EVERSOURCE ENERGY

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

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

January 28, 2021

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

RE: **Notice of Exempt Modification**
Eversource Site # ES-051 Thompson
97 Mountain Hill Road, Thompson, CT 06255
Latitude: 41-59-11.76 N / Longitude: 71-54-49.11 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 180-foot self-support tower located at 97 Mountain Hill Road in Thompson. 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 4-feet 3-inch tall omni-directional antennas to be mounted at 131 feet and 154 feet above ground level ("AGL") and two 7/8-inch diameter coaxial cables. Two existing antennas and associated coaxial cables will be removed. The antennas will be mounted to the existing tower on new 4-foot stand-off mounts. See Attachment C, Mount Analysis. There will be no other changes to the area of the fenced compound, the tower or the existing antennas and equipment currently mounted on the tower. The tower and existing and proposed equipment are depicted on Attachment D, Construction Drawings, dated December 16, 2020 and Attachment E, Structural Analysis, dated November 25, 2020. The Connecticut Siting Council approved this tower under Docket No. 157 in March 1993.

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 § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to Amy

St. Onge, First Selectman for the Town of Thompson and Tyra Penn-Gesek, Director of Planning and Development for the Town of Thompson via private carrier. Proof of delivery is attached. See Attachment F, 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 December 18, 2020 (Attachment G – Power Density Report)[1].
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 Amy St. Onge, First Selectman, Town of Thompson
Tyra Penn-Gesek, Director of Planning and Development, Town of Thompson
DESPP

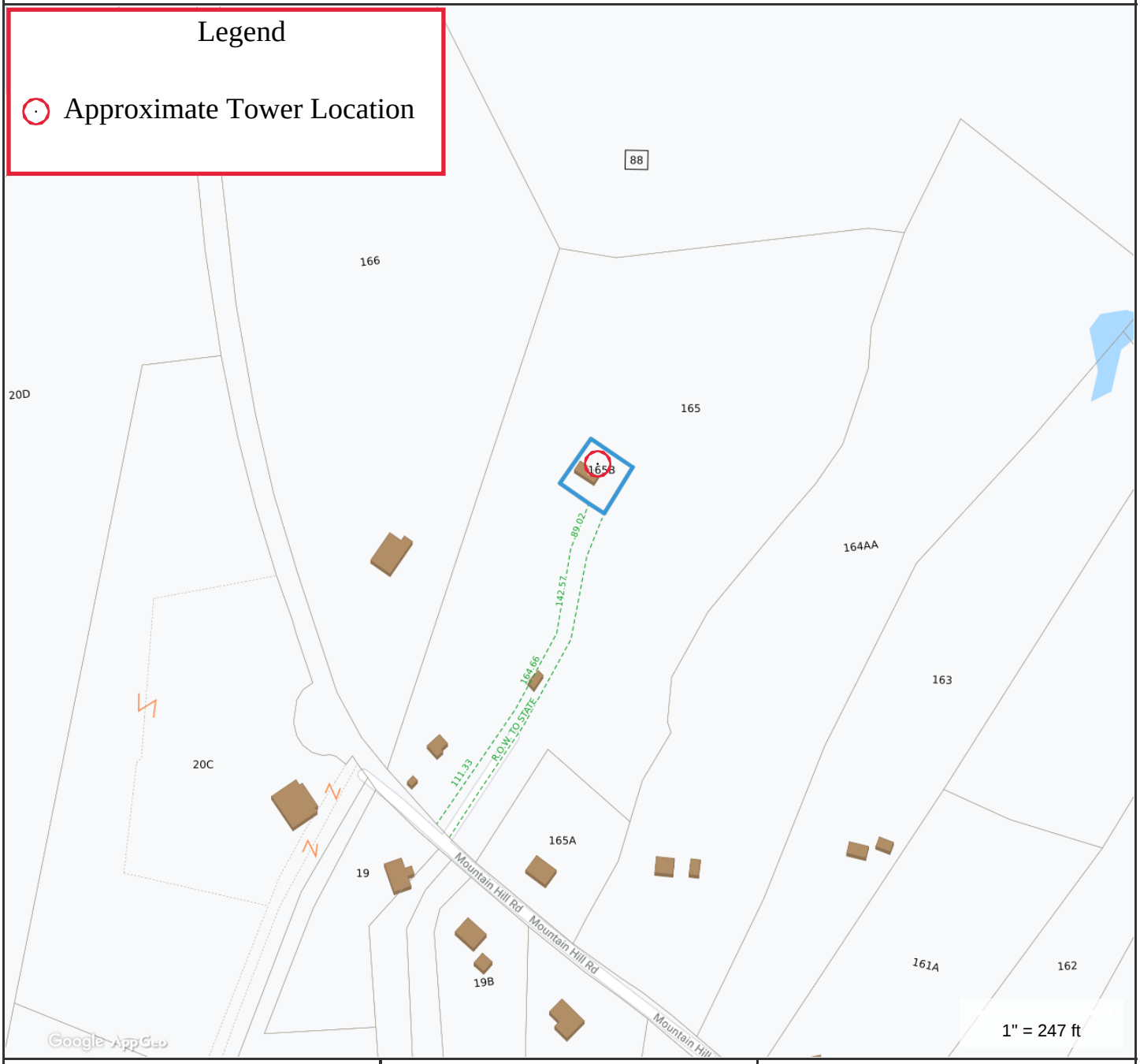
Attachments

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

[1] 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

ES-051 Thompson



Property Information

Property ID	104520
Location	97 MOUNTAIN HILL RD
Owner	CONNECTICUT STATE OF DPS

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

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

Geometry updated April 1, 2018
Data updated April 1, 2018

Property Location: 97 MOUNTAIN HILL RD **MAP ID:** 42/ 88/ 165/B / **Bldg Name:** **State Use:** 9010

Vision ID: 848 **Account #** 001730 **Bldg #:** 1 of 1 **Sec #:** 1 of 1 **Card** 1 of 1 **Print Date:** 12/02/2019 11:40

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CONNECTICUT STATE OF DEPT PUBLIC SAFETY 165 CAPITOL AVE HARTFORD, CT 06106 Additional Owners:			1 Paved	2 Secondary St.

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX COM LN	21	200,000	140,000
EX CM OTB	25	239,200	167,500
		Total 439,200	307,500

6140
THOMPSON, CT

VISION

SUPPLEMENTAL DATA

Other ID:		DV LOT #	
SIDE	N-28	SEWER	NO
CENSUS TR	09002	BAA	
FLOOD PLN	NO	CALLBACK	
ACCOUNT #	5268	DM Result	848
DV MAP #	1120		
GIS ID:		*ASSOC PID#*	

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CONNECTICUT STATE OF	0248/0073	11/27/1989	U		0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2018	21	140,000	2017	21	140,000	2016	21	140,000
2018	25	167,900	2017	25	167,900	2016	25	167,900
	Total:	307,900		*Total:*	307,900		*Total:*	307,900

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	0
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	239,200
Appraised Land Value (Bldg)	200,000
Special Land Value	0
Total Appraised Parcel Value	439,200
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	439,200

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				DM1

NOTES

180' TRIPOLE TOWER LTS SITE #62
POLICE RADIO
LEASE TO N. E. UTILITIES
SHED ON LAND OF N/V
LEASE IS RECIPROCAL
FOR SPACE ONLY

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
10/01/2019			V	53	FIELD REVIEW
05/03/2019			RH	14	Vacant Land/Oby
01/14/2009			MM	14	Vacant Land/Oby
01/14/2000			NS	00	Measur+Listed

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.		C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing Spec Use	Special Pricing Spec Calc	S Adj Fact	Adj. Unit Price	Land Value
1	9010	STATE	RA80				0.23	AC	0.00	1.0000	0		1.00		0.00				.00	0.00	0
1	9010	STATE	RA80				1.00	BL	200,000.00	1.0000	0		1.00		0.00				1.00	200,000.00	200,000

Total Card Land Units: 0.23 AC **Parcel Total Land Area:** 0.23 AC **Total Land Value:** 200,000

Property Location: 97 MOUNTAIN HILL RD **MAP ID:** 42/ 88/ 165/B / **Bldg Name:** **State Use:** 9010

Vision ID: 848 **Account #** 001730 **Bldg #:** 1 of 1 **Sec #:** 1 of 1 **Card** 1 of 1 **Print Date:** 12/02/2019 11:40

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Model	00		Vacant

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
9010	STATE	100

COST/MARKET VALUATION

Adj. Base Rate:	0.00
	0
Net Other Adj:	0.00
Replace Cost	0
AYB	
Dep Code	
Remodel Rating	
Year Remodeled	
Dep %	
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	
Apprais Val	
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
CB1	PRECAST CO			L	756	125.00	2000		0		90	85,100
FN9	W/O TOP RL-8			L	370	25.00	2000		0		90	8,300
TWR2	MONOPOLE			L	180	900.00	2000		0		90	145,800

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
	Ttl. Gross Liv/Lease Area:	0	0	0		

No Photo On Record

ATTACHMENT B – LETTER OF AUTHORIZATION

STATE OF CONNECTICUT

DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION

April 7, 2020

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Letter of Authorization** – Co-location on Connecticut State Police tower
Property address: 97 Mt. Hill Road, Thompson, CT
Latitude: 41 98'-65" Longitude: 71 54' 49.16"

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 97 Mt. Hill Road, Thompson, 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

ATTACHMENT C – MOUNT ANALYSIS

BLACK & VEATCH
Building a world of difference.
BLACK & VEATCH CORPORATION
6800 W 115TH ST, SUITE 2292, OVERLAND PARK, KS 66211
+1 913-458-2522 | RILEYJJ@BV.COM

December 2, 2020

MOUNT EVALUATION LETTER

Site Number: 848
Site Name: THOMPSON CSP
Site Data: 97 Mountain Hill Road
Thompson, CT 06255
Latitude: 41° 59' 11.76"
Longitude: -71° 54' 49.11"

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**

Structure Rating (max from all components) =	17.1%

Proposed Mounting System
SitePro 1 (USF-4U) 48" Ultimate Universal Stand-off Frame

This analysis analyzes the worst-case scenario for the proposed USF-4U Stand-off Frame. All levels are deemed sufficient. 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.

12/02/2020

TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	157	154	1	Omni	Telewave	ANT220F2
Eversource	1	-	134	131	1	Omni	Telewave	ANT220F2

This analysis analyzes the worst-case scenario for the proposed USF-4U Stand-off Frame. All 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	B
RISK CATEGORY	III
TOPO CATEGORY	Hill
CREST HEIGHT	110 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	13.0%	Pass	2.8%	Pass
Bracing: Pipe 2.0 Std	17.1%	Pass	2.2%	Pass
Mount Pipe: Pipe 3.0 Std	8.6%	Pass	3.8%	Pass

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

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

APPENDIX 1:
MOUNT ANALYSIS REPORT

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		Computed By: Joohwan Jung
	Site Name: THOMPSON CSP (848)		Date: 11/30/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/30/2020

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Basic Wind Speed, V =	140	mph		
Height Above Ground, z =	157	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.12		$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.06			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factor, K_e =	1.000		$F_A = q_z G_h (EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	56.59	psf		
Gust Effect Factor, G_h =	1.00		$F_M = q_z G_h C_f D_p$	2.6.11.2

Appurtenance Wind Loads

Name	Height (ft)	Width (ft)	Depth (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
ANT220F2	4.25	0.23	0.23	1.78	1.56	88.54	1.78	1.56	88.54

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	THOMPSON CSP (848)	Date: 11/30/2020
			Verified By: JW
	Title:	MOUNT ANALYSIS REPORT	Date: 11/30/2020

Member Wind Loading

Exposure Category =	B		
Risk Category =	III		
Topographic Category =	1		
Basic Wind Speed, V =	140	mph	
Height Above Ground, z =	157	ft	
Crest Height, H =	110 ft	ft	
Velocity Pressure Coefficient, K_z =	1.12		
Topographic Factor, K_{zt} =	1.06		
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 =	56.59	psf	
Gust Effect Factor, G_h =	1.00		

Equations

	TIA-222-H
$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_e = e^{-0.000032 \cdot zs}$	2.6.8
$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
$F_A = q_z G_h (EPA)$	2.6.11.2
$F_M = q_z G_h C_f D_p$	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	28.29
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	13.44
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	19.81

Client:	Eversource	Computed By:	Joohwan Jung
Site Name:	THOMPSON CSP (848)	Date:	11/30/2020
		Verified By:	JW
Title:	MOUNT ANALYSIS REPORT	Date:	11/30/2020

BLACK & VEATCH

Appurtenance Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	157	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.06		$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.17			
Factored Ice Thickness, T_{iz} =	2.74	in	$DL_{ice}=[(H_{ice}*D_{ice}*W_{ice}) - (H*W*D)]*56pcf$	
Grating Ice Dead Load, D_{Gice} =	12.79	psf		

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft^3)	DL_{ice} (lb)
ANT220F2	4.71	0.69	0.69	1.99	111.48

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	THOMPSON CSP (848)	Date: 11/30/2020
			Verified By: JW
	Title:	MOUNT ANALYSIS REPORT	Date: 11/30/2020

Member Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	157	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.06		$T_{iz} = T_i I K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.17			
Factored Ice Thickness, T_{iz} =	2.74	in	Aiz = pi*Tiz*(Dc+Tiz)	2.6.10
Grating Ice Dead Load, D_{Gice} =	12.79	psf		
			DL_{ice}=Aiz*56pcf	

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft^2)	DL_{ice} (lb/ft)
Arm: HSS3X3X3/16	0.71	0.71	0.35	0.42	23.38
Bracing: Pipe 2.0 Std	0.65		0.20	0.31	17.12
Mount Pipe: Pipe 3.0 Std	0.75		0.29	0.37	20.89

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: THOMPSON CSP (848)		Date: 11/30/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 11/30/2020

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	157	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.12	psf	$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.06			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.218			
Factored Ice Thickness, T_{iz} =	2.74	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

Appurtenance Ice Wind Loads

Name	Height w/ Ice (ft)	Width w/ Ice (ft)	Depth w/ Ice (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
ANT220F2	4.71	0.69	0.69	-	2.84	20.49	-	2.84	20.49

Client:	Eversource	Computed By:	Joohwan Jung
Site Name:	THOMPSON CSP (848)	Date:	11/30/2020
		Verified By:	JW
Title:	MOUNT ANALYSIS REPORT	Date:	11/30/2020

BLACK & VEATCH

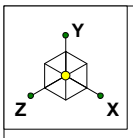
Member Ice Wind Loading

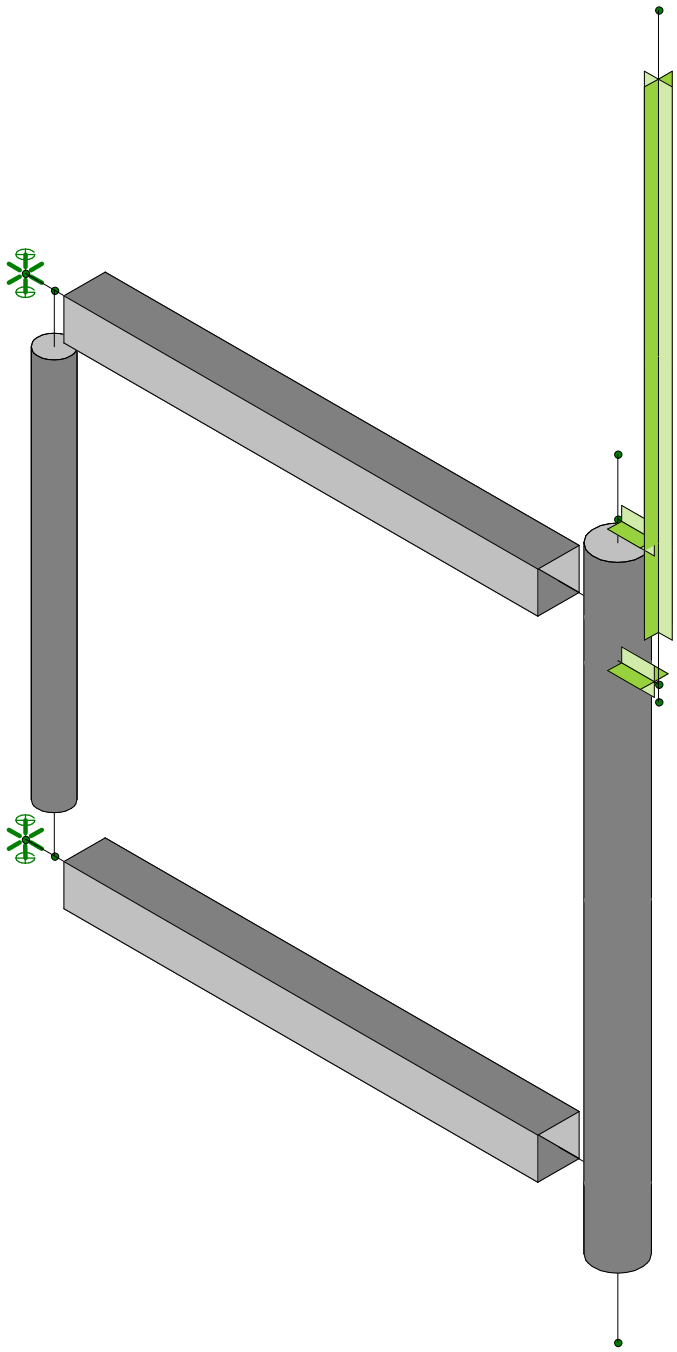
				TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	157	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.12	psf	$K_e = e^{-0.000032 z s}$	2.6.8
Topographic Factor, K_{zt} =	1.06			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.218			
Factored Ice Thickness, T_{iz} =	2.74	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

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	0.71	0.71	2	0.71	10.20
Bracing: Pipe 2.0 Std	0.65		1.2	0.65	5.67
Mount Pipe: Pipe 3.0 Std	0.75		1.2	0.75	6.48

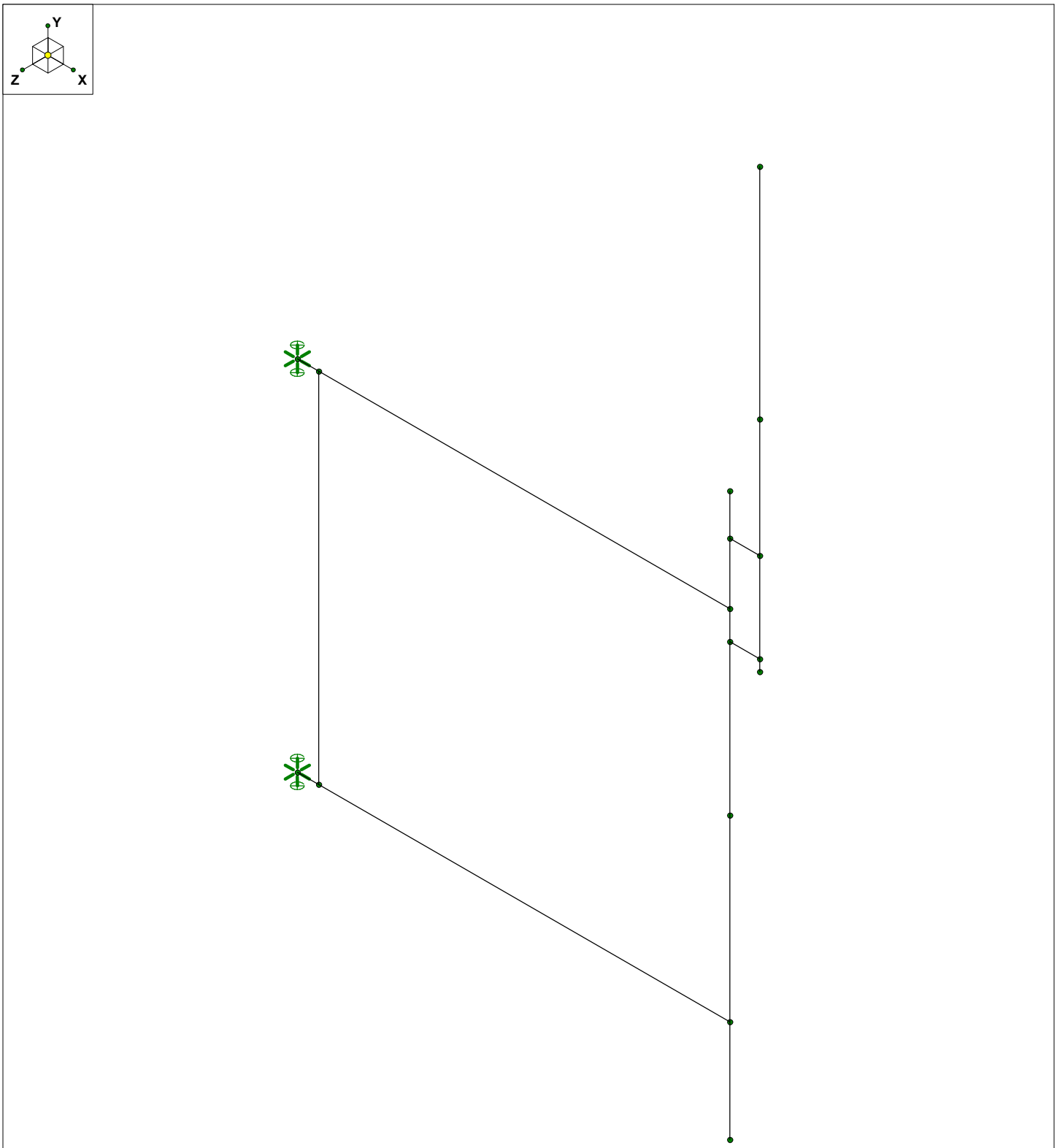
APPENDIX 2:
RISA PRINTOUTS





Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 1
Joohwan Jung		Dec 1, 2020 at 11:29 AM
405025.2021.2200		THOMPSONCSP USF-4U Model.r3d



