 <sup>1</sup>
T9	180 - 170	L4x4x3/8	22.13	10.68	105.6	1.8637	22538.90	90857.80	0.248 <sup>1</sup>
T10	170 - 160	L4x4x3/8	23.06	11.15	110.2	1.8637	23244.00	90857.80	0.256 <sup>1</sup>
T11	160 - 140	L5x5x1/2	24.84	12.01	94.8	3.1875	28272.90	155391.00	0.182 <sup>1</sup>
T12	140 - 120	L5x5x1/2	26.78	13.03	102.7	3.1875	29995.90	155391.00	0.193 <sup>1</sup>
T13	120 - 100	ROHN 3 XXS	24.42	12.21	139.9	5.4664	48086.90	245987.00	0.195 <sup>1</sup>
T14	100 - 80	ROHN 3 XXS	25.15	12.58	144.1	5.4664	49547.20	245987.00	0.201 <sup>1</sup>
T15	80 - 60	ROHN 3 XXS	25.98	12.99	148.9	5.4664	48472.60	245987.00	0.197 <sup>1</sup>
T16	60 - 30	ROHN 4 EH	35.21	11.74	95.4	4.4074	68306.40	198335.00	0.344 <sup>1</sup>
T17	30 - 0	ROHN 4 EH	36.27	12.09	98.2	4.4074	69597.20	198335.00	0.351 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 3 STD	25.39	12.22	126.1	2.2285	26754.50	100281.00	0.267 <sup>1</sup>
T14	100 - 80	ROHN 3 EH	27.97	13.51	142.7	3.0159	29223.70	135717.00	0.215 <sup>1</sup>
T15	80 - 60	ROHN 3 XXS	30.47	14.76	169.2	5.4664	29908.40	245987.00	0.122 <sup>1</sup>
T16	60 - 30	ROHN 3.5 EH	33.14	16.04	147.3	3.6784	34937.70	165529.00	0.211 <sup>1</sup>

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T17	30 - 0	ROHN 4 EH	36.80	17.87	145.2	4.4074	37602.50	198335.00	0.190 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T1	320 - 304	L1 3/4x1 3/4x3/16	6.81	6.35	141.8	0.6211	182.36	20123.40	0.009 <sup>1</sup> ✓
T3	300 - 280	L2x2x1/4	6.81	6.35	125.1	0.9380	49.59	30391.20	0.002 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 1.5 STD	6.35	5.88	113.3	0.7995	9017.86	35975.60	0.251 <sup>1</sup> ✓
T14	100 - 80	P1.5x.145	6.99	6.52	125.7	0.7995	10238.40	35975.60	0.285 <sup>1</sup> ✓
T15	80 - 60	ROHN 2 STD	7.62	7.09	108.0	1.0745	11487.40	48353.90	0.238 <sup>1</sup> ✓
T16	60 - 30	ROHN 1.5 STD	5.52	4.99	96.2	0.7995	12749.80	35975.60	0.354 <sup>1</sup> ✓
T17	30 - 0	P1.5x.145	6.13	5.60	108.0	0.7995	14642.70	35975.60	0.407 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Horizontal (2) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 XXS	11.05	10.52	179.6	2.6559	12749.80	119516.00	0.107 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 EH	12.27	11.74	152.4	2.2535	14642.70	101409.00	0.144 <sup>1</sup>



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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
									✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 2 STD	11.52	10.57	161.1	1.0745	8181.56	48353.90	0.169 <sup>1</sup> ✓
T14	100 - 80	ROHN 2 EH	11.86	10.98	171.6	1.4807	8683.21	66630.70	0.130 <sup>1</sup> ✓
T15	80 - 60	ROHN 2 EH	12.18	11.36	177.4	1.4807	9186.98	66630.70	0.138 <sup>1</sup> ✓
T16	60 - 30	ROHN 2 EH	11.15	9.95	155.3	1.4807	12866.10	66630.70	0.193 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	11.41	10.31	130.6	1.7040	13622.00	76682.30	0.178 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Diagonal (2) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2.5 STD	14.46	13.72	173.8	1.7040	8343.82	76682.30	0.109 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	15.33	14.63	185.3	1.7040	9151.97	76682.30	0.119 <sup>1</sup> ✓

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Redundant Hip (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 1.5 STD	6.35	6.35	122.3	0.7995	23.19	35975.60	0.001 <sup>1</sup> ✓
T14	100 - 80	ROHN 1.5 STD	6.99	6.99	134.8	0.7995	21.08	35975.60	0.001 <sup>1</sup> ✓

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Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>lb</i>	$\phi P_n$ <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T15	80 - 60	ROHN 1.5 STD	7.62	7.62	146.8	0.7995	15.69	35975.60	0.000 <sup>1</sup>
T16	60 - 30	ROHN 1.5 STD	5.52	5.52	106.5	0.7995	170.36	35975.60	0.005 <sup>1</sup> ✓
T17	30 - 0	ROHN 1.5 STD	6.13	6.13	118.2	0.7995	147.06	35975.60	0.004 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Redundant Hip (2) Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>lb</i>	$\phi P_n$ <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 STD	11.05	11.05	168.4	1.0745	70.64	48353.90	0.001 <sup>1</sup> ✓
T17	30 - 0	ROHN 2 STD	12.27	12.27	187.0	1.0745	61.66	48353.90	0.001 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Redundant Hip Diagonal (1) Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L<sub>u</sub></i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in<sup>2</sup></i>	<i>P<sub>u</sub></i> <i>lb</i>	$\phi P_n$ <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 2.5 STD	15.15	15.15	191.9	1.7040	98.62	76682.30	0.001 <sup>1</sup> ✓
T14	100 - 80	ROHN 2.5 STD	16.00	16.00	202.6	1.7040	91.43	76682.30	0.001 <sup>1</sup> ✓
T15	80 - 60	ROHN 3 STD	16.88	16.88	174.1	2.2285	93.77	100281.00	0.001 <sup>1</sup> ✓
T16	60 - 30	ROHN 2 STD	14.10	14.10	214.9	1.0745	355.70	48353.90	0.007 <sup>1</sup> ✓
T17	30 - 0	ROHN 2.5 STD	14.88	14.88	188.4	1.7040	322.57	76682.30	0.004 <sup>1</sup> ✓

<sup>1</sup>  $P_u / \phi P_n$  controls

### Redundant Hip Diagonal (2) Design Data (Tension)

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T16	60 - 30	ROHN 2 STD	17.91	17.91	273.1	1.0745	121.93	48353.90	0.003 <sup>1</sup>
T17	30 - 0	ROHN 2.5 STD	19.28	19.28	244.2	1.7040	118.01	76682.30	0.002 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
T13	120 - 100	ROHN 3 STD	12.69	12.69	130.9	2.2285	7.51	100281.00	0.000 <sup>1</sup>
T14	100 - 80	ROHN 3 STD	13.99	13.99	144.2	2.2285	4.00	100281.00	0.000 <sup>1</sup>
T16	60 - 30	ROHN 3 STD	16.57	16.57	170.9	2.2285	44.22	100281.00	0.000 <sup>1</sup>
T17	30 - 0	ROHN 3 STD	18.40	18.40	189.8	2.2285	40.14	100281.00	0.000 <sup>1</sup>

<sup>1</sup> P<sub>u</sub> / φP<sub>n</sub> controls

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	φP <sub>allow</sub> lb	% Capacity	Pass Fail
T1	320 - 304	Leg	ROHN 5 EH	1	-7158.84	261674.00	2.7	Pass
		Leg	ROHN 5 EH	2	-7090.50	261674.00	2.7	Pass
		Leg	ROHN 5 EH	3	-7130.55	261674.00	2.7	Pass
T2	304 - 300	Leg	ROHN 5 EH	31	-9868.54	261674.00	3.8	Pass
		Leg	ROHN 5 EH	32	-9805.40	261674.00	3.7	Pass
		Leg	ROHN 5 EH	33	-9841.92	261674.00	3.8	Pass
T3	300 - 280	Leg	ROHN 6 EH	40	-27182.10	358043.00	7.6	Pass
		Leg	ROHN 6 EH	41	-26687.60	358043.00	7.5	Pass
		Leg	ROHN 6 EH	42	-26897.60	358043.00	7.5	Pass
T4	280 - 260	Leg	ROHN 8 EH w/ angle 8x8x0.5	70	-51734.40	874859.00	5.9	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	71	-51465.00	874859.00	5.9	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	72	-51519.70	874859.00	5.9	Pass
T5	260 - 240	Leg	ROHN 8 EH w/ angle 8x8x0.5	91	-86845.30	874884.00	9.9	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	92	-87475.40	874884.00	10.0	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	93	-86550.70	874884.00	9.9	Pass
T6	240 - 220	Leg	ROHN 8 EH w/ angle 8x8x0.5	112	-140010.00	874888.00	16.0	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
		Leg	ROHN 8 EH w/ angle 8x8x0.5	113	-140783.00	874888.00	24.9 (b) 16.1	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	114	-140046.00	874888.00	24.8 (b) 16.0	Pass
T7	220 - 200	Leg	ROHN 8 EH w/ angle 8x8x0.5	133	-196039.00	818638.00	24.9 (b) 23.9	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	134	-197088.00	818638.00	24.1	Pass
		Leg	ROHN 8 EH w/ angle 8x8x0.5	135	-196080.00	818638.00	24.0	Pass
T8	200 - 180	Leg	ROHN 10 EH w/ angle 8x8x0.5	148	-266720.00	982914.00	27.1	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	149	-268188.00	982914.00	32.3 (b) 27.3	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	150	-266654.00	982914.00	32.1 (b) 27.1	Pass
T9	180 - 170	Leg	ROHN 10 EH w/ angle 8x8x0.5	163	-303505.00	982929.00	32.3 (b) 30.9	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	164	-305050.00	982929.00	36.8 (b) 31.0	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	165	-303292.00	982929.00	36.7 (b) 30.9	Pass
T10	170 - 160	Leg	ROHN 10 EH w/ angle 8x8x0.5	172	-340647.00	982929.00	36.9 (b) 34.7	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	173	-342203.00	982929.00	34.8	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	174	-340344.00	982929.00	34.6	Pass
T11	160 - 140	Leg	ROHN 10 EH w/ angle 8x8x0.5	181	-420942.00	982978.00	42.8	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	182	-421750.00	982978.00	51.1 (b) 42.9	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	183	-419751.00	982978.00	51.0 (b) 42.7	Pass
T12	140 - 120	Leg	ROHN 10 EH w/ angle 8x8x0.5	196	-501945.00	982899.00	51.2 (b) 51.1	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	197	-502759.00	982899.00	60.8 (b) 51.2	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	198	-500535.00	982899.00	60.8 (b) 50.9	Pass
T13	120 - 100	Leg	ROHN 10 EH w/ angle 8x8x0.5	211	-518675.00	982763.00	61.0 (b) 52.8	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	212	-519178.00	982763.00	62.2 (b) 52.8	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	213	-517453.00	982763.00	62.2 (b) 52.7	Pass
T14	100 - 80	Leg	ROHN 10 EH w/ angle 8x8x0.5	244	-588739.00	982792.00	62.4 (b) 59.9	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	245	-589434.00	982792.00	60.0	Pass
		Leg	ROHN 10 EH w/ angle 8x8x0.5	246	-587426.00	982792.00	59.8	Pass
T15	80 - 60	Leg	ROHN 12 EH w/ angle 8x8x0.5	277	-660085.00	1136630.00	58.1	Pass
		Leg	ROHN 12 EH w/ angle 8x8x0.5	278	-661020.00	1136630.00	59.4 (b) 58.2	Pass
		Leg	ROHN 12 EH w/ angle 8x8x0.5	279	-658736.00	1136630.00	59.3 (b) 58.0	Pass
T16	60 - 30	Leg	ROHN 12 EH w/ angle 8x8x0.5	310	-731976.00	1136700.00	59.5 (b) 64.4	Pass
		Leg	ROHN 12 EH w/ angle 8x8x0.5	311	-733002.00	1136700.00	64.8 (b) 64.5	Pass
		Leg	ROHN 12 EH w/ angle 8x8x0.5	312	-730644.00	1136700.00	64.7 (b) 64.3	Pass
T17	30 - 0	Leg	ROHN 12 EHS w Angle 8x8x0.625	361	-839274.00	1402320.00	64.9 (b) 59.8	Pass
		Leg	ROHN 12 EHS w Angle 8x8x0.625	362	-840602.00	1402320.00	59.9	Pass
		Leg	ROHN 12 EHS w Angle	363	-837869.00	1402320.00	59.7	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T1	320 - 304	Diagonal	8x8x0.625					
			L1 3/4x1 3/4x3/16	7	-1318.90	11479.60	11.5	Pass
							22.8 (b)	
			L1 3/4x1 3/4x3/16	8	-1318.06	11479.60	11.5	Pass
							22.8 (b)	
			L1 3/4x1 3/4x3/16	9	-1307.04	11479.60	11.4	Pass
							22.4 (b)	
			L1 3/4x1 3/4x3/16	10	-1293.20	11479.60	11.3	Pass
							22.4 (b)	
			L1 3/4x1 3/4x3/16	11	-1332.71	11479.60	11.6	Pass
							23.1 (b)	
			L1 3/4x1 3/4x3/16	12	-1332.07	11479.60	11.6	Pass
							23.1 (b)	
			L1 3/4x1 3/4x3/16	13	-1077.24	11479.60	9.4	Pass
							18.5 (b)	
			L1 3/4x1 3/4x3/16	14	-1077.61	11479.60	9.4	Pass
							18.5 (b)	
			L1 3/4x1 3/4x3/16	15	-1056.66	11479.60	9.2	Pass
							18.0 (b)	
			L1 3/4x1 3/4x3/16	16	-1046.79	11479.60	9.1	Pass
							18.0 (b)	
			L1 3/4x1 3/4x3/16	17	-1116.28	11479.60	9.7	Pass
							19.2 (b)	
			L1 3/4x1 3/4x3/16	18	-1116.56	11479.60	9.7	Pass
							19.2 (b)	
			L1 3/4x1 3/4x3/16	19	-852.74	11479.60	7.4	Pass
							14.7 (b)	
			L1 3/4x1 3/4x3/16	20	-852.56	11479.60	7.4	Pass
							14.7 (b)	
			L1 3/4x1 3/4x3/16	21	-828.16	11479.60	7.2	Pass
				14.1 (b)				
L1 3/4x1 3/4x3/16	22	-815.60	11479.60	7.1	Pass			
				14.1 (b)				
L1 3/4x1 3/4x3/16	23	-901.56	11479.60	7.9	Pass			
				15.6 (b)				
L1 3/4x1 3/4x3/16	24	-901.57	11479.60	7.9	Pass			
				15.6 (b)				
L1 3/4x1 3/4x3/16	25	-538.76	11479.60	4.7	Pass			
				9.2 (b)				
L1 3/4x1 3/4x3/16	26	-593.79	11479.60	5.2	Pass			
				9.9 (b)				
L1 3/4x1 3/4x3/16	27	-543.58	11479.60	4.7	Pass			
				9.0 (b)				
L1 3/4x1 3/4x3/16	28	-495.26	11479.60	4.3	Pass			
				8.4 (b)				
L1 3/4x1 3/4x3/16	29	-707.27	11479.60	6.2	Pass			
				12.1 (b)				
L1 3/4x1 3/4x3/16	30	-707.14	11479.60	6.2	Pass			
				12.1 (b)				
T2	304 - 300	Diagonal	L1 3/4x1 3/4x3/16	34	-1522.62	11479.60	13.3	Pass
							25.9 (b)	
			L1 3/4x1 3/4x3/16	35	-1522.70	11479.60	13.3	Pass
							25.8 (b)	
			L1 3/4x1 3/4x3/16	36	-1542.89	11479.60	13.4	Pass
							25.6 (b)	
L1 3/4x1 3/4x3/16	37	-1505.81	11479.60	13.1	Pass			
				25.6 (b)				
L1 3/4x1 3/4x3/16	38	-1579.36	11479.60	13.8	Pass			
				26.8 (b)				
L1 3/4x1 3/4x3/16	39	-1578.43	11479.60	13.7	Pass			
				26.8 (b)				

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T3	300 - 280	Diagonal	L2x2x1/4	46	-2797.75	13009.80	21.5	Pass
							30.6 (b)	
		Diagonal	L2x2x1/4	47	-2936.33	13009.80	22.6	Pass
							30.4 (b)	
		Diagonal	L2x2x1/4	48	-2340.51	13009.80	18.0	Pass
							24.3 (b)	
		Diagonal	L2x2x1/4	49	-2234.06	13009.80	17.2	Pass
							24.4 (b)	
		Diagonal	L2x2x1/4	50	-3094.91	13009.80	23.8	Pass
							33.6 (b)	
		Diagonal	L2x2x1/4	51	-3084.02	13009.80	23.7	Pass
							33.7 (b)	
		Diagonal	L2x2x1/4	52	-2266.00	14300.60	15.8	Pass
							24.9 (b)	
		Diagonal	L2x2x1/4	53	-2279.03	14300.60	15.9	Pass
							24.8 (b)	
		Diagonal	L2x2x1/4	54	-2266.25	14300.60	15.8	Pass
							23.8 (b)	
		Diagonal	L2x2x1/4	55	-2181.75	14300.60	15.3	Pass
							23.9 (b)	
Diagonal	L2x2x1/4	56	-2578.62	14300.60	18.0	Pass		
					28.1 (b)			
Diagonal	L2x2x1/4	57	-2579.09	14300.60	18.0	Pass		
					28.1 (b)			
Diagonal	L2x2x1/4	58	-2108.38	15762.10	13.4	Pass		
					23.2 (b)			
Diagonal	L2x2x1/4	59	-2134.23	15762.10	13.5	Pass		
					23.1 (b)			
Diagonal	L2x2x1/4	60	-1704.75	15762.10	10.8	Pass		
					18.3 (b)			
Diagonal	L2x2x1/4	61	-1668.75	15762.10	10.6	Pass		
					18.3 (b)			
Diagonal	L2x2x1/4	62	-2122.00	15762.10	13.5	Pass		
					22.9 (b)			
Diagonal	L2x2x1/4	63	-2086.72	15762.10	13.2	Pass		
					23.0 (b)			
Diagonal	L2x2x1/4	64	-1982.10	17400.80	11.4	Pass		
					21.4 (b)			
Diagonal	L2x2x1/4	65	-2053.25	17400.80	11.8	Pass		
					21.3 (b)			
Diagonal	L2x2x1/4	66	-1454.62	17400.80	8.4	Pass		
					15.2 (b)			
Diagonal	L2x2x1/4	67	-1435.60	17400.80	8.3	Pass		
					15.2 (b)			
Diagonal	L2x2x1/4	68	-2006.53	17400.80	11.5	Pass		
					20.4 (b)			
Diagonal	L2x2x1/4	69	-1901.74	17400.80	10.9	Pass		
					20.5 (b)			
T4	280 - 260	Diagonal	L2 1/2x2 1/2x1/4	73	-4747.34	16785.10	28.3	Pass
							39.5 (b)	
		Diagonal	L2 1/2x2 1/2x1/4	74	-4796.71	16785.10	28.6	Pass
							39.4 (b)	
		Diagonal	L2 1/2x2 1/2x1/4	75	-4295.55	16785.10	25.6	Pass
							34.5 (b)	
		Diagonal	L2 1/2x2 1/2x1/4	76	-4203.96	16785.10	25.0	Pass
							34.6 (b)	
Diagonal	L2 1/2x2 1/2x1/4	77	-4701.76	16785.10	28.0	Pass		
					38.1 (b)			
Diagonal	L2 1/2x2 1/2x1/4	78	-4587.37	16785.10	27.3	Pass		
					38.2 (b)			
Diagonal	L2 1/2x2 1/2x1/4	79	-4203.19	18668.80	22.5	Pass		

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
		Diagonal	L2 1/2x2 1/2x1/4	80	-4332.74	18668.80	34.9 (b) 23.2	Pass
		Diagonal	L2 1/2x2 1/2x1/4	81	-3663.41	18668.80	34.8 (b) 19.6	Pass
		Diagonal	L2 1/2x2 1/2x1/4	82	-3524.49	18668.80	29.1 (b) 18.9	Pass
		Diagonal	L2 1/2x2 1/2x1/4	83	-4357.05	18668.80	29.2 (b) 23.3	Pass
		Diagonal	L2 1/2x2 1/2x1/4	84	-4254.45	18668.80	35.2 (b) 22.8	Pass
		Diagonal	L2 1/2x2 1/2x1/4	85	-3655.79	20825.20	35.3 (b) 17.6	Pass
		Diagonal	L2 1/2x2 1/2x1/4	86	-3836.85	20825.20	30.5 (b) 18.4	Pass
		Diagonal	L2 1/2x2 1/2x1/4	87	-2949.11	20825.20	30.3 (b) 14.2	Pass
		Diagonal	L2 1/2x2 1/2x1/4	88	-2823.74	20825.20	23.3 (b) 13.6	Pass
		Diagonal	L2 1/2x2 1/2x1/4	89	-3940.54	20825.20	23.4 (b) 18.9	Pass
		Diagonal	L2 1/2x2 1/2x1/4	90	-3847.13	20825.20	31.9 (b) 18.5	Pass
T5	260 - 240	Diagonal	L3x3x1/4	94	-8485.37	22180.60	32.0 (b) 38.3	Pass
		Diagonal	L3x3x1/4	95	-8264.06	22180.60	58.0 (b) 37.3	Pass
		Diagonal	L3x3x1/4	96	-7648.17	22180.60	58.2 (b) 34.5	Pass
		Diagonal	L3x3x1/4	97	-8138.74	22180.60	53.9 (b) 36.7	Pass
		Diagonal	L3x3x1/4	98	-6482.21	22180.60	53.7 (b) 29.2	Pass
		Diagonal	L3x3x1/4	99	-6230.89	22180.60	43.7 (b) 28.1	Pass
		Diagonal	L3x3x1/4	100	-6718.30	24277.90	43.8 (b) 27.7	Pass
		Diagonal	L3x3x1/4	101	-6691.15	24277.90	47.0 (b) 27.6	Pass
		Diagonal	L3x3x1/4	102	-6268.77	24277.90	47.0 (b) 25.8	Pass
		Diagonal	L3x3x1/4	103	-6423.37	24277.90	43.4 (b) 26.5	Pass
		Diagonal	L3x3x1/4	104	-6002.87	24277.90	43.4 (b) 24.7	Pass
		Diagonal	L3x3x1/4	105	-5804.19	24277.90	40.8 (b) 23.9	Pass
		Diagonal	L3x3x1/4	106	-5802.72	26649.70	40.9 (b) 21.8	Pass
		Diagonal	L3x3x1/4	107	-5806.88	26649.70	40.8 (b) 21.8	Pass
		Diagonal	L3x3x1/4	108	-5406.85	26649.70	40.8 (b) 20.3	Pass
		Diagonal	L3x3x1/4	109	-5414.35	26649.70	37.2 (b) 20.3	Pass
		Diagonal	L3x3x1/4	110	-5475.93	26649.70	37.1 (b) 20.5	Pass
		Diagonal	L3x3x1/4	111	-5331.36	26649.70	37.5 (b) 20.0	Pass
T6	240 - 220	Diagonal	L4x4x5/16	115	-13155.80	50268.80	37.5 (b) 26.2	Pass
							74.1 (b)	

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
		Diagonal	L4x4x5/16	116	-13074.70	50268.80	26.0	Pass
		Diagonal	L4x4x5/16	117	-13314.90	50268.80	74.2 (b) 26.5	Pass
		Diagonal	L4x4x5/16	118	-13340.70	50268.80	75.6 (b) 26.5	Pass
		Diagonal	L4x4x5/16	119	-10925.10	50268.80	75.4 (b) 21.7	Pass
		Diagonal	L4x4x5/16	120	-10926.30	50268.80	61.9 (b) 21.7	Pass
		Diagonal	L4x4x5/16	121	-12552.80	53365.30	61.9 (b) 23.5	Pass
		Diagonal	L4x4x5/16	122	-12154.00	53365.30	68.2 (b) 22.8	Pass
		Diagonal	L4x4x5/16	123	-12339.10	53365.30	68.3 (b) 23.1	Pass
		Diagonal	L4x4x5/16	124	-12659.20	53365.30	69.4 (b) 23.7	Pass
		Diagonal	L4x4x5/16	125	-10055.60	53365.30	69.2 (b) 18.8	Pass
		Diagonal	L4x4x5/16	126	-10103.10	53365.30	56.3 (b) 18.9	Pass
		Diagonal	L4x4x5/16	127	-10431.10	56723.40	56.3 (b) 18.4	Pass
		Diagonal	L4x4x5/16	128	-9855.64	56723.40	55.3 (b) 17.4	Pass
		Diagonal	L4x4x5/16	129	-9601.97	56723.40	55.5 (b) 16.9	Pass
		Diagonal	L4x4x5/16	130	-10289.20	56723.40	54.0 (b) 18.1	Pass
		Diagonal	L4x4x5/16	131	-7826.39	56723.40	53.9 (b) 13.8	Pass
		Diagonal	L4x4x5/16	132	-7675.05	56723.40	41.9 (b) 13.5	Pass
T7	220 - 200	Diagonal	L4x4x3/8	136	-17147.40	40783.20	42.0 (b) 42.0	Pass
		Diagonal	L4x4x3/8	137	-16367.70	40783.20	76.7 (b) 40.1	Pass
		Diagonal	L4x4x3/8	138	-16704.20	40783.20	76.9 (b) 41.0	Pass
		Diagonal	L4x4x3/8	139	-17336.80	40783.20	78.5 (b) 42.5	Pass
		Diagonal	L4x4x3/8	140	-13338.70	40783.20	78.3 (b) 32.7	Pass
		Diagonal	L4x4x3/8	141	-13530.20	40783.20	62.2 (b) 33.2	Pass
		Diagonal	L4x4x3/8	142	-15678.40	44725.40	62.2 (b) 35.1	Pass
		Diagonal	L4x4x3/8	143	-15344.20	44725.40	71.9 (b) 34.3	Pass
		Diagonal	L4x4x3/8	144	-15640.50	44725.40	72.1 (b) 35.0	Pass
		Diagonal	L4x4x3/8	145	-15848.00	44725.40	73.5 (b) 35.4	Pass
		Diagonal	L4x4x3/8	146	-12631.30	44725.40	73.3 (b) 28.2	Pass
		Diagonal	L4x4x3/8	147	-12632.50	44725.40	59.2 (b) 28.2	Pass
T8	200 - 180	Diagonal	L4x4x3/8	151	-21313.70	33828.90	59.2 (b) 63.0	Pass
		Diagonal	L4x4x3/8	152	-20973.10	33828.90	84.1 (b) 62.0	Pass



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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
		Diagonal	L4x4x3/8	153	-21120.30	33828.90	84.3 (b) 62.4	Pass
		Diagonal	L4x4x3/8	154	-21398.20	33828.90	85.0 (b) 63.3	Pass
		Diagonal	L4x4x3/8	155	-16830.70	33828.90	84.7 (b) 49.8	Pass
		Diagonal	L4x4x3/8	156	-16829.00	33828.90	67.5 (b) 49.7	Pass
		Diagonal	L4x4x3/8	157	-20518.90	37111.10	67.5 (b) 55.3	Pass
		Diagonal	L4x4x3/8	158	-19714.90	37111.10	78.7 (b) 53.1	Pass
		Diagonal	L4x4x3/8	159	-20064.40	37111.10	78.9 (b) 54.1	Pass
		Diagonal	L4x4x3/8	160	-20719.40	37111.10	80.3 (b) 55.8	Pass
		Diagonal	L4x4x3/8	161	-15823.90	37111.10	80.1 (b) 42.6	Pass
		Diagonal	L4x4x3/8	162	-15967.10	37111.10	63.1 (b) 43.0	Pass
T9	180 - 170	Diagonal	L4x4x3/8	166	-22966.30	30962.40	63.1 (b) 74.2	Pass
		Diagonal	L4x4x3/8	167	-22534.80	30962.40	90.4 (b) 72.8	Pass
		Diagonal	L4x4x3/8	168	-22397.20	30962.40	90.7 (b) 72.3	Pass
		Diagonal	L4x4x3/8	169	-22892.30	30962.40	90.1 (b) 73.9	Pass
		Diagonal	L4x4x3/8	170	-17957.80	30962.40	89.9 (b) 58.0	Pass
		Diagonal	L4x4x3/8	171	-17951.40	30962.40	72.0 (b) 58.0	Pass
T10	170 - 160	Diagonal	L4x4x3/8	175	-23824.30	28413.70	72.0 (b) 83.8	Pass
		Diagonal	L4x4x3/8	176	-23363.10	28413.70	93.3 (b) 82.2	Pass
		Diagonal	L4x4x3/8	177	-23081.80	28413.70	93.5 (b) 81.2	Pass
		Diagonal	L4x4x3/8	178	-23668.70	28413.70	92.4 (b) 83.3	Pass
		Diagonal	L4x4x3/8	179	-18553.40	28413.70	92.1 (b) 65.3	Pass
		Diagonal	L4x4x3/8	180	-18545.10	28413.70	73.9 (b) 65.3	Pass
T11	160 - 140	Diagonal	L5x5x1/2	184	-29160.70	63217.20	73.9 (b) 46.1	Pass
		Diagonal	L5x5x1/2	185	-28558.00	63217.20	86.2 (b) 45.2	Pass
		Diagonal	L5x5x1/2	186	-27085.80	63217.20	85.3 (b) 42.8	Pass
		Diagonal	L5x5x1/2	187	-28339.20	63217.20	81.0 (b) 44.8	Pass
		Diagonal	L5x5x1/2	188	-23660.20	63217.20	83.8 (b) 37.4	Pass
		Diagonal	L5x5x1/2	189	-23066.40	63217.20	70.0 (b) 36.5	Pass
		Diagonal	L5x5x1/2	190	-26998.10	68040.50	68.8 (b) 39.7	Pass
		Diagonal	L5x5x1/2	191	-26846.20	68040.50	80.8 (b) 39.5	Pass
							80.9 (b)	