Envelope Only Solution

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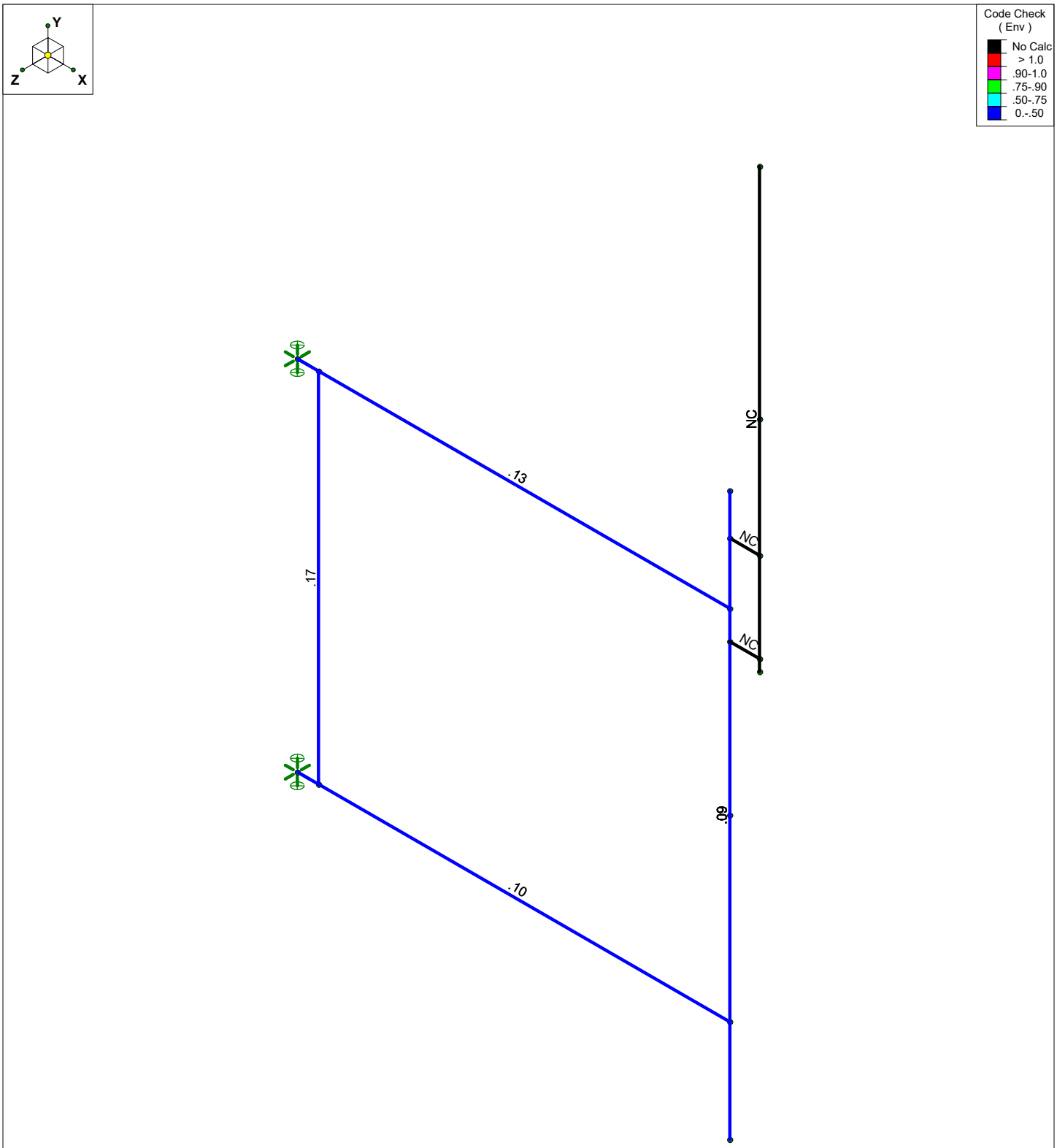
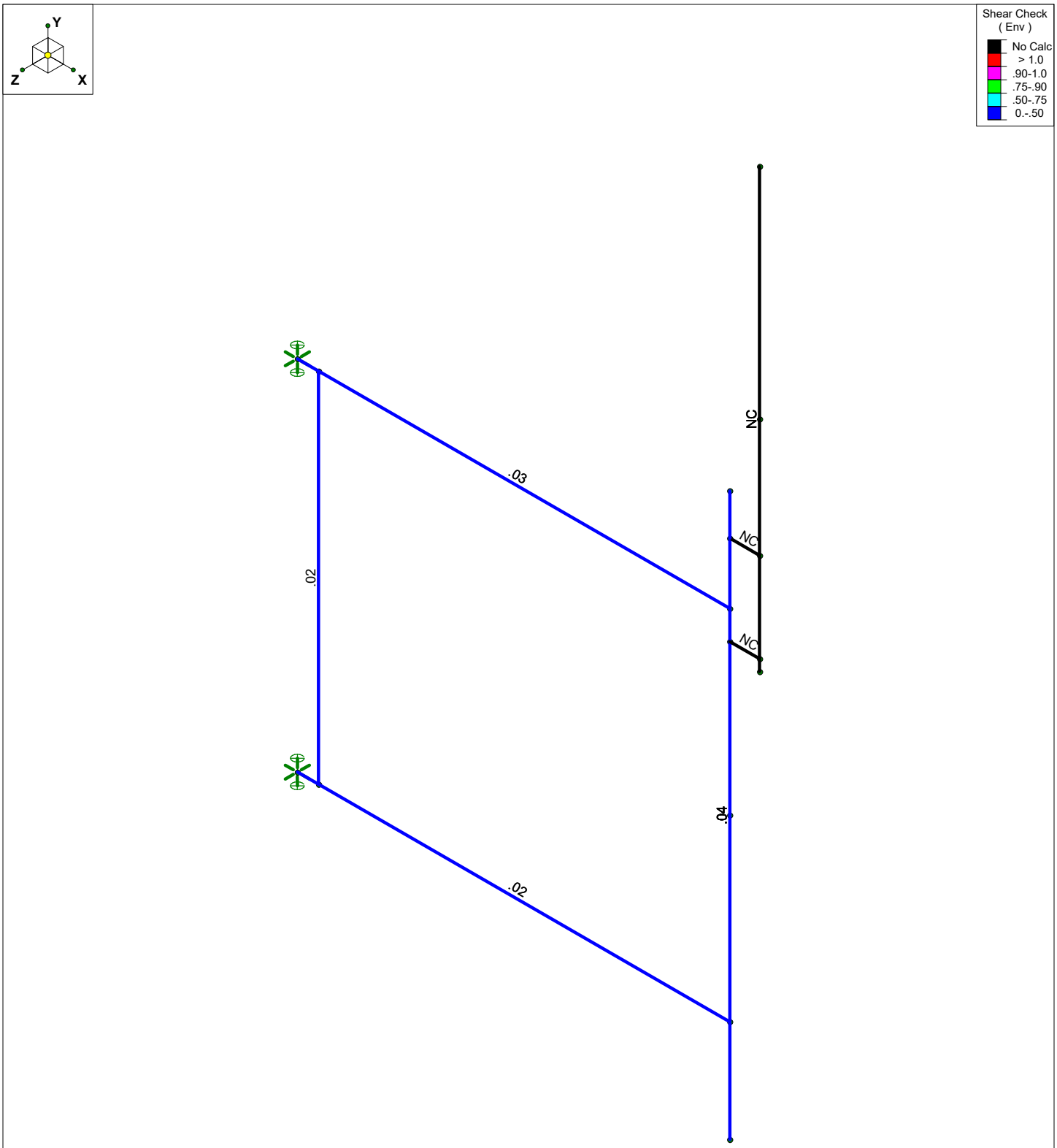


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 3
Joohwan Jung		Dec 1, 2020 at 11:29 AM
405025.2021.2200		THOMPSONCSP USF-4U Model.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 4
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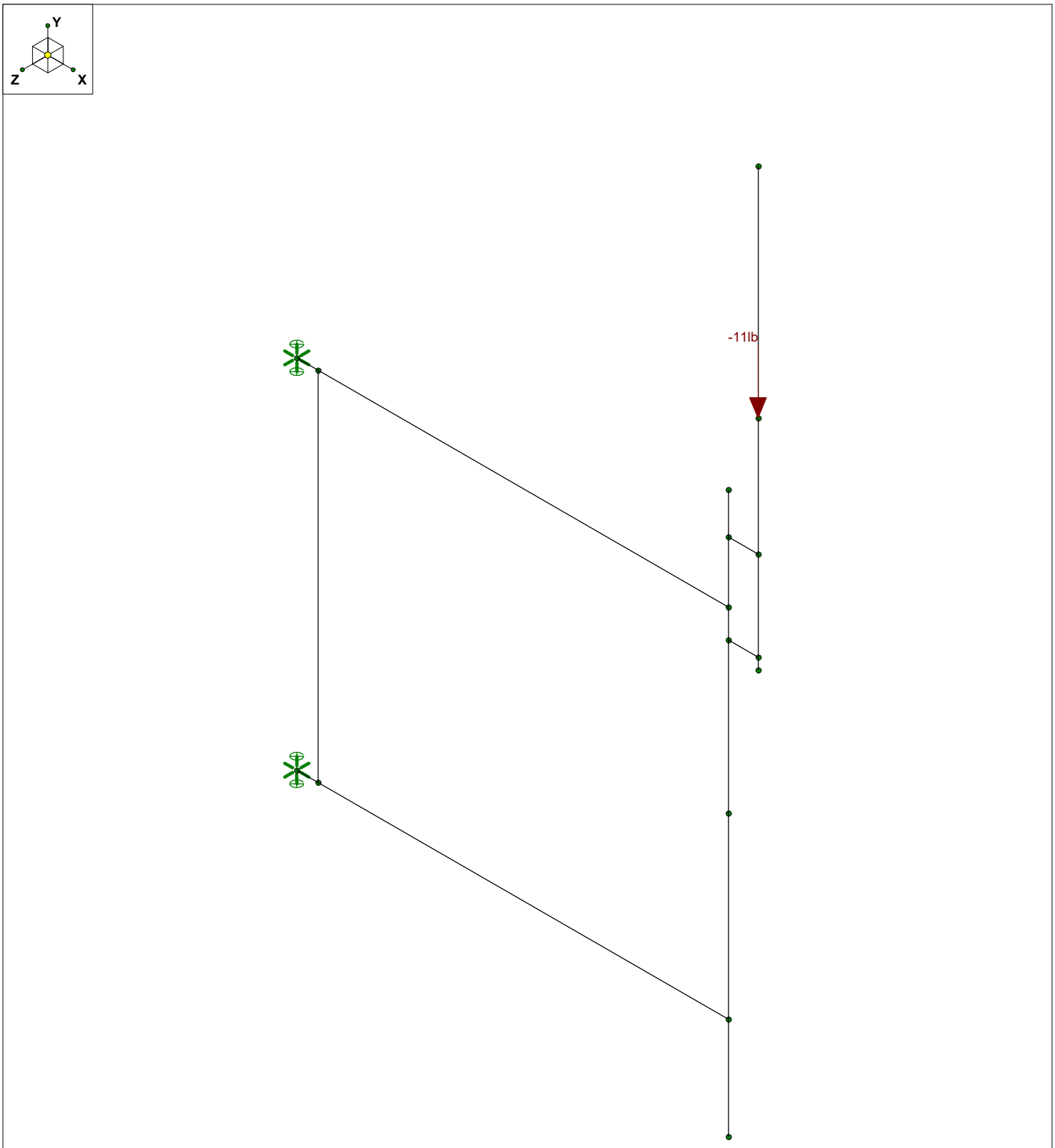
405025.2021.2200		THOMPSONCSP USF-4U Model.r3d



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 5
Joohwan Jung		Dec 1, 2020 at 11:29 AM
405025.2021.2200		THOMPSONCSP USF-4U Model.r3d

(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...	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...	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	202.383	2	291.863	38	302.166	5	0	43	667.538	11	0	43
2		min	-559.263	38	2.819	2	-302.166	11	0	2	-667.538	5	0	2
3	N3	max	552.813	17	295.242	32	125.067	5	0	43	392.418	11	0	43
4		min	-25.514	8	5.454	8	-125.067	11	0	2	-392.418	5	0	2
5	Totals:	max	427.235	2	552.076	38	427.233	5						
6		min	-427.235	8	121.444	2	-427.233	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	.130	0	11	.028	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	.038	10.5...		17	57908....	65205	5748.75	5748.75	1...	H1-1b

APPENDIX 3:
ATTACHMENTS

TELEWAVE, INC.®

195 - 260 MHz

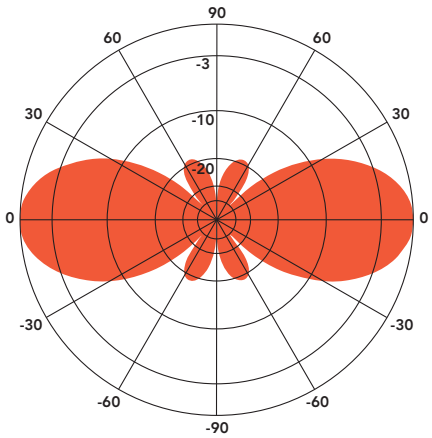
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

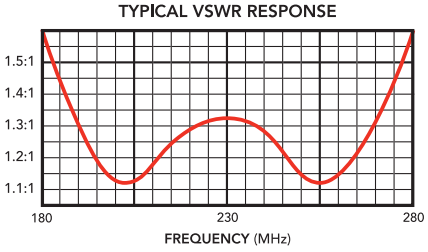
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

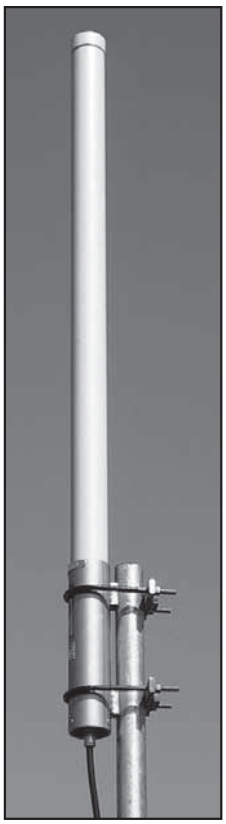
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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



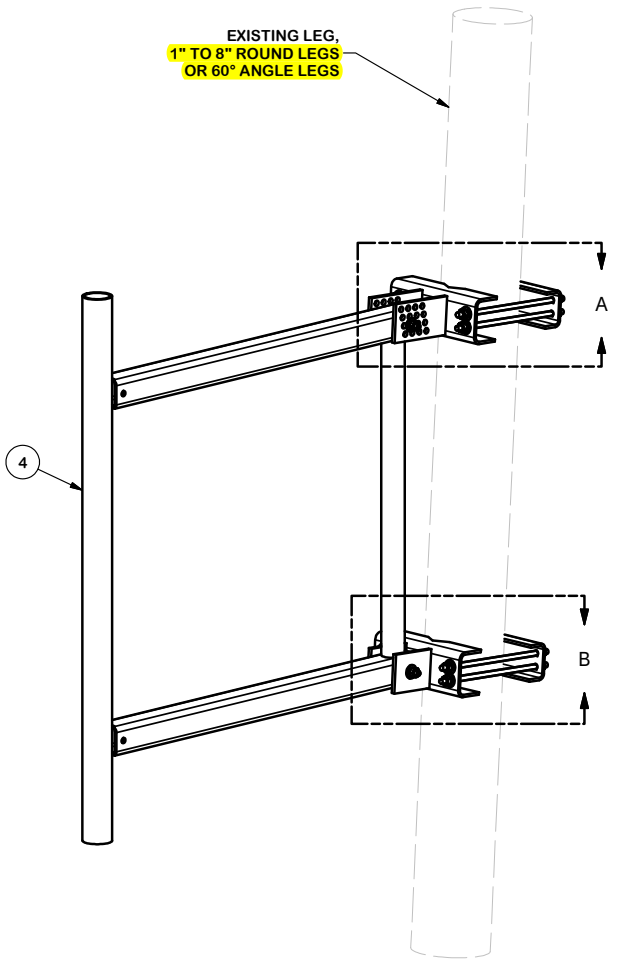


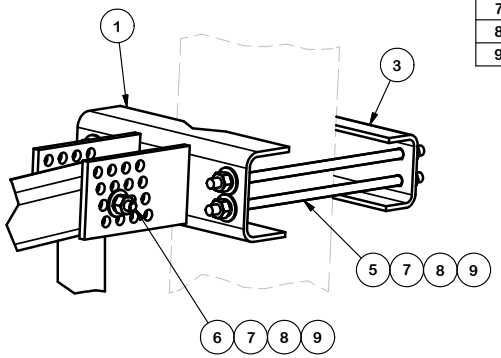
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 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.²
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.)**	

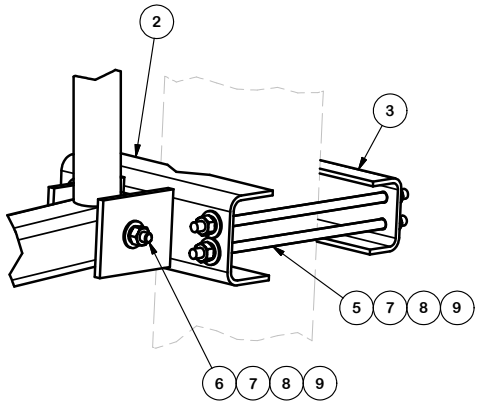
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5.0"± DIAMETER.

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

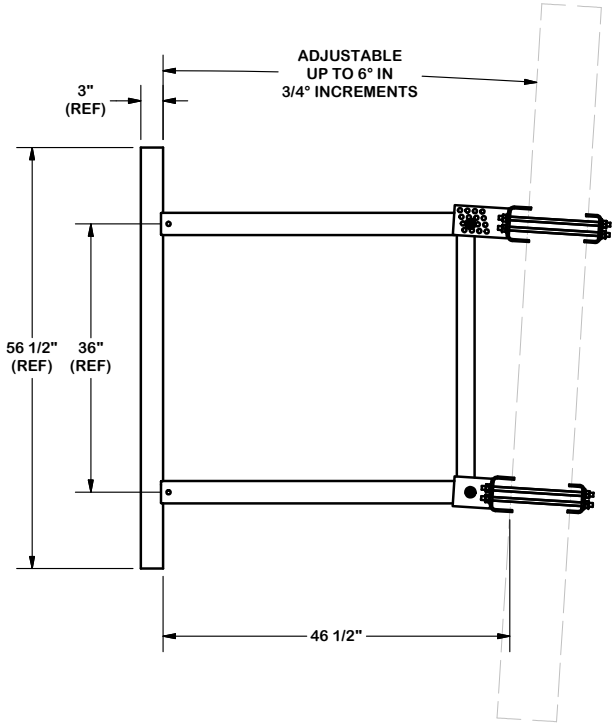




DETAIL A



DETAIL B



TOLERANCE NOTES

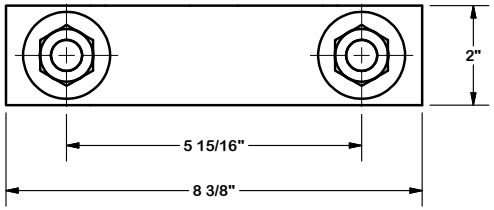
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

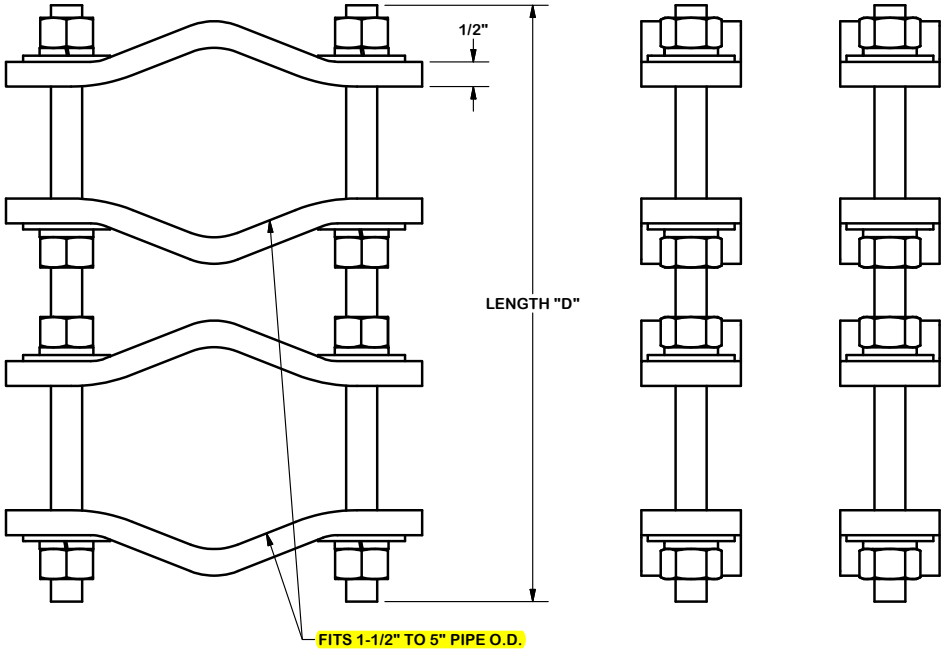
DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

SITE PRO 1 — A valmont COMPANY
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	PART NO.	PAGE
	RCH 2/4/2011		USF-4U	1 OF 1