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T12	140 - 120	Diagonal	L5x5x1/2	192	-25958.60	68040.50	38.2	Pass
		Diagonal	L5x5x1/2	193	-26500.60	68040.50	78.3 (b)	Pass
		Diagonal	L5x5x1/2	194	-21501.90	68040.50	38.9	Pass
		Diagonal	L5x5x1/2	195	-21476.20	68040.50	78.3 (b)	Pass
		Diagonal	L5x5x1/2	199	-30916.30	53762.80	31.6	Pass
		Diagonal	L5x5x1/2	200	-30154.40	53762.80	64.6 (b)	Pass
		Diagonal	L5x5x1/2	201	-28057.70	53762.80	31.6	Pass
		Diagonal	L5x5x1/2	202	-29741.60	53762.80	64.6 (b)	Pass
		Diagonal	L5x5x1/2	203	-24921.80	53762.80	57.5	Pass
		Diagonal	L5x5x1/2	204	-23903.80	53762.80	91.4 (b)	Pass
		Diagonal	L5x5x1/2	205	-28372.50	58159.10	56.1	Pass
		Diagonal	L5x5x1/2	206	-28344.60	58159.10	90.5 (b)	Pass
		Diagonal	L5x5x1/2	207	-26408.70	58159.10	52.2	Pass
		Diagonal	L5x5x1/2	208	-26855.10	58159.10	84.3 (b)	Pass
T13	120 - 100	Diagonal	L5x5x1/2	209	-22530.30	58159.10	55.3	Pass
		Diagonal	L5x5x1/2	210	-22473.80	58159.10	87.9 (b)	Pass
		Diagonal	L5x5x1/2	215	-50783.80	63081.40	46.4	Pass
		Diagonal	ROHN 3 XXS	218	-49659.40	63081.40	73.7 (b)	Pass
		Diagonal	ROHN 3 XXS	222	-47760.80	63081.40	38.6	Pass
T14	100 - 80	Diagonal	ROHN 3 XXS	225	-49781.80	63081.40	67.9 (b)	Pass
		Diagonal	ROHN 3 XXS	231	-41491.90	63081.40	80.5	Pass
		Diagonal	ROHN 3 XXS	234	-40613.20	63081.40	78.7	Pass
		Diagonal	ROHN 3 XXS	248	-53199.60	59442.80	75.7	Pass
		Diagonal	ROHN 3 XXS	251	-51437.60	59442.80	78.9	Pass
		Diagonal	ROHN 3 XXS	255	-50772.90	59442.80	65.8	Pass
		Diagonal	ROHN 3 XXS	258	-52717.80	59442.80	64.4	Pass
T15	80 - 60	Diagonal	ROHN 3 XXS	264	-43783.30	59442.80	89.5	Pass
		Diagonal	ROHN 3 XXS	267	-43201.50	59442.80	86.5	Pass
		Diagonal	ROHN 3 XXS	281	-53145.50	55698.10	85.4 (b)	Pass
		Diagonal	ROHN 3 XXS	284	-50878.20	55698.10	45.4	Pass
		Diagonal	ROHN 3 XXS	288	-50034.90	55698.10	81.4 (b)	Pass
		Diagonal	ROHN 3 XXS	291	-52529.40	55698.10	46.2	Pass
T16	60 - 30	Diagonal	ROHN 3 XXS	297	-43005.40	55698.10	79.6 (b)	Pass
		Diagonal	ROHN 3 XXS	300	-42287.80	55698.10	38.7	Pass
		Diagonal	ROHN 4 EH	314	-75010.30	101988.00	67.7 (b)	Pass
		Diagonal	ROHN 4 EH	319	-71265.90	101988.00	38.6	Pass
		Diagonal	ROHN 4 EH	325	-70420.30	101988.00	67.9 (b)	Pass
		Diagonal	ROHN 4 EH	330	-74258.80	101988.00	73.9 (b)	Pass
		Diagonal	ROHN 4 EH	340	-61493.10	101988.00	69.9	Pass
		Diagonal	ROHN 4 EH	345	-60647.60	101988.00	70.2 (b)	Pass
		Diagonal	ROHN 4 EH	345	-60647.60	101988.00	69.0	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
							59.8 (b)	
T17	30 - 0	Diagonal	ROHN 4 EH	365	-73992.20	97939.00	75.5	Pass
		Diagonal	ROHN 4 EH	370	-71931.80	97939.00	73.4	Pass
		Diagonal	ROHN 4 EH	376	-69478.00	97939.00	70.9	Pass
		Diagonal	ROHN 4 EH	381	-72934.30	97939.00	74.5	Pass
		Diagonal	ROHN 4 EH	391	-57652.20	97939.00	58.9	Pass
		Diagonal	ROHN 4 EH	396	-56658.80	97939.00	57.9	Pass
T13	120 - 100	Horizontal	ROHN 3 STD	214	-27066.70	31679.40	85.4	Pass
		Horizontal	ROHN 3 STD	221	-26196.70	31679.40	82.7	Pass
		Horizontal	ROHN 3 STD	230	-21372.10	31679.40	67.5	Pass
T14	100 - 80	Horizontal	ROHN 3 EH	247	-30467.60	33455.50	91.1	Pass
		Horizontal	ROHN 3 EH	254	-30173.20	33455.50	90.2	Pass
		Horizontal	ROHN 3 EH	263	-24523.00	33455.50	73.3	Pass
T15	80 - 60	Horizontal	ROHN 3 XXS	280	-31433.60	43132.20	72.9	Pass
		Horizontal	ROHN 3 XXS	287	-30972.60	43132.20	71.8	Pass
		Horizontal	ROHN 3 XXS	296	-24572.60	43132.20	57.0	Pass
T16	60 - 30	Horizontal	ROHN 3.5 EH	313	-35097.20	38300.30	91.6	Pass
		Horizontal	ROHN 3.5 EH	324	-34544.40	38300.30	90.2	Pass
		Horizontal	ROHN 3.5 EH	339	-27287.90	38300.30	71.2	Pass
T17	30 - 0	Horizontal	ROHN 4 EH	364	-41666.30	47220.90	88.2	Pass
		Horizontal	ROHN 4 EH	375	-40964.30	47220.90	86.8	Pass
		Horizontal	ROHN 4 EH	390	-32007.60	47220.90	67.8	Pass
T1	320 - 304	Top Girt	L1 3/4x1 3/4x3/16	4	-193.63	5333.23	3.6	Pass
		Top Girt	L1 3/4x1 3/4x3/16	5	-193.80	5333.23	3.6	Pass
		Top Girt	L1 3/4x1 3/4x3/16	6	-193.13	5333.23	3.6	Pass
T3	300 - 280	Top Girt	L2x2x1/4	43	-69.39	9744.39	0.7	Pass
		Top Girt	L2x2x1/4	44	-68.56	9744.39	0.7	Pass
		Top Girt	L2x2x1/4	45	-69.63	9744.39	0.7	Pass
T13	120 - 100	Redund Horz 1 Bracing	ROHN 1.5 STD	216	-9009.14	14083.10	64.0	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	219	-9017.86	14083.10	64.0	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	223	-9017.86	14083.10	64.0	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	226	-8987.92	14083.10	63.8	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	232	-8987.92	14083.10	63.8	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	235	-9009.14	14083.10	64.0	Pass
T14	100 - 80	Redund Horz 1 Bracing	P1.5x.145	249	-10226.40	11432.70	89.4	Pass
		Redund Horz 1 Bracing	P1.5x.145	252	-10238.40	11432.70	89.6	Pass
		Redund Horz 1 Bracing	P1.5x.145	256	-10238.40	11432.70	89.6	Pass
		Redund Horz 1 Bracing	P1.5x.145	259	-10203.60	11432.70	89.2	Pass
		Redund Horz 1 Bracing	P1.5x.145	265	-10203.60	11432.70	89.2	Pass
		Redund Horz 1 Bracing	P1.5x.145	268	-10226.40	11432.70	89.4	Pass
T15	80 - 60	Redund Horz 1 Bracing	ROHN 2 STD	282	-11471.20	20598.10	55.7	Pass
		Redund Horz 1 Bracing	ROHN 2 STD	285	-11487.40	20598.10	55.8	Pass
		Redund Horz 1 Bracing	ROHN 2 STD	289	-11487.40	20598.10	55.8	Pass
		Redund Horz 1 Bracing	ROHN 2 STD	292	-11447.80	20598.10	55.6	Pass
		Redund Horz 1 Bracing	ROHN 2 STD	298	-11447.80	20598.10	55.6	Pass

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	<p><b>Client</b></p> <p>VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"</p>	<p><b>Designed by</b></p> <p>MCD</p>

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
		Bracing						
T16	60 - 30	Redund Horz 1	ROHN 2 STD	301	-11471.20	20598.10	55.7	Pass
		Bracing						
		Redund Horz 1	ROHN 1.5 STD	315	-12727.50	18282.30	69.6	Pass
		Bracing						
		Redund Horz 1	ROHN 1.5 STD	320	-12749.80	18282.30	69.7	Pass
		Bracing						
		Redund Horz 1	ROHN 1.5 STD	326	-12749.80	18282.30	69.7	Pass
T17	30 - 0	Bracing						
		Redund Horz 1	ROHN 1.5 STD	331	-12702.60	18282.30	69.5	Pass
		Bracing						
		Redund Horz 1	ROHN 1.5 STD	341	-12702.60	18282.30	69.5	Pass
		Bracing						
		Redund Horz 1	ROHN 1.5 STD	346	-12727.50	18282.30	69.6	Pass
		Bracing						
T16	60 - 30	Redund Horz 1	P1.5x.145	366	-14615.80	15339.00	95.3	Pass
		Bracing						
		Redund Horz 1	P1.5x.145	371	-14642.70	15339.00	95.5	Pass
		Bracing						
		Redund Horz 1	P1.5x.145	377	-14642.70	15339.00	95.5	Pass
		Bracing						
		Redund Horz 1	P1.5x.145	382	-14589.60	15339.00	95.1	Pass
T17	30 - 0	Bracing						
		Redund Horz 1	P1.5x.145	392	-14589.60	15339.00	95.1	Pass
		Bracing						
		Redund Horz 1	P1.5x.145	397	-14615.80	15339.00	95.3	Pass
		Bracing						
		Redund Horz 2	ROHN 2 XXS	316	-12727.50	18604.80	68.4	Pass
		Bracing						
T16	60 - 30	Redund Horz 2	ROHN 2 XXS	321	-12749.80	18604.80	68.5	Pass
		Bracing						
		Redund Horz 2	ROHN 2 XXS	327	-12749.80	18604.80	68.5	Pass
		Bracing						
		Redund Horz 2	ROHN 2 XXS	332	-12702.60	18604.80	68.3	Pass
		Bracing						
		Redund Horz 2	ROHN 2 XXS	342	-12702.60	18604.80	68.3	Pass
T17	30 - 0	Bracing						
		Redund Horz 2	ROHN 2 XXS	347	-12727.50	18604.80	68.4	Pass
		Bracing						
		Redund Horz 2	ROHN 2.5 EH	367	-14615.80	21919.90	66.7	Pass
		Bracing						
		Redund Horz 2	ROHN 2.5 EH	372	-14642.70	21919.90	66.8	Pass
		Bracing						
T16	60 - 30	Redund Horz 2	ROHN 2.5 EH	378	-14642.70	21919.90	66.8	Pass
		Bracing						
		Redund Horz 2	ROHN 2.5 EH	383	-14589.60	21919.90	66.6	Pass
		Bracing						
		Redund Horz 2	ROHN 2.5 EH	393	-14589.60	21919.90	66.6	Pass
		Bracing						
		Redund Horz 2	ROHN 2.5 EH	398	-14615.80	21919.90	66.7	Pass
T13	120 - 100	Bracing						
		Redund Diag 1	ROHN 2 STD	217	-8173.65	9352.65	87.4	Pass
		Bracing						
		Redund Diag 1	ROHN 2 STD	220	-8181.56	9352.65	87.5	Pass
		Bracing						
		Redund Diag 1	ROHN 2 STD	224	-8181.56	9352.65	87.5	Pass
		Bracing						
T16	60 - 30	Redund Diag 1	ROHN 2 STD	227	-8154.40	9352.65	87.2	Pass
		Bracing						
		Redund Diag 1	ROHN 2 STD	233	-8154.40	9352.65	87.2	Pass

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	<b>Client</b> VZW-217/EMP-008/EVS-010/CSP 2020 Revision - "H"	<b>Designed by</b> MCD

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T14	100 - 80	Redund Diag 1 Bracing	ROHN 2 STD	236	-8173.65	9352.65	87.4	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	250	-8672.98	11364.10	76.3	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	253	-8683.21	11364.10	76.4	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	257	-8683.21	11364.10	76.4	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	260	-8653.66	11364.10	76.1	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	266	-8653.66	11364.10	76.1	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	269	-8672.98	11364.10	76.3	Pass
T15	80 - 60	Redund Diag 1 Bracing	ROHN 2 EH	283	-9174.00	10626.30	86.3	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	286	-9186.98	10626.30	86.5	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	290	-9186.98	10626.30	86.5	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	293	-9155.27	10626.30	86.2	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	299	-9155.27	10626.30	86.2	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	302	-9174.00	10626.30	86.3	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	317	-12843.60	13862.10	92.7	Pass
T16	60 - 30	Redund Diag 1 Bracing	ROHN 2 EH	322	-12866.10	13862.10	92.8	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	328	-12866.10	13862.10	92.8	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	333	-12818.50	13862.10	92.5	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	343	-12818.50	13862.10	92.5	Pass
		Redund Diag 1 Bracing	ROHN 2 EH	348	-12843.60	13862.10	92.7	Pass
		Redund Diag 1 Bracing	ROHN 2.5 STD	368	-13597.00	22579.60	60.2	Pass
		Redund Diag 1 Bracing	ROHN 2.5 STD	373	-13622.00	22579.60	60.3	Pass
T17	30 - 0	Redund Diag 1 Bracing	ROHN 2.5 STD	379	-13622.00	22579.60	60.3	Pass
		Redund Diag 1 Bracing	ROHN 2.5 STD	384	-13572.70	22579.60	60.1	Pass
		Redund Diag 1 Bracing	ROHN 2.5 STD	394	-13572.70	22579.60	60.1	Pass
		Redund Diag 1 Bracing	ROHN 2.5 STD	399	-13597.00	22579.60	60.2	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	318	-8329.25	12742.30	65.4	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	323	-8343.82	12742.30	65.5	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	329	-8343.82	12742.30	65.5	Pass
T16	60 - 30	Redund Diag 2 Bracing	ROHN 2.5 STD	334	-8312.96	12742.30	65.2	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	344	-8312.96	12742.30	65.2	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	349	-8329.25	12742.30	65.4	Pass
		Redund Diag 2 Bracing	ROHN 2.5 STD	349	-8329.25	12742.30	65.4	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T17	30 - 0	Bracing Redund Diag 2	ROHN 2.5 STD	369	-9135.13	11206.60	81.5	Pass
		Bracing Redund Diag 2	ROHN 2.5 STD	374	-9151.97	11206.60	81.7	Pass
		Bracing Redund Diag 2	ROHN 2.5 STD	380	-9151.97	11206.60	81.7	Pass
		Bracing Redund Diag 2	ROHN 2.5 STD	385	-9118.79	11206.60	81.4	Pass
		Bracing Redund Diag 2	ROHN 2.5 STD	395	-9118.79	11206.60	81.4	Pass
		Bracing Redund Diag 2	ROHN 2.5 STD	400	-9135.13	11206.60	81.5	Pass
T13	120 - 100	Bracing Redund Hip 1	ROHN 1.5 STD	228	-48.78	12066.60	0.4	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	237	-40.74	12066.60	0.3	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	239	-49.03	12066.60	0.4	Pass
T14	100 - 80	Bracing Redund Hip 1	ROHN 1.5 STD	261	-48.04	9943.20	0.5	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	270	-41.45	9943.20	0.4	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	272	-47.92	9943.20	0.5	Pass
T15	80 - 60	Bracing Redund Hip 1	ROHN 1.5 STD	294	-47.06	8378.50	0.6	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	303	-39.79	8378.50	0.5	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	305	-46.57	8378.50	0.6	Pass
T16	60 - 30	Bracing Redund Hip 1	ROHN 1.5 STD	335	-171.63	15708.50	1.1	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	350	-144.13	15708.50	0.9	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	354	-175.83	15708.50	1.1	Pass
T17	30 - 0	Bracing Redund Hip 1	ROHN 1.5 STD	386	-152.91	12924.00	1.2	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	401	-125.52	12924.00	1.0	Pass
		Bracing Redund Hip 1	ROHN 1.5 STD	405	-157.40	12924.00	1.2	Pass
T16	60 - 30	Bracing Redund Hip 2	ROHN 2 STD	336	-93.41	8559.02	1.1	Pass
		Bracing Redund Hip 2	ROHN 2 STD	351	-78.61	8559.02	0.9	Pass
		Bracing Redund Hip 2	ROHN 2 STD	355	-95.51	8559.02	1.1	Pass
T17	30 - 0	Bracing Redund Hip 2	ROHN 2 STD	387	-87.63	6941.18	1.3	Pass
		Bracing Redund Hip 2	ROHN 2 STD	402	-73.06	6941.18	1.1	Pass
		Bracing Redund Hip 2	ROHN 2 STD	406	-89.81	6941.18	1.3	Pass
T13	120 - 100	Bracing Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	229	-97.06	10450.60	0.9	Pass
		Bracing Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	238	-80.65	10450.60	0.8	Pass
		Bracing Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	240	-96.74	10450.60	0.9	Pass

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	94 of 95
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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
T14	100 - 80	Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	262	-91.08	9375.46	1.0	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	271	-79.56	9375.46	0.8	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	273	-88.18	9375.46	0.9	Pass
T15	80 - 60	Redund Hip Diagonal 1 Bracing	ROHN 3 STD	295	-102.08	16617.70	0.6	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 3 STD	304	-95.73	16617.70	0.6	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 3 STD	306	-102.08	16617.70	0.6	Pass
T16	60 - 30	Redund Hip Diagonal 1 Bracing	ROHN 2 STD	337	-348.86	5254.92	6.6	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2 STD	352	-279.34	5254.92	5.3	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2 STD	356	-360.74	5254.92	6.9	Pass
T17	30 - 0	Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	388	-315.32	10840.00	2.9	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	403	-249.57	10840.00	2.3	Pass
		Redund Hip Diagonal 1 Bracing	ROHN 2.5 STD	407	-327.42	10840.00	3.0	Pass
T16	60 - 30	Redund Hip Diagonal 2 Bracing	ROHN 2 STD	338	-141.61	3255.91	4.3	Pass
		Redund Hip Diagonal 2 Bracing	ROHN 2 STD	353	-141.12	3255.91	4.3	Pass
		Redund Hip Diagonal 2 Bracing	ROHN 2 STD	357	-143.01	3255.91	4.4	Pass
T17	30 - 0	Redund Hip Diagonal 2 Bracing	ROHN 2.5 STD	389	-139.41	6453.40	2.2	Pass
		Redund Hip Diagonal 2 Bracing	ROHN 2.5 STD	404	-139.16	6453.40	2.2	Pass
		Redund Hip Diagonal 2 Bracing	ROHN 2.5 STD	408	-140.44	6453.40	2.2	Pass
T13	120 - 100	Inner Bracing	ROHN 3 STD	241	-27.79	29370.40	0.4	Pass
		Inner Bracing	ROHN 3 STD	242	-23.51	29370.40	0.4	Pass
		Inner Bracing	ROHN 3 STD	243	-27.38	29370.40	0.4	Pass
T14	100 - 80	Inner Bracing	ROHN 3 STD	274	-27.56	24201.90	0.4	Pass
		Inner Bracing	ROHN 3 STD	275	-23.86	24201.90	0.4	Pass
		Inner Bracing	ROHN 3 STD	276	-26.46	24201.90	0.4	Pass
T15	80 - 60	Inner Bracing	ROHN 3 STD	307	-31.26	20393.40	0.4	Pass
		Inner Bracing	ROHN 3 STD	308	-28.68	20393.40	0.4	Pass
		Inner Bracing	ROHN 3 STD	309	-29.93	20393.40	0.4	Pass
T16	60 - 30	Inner Bracing	ROHN 3 STD	358	-59.87	17239.70	0.5	Pass
		Inner Bracing	ROHN 3 STD	359	-59.49	17239.70	0.5	Pass
		Inner Bracing	ROHN 3 STD	360	-60.20	17239.70	0.5	Pass
T17	30 - 0	Inner Bracing	ROHN 3 STD	409	-62.35	13981.00	0.5	Pass
		Inner Bracing	ROHN 3 STD	410	-62.04	13981.00	0.5	Pass
		Inner Bracing	ROHN 3 STD	411	-62.56	13981.00	0.6	Pass

Summary

Leg (T16)	64.9	Pass
Diagonal (T15)	95.4	Pass
Horizontal (T16)	91.6	Pass
Top Girt (T1)	3.6	Pass
Redund Horz 1	95.5	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail
						Bracing (T17)		
						Redund Horz 2	68.5	Pass
						Bracing (T16)		
						Redund Diag 1	92.8	Pass
						Bracing (T16)		
						Redund Diag 2	81.7	Pass
						Bracing (T17)		
						Redund Hip 1 Bracing (T17)	1.2	Pass
						Redund Hip 2 Bracing (T17)	1.3	Pass
						Redund Hip Diagonal 1 Bracing (T16)	6.9	Pass
						Redund Hip Diagonal 2 Bracing (T16)	4.4	Pass
						Inner Bracing (T17)	0.6	Pass
						Bolt Checks	93.5	Pass
						<b>RATING =</b>	<b>95.5</b>	<b>Pass</b>



## **ANCHOR BOLT EVALUATION**

Job	<u>320' Rohn SSMW - Colchester, CT</u>	Project No.	<u>EMP / VZW / EVS</u>	Sheet	<u>1</u> of <u>4</u>
Description	<u>Anchor Bolt Analysis (TIA-222-H) (Addendum 1)</u>	Computed by	<u>MCD</u>	Date	<u>05/18/20</u>
	<u>Proposed Inventory - Modification Analysis</u>	Checked by	<u>                    </u>	Date	<u>                    </u>

# ANCHOR BOLT ANALYSIS

## Input Data

### Tower Reactions:

Uplift:	<b>Uplift := 740.586·kips</b>	<i>user input</i>
Shear:	<b>Shear := 129.314·kips</b>	<i>user input</i>
Compression:	<b>Compression := 942.660·kips</b>	<i>user input</i>

### Anchor Bolt Data:

**Use ASTM A354 Grade BC [ref. ROHN Drawing A971600, dated 9/23/1999]**

Number of Anchor Bolts = N	<b>N := 24</b>	<i>user input</i>
Bolt Ultimate Strength:	<b>F<sub>u</sub> := 125·ksi</b>	<i>user input</i>
Bolt Yield Strength:	<b>F<sub>y</sub> := 109·ksi</b>	<i>user input</i>
Bolt Modulus:	<b>E := 29000·ksi</b>	<i>user input</i>
Thickness of Anchor Bolts	<b>D := 1.0in</b>	<i>user input</i>
Threads per Inch:	<b>n := 8</b>	<i>user input</i>
Coefficient of Friction:	<b>μ := 0.55</b>	<i>user input</i> (for baseplate with grout ASCE 10-15)
Length from top of pier to bottom of leveling nut:	<b>L<sub>ar</sub> := 0in</b>	<i>user input</i>
Bolt Modulus:	<b>E<sub>ww</sub> := 29000·ksi</b>	<i>user input</i>

Job	<u>320' Rohn SSMW - Colchester, CT</u>	Project No.	<u>EMP / VZW / EVS</u>	Sheet	<u>2</u> of <u>4</u>
Description	<u>Anchor Bolt Analysis (TIA-222-H) (Addendum 1)</u>	Computed by	<u>MCD</u>	Date	<u>05/18/20</u>
	<u>Proposed Inventory - Modification Analysis</u>	Checked by	<u>    </u>	Date	<u>    </u>

**Anchor Bolt Section Properties:**

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 0.79 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left( D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \qquad A_n = 0.61 \cdot \text{in}^2$$

Net Diameter:

$$D_n := D - \frac{0.9743 \text{in}}{n} \qquad D_n = 0.88 \cdot \text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.22 \cdot \text{in}$$

Plastic Section Modulus of Bolt:

$$Z_x := \frac{D_n^3}{6} \qquad Z_x = 0.11 \cdot \text{in}^3$$

**Forces:**

Tension Force:

$$T_u := \frac{\text{Uplift}}{N}$$

$$T_u = 30.86 \cdot \text{kip} \qquad T_{ub} := T_u$$

Resistance Factor for Flexure (TIA-222-H 4.9.9):

$$\phi_f := 0.9$$

Resistance Factor for Anchor Bolt (Compression (TIA-222-H 4.9.9 Addendum 1)):

$$\phi_c := 0.90$$

Compression Force:

$$P_{uc} := \frac{\text{Compression}}{N}$$

$$P_{uc} = 39.28 \cdot \text{kip} \qquad P_{ucb} := P_{uc}$$

Resistance Factor for Tension (TIA-222-H 4.9.9):

$$\phi_t := 0.75$$

Shear Force:

$$V_u := \frac{\text{Shear}}{N}$$

$$V_u = 5.39 \cdot \text{kip} \qquad V_{ub} := V_u$$

Resistance Factor for Shear (TIA-222-H 4.9.9):

$$\phi_v := 0.75$$

### TIA-222-H 4.9.9 Calculate Equation Variables Strength Design:

Design Tensile Strength,  $R_{nt}$ :

$$R_{nt} := F_u \cdot A_n$$

$$R_{nt} = 75.72 \cdot \text{ft} \cdot \text{kip}$$

$$\phi_t \cdot R_{nt} = 56.79 \cdot \text{ft} \cdot \text{kip}$$

Design Compression Strength,  $R_{nc}$ :

$$R_{nc} := F_y \cdot A_g$$

$$R_{nc} = 85.61 \cdot \text{ft} \cdot \text{kip}$$

$$\phi_c \cdot R_{nc} = 77.05 \cdot \text{ft} \cdot \text{kip}$$

Design Shear Strength (Tension),  $R_{nv}$ :

$$R_{nv} := 0.5 \cdot F_u \cdot A_g$$

$$R_{nv} = 49.09 \cdot \text{ft} \cdot \text{kip}$$

$$\phi_v \cdot R_{nv} = 36.82 \cdot \text{ft} \cdot \text{kip}$$

Design Shear Strength (Compression),  $R_{nvc}$ :

$$R_{nvc} := 0.6 \cdot F_y \cdot 0.75 A_g$$

$$R_{nvc} = 38.52 \cdot \text{ft} \cdot \text{kip}$$

$$\phi_c \cdot R_{nvc} = 34.67 \cdot \text{ft} \cdot \text{kip}$$

NOTE: Per TIA-222-H The determination of capacity formulas are based on the existing constructed condition of exposed anchor rod from the top of the foundation to the bottom of the (base) leveling nut., Therefore the following equations next page), reflects for this tower site, the first formula shall be applied:

$l_{ar} = 3" - 1.75" \text{ (nut height)} = 1.25" < 1.0 \text{ Bolt Diameter}$ , however bearing on grouted pad, therefore consider  $(1 \times d)$  anchor bolted considerations (TIA-222-H- Section 4.9.9 Addendum 1)

Job	<u>320' Rohn SSMW - Colchester, CT</u>	Project No.	<u>EMP / VZW / EVS</u>	Sheet	<u>4</u> of <u>4</u>
Description	<u>Anchor Bolt Analysis (TIA-222-H) (Addendum 1)</u>	Computed by	<u>MCD</u>	Date	<u>05/18/20</u>
	<u>Proposed Inventory - Modification Analysis</u>	Checked by	_____	Date	_____

**TIA-222-H 4.9.9 Combined Shear and Tension:**

$$\left[ \frac{T_{ub}}{(\phi_t \cdot R_{nt})} \right]^2 + \left[ \frac{V_{ub}}{(\phi_v \cdot R_{nv})} \right]^2 \leq 1$$

$$\left[ \frac{T_{ub}}{(\phi_t \cdot R_{nt})} \right]^2 + \left( \frac{V_{ub}}{\phi_v \cdot R_{nv}} \right)^2 = 0.32$$

**TIA-222-H 4.9.9 Combined Shear and Compression:**

$$\left[ \frac{P_{ucb}}{(\phi_c \cdot R_{nc})} \right] + \left( \frac{V_{ub}}{\phi_c \cdot R_{nvc}} \right)^2 \leq 1$$

$$\left[ \frac{P_{ucb}}{(\phi_c \cdot R_{nc})} \right] + \left( \frac{V_{ub}}{\phi_c \cdot R_{nvc}} \right)^2 = 0.53$$

NOTE: Larger ratio number shown above Governs design Capacity.

**Combined Shear and Tension/Compression Check:**

$$\text{ShearAndTensionCheck} := \text{if} \left[ \max \left[ \left[ \frac{V_{ub}}{(\phi_v \cdot R_{nv})} \right]^2 + \left[ \frac{T_{ub}}{(\phi_t \cdot R_{nt})} \right]^2, \left[ \frac{P_{ucb}}{(\phi_c \cdot R_{nc})} \right] + \left( \frac{V_{ub}}{\phi_c \cdot R_{nvc}} \right)^2 \right] \leq 1, \text{"OK"}, \text{"NO GOOD"} \right]$$

ShearAndTensionCheck = "OK"

# FOUNDATION EVALUATION

Job	<u>320' Rohn SSVMW - Colchester, CT</u>	Project No.	<u>EMP / VZW / EVS</u>	Sheet	<u>1</u> of <u>2</u>
Description	<u>Evaluation of Drilled Pier Caisson</u>	Computed by	<u>MCD</u>	Date	<u>05/18/20</u>
	<u>Proposed Inventory - Modification Analysis</u>	Checked by		Date	

### 3 SIDED SELF SUPPORTING TOWER FOUNDATION DRILLED PIER

Compression:	<b>Download := 942.660 kips</b>	$\gamma_c := 150 \text{pcf}$	Concrete unit weight
Uplift:	<b>uplift := 740.586 kips</b>	$\gamma_w := 62.4 \text{pcf}$	Water unit weight
Depth Neglected for Skin Friction at the top	<b>Depthunbond := 4 ft</b>	$\gamma_s := 120 \text{pcf}$	Soil unit weight
Drill Caisson length	<b>CaissonLength := 35.5 ft</b>	<b>Pier<math>\phi</math> := 7.5 ft</b>	Pier diameter
Water Table Below grade:	<b>Wd := 10 ft</b>	Per BL Companies Report 9.13.2000	<b>hg := 0.5 ft</b> Height of Pier Above grade
Ave allowable Shear at Depth of 4' to 10'	<b>f1 := (380psf) · 2.0</b>		<b>SoilBearingCapacity = (6.7ksf) · 2.0</b>
Ave allowable Shear at Depth of 10' to 35'	<b>f2 := (700psf) · 2.0</b>		Allowable Bearing Pressure at Depth 35' x 2 for Ultimate Bearing Capacity (TIA-222-H)

NOTE: Values indicated as "Allowable Stress" figures are increased, Per TIA-222-H Section 9.7 (Design Strength), Allowable values may be multiplied to obtain Design Strength values before applying reduction factors.

#### Loading:

$$\text{TotalDownload} := \text{Download} + 1.2 \cdot \left[ \pi \cdot \frac{\text{Pier}\phi^2}{4} \cdot (\text{CaissonLength} \cdot \gamma_c) \right]$$

TotalDownload = 1224.96 kips

$$\text{Pierweight} := 0.9 \cdot \left[ \pi \cdot \frac{\text{Pier}\phi^2}{4} \cdot [(\text{Wd} + \text{hg}) \cdot \gamma_c + (\text{CaissonLength} - \text{Wd} - \text{hg}) \cdot (\gamma_c - \gamma_w)] \right]$$

Pierweight = 149.7 kips

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

Soilshear = 932.11 kips

#### Compression Capacity:

$$\text{TotalDownloadCapacity} := 0.75 \cdot \text{Soilshear} + 0.75 \cdot \text{SoilBearingCapacity} \cdot \left( \pi \cdot \frac{\text{Pier}\phi^2}{4} \right)$$

TotalDownloadCapacity = 1143.08 kips

NOTE: 0.75 reduction factor for foundation bearing (TIA-H Section 9.7)

#### Tension Capacity:

$$\text{TotalUpLiftCapacity} := 0.75 \cdot \text{Soilshear} + 0.75 \cdot \text{Pierweight}$$

TotalUpLiftCapacity = 811.36 kips

NOTE: 0.75 reduction factor for foundation uplift of caisson (TIA-H Section 9.7)

Job	<u>320' Rohn SSVMW - Colchester, CT</u>	Project No.	<u>EMP / VZW / EVS</u>	Sheet	<u>2</u> of <u>2</u>
Description	<u>Evaluation of Drilled Pier Caisson</u>	Computed by	<u>MCD</u>	Date	<u>05/18/20</u>
	<u>Proposed Inventory - Modification Analysis</u>	Checked by	<u>                    </u>	Date	<u>                    </u>

Check Cone Failure

$$\text{ConeFailureCapacity} := \frac{[(\text{CaissonLength} - \text{hg}) \cdot \tan(30 \cdot \text{deg}) \cdot 2 + \text{Pier}\phi]^2 \cdot \pi \cdot \text{CaissonLength} - \text{hg}}{4} \cdot \frac{\text{CaissonLength} - \text{hg}}{3} \cdot (69 \text{pcf})$$

*NOTE: "69 pcf" is the approximate average of submerged soil (25 ft) and dry soil (10.5 ft) considered in uplifting failure cone.*

$$\text{ConeFailureCapacity} = 1451.51 \cdot \text{kips}$$

$$\text{CheckConeFailureCapacity} := \text{if}(\text{uplift} < \text{ConeFailureCapacity}, \text{"Okay"}, \text{"No Good"})$$

$$\text{CheckConeFailureCapacity} = \text{"Okay"}$$

$$\frac{\text{uplift}}{0.75 \text{ConeFailureCapacity}} = 68.0\%$$

**Foundation Check (Previous foundation Mod. designed by URS dated 7/13/2012 (vz5-122)):**

Add Concrete around existing caisson foundations

$$L_{\text{modification}} := 12 \text{ft} \quad \text{Depth}_{\text{modification}} := 4 \text{ft}$$

$$\text{Area}_{\text{modification}} := L_{\text{modification}}^2 - \pi \cdot \frac{\text{Pier}\phi^2}{4} \quad \text{Area}_{\text{modification}} = 99.82 \text{ft}^2$$

$$\text{Weight}_{\text{modification}} := \text{Area}_{\text{modification}} \cdot \text{Depth}_{\text{modification}} \cdot \gamma_c \quad \text{Weight}_{\text{modification}} = 59.89 \cdot \text{kip}$$

$$\text{SoilBearingCapacity}_{4\text{ft}} := (2 \text{kSF}) \cdot 2.0 \quad \text{Ultimate Soil Bearing Capacity at 4' Below --> Based on Boring Logs}$$

$$\text{TotalDownLoad}_2 := \text{TotalDownLoad} + 1.2 \text{Weight}_{\text{modification}} \quad \text{TotalDownLoad}_2 = 1296.83 \cdot \text{kip}$$

$$\text{TotalDownLoadCapacity}_2 := \text{TotalDownLoadCapacity} + 0.75(\text{Area}_{\text{modification}} \cdot \text{SoilBearingCapacity}_{4\text{ft}})$$

$$\text{TotalDownLoadCapacity}_2 = 1442.54 \cdot \text{kip}$$

$$\text{CheckDownLoadCapacity}_2 := \text{if}(\text{TotalDownLoad}_2 < \text{TotalDownLoadCapacity}_2, \text{"Okay"}, \text{"No Good"})$$

$$\text{CheckDownLoadCapacity}_2 = \text{"Okay"}$$

$$\frac{\text{TotalDownLoad}_2}{\text{TotalDownLoadCapacity}_2} = 89.9\%$$

$$\text{TotalUpLiftCapacity}_2 := \text{TotalUpLiftCapacity} + 0.9 \text{Weight}_{\text{modification}}$$

$$\text{TotalUpLiftCapacity}_2 = 865.26 \cdot \text{kips}$$

$$\text{CheckUpLiftCapacity}_2 := \text{if}(\text{uplift} < \text{TotalUpLiftCapacity}_2, \text{"Okay"}, \text{"No Good"})$$

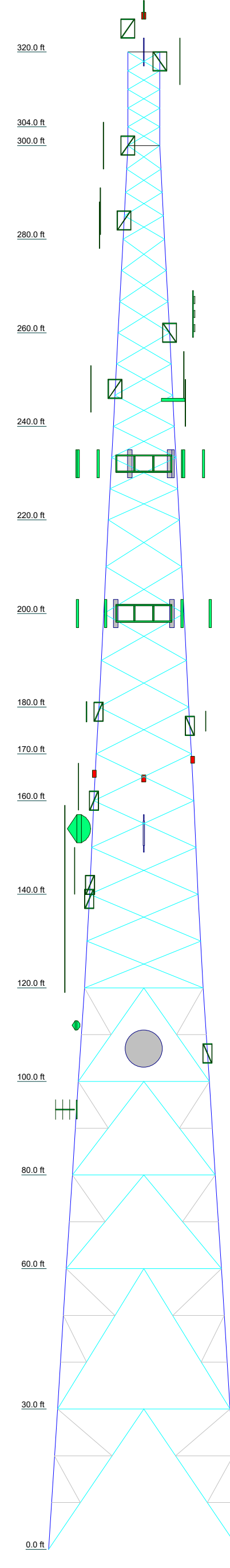
$$\frac{\text{uplift}}{\text{TotalUpLiftCapacity}_2} = 85.59\%$$

$$\text{CheckUpLiftCapacity}_2 = \text{"Okay"}$$



## **ANALYSIS UNDER TIA-222-F DESIGN CRITERIA (DESPP / CSP)**

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	
Legs					ROHN 8 EH w/ angle 8x8x0.5							ROHN 10 EH w/ angle 8x8x0.5			ROHN 12 EH w/ angle 8x8x0.5			
Leg Grade					A572-50							A572-50						
Diagonals						L4x4x5/16												
Diagonal Grade						L3x3x1/4												
Top Girts																		
Horizontals																		
Red. Horizontals																		
Red. Diagonals																		
Red. Hips																		
Inner Bracing																		
Face Width (ft)						11.04												6.81
# Panels @ (ft)						9 @ 6.66667												5 @ 4
Weight (lb)						5907.7												1442.1



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (Lightning Rod)	329	CBC78T-DS-43-2X Diplexer (Verizon (Prev. Prop.))	232
Dual Lights (Beacon)	327	CBC78T-DS-43-2X Diplexer (Verizon (Prev. Prop.))	232
PD128-1 (ECI-1)	325	PIROD 12' Lightweight T-Frame (ATI)	200
6' Side Mount Standoff (ECI-1)	325	PIROD 12' Lightweight T-Frame (ATI)	200
BA1012-0 (ECI-2)	320	PIROD 12' Lightweight T-Frame (ATI)	200
6' Side Mount Standoff (ECI-2)	320	7770.00 (ATI)	200
ANT450F6 (ECI-3)	318	HPA-65R-BUU-H8 Panel (ATI (Prev. Proposed))	200
4x4" Pipe Mount (ECI-3)	318	RRUS-32 (ATI (Prev. Proposed))	200
SC479-HF1LDF (ECI-4)	300	RRUS-11 (ATI (Prev. Proposed))	200
6' Side Mount Standoff (ECI-4)	300	7770.00 (ATI)	200
PD340-1 (ECI-5)	290	HPA-65R-BUU-H8 Panel (ATI (Prev. Proposed))	200
6' Side Mount Standoff (ECI-5)	290	RRUS-32 (ATI (Prev. Proposed))	200
DB809T3E-XC (ECI-6)	286	RRUS-11 (ATI (Prev. Proposed))	200
6' Side Mount Standoff (ECI-7)	284	7770.00 (ATI)	200
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-7)	283	HPA-65R-BUU-H6 Panel (ATI (Prev. Proposed))	200
PD440-2 (ECI-8)	264	RRUS-32 (ATI (Prev. Proposed))	200
6' Side Mount Standoff (ECI-8)	260	RRUS-11 (ATI (Prev. Proposed))	200
SC479-HF1LDF (ECI-10)	251	DC6-48-60-0-8C Squid / Surge Arrestor (ATI (Prev. Proposed))	200
PD1142-1 (ECI-14)	248	STK-U Stiffener Side Arm Attachment (ATI)	200
6' Side Mount Standoff (ECI-14)	248	STK-U Stiffener Side Arm Attachment (ATI)	200
430-94C-09168-M-11048 TTA (ECI-11)	247	STK-U Stiffener Side Arm Attachment (ATI)	200
Sabre T-Boom (1) (ECI-10, 11, 12, 13)	246	STK-U Stiffener Side Arm Attachment (ATI)	200
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-13)	245	STK-U Stiffener Side Arm Attachment (ATI)	200
SC479-HF1LDF(D001-E6085) (Inverted) (ECI-12)	245	STK-U Stiffener Side Arm Attachment (ATI)	200
6' Side Mount Standoff (ECI-15)	238	STK-U Stiffener Side Arm Attachment (ATI)	200
531-70HD Exposed Dipole Antenna (ECI-15)	238	PIROD 4' Side Mount Standoff (1) (ECI-50)	179
Valmont VFA-10-U V-Frame (Verizon)	232	DB586-Y (ECI-50)	179
Valmont VFA-10-U V-Frame (Verizon)	232	DB586-Y (ECI-51)	177
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	232	PIROD 4' Side Mount Standoff (1) (ECI-53,52,51)	176
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	232	430-94C-09168-M-11048 TTA (ECI-52)	176
LNx-6512DS-VTM (Verizon-850)	232	DB586-Y (inverted) (ECI-53)	175
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	232	L-810 Obstruction Lighting (1) (ECI-54)	168
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	232	L-810 Obstruction Lighting (1) (ECI-55)	165
RFV01U-D2A RRH Unit (Verizon RRH (Prev. Prop.))	232	L-810 Obstruction Lighting (1) (ECI-56)	164
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	232	Telewave ANT220F2 - Omni Antenna (Eversource (Proposed #1))	163
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	232	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed #1))	160
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	232	5'3"x4" Pipe Mount (ECI-58a (Dish Support))	154
LNx-6512DS-VTM (Verizon-850)	232	Commscope PAR6-59W-PXA/A (ECI-58)	154
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	232	5'3"x4" Pipe Mount (ECI-57)	153
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	232	ANT450F6 (ECI-57)	153
RFV01U-D2A RRH Unit (Verizon RRH (Prev. Prop.))	232	Telewave ANT220F2 - Omni Antenna (Eversource (Proposed #2))	145
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	232	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed #1))	142
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	232	4' Side Mount Standoff (ECI-60 .59)	139
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	232	PD156S (ECI-60)	139
LNx-6512DS-VTM (Verizon-850)	232	DB212-1 (ECI-59)	139
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	232	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-61a)	117
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	232	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-63a (Dish Ice Shield))	115
RFV01U-D2A RRH Unit (Verizon RRH (Prev. Prop.))	232	5'3"x4" Pipe Mount (ECI-61a (Dish Support))	112
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	232	Andrew 2' w/Radome (ECI-61)	112
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	232	5'3"x4" Pipe Mount (ECI-63 (Dish Support))	107
LNx-6512DS-VTM (Verizon-850)	232	PA8-65 (ECI-63)	107
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	232	PIROD 4' Side Mount Standoff (1) (ECI-62)	106
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	232	PD458 (ECI-62)	106
RFV01U-D2A RRH Unit (Verizon RRH (Prev. Prop.))	232	4'x4" Pipe Mount (ECI-66)	94
CBC78T-DS-43-2X Diplexer (Verizon (Prev. Prop.))	232	PD688S-4 (ECI-66)	94

### MATERIAL STRENGTH

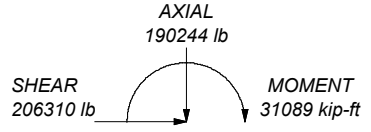
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

### TOWER DESIGN NOTES

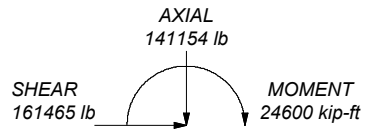
1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.

MAX. CORNER REACTIONS AT BASE:  
**DOWN: 945667 lb**  
**SHEAR: 123290 lb**

**UPLIFT: -746402 lb**  
**SHEAR: 105013 lb**



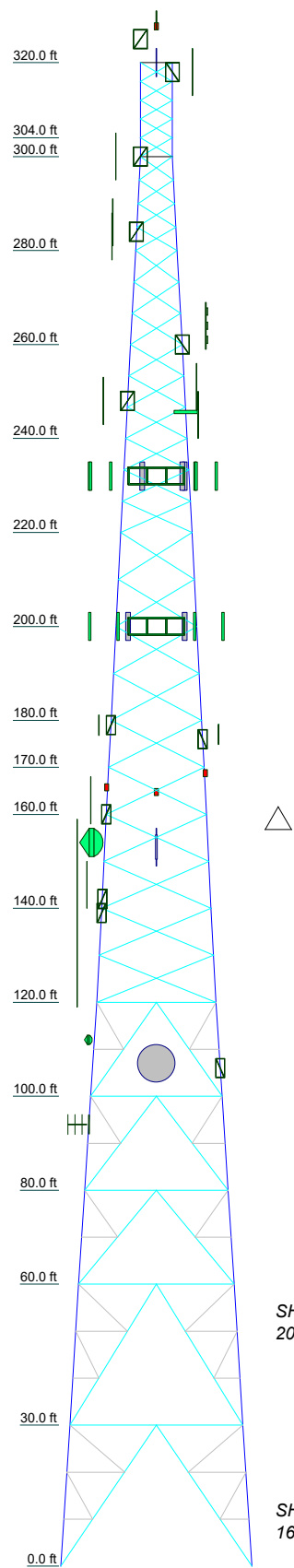
TORQUE 629 kip-ft  
90 mph WIND - 0.5000 in ICE



TORQUE 373 kip-ft  
REACTIONS - 90 mph WIND

<b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	Job: <b>320' Rohn SSMW</b> Project: <b>CSP Tower - Colchester, CT</b> Client: <b>DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied</b> Code: <b>TIA/EIA-222-F</b> Path:	Drawn by: <b>MCD</b> Date: <b>05/18/20</b>	App'd: Scale: <b>NTS</b> Dwg No. <b>E-1</b>
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Section	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	A	ROHN 12 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 10 EH w/ angle 8x8x0.5	ROHN 8 EH w/ angle 8x8x0.5	ROHN 8 EH w/ angle 8x8x0.5	ROHN 6 EH	ROHN 5 EH									
Leg Grade																	
Diagonals		ROHN 4 EH	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 XXS	ROHN 3 STD											
Diagonal Grade																	
Top Girts																	
Horizontals		ROHN 4 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3.5 EH	ROHN 3 STD											
Red. Horizontals		P1.5x.145	ROHN 1.5 STD	ROHN 2 STD	ROHN 2 STD	E											
Red. Diagonals		ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD	ROHN 2.5 STD												
Red. Hips			ROHN 1.5 STD	ROHN 1.5 STD	ROHN 1.5 STD												
Inner Bracing			ROHN 3 STD	ROHN 3 STD	ROHN 3 STD												
Face Width (ft)	40.89	36.8	33.14	30.47	27.97	25.39	21.3	20.28	19.22	17.09	15.09	13.08	11.04	8.85			6.81
# Panels @ (ft)		2 @ 30	3 @ 20	3 @ 20	3 @ 20	3 @ 20	10 @ 10	10 @ 10	10 @ 10	9 @ 6.66667	9 @ 6.66667	9 @ 6.66667	9 @ 6.66667	9 @ 6.66667	4 @ 5	5 @ 4	5 @ 4
Weight (lb)	125382.3	17941.9	15115.4	11450.5	9875.5	9144.9	9008.6	3795.3	3750.8	7298.6	6409.0	6494.4	5409.2	5907.7	2498.3	340.7	1442.1



**SYMBOL LIST**

MARK	SIZE	MARK	SIZE
A	ROHN 12 EHS w Angle 8x8x0.625	D	N.A.
B	L1 3/4x1 3/4x3/16	E	ROHN 1.5 STD
C	L2 1/2x2 1/2x1/4		

**MATERIAL STRENGTH**

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

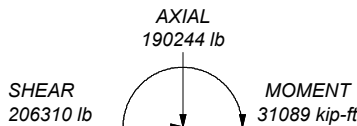
**TOWER DESIGN NOTES**

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.

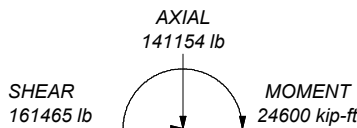
**MAX. CORNER REACTIONS AT BASE:**

DOWN: 945667 lb  
SHEAR: 123290 lb

UPLIFT: -746402 lb  
SHEAR: 105013 lb



TORQUE 629 kip-ft  
90 mph WIND - 0.5000 in ICE



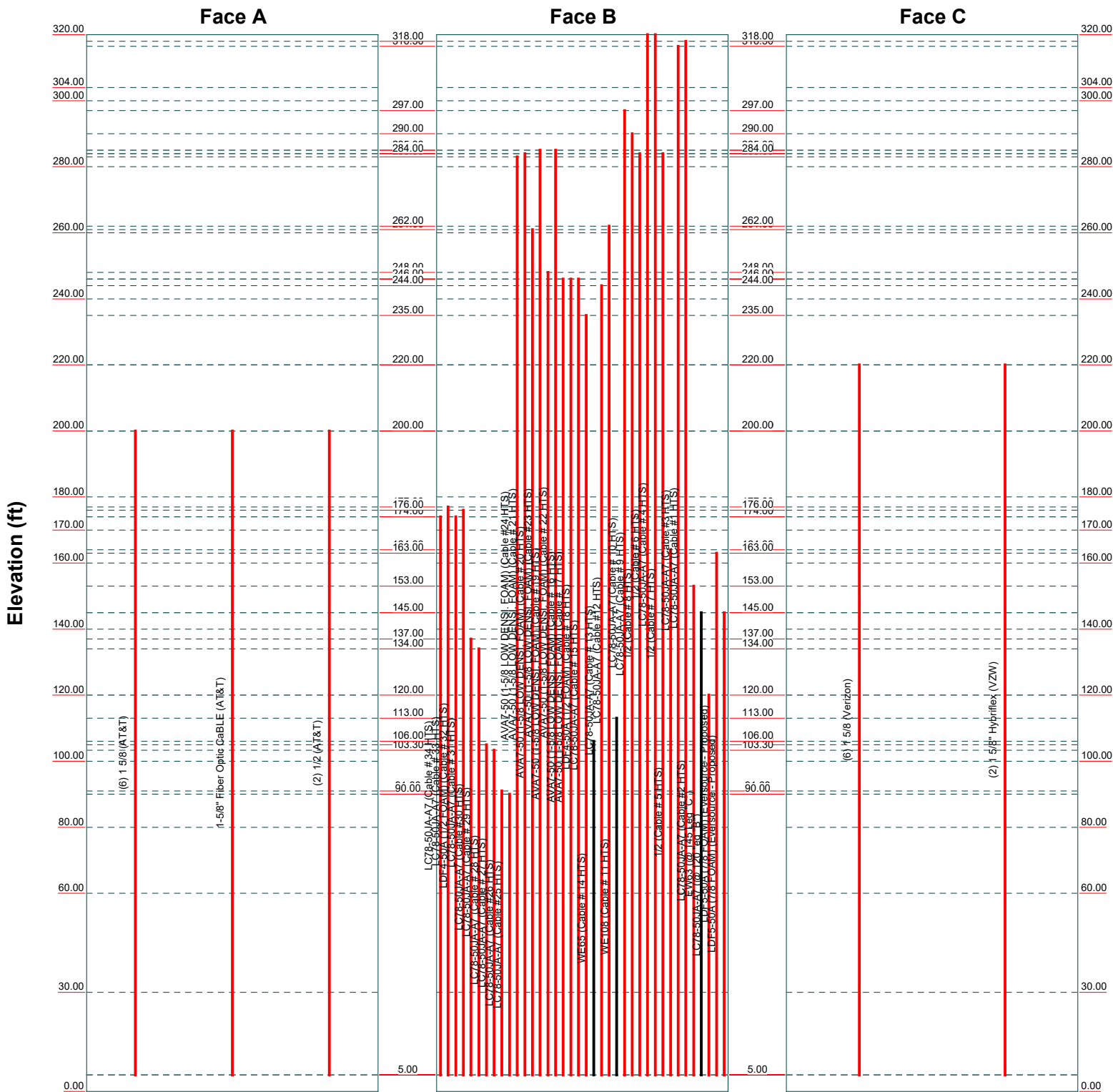
TORQUE 373 kip-ft  
REACTIONS - 90 mph WIND

<b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job: 320' Rohn SSVMW</b>		
	<b>Project: CSP Tower - Colchester, CT</b>		
	Client: DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	Drawn by: MCD	App'd:
	Code: TIA/EIA-222-F	Date: 05/18/20	Scale: NTS
	Path:	Dwg No. E-1	

# Feed Line Distribution Chart

## 0' - 320'

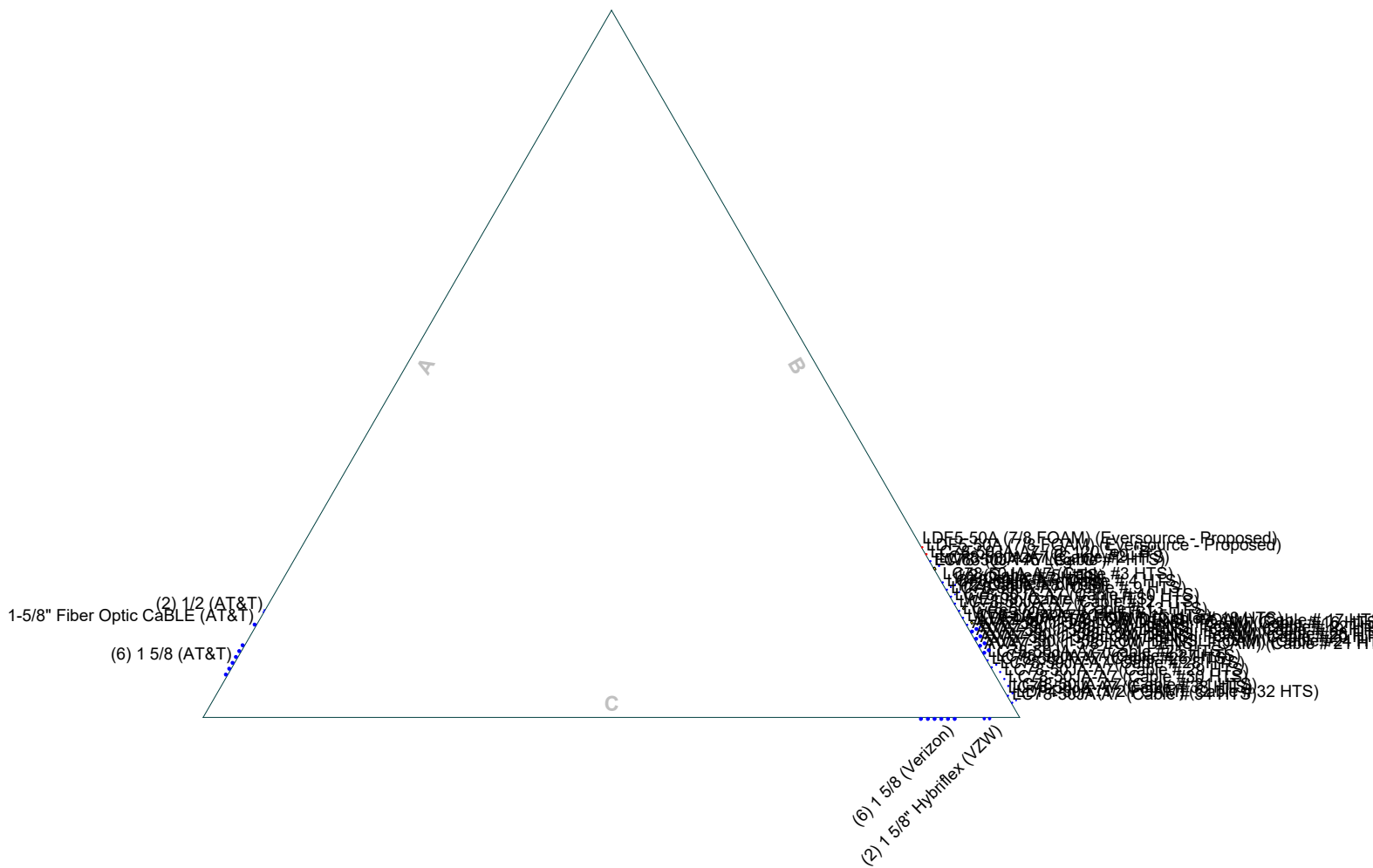
— Round   
 — Flat   
 — App In Face   
 — App Out Face   
 — Truss Leg



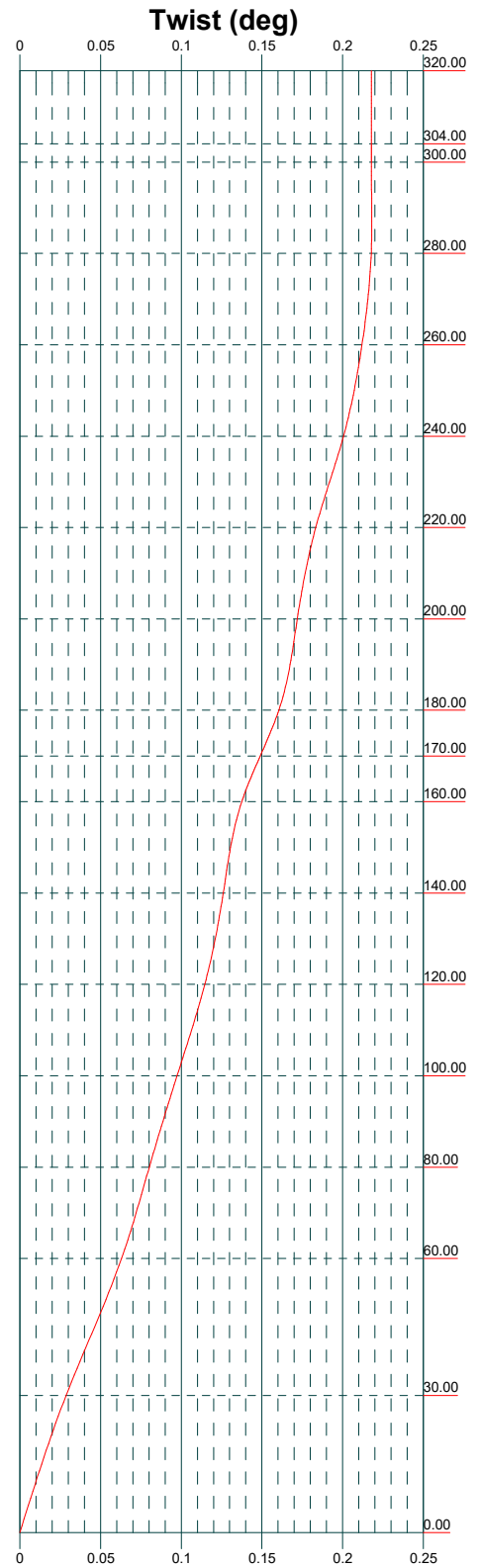
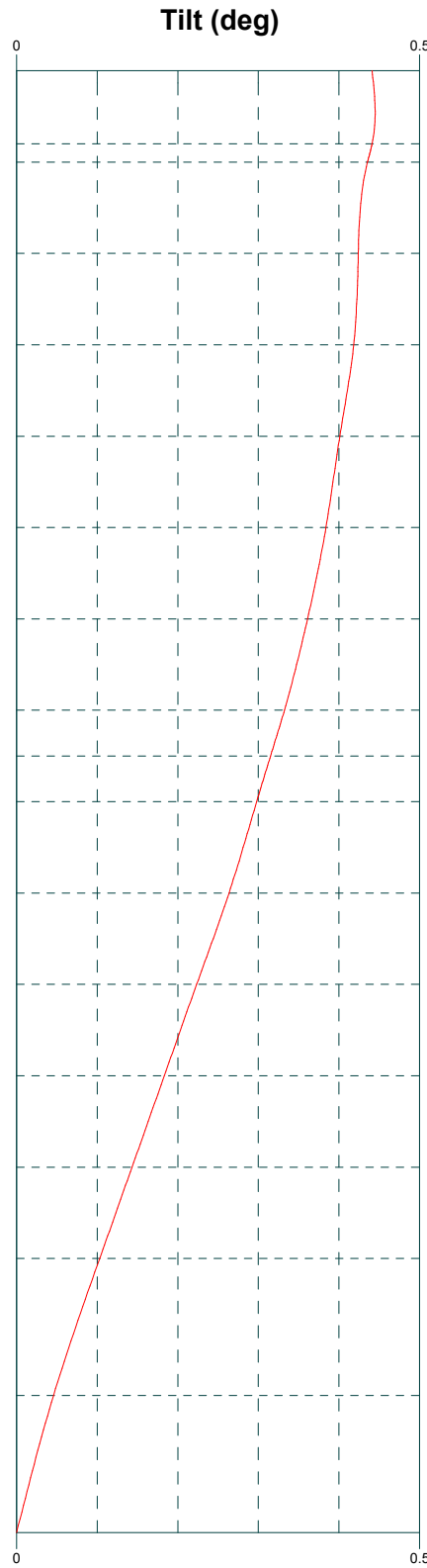
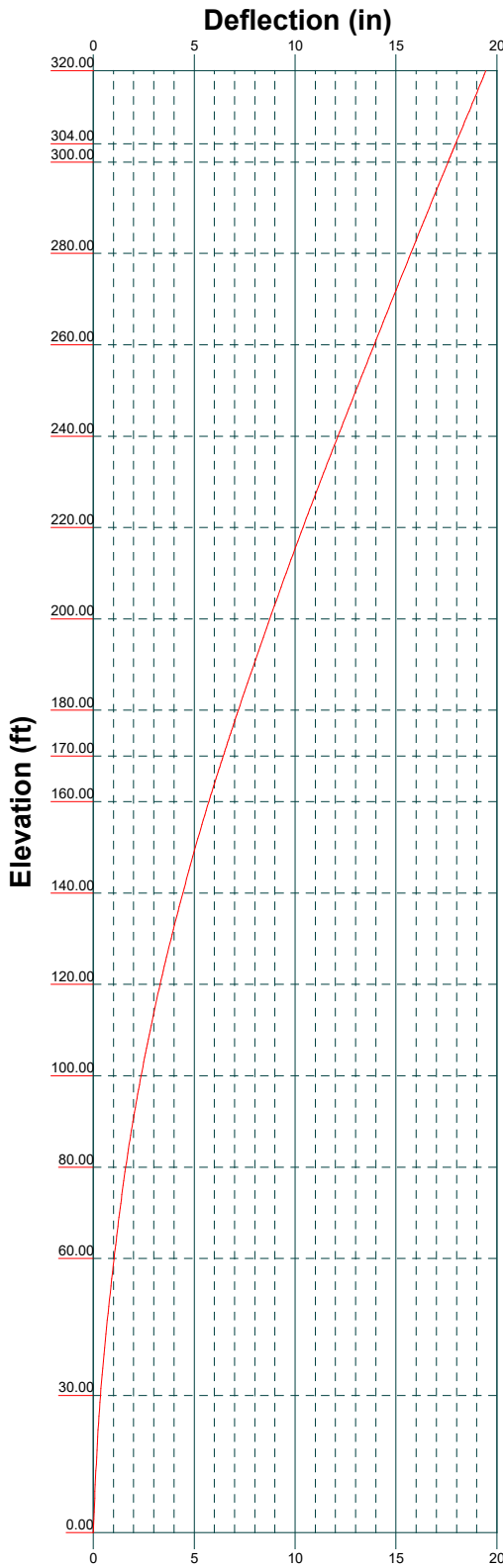
<p><b>AECOM</b>                  500 Enterprise Drive, Suite 3B                  Rocky Hill, CT                  Phone: 860-263-5800                  FAX: 860-812-2094</p>	<p>Job: <b>320' Rohn SSMW</b>                  Project: <b>CSP Tower - Colchester, CT</b>                  Client: <b>DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied</b>                  Code: <b>TIA/EIA-222-F</b>                  Path:</p>
	<p>Drawn by: <b>MCD</b> App'd:                  Date: <b>05/18/20</b> Scale: <b>NTS</b>                  Dwg No. <b>E-7</b></p>