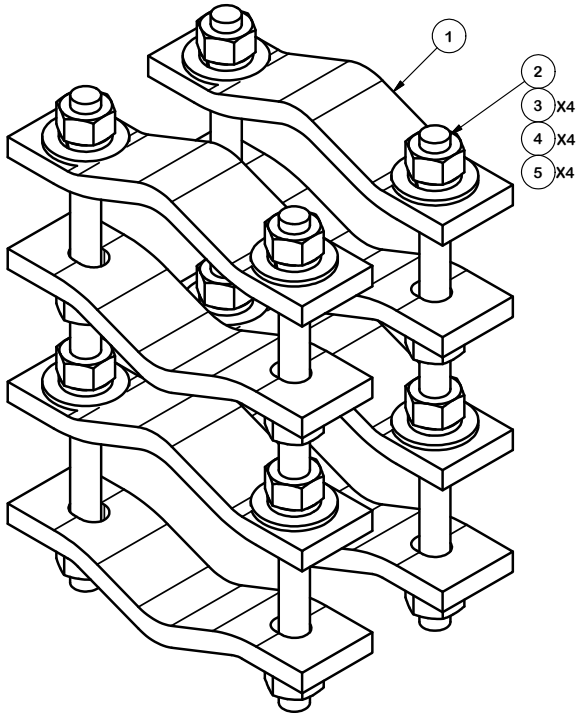
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 2/16/2011	USF-4U





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

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DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

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

SITE PRO 1 — A valmont COMPANY

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	PART NO.	PAGE
	KC8 8/21/2012		SEE ASSEMBLY "A"	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	CEK 1/22/2013	DCPxxK

ATTACHMENT D – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (2) NEW OMNI/WHIP ANTENNAS, (1) AT ELEVATION 159'–1 1/2"± AGL AND (1) AT ELEVATION 136'–1 1/2"± AGL
2. REMOVE (2) EXISTING ANTENNAS AND THEIR ASSOCIATED COAX, (1) AT ELEVATION 127'–0"± AGL AND (1) AT ELEVATION 47'–0"± AGL
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM

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:	THOMPSON CSP
SITE ID NUMBER:	#848
SITE ADDRESS:	97 MOUNTAIN HILL ROAD THOMPSON, CT 06255
MAP:	42
BLOCK:	88
LOT:	165
ZONE:	RA80
LATITUDE:	41° 59' 11.76" N
LONGITUDE:	71° 54' 49.11" W
ELEVATION:	558'± AMSL
FEMA/FIRM DESIGNATION:	C
ACREAGE:	0.23± AC (BOOK: 0248, PAGE: 0073)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
CONNECTICUT STATE POLICE
165 CAPITOL AVE
HARTFORD, CT 06106

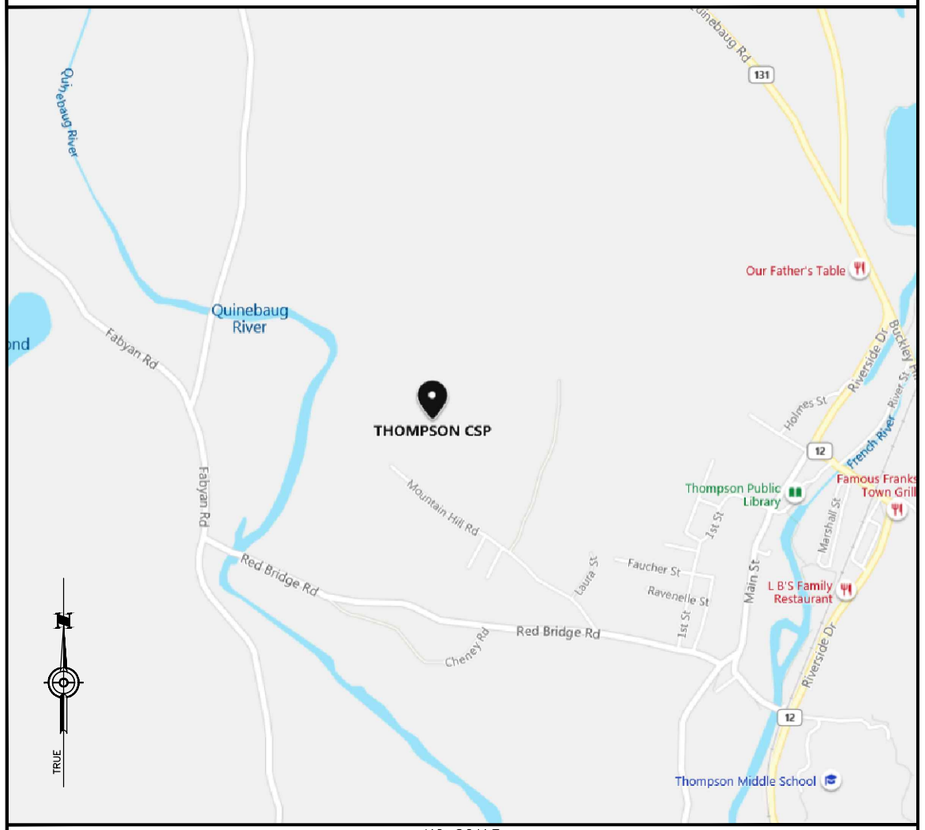
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

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

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

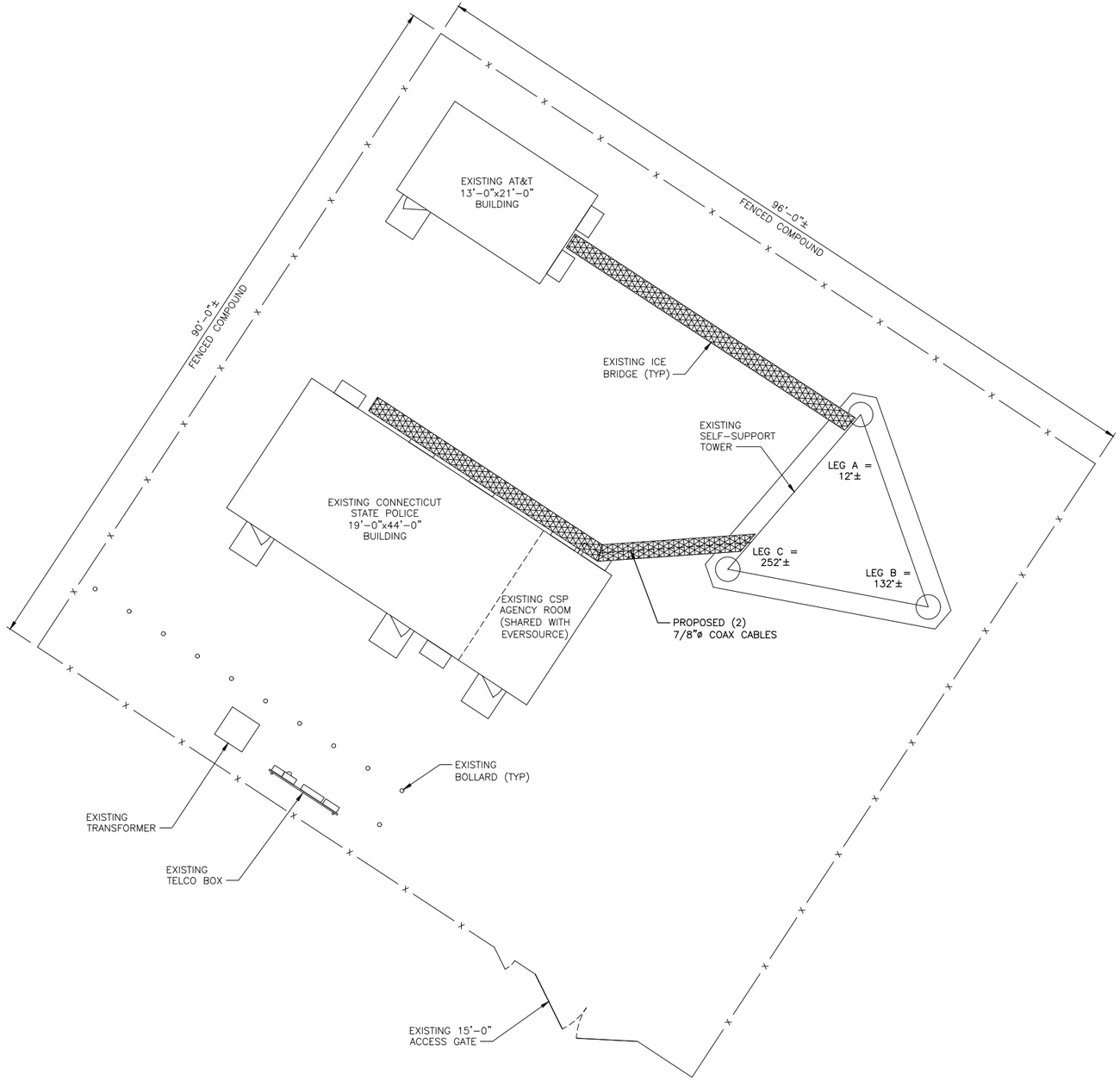
REV	DATE	DESCRIPTION
0	12/16/20	ISSUED FOR FILING

JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



SITE PLAN
NO SCALE

N

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

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
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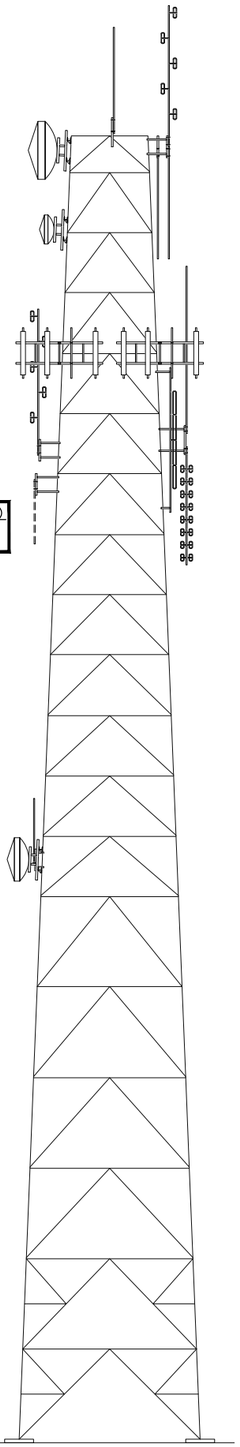
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



TOWER ELEVATION FACE BA

NO SCALE

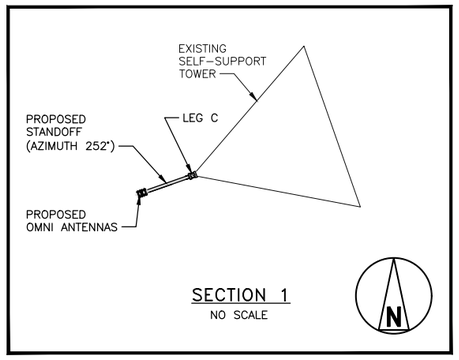
TOP OF EXISTING ANTENNA (NON–EVERSOURCE)
ELEVATION 198'–0"± AGL

EXISTING ANTENNAS (NON–EVERSOURCE)
RAD CL ELEVATION 170'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 151'–0"± AGL

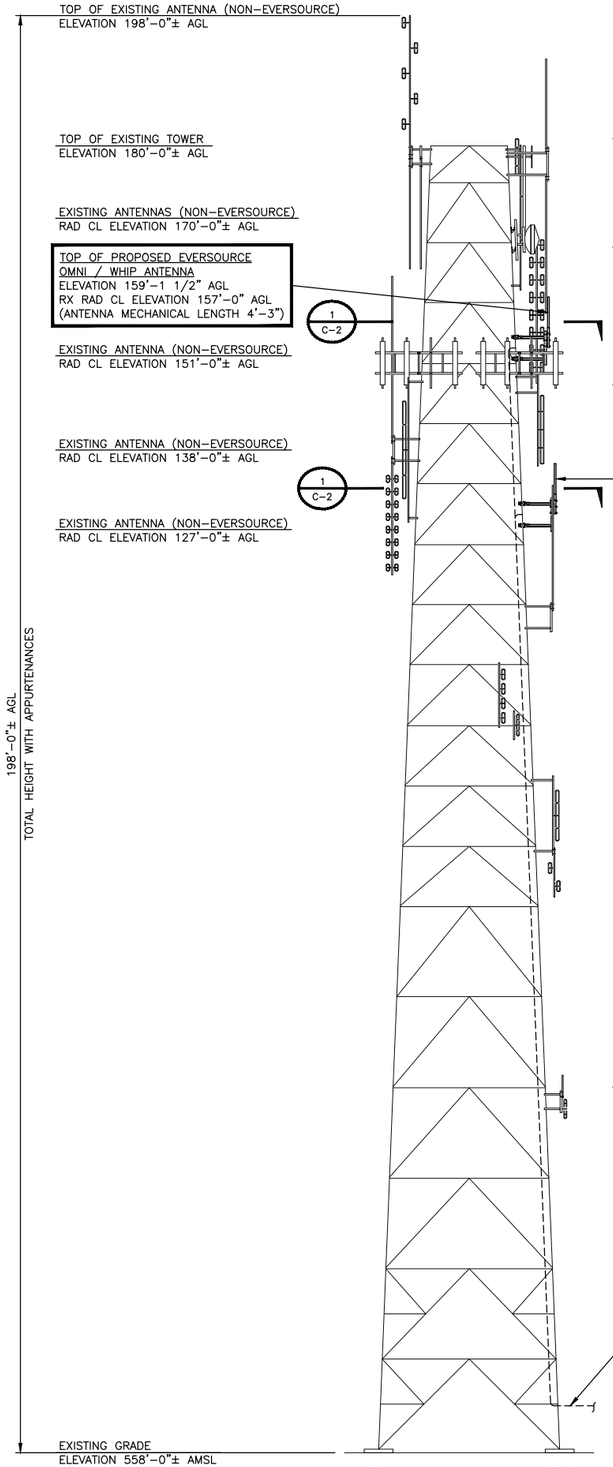
EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 138'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 127'–0"± AGL



SECTION 1

NO SCALE



TOWER ELEVATION FACE AC

NO SCALE

TOP OF EXISTING ANTENNA (NON–EVERSOURCE)
ELEVATION 192'–0"± AGL

TOP OF EXISTING ANTENNA (NON–EVERSOURCE)
ELEVATION 181'–0"± AGL

TOP OF EXISTING ANTENNA (NON–EVERSOURCE)
ELEVATION 180'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 170'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 169'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 158'–0"± AGL

EXISTING ANTENNAS (NON–EVERSOURCE)
RAD CL ELEVATION 149'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 147'–0"± AGL

TOP OF PROPOSED EVERSOURCE
OMNI / WHIP ANTENNA
ELEVATION 136'–1 1/2" AGL
TX RAD CL ELEVATION 134'–0" AGL
(ANTENNA MECHANICAL LENGTH 4'–3")

EXISTING EVERSOURCE ANTENNA
RAD CL ELEVATION 125'–0"± AGL

EXISTING EVERSOURCE ANTENNA
RAD CL ELEVATION 104'–0"± AGL

EXISTING EVERSOURCE ANTENNA
RAD CL ELEVATION 100'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 87'–6"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 79'–0"± AGL

EXISTING ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 50'–0"± AGL

EXISTING ABANDONED ANTENNA (NON–EVERSOURCE)
RAD CL ELEVATION 47'–0"± AGL
(ANTENNA AND COAX TO BE REMOVED)

PROPOSED (2) 7/8"ø
COAX CABLES ROUTED TO
PROPOSED ANTENNAS

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	12/16/20	ISSUED FOR FILING

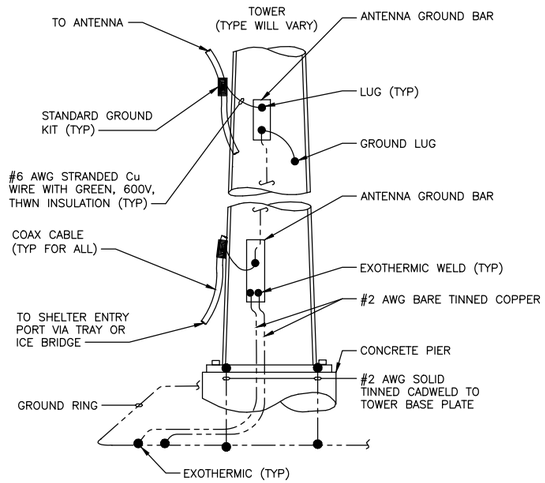
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER

12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER
C-2

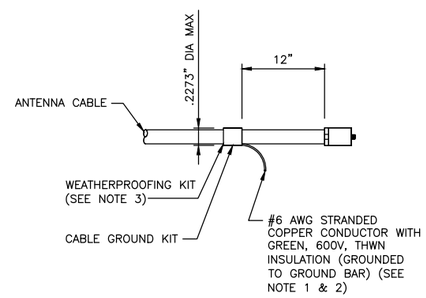


NOTE

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

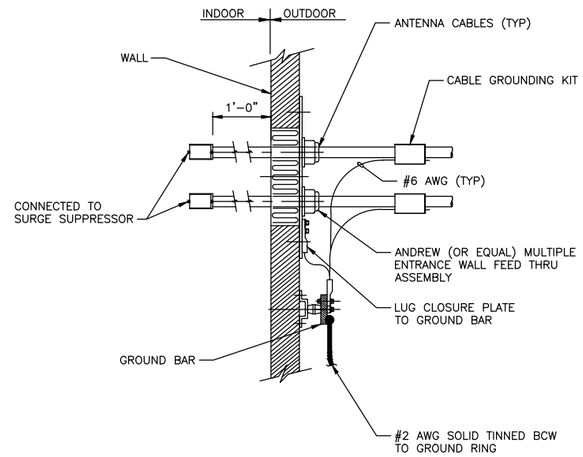


NOTES

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

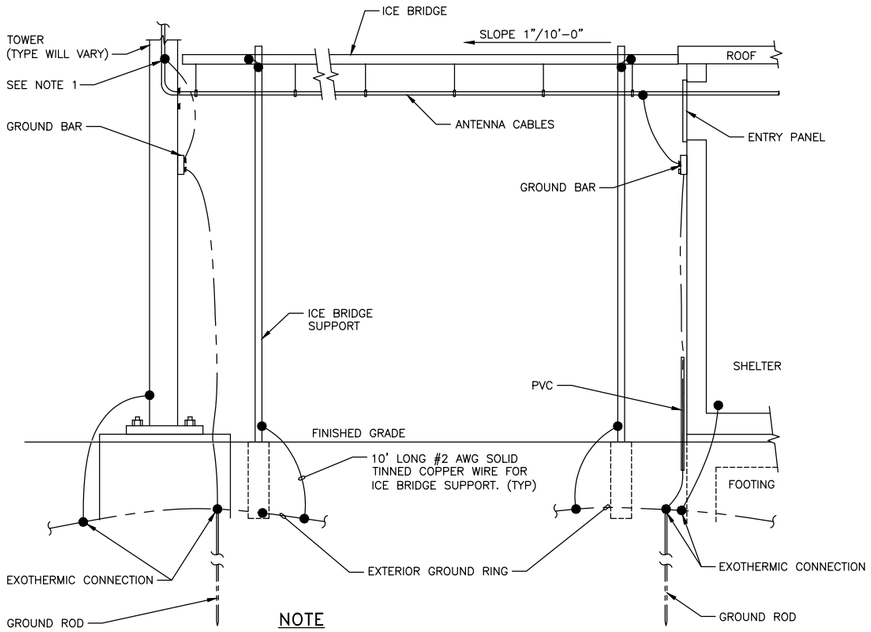
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

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

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	12/16/20	ISSUED FOR FILING

STATE OF CONNECTICUT · MARK P. STILES · 34358 · LICENSED PROFESSIONAL ENGINEER

12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-1

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 SWEPT 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.

EVERSOURCE ENERGY
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BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
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PHONE: (913) 458-2522

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

REV	DATE	DESCRIPTION
0	12/16/20	ISSUED FOR FILING

STATE OF CONNECTICUT · JOSHUA J. RILEY · 33208 · LICENSED PROFESSIONAL ENGINEER
12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-1

ELECTRICAL

1. CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
2. 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.
3. 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.
4. ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
5. CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
6. ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
7. 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.
8. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
9. CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
10. 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.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.