# Feed Line Plan

Round    Flat    App In Face    App Out Face



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		Project: <b>CSP Tower - Colchester, CT</b>	
Client: DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied		Drawn by: MCD	App'd:
Code: TIA/EIA-222-F		Date: 05/18/20	Scale: NTS
Path:		Dwg No. E-7	



<b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094		Job: <b>320' Rohn SSMW</b>	
		Project: <b>CSP Tower - Colchester, CT</b>	
Client: <b>DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied</b>		Drawn by: <b>MCD</b>	App'd:
Code: <b>TIA/EIA-222-F</b>		Date: <b>05/18/20</b>	Scale: <b>NTS</b>
Path:		Dwg No. <b>E-5</b>	

<p><b>tnxTower</b></p> <p><b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	<p><b>Job</b></p> <p>320' Rohn SSVMW</p>	<p><b>Page</b></p> <p>1 of 41</p>
	<p><b>Project</b></p> <p>CSP Tower - Colchester, CT</p>	<p><b>Date</b></p> <p>11:26:38 05/18/20</p>
	<p><b>Client</b></p> <p>DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied</p>	<p><b>Designed by</b></p> <p>MCD</p>

## 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.

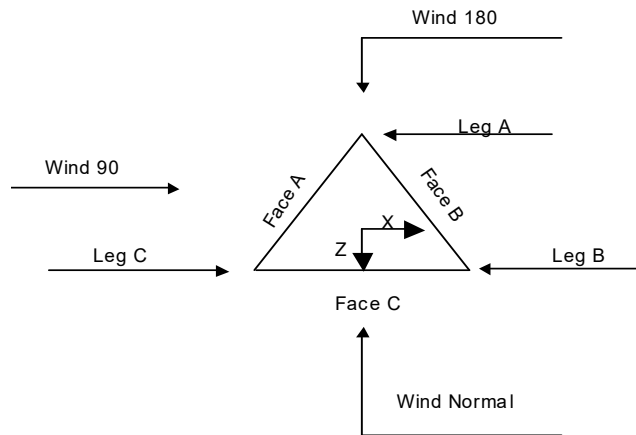
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>√ Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>√ Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>√ SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retention Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>Use Azimuth Dish Coefficients</li> <li>Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>√ Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>√ SR Leg Bolts Resist Compression</li> <li>√ All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>√ Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> </ul> |
|  |   | <p><b>Poles</b></p> <ul style="list-style-type: none"> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul>   |

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	2 of 41
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**Triangular Tower**

**Tower Section Geometry**

<i>Tower Section</i>	<i>Tower Elevation</i>	<i>Assembly Database</i>	<i>Description</i>	<i>Section Width</i>	<i>Number of Sections</i>	<i>Section Length</i>
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	320.00-304.00			6.81	1	16.00
T2	304.00-300.00			6.81	1	4.00
T3	300.00-280.00			6.81	1	20.00
T4	280.00-260.00			8.85	1	20.00
T5	260.00-240.00			11.04	1	20.00
T6	240.00-220.00			13.08	1	20.00
T7	220.00-200.00			15.09	1	20.00
T8	200.00-180.00			17.09	1	20.00
T9	180.00-170.00			19.22	1	10.00
T10	170.00-160.00			20.26	1	10.00
T11	160.00-140.00			21.30	1	20.00
T12	140.00-120.00			23.21	1	20.00
T13	120.00-100.00			25.39	1	20.00
T14	100.00-80.00			27.97	1	20.00
T15	80.00-60.00			30.47	1	20.00
T16	60.00-30.00			33.14	1	30.00
T17	30.00-0.00			36.80	1	30.00

**Tower Section Geometry (cont'd)**



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Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	320.00-304.00	4.00	X Brace	No	No	0.0000	0.0000
T2	304.00-300.00	4.00	X Brace	No	No	0.0000	0.0000
T3	300.00-280.00	5.00	X Brace	No	No	0.0000	0.0000
T4	280.00-260.00	6.67	X Brace	No	No	0.0000	0.0000
T5	260.00-240.00	6.67	X Brace	No	No	0.0000	0.0000
T6	240.00-220.00	6.67	X Brace	No	No	0.0000	0.0000
T7	220.00-200.00	10.00	X Brace	No	No	0.0000	0.0000
T8	200.00-180.00	10.00	X Brace	No	No	0.0000	0.0000
T9	180.00-170.00	10.00	X Brace	No	No	0.0000	0.0000
T10	170.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T11	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T12	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T13	120.00-100.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T14	100.00-80.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T15	80.00-60.00	20.00	K1 Down	No	Yes	0.0000	0.0000
T16	60.00-30.00	30.00	K2 Down	No	Yes	0.0000	0.0000
T17	30.00-0.00	30.00	K2 Down	No	Yes	0.0000	0.0000

### Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 320.00-304.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 304.00-300.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 300.00-280.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 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)
T5 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)
T6 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)
T7 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)
T8 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)
T9 180.00-170.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T10 170.00-160.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 ksi)
T11 160.00-140.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x1/2	A572-50 (50 ksi)
T12 140.00-120.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Equal Angle	L5x5x1/2	A572-50 (50 ksi)
T13 120.00-100.00	Arbitrary Shape	ROHN 10 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T14 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)
T15 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)
T16 60.00-30.00	Arbitrary Shape	ROHN 12 EH w/ angle 8x8x0.5	A572-50 (50 ksi)	Pipe	ROHN 4 EH	A572-50 (50 ksi)
T17 30.00-0.00	Arbitrary Shape	ROHN 12 EHS w Angle	A572-50	Pipe	ROHN 4 EH	A572-50

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<i>Tower Elevation</i> <i>ft</i>	<i>Leg Type</i>	<i>Leg Size</i>	<i>Leg Grade</i>	<i>Diagonal Type</i>	<i>Diagonal Size</i>	<i>Diagonal Grade</i>
		8x8x0.625	(50 ksi)			(50 ksi)

### Tower Section Geometry (cont'd)

<i>Tower Elevation</i> <i>ft</i>	<i>Top Girt Type</i>	<i>Top Girt Size</i>	<i>Top Girt Grade</i>	<i>Bottom Girt Type</i>	<i>Bottom Girt Size</i>	<i>Bottom Girt Grade</i>
T1 320.00-304.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T3 300.00-280.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

### Tower Section Geometry (cont'd)

<i>Tower Elevation</i> <i>ft</i>	<i>No. of Mid Girts</i>	<i>Mid Girt Type</i>	<i>Mid Girt Size</i>	<i>Mid Girt Grade</i>	<i>Horizontal Type</i>	<i>Horizontal Size</i>	<i>Horizontal Grade</i>
T13 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T14 100.00-80.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 EH	A572-50 (50 ksi)
T15 80.00-60.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3 XXS	A572-50 (50 ksi)
T16 60.00-30.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 3.5 EH	A572-50 (50 ksi)
T17 30.00-0.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 4 EH	A572-50 (50 ksi)

### Tower Section Geometry (cont'd)

<i>Tower Elevation</i> <i>ft</i>	<i>Secondary Horizontal Type</i>	<i>Secondary Horizontal Size</i>	<i>Secondary Horizontal Grade</i>	<i>Inner Bracing Type</i>	<i>Inner Bracing Size</i>	<i>Inner Bracing Grade</i>
T13 120.00-100.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T14 100.00-80.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T15 80.00-60.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T16 60.00-30.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T17 30.00-0.00	Pipe		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

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### Tower Section Geometry (cont'd)

Tower Elevation	Redundant Bracing Grade	Redundant Type	Redundant Size	K Factor
ft				
T13 120.00-100.00	A572-50 (50 ksi)	Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe	1 1 1
T14 100.00-80.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe Pipe	1 1 1 1
T15 80.00-60.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Diagonal (1) Hip (1)	Pipe Pipe Pipe Pipe	1 1 1 1
T16 60.00-30.00	A572-50 (50 ksi)	Hip Diagonal (1) Horizontal (1) Horizontal (2) Diagonal (1) Diagonal (2) Hip (1) Hip (2)	Pipe Pipe Pipe Pipe Pipe Pipe Pipe	1 1 1 1 1 1 1
T17 30.00-0.00	A572-50 (50 ksi)	Hip Diagonal (1) Hip Diagonal (2) Horizontal (1) Horizontal (2) Diagonal (1) Diagonal (2) Hip (1) Hip (2) Hip Diagonal (1) Hip Diagonal (2)	Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe	1 1 1 1 1 1 1 1 1 1

### Tower Section Geometry (cont'd)

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	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
T1 320.00-304.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 304.00-300.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 300.00-280.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 280.00-260.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 260.00-240.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 240.00-220.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 220.00-200.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8	0.00	0.0000	A36	1	1	1	36.0000	36.0000	36.0000





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**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1	Flange	1.0000	6	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
320.00-304.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T2	Flange	1.0000	8	0.6250	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
304.00-300.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T3	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
300.00-280.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T4	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
280.00-260.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T5	Flange	1.0000	8	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
260.00-240.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T6	Flange	1.0000	12	0.7500	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
240.00-220.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T7	Flange	1.0000	12	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
220.00-200.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T8	Flange	1.0000	12	0.8750	1	0.6250	0	0.0000	0	0.6250	0	0.6250	0	0.6250	0
200.00-180.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T9	Flange	1.0000	0	0.8750	1	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
180.00-170.00		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
170.00-160.00		A325N		A325X		A325N		A325N		A325N		A325N		A325N	
T11	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	
T12	Flange	1.0000	12	0.7500	3	0.6250	0	0.6250	0	0.6250	0	0.7500	2	0.6250	0
140.00-120.00		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
120.00-100.00		A325N		A325X		A325N		A325N		A325N		A325X		A325N	
T14	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	
T15	Flange	1.0000	16	0.8750	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	
T16	Flange	1.0000	24	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	
T17 30.00-0.00	Flange	0.7500	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
		A325N		A325N		A325N		A325N		A325N		A325N		A325N	

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	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	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.42	6	6	1.9800	1.9800		1.04
1 5/8 (Verizon)	C	Yes	No	Ar (CaAa)	220.00 - 5.00	0.0000	-0.4	6	6	1.9800	1.9800		1.04
1 5/8" Hybriflex (VZW)	C	Yes	No	Ar (CaAa)	220.00 - 5.00	0.0000	-0.46	2	2	1.6000	1.6000		1.85
LC78-50JA-A	B	Yes	No	Ar (CaAa)	174.00 -	0.0000	0.48	1	1	1.0900	1.0900		0.28

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	9 of 41
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7 (Cable # 34 HTS)					5.00								
LC78-50JA-A	B	Yes	No	Ar (CaAa)	177.00 - 5.00	0.0000	0.47	1	1	1.0900	1.0900		0.28
7 (Cable # 33 HTS)													
LDF4-50A (1/2 FOAM)	B	Yes	No	Ar (CaAa)	174.00 - 5.00	3.0000	0.48	1	1	0.6300	0.6300		0.15
7 (Cable # 32 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	176.00 - 5.00	3.0000	0.47	1	1	1.0900	1.0900		0.28
7 (Cable # 31 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	137.00 - 5.00	3.0000	0.46	1	1	1.0900	1.0900		0.28
7 (Cable #30 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	134.00 - 5.00	3.0000	0.45	1	1	1.0900	1.0900		0.28
7 (Cable # 29 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	105.00 - 5.00	3.0000	0.44	1	1	1.0900	1.0900		0.28
7 (Cable # 28 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	103.30 - 5.00	3.0000	0.43	1	1	1.0900	1.0900		0.28
7 (Cable # 27 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	91.00 - 5.00	0.0000	0.43	1	1	1.0900	1.0900		0.28
7 (Cable #26 HTS)													
LC78-50JA-A	B	Yes	No	Ar (CaAa)	90.00 - 5.00	0.0000	0.42	1	1	1.0900	1.0900		0.28
7 (Cable #25 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	283.00 - 5.00	3.0000	0.41	1	1	1.9800	1.9800		0.72
7 (Cable #24 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	284.00 - 5.00	0.0000	0.41	1	1	1.9800	1.9800		0.72
7 (Cable # 21 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	261.00 - 5.00	0.0000	0.4	1	1	1.9800	1.9800		0.72
7 (Cable # 20 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	285.00 - 5.00	3.0000	0.4	1	1	1.9800	1.9800		0.72

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	10 of 41
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
FOAM) (Cable #23 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	248.00 - 5.00	0.0000	0.39	1	1	1.9800	1.9800		0.72
(Cable # 19 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	285.00 - 5.00	3.0000	0.39	1	1	1.9800	1.9800		0.72
(Cable # 22 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	246.00 - 5.00	0.0000	0.38	1	1	1.9800	1.9800		0.72
(Cable # 16 HTS)													
AVA7-50 (1-5/8 LOW DENS. FOAM)	B	Yes	No	Ar (CaAa)	246.00 - 5.00	3.0000	0.38	1	1	1.9800	1.9800		0.72
(Cable # 17 HTS)													
LDF4-50A (1/2 FOAM)	B	Yes	No	Ar (CaAa)	246.00 - 5.00	6.0000	0.38	1	1	0.6300	0.6300		0.15
(Cable # 18 HTS)													
LC78-50JA-A7	B	Yes	No	Ar (CaAa)	235.00 - 5.00	0.0000	0.37	1	1	1.0900	1.0900		0.28
(Cable # 15 HTS)													
WE65 (Cable # 14 HTS)	B	Yes	No	Af (CfAe)	106.00 - 5.00	3.0000	0.37	1	1	1.5836	1.5836	5.1284	0.53
LC78-50JA-A7	B	Yes	No	Ar (CaAa)	244.00 - 5.00	0.0000	0.36	1	1	1.0900	1.0900		0.28
(Cable # 13 HTS)													
LC78-50JA-A7	B	Yes	No	Ar (CaAa)	262.00 - 5.00	0.0000	0.35	1	1	1.0900	1.0900		0.28
(Cable #12 HTS)													
WE108 (Cable # 11 HTS)	B	Yes	No	Af (CfAe)	113.00 - 5.00	3.0000	0.35	1	1	1.0149	1.0149	3.4851	0.35
LC78-50JA-A7	B	Yes	No	Ar (CaAa)	297.00 - 5.00	0.0000	0.34	1	1	1.0900	1.0900		0.28
(Cable # 10 HTS)													
LC78-50JA-A7	B	Yes	No	Ar (CaAa)	290.00 - 5.00	0.0000	0.33	1	1	1.0900	1.0900		0.28
(Cable # 9 HTS)													
1/2 (Cable # 8 HTS)	B	Yes	No	Ar (CaAa)	284.00 - 5.00	3.0000	0.33	1	1	0.5800	0.5800		0.25



<p style="text-align: center;"><b>tnxTower</b></p> <p style="text-align: center;"><b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	<p><b>Job</b></p> <p style="text-align: center;">320' Rohn SSVMW</p>	<p><b>Page</b></p> <p style="text-align: center;">11 of 41</p>
	<p><b>Project</b></p> <p style="text-align: center;">CSP Tower - Colchester, CT</p>	<p><b>Date</b></p> <p style="text-align: center;">11:26:38 05/18/20</p>
	<p><b>Client</b></p> <p style="text-align: center;">DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied</p>	<p><b>Designed by</b></p> <p style="text-align: center;">MCD</p>

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1/2 (Cable # 6 HTS)	B	Yes	No	Ar (CaAa)	320.00 - 5.00	6.0000	0.33	1	1	0.5800	0.5800		0.25
LC78-50JA-A7 (Cable # 4 HTS)	B	Yes	No	Ar (CaAa)	320.00 - 5.00	0.0000	0.32	1	1	1.0900	1.0900		0.28
1/2 (Cable # 7 HTS)	B	Yes	No	Ar (CaAa)	284.00 - 5.00	3.0000	0.32	1	1	0.5800	0.5800		0.25
1/2 (Cable # 5 HTS)	B	Yes	No	Ar (CaAa)	164.00 - 5.00	6.0000	0.32	1	1	0.5800	0.5800		0.25
LC78-50JA-A7 (Cable #3 HTS)	B	Yes	No	Ar (CaAa)	316.50 - 5.00	0.0000	0.31	1	1	1.0900	1.0900		0.28
LC78-50JA-A7 (Cable #1 HTS)	B	Yes	No	Ar (CaAa)	318.00 - 5.00	0.0000	0.29	1	1	1.0900	1.0900		0.28
LC78-50JA-A7 (Cable #2 HTS) * CSP Proposed Cables	B	Yes	No	Ar (CaAa)	153.00 - 5.00	3.0000	0.29	1	1	1.0900	1.0900		0.28
EW63 (@ 145 Leg "C")	B	Yes	No	Af (CfAe)	145.00 - 5.00	0.0000	0.29	1	1	1.5742	1.5742	5.0668	0.51
LC78-50JA-A7 (@ 120 "eg "B")	B	Yes	No	Ar (CaAa)	120.00 - 5.00	0.0000	0.28	1	1	1.0900	1.0900		0.28
1-5/8" Fiber Optic CaBLE (AT&T)	A	Yes	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.37	1	1	1.9800	1.9800		1.85
1/2 (AT&T) * Eversource Proposed Cables	A	Yes	No	Ar (CaAa)	200.00 - 5.00	0.0000	-0.35	2	2	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (Eversource - Proposed)	B	Yes	No	Ar (CfAe)	163.00 - 5.00	0.0000	0.27	1	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM) (Eversource - Proposed)	B	No	No	Ar (CfAe)	145.00 - 5.00	0.0000	0.26	1	1	1.0900	1.0900		0.33

**Feed Line/Linear Appurtenances Section Areas**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	12 of 41
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	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T1	320.00-304.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	5.561	0.000	15.90
		C	0.000	0.000	0.000	0.000	0.00
T2	304.00-300.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.540	0.000	4.36
		C	0.000	0.000	0.000	0.000	0.00
T3	300.00-280.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	14.473	0.000	43.60
		C	0.000	0.000	0.000	0.000	0.00
T4	280.00-260.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	30.636	0.000	101.88
		C	0.000	0.000	0.000	0.000	0.00
T5	260.00-240.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	41.134	0.000	137.02
		C	0.000	0.000	0.000	0.000	0.00
T6	240.00-220.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	53.315	0.000	176.60
		C	0.000	0.000	0.000	0.000	0.00
T7	220.00-200.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	53.860	0.000	178.00
		C	0.000	0.000	30.160	0.000	198.80
T8	200.00-180.00	A	0.000	0.000	30.040	0.000	171.80
		B	0.000	0.000	53.860	0.000	178.00
		C	0.000	0.000	30.160	0.000	198.80
T9	180.00-170.00	A	0.000	0.000	15.020	0.000	85.90
		B	0.000	0.000	29.035	0.000	94.36
		C	0.000	0.000	15.080	0.000	99.40
T10	170.00-160.00	A	0.000	0.000	15.020	0.000	85.90
		B	0.273	0.000	31.062	0.000	100.89
		C	0.000	0.000	15.080	0.000	99.40
T11	160.00-140.00	A	0.000	0.000	30.040	0.000	171.80
		B	2.271	0.656	64.237	0.000	217.24
		C	0.000	0.000	30.160	0.000	198.80
T12	140.00-120.00	A	0.000	0.000	30.040	0.000	171.80
		B	3.633	2.624	68.379	0.000	240.48
		C	0.000	0.000	30.160	0.000	198.80
T13	120.00-100.00	A	0.000	0.000	30.040	0.000	171.80
		B	3.633	4.515	72.445	0.000	258.65
		C	0.000	0.000	30.160	0.000	198.80
T14	100.00-80.00	A	0.000	0.000	30.040	0.000	171.80
		B	3.633	6.954	78.189	0.000	283.28
		C	0.000	0.000	30.160	0.000	198.80
T15	80.00-60.00	A	0.000	0.000	30.040	0.000	171.80
		B	3.633	6.954	80.260	0.000	288.60
		C	0.000	0.000	30.160	0.000	198.80
T16	60.00-30.00	A	0.000	0.000	45.060	0.000	257.70
		B	5.450	10.432	120.390	0.000	432.90
		C	0.000	0.000	45.240	0.000	298.20
T17	30.00-0.00	A	0.000	0.000	37.550	0.000	214.75
		B	4.542	8.693	100.325	0.000	360.75
		C	0.000	0.000	37.700	0.000	248.50

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
T1	320.00-304.00	A	0.500	0.000	0.000	0.000	0.000	0.00

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSMW	<b>Page</b>	13 of 41
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	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
		B		0.000	0.000	11.411	0.000	67.73
		C		0.000	0.000	0.000	0.000	0.00
T2	304.00-300.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	3.140	0.000	18.65
		C		0.000	0.000	0.000	0.000	0.00
T3	300.00-280.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	27.673	0.000	172.33
		C		0.000	0.000	0.000	0.000	0.00
T4	280.00-260.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	54.936	0.000	363.24
		C		0.000	0.000	0.000	0.000	0.00
T5	260.00-240.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	72.134	0.000	482.98
		C		0.000	0.000	0.000	0.000	0.00
T6	240.00-220.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	92.815	0.000	622.93
		C		0.000	0.000	0.000	0.000	0.00
T7	220.00-200.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	93.860	0.000	629.19
		C		0.000	0.000	46.160	0.000	431.91
T8	200.00-180.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		0.000	0.000	93.860	0.000	629.19
		C		0.000	0.000	46.160	0.000	431.91
T9	180.00-170.00	A	0.500	0.000	0.000	24.373	0.000	204.64
		B		0.000	0.000	51.135	0.000	339.23
		C		0.000	0.000	23.080	0.000	215.95
T10	170.00-160.00	A	0.500	0.000	0.000	24.373	0.000	204.64
		B		0.522	0.000	55.462	0.000	368.08
		C		0.000	0.000	23.080	0.000	215.95
T11	160.00-140.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		4.354	0.934	115.537	0.000	797.38
		C		0.000	0.000	46.160	0.000	431.91
T12	140.00-120.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		6.967	3.735	123.479	0.000	892.39
		C		0.000	0.000	46.160	0.000	431.91
T13	120.00-100.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		6.967	6.682	131.275	0.000	968.58
		C		0.000	0.000	46.160	0.000	431.91
T14	100.00-80.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		6.967	10.288	142.289	0.000	1070.83
		C		0.000	0.000	46.160	0.000	431.91
T15	80.00-60.00	A	0.500	0.000	0.000	48.747	0.000	409.29
		B		6.967	10.288	146.260	0.000	1094.60
		C		0.000	0.000	46.160	0.000	431.91
T16	60.00-30.00	A	0.500	0.000	0.000	73.120	0.000	613.93
		B		10.450	15.432	219.390	0.000	1641.90
		C		0.000	0.000	69.240	0.000	647.86
T17	30.00-0.00	A	0.500	0.000	0.000	60.933	0.000	511.61
		B		8.708	12.860	182.825	0.000	1368.25
		C		0.000	0.000	57.700	0.000	539.88

### Feed Line Shielding

Section	Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_R$ Ice ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$A_F$ Ice ft <sup>2</sup>
T1	320.00-304.00	A	0.000	0.000	0.000	0.000

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	14 of 41
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Section	Elevation	Face	$A_R$	$A_{R, Ice}$	$A_F$	$A_{F, Ice}$
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
		B	0.000	0.509	0.434	0.891
		C	0.000	0.000	0.000	0.000
T2	304.00-300.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.126	0.109	0.221
		C	0.000	0.000	0.000	0.000
T3	300.00-280.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.010	1.056	2.020
		C	0.000	0.000	0.000	0.000
T4	280.00-260.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.380	1.924	3.450
		C	0.000	0.000	0.000	0.000
T5	260.00-240.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.718	2.939	5.155
		C	0.000	0.000	0.000	0.000
T6	240.00-220.00	A	0.000	0.000	0.000	0.000
		B	0.000	2.140	4.917	8.560
		C	0.000	0.000	0.000	0.000
T7	220.00-200.00	A	0.000	0.000	0.000	0.000
		B	0.000	1.535	3.524	6.141
		C	0.000	0.755	1.973	3.020
T8	200.00-180.00	A	0.000	0.749	1.906	2.994
		B	0.000	1.489	3.417	5.955
		C	0.000	0.732	1.913	2.928
T9	180.00-170.00	A	0.000	0.367	0.935	1.470
		B	0.000	0.796	1.808	3.184
		C	0.000	0.359	0.939	1.437
T10	170.00-160.00	A	0.000	0.364	0.926	1.455
		B	0.000	0.865	1.935	3.458
		C	0.000	0.356	0.930	1.423
T11	160.00-140.00	A	0.000	0.719	2.287	3.594
		B	0.000	1.843	5.117	9.213
		C	0.000	0.703	2.296	3.515
T12	140.00-120.00	A	0.000	0.709	2.256	3.545
		B	0.000	1.995	5.536	9.974
		C	0.000	0.693	2.265	3.467
T13	120.00-100.00	A	1.699	3.613	0.000	0.000
		B	4.527	11.083	0.000	0.000
		C	1.706	3.534	0.000	0.000
T14	100.00-80.00	A	1.627	3.459	0.000	0.000
		B	4.805	11.786	0.000	0.000
		C	1.633	3.383	0.000	0.000
T15	80.00-60.00	A	1.619	3.415	0.000	0.000
		B	4.893	11.924	0.000	0.000
		C	1.626	3.340	0.000	0.000
T16	60.00-30.00	A	2.737	5.703	0.000	0.000
		B	8.271	19.909	0.000	0.000
		C	2.748	5.577	0.000	0.000
T17	30.00-0.00	A	2.351	4.810	0.000	0.000
		B	7.104	16.793	0.000	0.000
		C	2.360	4.704	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	320.00-304.00	3.3623	0.9930	5.2035	1.4807

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Section	Elevation	CP <sub>X</sub>	CP <sub>Z</sub>	CP <sub>X</sub>	CP <sub>Z</sub>
				Ice	Ice
	ft	in	in	in	in
T2	304.00-300.00	3.8443	1.1325	5.8879	1.6755
T3	300.00-280.00	7.0359	2.4105	9.9448	3.2627
T4	280.00-260.00	9.7443	3.9639	14.0090	5.4122
T5	260.00-240.00	13.4278	5.6935	18.7298	7.5687
T6	240.00-220.00	16.4445	7.0885	22.7219	9.3736
T7	220.00-200.00	26.9333	14.8331	34.9737	18.2835
T8	200.00-180.00	15.3584	18.2218	20.8177	21.8417
T9	180.00-170.00	17.5744	19.9875	23.9998	24.1236
T10	170.00-160.00	19.5707	21.3099	26.9587	25.8532
T11	160.00-140.00	20.4689	21.3261	28.6780	26.2438
T12	140.00-120.00	23.8729	23.3789	33.3841	28.8925
T13	120.00-100.00	34.1073	30.8927	44.7378	36.2306
T14	100.00-80.00	40.1488	34.6874	52.2964	40.6819
T15	80.00-60.00	41.1722	35.4519	54.6331	42.3668
T16	60.00-30.00	43.8332	37.7506	58.3746	45.3097
T17	30.00-0.00	41.4906	35.9230	56.6973	44.2658

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
* CSP Antenna Inventory - via Eastern Communications									
Climb/Mapping									
PD688S-4 (ECI-66)	C	From Leg	0.50	0.0000	94.00	No Ice	0.35	0.35	3.75
			0.00			1/2" Ice	0.63	0.63	4.88
			0.00						
4'x4" Pipe Mount (ECI-66)	C	From Leg	0.00	0.0000	94.00	No Ice	1.32	1.32	44.00
			0.00			1/2" Ice	1.58	1.58	56.99
			0.00						
Pirot 4' Side Mount Standoff (1) (ECI-62)	B	From Leg	0.00	0.0000	106.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00						
PD458 (ECI-62)	B	From Leg	3.00	0.0000	106.00	No Ice	2.88	2.88	20.00
			0.00			1/2" Ice	4.34	4.34	46.22
			0.00						
5'3"x4" Pipe Mount (ECI-63 (Dish Support))	A	From Leg	0.00	0.0000	107.00	No Ice	1.88	1.88	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00						
8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-63a (Dish Ice Shield))	A	From Leg	0.00	0.0000	115.00	No Ice	8.34	4.76	400.00
			0.00			1/2" Ice	11.01	6.71	756.25
			0.00						
3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0) (ECI-61a)	C	From Leg	0.00	0.0000	117.00	No Ice	8.34	4.76	400.00
			0.00			1/2" Ice	11.01	6.71	756.25
			0.00						
5'3"x4" Pipe Mount (ECI-61a (Dish Support))	C	From Leg	0.00	0.0000	112.00	No Ice	1.88	1.88	57.00
			0.00			1/2" Ice	2.21	2.21	73.81
			0.00						
DB212-1 (ECI-59)	C	From Leg	6.00	0.0000	139.00	No Ice	4.40	4.40	31.00
			0.00			1/2" Ice	8.42	8.42	70.21
			0.00						