GROUNDING

1. #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
2. #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
3. #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
4. 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).
5. 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.
6. 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–BELEVILE WASHER–NUT.
7. 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.
8. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
9. ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
10. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
11. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2–HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
12. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
13. 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.
14. MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
15. ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

ANTENNA & CABLE NOTES

1. 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.
2. 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.
3. 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.
4. 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.
5. MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
   - 7/8 INCH, RMIN = 15 INCHES
   - 1 5/8 INCH, RMIN = 25 INCHES
6. 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.
7. ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
8. CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
9. CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

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PHONE: (913) 458–2522

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

REV	DATE	DESCRIPTION
0	12/16/20	ISSUED FOR FILING

STATE OF CONNECTICUT · MARK P. STILES · 24358 · LICENSED PROFESSIONAL ENGINEER

12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
NOTES
& SPECIFICATIONS

SHEET NUMBER
N-2

SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⏚●	5/8"ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
⏚◉	TEST GROUND ROD WITH INSPECTION SLEEVE
– – –	GROUNDING CONDUCTOR
(A)	KEY NOTES
CHAINLINK FENCE	X X X X X
WOOD FENCE	
LEASE AREA	
ICE BRIDGE	
CABLE TRAY	
GAS LINE	G G G G G
UNDERGROUND ELECTRICAL/TELCO	E/T E/T E/T E/T
UNDERGROUND ELECTRICAL/CONTROL	E/C E/C E/C E/C
UNDERGROUND ELECTRICAL	E E E E E
UNDERGROUND TELCO	T T T T T
PROPERTY LINE (PL)	

ABBREVIATIONS

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

EVERSOURCE ENERGY

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JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER

12/16/2020

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE

NOTES
& SPECIFICATIONS

SHEET NUMBER

N-3

REFERENCE CUTSHEETS

TELEWAVE, INC.®

195 - 260 MHz

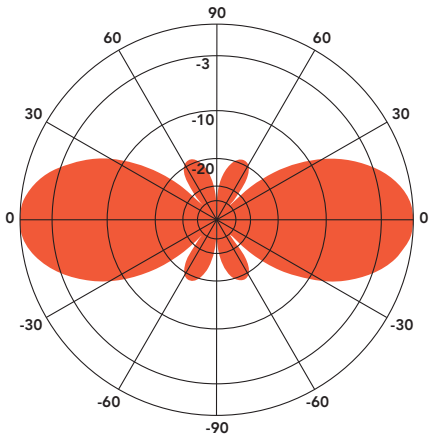
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

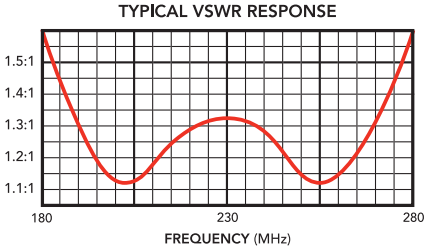
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

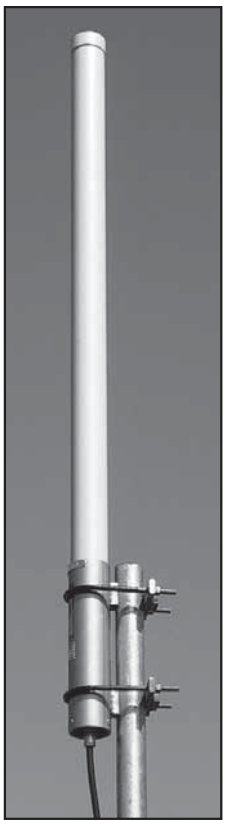
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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



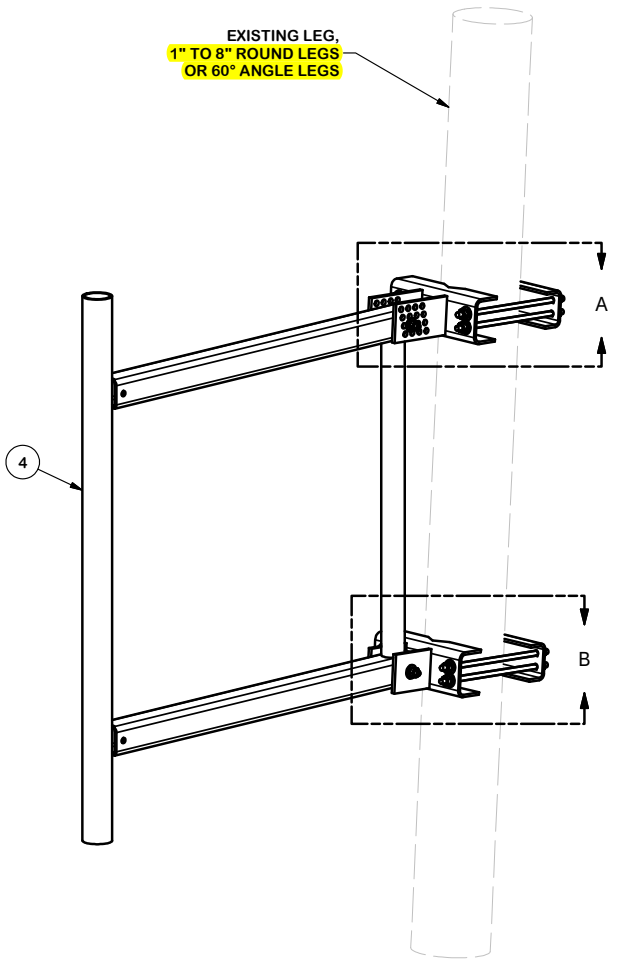


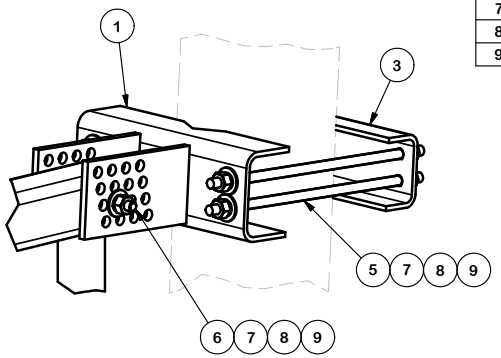
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 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.²
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.)**	

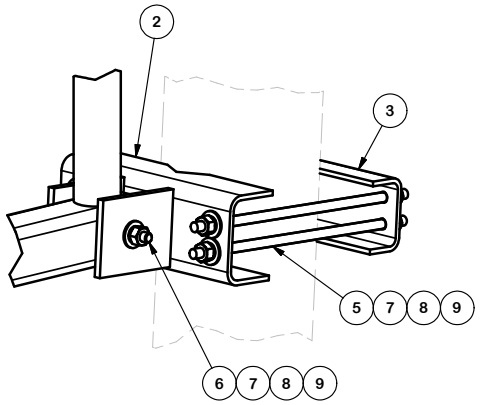
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5.0"± DIAMETER.

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

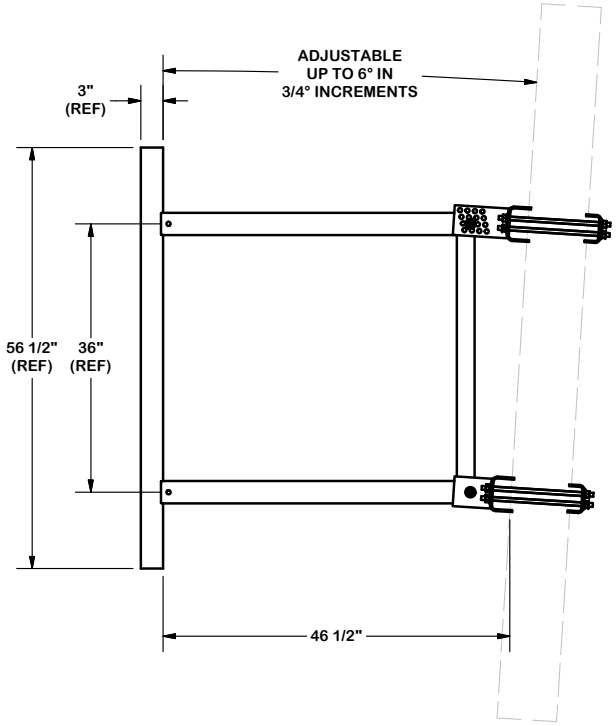




DETAIL A



DETAIL B



TOLERANCE NOTES

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

DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

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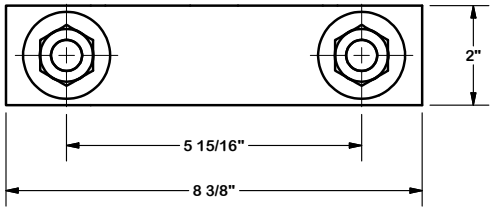
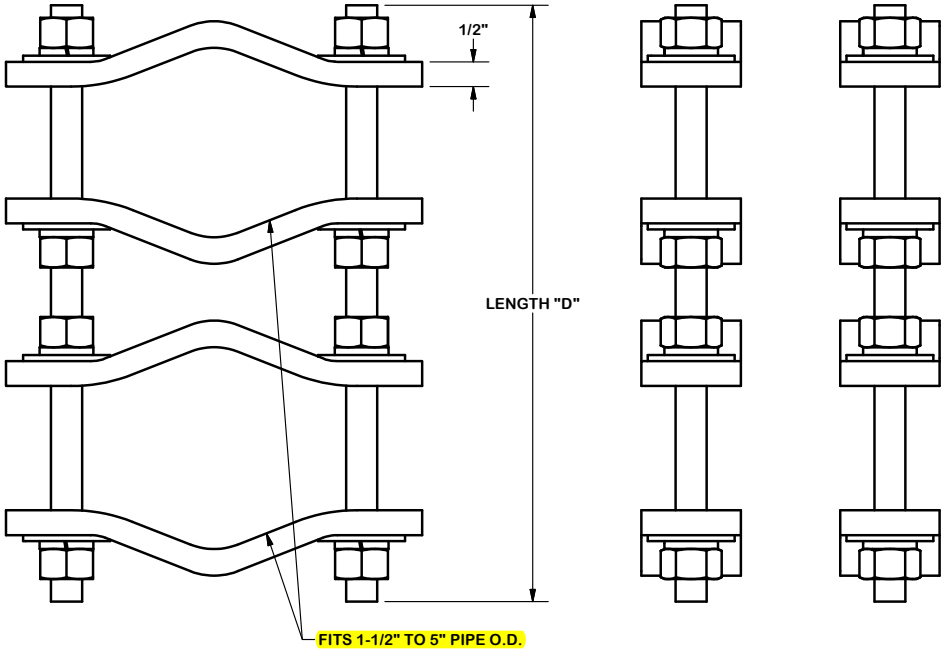
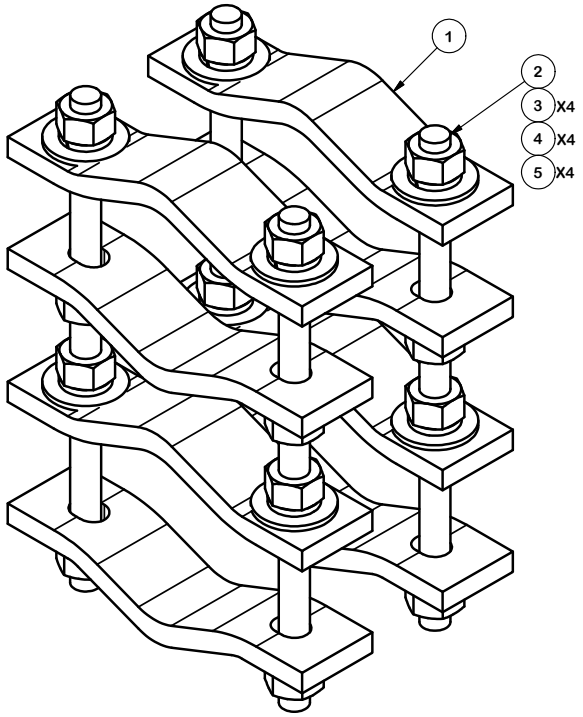




PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

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



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DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

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

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

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ATTACHMENT E – STRUCTURAL ANALYSIS

AECOM

Submitted to
Eversource Energy
107 Selden Street
Berlin, CT 06037

Submitted by
AECOM
1255 Broad St,
Suite 201
Clifton, NJ 07013
November 25, 2020

DETAILED STRUCTURAL ANALYSIS AND MODIFICATION OF AN EXISTING 180’ SELF SUPPORTING LATTICE TOWER AND EXISTING FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

EVERSOURCE ENERGY

Site ID : CSP #62 Thompson
Site Address: 97 Mountain Hill Road
Thompson, Connecticut

60619086 CSP#62
EVS-017 Revision 3 (b.2)

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis and modification of the existing 180' self-supporting lattice tower structure located at 97 Mountain Hill Road, Thompson, Connecticut.

The structural analysis was conducted in accordance with the 2018 Connecticut State Building Code which include the TIA-222-H[1] Standard, 2015 International Building Code, the 2018 Connecticut State Building Code Amendments, the AISC[2] Load Resistance Factor Design (LRFD), the ASCE 7[3] design Code, and the Department of Emergency Services and Public Protection (DESPP) / Connecticut State Police (CSP) design requirements.

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 antenna upgrades are listed below:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Remove: **(1) Decibel DB-212 Dipole (CSP-23)**	**CSP**	**47'**
(1) Amphenol BCD806-09NE Inverted Whip (CSP-38)	**CSP**	**127'**
Install: **(1) Telewave ANT220F2 Omni Antenna (Antenna Centerline Install @ 134')** **(1) SitePro USF-4U (Mount Centerline Install @ 131')** **(1) RFS LCF78-50JA-A7 Cellflex Coaxial Cable**	**Eversource (Proposed)**	**131'-157'**
(1) Telewave ANT220F2 Omni Antenna (Antenna Centerline Install @ 157') **(1) SitePro USF-4U (Mount Centerline Install @ 154')** **(1) RFS LCF78-50JA-A7 Cellflex Coaxial Cable**		

The results of the structural analysis indicated the existing tower structure did not have enough capacity for the proposed loading conditions above. The tower structure requires modifications shown on SK-1 through SK-2. **Once the modifications indicated on sheets SK-1 through SK-2 are performed, the modified structure is considered structurally adequate with the wind load specification specified above with the existing and proposed antenna loading herein. The controlling structural capacity for all tower and foundation components for the proposed antenna loading after modifications are installed is 87.6%.**

1. TIA = Telecommunications Industry Association Structural Standard for Antenna Supporting Structures and Antennas (Version H)

2. AISC = American Institute of Steel Construction (15th Edition)

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

1. EXECUTIVE SUMMARY *(continued):*

This analysis is based on:

1) The tower structure's theoretical capacity not including any assessment of the condition of the tower.

2) Tower geometry, member sizes and foundation taken from original construction documents prepared by Stainless, Inc. project number 358815 dated October 31, 1995.

3) Previous structural analysis performed by URS Corporation on behalf of Northeast Utilities System, project number NU1-045 \ 36922408 signed and sealed March 14, 2013.

4) Geotechnical Study for Evaluation (for CSP#62) performed by Welti Geotechnical, P.C. dated March 26, 2018.

5) Proposed Antenna Radio Frequency Data Sheet (RFDS) from Smartlink on behalf of AT&T, dated May 5, 2019, obtained via e-mail dated November 20, 2019.

6) Existing tower antenna inventory obtained via tower climb performed by Eastern Communications, Inc. obtained via e-mail dated January 28, 2020.

7) Existing antenna inventory as specified in Section 2 and 6 of this report, provided by the CT State Police, obtained via e-mail dated October 11, 2017, with a follow up inventory update e-mail dated February 4, 2020.

8) Proposed Eversource inventory obtained via email dated February 10, 2020.

9) Previous structural analysis performed by AECOM on behalf of Eversource, project 60619086/EVS-017 Rev. 1 (a), signed and sealed September 22, 2020.

10) Previous structural analysis performed by AECOM on behalf of Eversource, project 60619086/EVS-017 Rev. 1 (b.1), signed and sealed September 22, 2020.

11) Previous structural analysis performed by AECOM on behalf of Eversource, project 60619086/EVS-017 Rev. 2 (b.1), dated October 27, 2020.

12) Antenna inventory as specified in Sections 2 and 6 of this report.

13) Coaxial cable orientation as specified in Section 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/cmc

2. INTRODUCTION

The subject tower is located at 97 Mountain Hill Road in Thompson, Connecticut. The structure is a self-supporting three-legged 180' steel tapered lattice tower manufactured by Stainless Incorporated.

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 an ultimate wind speed of 140 mph (3-second gust)
- 2016 AISC Load Resistance Factor Design (LRFD)
- 2016 ASCE 7 Minimum Design Loads for Buildings and Other Structures for the ice thickness referenced in the TIA-222-H Standard

The inventory together with the proposed Eversource antenna arrangement is summarized in the table below:

Antenna Type	***Carrier***	***Mount***	***Centerline Elevation***	***Cable***
(1) 4' Lightning Rod	Tower (existing)	*(1) 15' Pipe Mounted to Top of Tower*	197'	n/a
(1) PD440-2 Dipole Antenna	HGT-30 CSP-19 (existing)	(2) 4' Side Arm Mounts @ 175'	181'	(1) 7/8" coax cable
(1) OGT9-840 Omni Antenna	HGT-29 CSP-5 (existing)	*Mount Shared with HGT-28 (below)*	181'	(1) 1-5/8" coax cable
(1) 10 Foot Dish with Radome	HGT-27 CSP-1 (existing)	Pipe Mounted to Tower Leg	178'	(1) WEP65 Elliptical Cable
(1) DB225-A 2 Element Dipole	HGT-31 CSP-17 (existing)	Mounted to Tower Leg	177'	(1) 1/2" coax cable
(1) (Inverted) OGT9-840 Omni Antenna	HGT-24 CSP-6 (existing)	(1) 4' Side Arm Mount (Shared with HGT-24, 25, 26 / CSP 4, 6) @ 175'	177'	(1) 1-5/8" coax cable (1) 0.4" (dia) cable
(1) (inverted) OGT9-840 Omni Antenna	HGT-25 CSP-4 (existing)	(1) 4' Side Arm Mount (Shared with HGT-24, 25, 26 / CSP 4, 6) @ 175'	177'	(1) 1-5/8" coax cable
(1) DB-B1-6C-8AB-0Z Distribution Box	HGT-26 CSP (existing)	(1) 4' Side Arm Mount (Shared with HGT-24, 25, 26 / CSP 4, 6) @ 175'	177'	(1) 1-5/8 " coax cable (1) 1/2" (dia) cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) SE4192-SWBP4LDF (Dxx-E6461) Panel Antenna (1) 432E-83I-01T TTA Unit (2) (inverted) SC479-HF1LDF Omni Antennas (centerline Elevation appx 168')	CSP Troop D (existing)	(1) USF-2U Side Arm Mount Frame @ 175'	175'	(2) AVA7-50 1-5/8" Low Density Coaxial Cable (1) 1/2" coax cable
(1) (inverted) OGT9-840 Omni Antenna	HGT-28 CSP-7 (existing)	(2) 4' Side Arm Mounts	175'	(1) 1-5/8" coax cable
(1) 8 Foot Dish with Radome	HGT-23 CSP-3 (existing)	Pipe Mounted to Tower Leg	169'	(1) EW63 Elliptical Cable
(1) 8 Foot Dish with Radome	HGT-22 CSP-2 (existing)	Pipe Mounted to Tower Leg	168'	(1) EW63 Elliptical Cable
(1) Telewave ANT220F2 Omni Antenna	**Eversource (Proposed)**	**(1) SitePro USF-4U (Mount Centerline Install @ 154')**	**157'**	**(1) 7/8"**
(6) Powerwave 7770 Panel (2) KMW AM-X-CD-17-65-00T-RET Panel Antennas (Alpha & Gamma Sectors) (1) KMW AM-X-CD-16-65-00T-RET Panel Antennas (Beta Sector) (3) RRUS-11 RRH Units (3) Ericsson RRUS-12 RRH Units (1) DC6-48-60-18-8F Surge Protector (6) Powerwave LGP21401 TMA Units	AT&T HGT (existing)	(3) 13' Lightweight T-Arms (Valmont P/N 800942)	150'	(12) 1 5/8" coax cables (1) 3" Flex conduit containing (1) F.O. Cable and (2) DC Cables
(1) 8-Bay Dipole Antenna	HGT-17 CSP-20 (existing)	*Shared with Below Mount*	148'	(1) 7/8" coax cable
(1) PD200 Omni Antenna	HGT-15 CSP-9 (existing)	*Shared with below mount HGT-14/CSP#11*	140'	(1) 7/8" coax cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) 12’ Dipole Antenna	HGT-11 CSP (existing)	4’ Side Arm Mount	138’	(1) 0.4” (dia) Cable
(1) DB 420 (inverted) Dipole Antenna	HGT-16 CSP-12 (existing)	4’ Side Arm Mount	138’	(1) 7/8” coax cable
(1) DB224-A 4-Bay Dipole Antenna	HGT-13 CSP (existing)	1’ Side Arm Mount	138’	(1) 7/8” coax cable
(1) (inverted) 20’ 8-Bay Dipole Antenna	HGT-14 CSP#11 (existing)	(2) 4’ Side Arm Mounts	138’	(1) 7/8” coax cable
(1) Telewave ANT220F2 Omni Antenna	**Eversource (Proposed)**	**(1) SitePro USF-4U (Mount Centerline Install @ 131’)**	**134’**	**(1) 7/8”**
(1) DS9A09F36D-N Omni Antenna	HGT-9 CSP (existing)	Shared with below mount	116’	(2) 7/8” coax cables
(1) DB-B1-6C-8AB-0Z Distribution Box	HGT-10 CSP-24 (existing)	4’ Side Arm Mount	116’	(1) 7/8” coax cable (1) 1/2" coax cable
(1) PD458-1 4-Bay Dipole Antenna	HGT-8 CSP-14 (existing)	Pipe Mounted to Tower Face	105’	(1) 7/8” coax cable
(1) DB222 Dipole Antenna	HGT-7 CSP-13 (existing)	Pipe Mounted to Tower Face	100’	(1) 7/8” coax cable
(1) 15’ 1-Bay Dipole Antenna	HGT-6 CSP-15 (existing)	*Shared with below Mount (HGT-5/CSP-8)*	86’	(1) 7/8” coax cable
(1) DB 222 Omni Antenna	HGT-4 CSP-22 (existing)	*Pipe Mounted to Leg*	81’	(1) 1/2" coax cable
(1) (inverted) DB212-1 Omni Antenna	HGT-5 CSP-8 (existing)	4’ Side Arm Mount	81’	(1) 1/2" coax cable
(1) 8 Foot Dish with Radome	HGT-3 CSP-16 (existing)	Pipe Mounted to Tower Leg	79’	(1) EW63 Elliptical Cable

Antenna Type	*Carrier*	*Mount*	*Centerline Elevation*	*Cable*
(1) DB-803M-XT Omni antenna	HGT-2 CSP-21 (existing)	4’ Side Arm Mount	49’	(1) 1/2” coax cable

Notes: Antenna ID numbering (HTS-#) obtained from Tower Existing Inventory via tower climb, performed by Hightower Solutions, Inc on October 24, 2016. CSP numbering and elevations provided by CSP inventory obtained via e-mail dated October 11, 2017, with follow-up inventory update obtained via e-mail dated February 4, 2020. “HTS” elevations have been updated per Eastern Communications Inc tower climb.

This structural analysis of the communications tower was performed by AECOM, on behalf of Everosurce. The purpose of this analysis was to investigate the structural integrity of the modified tower and foundation for existing antenna loads and proposed antennas in compliance with the 2018 Connecticut State Building Code. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing antenna arrangements and proposed antennas.

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 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 8.0.7.4 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)
  - NOTE: The use of Google Earth Pro software (version 7.3.1.4505) along with Survey Topographic Maps were used in determining the applied crest height for tower location.
    - Crest Height used for analysis: → **110 feet**
- **Exposure Class B** – (Urban/suburban areas, **Wooded areas** closely spaced obstructions – Wind speed-up disruptions)
- 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.
    - Due to tnxTower program options for TIA-222-H, the program appears to perform tower analysis with speeds according to ASCE 7-16 V.ult loads, therefore, V.ult speeds are to be used.
  - (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 Thompson, 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 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 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 = 0.172 (2018 CT State Building Code – Location Specific Value)
- S.1 = 0.063 (2018 CT State Building Code – Location Specific Value)
- Site Classification = “D”
- Seismic Design Category = “A” – (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)

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 that the existing tower structure did not have enough capacity to support the proposed loading conditions. The tower structure require modifications shown on SK-1 through SK-2. **Once the modifications indicated on sheets SK-1 through SK-2 are performed, the modified structure and foundation are considered structurally adequate with the wind load classification specified with the existing and proposed antenna loading noted herein. The controlling structural capacity for all tower and foundation components for the proposed antenna loading after modifications are installed is 87.6 %.**

Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail
Leg (T4)	HSS 5.0x0.25 / Compression / 100' – 125'	87.6	**Pass**
Diagonal (T11)	(2) L3x3-1/2x5/16" (3/8" gap) / Compression / 0' – 25'	74.4	**Pass**
Horizontal (T10)	L3x3x1/4 / Compression / 25' – 37.5'	82.6	**Pass**
Top Girt (T1)	L3x3x1/4 / Compression / 175' – 180'	1.5	**Pass**
Redundant Horizontal Bracing (T11)	L3x3x1/4 / Compression / 0' – 25'	19.0	**Pass**
Redundant Diagonal Bracing (T11)	L3x3x1/4 / Compression / 0' – 25'	26.2	**Pass**
Inner Bracing (T8)	L2-1/2x2-1/2x3/16 / Compression / 50' – 75'	0.6	**Pass**
Bolt Checks(T10)	(2) 0.625" Diameter A325X Bolt / Member Block Shear / 37.5'	76.9	**Pass**

Foundation Summary

Component	Required	Computed	% Capacity	Pass/Fail
Anchor Rod Capacity (TIA-222-H – 4.9.9)	Ratio < 1.0	0.82	82.0	**Pass**
Foundation – Spread Foot (6'x6') Uplift Capacity	384.59 kip (Factored Resistance)	313.641	82.0	**Pass**
Foundation – Rock Anchorage – Bonded Embedment Length	15 feet (installed)	8.95 feet (calculated)	52.0	**Pass**
Foundation – Bearing on Rock Capacity	30.000 ksf (Factored Resistance)	12.689 ksf	42.3	**Pass**

Maximum Structure Rating (from all components) =	**87.6 %**	**Pass**

4. FINDINGS AND EVALUATION (cont.)

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.

Load Case Description	Current		Allowable	
	Sway (degree)	Displacement (Feet)	Sway (degree)	Displacement (Feet)
Service Wind Load	0.120	0.228	4.0	5.97

5. CONCLUSIONS

The results of an initial analysis indicated the existing tower structure did not have enough capacity for the proposed loading conditions above. The tower structure requires modifications shown on SK-1 through SK-2. **Once the modifications indicated on sheets SK-1 through SK-2 are performed, the modified structure is considered structurally adequate with the wind load specification specified above with the existing and proposed antenna loading herein. The controlling structural capacity for all tower and foundation components for the proposed antenna loading after modifications are installed is 87.6 %.**

Limitations/Assumptions:

This report is based on the following:

A. Tower inventory as listed in this report.

B. Tower is properly installed and maintained.

C. All members are as specified in the original design documents and are in good condition.

D. All required members are in place.

E. All bolts are in place and are properly tightened.

F. Tower is in plumb condition.

G. All member protective coatings are in good condition.

H. All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.

I. 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 owner shall refer to TIA-222-H Section 14.2 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

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND NOTES IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION AND ELECTRICAL SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING OPERATING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS AND THE TOWER OWNER. THERE SHALL BE NO INTERRUPTION OF OPERATION WITHOUT TIMELY COORDINATION WITH AND APPROVAL BY THE VARIOUS COMMUNICATIONS OPERATORS INCLUDING THE CONNECTICUT STATE POLICE.
8. 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.
9. 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.
10. 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 FROM THIS SHALL REQUIRE EXPRESSED WRITTEN PERMISSION FROM THE ENGINEER AND CONNECTICUT STATE POLICE.
11. 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.
12. 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.
13. 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.
14. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT ANY DISCREPANCIES FROM THE DRAWINGS TO THE ARCHITECT.
15. 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.
16. CONTRACTOR SHALL COMPLY WITH OWNER ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
17. DIMENSIONS OF EXISTING TOWER ARE BASED ON MANUFACTURER'S DRAWINGS PREPARED BY STAINLESS INC., DATED DECEMBER 1993, 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.
18. TOWER INVENTORY IS BASED ON INFORMATION OBTAINED BY CONNECTICUT STATE POLICE DATED OCTOBER 11, 2017. TOWER MAPPING AND EXISTING INVENTORY OBTAINED FROM HIGH TOWER SOLUTIONS, INC. DATED OCTOBER 24, 2016.
19. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK.
20. 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 TO BE PROVIDED:

ANGLE	A529-50
STRUCTURAL PLATES	A36
ROUND HSS TUBE	ASTM A501 Gr. 50

STRUCTURAL STEEL SHALL CONFORM TO ALL THE REQUIREMENTS OF THE ASTM SPECIFICATION, AS REFERENCED IN THE CODE.

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

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

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

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

CONNECTIONS / FIELD ASSEMBLY:

BOLTED CONNECTIONS: UNLESS OTHERWISE NOTED, ALL JOINTS ARE SLIP CRITICAL TYPE, REQUIRING 5/8" & 1" DIA. A325-X 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.

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

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

STATE OF CONNECTICUT
RICHARD A. SAMPSON
NO. 9057
REGISTERED
PROFESSIONAL ENGINEER

PROJECT NO.	60619086
Designed by:	CMC
Drawn by:	GAT
Checked by:	DJR
Approved by:	RAS

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

EVERSOURCE

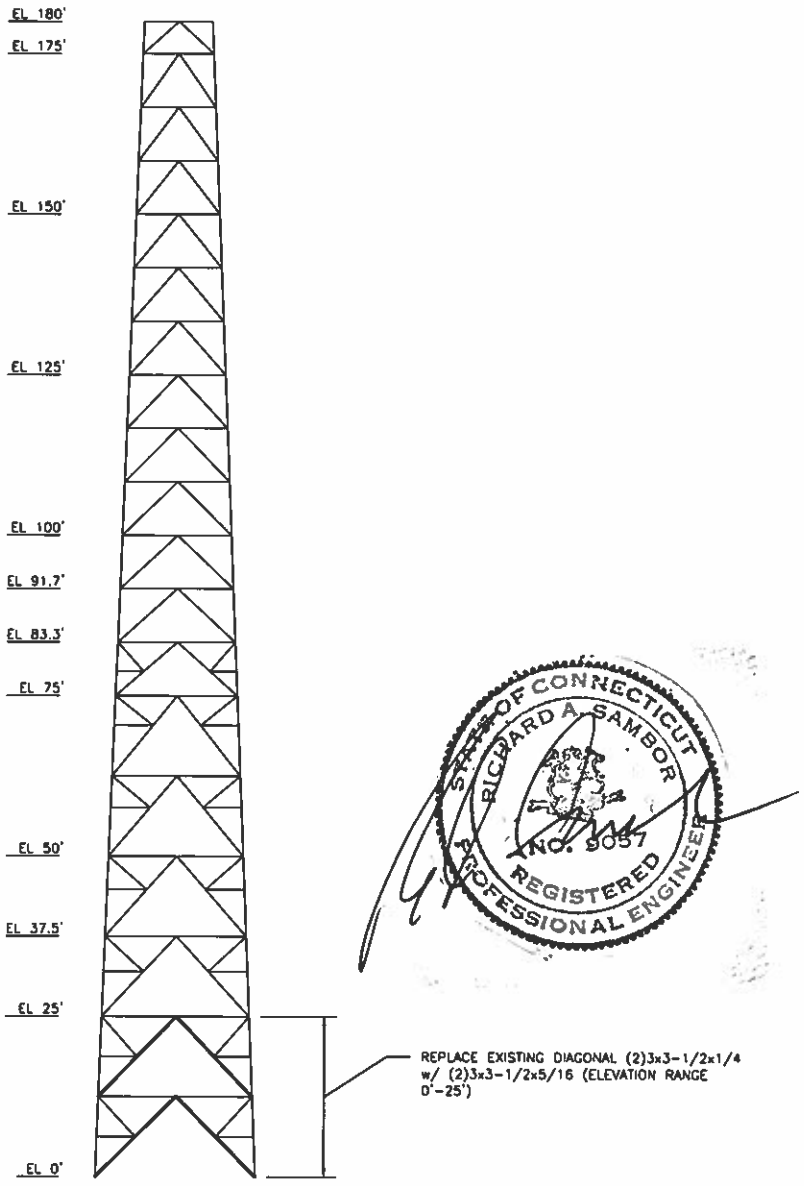
SITE ADDRESS: CSP TOWER #62
97 MOUNTAIN HILL ROAD
THOMPSON, CONNECTICUT

REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 11/25/20
Job No. | File No.

Dwg. No. SK-1

NOTES:
1. REFER TO STRUCTURAL NOTES ON SK-1 FOR STEEL GRADE REQUIREMENTS FOR REPLACEMENT MEMBERS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING TOWER INFORMATION AND ANGLE MEMBER ORIENTATION PRIOR TO ORDERING MATERIALS.
3. REINFORCEMENT OF TOWER IS REQUIRED FOR ALL 3 SIDES OF EXISTING TOWER STRUCTURE.
4. MEMBERS INDICATED FOR REPLACEMENT/INSTALLATION SHALL HAVE A MINIMUM OF 50 KSI (YIELD STRENGTH). COORDINATE WITH STRUCTURAL NOTES ON SK-1.
5. CONTRACTOR SHALL ASSESS U-BOLTS INDICATED TO BE INSTALLED AT ENDS OF 25' ELEVATION POINTS AND ADJUST WHERE REQUIRED. CONTRACTOR SHALL SUBMIT PROPOSED RE-LOCATIONS OF U-BOLTS PRIOR TO ORDERING OF MATERIALS RELATED TO THIS INSTALL. REUSE OF EXISTING U-BOLTS SHALL NOT BE PERMITTED.



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

PROJECT NO. 60619086	AECOM	EVERSOURCE
Designed by: CMC	500 ENTERPRISE DRIVE	
Drawn by: CAT	ROCKY HILL, CONNECTICUT	CSP TOWER #62
Checked by: DJR	(860)-529-8882	SITE ADDRESS: 97 MOUNTAIN HILL ROAD THOMPSON, CONNECTICUT
Approved by: RAS		

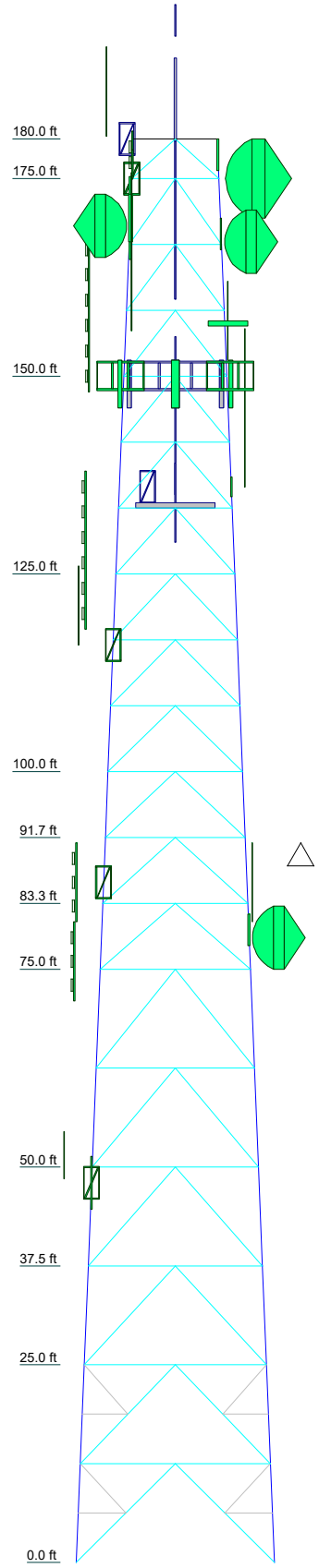
REV.	DATE:	DESCRIPTION

Scale: AS NOTED | Date: 11/25/20 | Job No. | File No. | Dwg. 2 of 2

Dwg. No. SK-2

TNX TOWER INPUT / OUTPUT SUMMARY

Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	HSS6.875x.5		A572-60	HSS6.875x.375		HSS5x.375			HSS5x.25		
Leg Grade								A572-50			
Diagonals	2L3x3 1/2x5/16x3/8		2L3 1/2x3x3/8x3/8					2L3x2 1/2x1/4x3/8		2L2 1/2x2x3/16x3/8	
Diagonal Grade	A529-50							A36			
Top Girts								N.A.			A
Horizontals	L4x4x1/2		L4x4x1/4		L3x4x1/2	L3x4x1/4			L3x3x1/4		N.A.
Red. Horizontals	L3x3x1/4						N.A.				
Red. Diagonals	L3x3x1/4						N.A.				
Inner Bracing	L3x3x1/4							L2 1/2x2 1/2x3/16			
Face Width (ft) 25	23	22	21	19	18.3333	17.6667	17	15	13	11	10.6
# Panels @ (ft)		6 @ 12.5					12 @ 8.33333				1 @ 5
Weight (lb) 35773.2	8143.2	3385.5	3327.0	5810.4	1805.6	1485.7	1458.0	3678.8	3454.1	2596.2	628.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
OGT9-840 (HGT-29 / CSP#5)	181	Ericsson RRUS-12 RRH Unit (ATI)	149
PD440-2 (HGT-30 / CSP-19)	181	Ericsson RRUS-12 RRH Unit (ATI)	149
Pirod 4' Side Mount Standoff (1) (HGT-30 / CSP#19)	180	Ericsson RRUS-12 RRH Unit (ATI)	149
Pirod 4' Side Mount Standoff (1) (HGT-30 / CSP#19)	180	RRUS-11 (ATI)	149
432E-83I-01T TTA Unit (CSP - Troop D)	180	RRUS-11 (ATI)	149
10'6"x4" Pipe Mount (Tower)	180	RRUS-11 (ATI)	149
Lightning Rod 5/8x4' (Tower)	180	20' 8 Bay Di-Pole (HGT-17 / CSP#20)	148
4'x4" Pipe Mount (HGT-27 / CSP#1)	178	(2) LPG21401 TMA (ATI)	147
DB225-A (HGT-31 / CSP#-17)	178	(2) LPG21401 TMA (ATI)	147
OGT9-840 (HGT-24 / CSP#6)	177	(2) LPG21401 TMA (ATI)	147
OGT9-840 (HGT-25 / CSP#4)	177	Pirod 4' Side Mount Standoff (1) (Shared HGT-1617 / CSP#12,#20)	143
DB-B1-6C-8AB-0Z Dist. Box (HGT-26)	177	PD200 (HGT-15 / CSP#9)	140
Pirod 4' Side Mount Standoff (1) (Shared HGT-24,25,26 / CSP# 4,6)	177	Pirod 4' Side Mount Standoff (1) (HGT-11 / CSP)	138
3'4"x4" Pipe Mount (CSP - Troop D)	177	(inverted) DB420 (HGT-16 / CSP#12)	138
(inverted) OGT9-840 (HGT-28 / CSP#7)	175	12' Dipole (HGT-11 / CSP)	138
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP# 5,7)	175	(inverted) 20' 8 Bay Di-Pole (HGT-14 / CSP#11)	136
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP# 5,7)	175	Pirod 4' Side Mount Standoff (1) (Shared HGT-1415 / CSP#11,#9)	136
USF-2U w/ TAM-II adapter with 8' 2-3/8" Pipe (CSP - Troop D)	175	2'6"x4" Pipe Mount (HGT-13 / CSP)	136
10 FT DISH (HGT-27 / CSP#1)	175	Pirod 4' Side Mount Standoff (1) (Shared HGT-1415 / CSP#11,#9)	136
(inverted) SC479-HF1LDF (CSP - Troop D)	173	DB224-A (HGT-13 / CSP)	136
(inverted) SC479-HF1LDF (CSP - Troop D)	173	ANT220F2 w/clamps (Eversource - Proposed)	134
10'6"x4" Pipe Mount (CSP - Troop D)	170	Site Pro USF-4U w/ (2) Stiff-Arm Supports (Eversource - Proposed)	134
SE4192-SWBP4LDF(Dxx-E6461) Panel Anenna (CSP - Troop D)	170	Pirod 4' Side Mount Standoff (1) (HGT-9,10 / CSP#24)	116
4'x4" Pipe Mount (HGT-23 / CSP#3)	169	DS9A09F36D-N 19 ft Omni w/ Mount Pipe (HGT-9 / CSP)	116
8 FT DISH (HGT-23 / CSP#3)	169	DB-B1-6C-8AB-0Z Dist. Box (HGT-10 / CSP#24)	116
4'x4" Pipe Mount (HGT-22 / CSP#2)	168	PD458-1 (HGT-8 / CSP#14 (Twr Face Mt.))	105
8 FT DISH (HGT-22 / CSP#2)	167	DB222 (HGT-7 / CSP#13 (Twr Face Mt.))	100
ANT220F2 w/clamps (Eversource - Proposed)	157	Pirod 4' Side Mount Standoff (1) (Shared HGT-56 / CSP#8,15)	86
Site Pro USF-4U w/ (2) Stiff-Arm Supports (Eversource - Proposed)	157	DB212-1 (HGT-6/CSP#15)	86
Valmont 13' Lightweight T-Frame (ATI)	150	DB222 (HGT-4/CSP#22)	81
Valmont 13' Lightweight T-Frame (ATI)	150	(inverted) DB212-1 (HGT-5/CSP#8)	81
Valmont 13' Lightweight T-Frame (ATI)	150	4'x4" Pipe Mount (Shared HGT-34/CSP#16,#22)	80
DC6-48-60-18-8F (ATI)	150	8 FT DISH (HGT-3/CSP#16)	79
(2) 7770.00 panel antenna (ATI)	149	DB803M-XT (HGT-2/CSP#21)	49
(2) 7770.00 panel antenna (ATI)	149	Pirod 4' Side Mount Standoff (1) (Shared HGT-12 / CSP#23,21)	48
(2) 7770.00 panel antenna (ATI)	149	6'8"x4" Pipe Mount (Shared HGT-12 / CSP#23,21)	48
AM-X-CD-17-65-00T (ATI)	149		
AM-X-CD-17-65-00T (ATI)	149		
AM-X-CD-16-65-00T (ATI)	149		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L3x3x1/4		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi	A529-50	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 3 with Crest Height of 110.00 ft
8. "H" is based on the Difference between the Base Base Elevation above the Average Elevation within a 2 mile radius.
9. Elevations are based on Average elevations from Google Earth Measures measured from 0.5, 1.0, 1.5 _2.0 Mile Radius distances from tower base
10. Average El = 430 feet; Tower Base Elevation = 540 feet "H" = 110ft
11. Updates to elevations previously climbed by High Tower (2016) have been adjusted per January 2020 tower climb from Eastern Communications Inc.