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	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
4' Side Mount Standoff (ECI-60 & 59)	C	From Leg	0.00	0.00	0.0000	139.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
PD156S (ECI-60)	C	From Leg	6.00	0.00	0.0000	139.00	No Ice 1/2" Ice	0.44 0.79	0.44 0.79	5.00 6.50
5'3"x4" Pipe Mount (ECI-58a (Dish Support))	C	From Leg	0.00	0.00	0.0000	154.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	57.00 73.81
ANT450F6 (ECI-57)	A	From Leg	0.50	0.00	0.0000	153.00	No Ice 1/2" Ice	1.90 2.73	1.90 2.73	8.00 22.34
5'3"x4" Pipe Mount (ECI-57)	A	From Leg	0.00	0.00	0.0000	153.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	57.00 73.81
L-810 Obstruction Lighting (1) (ECI-56)	A	From Leg	0.25	0.00	0.0000	164.00	No Ice 1/2" Ice	0.36 0.52	0.36 0.52	6.65 12.44
L-810 Obstruction Lighting (1) (ECI-54)	B	From Leg	0.25	0.00	0.0000	168.00	No Ice 1/2" Ice	0.36 0.52	0.36 0.52	6.65 12.44
L-810 Obstruction Lighting (1) (ECI-55)	C	From Leg	0.25	0.00	0.0000	165.00	No Ice 1/2" Ice	0.36 0.52	0.36 0.52	6.65 12.44
DB586-Y (inverted) (ECI-53)	B	From Leg	4.00	0.00	0.0000	175.00	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	8.25 16.59
Pirod 4' Side Mount Standoff (1) (ECI-53,52,51)	B	From Leg	0.00	0.00	0.0000	176.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
430-94C-09168-M-11048 TTA (ECI-52)	B	From Leg	2.00	0.00	0.0000	176.00	No Ice 1/2" Ice	1.63 1.81	0.95 1.09	30.00 37.44
DB586-Y (ECI-51)	B	From Leg	4.00	0.00	0.0000	177.00	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	8.25 16.59
DB586-Y (ECI-50)	C	From Leg	3.00	0.00	0.0000	179.00	No Ice 1/2" Ice	1.01 1.28	1.01 1.28	8.25 16.59
Pirod 4' Side Mount Standoff (1) (ECI-50)	C	From Leg	0.00	0.00	0.0000	179.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	50.00 89.00
531-70HD Exposed Dipole Antenna (ECI-15)	A	From Leg	6.00	0.00	0.0000	238.00	No Ice 1/2" Ice	5.91 7.68	5.91 7.68	50.00 79.03
6' Side Mount Standoff (ECI-15)	A	From Leg	0.00	0.00	0.0000	238.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
PD1142-1 (ECI-14)	C	From Leg	6.00	0.00	0.0000	248.00	No Ice 1/2" Ice	1.32 3.21	1.32 3.21	10.00 23.85
6' Side Mount Standoff (ECI-14)	C	From Leg	0.00	0.00	0.0000	248.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
SC479-HF1LDF(D00I-E6085) (Inverted) (ECI-13)	B	From Leg	3.00	0.00	0.0000	245.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
SC479-HF1LDF(D001-E6085) ) (Inverted) (ECI-12)	B	From Leg	3.00	0.00	0.0000	245.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
Sabre T-Boom (1) (ECI-10,11,12,13)	B	From Leg	0.00	0.00	0.0000	246.00	No Ice 1/2" Ice	35.40 46.90	35.40 46.90	471.00 690.00
430-94C-09168-M-11048 TTA (ECI-11)	B	From Leg	2.00	0.00	0.0000	247.00	No Ice 1/2" Ice	1.63 1.81	0.95 1.09	30.00 37.44
SC479-HF1LDF (ECI-10)	B	From Leg	3.00	0.00	0.0000	251.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
6' Side Mount Standoff (ECI-8)	B	From Leg	0.00	0.00	0.0000	260.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
PD440-2 (ECI-8)	B	From Leg	6.00	0.00	0.0000	264.00	No Ice 1/2" Ice	1.38 2.48	1.38 2.48	19.00 24.70
SC479-HF1LDF(D001-E6085) ) (Inverted) (ECI-7)	C	From Leg	6.00	0.00	0.0000	283.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
6' Side Mount Standoff (ECI-7)	C	From Leg	0.00	0.00	0.0000	284.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
DB809T3E-XC (ECI-6)	C	From Leg	6.00	0.00	0.0000	286.00	No Ice 1/2" Ice	4.25 5.70	4.25 5.70	39.00 69.70
PD340-1 (ECI-5)	A	From Leg	6.00	0.00	0.0000	290.00	No Ice 1/2" Ice	3.30 5.94	3.30 5.94	40.00 52.00
6' Side Mount Standoff (ECI-5)	A	From Leg	0.00	0.00	0.0000	290.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
SC479-HF1LDF (ECI-4)	C	From Leg	6.00	0.00	0.0000	300.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	34.00 69.82
6' Side Mount Standoff (ECI-4)	C	From Leg	0.00	0.00	0.0000	300.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
ANT450F6 (ECI-3)	B	From Leg	5.00	0.00	0.0000	318.00	No Ice 1/2" Ice	1.90 2.73	1.90 2.73	8.00 22.34
4'x4" Pipe Mount (ECI-3)	B	From Leg	0.00	0.00	0.0000	318.00	No Ice 1/2" Ice	1.32 1.58	1.32 1.58	44.00 56.99
BA1012-0 (ECI-2)	A	From Leg	6.00	0.00	0.0000	320.00	No Ice 1/2" Ice	0.47 0.96	0.47 0.96	2.20 6.61
6' Side Mount Standoff (ECI-2)	A	From Leg	0.00	0.00	0.0000	320.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00
PD128-1 (ECI-1)	C	From Leg	6.00	0.00	0.0000	325.00	No Ice 1/2" Ice	1.00 1.80	1.00 1.80	13.00 16.90
6' Side Mount Standoff (ECI-1)	C	From Leg	0.00	0.00	0.0000	325.00	No Ice 1/2" Ice	6.50 8.50	6.50 8.50	100.00 170.00

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz Lateral	Vert						ft
Dual Lights (Beacon)	A	None			0.0000	327.00	No Ice 1/2" Ice	4.00 4.80	4.00 4.80	250.00 400.00
Lightning Rod 5/8x4' (Lightning Rod)	C	None			0.0000	329.00	No Ice 1/2" Ice	0.25 0.66	0.25 0.66	31.00 33.82
* VZW Proposed 12/07/2018										
Valmont VFA-10-U V-Frame (Verizon)	A	None			0.0000	232.00	No Ice 1/2" Ice	7.95 8.33	4.45 4.74	285.00 343.57
Valmont VFA-10-U V-Frame (Verizon)	B	None			0.0000	232.00	No Ice 1/2" Ice	7.95 8.33	4.45 4.74	285.00 343.57
Valmont VFA-10-U V-Frame (Verizon)	C	None			0.0000	232.00	No Ice 1/2" Ice	7.95 8.33	4.45 4.74	285.00 343.57
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	A	From Leg	5.00 6.00		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	A	From Leg	5.00 5.50		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38
LNX-6512DS-VTM (Verizon-850)	A	From Leg	5.00 -3.00		0.0000	232.00	No Ice 1/2" Ice	5.61 6.01	3.30 3.66	30.00 63.32
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	A	From Leg	5.00 6.00		0.0000	232.00	No Ice 1/2" Ice	3.78 4.84	3.56 4.62	116.83 175.06
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	A	From Leg	5.00 0.00		0.0000	232.00	No Ice 1/2" Ice	2.19 2.39	1.46 1.62	97.50 115.84
RFV01U-D2A RRH Unit (Verizon RRH (Prev. Prop.))	A	From Leg	5.00 0.00		0.0000	232.00	No Ice 1/2" Ice	2.19 2.39	1.18 1.34	82.00 98.43
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	A	From Leg	5.00 0.00		0.0000	232.00	No Ice 1/2" Ice	4.42 4.72	2.90 3.16	32.00 63.48
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	B	From Leg	5.00 6.00		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	B	From Leg	5.00 5.50		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38
LNX-6512DS-VTM (Verizon-850)	B	From Leg	5.00 -3.00		0.0000	232.00	No Ice 1/2" Ice	5.61 6.01	3.30 3.66	30.00 63.32
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2)) (Verizon-PCS/AWS (Prev. Prop.))	B	From Leg	5.00 6.00		0.0000	232.00	No Ice 1/2" Ice	3.78 4.84	3.56 4.62	116.83 175.06
RFV01U-D1A RRH Unit (Verizon RRH (Prev. Prop.))	B	From Leg	5.00 0.00		0.0000	232.00	No Ice 1/2" Ice	2.19 2.39	1.46 1.62	97.50 115.84
DB-B1-6C-12AB-0Z / DC-3315-PF-48 Dist. Box (Verizon)	B	From Leg	5.00 0.00		0.0000	232.00	No Ice 1/2" Ice	4.42 4.72	2.90 3.16	32.00 63.48
JAHH-65B-R3B Panel Antenna (Verizon-AWS (Prev. Prop.))	C	From Leg	5.00 6.00		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38
JAHH-65B-R3B Panel Antenna (Verizon-PCS (Prev. Prop.))	C	From Leg	5.00 5.50		0.0000	232.00	No Ice 1/2" Ice	9.66 10.22	5.98 6.44	126.30 184.38



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<b>Client</b>						<b>Designed by</b>			
DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied						MCD			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
(Verizon-PCS (Prev. Prop.))			0.00							
LNx-6512DS-VTM	C	From Leg	5.00		0.0000	232.00	No Ice	5.61	3.30	30.00
(Verizon-850)			-3.00				1/2" Ice	6.01	3.66	63.32
			0.00							
BSAMNT-SBS-2-2 (JAHH Antenna Bracket (for 2))	C	From Leg	5.00		0.0000	232.00	No Ice	3.78	3.56	116.83
(Verizon-PCS/AWS (Prev. Prop.))			6.00				1/2" Ice	4.84	4.62	175.06
			0.00							
RFV01U-D1A RRH Unit	C	From Leg	5.00		0.0000	232.00	No Ice	2.19	1.46	97.50
(Verizon RRH (Prev. Prop.))			0.00				1/2" Ice	2.39	1.62	115.84
			0.00							
RFV01U-D2A RRH Unit	C	From Leg	5.00		0.0000	232.00	No Ice	2.19	1.18	82.00
(Verizon RRH (Prev. Prop.))			0.00				1/2" Ice	2.39	1.34	98.43
			0.00							
CBC78T-DS-43-2X Diplexer	A	From Leg	5.00		0.0000	232.00	No Ice	0.43	0.60	22.00
(Verizon (Prev. Prop.))			0.00				1/2" Ice	0.52	0.71	28.34
			0.00							
CBC78T-DS-43-2X Diplexer	B	From Leg	5.00		0.0000	232.00	No Ice	0.43	0.60	22.00
(Verizon (Prev. Prop.))			0.00				1/2" Ice	0.52	0.71	28.34
			0.00							
CBC78T-DS-43-2X Diplexer	C	From Leg	5.00		0.0000	232.00	No Ice	0.43	0.60	22.00
(Verizon (Prev. Prop.))			0.00				1/2" Ice	0.52	0.71	28.34
			0.00							
* VZW Proposed 12/07/2018										
*** EMP-005 AT&T										
Inventory 08/2019 Updates										
PiROD 12' Lightweight T-Frame (AT&T)	A	None			0.0000	200.00	No Ice	10.20	10.20	253.00
							1/2" Ice	16.20	16.20	355.00
PiROD 12' Lightweight T-Frame (AT&T)	B	None			0.0000	200.00	No Ice	10.20	10.20	253.00
							1/2" Ice	16.20	16.20	355.00
PiROD 12' Lightweight T-Frame (AT&T)	C	None			0.0000	200.00	No Ice	10.20	10.20	253.00
							1/2" Ice	16.20	16.20	355.00
7770.00 (AT&T)	A	From Leg	3.00		0.0000	200.00	No Ice	10.03	5.60	20.00
			-6.00				1/2" Ice	10.61	6.15	70.47
			0.00							
HPA-65R-BUU-H8 Panel (AT&T (Prev. Proposed))	A	From Leg	3.00		0.0000	200.00	No Ice	12.99	7.48	68.00
			6.00				1/2" Ice	13.69	8.06	140.41
			0.00							
RRUS-32 (AT&T (Prev. Proposed))	A	From Leg	3.00		0.0000	200.00	No Ice	3.20	1.85	60.00
			6.00				1/2" Ice	3.46	2.08	81.11
			1.50							
RRUS-11 (AT&T (Prev. Proposed))	A	From Leg	3.00		0.0000	200.00	No Ice	2.99	1.25	50.00
			6.00				1/2" Ice	3.23	1.41	69.57
			-1.50							
7770.00 (AT&T)	B	From Leg	3.00		0.0000	200.00	No Ice	10.03	5.60	20.00
			-6.00				1/2" Ice	10.61	6.15	70.47
			0.00							
HPA-65R-BUU-H8 Panel (AT&T (Prev. Proposed))	B	From Leg	3.00		0.0000	200.00	No Ice	12.99	7.48	68.00
			6.00				1/2" Ice	13.69	8.06	140.41
			0.00							
RRUS-32 (AT&T (Prev. Proposed))	B	From Leg	3.00		0.0000	200.00	No Ice	3.20	1.85	60.00
			6.00				1/2" Ice	3.46	2.08	81.11
			1.50							
RRUS-11	B	From Leg	3.00		0.0000	200.00	No Ice	2.99	1.25	50.00

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<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
(AT&T (Prev. Proposed))			6.00 -1.50		1/2" Ice	3.23	1.41	69.57
7770.00 (AT&T)	C	From Leg	3.00 -6.00 0.00	0.0000	200.00	No Ice 1/2" Ice	10.03 10.61	20.00 70.47
HPA-65R-BUU-H6 Panel (AT&T (Prev. Proposed))	C	From Leg	3.00 6.00 0.00	0.0000	200.00	No Ice 1/2" Ice	10.12 10.69	48.00 105.33
RRUS-32 (AT&T (Prev. Proposed))	B	From Leg	3.00 6.00 1.50	0.0000	200.00	No Ice 1/2" Ice	3.20 3.46	1.85 2.08 60.00 81.11
RRUS-11 (AT&T (Prev. Proposed))	B	From Leg	3.00 6.00 -1.50	0.0000	200.00	No Ice 1/2" Ice	2.99 3.23	1.25 1.41 50.00 69.57
DC6-48-60-0-8C Squid / Surge Arrestor (AT&T (Prev. Proposed))	C	None		0.0000	200.00	No Ice 1/2" Ice	1.79 2.02	1.79 2.02 27.00 47.39
STK-U Stiffener Side Arm Attachment (AT&T)	A	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
STK-U Stiffener Side Arm Attachment (AT&T)	B	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
STK-U Stiffener Side Arm Attachment (AT&T)	C	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
STK-U Stiffener Side Arm Attachment (AT&T)	A	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
STK-U Stiffener Side Arm Attachment (AT&T)	B	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
STK-U Stiffener Side Arm Attachment (AT&T)	C	None		0.0000	200.00	No Ice 1/2" Ice	0.07 0.11	4.01 5.00 63.79 95.84
*** EMP-005 AT&T Inventory 08/2019 Updates *EVS-010 Proposed Inventory								
Telewave ANT220F2 - Omni Antenna (Eversource (Proposed #1))	C	From Leg	4.00 0.00 0.00	0.0000	163.00	No Ice 1/2" Ice	1.03 1.29	1.03 1.29 14.00 22.80
Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed #1))	C	From Leg	0.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	2.48 3.25	5.14 6.91 165.00 318.00
Telewave ANT220F2 - Omni Antenna (Eversource (Proposed #2))	C	From Leg	4.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice	1.03 1.29	1.03 1.29 14.00 22.80
Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed) (Eversource (Proposed #1))	C	From Leg	0.00 0.00 0.00	0.0000	142.00	No Ice 1/2" Ice	2.48 3.25	5.14 6.91 165.00 318.00

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	21 of 41
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## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				ft	°	°	ft	ft	ft <sup>2</sup>	lb	
* CSP Inventory from HighTower Solutions											
Climb											
PA8-65 (ECI-63)	A	Paraboloid w/Shroud (HP)	From Leg	0.50 0.00 0.00	Worst		107.00	8.00	No Ice 1/2" Ice	50.27 51.29	285.00 548.30
Andrew 2' w/Radome (ECI-61)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		112.00	2.00	No Ice 1/2" Ice	3.14 3.41	70.00 282.00
* CSP Proposed											
Commscope PAR6-59W-PXA/A (ECI-58)	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		154.00	6.00	No Ice 1/2" Ice	28.27 29.07	310.00 460.00

## Tower Pressures - No Ice

$$G_H = 1.084$$

Section Elevation	z	Kz	qz	AG	F a c e	AF	AR	Aleg	Leg %	CAAA In Face	CAAA Out Face
ft	ft		psf	ft <sup>2</sup>	e	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
T1 320.00-304.00	312.00	1.9	39	116.377	A	9.512	14.835	14.835	60.93	0.000	0.000
					B	9.078	14.835		62.04	5.561	0.000
					C	9.512	14.835		60.93	0.000	0.000
T2 304.00-300.00	302.00	1.882	39	29.094	A	2.147	3.709	3.709	63.34	0.000	0.000
					B	2.038	3.709		64.53	1.540	0.000
					C	2.147	3.709		63.34	0.000	0.000
T3 300.00-280.00	290.00	1.861	39	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
					B	11.540	22.122		65.72	14.473	0.000
					C	12.596	22.122		63.72	0.000	0.000
T4 280.00-260.00	270.00	1.823	38	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
					B	49.540	0.000		76.28	30.636	0.000
					C	51.464	0.000		73.43	0.000	0.000
T5 260.00-240.00	250.00	1.783	37	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
					B	53.929	0.000		70.05	41.134	0.000
					C	56.868	0.000		66.43	0.000	0.000
T6 240.00-220.00	230.00	1.741	36	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
					B	61.984	0.000		60.94	53.315	0.000
					C	66.901	0.000		56.46	0.000	0.000
T7 220.00-200.00	210.00	1.697	35	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
					B	58.064	0.000		65.06	53.860	0.000
					C	59.614	0.000		63.37	30.160	0.000
T8 200.00-180.00	190.00	1.649	34	385.076	A	69.940	0.000	45.633	65.25	30.040	0.000
					B	68.429	0.000		66.69	53.860	0.000
					C	69.932	0.000		65.25	30.160	0.000
T9 180.00-170.00	175.00	1.611	33	208.387	A	35.928	0.000	22.815	63.50	15.020	0.000
					B	35.056	0.000		65.08	29.035	0.000
					C	35.925	0.000		63.51	15.080	0.000
T10 170.00-160.00	165.00	1.584	33	218.787	A	36.566	0.000	22.815	62.39	15.020	0.000
					B	35.557	0.273		63.68	31.062	0.000
					C	36.563	0.000		62.40	15.080	0.000

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Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> psf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
T11 160.00-140.00	150.00	1.541	32	467.070	A	82.274	0.000	45.617	55.44	30.040	0.000
					B	80.101	2.271		55.38	64.237	0.000
					C	82.265	0.000		55.45	30.160	0.000
T12 140.00-120.00	130.00	1.48	31	507.978	A	85.482	0.000	45.637	53.39	30.040	0.000
					B	84.826	3.633		51.59	68.379	0.000
					C	85.473	0.000		53.39	30.160	0.000
T13 120.00-100.00	110.00	1.411	29	555.591	A	45.673	25.238	45.673	64.41	30.040	0.000
					B	50.188	26.044		59.91	72.445	0.000
					C	45.673	25.232		64.41	30.160	0.000
T14 100.00-80.00	90.00	1.332	28	606.388	A	45.666	26.897	45.666	62.93	30.040	0.000
					B	52.620	27.352		57.10	78.189	0.000
					C	45.666	26.890		62.94	30.160	0.000
T15 80.00-60.00	70.00	1.24	26	662.098	A	53.708	28.975	53.708	64.96	30.040	0.000
					B	60.663	29.334		59.68	80.260	0.000
					C	53.708	28.969		64.96	30.160	0.000
T16 60.00-30.00	45.00	1.093	23	1088.08	A	80.523	49.865	80.523	61.76	45.060	0.000
					3						
					B	90.955	49.781		57.22	120.390	0.000
					C	80.523	49.854		61.76	45.240	0.000
T17 30.00-0.00	15.00	1	21	1202.12	A	81.480	56.889	81.480	58.89	37.550	0.000
					2						
					B	90.173	56.677		55.48	100.325	0.000
					C	81.480	56.880		58.89	37.700	0.000

**Tower Pressure - With Ice**

$G_H = 1.084$

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> psf	t <sub>z</sub> in	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
T1 320.00-304.00	312.00	1.9	39	0.5000	117.711	A	9.512	22.937	17.501	53.93	0.000	0.000
						B	8.622	22.428		56.37	11.411	0.000
						C	9.512	22.937		53.93	0.000	0.000
T2 304.00-300.00	302.00	1.882	39	0.5000	29.428	A	2.147	5.602	4.375	56.46	0.000	0.000
						B	1.925	5.476		59.12	3.140	0.000
						C	2.147	5.602		56.46	0.000	0.000
T3 300.00-280.00	290.00	1.861	39	0.5000	169.325	A	12.596	31.759	25.461	57.40	0.000	0.000
						B	10.576	30.749		61.61	27.673	0.000
						C	12.596	31.759		57.40	0.000	0.000
T4 280.00-260.00	270.00	1.823	38	0.5000	218.499	A	53.691	5.471	40.014	67.64	0.000	0.000
						B	50.241	4.091		73.65	54.936	0.000
						C	53.691	5.471		67.64	0.000	0.000
T5 260.00-240.00	250.00	1.783	37	0.5000	260.795	A	59.094	6.363	40.004	61.11	0.000	0.000
						B	53.939	4.645		68.28	72.134	0.000
						C	59.094	6.363		61.11	0.000	0.000
T6 240.00-220.00	230.00	1.741	36	0.5000	301.294	A	69.127	7.281	40.002	52.35	0.000	0.000
						B	60.567	5.141		60.88	92.815	0.000
						C	69.127	7.281		52.35	0.000	0.000
T7 220.00-200.00	210.00	1.697	35	0.5000	341.394	A	63.814	5.953	40.001	57.34	0.000	0.000
						B	57.672	4.418		64.42	93.860	0.000
						C	60.793	5.198		60.62	46.160	0.000
T8 200.00-180.00	190.00	1.649	34	0.5000	386.745	A	71.078	5.805	47.860	62.25	48.747	0.000
						B	68.118	5.064		65.40	93.860	0.000
						C	71.144	5.821		62.18	46.160	0.000
T9 180.00-170.00	175.00	1.611	33	0.5000	209.222	A	36.507	3.145	23.928	60.34	24.373	0.000
						B	34.792	2.716		63.79	51.135	0.000

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	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation <i>ft</i>	<i>z</i> <i>ft</i>	<i>K<sub>Z</sub></i>	<i>q<sub>z</sub></i> <i>psf</i>	<i>t<sub>z</sub></i> <i>in</i>	<i>A<sub>G</sub></i> <i>ft<sup>2</sup></i>	<i>F<sub>a</sub></i> <i>c</i> <i>e</i>	<i>A<sub>F</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>R</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>leg</sub></i> <i>ft<sup>2</sup></i>	<i>Leg</i> <i>%</i>	<i>C<sub>A</sub>A<sub>i</sub></i> <i>In</i> <i>Face</i> <i>ft<sup>2</sup></i>	<i>C<sub>A</sub>A<sub>i</sub></i> <i>Out</i> <i>Face</i> <i>ft<sup>2</sup></i>
T10 170.00-160.00	165.00	1.584	33	0.5000	219.622	C	36.540	3.153	23.928	60.28	23.080	0.000
						A	37.151	3.306		59.14	24.373	0.000
						B	35.148	3.327		62.19	55.462	0.000
T11 160.00-140.00	150.00	1.541	32	0.5000	468.739	C	37.183	3.314	47.842	59.09	23.080	0.000
						A	83.193	7.070		53.00	48.747	0.000
						B	78.508	10.301		53.87	115.537	0.000
T12 140.00-120.00	130.00	1.48	31	0.5000	509.647	C	83.273	7.086	47.864	52.95	46.160	0.000
						A	86.420	7.711		50.85	48.747	0.000
						B	83.725	13.392		49.28	123.479	0.000
T13 120.00-100.00	110.00	1.411	29	0.5000	557.261	C	86.498	7.727	47.902	50.80	46.160	0.000
						A	47.902	32.034		59.93	48.747	0.000
						B	54.583	31.531		55.63	131.275	0.000
T14 100.00-80.00	90.00	1.332	28	0.5000	608.058	C	47.902	32.114	47.894	59.87	46.160	0.000
						A	47.894	34.297		58.27	48.747	0.000
						B	58.182	32.937		52.56	142.289	0.000
T15 80.00-60.00	70.00	1.24	26	0.5000	663.769	C	47.894	34.373	55.937	58.22	46.160	0.000
						A	55.937	36.906		60.25	48.747	0.000
						B	66.225	35.364		55.06	146.260	0.000
T16 60.00-30.00	45.00	1.093	23	0.5000	1090.588	C	55.937	36.981	83.865	60.20	46.160	0.000
						A	83.865	61.800		57.57	73.120	0.000
						B	99.296	58.044		53.30	219.390	0.000
T17 30.00-0.00	15.00	1	21	0.5000	1204.627	C	83.865	61.926	84.823	57.52	69.240	0.000
						A	84.823	70.341		54.67	60.933	0.000
						B	97.682	67.067		51.49	182.825	0.000
						C	84.823	70.447		54.63	57.700	0.000

### Tower Pressure - Service

$$G_H = 1.084$$

Section Elevation <i>ft</i>	<i>z</i> <i>ft</i>	<i>K<sub>Z</sub></i>	<i>q<sub>z</sub></i> <i>psf</i>	<i>A<sub>G</sub></i> <i>ft<sup>2</sup></i>	<i>F<sub>a</sub></i> <i>c</i> <i>e</i>	<i>A<sub>F</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>R</sub></i> <i>ft<sup>2</sup></i>	<i>A<sub>leg</sub></i> <i>ft<sup>2</sup></i>	<i>Leg</i> <i>%</i>	<i>C<sub>A</sub>A<sub>i</sub></i> <i>In</i> <i>Face</i> <i>ft<sup>2</sup></i>	<i>C<sub>A</sub>A<sub>i</sub></i> <i>Out</i> <i>Face</i> <i>ft<sup>2</sup></i>
T1 320.00-304.00	312.00	1.9	39	116.377	A	9.512	14.835	14.835	60.93	0.000	0.000
					B	9.078	14.835		62.04	5.561	0.000
					C	9.512	14.835		60.93	0.000	0.000
T2 304.00-300.00	302.00	1.882	39	29.094	A	2.147	3.709	3.709	63.34	0.000	0.000
					B	2.038	3.709		64.53	1.540	0.000
					C	2.147	3.709		63.34	0.000	0.000
T3 300.00-280.00	290.00	1.861	39	167.656	A	12.596	22.122	22.122	63.72	0.000	0.000
					B	11.540	22.122		65.72	14.473	0.000
					C	12.596	22.122		63.72	0.000	0.000
T4 280.00-260.00	270.00	1.823	38	216.829	A	51.464	0.000	37.788	73.43	0.000	0.000
					B	49.540	0.000		76.28	30.636	0.000
					C	51.464	0.000		73.43	0.000	0.000
T5 260.00-240.00	250.00	1.783	37	259.126	A	56.868	0.000	37.778	66.43	0.000	0.000
					B	53.929	0.000		70.05	41.134	0.000
					C	56.868	0.000		66.43	0.000	0.000
T6 240.00-220.00	230.00	1.741	36	299.625	A	66.901	0.000	37.776	56.46	0.000	0.000
					B	61.984	0.000		60.94	53.315	0.000
					C	66.901	0.000		56.46	0.000	0.000
T7 220.00-200.00	210.00	1.697	35	339.725	A	61.588	0.000	37.775	61.34	0.000	0.000
					B	58.064	0.000		65.06	53.860	0.000
					C	59.614	0.000		63.37	30.160	0.000

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 24 of 41
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 11:26:38 05/18/20
	<b>Client</b> DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b> MCD

Section Elevation ft	z ft	K <sub>Z</sub>	q <sub>z</sub> psf	A <sub>G</sub> ft <sup>2</sup>	F <sub>a</sub> c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>
T8 200.00-180.00	190.00	1.649	34	385.076	A	69.940	0.000	45.633	65.25	30.040	0.000
					B	68.429	0.000		66.69	53.860	0.000
					C	69.932	0.000		65.25	30.160	0.000
T9 180.00-170.00	175.00	1.611	33	208.387	A	35.928	0.000	22.815	63.50	15.020	0.000
					B	35.056	0.000		65.08	29.035	0.000
					C	35.925	0.000		63.51	15.080	0.000
T10 170.00-160.00	165.00	1.584	33	218.787	A	36.566	0.000	22.815	62.39	15.020	0.000
					B	35.557	0.273		63.68	31.062	0.000
					C	36.563	0.000		62.40	15.080	0.000
T11 160.00-140.00	150.00	1.541	32	467.070	A	82.274	0.000	45.617	55.44	30.040	0.000
					B	80.101	2.271		55.38	64.237	0.000
					C	82.265	0.000		55.45	30.160	0.000
T12 140.00-120.00	130.00	1.48	31	507.978	A	85.482	0.000	45.637	53.39	30.040	0.000
					B	84.826	3.633		51.59	68.379	0.000
					C	85.473	0.000		53.39	30.160	0.000
T13 120.00-100.00	110.00	1.411	29	555.591	A	45.673	25.238	45.673	64.41	30.040	0.000
					B	50.188	26.044		59.91	72.445	0.000
					C	45.673	25.232		64.41	30.160	0.000
T14 100.00-80.00	90.00	1.332	28	606.388	A	45.666	26.897	45.666	62.93	30.040	0.000
					B	52.620	27.352		57.10	78.189	0.000
					C	45.666	26.890		62.94	30.160	0.000
T15 80.00-60.00	70.00	1.24	26	662.098	A	53.708	28.975	53.708	64.96	30.040	0.000
					B	60.663	29.334		59.68	80.260	0.000
					C	53.708	28.969		64.96	30.160	0.000
T16 60.00-30.00	45.00	1.093	23	1088.08	A	80.523	49.865	80.523	61.76	45.060	0.000
			3		B	90.955	49.781		57.22	120.390	0.000
					C	80.523	49.854		61.76	45.240	0.000
T17 30.00-0.00	15.00	1	21	1202.12	A	81.480	56.889	81.480	58.89	37.550	0.000
			2		B	90.173	56.677		55.48	100.325	0.000
					C	81.480	56.880		58.89	37.700	0.000

### Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F <sub>a</sub> c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub> ft <sup>2</sup>	F lb	w plf	Ctrl. Face
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	1	1	18.299	2241.92	140.12	C
			B	0.205	2.578	0.592	1	1	17.854			
			C	0.209	2.566	0.592	1	1	18.299			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	1	1	4.337	540.67	135.17	C
			B	0.198	2.604	0.59	1	1	4.226			
			C	0.201	2.592	0.591	1	1	4.337			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	1	1	25.689	3368.49	168.42	C
			B	0.201	2.593	0.591	1	1	24.604			
			C	0.207	2.573	0.592	1	1	25.689			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	1	1	51.464	6475.59	323.78	C
			B	0.228	2.504	0.597	1	1	49.540			
			C	0.237	2.476	0.599	1	1	51.464			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	1	1	56.868	7420.02	371.00	C
			B	0.208	2.569	0.592	1	1	53.929			
			C	0.219	2.532	0.595	1	1	56.868			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	1	1	66.901	8684.36	434.22	C
			B	0.207	2.573	0.592	1	1	61.984			
			C	0.223	2.52	0.595	1	1	66.901			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	1	1	61.588	9449.61	472.48	A
			B	0.171	2.696	0.585	1	1	58.064			

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	25 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T8 200.00-180.00	548.60	7298.65	C	0.175	2.68	0.586	1	1	59.614	11116.49	555.82	A
			A	0.182	2.659	0.587	1	1	69.940			
			B	0.178	2.672	0.586	1	1	68.429			
T9 180.00-170.00	279.66	3730.84	C	0.182	2.659	0.587	1	1	69.932	5639.47	563.95	A
			A	0.172	2.691	0.585	1	1	35.928			
			B	0.168	2.706	0.584	1	1	35.056			
T10 170.00-160.00	286.19	3785.29	C	0.172	2.691	0.585	1	1	35.925	5703.06	570.31	A
			A	0.167	2.709	0.584	1	1	36.566			
			B	0.164	2.721	0.584	1	1	35.716			
T11 160.00-140.00	587.84	9608.59	C	0.167	2.71	0.584	1	1	36.563	11939.98	597.00	A
			A	0.176	2.678	0.586	1	1	82.274			
			B	0.176	2.677	0.586	1	1	81.431			
T12 140.00-120.00	611.08	9975.29	C	0.176	2.678	0.586	1	1	82.265	12036.27	601.81	B
			A	0.168	2.705	0.584	1	1	85.482			
			B	0.174	2.685	0.585	1	1	86.953			
T13 120.00-100.00	629.25	9144.95	C	0.168	2.705	0.584	1	1	85.473	10038.38	501.92	B
			A	0.128	2.856	0.578	1	1	60.269			
			B	0.137	2.819	0.58	1	1	65.283			
T14 100.00-80.00	653.88	9675.54	C	0.128	2.856	0.578	1	1	60.265	9959.77	497.99	B
			A	0.12	2.886	0.577	1	1	61.193			
			B	0.132	2.839	0.579	1	1	68.454			
T15 80.00-60.00	659.20	11450.50	C	0.12	2.886	0.577	1	1	61.189	10022.40	501.12	B
			A	0.125	2.866	0.578	1	1	70.455			
			B	0.136	2.824	0.579	1	1	77.660			
T16 60.00-30.00	988.80	15115.36	C	0.125	2.866	0.578	1	1	70.451	13550.63	451.69	B
			A	0.12	2.886	0.577	1	1	109.311			
			B	0.129	2.849	0.579	1	1	119.755			
T17 30.00-0.00	824.00	17941.94	C	0.12	2.886	0.577	1	1	109.305	11890.73	396.36	B
			A	0.115	2.904	0.577	1	1	114.291			
			B	0.122	2.877	0.578	1	1	122.911			
Sum Weight:	6924.66	125382.28	C	0.115	2.904	0.577	1	114.286	20310.92 kip-ft	140077.83		

### Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	0.825	1	16.635	2059.57	128.72	C
			B	0.205	2.578	0.592	0.825	1	16.265			
			C	0.209	2.566	0.592	0.825	1	16.635			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	0.825	1	3.962	499.48	124.87	C
			B	0.198	2.604	0.59	0.825	1	3.869			
			C	0.201	2.592	0.591	0.825	1	3.962			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	0.825	1	23.485	3131.38	156.57	C
			B	0.201	2.593	0.591	0.825	1	22.584			
			C	0.207	2.573	0.592	0.825	1	23.485			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	0.825	1	42.458	5562.01	278.10	C
			B	0.228	2.504	0.597	0.825	1	40.871			
			C	0.237	2.476	0.599	0.825	1	42.458			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	0.825	1	46.916	6410.02	320.50	C
			B	0.208	2.569	0.592	0.825	1	44.491			
			C	0.219	2.532	0.595	0.825	1	46.916			
T6	176.60	6484.36	A	0.223	2.52	0.595	0.825	1	55.194	7529.72	376.49	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	26 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
240.00-220.00			B	0.207	2.573	0.592	0.825	1	51.137			
			C	0.223	2.52	0.595	0.825	1	55.194			
T7	376.80	6406.00	A	0.181	2.66	0.587	0.825	1	50.810	8356.58	417.83	A
220.00-200.00			B	0.171	2.696	0.585	0.825	1	47.903			
			C	0.175	2.68	0.586	0.825	1	49.182			
T8	548.60	7298.65	A	0.182	2.659	0.587	0.825	1	57.701	9910.75	495.54	A
200.00-180.00			B	0.178	2.672	0.586	0.825	1	56.454			
			C	0.182	2.659	0.587	0.825	1	57.694			
T9	279.66	3730.84	A	0.172	2.691	0.585	0.825	1	29.641	5027.13	502.71	A
180.00-170.00			B	0.168	2.706	0.584	0.825	1	28.921			
			C	0.172	2.691	0.585	0.825	1	29.638			
T10	286.19	3785.29	A	0.167	2.709	0.584	0.825	1	30.167	5085.97	508.60	A
170.00-160.00			B	0.164	2.721	0.584	0.825	1	29.494			
			C	0.167	2.71	0.584	0.825	1	30.164			
T11	587.84	9608.59	A	0.176	2.678	0.586	0.825	1	67.876	10604.71	530.24	A
160.00-140.00			B	0.176	2.677	0.586	0.825	1	67.413			
			C	0.176	2.678	0.586	0.825	1	67.869			
T12	611.08	9975.29	A	0.168	2.705	0.584	0.825	1	70.523	10711.27	535.56	B
140.00-120.00			B	0.174	2.685	0.585	0.825	1	72.109			
			C	0.168	2.705	0.584	0.825	1	70.515			
T13	629.25	9144.95	A	0.128	2.856	0.578	0.825	1	52.276	9253.52	462.68	B
120.00-100.00			B	0.137	2.819	0.58	0.825	1	56.500			
			C	0.128	2.856	0.578	0.825	1	52.272			
T14	653.88	9675.54	A	0.12	2.886	0.577	0.825	1	53.202	9177.18	458.86	B
100.00-80.00			B	0.132	2.839	0.579	0.825	1	59.245			
			C	0.12	2.886	0.577	0.825	1	53.198			
T15	659.20	11450.50	A	0.125	2.866	0.578	0.825	1	61.056	9187.25	459.36	B
80.00-60.00			B	0.136	2.824	0.579	0.825	1	67.044			
			C	0.125	2.866	0.578	0.825	1	61.052			
T16	988.80	15115.36	A	0.12	2.886	0.577	0.825	1	95.220	12437.16	414.57	B
60.00-30.00			B	0.129	2.849	0.579	0.825	1	103.837			
			C	0.12	2.886	0.577	0.825	1	95.213			
T17	824.00	17941.94	A	0.115	2.904	0.577	0.825	1	100.032	10870.66	362.36	B
30.00-0.00			B	0.122	2.877	0.578	0.825	1	107.130			
			C	0.115	2.904	0.577	0.825	1	100.027			
Sum Weight:	6924.66	125382.28						OTM	18087.31 kip-ft	125814.35		

### Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1	15.90	1442.07	A	0.209	2.566	0.592	0.8	1	16.397	2033.52	127.10	C
320.00-304.00			B	0.205	2.578	0.592	0.8	1	16.038			
			C	0.209	2.566	0.592	0.8	1	16.397			
T2	4.36	349.72	A	0.201	2.592	0.591	0.8	1	3.908	493.60	123.40	C
304.00-300.00			B	0.198	2.604	0.59	0.8	1	3.818			
			C	0.201	2.592	0.591	0.8	1	3.908			
T3	43.60	2496.34	A	0.207	2.573	0.592	0.8	1	23.170	3097.50	154.88	C
300.00-280.00			B	0.201	2.593	0.591	0.8	1	22.296			
			C	0.207	2.573	0.592	0.8	1	23.170			
T4	101.88	5067.66	A	0.237	2.476	0.599	0.8	1	41.171	5431.49	271.57	C
280.00-260.00			B	0.228	2.504	0.597	0.8	1	39.632			
			C	0.237	2.476	0.599	0.8	1	41.171			



<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	27 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	0.8	1	45.494	6265.73	313.29	C
			B	0.208	2.569	0.592	0.8	1	43.143			
			C	0.219	2.532	0.595	0.8	1	45.494			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	0.8	1	53.521	7364.78	368.24	C
			B	0.207	2.573	0.592	0.8	1	49.587			
			C	0.223	2.52	0.595	0.8	1	53.521			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	0.8	1	49.270	8200.43	410.02	A
			B	0.171	2.696	0.585	0.8	1	46.451			
			C	0.175	2.68	0.586	0.8	1	47.692			
T8 200.00-180.00	548.60	7298.65	A	0.182	2.659	0.587	0.8	1	55.952	9738.50	486.92	A
			B	0.178	2.672	0.586	0.8	1	54.743			
			C	0.182	2.659	0.587	0.8	1	55.946			
T9 180.00-170.00	279.66	3730.84	A	0.172	2.691	0.585	0.8	1	28.743	4939.65	493.97	A
			B	0.168	2.706	0.584	0.8	1	28.044			
			C	0.172	2.691	0.585	0.8	1	28.740			
T10 170.00-160.00	286.19	3785.29	A	0.167	2.709	0.584	0.8	1	29.253	4997.82	499.78	A
			B	0.164	2.721	0.584	0.8	1	28.605			
			C	0.167	2.71	0.584	0.8	1	29.250			
T11 160.00-140.00	587.84	9608.59	A	0.176	2.678	0.586	0.8	1	65.820	10413.96	520.70	A
			B	0.176	2.677	0.586	0.8	1	65.411			
			C	0.176	2.678	0.586	0.8	1	65.812			
T12 140.00-120.00	611.08	9975.29	A	0.168	2.705	0.584	0.8	1	68.385	10521.98	526.10	B
			B	0.174	2.685	0.585	0.8	1	69.988			
			C	0.168	2.705	0.584	0.8	1	68.378			
T13 120.00-100.00	629.25	9144.95	A	0.128	2.856	0.578	0.8	1	51.134	9141.40	457.07	B
			B	0.137	2.819	0.58	0.8	1	55.246			
			C	0.128	2.856	0.578	0.8	1	51.130			
T14 100.00-80.00	653.88	9675.54	A	0.12	2.886	0.577	0.8	1	52.060	9065.38	453.27	B
			B	0.132	2.839	0.579	0.8	1	57.930			
			C	0.12	2.886	0.577	0.8	1	52.056			
T15 80.00-60.00	659.20	11450.50	A	0.125	2.866	0.578	0.8	1	59.713	9067.94	453.40	B
			B	0.136	2.824	0.579	0.8	1	65.527			
			C	0.125	2.866	0.578	0.8	1	59.709			
T16 60.00-30.00	988.80	15115.36	A	0.12	2.886	0.577	0.8	1	93.207	12278.10	409.27	B
			B	0.129	2.849	0.579	0.8	1	101.564			
			C	0.12	2.886	0.577	0.8	1	93.200			
T17 30.00-0.00	824.00	17941.94	A	0.115	2.904	0.577	0.8	1	97.995	10724.93	357.50	B
			B	0.122	2.877	0.578	0.8	1	104.876			
			C	0.115	2.904	0.577	0.8	1	97.990			
Sum Weight:	6924.66	125382.28						OTM	17769.65 kip-ft	123776.72		

### Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	0.85	1	16.872	2085.62	130.35	C
			B	0.205	2.578	0.592	0.85	1	16.492			
			C	0.209	2.566	0.592	0.85	1	16.872			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	0.85	1	4.015	505.36	126.34	C
			B	0.198	2.604	0.59	0.85	1	3.920			
			C	0.201	2.592	0.591	0.85	1	4.015			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	0.85	1	23.800	3165.25	158.26	C
			B	0.201	2.593	0.591	0.85	1	22.873			

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	28 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T4 280.00-260.00	101.88	5067.66	C	0.207	2.573	0.592	0.85	1	23.800			
			A	0.237	2.476	0.599	0.85	1	43.745	5692.52	284.63	C
			B	0.228	2.504	0.597	0.85	1	42.109			
T5 260.00-240.00	137.02	5409.17	C	0.237	2.476	0.599	0.85	1	43.745			
			A	0.219	2.532	0.595	0.85	1	48.338	6554.30	327.72	C
			B	0.208	2.569	0.592	0.85	1	45.839			
T6 240.00-220.00	176.60	6484.36	C	0.219	2.532	0.595	0.85	1	48.338			
			A	0.223	2.52	0.595	0.85	1	56.866	7694.67	384.73	C
			B	0.207	2.573	0.592	0.85	1	52.686			
T7 220.00-200.00	376.80	6406.00	C	0.223	2.52	0.595	0.85	1	56.866			
			A	0.181	2.66	0.587	0.85	1	52.350	8512.73	425.64	A
			B	0.171	2.696	0.585	0.85	1	49.354			
T8 200.00-180.00	548.60	7298.65	C	0.175	2.68	0.586	0.85	1	50.672			
			A	0.182	2.659	0.587	0.85	1	59.449	10082.99	504.15	A
			B	0.178	2.672	0.586	0.85	1	58.165			
T9 180.00-170.00	279.66	3730.84	C	0.182	2.659	0.587	0.85	1	59.443			
			A	0.172	2.691	0.585	0.85	1	30.539	5114.61	511.46	A
			B	0.168	2.706	0.584	0.85	1	29.797			
T10 170.00-160.00	286.19	3785.29	C	0.172	2.691	0.585	0.85	1	30.536			
			A	0.167	2.709	0.584	0.85	1	31.081	5174.13	517.41	A
			B	0.164	2.721	0.584	0.85	1	30.383			
T11 160.00-140.00	587.84	9608.59	C	0.167	2.71	0.584	0.85	1	31.078			
			A	0.176	2.678	0.586	0.85	1	69.933	10795.47	539.77	A
			B	0.176	2.677	0.586	0.85	1	69.416			
T12 140.00-120.00	611.08	9975.29	C	0.176	2.678	0.586	0.85	1	69.925			
			A	0.168	2.705	0.584	0.85	1	72.660	10900.55	545.03	B
			B	0.174	2.685	0.585	0.85	1	74.229			
T13 120.00-100.00	629.25	9144.95	C	0.168	2.705	0.584	0.85	1	72.652			
			A	0.128	2.856	0.578	0.85	1	53.418	9365.65	468.28	B
			B	0.137	2.819	0.58	0.85	1	57.755			
T14 100.00-80.00	653.88	9675.54	C	0.128	2.856	0.578	0.85	1	53.414			
			A	0.12	2.886	0.577	0.85	1	54.343	9288.98	464.45	B
			B	0.132	2.839	0.579	0.85	1	60.561			
T15 80.00-60.00	659.20	11450.50	C	0.12	2.886	0.577	0.85	1	54.340			
			A	0.125	2.866	0.578	0.85	1	62.398	9306.56	465.33	B
			B	0.136	2.824	0.579	0.85	1	68.560			
T16 60.00-30.00	988.80	15115.36	C	0.125	2.866	0.578	0.85	1	62.395			
			A	0.12	2.886	0.577	0.85	1	97.233	12596.23	419.87	B
			B	0.129	2.849	0.579	0.85	1	106.111			
T17 30.00-0.00	824.00	17941.94	C	0.12	2.886	0.577	0.85	1	97.226			
			A	0.115	2.904	0.577	0.85	1	102.069	11016.38	367.21	B
			B	0.122	2.877	0.578	0.85	1	109.385			
Sum Weight:	6924.66	125382.28	C	0.115	2.904	0.577	0.85	1	102.064			
								OTM	18404.97 kip-ft	127851.99		

### Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	67.73	1985.82	A	0.276	2.363	0.609	1	1	23.476	2855.41	178.46	C
			B	0.264	2.397	0.605	1	1	22.201			
			C	0.276	2.363	0.609	1	1	23.476			
T2	18.65	476.76	A	0.263	2.398	0.605	1	1	5.538	694.62	173.66	C

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	29 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
304.00-300.00			B	0.251	2.433	0.602	1	1	5.223			
			C	0.263	2.398	0.605	1	1	5.538			
T3	172.33	3229.77	A	0.262	2.402	0.605	1	1	31.810	4352.18	217.61	C
300.00-280.00			B	0.244	2.455	0.6	1	1	29.037			
			C	0.262	2.402	0.605	1	1	31.810			
T4	363.24	6496.99	A	0.271	2.377	0.607	1	1	57.014	7802.06	390.10	C
280.00-260.00			B	0.249	2.442	0.602	1	1	52.702			
			C	0.271	2.377	0.607	1	1	57.014			
T5	482.98	7010.32	A	0.251	2.435	0.602	1	1	62.926	9030.67	451.53	C
260.00-240.00			B	0.225	2.516	0.596	1	1	56.707			
			C	0.251	2.435	0.602	1	1	62.926			
T6	622.93	8391.73	A	0.254	2.427	0.603	1	1	73.517	10614.03	530.70	C
240.00-220.00			B	0.218	2.537	0.594	1	1	63.622			
			C	0.254	2.427	0.603	1	1	73.517			
T7	1061.09	8127.65	A	0.204	2.582	0.591	1	1	67.334	11966.90	598.35	A
220.00-200.00			B	0.182	2.658	0.587	1	1	60.265			
			C	0.193	2.619	0.589	1	1	63.855			
T8	1470.38	9251.50	A	0.199	2.6	0.59	1	1	74.503	14178.21	708.91	C
200.00-180.00			B	0.189	2.632	0.588	1	1	71.097			
			C	0.199	2.599	0.59	1	1	74.579			
T9	759.82	4736.56	A	0.19	2.631	0.588	1	1	38.357	7224.25	722.43	C
180.00-170.00			B	0.179	2.667	0.586	1	1	36.385			
			C	0.19	2.631	0.588	1	1	38.395			
T10	788.67	4810.55	A	0.184	2.65	0.587	1	1	39.092	7351.99	735.20	C
170.00-160.00			B	0.175	2.681	0.586	1	1	37.096			
			C	0.184	2.649	0.587	1	1	39.129			
T11	1638.57	11942.62	A	0.193	2.621	0.589	1	1	87.357	15225.01	761.25	C
160.00-140.00			B	0.189	2.632	0.588	1	1	84.568			
			C	0.193	2.62	0.589	1	1	87.446			
T12	1733.59	12406.11	A	0.185	2.648	0.587	1	1	90.949	15273.51	763.68	C
140.00-120.00			B	0.191	2.628	0.589	1	1	91.607			
			C	0.185	2.647	0.587	1	1	91.037			
T13	1809.77	11165.81	A	0.143	2.796	0.58	1	1	66.498	13539.03	676.95	B
120.00-100.00			B	0.155	2.755	0.582	1	1	72.940			
			C	0.144	2.795	0.581	1	1	66.544			
T14	1912.02	11752.95	A	0.135	2.827	0.579	1	1	67.762	13516.19	675.81	B
100.00-80.00			B	0.15	2.772	0.581	1	1	77.333			
			C	0.135	2.826	0.579	1	1	67.807			
T15	1935.79	13749.55	A	0.14	2.809	0.58	1	1	77.342	13393.40	669.67	B
80.00-60.00			B	0.153	2.76	0.582	1	1	86.805			
			C	0.14	2.809	0.58	1	1	77.386			
T16	2903.69	18692.57	A	0.134	2.833	0.579	1	1	119.653	18002.40	600.08	B
60.00-30.00			B	0.144	2.793	0.581	1	1	132.997			
			C	0.134	2.832	0.579	1	1	119.727			
T17	2419.74	21738.94	A	0.129	2.851	0.578	1	1	125.512	15430.10	514.34	B
30.00-0.00			B	0.137	2.821	0.58	1	1	136.550			
			C	0.129	2.851	0.578	1	1	125.574			
Sum Weight:	20161.00	155966.19						OTM	25806.64 kip-ft	180449.97		

### Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	

<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	30 of 41
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	67.73	1985.82	A	0.276	2.363	0.609	0.825	1	21.811	2687.48	167.97	C
			B	0.264	2.397	0.605	0.825	1	20.693			
			C	0.276	2.363	0.609	0.825	1	21.811			
T2 304.00-300.00	18.65	476.76	A	0.263	2.398	0.605	0.825	1	5.162	656.51	164.13	C
			B	0.251	2.433	0.602	0.825	1	4.886			
			C	0.263	2.398	0.605	0.825	1	5.162			
T3 300.00-280.00	172.33	3229.77	A	0.262	2.402	0.605	0.825	1	29.606	4130.77	206.54	C
			B	0.244	2.455	0.6	0.825	1	27.186			
			C	0.262	2.402	0.605	0.825	1	29.606			
T4 280.00-260.00	363.24	6496.99	A	0.271	2.377	0.607	0.825	1	47.618	6887.19	344.36	C
			B	0.249	2.442	0.602	0.825	1	43.910			
			C	0.271	2.377	0.607	0.825	1	47.618			
T5 260.00-240.00	482.98	7010.32	A	0.251	2.435	0.602	0.825	1	52.584	8021.65	401.08	C
			B	0.225	2.516	0.596	0.825	1	47.267			
			C	0.251	2.435	0.602	0.825	1	52.584			
T6 240.00-220.00	622.93	8391.73	A	0.254	2.427	0.603	0.825	1	61.419	9465.17	473.26	C
			B	0.218	2.537	0.594	0.825	1	53.023			
			C	0.254	2.427	0.603	0.825	1	61.419			
T7 220.00-200.00	1061.09	8127.65	A	0.204	2.582	0.591	0.825	1	56.166	10867.66	543.38	A
			B	0.182	2.658	0.587	0.825	1	50.172			
			C	0.193	2.619	0.589	0.825	1	53.217			
T8 200.00-180.00	1470.38	9251.50	A	0.199	2.6	0.59	0.825	1	62.065	12979.03	648.95	C
			B	0.189	2.632	0.588	0.825	1	59.176			
			C	0.199	2.599	0.59	0.825	1	62.129			
T9 180.00-170.00	759.82	4736.56	A	0.19	2.631	0.588	0.825	1	31.969	6615.39	661.54	C
			B	0.179	2.667	0.586	0.825	1	30.296			
			C	0.19	2.631	0.588	0.825	1	32.000			
T10 170.00-160.00	788.67	4810.55	A	0.184	2.65	0.587	0.825	1	32.591	6738.51	673.85	C
			B	0.175	2.681	0.586	0.825	1	30.945			
			C	0.184	2.649	0.587	0.825	1	32.622			
T11 160.00-140.00	1638.57	11942.62	A	0.193	2.621	0.589	0.825	1	72.798	13902.45	695.12	C
			B	0.189	2.632	0.588	0.825	1	70.829			
			C	0.193	2.62	0.589	0.825	1	72.873			
T12 140.00-120.00	1733.59	12406.11	A	0.185	2.648	0.587	0.825	1	75.826	13984.35	699.22	B
			B	0.191	2.628	0.589	0.825	1	76.955			
			C	0.185	2.647	0.587	0.825	1	75.900			
T13 120.00-100.00	1809.77	11165.81	A	0.143	2.796	0.58	0.825	1	58.115	12704.90	635.24	B
			B	0.155	2.755	0.582	0.825	1	63.388			
			C	0.144	2.795	0.581	0.825	1	58.162			
T14 100.00-80.00	1912.02	11752.95	A	0.135	2.827	0.579	0.825	1	59.381	12671.39	633.57	B
			B	0.15	2.772	0.581	0.825	1	67.151			
			C	0.135	2.826	0.579	0.825	1	59.426			
T15 80.00-60.00	1935.79	13749.55	A	0.14	2.809	0.58	0.825	1	67.553	12502.22	625.11	B
			B	0.153	2.76	0.582	0.825	1	75.215			
			C	0.14	2.809	0.58	0.825	1	67.597			
T16 60.00-30.00	2903.69	18692.57	A	0.134	2.833	0.579	0.825	1	104.977	16810.83	560.36	B
			B	0.144	2.793	0.581	0.825	1	115.621			
			C	0.134	2.832	0.579	0.825	1	105.051			
T17 30.00-0.00	2419.74	21738.94	A	0.129	2.851	0.578	0.825	1	110.668	14346.51	478.22	B
			B	0.137	2.821	0.58	0.825	1	119.456			
			C	0.129	2.851	0.578	0.825	1	110.731			
Sum Weight:	20161.00	155966.19						OTM	23582.53 kip-ft	165971.98		

**Tower Forces - With Ice - Wind 60 To Face**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 31 of 41
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 11:26:38 05/18/20
	<b>Client</b> DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b> MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	67.73	1985.82	A	0.276	2.363	0.609	0.8	1	21.573	2663.49	166.47	C
			B	0.264	2.397	0.605	0.8	1	20.477			
			C	0.276	2.363	0.609	0.8	1	21.573			
T2 304.00-300.00	18.65	476.76	A	0.263	2.398	0.605	0.8	1	5.109	651.07	162.77	C
			B	0.251	2.433	0.602	0.8	1	4.838			
			C	0.263	2.398	0.605	0.8	1	5.109			
T3 300.00-280.00	172.33	3229.77	A	0.262	2.402	0.605	0.8	1	29.291	4099.15	204.96	C
			B	0.244	2.455	0.6	0.8	1	26.922			
			C	0.262	2.402	0.605	0.8	1	29.291			
T4 280.00-260.00	363.24	6496.99	A	0.271	2.377	0.607	0.8	1	46.275	6756.49	337.82	C
			B	0.249	2.442	0.602	0.8	1	42.654			
			C	0.271	2.377	0.607	0.8	1	46.275			
T5 260.00-240.00	482.98	7010.32	A	0.251	2.435	0.602	0.8	1	51.107	7877.50	393.88	C
			B	0.225	2.516	0.596	0.8	1	45.919			
			C	0.251	2.435	0.602	0.8	1	51.107			
T6 240.00-220.00	622.93	8391.73	A	0.254	2.427	0.603	0.8	1	59.691	9301.04	465.05	C
			B	0.218	2.537	0.594	0.8	1	51.509			
			C	0.254	2.427	0.603	0.8	1	59.691			
T7 220.00-200.00	1061.09	8127.65	A	0.204	2.582	0.591	0.8	1	54.571	10710.62	535.53	A
			B	0.182	2.658	0.587	0.8	1	48.731			
			C	0.193	2.619	0.589	0.8	1	51.697			
T8 200.00-180.00	1470.38	9251.50	A	0.199	2.6	0.59	0.8	1	60.288	12807.71	640.39	C
			B	0.189	2.632	0.588	0.8	1	57.473			
			C	0.199	2.599	0.59	0.8	1	60.351			
T9 180.00-170.00	759.82	4736.56	A	0.19	2.631	0.588	0.8	1	31.056	6528.40	652.84	C
			B	0.179	2.667	0.586	0.8	1	29.427			
			C	0.19	2.631	0.588	0.8	1	31.087			
T10 170.00-160.00	788.67	4810.55	A	0.184	2.65	0.587	0.8	1	31.662	6650.87	665.09	C
			B	0.175	2.681	0.586	0.8	1	30.067			
			C	0.184	2.649	0.587	0.8	1	31.692			
T11 160.00-140.00	1638.57	11942.62	A	0.193	2.621	0.589	0.8	1	70.719	13713.51	685.68	C
			B	0.189	2.632	0.588	0.8	1	68.866			
			C	0.193	2.62	0.589	0.8	1	70.791			
T12 140.00-120.00	1733.59	12406.11	A	0.185	2.648	0.587	0.8	1	73.665	13801.47	690.07	B
			B	0.191	2.628	0.589	0.8	1	74.862			
			C	0.185	2.647	0.587	0.8	1	73.737			
T13 120.00-100.00	1809.77	11165.81	A	0.143	2.796	0.58	0.8	1	56.917	12585.73	629.29	B
			B	0.155	2.755	0.582	0.8	1	62.024			
			C	0.144	2.795	0.581	0.8	1	56.964			
T14 100.00-80.00	1912.02	11752.95	A	0.135	2.827	0.579	0.8	1	58.184	12550.70	627.53	B
			B	0.15	2.772	0.581	0.8	1	65.696			
			C	0.135	2.826	0.579	0.8	1	58.228			
T15 80.00-60.00	1935.79	13749.55	A	0.14	2.809	0.58	0.8	1	66.154	12374.91	618.75	B
			B	0.153	2.76	0.582	0.8	1	73.560			
			C	0.14	2.809	0.58	0.8	1	66.198			
T16 60.00-30.00	2903.69	18692.57	A	0.134	2.833	0.579	0.8	1	102.880	16640.60	554.69	B
			B	0.144	2.793	0.581	0.8	1	113.138			
			C	0.134	2.832	0.579	0.8	1	102.954			
T17 30.00-0.00	2419.74	21738.94	A	0.129	2.851	0.578	0.8	1	108.548	14191.71	473.06	B
			B	0.137	2.821	0.58	0.8	1	117.014			
			C	0.129	2.851	0.578	0.8	1	108.610			
Sum Weight:	20161.00	155966.19						OTM	23264.97 kip-ft	163904.99		