AECOM
1255 Broad St. Suite 201
Clifton, NJ 07013
Phone: (973) 883-8663
FAX: (973) 883-8500

Job:	***180' Stainless, Inc. Self Supportting Lattice***		
Project:	***97 Mountain Hill Road, Thompson, CT--CSP***		
Client: Eversource Phase (b.2) rev. 3	Drawn by: christina.carlos		App'd:
Code: TIA-222-H	Date: 11/25/20		Scale: NTS
Path:			Dwg No. E-1

Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	HSS6.875x.5		A572-60	HSS6.875x.375		HSS5x.375			HSS5x.25		
Leg Grade									A572-50		
Diagonals	2L3x3 1/2x5/16x3/8		2L3 1/2x3x3/8x3/8					2L3x2 1/2x1/4x3/8		2L2 1/2x2x3/16x3/8	
Diagonal Grade	A529-50							A36			
Top Girts								N.A.			A
Horizontals	L4x4x1/2		L4x4x1/4		L3x4x1/2	L3x4x1/4			L3x3x1/4		N.A.
Red. Horizontals	L3x3x1/4						N.A.				
Red. Diagonals	L3x3x1/4						N.A.				
Inner Bracing	L3x3x1/4							L2 1/2x2 1/2x3/16			
Face Width (ft) 25	23	22	21	19	18.3333	17.6667	17	15	13	11	10.6
# Panels @ (ft)	6 @ 12.5				12 @ 8.33333						1 @ 5
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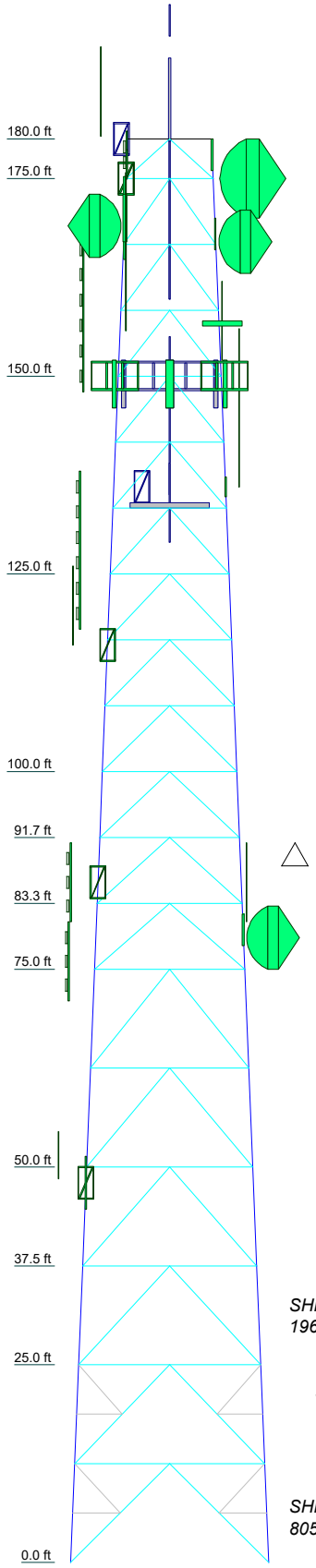

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L3x3x1/4		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi	A529-50	50 ksi	65 ksi

TOWER DESIGN NOTES

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6. Tower Risk Category III.
7. Topographic Category 3 with Crest Height of 110.00 ft
8. "H" is based on the Difference between the Base Base Elevation above the Average Elevation within a 2 mile radius.
9. Elevations are based on Average elevations from Google Earth Measures measured from 0.5, 1.0, 1.5 _2.0 Mile Radius distances from tower base
10. Average El = 430 feet; Tower Base Elevation = 540 feet "H" = 110ft
11. Updates to elevations previously climbed by High Tower (2016) have been adjusted per January 2020 tower climb from Eastern Communications Inc.
12. TOWER RATING: 87.6%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 362710 lb
SHEAR: 45184 lb

UPLIFT: -313641 lb
SHEAR: 39877 lb

AXIAL 133198 lb
SHEAR 19686 lb *MOMENT 1844 kip-ft*
TORQUE 41 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 53662 lb
SHEAR 80590 lb *MOMENT 7466 kip-ft*
TORQUE 122 kip-ft
REACTIONS - 140 mph WIND

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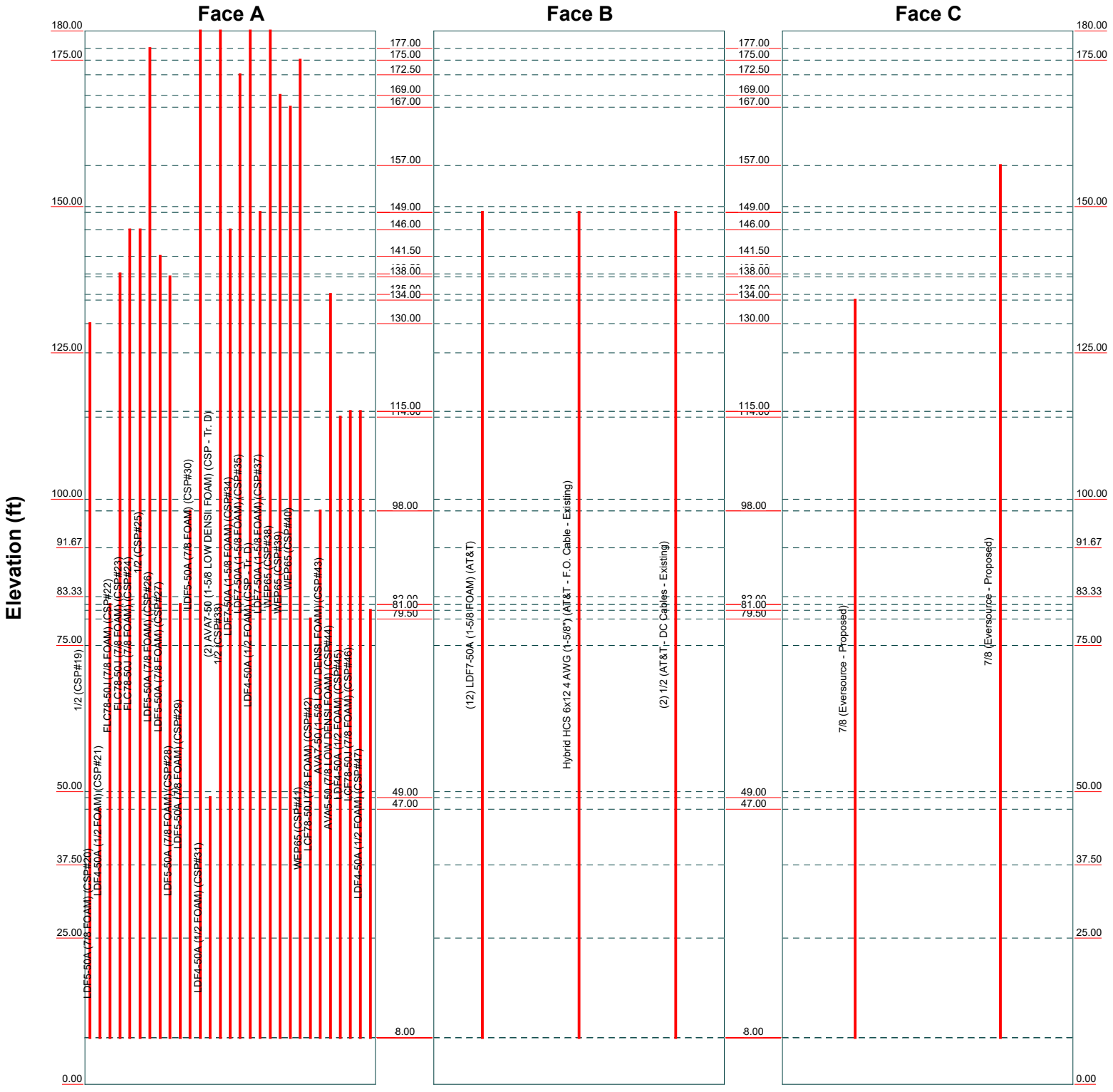
Project:	***97 Mountain Hill Road, Thompson, CT--CSP***		
Client: Eversource Phase (b.2) rev. 3	Drawn by: christina.carlos	App'd:	
Code: TIA-222-H	Date: 11/25/20	Scale: NTS	
Path:		Dwg No. E-1	

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 180'

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



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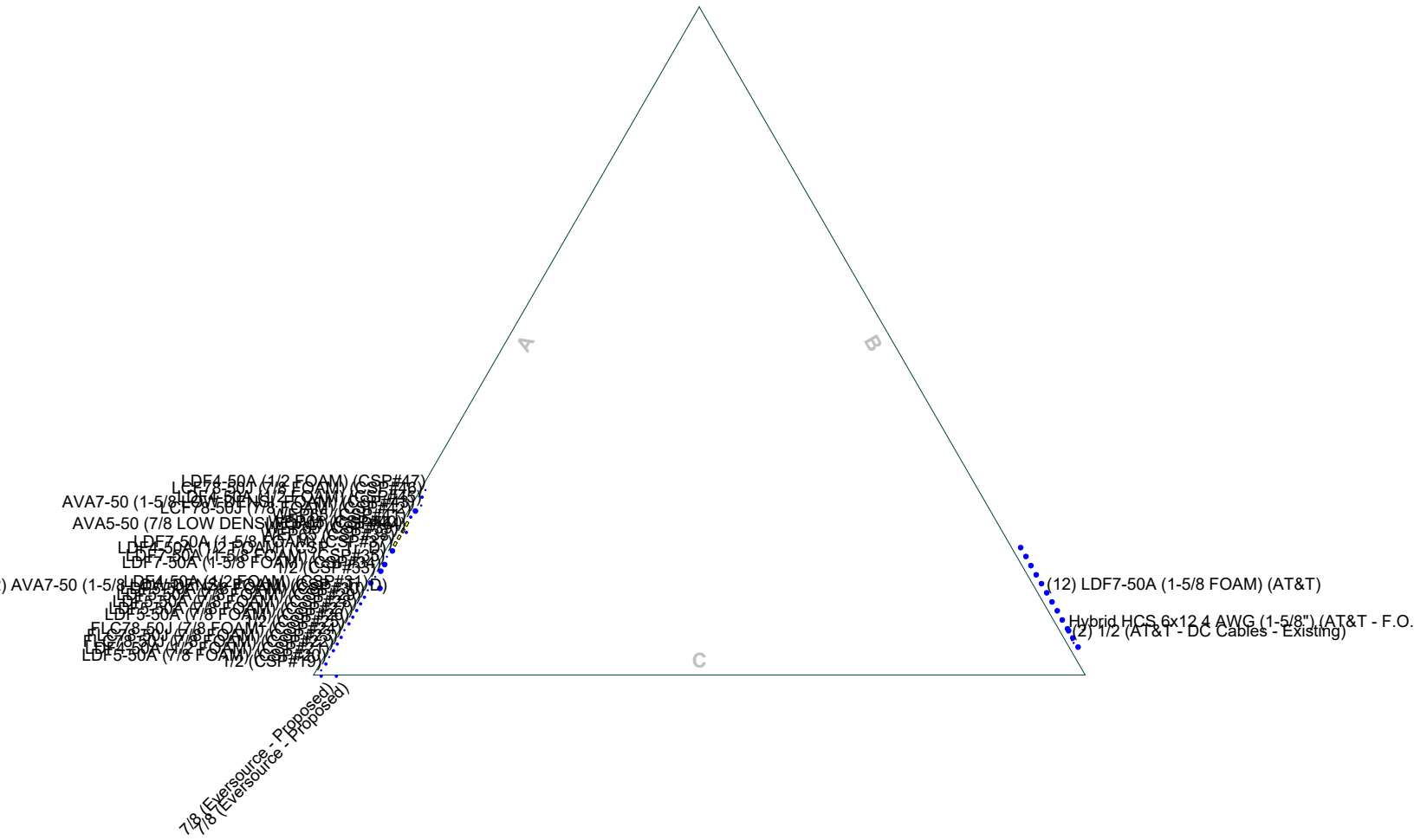
Client: Eversource Phase (b.2) rev. 3	Drawn by: christina.carlos	App'd:	
Code: TIA-222-H	Date: 11/25/20	Scale: NTS	
Path:		Dwg No. E-7	

TNX TOWER FEEDLINE PLAN

Feed Line Plan

Round Flat App In Face App Out Face



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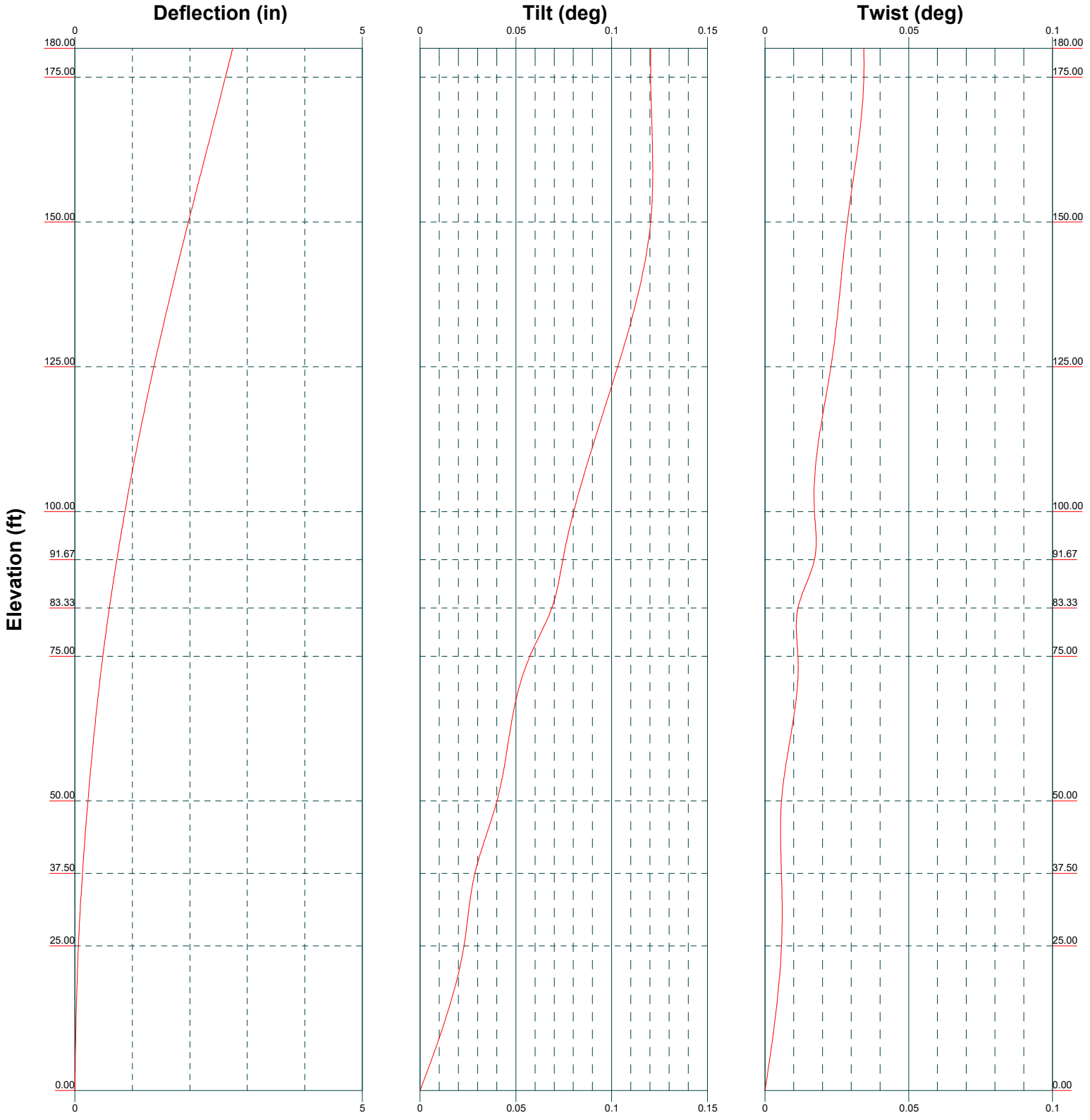
Job: ***180' Stainless, Inc. Self Supportting Lattice***			
Project: ***97 Mountain Hill Road, Thompson, CT--CSP***			
Client: Eversource Phase (b.2) rev. 3	Drawn by: christina.carlos	App'd:	
Code: TIA-222-H	Date: 11/25/20	Scale: NTS	
Path:		Dwg No. E-7	

TNX TOWER DEFLECTION, TILT, AND TWIST

TIA-222-H - Service - 60 mph

Maximum Values



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Project: ***97 Mountain Hill Road, Thompson, CT--CSP***			
Client: Eversource Phase (b.2) rev. 3	Drawn by: christina.carlos	App'd:	
Code: TIA-222-H	Date: 11/25/20	Scale: NTS	
Path:		Dwg No. E-5	

TNX TOWER DETAILED OUTPUT

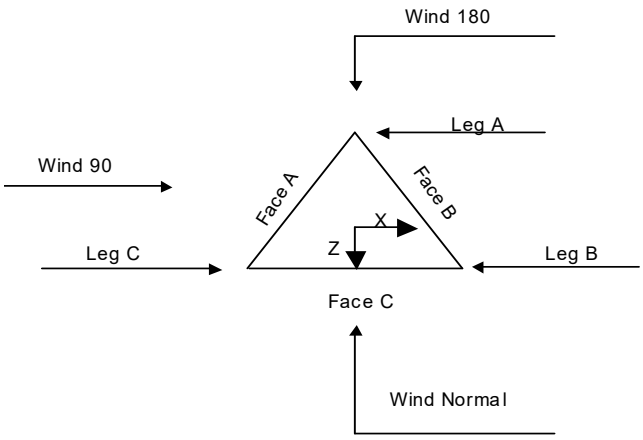
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 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 10.60 ft at the top and 25.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Windham County, Connecticut.
Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 140 mph.
Risk Category III.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 3.
Crest Height: 110.00 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.
"H" is based on the Difference between the Base Base Elevation above the Average Elevation within a 2 mile radius..
Elevations are based on Average elevations from Google Earth Measures measured from 0.5, 1.0, 1.5 & 2.0 Mile Radius distances from tower base.
Average El = 430 feet; Tower Base Elevation = 540 feet "H" = 110ft.
Updates to elevations previously climbed by High Tower (2016) have been adjusted per January 2020 tower climb from Eastern Communications Inc..
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

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r	√	All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
√	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-175.00			10.60	1	5.00
T2	175.00-150.00			11.00	1	25.00
T3	150.00-125.00			13.00	1	25.00
T4	125.00-100.00			15.00	1	25.00
T5	100.00-91.67			17.00	1	8.33
T6	91.67-83.33			17.67	1	8.33
T7	83.33-75.00			18.33	1	8.33
T8	75.00-50.00			19.00	1	25.00
T9	50.00-37.50			21.00	1	12.50
T10	37.50-25.00			22.00	1	12.50
T11	25.00-0.00			23.00	1	25.00

Tower Section Geometry *(cont'd)*

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

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180.00-175.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	175.00-150.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	150.00-125.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	125.00-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	100.00-91.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T6	91.67-83.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T7	83.33-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	75.00-50.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T9	50.00-37.50	12.50	K Brace Down	No	Yes	0.0000	0.0000
T10	37.50-25.00	12.50	K Brace Down	No	Yes	0.0000	0.0000
T11	25.00-0.00	12.50	K1 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 180.00-175.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T2 175.00-150.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16x3/8	A36 (36 ksi)
T3 150.00-125.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T4 125.00-100.00	Pipe	HSS5x.25	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T5 100.00-91.67	Pipe	HSS5x.375	A572-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T6 91.67-83.33	Pipe	HSS5x.375	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T7 83.33-75.00	Pipe	HSS5x.375	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4x3/8	A36 (36 ksi)
T8 75.00-50.00	Pipe	HSS6.875x.375	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T9 50.00-37.50	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T10 37.50-25.00	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x3/8x3/8	A36 (36 ksi)
T11 25.00-0.00	Pipe	HSS6.875x.5	A572-60 (60 ksi)	Double Angle	2L3x3 1/2x5/16x3/8	A529-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180.00-175.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T2 175.00-150.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T3 150.00-125.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 125.00-100.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T5 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T6 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/4	A36 (36 ksi)
T7 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x4x1/2	A36 (36 ksi)
T8 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T9 50.00-37.50	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T10 37.50-25.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)
T11 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 180.00-175.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 175.00-150.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 150.00-125.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 125.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 100.00-91.67	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 91.67-83.33	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 83.33-75.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 75.00-50.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 50.00-37.50	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T10 37.50-25.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 25.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T11 25.00-0.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/4	1
		Diagonal (1)	Equal Angle	L3x3x1/4	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180.00-175.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T2 175.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T3 150.00-125.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T4 125.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T5 100.00-91.67	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T6 91.67-83.33	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T7 83.33-75.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T8 75.00-50.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T9 50.00-37.50	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T10 37.50-25.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T11 25.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
180.00-175.00				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
175.00-150.00				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
150.00-125.00				1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1
125.00-100.00				1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1
100.00-91.67				1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1
91.67-83.33				1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T7	No	No	1	1	1	1	1	1	1	1
83.33-75.00				1	1	1	1	1	1	1
T8	No	No	1	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1
T9	No	No	1	1	1	1	1	1	1	1
50.00-37.50				1	1	1	1	1	1	1
T10	No	No	1	1	1	1	1	1	1	1
37.50-25.00				1	1	1	1	1	1	1
T11	No	No	1	1	1	1	1	1	1	1
25.00-0.00				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
180.00-175.00														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
175.00-150.00														
T3	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
150.00-125.00														
T4	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
125.00-100.00														
T5	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-91.67														
T6 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 83.33-75.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 75.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 50.00-37.50	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
37.50-25.00														
T11 25.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1	Flange	0.7500	0	1.0000	1	0.6250	0	0.6250	0	0.6250	0	0.6250	2	0.6250	0
180.00-175.00		A325X		A325X		A325N		A325N		A325N		A325X		A325N	

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.
T2 175.00-150.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 150.00-125.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 125.00-100.00	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 100.00-91.67	Flange	0.7500 A325X	6	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 91.67-83.33	Flange	0.7500 A325X	0	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 83.33-75.00	Flange	0.7500 A325X	0	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 75.00-50.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 50.00-37.50	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T10 37.50-25.00	Flange	1.0000 A325X	0	1.0000 A325X	1	0.6250 A325X	2	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T11 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

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
*** Hightower Inc Climb Report													
1/2 (CSP#19)	A	No	No	Ar (CaAa)	130.00 - 8.00	-1.5000	-0.49	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (CSP#20)	A	No	No	Ar (CaAa)	47.00 - 8.00	-1.5000	-0.48	1	1	1.0900	1.0900		0.33
LDF4-50A (1/2 FOAM) (CSP#21)	A	No	No	Ar (CaAa)	82.00 - 8.00	-1.5000	-0.47	1	1	0.6300	0.6300		0.15
FLC78-50J (7/8 FOAM) (CSP#22)	A	No	No	Ar (CaAa)	138.50 - 8.00	-1.5000	-0.46	1	1	1.1200	1.1200		0.40
FLC78-50J (7/8 FOAM) (CSP#23)	A	No	No	Ar (CaAa)	146.00 - 8.00	-1.5000	-0.45	1	1	1.1200	1.1200		0.40
FLC78-50J (7/8 FOAM) (CSP#24)	A	No	No	Ar (CaAa)	146.00 - 8.00	-1.5000	-0.44	1	1	1.1200	1.1200		0.40
1/2 (CSP#25)	A	No	No	Ar (CaAa)	177.00 - 8.00	-1.5000	-0.43	1	1	0.5800	0.5800		0.25
LDF5-50A (7/8 FOAM) (CSP#26)	A	No	No	Ar (CaAa)	141.50 - 8.00	-1.5000	-0.42	1	1	1.0900	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	No	No	Ar (CaAa)	138.00 - 8.00	-1.5000	-0.41	1	1	1.0900	1.0900		0.33

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
(CSP#27) LDF5-50A (7/8 FOAM)	A	No	No	Ar (CaAa)	82.00 - 8.00	-1.5000	-0.4	1	1	1.0900	1.0900		0.33
(CSP#28) LDF5-50A (7/8 FOAM)	A	No	No	Ar (CaAa)	98.00 - 8.00	-1.5000	-0.39	1	1	1.0900	1.0900		0.33
(CSP#29) LDF5-50A (7/8 FOAM)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.38	1	1	1.0900	1.0900		0.33
(CSP#30) LDF4-50A (1/2 FOAM)	A	No	No	Ar (CaAa)	49.00 - 8.00	-1.5000	-0.37	1	1	0.6300	0.6300		0.15
(CSP#31) AVA7-50 (1-5/8 LOW DENSI. FOAM)	A	No	No	Ar (CaAa)	180.00 - 8.00	-4.5000	-0.36	2	1	1.9800	1.9800		0.72
(CSP - Tr. D) 1/2	A	No	No	Ar (CaAa)	146.00 - 8.00	-1.5000	-0.35	1	1	0.5800	0.5800		0.25
(CSP#33) LDF7-50A (1-5/8 FOAM)	A	No	No	Ar (CaAa)	172.50 - 8.00	-1.5000	-0.34	1	1	1.9800	1.9800		0.82
(CSP#34) LDF7-50A (1-5/8 FOAM)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.33	1	1	1.9800	1.9800		0.82
(CSP#35) LDF4-50A (1/2 FOAM)	A	No	No	Ar (CaAa)	149.00 - 8.00	-1.5000	-0.32	1	1	0.6300	0.6300		0.15
(CSP - Tr. D) LDF7-50A (1-5/8 FOAM)	A	No	No	Ar (CaAa)	180.00 - 8.00	-1.5000	-0.31	1	1	1.9800	1.9800		0.82
(CSP#37) WEP65	A	No	No	Af (CaAa)	169.00 - 8.00	-1.5000	-0.3	1	1	1.5836	1.5836		0.53
(CSP#38) WEP65	A	No	No	Af (CaAa)	167.00 - 8.00	-1.5000	-0.29	1	1	1.5836	1.5836		0.53
(CSP#39) WEP65	A	No	No	Af (CaAa)	175.00 - 8.00	-1.5000	-0.28	1	1	1.5836	1.5836		0.53
(CSP#40) WEP65	A	No	No	Af (CaAa)	79.50 - 8.00	-1.5000	-0.27	1	1	1.5836	1.5836		0.53
(CSP#41) LCF78-50J (7/8 FOAM)	A	No	No	Ar (CaAa)	98.00 - 8.00	-1.5000	-0.26	1	1	1.1000	1.1000		0.53
(CSP#42) AVA7-50 (1-5/8 LOW DENSI. FOAM)	A	No	No	Ar (CaAa)	135.00 - 8.00	-1.5000	-0.25	1	1	1.9800	1.9800		0.72
(CSP#43) AVA5-50 (7/8 LOW DENSI.FOAM)	A	No	No	Ar (CaAa)	114.00 - 8.00	-3.0000	-0.28	1	1	1.1000	1.1000		0.30
(CSP#44) LDF4-50A (1/2 FOAM)	A	No	No	Ar (CaAa)	115.00 - 8.00	-3.0000	-0.24	1	1	0.6300	0.6300		0.15
(CSP#45) LCF78-50J (7/8 FOAM)	A	No	No	Ar (CaAa)	115.00 - 8.00	-1.5000	-0.23	1	1	1.1000	1.1000		0.53
(CSP#46) LDF4-50A	A	No	No	Ar (CaAa)	81.00 - 8.00	-1.5000	-0.22	1	1	0.6300	0.6300		0.15

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 FOAM) (CSP#47) *** Hightower Inc Climb Report *** T-Mobile Additions LDF7-50A (1-5/8 FOAM) (AT&T)	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.39	12	12	1.9800	1.9800		0.82
Hybrid HCS 6x12 4 AWG (1-5/8") (AT&T - F.O. Cable - Existing)	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.44	1	1	1.9900	1.9900		2.59
1/2 (AT&T - DC Cables - Existing) **Eversource Proposed Cables**	B	No	No	Ar (CaAa)	149.00 - 8.00	2.0000	0.455	2	2	0.5800	0.5800		0.25
7/8 (Eversource - Proposed)	C	No	No	Ar (CaAa)	134.00 - 8.00	0.0000	0.47	1	1	1.1100	1.1100		0.54
7/8 (Eversource - Proposed) **	C	No	No	Ar (CaAa)	157.00 - 8.00	0.0000	0.49	1	1	1.1100	1.1100		0.54

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf
*** Hightower Inc Climb Report **								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-175.00	A	0.000	0.000	4.621	0.000	17.55
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	175.00-150.00	A	0.000	0.000	44.530	0.000	142.28

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.777	0.000	3.78
T3	150.00-125.00	A	0.000	0.000	63.151	0.000	200.98
		B	0.000	0.000	64.584	0.000	310.37
		C	0.000	0.000	3.774	0.000	18.36
T4	125.00-100.00	A	0.000	0.000	76.130	0.000	246.90
		B	0.000	0.000	67.275	0.000	323.30
		C	0.000	0.000	5.550	0.000	27.00
T5	100.00-91.67	A	0.000	0.000	27.744	0.000	91.11
		B	0.000	0.000	22.425	0.000	107.77
		C	0.000	0.000	1.850	0.000	9.00
T6	91.67-83.33	A	0.000	0.000	28.182	0.000	92.83
		B	0.000	0.000	22.425	0.000	107.77
		C	0.000	0.000	1.850	0.000	9.00
T7	83.33-75.00	A	0.000	0.000	30.951	0.000	99.48
		B	0.000	0.000	22.425	0.000	107.77
		C	0.000	0.000	1.850	0.000	9.00
T8	75.00-50.00	A	0.000	0.000	97.018	0.000	307.50
		B	0.000	0.000	67.275	0.000	323.30
		C	0.000	0.000	5.550	0.000	27.00
T9	50.00-37.50	A	0.000	0.000	50.269	0.000	158.61
		B	0.000	0.000	33.638	0.000	161.65
		C	0.000	0.000	2.775	0.000	13.50
T10	37.50-25.00	A	0.000	0.000	50.659	0.000	159.75
		B	0.000	0.000	33.638	0.000	161.65
		C	0.000	0.000	2.775	0.000	13.50
T11	25.00-0.00	A	0.000	0.000	68.896	0.000	217.26
		B	0.000	0.000	45.747	0.000	219.84
		C	0.000	0.000	3.774	0.000	18.36

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	180.00-175.00	A	1.379	0.000	0.000	13.518	0.000	158.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	175.00-150.00	A	1.372	0.000	0.000	115.881	0.000	1351.65
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	2.698	0.000	32.91
T3	150.00-125.00	A	1.363	0.000	0.000	178.080	0.000	2057.34
		B		0.000	0.000	173.464	0.000	2285.57
		C		0.000	0.000	13.039	0.000	158.30
T4	125.00-100.00	A	1.356	0.000	0.000	224.148	0.000	2582.62
		B		0.000	0.000	180.550	0.000	2372.16
		C		0.000	0.000	19.107	0.000	231.19
T5	100.00-91.67	A	1.353	0.000	0.000	83.226	0.000	958.18
		B		0.000	0.000	60.167	0.000	789.71
		C		0.000	0.000	6.361	0.000	76.88
T6	91.67-83.33	A	1.353	0.000	0.000	84.729	0.000	975.66
		B		0.000	0.000	60.164	0.000	789.52
		C		0.000	0.000	6.359	0.000	76.84
T7	83.33-75.00	A	1.353	0.000	0.000	94.131	0.000	1077.53
		B		0.000	0.000	60.164	0.000	789.56
		C		0.000	0.000	6.360	0.000	76.85
T8	75.00-50.00	A	1.354	0.000	0.000	293.932	0.000	3360.95
		B		0.000	0.000	180.524	0.000	2370.54

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		0.000	0.000	19.094	0.000	230.89
T9	50.00-37.50	A	1.356	0.000	0.000	154.525	0.000	1764.24
		B		0.000	0.000	90.277	0.000	1186.21
		C		0.000	0.000	9.554	0.000	115.62
T10	37.50-25.00	A	1.352	0.000	0.000	155.728	0.000	1774.14
		B		0.000	0.000	90.240	0.000	1183.92
		C		0.000	0.000	9.536	0.000	115.19
T11	25.00-0.00	A	1.308	0.000	0.000	207.279	0.000	2302.87
		B		0.000	0.000	122.101	0.000	1572.07
		C		0.000	0.000	12.665	0.000	149.67

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180.00-175.00	-6.3146	2.8905	-11.4976	5.1117
T2	175.00-150.00	-13.8234	5.6149	-20.8064	8.4977
T3	150.00-125.00	1.2641	13.9320	0.0722	19.1225
T4	125.00-100.00	-1.6134	16.2124	-5.2259	22.2822
T5	100.00-91.67	-3.3608	17.2705	-8.2431	23.6967
T6	91.67-83.33	-3.7852	17.7631	-9.0040	24.4274
T7	83.33-75.00	-5.8909	18.5532	-12.3660	25.5134
T8	75.00-50.00	-7.2912	19.7649	-14.4410	27.1938
T9	50.00-37.50	-8.7442	21.1927	-17.2668	29.3625
T10	37.50-25.00	-9.2889	21.9735	-18.2779	30.5626
T11	25.00-0.00	-6.6752	16.0745	-14.1815	24.7061