**Tower Forces - With Ice - Wind 90 To Face**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b> 320' Rohn SSVMW	<b>Page</b> 32 of 41
	<b>Project</b> CSP Tower - Colchester, CT	<b>Date</b> 11:26:38 05/18/20
	<b>Client</b> DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b> MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	67.73	1985.82	A	0.276	2.363	0.609	0.85	1	22.049	2711.47	169.47	C
			B	0.264	2.397	0.605	0.85	1	20.908			
			C	0.276	2.363	0.609	0.85	1	22.049			
T2 304.00-300.00	18.65	476.76	A	0.263	2.398	0.605	0.85	1	5.216	661.96	165.49	C
			B	0.251	2.433	0.602	0.85	1	4.934			
			C	0.263	2.398	0.605	0.85	1	5.216			
T3 300.00-280.00	172.33	3229.77	A	0.262	2.402	0.605	0.85	1	29.920	4162.40	208.12	C
			B	0.244	2.455	0.6	0.85	1	27.450			
			C	0.262	2.402	0.605	0.85	1	29.920			
T4 280.00-260.00	363.24	6496.99	A	0.271	2.377	0.607	0.85	1	48.960	7017.88	350.89	C
			B	0.249	2.442	0.602	0.85	1	45.166			
			C	0.271	2.377	0.607	0.85	1	48.960			
T5 260.00-240.00	482.98	7010.32	A	0.251	2.435	0.602	0.85	1	54.062	8165.80	408.29	C
			B	0.225	2.516	0.596	0.85	1	48.616			
			C	0.251	2.435	0.602	0.85	1	54.062			
T6 240.00-220.00	622.93	8391.73	A	0.254	2.427	0.603	0.85	1	63.147	9629.29	481.46	C
			B	0.218	2.537	0.594	0.85	1	54.537			
			C	0.254	2.427	0.603	0.85	1	63.147			
T7 220.00-200.00	1061.09	8127.65	A	0.204	2.582	0.591	0.85	1	57.762	11024.69	551.23	A
			B	0.182	2.658	0.587	0.85	1	51.614			
			C	0.193	2.619	0.589	0.85	1	54.736			
T8 200.00-180.00	1470.38	9251.50	A	0.199	2.6	0.59	0.85	1	63.842	13150.34	657.52	C
			B	0.189	2.632	0.588	0.85	1	60.879			
			C	0.199	2.599	0.59	0.85	1	63.908			
T9 180.00-170.00	759.82	4736.56	A	0.19	2.631	0.588	0.85	1	32.881	6702.37	670.24	C
			B	0.179	2.667	0.586	0.85	1	31.166			
			C	0.19	2.631	0.588	0.85	1	32.914			
T10 170.00-160.00	788.67	4810.55	A	0.184	2.65	0.587	0.85	1	33.519	6826.15	682.61	C
			B	0.175	2.681	0.586	0.85	1	31.824			
			C	0.184	2.649	0.587	0.85	1	33.551			
T11 160.00-140.00	1638.57	11942.62	A	0.193	2.621	0.589	0.85	1	74.878	14091.39	704.57	C
			B	0.189	2.632	0.588	0.85	1	72.791			
			C	0.193	2.62	0.589	0.85	1	74.955			
T12 140.00-120.00	1733.59	12406.11	A	0.185	2.648	0.587	0.85	1	77.986	14167.23	708.36	B
			B	0.191	2.628	0.589	0.85	1	79.048			
			C	0.185	2.647	0.587	0.85	1	78.062			
T13 120.00-100.00	1809.77	11165.81	A	0.143	2.796	0.58	0.85	1	59.312	12824.06	641.20	B
			B	0.155	2.755	0.582	0.85	1	64.753			
			C	0.144	2.795	0.581	0.85	1	59.359			
T14 100.00-80.00	1912.02	11752.95	A	0.135	2.827	0.579	0.85	1	60.578	12792.07	639.60	B
			B	0.15	2.772	0.581	0.85	1	68.606			
			C	0.135	2.826	0.579	0.85	1	60.623			
T15 80.00-60.00	1935.79	13749.55	A	0.14	2.809	0.58	0.85	1	68.951	12629.53	631.48	B
			B	0.153	2.76	0.582	0.85	1	76.871			
			C	0.14	2.809	0.58	0.85	1	68.995			
T16 60.00-30.00	2903.69	18692.57	A	0.134	2.833	0.579	0.85	1	107.073	16981.05	566.03	B
			B	0.144	2.793	0.581	0.85	1	118.103			
			C	0.134	2.832	0.579	0.85	1	107.147			
T17 30.00-0.00	2419.74	21738.94	A	0.129	2.851	0.578	0.85	1	112.789	14501.31	483.38	B
			B	0.137	2.821	0.58	0.85	1	121.898			
			C	0.129	2.851	0.578	0.85	1	112.851			
Sum Weight:	20161.00	155966.19						OTM	23900.09 kip-ft	168038.98		

**Tower Forces - Service - Wind Normal To Face**

<b>Job</b>	320' Rohn SSMW	<b>Page</b>	33 of 41
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	1	1	18.299	2241.92	140.12	C
			B	0.205	2.578	0.592	1	1	17.854			
			C	0.209	2.566	0.592	1	1	18.299			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	1	1	4.337	540.67	135.17	C
			B	0.198	2.604	0.59	1	1	4.226			
			C	0.201	2.592	0.591	1	1	4.337			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	1	1	25.689	3368.49	168.42	C
			B	0.201	2.593	0.591	1	1	24.604			
			C	0.207	2.573	0.592	1	1	25.689			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	1	1	51.464	6475.59	323.78	C
			B	0.228	2.504	0.597	1	1	49.540			
			C	0.237	2.476	0.599	1	1	51.464			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	1	1	56.868	7420.02	371.00	C
			B	0.208	2.569	0.592	1	1	53.929			
			C	0.219	2.532	0.595	1	1	56.868			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	1	1	66.901	8684.36	434.22	C
			B	0.207	2.573	0.592	1	1	61.984			
			C	0.223	2.52	0.595	1	1	66.901			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	1	1	61.588	9449.61	472.48	A
			B	0.171	2.696	0.585	1	1	58.064			
			C	0.175	2.68	0.586	1	1	59.614			
T8 200.00-180.00	548.60	7298.65	A	0.182	2.659	0.587	1	1	69.940	11116.49	555.82	A
			B	0.178	2.672	0.586	1	1	68.429			
			C	0.182	2.659	0.587	1	1	69.932			
T9 180.00-170.00	279.66	3730.84	A	0.172	2.691	0.585	1	1	35.928	5639.47	563.95	A
			B	0.168	2.706	0.584	1	1	35.056			
			C	0.172	2.691	0.585	1	1	35.925			
T10 170.00-160.00	286.19	3785.29	A	0.167	2.709	0.584	1	1	36.566	5703.06	570.31	A
			B	0.164	2.721	0.584	1	1	35.716			
			C	0.167	2.71	0.584	1	1	36.563			
T11 160.00-140.00	587.84	9608.59	A	0.176	2.678	0.586	1	1	82.274	11939.98	597.00	A
			B	0.176	2.677	0.586	1	1	81.431			
			C	0.176	2.678	0.586	1	1	82.265			
T12 140.00-120.00	611.08	9975.29	A	0.168	2.705	0.584	1	1	85.482	12036.27	601.81	B
			B	0.174	2.685	0.585	1	1	86.953			
			C	0.168	2.705	0.584	1	1	85.473			
T13 120.00-100.00	629.25	9144.95	A	0.128	2.856	0.578	1	1	60.269	10038.38	501.92	B
			B	0.137	2.819	0.58	1	1	65.283			
			C	0.128	2.856	0.578	1	1	60.265			
T14 100.00-80.00	653.88	9675.54	A	0.12	2.886	0.577	1	1	61.193	9959.77	497.99	B
			B	0.132	2.839	0.579	1	1	68.454			
			C	0.12	2.886	0.577	1	1	61.189			
T15 80.00-60.00	659.20	11450.50	A	0.125	2.866	0.578	1	1	70.455	10022.40	501.12	B
			B	0.136	2.824	0.579	1	1	77.660			
			C	0.125	2.866	0.578	1	1	70.451			
T16 60.00-30.00	988.80	15115.36	A	0.12	2.886	0.577	1	1	109.311	13550.63	451.69	B
			B	0.129	2.849	0.579	1	1	119.755			
			C	0.12	2.886	0.577	1	1	109.305			
T17 30.00-0.00	824.00	17941.94	A	0.115	2.904	0.577	1	1	114.291	11890.73	396.36	B
			B	0.122	2.877	0.578	1	1	122.911			
			C	0.115	2.904	0.577	1	1	114.286			
Sum Weight:	6924.66	125382.28						OTM	20310.92 kip-ft	140077.83		

**Tower Forces - Service - Wind 45 To Face**

<p><b>tnxTower</b></p> <p><b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	34 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	0.825	1	16.635	2059.57	128.72	C
			B	0.205	2.578	0.592	0.825	1	16.265			
			C	0.209	2.566	0.592	0.825	1	16.635			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	0.825	1	3.962	499.48	124.87	C
			B	0.198	2.604	0.59	0.825	1	3.869			
			C	0.201	2.592	0.591	0.825	1	3.962			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	0.825	1	23.485	3131.38	156.57	C
			B	0.201	2.593	0.591	0.825	1	22.584			
			C	0.207	2.573	0.592	0.825	1	23.485			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	0.825	1	42.458	5562.01	278.10	C
			B	0.228	2.504	0.597	0.825	1	40.871			
			C	0.237	2.476	0.599	0.825	1	42.458			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	0.825	1	46.916	6410.02	320.50	C
			B	0.208	2.569	0.592	0.825	1	44.491			
			C	0.219	2.532	0.595	0.825	1	46.916			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	0.825	1	55.194	7529.72	376.49	C
			B	0.207	2.573	0.592	0.825	1	51.137			
			C	0.223	2.52	0.595	0.825	1	55.194			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	0.825	1	50.810	8356.58	417.83	A
			B	0.171	2.696	0.585	0.825	1	47.903			
			C	0.175	2.68	0.586	0.825	1	49.182			
T8 200.00-180.00	548.60	7298.65	A	0.182	2.659	0.587	0.825	1	57.701	9910.75	495.54	A
			B	0.178	2.672	0.586	0.825	1	56.454			
			C	0.182	2.659	0.587	0.825	1	57.694			
T9 180.00-170.00	279.66	3730.84	A	0.172	2.691	0.585	0.825	1	29.641	5027.13	502.71	A
			B	0.168	2.706	0.584	0.825	1	28.921			
			C	0.172	2.691	0.585	0.825	1	29.638			
T10 170.00-160.00	286.19	3785.29	A	0.167	2.709	0.584	0.825	1	30.167	5085.97	508.60	A
			B	0.164	2.721	0.584	0.825	1	29.494			
			C	0.167	2.71	0.584	0.825	1	30.164			
T11 160.00-140.00	587.84	9608.59	A	0.176	2.678	0.586	0.825	1	67.876	10604.71	530.24	A
			B	0.176	2.677	0.586	0.825	1	67.413			
			C	0.176	2.678	0.586	0.825	1	67.869			
T12 140.00-120.00	611.08	9975.29	A	0.168	2.705	0.584	0.825	1	70.523	10711.27	535.56	B
			B	0.174	2.685	0.585	0.825	1	72.109			
			C	0.168	2.705	0.584	0.825	1	70.515			
T13 120.00-100.00	629.25	9144.95	A	0.128	2.856	0.578	0.825	1	52.276	9253.52	462.68	B
			B	0.137	2.819	0.58	0.825	1	56.500			
			C	0.128	2.856	0.578	0.825	1	52.272			
T14 100.00-80.00	653.88	9675.54	A	0.12	2.886	0.577	0.825	1	53.202	9177.18	458.86	B
			B	0.132	2.839	0.579	0.825	1	59.245			
			C	0.12	2.886	0.577	0.825	1	53.198			
T15 80.00-60.00	659.20	11450.50	A	0.125	2.866	0.578	0.825	1	61.056	9187.25	459.36	B
			B	0.136	2.824	0.579	0.825	1	67.044			
			C	0.125	2.866	0.578	0.825	1	61.052			
T16 60.00-30.00	988.80	15115.36	A	0.12	2.886	0.577	0.825	1	95.220	12437.16	414.57	B
			B	0.129	2.849	0.579	0.825	1	103.837			
			C	0.12	2.886	0.577	0.825	1	95.213			
T17 30.00-0.00	824.00	17941.94	A	0.115	2.904	0.577	0.825	1	100.032	10870.66	362.36	B
			B	0.122	2.877	0.578	0.825	1	107.130			
			C	0.115	2.904	0.577	0.825	1	100.027			
Sum Weight:	6924.66	125382.28						OTM	18087.31 kip-ft	125814.35		

**Tower Forces - Service - Wind 60 To Face**



<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	35 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	0.8	1	16.397	2033.52	127.10	C
			B	0.205	2.578	0.592	0.8	1	16.038			
			C	0.209	2.566	0.592	0.8	1	16.397			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	0.8	1	3.908	493.60	123.40	C
			B	0.198	2.604	0.59	0.8	1	3.818			
			C	0.201	2.592	0.591	0.8	1	3.908			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	0.8	1	23.170	3097.50	154.88	C
			B	0.201	2.593	0.591	0.8	1	22.296			
			C	0.207	2.573	0.592	0.8	1	23.170			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	0.8	1	41.171	5431.49	271.57	C
			B	0.228	2.504	0.597	0.8	1	39.632			
			C	0.237	2.476	0.599	0.8	1	41.171			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	0.8	1	45.494	6265.73	313.29	C
			B	0.208	2.569	0.592	0.8	1	43.143			
			C	0.219	2.532	0.595	0.8	1	45.494			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	0.8	1	53.521	7364.78	368.24	C
			B	0.207	2.573	0.592	0.8	1	49.587			
			C	0.223	2.52	0.595	0.8	1	53.521			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	0.8	1	49.270	8200.43	410.02	A
			B	0.171	2.696	0.585	0.8	1	46.451			
			C	0.175	2.68	0.586	0.8	1	47.692			
T8 200.00-180.00	548.60	7298.65	A	0.182	2.659	0.587	0.8	1	55.952	9738.50	486.92	A
			B	0.178	2.672	0.586	0.8	1	54.743			
			C	0.182	2.659	0.587	0.8	1	55.946			
T9 180.00-170.00	279.66	3730.84	A	0.172	2.691	0.585	0.8	1	28.743	4939.65	493.97	A
			B	0.168	2.706	0.584	0.8	1	28.044			
			C	0.172	2.691	0.585	0.8	1	28.740			
T10 170.00-160.00	286.19	3785.29	A	0.167	2.709	0.584	0.8	1	29.253	4997.82	499.78	A
			B	0.164	2.721	0.584	0.8	1	28.605			
			C	0.167	2.71	0.584	0.8	1	29.250			
T11 160.00-140.00	587.84	9608.59	A	0.176	2.678	0.586	0.8	1	65.820	10413.96	520.70	A
			B	0.176	2.677	0.586	0.8	1	65.411			
			C	0.176	2.678	0.586	0.8	1	65.812			
T12 140.00-120.00	611.08	9975.29	A	0.168	2.705	0.584	0.8	1	68.385	10521.98	526.10	B
			B	0.174	2.685	0.585	0.8	1	69.988			
			C	0.168	2.705	0.584	0.8	1	68.378			
T13 120.00-100.00	629.25	9144.95	A	0.128	2.856	0.578	0.8	1	51.134	9141.40	457.07	B
			B	0.137	2.819	0.58	0.8	1	55.246			
			C	0.128	2.856	0.578	0.8	1	51.130			
T14 100.00-80.00	653.88	9675.54	A	0.12	2.886	0.577	0.8	1	52.060	9065.38	453.27	B
			B	0.132	2.839	0.579	0.8	1	57.930			
			C	0.12	2.886	0.577	0.8	1	52.056			
T15 80.00-60.00	659.20	11450.50	A	0.125	2.866	0.578	0.8	1	59.713	9067.94	453.40	B
			B	0.136	2.824	0.579	0.8	1	65.527			
			C	0.125	2.866	0.578	0.8	1	59.709			
T16 60.00-30.00	988.80	15115.36	A	0.12	2.886	0.577	0.8	1	93.207	12278.10	409.27	B
			B	0.129	2.849	0.579	0.8	1	101.564			
			C	0.12	2.886	0.577	0.8	1	93.200			
T17 30.00-0.00	824.00	17941.94	A	0.115	2.904	0.577	0.8	1	97.995	10724.93	357.50	B
			B	0.122	2.877	0.578	0.8	1	104.876			
			C	0.115	2.904	0.577	0.8	1	97.990			
Sum Weight:	6924.66	125382.28						OTM	17769.65 kip-ft	123776.72		

**Tower Forces - Service - Wind 90 To Face**

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	36 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section Elevation	Add Weight	Self Weight	F a c e	e	C <sub>F</sub>	R <sub>R</sub>	D <sub>F</sub>	D <sub>R</sub>	A <sub>E</sub>	F	w	Ctrl. Face
ft	lb	lb							ft <sup>2</sup>	lb	plf	
T1 320.00-304.00	15.90	1442.07	A	0.209	2.566	0.592	0.85	1	16.872	2085.62	130.35	C
			B	0.205	2.578	0.592	0.85	1	16.492			
			C	0.209	2.566	0.592	0.85	1	16.872			
T2 304.00-300.00	4.36	349.72	A	0.201	2.592	0.591	0.85	1	4.015	505.36	126.34	C
			B	0.198	2.604	0.59	0.85	1	3.920			
			C	0.201	2.592	0.591	0.85	1	4.015			
T3 300.00-280.00	43.60	2496.34	A	0.207	2.573	0.592	0.85	1	23.800	3165.25	158.26	C
			B	0.201	2.593	0.591	0.85	1	22.873			
			C	0.207	2.573	0.592	0.85	1	23.800			
T4 280.00-260.00	101.88	5067.66	A	0.237	2.476	0.599	0.85	1	43.745	5692.52	284.63	C
			B	0.228	2.504	0.597	0.85	1	42.109			
			C	0.237	2.476	0.599	0.85	1	43.745			
T5 260.00-240.00	137.02	5409.17	A	0.219	2.532	0.595	0.85	1	48.338	6554.30	327.72	C
			B	0.208	2.569	0.592	0.85	1	45.839			
			C	0.219	2.532	0.595	0.85	1	48.338			
T6 240.00-220.00	176.60	6484.36	A	0.223	2.52	0.595	0.85	1	56.866	7694.67	384.73	C
			B	0.207	2.573	0.592	0.85	1	52.686			
			C	0.223	2.52	0.595	0.85	1	56.866			
T7 220.00-200.00	376.80	6406.00	A	0.181	2.66	0.587	0.85	1	52.350	8512.73	425.64	A
			B	0.171	2.696	0.585	0.85	1	49.354			
			C	0.175	2.68	0.586	0.85	1	50.672			
T8 200.00-180.00	548.60	7298.65	A	0.182	2.659	0.587	0.85	1	59.449	10082.99	504.15	A
			B	0.178	2.672	0.586	0.85	1	58.165			
			C	0.182	2.659	0.587	0.85	1	59.443			
T9 180.00-170.00	279.66	3730.84	A	0.172	2.691	0.585	0.85	1	30.539	5114.61	511.46	A
			B	0.168	2.706	0.584	0.85	1	29.797			
			C	0.172	2.691	0.585	0.85	1	30.536			
T10 170.00-160.00	286.19	3785.29	A	0.167	2.709	0.584	0.85	1	31.081	5174.13	517.41	A
			B	0.164	2.721	0.584	0.85	1	30.383			
			C	0.167	2.71	0.584	0.85	1	31.078			
T11 160.00-140.00	587.84	9608.59	A	0.176	2.678	0.586	0.85	1	69.933	10795.47	539.77	A
			B	0.176	2.677	0.586	0.85	1	69.416			
			C	0.176	2.678	0.586	0.85	1	69.925			
T12 140.00-120.00	611.08	9975.29	A	0.168	2.705	0.584	0.85	1	72.660	10900.55	545.03	B
			B	0.174	2.685	0.585	0.85	1	74.229			
			C	0.168	2.705	0.584	0.85	1	72.652			
T13 120.00-100.00	629.25	9144.95	A	0.128	2.856	0.578	0.85	1	53.418	9365.65	468.28	B
			B	0.137	2.819	0.58	0.85	1	57.755			
			C	0.128	2.856	0.578	0.85	1	53.414			
T14 100.00-80.00	653.88	9675.54	A	0.12	2.886	0.577	0.85	1	54.343	9288.98	464.45	B
			B	0.132	2.839	0.579	0.85	1	60.561			
			C	0.12	2.886	0.577	0.85	1	54.340			
T15 80.00-60.00	659.20	11450.50	A	0.125	2.866	0.578	0.85	1	62.398	9306.56	465.33	B
			B	0.136	2.824	0.579	0.85	1	68.560			
			C	0.125	2.866	0.578	0.85	1	62.395			
T16 60.00-30.00	988.80	15115.36	A	0.12	2.886	0.577	0.85	1	97.233	12596.23	419.87	B
			B	0.129	2.849	0.579	0.85	1	106.111			
			C	0.12	2.886	0.577	0.85	1	97.226			
T17 30.00-0.00	824.00	17941.94	A	0.115	2.904	0.577	0.85	1	102.069	11016.38	367.21	B
			B	0.122	2.877	0.578	0.85	1	109.385			
			C	0.115	2.904	0.577	0.85	1	102.064			
Sum Weight:	6924.66	125382.28						OTM	18404.97 kip-ft	127851.99		

### Force Totals

<b>Job</b>	320' Rohn SSMW	<b>Page</b>	37 of 41
<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, $M_x$ kip-ft	Sum of Overturning Moments, $M_z$ kip-ft	Sum of Torques kip-ft
Leg Weight	73044.53					
Bracing Weight	52337.75					
Total Member Self-Weight	125382.28			41.98	-26.53	
Total Weight	141154.12			41.98	-26.53	
Wind 0 deg - No Ice		0.00	-161488.05	-24749.82	-26.53	303.50
Wind 30 deg - No Ice		74631.11	-129264.87	-19777.75	-11469.45	357.69
Wind 45 deg - No Ice		104103.50	-104103.50	-15916.14	-15984.65	356.42
Wind 60 deg - No Ice		125735.57	-72593.47	-11083.29	-19296.05	331.11
Wind 90 deg - No Ice		149262.21	0.00	41.98	-22912.38	233.92
Wind 120 deg - No Ice		139852.75	80744.03	12437.88	-21496.86	69.46
Wind 135 deg - No Ice		104103.50	104103.50	16000.10	-15984.65	-30.68
Wind 150 deg - No Ice		74631.11	129264.87	19861.71	-11469.45	-123.77
Wind 180 deg - No Ice		0.00	145186.94	22292.51	-26.53	-269.47
Wind 210 deg - No Ice		-74631.11	129264.87	19861.71	11416.40	-357.69
Wind 225 deg - No Ice		-104103.50	104103.50	16000.10	15931.60	-356.42
Wind 240 deg - No Ice		-139852.75	80744.03	12437.88	21443.80	-372.96
Wind 270 deg - No Ice		-149262.21	0.00	41.98	22859.32	-233.92
Wind 300 deg - No Ice		-125735.57	-72593.47	-11083.29	19243.00	-61.64
Wind 315 deg - No Ice		-104103.50	-104103.50	-15916.14	15931.60	30.68
Wind 330 deg - No Ice		-74631.11	-129264.87	-19777.75	11416.40	123.77
Member Ice	30583.91					
Total Weight Ice	190243.54			114.12	-109.31	
Wind 0 deg - Ice		0.00	-206349.69	-31163.36	-109.31	536.71
Wind 30 deg - Ice		96969.35	-167955.84	-25321.86	-14794.78	628.84
Wind 45 deg - Ice		135673.78	-135673.78	-20429.72	-20653.15	622.54
Wind 60 deg - Ice		164375.70	-94902.35	-14253.79	-24995.25	574.33
Wind 90 deg - Ice		193938.70	0.00	114.12	-29480.25	389.67
Wind 120 deg - Ice		178704.07	103174.85	15752.86	-27196.40	92.46
Wind 135 deg - Ice		135673.78	135673.78	20657.96	-20653.15	-77.82
Wind 150 deg - Ice		96969.35	167955.84	25550.10	-14794.78	-239.18
Wind 180 deg - Ice		0.00	189804.71	28849.93	-109.31	-489.31
Wind 210 deg - Ice		-96969.35	167955.84	25550.10	14576.16	-628.84
Wind 225 deg - Ice		-135673.78	135673.78	20657.96	20434.53	-622.54
Wind 240 deg - Ice		-178704.07	103174.85	15752.86	26977.79	-629.17
Wind 270 deg - Ice		-193938.70	0.00	114.12	29261.63	-389.67
Wind 300 deg - Ice		-164375.70	-94902.35	-14253.79	24776.64	-85.03
Wind 315 deg - Ice		-135673.78	-135673.78	-20429.72	20434.53	77.82
Wind 330 deg - Ice		-96969.35	-167955.84	-25321.86	14576.16	239.18
Total Weight	141154.12			41.98	-26.53	
Wind 0 deg - Service		0.00	-161488.05	-24790.25	11.77	303.50
Wind 30 deg - Service		74631.11	-129264.87	-19818.18	-11431.15	357.69
Wind 45 deg - Service		104103.50	-104103.50	-15956.57	-15946.35	356.42
Wind 60 deg - Service		125735.57	-72593.47	-11123.72	-19257.76	331.11
Wind 90 deg - Service		149262.21	0.00	1.55	-22874.08	233.92
Wind 120 deg - Service		139852.75	80744.03	12397.45	-21458.56	69.46
Wind 135 deg - Service		104103.50	104103.50	15959.67	-15946.35	-30.68
Wind 150 deg - Service		74631.11	129264.87	19821.28	-11431.15	-123.77
Wind 180 deg - Service		0.00	145186.94	22252.08	11.77	-269.47
Wind 210 deg - Service		-74631.11	129264.87	19821.28	11454.70	-357.69
Wind 225 deg - Service		-104103.50	104103.50	15959.67	15969.89	-356.42
Wind 240 deg - Service		-139852.75	80744.03	12397.45	21482.10	-372.96
Wind 270 deg - Service		-149262.21	0.00	1.55	22897.62	-233.92
Wind 300 deg - Service		-125735.57	-72593.47	-11123.72	19281.30	-61.64
Wind 315 deg - Service		-104103.50	-104103.50	-15956.57	15969.89	30.68
Wind 330 deg - Service		-74631.11	-129264.87	-19818.18	11454.70	123.77

<p><b>tnxTower</b></p> <p><b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094</p>	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	38 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

## 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
50	Dead+Wind 330 deg - Service

## Maximum Tower Deflections - Service Wind

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

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	39 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	320 - 304	19.454	40	0.4432	0.2151
T2	304 - 300	17.954	40	0.4396	0.2161
T3	300 - 280	17.578	40	0.4373	0.2162
T4	280 - 260	15.733	40	0.4242	0.2161
T5	260 - 240	13.918	40	0.4162	0.2131
T6	240 - 220	12.123	40	0.4036	0.1996
T7	220 - 200	10.386	40	0.3847	0.1860
T8	200 - 180	8.745	40	0.3588	0.1740
T9	180 - 170	7.185	40	0.3321	0.1582
T10	170 - 160	6.440	40	0.3170	0.1494
T11	160 - 140	5.724	40	0.3008	0.1404
T12	140 - 120	4.440	40	0.2638	0.1282
T13	120 - 100	3.311	40	0.2231	0.1150
T14	100 - 80	2.372	40	0.1831	0.0951
T15	80 - 60	1.609	40	0.1411	0.0785
T16	60 - 30	1.033	35	0.1027	0.0641
T17	30 - 0	0.357	35	0.0467	0.0311

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
329.00	Lightning Rod 5/8x4'	40	19.454	0.4432	0.2151	Inf
327.00	Dual Lights	40	19.454	0.4432	0.2151	Inf
325.00	PD128-1	40	19.454	0.4432	0.2151	Inf
320.00	BA1012-0	40	19.454	0.4432	0.2151	Inf
318.00	ANT450F6	40	19.267	0.4430	0.2153	Inf
300.00	SC479-HF1LDF	40	17.578	0.4373	0.2162	92036
290.00	PD340-1	40	16.650	0.4304	0.2163	98167
286.00	DB809T3E-XC	40	16.282	0.4278	0.2162	119505
284.00	6' Side Mount Standoff	40	16.099	0.4265	0.2162	134046
283.00	SC479-HF1LDF(D00I-E6085) (Inverted)	40	16.007	0.4259	0.2162	142495
264.00	PD440-2	40	14.280	0.4179	0.2145	320715
260.00	6' Side Mount Standoff	40	13.918	0.4162	0.2131	340093
251.00	SC479-HF1LDF	40	13.106	0.4114	0.2079	158950
248.00	PD1142-1	40	12.837	0.4094	0.2057	128752
247.00	430-94C-09168-M-11048 TTA	40	12.747	0.4088	0.2050	121083
246.00	Sabre T-Boom (1)	40	12.658	0.4081	0.2042	114277
245.00	SC479-HF1LDF(D00I-E6085) (Inverted)	40	12.568	0.4073	0.2035	108196
238.00	531-70HD Exposed Dipole Antenna	40	11.946	0.4020	0.1981	77319
232.00	Valmont VFA-10-U V-Frame	40	11.418	0.3969	0.1938	60437
200.00	PIROD 12' Lightweight T-Frame	40	8.745	0.3588	0.1740	70113
179.00	DB586-Y	40	7.109	0.3307	0.1573	46303
177.00	DB586-Y	40	6.959	0.3277	0.1556	47875
176.00	Pirod 4' Side Mount Standoff (1)	40	6.884	0.3263	0.1548	49035
175.00	DB586-Y (inverted)	40	6.809	0.3247	0.1539	50353
168.00	L-810 Obstruction Lighting (1)	40	6.294	0.3139	0.1476	40655
165.00	L-810 Obstruction Lighting (1)	40	6.077	0.3091	0.1448	29413
164.00	L-810 Obstruction Lighting (1)	40	6.005	0.3074	0.1438	26784
163.00	Telewave ANT220F2 - Omni Antenna	40	5.934	0.3058	0.1429	24700
160.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	40	5.724	0.3008	0.1404	21311
154.00	Commscope PAR6-59W-PXA/A	40	5.319	0.2903	0.1360	23336

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	40 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
153.00	ANT450F6	40	5.254	0.2885	0.1354	24085
145.00	Telewave ANT220F2 - Omni Antenna	40	4.745	0.2736	0.1308	32397
142.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	40	4.561	0.2677	0.1293	36627
139.00	DB212-1	40	4.380	0.2618	0.1277	38042
117.00	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	40	3.158	0.2171	0.1123	23125
115.00	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	40	3.058	0.2131	0.1104	23826
112.00	Andrew 2' w/Radome	40	2.913	0.2072	0.1074	25047
107.00	PA8-65	40	2.680	0.1973	0.1022	27386
106.00	Pirod 4' Side Mount Standoff (1)	40	2.635	0.1953	0.1012	27907
94.00	PD688S-4	40	2.123	0.1705	0.0895	27305

### Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
T1	320 - 304	24.443	24	0.5583	0.3558
T2	304 - 300	22.552	24	0.5536	0.3566
T3	300 - 280	22.079	24	0.5505	0.3565
T4	280 - 260	19.756	24	0.5336	0.3549
T5	260 - 240	17.475	24	0.5231	0.3523
T6	240 - 220	15.221	24	0.5068	0.3321
T7	220 - 200	13.044	24	0.4826	0.3088
T8	200 - 180	10.989	24	0.4499	0.2873
T9	180 - 170	9.035	24	0.4165	0.2626
T10	170 - 160	8.103	24	0.3975	0.2489
T11	160 - 140	7.206	24	0.3773	0.2347
T12	140 - 120	5.596	24	0.3310	0.2154
T13	120 - 100	4.180	24	0.2801	0.1944
T14	100 - 80	3.001	24	0.2300	0.1616
T15	80 - 60	2.041	24	0.1774	0.1331
T16	60 - 30	1.316	19	0.1292	0.1086
T17	30 - 0	0.459	19	0.0589	0.0526

### Critical Deflections and Radius of Curvature - Design Wind

<i>Elevation ft</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
329.00	Lightning Rod 5/8x4'	24	24.443	0.5583	0.3558	Inf
327.00	Dual Lights	24	24.443	0.5583	0.3558	Inf
325.00	PD128-1	24	24.443	0.5583	0.3558	Inf
320.00	BA1012-0	24	24.443	0.5583	0.3558	Inf
318.00	ANT450F6	24	24.207	0.5581	0.3560	Inf
300.00	SC479-HF1LDF	24	22.079	0.5505	0.3565	71385
290.00	PD340-1	24	20.910	0.5416	0.3559	74818
286.00	DB809T3E-XC	24	20.447	0.5381	0.3555	89487
284.00	6' Side Mount Standoff	24	20.216	0.5365	0.3553	99194

<b>tnxTower</b>  <b>AECOM</b> 500 Enterprise Drive, Suite 3B Rocky Hill, CT Phone: 860-263-5800 FAX: 860-812-2094	<b>Job</b>	320' Rohn SSVMW	<b>Page</b>	41 of 41
	<b>Project</b>	CSP Tower - Colchester, CT	<b>Date</b>	11:26:38 05/18/20
	<b>Client</b>	DESPP Loads /VZW-217/EMP-008/EVS-010-"TIA-F" applied	<b>Designed by</b>	MCD

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
283.00	SC479-HF1LDF(D00I-E6085) (Inverted)	24	20.101	0.5357	0.3552	104743
264.00	PD440-2	24	17.929	0.5252	0.3540	227159
260.00	6' Side Mount Standoff	24	17.475	0.5231	0.3523	240427
251.00	SC479-HF1LDF	24	16.455	0.5168	0.3449	115341
248.00	PD1142-1	24	16.117	0.5143	0.3416	94350
247.00	430-94C-09168-M-11048 TTA	24	16.004	0.5134	0.3405	88954
246.00	Sabre T-Boom (1)	24	15.892	0.5125	0.3393	84141
245.00	SC479-HF1LDF(D00I-E6085) (Inverted)	24	15.780	0.5116	0.3381	79823
238.00	531-70HD Exposed Dipole Antenna	24	14.999	0.5047	0.3296	58178
232.00	Valmont VFA-10-U V-Frame	24	14.337	0.4982	0.3224	46568
200.00	PIROD 12' Lightweight T-Frame	24	10.989	0.4499	0.2873	55451
179.00	DB586-Y	24	8.941	0.4146	0.2613	37488
177.00	DB586-Y	24	8.753	0.4110	0.2586	38801
176.00	Pirod 4' Side Mount Standoff (1)	24	8.659	0.4091	0.2572	39761
175.00	DB586-Y (inverted)	24	8.566	0.4072	0.2559	40851
168.00	L-810 Obstruction Lighting (1)	24	7.920	0.3936	0.2460	32823
165.00	L-810 Obstruction Lighting (1)	24	7.648	0.3876	0.2416	23626
164.00	L-810 Obstruction Lighting (1)	24	7.558	0.3856	0.2401	21489
163.00	Telewave ANT220F2 - Omni Antenna	24	7.469	0.3835	0.2387	19799
160.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	24	7.206	0.3773	0.2347	17056
154.00	Commscope PAR6-59W-PXA/A	24	6.698	0.3642	0.2278	18694
153.00	ANT450F6	24	6.616	0.3619	0.2268	19300
145.00	Telewave ANT220F2 - Omni Antenna	24	5.979	0.3432	0.2196	26056
142.00	Sitepro1 USF-4U Mount Assembly (Ca = 1.4 assumed)	24	5.748	0.3359	0.2171	29510
139.00	DB212-1	24	5.521	0.3285	0.2146	30642
117.00	3' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	24	3.987	0.2726	0.1900	18410
115.00	8' Wide Ice Shield (for Dish Antennas) (Assume Ca=2.0)	24	3.863	0.2676	0.1869	18996
112.00	Andrew 2' w/Radome	24	3.680	0.2602	0.1820	20021
107.00	PA8-65	24	3.388	0.2477	0.1735	22000
106.00	Pirod 4' Side Mount Standoff (1)	24	3.331	0.2452	0.1717	22444
94.00	PD688S-4	24	2.689	0.2142	0.1521	22006

## 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](http://www.aecom.com).

500 Enterprise Drive, Suite 3B  
Rocky Hill, CT 06067  
860-529-8882  
Fax: 860-529-3991



ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

Ref: ES-018 COLCHESTE Date: 07Jan21  
Dep: BL GRAPHICS Wgt: 2.50 LBS

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

DV:  
Svcs: PRIORITY OVERNIGHT  
TRK: 9151 3346 9977

ORIGIN ID:RSPA (800) 301-3077

SHIP DATE: 07JAN21  
ACTWGT: 2.50 LB  
CAD: 0765627/CAFE3407

BL COMPANIES  
355 RESEARCH PARKWAY

BILL THIRD PARTY

MERIDEN, CT 06450  
UNITED STATES US

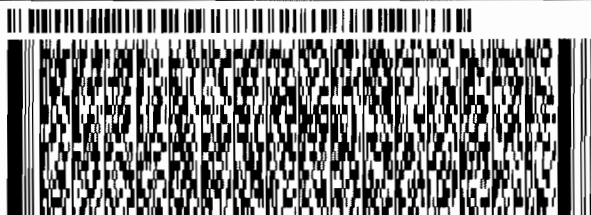
TO HONORABLE MARY BYLONE  
TOWN OF COLCHESTER  
127 NORWICH AVENUE

COLCHESTER CT 06415

REF: ES-018 COLCHESTER

DEPT: BL GRAPHICS

56BC1/1136/05A2



FedEx  
Express



J201019110601uv

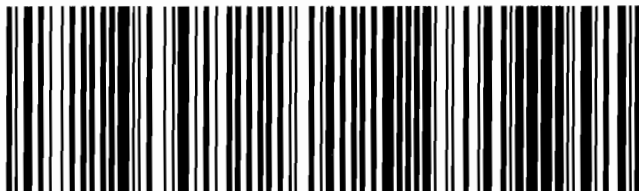
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0201

FRI - 08 JAN 10:30A  
PRIORITY OVERNIGHT

00 SKKA

06415  
CT-US BDL

Part #: 155149-434 RIV EX 0321 \*9



Ref: ES-018 COLCHESTE Date: 07Jan21  
Dep: BL GRAPHICS Wgt: 2.50 LBS

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

DV:

Svcs: PRIORITY OVERNIGHT  
TRCK: 9151 3346 9988

ORIGIN ID:RSPA (800) 301-3077

SHIP DATE: 07JAN21  
ACTWGT: 2.50 LB MAN  
CAD: 0765627/CAFE3407

BL COMPANIES  
355 RESEARCH PARKWAY

MERIDEN, CT 06450  
UNITED STATES US

BILL THIRD PARTY

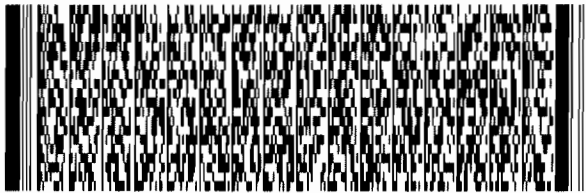
TO **MATTHEW BORDEAUX, TOWN PLANNER**  
**TOWN OF COLCHESTER**  
**127 NORWICH AVENUE**

**COLCHESTER CT 06415**

REF: ES-018 COLCHESTER

DEPT: BL GRAPHICS

56DCL/1136/0582



**FedEx**  
Express



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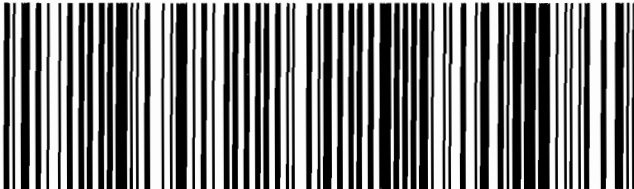
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**FRI - 08 JAN 10:30A**  
**PRIORITY OVERNIGHT**

**00 SKKA**

**06415**  
**CT-US BDL**

Part # 158148-484 RIT EXP 09/21



Ref: ES-018 COLCHESTE Date: 07Jan21  
Dep: BL GRAPHICS Wgt: 2.50 LBS

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
0.00 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT  
TRCK: 9151 3346 9999

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES  
355 RESEARCH PARKWAY

MERIDEN, CT 06450  
UNITED STATES US

SHIP DATE: 07JAN21  
ACTWGT: 2.50 LB  
CAD: 0765627/CAFE3407

BILL THIRD PARTY

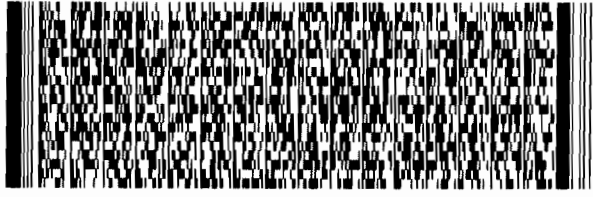
TO **BRIAN BENITO**  
**DEPT OF EMERGENCY SERVICES**  
**1111 COUNTRY CLUB ROAD**

**MIDDLETOWN CT 06457**

REF: ES-018 COLCHESTER

DEPT: BL GRAPHICS

56DC1/1136/05A2



**FedEx**  
Express



J2010191106801uv

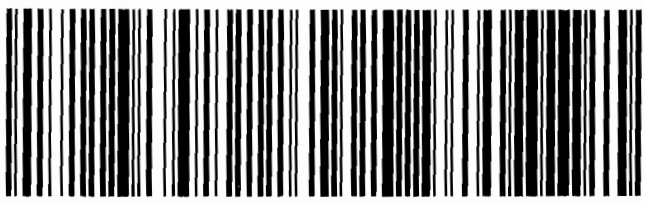
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**FRI - 08 JAN 10:30A**  
**PRIORITY OVERNIGHT**

**00 BDLA**

**06457**  
**CT-US BDL**

Part # 150148-434 RIT EXP 08/21 \*8



Ref: ES-018 COLCHESTE Date: 07Jan21  
Dep: BL GRAPHICS Wgt: 2.50 LBS

SHIPPING: 0.00  
SPECIAL: 0.00  
HANDLING: 0.00  
TOTAL: 0.00

DV:

Svs: PRIORITY OVERNIGHT  
TRCK: 9151 3347 0000

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES  
355 RESEARCH PARKWAY

MERIDEN, CT 06450  
UNITED STATES US

SHIP DATE: 07JAN21  
ACTWGT: 2.50 LB MAN  
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO

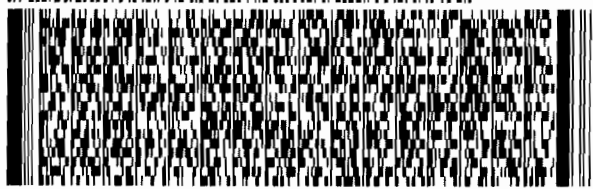
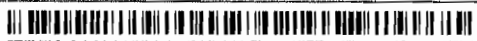
**CONNECTICUT SITING COUNCIL**  
**10 FRANKLIN SQUARE**

**NEW BRITAIN CT 06051**

REF: ES-018 COLCHESTER

DEPT: BL GRAPHICS

560C1/1136/0562



**FedEx**  
Express



J201019110601uv

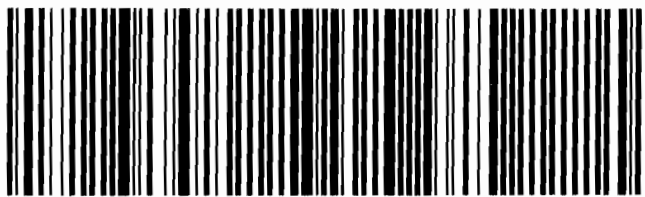
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0201

**FRI - 08 JAN 10:30A**  
**PRIORITY OVERNIGHT**

**00 BDLA**

**06051**  
**CT-US BDL**

Part #: 156140-004 RIT EXP 09/21



ATTACHMENT G - POWER DENSITY REPORT



C Squared Systems, LLC  
65 Dartmouth Drive  
Auburn, NH 03032  
603-644-2800  
[support@csquaredsystems.com](mailto:support@csquaredsystems.com)

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Calculated Radio Frequency Emissions Report



**ES-018**

112 Munn Road

Colchester, CT 06415

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November 30, 2020

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## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Eversource installation on the self-support tower off at 112 Munn Road in Colchester, CT. Eversource is proposing to install two omnidirectional antennas – one for transmit and one antenna for receive-only – as part of its 220 MHz communications system.

This report considers the proposed antenna configuration as detailed by Eversource along with % MPE (Maximum Permissible Exposure) measurements around the site to determine FCC compliance of the facility.



**Figure 1: View of ES-018 Colchester**

Site Address	112 Munn Road
Latitude	41°35'33.47"N
Longitude	72°19'16.19"W
Site Elevation AMSL	590'
Survey Engineer	Marc Salas
Survey Date/Time	6/24/2020; 1:00 PM – 1:40 PM

**Table 1: Survey Information**

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

### 3. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left( \frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

R = Radial Distance =  $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and full power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

### 4. Proposed Antenna Configuration

Table 2 below lists the technical details of the proposed Eversource installation. These parameters are applied to the above calculation methods in order to calculate the % MPE values of the proposed equipment. Any proposed receive-only antennas have not been included in the table as they are irrelevant in terms of the % MPE calculations.

Operator	Antenna Model	TX Freq. (MHz)	Ant Gain (dBd)	Power per Channel (ERP - Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	Telewave ANT220F2	217	2.5	124	4	38°	4.25	145

Table 2: Eversource Antenna Configuration (Proposed)<sup>1 2</sup>

<sup>1</sup> Transmit power assumes 0 dB of cable loss.

<sup>2</sup> Transmit antenna centerline height is based on the AECOM Structural Analysis Report dated May 21, 2020.

## 5. Measurement Procedure

Frequencies from 300 KHz to 50 GHz were measured using the Narda Probe EA 5091, E-Field, shaped, FCC probe in conjunction with the NBM550 survey meter. The EA 5091 probe is “shaped” such that in a mixed signal environment (i.e.: more than one frequency band is used in a particular location), it accurately measures the percent of MPE.

From FCC OET Bulletin No. 65 - Edition 97-01 – “A useful characteristic of broadband probes used in multiple-frequency RF environments is a frequency-dependent response that corresponds to the variation in MPE limits with frequency. Broadband probes having such a “shaped” response permit direct assessment of compliance at sites where RF fields result from antennas transmitting over a wide range of frequencies. Such probes can express the composite RF field as a percentage of the applicable MPEs”.

**Probe Description** - As suggested in FCC OET Bulletin No. 65 - Edition 97-01, the response of the measurement instrument should be essentially isotropic, (i.e., independent of orientation or rotation angle of the probe). For this reason, the Narda EA 5091 probe was used for these measurements.

**Sampling Description** - At each measurement location, a spatially averaged measurement is collected over the height of an average human body. The NBM550 survey meter performs a time average measurement while the user slowly moves the probe over a distance range of 20 cm to 200 cm (about 6 feet) above ground level. The results recorded at each measurement location include average values over the spatial distance.

**Instrumentation Information** - A summary of specifications for the equipment used is provided in the table below.

<b>Manufacturer</b>	Narda Microwave			
<b>Probe</b>	EA 5091, Serial# 0116			
<b>Calibration Date</b>	May 2020			
<b>Calibration Interval</b>	24 Months			
<b>Meter</b>	NBM550, Serial# E-1069			
<b>Calibration Date</b>	May 2020			
<b>Calibration Interval</b>	24 Months			
<b>Probe Specifications</b>	<b>Frequency Range</b>	<b>Field Measured</b>	<b>Standard</b>	<b>Measurement Range</b>
	300 KHz-50 GHz	Electric Field	U.S. FCC 1997 Occupational/Controlled	0.2 – 600 % of Standard

**Table 3: Instrumentation Information**

**Instrument Measurement Uncertainty** - The total measurement uncertainty of the NARDA measurement probe and meter is no greater than  $\pm 3$  dB (0.5% to 6%),  $\pm 1$  dB (6% to 100%),  $\pm 2$  dB (100% to 600%). The factors which contribute to this include the probe’s frequency response deviation, calibration uncertainty, ellipse ratio, and isotropic response<sup>3</sup>. Every effort is taken to reduce the overall uncertainty during measurement collection including pointing the probe directly at the likely highest source of emissions.

<sup>3</sup> For further details, please refer to Narda Safety Test Solutions NBM550 Probe Specifications, pg. 64  
[http://www.narda-sts.us/pdf\\_files/DataSheets/NBM-Probes\\_DataSheet.pdf](http://www.narda-sts.us/pdf_files/DataSheets/NBM-Probes_DataSheet.pdf)

## 6. Surveyed and Calculated % MPE Results

Measured and calculated results and a description of each survey location are detailed in the table below. Measurements were recorded on June 24, 2020 between 1:00 PM and 1:40 PM. The calculated % MPE contribution from the proposed equipment was then added to the measured % MPE values in the “Composite % MPE” column. These calculated values incorporate the antenna pattern of the antenna model specified by Eversource to determine the “Off Beam Loss” factor shown in the power density formula from Section 3. All % MPE values are in reference to the FCC Uncontrolled/General Population exposure limit.

Table 4 below lists 14 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 5.49% (Average Uncontrolled/General Population MPE) and was recorded at Location 5 at the northeast corner of the compound. The highest composite (measured + calculated) % MPE value is calculated to be 5.50% (Average Uncontrolled/General Population) and is also calculated to occur at Location 5.

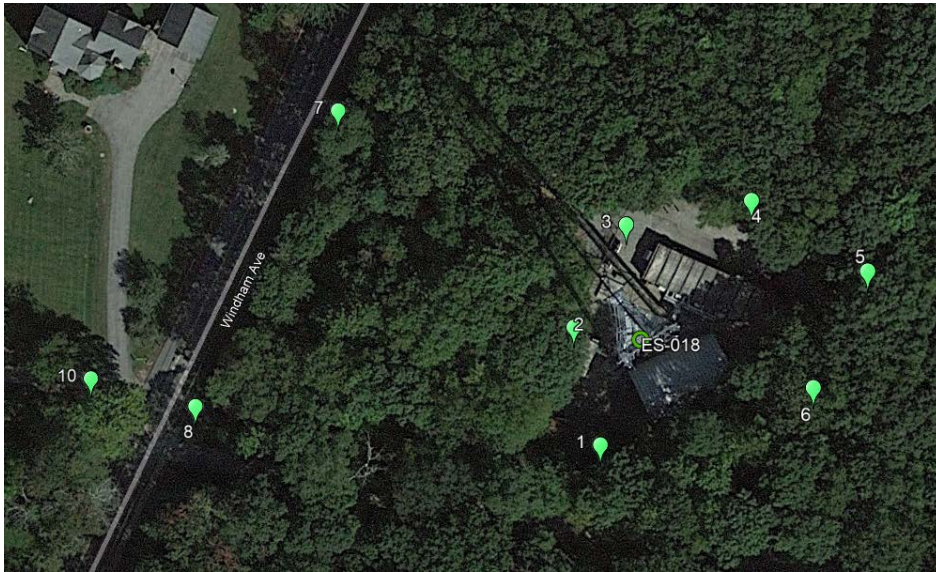
Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled/General)	Calculated % MPE (Eversource Proposed)	Composite % MPE (Uncontrolled/General)
1	Southern Compound Gate	41.59244	-72.32125	73	< 1.00%	0.05%	< 1.05%
2	East side of tower	41.59262	-72.32130	37	3.88%	0.05%	3.93%
3	Western Compound Gate	41.59277	-72.32120	53	2.17%	0.05%	2.23%
4	North side of compound	41.59281	-72.32096	86	3.73%	0.04%	3.78%
5	<b>Northeast corner of compound</b>	<b>41.59270</b>	<b>-72.32074</b>	<b>118</b>	<b>5.49%</b>	<b>0.02%</b>	<b>5.50%</b>
6	East side of compound	41.59253	-72.32084	97	2.72%	0.03%	2.75%
7	Northern access road and Windham Ave.	41.59295	-72.32178	204	< 1.00%	0.22%	< 1.22%
8	Southern access road and Windham Ave. (parallel to driveway)	41.59250	-72.32208	254	< 1.00%	0.33%	< 1.33%
9	293 Windham Ave.	41.59446	-72.32088	672	1.94%	0.17%	2.11%
10	gravel driveway to 285 Windham Ave.	41.59254	-72.32230	311	2.09%	0.35%	2.44%
11	Intersection of Windham Ave / Cousins Rd.	41.59144	-72.32275	614	1.66%	0.20%	1.86%
12	70 Cousins Rd., end of cul de sac	41.58982	-72.32034	1051	4.03%	0.08%	4.11%
13	Intersection of Windham Ave / Oakleaf Dr.	41.59088	-72.32332	869	3.76%	0.11%	3.88%
14	End of Oakleaf Dr.	41.59159	-72.32853	2047	1.91%	0.02%	1.93%

**Table 4: Measured and Calculated % MPE Results <sup>4 5</sup>**

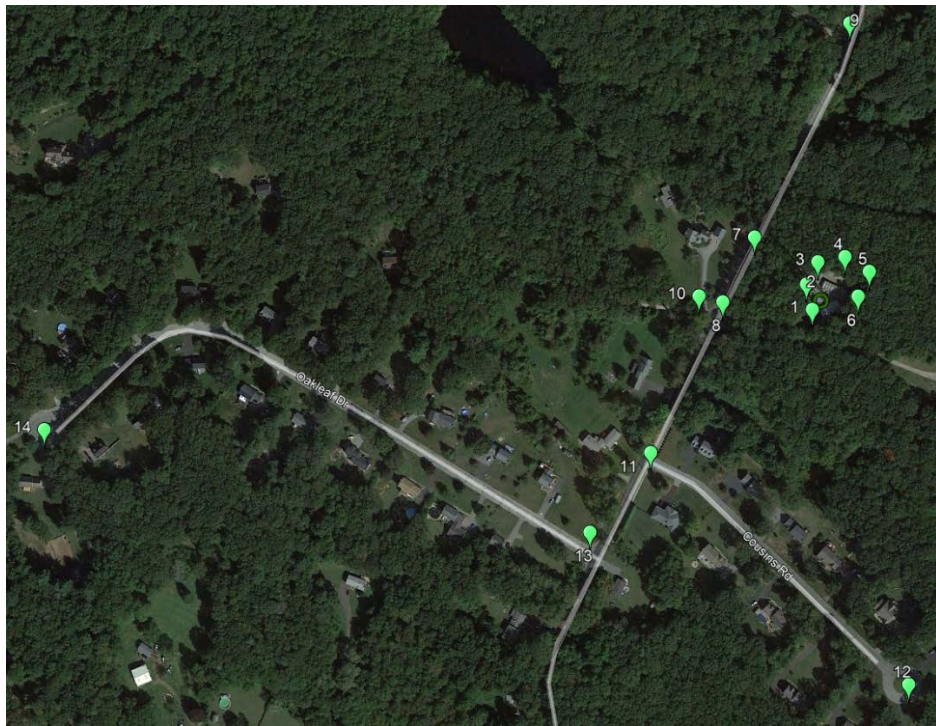
<sup>4</sup> Due to measurement uncertainty at low levels (See Table 3), any readings outside the measurement range of the probe (< 1.00 % FCC General Population/Uncontrolled MPE) are noted as such.

<sup>5</sup> Measured and calculated % MPE values listed are rounded to two decimal points and the composite % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total composite value reflected in the table.

Figures 2 and 3 below are aerial views<sup>6</sup> of the tower location and the surrounding area, along with the measurement locations listed in Table 4.



**Figure 2: Measurement Points – Zoom In**



**Figure 3: All Measurement Points**

<sup>6</sup> Map showing location of telecommunications facility and the surrounding area. *Google Earth*, <https://earth.google.com/web/>.

## 7. Conclusion

A number of accessible areas around the tower at 112 Munn Road in Colchester, CT were surveyed and found to be well within the mandated General Population/Uncontrolled limits for Maximum Permissible Exposure, as delineated in the Federal Communications Commission's Radio Frequency exposure rules published in 47 CFR 1.1307(b)(1)-(b)(3).

The highest spatially averaged % MPE measurement of all surveyed points based on the 1997 FCC standard for exposure to the general population is 5.49% MPE. This measurement was recorded at Location 5 by the northeast corner of the compound.

The highest composite (measured + calculated) power density is **5.50% of the FCC General Population MPE limit** with the proposed Eversource equipment and is also calculated to occur at Location 5.

The above analysis concludes that RF exposure at ground level around the tower, both currently and with the proposed antenna installation, will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

## 8. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.



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November 30, 2020

Date



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Date

## Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board



**Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)**

**(A) Limits for Occupational/Controlled Exposure<sup>7</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

**(B) Limits for General Population/Uncontrolled Exposure<sup>8</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz \* Plane-wave equivalent power density

**Table 5: FCC Limits for Maximum Permissible Exposure (MPE)**

<sup>7</sup> Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

<sup>8</sup> General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

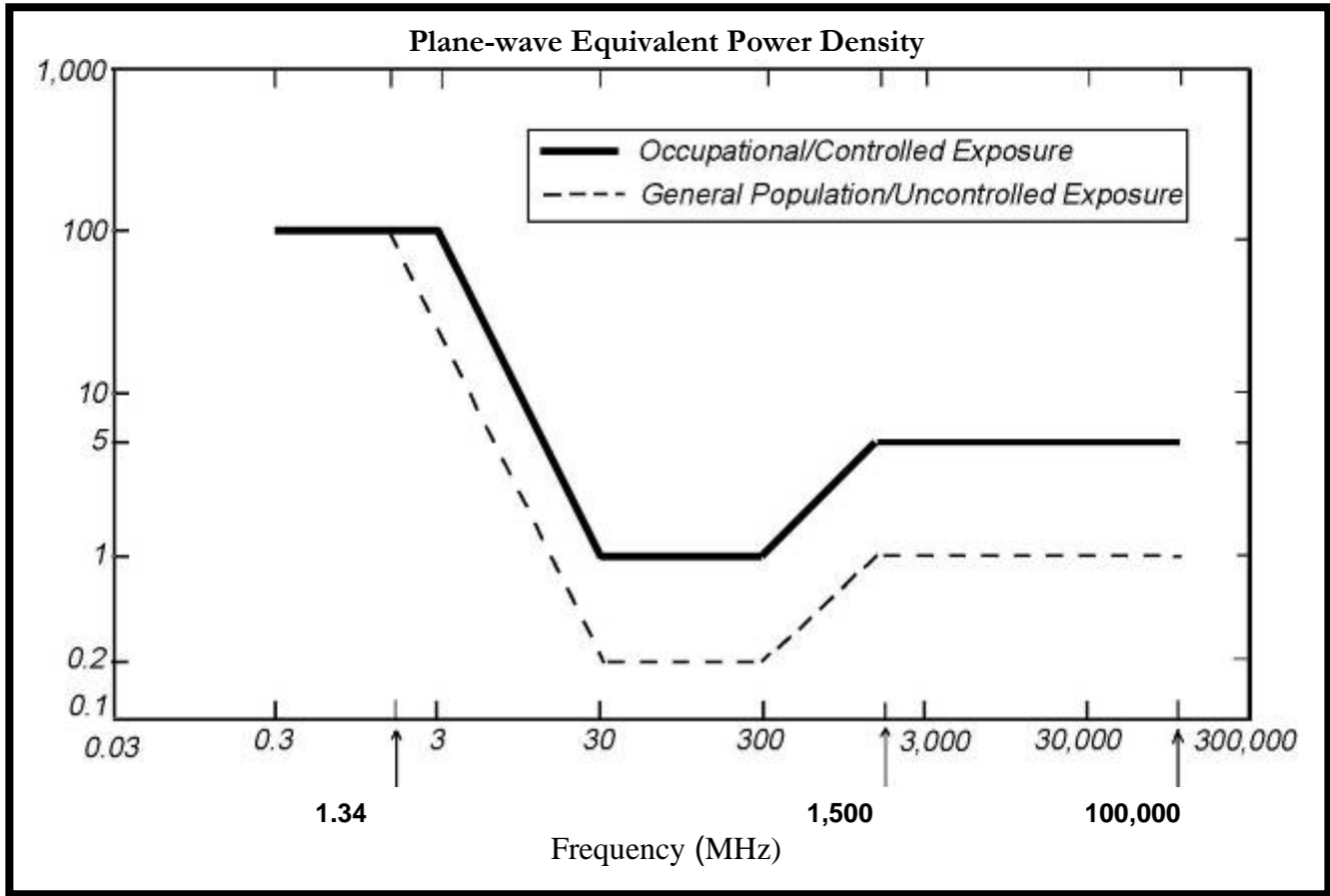
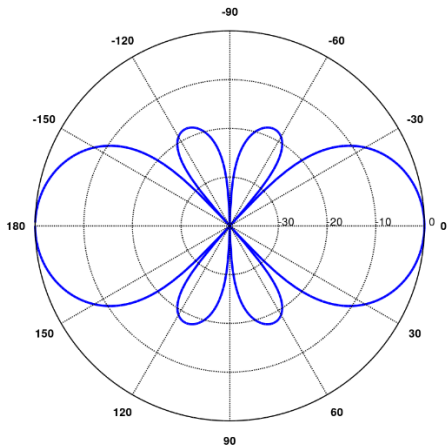


Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: Eversource Antenna Data Sheet and Electrical Patterns<sup>9</sup>**

<p><b>217 MHz</b></p> <p>Manufacturer: Telewave Model #: ANT220F2 Frequency Band: 195 - 260 MHz Gain: 2.5 dBd Vertical Beamwidth: 38° Horizontal Beamwidth: 360° Polarization: Vertical-Polarization Length: 4.25'</p>	 <p>The diagram is a polar plot of an antenna radiation pattern. The plot is circular with concentric dashed lines representing gain levels. The radial axis is labeled with values 10, 20, and 30. The angular axis is labeled with values from 0 to 180 in increments of 30 degrees. The radiation pattern consists of four main lobes, each extending to a gain of approximately 25 dBd. The lobes are oriented at 0, 90, 180, and 270 degrees. There are also smaller side lobes between the main lobes.</p>
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<sup>9</sup> In the case where pattern data was unavailable from the manufacturer, vertical patterns shown are for antennas with similar specifications.