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	8	1/2	175.00 - 177.00	0.6000	0.6000
T1	13	LDF5-50A (7/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T1	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	175.00 - 180.00	0.6000	0.6000
T1	18	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T1	20	LDF7-50A (1-5/8 FOAM)	175.00 - 180.00	0.6000	0.6000
T2	8	1/2	150.00 - 175.00	0.6000	0.6000
T2	13	LDF5-50A (7/8 FOAM)	150.00 - 175.00	0.6000	0.6000
T2	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	150.00 - 175.00	0.6000	0.6000
T2	17	LDF7-50A (1-5/8 FOAM)	150.00 - 172.50	0.6000	0.6000
T2	18	LDF7-50A (1-5/8 FOAM)	150.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	20	LDF7-50A (1-5/8 FOAM)	175.00 150.00 - 175.00	0.6000	0.6000
T2	21	WEP65	150.00 - 169.00	0.6000	0.6000
T2	22	WEP65	150.00 - 167.00	0.6000	0.6000
T2	23	WEP65	150.00 - 175.00	0.6000	0.6000
T2	40	7/8	150.00 - 157.00	0.6000	0.6000
T3	2	1/2	125.00 - 130.00	0.6000	0.6000
T3	5	FLC78-50J (7/8 FOAM)	125.00 - 138.50	0.6000	0.6000
T3	6	FLC78-50J (7/8 FOAM)	125.00 - 146.00	0.6000	0.6000
T3	7	FLC78-50J (7/8 FOAM)	125.00 - 146.00	0.6000	0.6000
T3	8	1/2	125.00 - 150.00	0.6000	0.6000
T3	9	LDF5-50A (7/8 FOAM)	125.00 - 141.50	0.6000	0.6000
T3	10	LDF5-50A (7/8 FOAM)	125.00 - 138.00	0.6000	0.6000
T3	13	LDF5-50A (7/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	125.00 - 150.00	0.6000	0.6000
T3	16	1/2	125.00 - 146.00	0.6000	0.6000
T3	17	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	18	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	19	LDF4-50A (1/2 FOAM)	125.00 - 149.00	0.6000	0.6000
T3	20	LDF7-50A (1-5/8 FOAM)	125.00 - 150.00	0.6000	0.6000
T3	21	WEP65	125.00 - 150.00	0.6000	0.6000
T3	22	WEP65	125.00 - 150.00	0.6000	0.6000
T3	23	WEP65	125.00 - 150.00	0.6000	0.6000
T3	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	125.00 - 135.00	0.6000	0.6000
T3	35	LDF7-50A (1-5/8 FOAM)	125.00 - 149.00	0.6000	0.6000
T3	36	Hybrid HCS 6x12 4 AWG (1-5/8")	125.00 - 149.00	0.6000	0.6000
T3	37	1/2	125.00 - 149.00	0.6000	0.6000
T3	39	7/8	125.00 - 134.00	0.6000	0.6000
T3	40	7/8	125.00 - 150.00	0.6000	0.6000
T4	2	1/2	100.00 - 125.00	0.6000	0.6000
T4	5	FLC78-50J (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	6	FLC78-50J (7/8 FOAM)	100.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			125.00		
T4	7	FLC78-50J (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	8	1/2	100.00 - 125.00	0.6000	0.6000
T4	9	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	10	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	13	LDF5-50A (7/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 125.00	0.6000	0.6000
T4	16	1/2	100.00 - 125.00	0.6000	0.6000
T4	17	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	18	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	19	LDF4-50A (1/2 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	20	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	21	WEP65	100.00 - 125.00	0.6000	0.6000
T4	22	WEP65	100.00 - 125.00	0.6000	0.6000
T4	23	WEP65	100.00 - 125.00	0.6000	0.6000
T4	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	100.00 - 125.00	0.6000	0.6000
T4	27	AVA5-50 (7/8 LOW DENSI.FOAM)	100.00 - 114.00	0.6000	0.6000
T4	28	LDF4-50A (1/2 FOAM)	100.00 - 115.00	0.6000	0.6000
T4	29	LCF78-50J (7/8 FOAM)	100.00 - 115.00	0.6000	0.6000
T4	35	LDF7-50A (1-5/8 FOAM)	100.00 - 125.00	0.6000	0.6000
T4	36	Hybrid HCS 6x12 4 AWG (1-5/8")	100.00 - 125.00	0.6000	0.6000
T4	37	1/2	100.00 - 125.00	0.6000	0.6000
T4	39	7/8	100.00 - 125.00	0.6000	0.6000
T4	40	7/8	100.00 - 125.00	0.6000	0.6000
T5	2	1/2	91.67 - 100.00	0.6000	0.6000
T5	5	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	6	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	7	FLC78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	8	1/2	91.67 - 100.00	0.6000	0.6000
T5	9	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	10	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	12	LDF5-50A (7/8 FOAM)	91.67 - 98.00	0.6000	0.6000
T5	13	LDF5-50A (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T5	16	1/2	91.67 - 100.00	0.6000	0.6000
T5	17	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	18	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	19	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
T5	20	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	21	WEP65	91.67 - 100.00	0.6000	0.6000
T5	22	WEP65	91.67 - 100.00	0.6000	0.6000
T5	23	WEP65	91.67 - 100.00	0.6000	0.6000
T5	25	LCF78-50J (7/8 FOAM)	91.67 - 98.00	0.6000	0.6000
T5	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	91.67 - 100.00	0.6000	0.6000
T5	27	AVA5-50 (7/8 LOW DENSI.FOAM)	91.67 - 100.00	0.6000	0.6000
T5	28	LDF4-50A (1/2 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	29	LCF78-50J (7/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	35	LDF7-50A (1-5/8 FOAM)	91.67 - 100.00	0.6000	0.6000
T5	36	Hybrid HCS 6x12 4 AWG (1-5/8")	91.67 - 100.00	0.6000	0.6000
T5	37	1/2	91.67 - 100.00	0.6000	0.6000
T5	39	7/8	91.67 - 100.00	0.6000	0.6000
T5	40	7/8	91.67 - 100.00	0.6000	0.6000
T6	2	1/2	83.33 - 91.67	0.6000	0.6000
T6	5	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	6	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	7	FLC78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	8	1/2	83.33 - 91.67	0.6000	0.6000
T6	9	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	10	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	12	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	13	LDF5-50A (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T6	16	1/2	83.33 - 91.67	0.6000	0.6000
T6	17	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	18	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	19	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	20	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	21	WEP65	83.33 - 91.67	0.6000	0.6000
T6	22	WEP65	83.33 - 91.67	0.6000	0.6000
T6	23	WEP65	83.33 - 91.67	0.6000	0.6000
T6	25	LCF78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	83.33 - 91.67	0.6000	0.6000
T6	27	AVA5-50 (7/8 LOW DENSI.FOAM)	83.33 - 91.67	0.6000	0.6000
T6	28	LDF4-50A (1/2 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	29	LCF78-50J (7/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	35	LDF7-50A (1-5/8 FOAM)	83.33 - 91.67	0.6000	0.6000
T6	36	Hybrid HCS 6x12 4 AWG (1-5/8")	83.33 - 91.67	0.6000	0.6000
T6	37	1/2	83.33 - 91.67	0.6000	0.6000
T6	39	7/8	83.33 - 91.67	0.6000	0.6000
T6	40	7/8	83.33 - 91.67	0.6000	0.6000
T7	2	1/2	75.00 - 83.33	0.6000	0.6000
T7	4	LDF4-50A (1/2 FOAM)	75.00 - 82.00	0.6000	0.6000
T7	5	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	6	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	7	FLC78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	8	1/2	75.00 - 83.33	0.6000	0.6000
T7	9	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	10	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	11	LDF5-50A (7/8 FOAM)	75.00 - 82.00	0.6000	0.6000
T7	12	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	13	LDF5-50A (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	16	1/2	75.00 - 83.33	0.6000	0.6000
T7	17	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	18	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	19	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	20	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	21	WEP65	75.00 - 83.33	0.6000	0.6000
T7	22	WEP65	75.00 - 83.33	0.6000	0.6000
T7	23	WEP65	75.00 - 83.33	0.6000	0.6000
T7	24	WEP65	75.00 - 79.50	0.6000	0.6000
T7	25	LCF78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	75.00 - 83.33	0.6000	0.6000
T7	27	AVA5-50 (7/8 LOW DENSI.FOAM)	75.00 - 83.33	0.6000	0.6000
T7	28	LDF4-50A (1/2 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	29	LCF78-50J (7/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	30	LDF4-50A (1/2 FOAM)	75.00 - 81.00	0.6000	0.6000
T7	35	LDF7-50A (1-5/8 FOAM)	75.00 - 83.33	0.6000	0.6000
T7	36	Hybrid HCS 6x12 4 AWG (1-5/8")	75.00 - 83.33	0.6000	0.6000
T7	37	1/2	75.00 - 83.33	0.6000	0.6000
T7	39	7/8	75.00 - 83.33	0.6000	0.6000
T7	40	7/8	75.00 - 83.33	0.6000	0.6000
T8	2	1/2	50.00 - 75.00	0.6000	0.6000
T8	4	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	5	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	6	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	7	FLC78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	8	1/2	50.00 - 75.00	0.6000	0.6000
T8	9	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	10	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	11	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	12	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	13	LDF5-50A (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T8	16	1/2	50.00 - 75.00	0.6000	0.6000
T8	17	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	18	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	19	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	20	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	21	WEP65	50.00 - 75.00	0.6000	0.6000
T8	22	WEP65	50.00 - 75.00	0.6000	0.6000
T8	23	WEP65	50.00 - 75.00	0.6000	0.6000
T8	24	WEP65	50.00 - 75.00	0.6000	0.6000
T8	25	LCF78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	50.00 - 75.00	0.6000	0.6000
T8	27	AVA5-50 (7/8 LOW DENSI.FOAM)	50.00 - 75.00	0.6000	0.6000
T8	28	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	29	LCF78-50J (7/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	30	LDF4-50A (1/2 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	35	LDF7-50A (1-5/8 FOAM)	50.00 - 75.00	0.6000	0.6000
T8	36	Hybrid HCS 6x12 4 AWG (1-5/8")	50.00 - 75.00	0.6000	0.6000
T8	37	1/2	50.00 - 75.00	0.6000	0.6000
T8	39	7/8	50.00 - 75.00	0.6000	0.6000
T8	40	7/8	50.00 - 75.00	0.6000	0.6000
T9	2	1/2	37.50 - 50.00	0.6000	0.6000
T9	3	LDF5-50A (7/8 FOAM)	37.50 - 47.00	0.6000	0.6000
T9	4	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	5	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	6	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	7	FLC78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	8	1/2	37.50 - 50.00	0.6000	0.6000
T9	9	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	10	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	11	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	12	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	13	LDF5-50A (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	14	LDF4-50A (1/2 FOAM)	37.50 - 49.00	0.6000	0.6000
T9	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	37.50 - 50.00	0.6000	0.6000
T9	16	1/2	37.50 - 50.00	0.6000	0.6000
T9	17	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	18	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	19	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	20	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	21	WEP65	37.50 - 50.00	0.6000	0.6000
T9	22	WEP65	37.50 - 50.00	0.6000	0.6000
T9	23	WEP65	37.50 - 50.00	0.6000	0.6000
T9	24	WEP65	37.50 - 50.00	0.6000	0.6000
T9	25	LCF78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	37.50 - 50.00	0.6000	0.6000
T9	27	AVA5-50 (7/8 LOW DENSI.FOAM)	37.50 - 50.00	0.6000	0.6000
T9	28	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	29	LCF78-50J (7/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	30	LDF4-50A (1/2 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	35	LDF7-50A (1-5/8 FOAM)	37.50 - 50.00	0.6000	0.6000
T9	36	Hybrid HCS 6x12 4 AWG (1-5/8")	37.50 - 50.00	0.6000	0.6000
T9	37	1/2	37.50 - 50.00	0.6000	0.6000
T9	39	7/8	37.50 - 50.00	0.6000	0.6000
T9	40	7/8	37.50 - 50.00	0.6000	0.6000
T10	2	1/2	25.00 - 37.50	0.6000	0.6000
T10	3	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	4	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	5	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	6	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	7	FLC78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	8	1/2	25.00 - 37.50	0.6000	0.6000
T10	9	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	10	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	11	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	12	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	13	LDF5-50A (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	14	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 37.50	0.6000	0.6000
T10	16	1/2	25.00 - 37.50	0.6000	0.6000
T10	17	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	18	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	19	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	20	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	21	WEP65	25.00 - 37.50	0.6000	0.6000
T10	22	WEP65	25.00 - 37.50	0.6000	0.6000
T10	23	WEP65	25.00 - 37.50	0.6000	0.6000
T10	24	WEP65	25.00 - 37.50	0.6000	0.6000
T10	25	LCF78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	25.00 - 37.50	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	27	AVA5-50 (7/8 LOW DENSI.FOAM)	25.00 - 37.50	0.6000	0.6000
T10	28	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	29	LCF78-50J (7/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	30	LDF4-50A (1/2 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	35	LDF7-50A (1-5/8 FOAM)	25.00 - 37.50	0.6000	0.6000
T10	36	Hybrid HCS 6x12 4 AWG (1-5/8")	25.00 - 37.50	0.6000	0.6000
T10	37	1/2	25.00 - 37.50	0.6000	0.6000
T10	39	7/8	25.00 - 37.50	0.6000	0.6000
T10	40	7/8	25.00 - 37.50	0.6000	0.6000
T11	2	1/2	8.00 - 25.00	0.6000	0.6000
T11	3	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	4	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	5	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	6	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	7	FLC78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	8	1/2	8.00 - 25.00	0.6000	0.6000
T11	9	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	10	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	11	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	12	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	13	LDF5-50A (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	14	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	15	AVA7-50 (1-5/8 LOW DENSI. FOAM)	8.00 - 25.00	0.6000	0.6000
T11	16	1/2	8.00 - 25.00	0.6000	0.6000
T11	17	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	18	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	19	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	20	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	21	WEP65	8.00 - 25.00	0.6000	0.6000
T11	22	WEP65	8.00 - 25.00	0.6000	0.6000
T11	23	WEP65	8.00 - 25.00	0.6000	0.6000
T11	24	WEP65	8.00 - 25.00	0.6000	0.6000
T11	25	LCF78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	26	AVA7-50 (1-5/8 LOW DENSI. FOAM)	8.00 - 25.00	0.6000	0.6000
T11	27	AVA5-50 (7/8 LOW DENSI.FOAM)	8.00 - 25.00	0.6000	0.6000
T11	28	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	29	LCF78-50J (7/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	30	LDF4-50A (1/2 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	35	LDF7-50A (1-5/8 FOAM)	8.00 - 25.00	0.6000	0.6000
T11	36	Hybrid HCS 6x12 4 AWG (1-5/8")	8.00 - 25.00	0.6000	0.6000
T11	37	1/2	8.00 - 25.00	0.6000	0.6000
T11	39	7/8	8.00 - 25.00	0.6000	0.6000
T11	40	7/8	8.00 - 25.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
*** Hightower CLimb Inventory - 10/24/2016									
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	48.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-1&2 / CSP#23,21)			0.00			1" Ice	7.10	7.10	128.00
6'8"x4" Pipe Mount (Shared HGT-1&2 / CSP#23,21)	C	From Leg	0.00	0.0000	48.00	No Ice	1.93	1.93	72.00
			0.00			1/2" Ice	3.01	3.01	93.13
			0.00			1" Ice	3.42	3.42	118.95
DB803M-XT (HGT-2/CSP#21)	C	From Leg	4.00	0.0000	49.00	No Ice	0.50	0.50	4.30
			0.00			1/2" Ice	0.68	0.68	8.98
			2.50			1" Ice	0.87	0.87	15.80
4'x4" Pipe Mount (Shared HGT-3&4/CSP#16,#22)	B	From Leg	0.00	0.0000	80.00	No Ice	1.08	1.08	44.00
			0.00			1/2" Ice	1.58	1.58	56.99
			0.00			1" Ice	1.84	1.84	73.03
DB222 (HGT-4/CSP#22)	B	From Leg	0.50	0.0000	81.00	No Ice	1.60	1.60	16.00
			0.00			1/2" Ice	2.88	2.88	20.80
			5.00			1" Ice	4.16	4.16	25.60
(inverted) DB212-1 (HGT-5/CSP#8)	C	From Leg	4.00	0.0000	81.00	No Ice	4.50	4.50	31.00
			0.00			1/2" Ice	8.10	8.10	40.30
			-5.00			1" Ice	11.70	11.70	49.60
DB212-1 (HGT-6/CSP#15)	C	From Leg	4.00	0.0000	86.00	No Ice	4.50	4.50	31.00
			0.00			1/2" Ice	8.10	8.10	40.30
			0.00			1" Ice	11.70	11.70	49.60
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	86.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(Shared HGT-5&6 / CSP#8,15)			0.00			1" Ice	7.10	7.10	128.00
DB222 (HGT-7 / CSP#13 (Twr Face Mt.))	C	From Face	0.00	0.0000	100.00	No Ice	1.60	1.60	16.00
			-3.00			1/2" Ice	2.88	2.88	20.80
			0.00			1" Ice	4.16	4.16	25.60
PD458-1 (HGT-8 / CSP#14 (Twr Face Mt.))	C	From Face	0.00	0.0000	105.00	No Ice	2.88	2.88	24.00
			-4.00			1/2" Ice	4.34	4.34	46.22
			0.00			1" Ice	5.83	5.83	77.59
DS9A09F36D-N 19 ft Omni w/ Mount Pipe (HGT-9 / CSP)	C	From Leg	5.00	0.0000	116.00	No Ice	6.95	6.95	98.25
			0.00			1/2" Ice	9.21	9.21	152.99
			5.00			1" Ice	11.49	11.49	221.39
DB-B1-6C-8AB-0Z Dist. Box (HGT-10 / CSP#24)	C	From Leg	2.50	0.0000	116.00	No Ice	5.60	2.33	45.00
			0.00			1/2" Ice	5.92	2.56	81.13
			0.00			1" Ice	6.24	2.79	121.22
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	116.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-9,10 / CSP#24)			0.00			1" Ice	7.10	7.10	128.00
12' Dipole (HGT-11 / CSP)	A	From Leg	5.00	0.0000	138.00	No Ice	3.70	3.70	40.00
			0.00			1/2" Ice	3.95	3.95	78.90
			0.00			1" Ice	4.22	4.22	121.78
Pirod 4' Side Mount Standoff (1)	A	From Leg	0.00	0.0000	138.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-11 / CSP)			0.00			1" Ice	7.10	7.10	128.00
DB224-A (HGT-13 / CSP)	B	From Leg	2.00	0.0000	136.00	No Ice	3.15	3.15	32.00
			0.00			1/2" Ice	5.67	5.67	41.60
			10.00			1" Ice	8.19	8.19	51.20
2'6"x4" Pipe Mount (HGT-13 / CSP)	B	From Leg	0.00	0.0000	136.00	No Ice	0.64	0.64	27.00
			0.00			1/2" Ice	0.91	0.91	35.41
			0.00			1" Ice	1.09	1.09	45.95
(inverted) 20' 8 Bay Di-Pole (HGT-14 / CSP#11)	A	From Face	4.00	0.0000	136.00	No Ice	4.00	4.00	55.00
			0.00			1/2" Ice	6.00	6.00	100.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			-10.00			1" Ice	8.00	8.00	145.00
Pirod 4' Side Mount Standoff (1) (Shared HGT-14&15 / CSP#11,#9)	A	From Leg	0.00 0.00 0.00	-30.0000	136.00	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
Pirod 4' Side Mount Standoff (1) (Shared HGT-14&15 / CSP#11,#9)	A	From Face	0.00 0.00 0.00	30.0000	136.00	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
PD200 (HGT-15 / CSP#9)	A	From Leg	4.00 0.00 5.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.03 4.94 7.85	2.03 4.94 7.85	20.00 49.00 78.00
(inverted) DB420 (HGT-16 / CSP#12)	C	From Leg	5.00 0.00 -10.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	3.33 5.99 8.66	3.33 5.99 8.66	34.00 44.20 54.40
20' 8 Bay Di-Pole (HGT-17 / CSP#20)	C	From Leg	5.00 0.00 10.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.00 6.00 8.00	4.00 6.00 8.00	55.00 100.00 145.00
Pirod 4' Side Mount Standoff (1) (Shared HGT-16&17 / CSP#12,#20)	A	From Leg	0.00 0.00 0.00	0.0000	143.00	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
4'x4" Pipe Mount (HGT-22 / CSP#2)	B	From Leg	0.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	1.06 1.58 1.84	1.06 1.58 1.84	44.00 56.99 73.03
4'x4" Pipe Mount (HGT-23 / CSP#3)	C	From Leg	0.00 0.00 0.00	0.0000	169.00	No Ice 1/2" Ice 1" Ice	1.06 1.58 1.84	1.06 1.58 1.84	44.00 56.99 73.03
OGT9-840 (HGT-24 / CSP#6)	A	From Leg	5.00 0.00 -7.25	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
OGT9-840 (HGT-25 / CSP#4)	A	From Leg	5.00 0.00 -7.25	0.0000	177.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
DB-B1-6C-8AB-0Z Dist. Box (HGT-26)	A	From Leg	0.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	5.60 5.92 6.24	2.33 2.56 2.79	45.00 81.13 121.22
Pirod 4' Side Mount Standoff (1) (Shared HGT-24,25,26 / CSP# 4,6)	A	From Leg	0.00 0.00 0.00	0.0000	177.00	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
4'x4" Pipe Mount (HGT-27 / CSP#1)	B	From Leg	0.00 0.00 0.00	0.0000	178.00	No Ice 1/2" Ice 1" Ice	1.06 1.58 1.84	1.06 1.58 1.84	44.00 56.99 73.03
(inverted) OGT9-840 (HGT-28 / CSP#7)	C	From Leg	4.00 0.00 -5.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
OGT9-840 (HGT-29 / CSP#5)	C	From Leg	4.00 0.00 5.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	2.27 3.44 4.61	2.27 3.44 4.61	18.50 36.09 60.98
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP# 5,7)	C	From Leg	0.00 0.00 0.00	-30.0000	175.00	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
Pirod 4' Side Mount Standoff (1) (Shared HGT-28, 29 / CSP#	C	From Face	4.00 0.00 0.00	30.0000	175.00	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

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
5,7)									
Pirod 4' Side Mount Standoff	A	From Leg	0.00	-30.0000	180.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-30 / CSP#19)			0.00			1" Ice	7.10	7.10	128.00
Pirod 4' Side Mount Standoff	A	From Face	4.00	30.0000	180.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
(HGT-30 / CSP#19)			0.00			1" Ice	7.10	7.10	128.00
PD440-2	A	From Leg	4.00	0.0000	181.00	No Ice	1.38	1.38	19.00
(HGT-30 / CSP-19)			0.00			1/2" Ice	2.48	2.48	24.70
			5.00			1" Ice	3.59	3.59	30.40
DB225-A	C	From Leg	0.00	0.0000	178.00	No Ice	3.21	3.21	37.00
(HGT-31 / CSP#-17)			0.00			1/2" Ice	5.78	5.78	48.10
			0.00			1" Ice	8.35	8.35	59.20
*** Hightower CLimb Inventory - 10/24/2016									
*** CSP Additional Antennas - 10/2/2017									
USF-2U w/ TAM-ll adapter	C	From Leg	0.00	0.0000	175.00	No Ice	3.44	6.04	197.50
with 8' 2-3/8" Pipe			0.00			1/2" Ice	4.59	7.76	214.60
(CSP - Troop D)			0.00			1" Ice	5.76	9.48	236.60
10'6"x4" Pipe Mount	C	From Leg	0.00	0.0000	170.00	No Ice	3.20	3.20	114.00
(CSP - Troop D)			0.00			1/2" Ice	5.62	5.62	146.84
			0.00			1" Ice	6.25	6.25	186.71
SE4192-SWBP4LDF(Dxx-E6	C	From Leg	0.00	0.0000	170.00	No Ice	8.70	25.50	56.00
461) Panel Anenna			0.00			1/2" Ice	10.73	26.96	144.00
(CSP - Troop D)			0.00			1" Ice	12.78	28.25	246.93
(inverted) SC479-HF1LDF	C	From Leg	0.00	0.0000	173.00	No Ice	5.06	5.06	30.00
(CSP - Troop D)			0.00			1/2" Ice	6.54	6.54	69.82
			-7.25			1" Ice	8.04	8.04	114.98
3'4"x4" Pipe Mount	C	From Leg	0.00	0.0000	177.00	No Ice	0.87	0.87	36.00
(CSP - Troop D)			0.00			1/2" Ice	1.27	1.27	46.95
			0.00			1" Ice	1.49	1.49	60.55
(inverted) SC479-HF1LDF	C	From Leg	0.00	0.0000	173.00	No Ice	5.06	5.06	30.00
(CSP - Troop D)			0.00			1/2" Ice	6.54	6.54	69.82
			-7.25			1" Ice	8.04	8.04	114.98
432E-83I-01T TTA Unit	C	From Leg	0.00	0.0000	180.00	No Ice	3.33	1.11	25.00
(CSP - Troop D)			0.00			1/2" Ice	3.57	1.27	44.70
			0.00			1" Ice	3.82	1.45	67.39
*** CSP Additional Antennas - 10/2/2017									
*** T-Mobile Additions 12/2017									
*** SMK-006 Proposed AT&T Config (01202020)									
Valmont 13' Lightweight	A	From Leg	0.50	30.0000	150.00	No Ice	10.60	10.60	255.00
T-Frame			0.00			1/2" Ice	16.80	16.80	359.00
(AT&T)			0.00			1" Ice	23.00	23.00	463.00
Valmont 13' Lightweight	B	From Leg	0.50	30.0000	150.00	No Ice	10.60	10.60	255.00
T-Frame			0.00			1/2" Ice	16.80	16.80	359.00
(AT&T)			0.00			1" Ice	23.00	23.00	463.00
Valmont 13' Lightweight	C	From Leg	0.50	30.0000	150.00	No Ice	10.60	10.60	255.00
T-Frame			0.00			1/2" Ice	16.80	16.80	359.00
(AT&T)			0.00			1" Ice	23.00	23.00	463.00
(2) 7770.00 panel antenna	A	From Leg	0.50	0.0000	149.00	No Ice	5.90	4.01	52.03
(AT&T)			0.00			1/2" Ice	6.34	4.64	97.08
			0.00			1" Ice	6.78	5.28	148.33
(2) 7770.00 panel antenna	B	From Leg	0.50	0.0000	149.00	No Ice	5.90	4.01	52.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(AT&T)			0.00			1/2" Ice	6.34	4.64	97.08
			0.00			1" Ice	6.78	5.28	148.33
(2) 7770.00 panel antenna	C	From Leg	0.50	0.0000	149.00	No Ice	5.90	4.01	52.03
(AT&T)			0.00			1/2" Ice	6.34	4.64	97.08
			0.00			1" Ice	6.78	5.28	148.33
AM-X-CD-17-65-00T	C	From Face	3.00	0.0000	149.00	No Ice	4.62	3.70	30.00
(AT&T)			0.00			1/2" Ice	5.03	4.11	58.78
			0.00			1" Ice	5.46	4.53	92.82
AM-X-CD-17-65-00T	A	From Face	3.00	0.0000	149.00	No Ice	4.62	3.70	30.00
(AT&T)			0.00			1/2" Ice	5.03	4.11	58.78
			0.00			1" Ice	5.46	4.53	92.82
AM-X-CD-16-65-00T	B	From Face	3.00	0.0000	149.00	No Ice	4.62	3.70	30.00
(AT&T)			0.00			1/2" Ice	5.03	4.11	58.78
			0.00			1" Ice	5.46	4.53	92.82
(2) LPG21401 TMA	A	From Face	3.00	0.0000	147.00	No Ice	0.95	0.37	17.50
(AT&T)			0.00			1/2" Ice	1.09	0.48	23.31
			0.00			1" Ice	1.24	0.60	30.86
(2) LPG21401 TMA	B	From Face	3.00	0.0000	147.00	No Ice	0.95	0.37	17.50
(AT&T)			0.00			1/2" Ice	1.09	0.48	23.31
			0.00			1" Ice	1.24	0.60	30.86
(2) LPG21401 TMA	C	From Face	3.00	0.0000	147.00	No Ice	0.95	0.37	17.50
(AT&T)			0.00			1/2" Ice	1.09	0.48	23.31
			0.00			1" Ice	1.24	0.60	30.86
Ericsson RRUS-12 RRH Unit	A	From Leg	0.50	0.0000	149.00	No Ice	3.67	1.49	58.00
(AT&T)			0.00			1/2" Ice	3.93	1.67	81.22
			0.00			1" Ice	4.19	1.87	107.64
Ericsson RRUS-12 RRH Unit	B	From Leg	0.50	0.0000	149.00	No Ice	3.67	1.49	58.00
(AT&T)			0.00			1/2" Ice	3.93	1.67	81.22
			0.00			1" Ice	4.19	1.87	107.64
Ericsson RRUS-12 RRH Unit	C	From Leg	0.50	0.0000	149.00	No Ice	3.67	1.49	58.00
(AT&T)			0.00			1/2" Ice	3.93	1.67	81.22
			0.00			1" Ice	4.19	1.87	107.64
* tower Lightning Rod									
10'6"x4" Pipe Mount	A	From Leg	0.00	0.0000	180.00	No Ice	3.19	3.19	114.00
(Tower)			0.00			1/2" Ice	5.62	5.62	146.84
			5.00			1" Ice	6.25	6.25	186.71
Lightning Rod 5/8x4'	A	From Leg	0.00	0.0000	180.00	No Ice	0.25	0.25	31.00
(Tower)			0.00			1/2" Ice	0.66	0.66	33.82
			15.00			1" Ice	0.97	0.97	39.29
DC6-48-60-18-8F	C	From Leg	0.00	0.0000	150.00	No Ice	1.33	1.33	30.00
(AT&T)			0.00			1/2" Ice	1.53	1.53	48.71
			0.00			1" Ice	1.73	1.73	67.01
RRUS-11	C	From Face	3.00	0.0000	149.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	B	From Face	3.00	0.0000	149.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	A	From Face	3.00	0.0000	149.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
Eversource Equipment									
ANT220F2 w/clamps	A	From Leg	0.50	0.0000	134.00	No Ice	0.58	0.58	14.00
(Eversource - Proposed)			0.00			1/2" Ice	0.81	0.81	25.19
			0.00			1" Ice	1.04	1.04	36.38
ANT220F2 w/clamps	B	From Leg	0.50	0.0000	157.00	No Ice	0.58	0.58	14.00
(Eversource - Proposed)			0.00			1/2" Ice	0.81	0.81	25.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	1.04	1.04	36.38
Site Pro USF-4U w/ (2)	A	From Leg	0.50	0.0000	134.00	No Ice	1.25	2.50	165.00
Stiff-Arm Supports			0.00			1/2" Ice	1.49	2.76	198.00
(Eversource - Proposed)			0.00			1" Ice	1.73	3.02	231.00
Site Pro USF-4U w/ (2)	B	From Leg	0.50	0.0000	157.00	No Ice	1.25	2.50	165.00
Stiff-Arm Supports			0.00			1/2" Ice	1.49	2.76	198.00
(Eversource - Proposed)			0.00			1" Ice	1.73	3.02	231.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
10 FT DISH	B	Paraboloid	From	1.00	Worst		175.00	10.00	No Ice	78.54	317.00
(HGT-27 / CSP#1)		w/Radome	Leg	0.00					1/2" Ice	79.81	726.71
				0.00					1" Ice	81.09	1136.42
8 FT DISH	C	Paraboloid	From	0.50	Worst		169.00	8.00	No Ice	50.30	251.00
(HGT-23 / CSP#3)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60
8 FT DISH	B	Paraboloid	From	0.50	Worst		167.00	8.00	No Ice	50.30	251.00
(HGT-22 / CSP#2)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60
8 FT DISH	B	Paraboloid	From	0.50	Worst		79.00	8.00	No Ice	50.30	251.00
(HGT-3/CSP#16)		w/Radome	Leg	0.00					1/2" Ice	51.29	514.30
				0.00					1" Ice	52.28	777.60

222-H Verification Constants

Constant	Value
K_d	0.85
Ice Thickness Importance Factor	1.15
Z_g	1200
α	7
K_{zmin}	0.7
K_c	0.9
K_t	0.53
f	2
K_e	1

222-H Section Verification ArRr By Element

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft^2	A_r w/Ice ft^2	A_rR_r ft^2	A_rR_r w/Ice ft^2
T1 180.00-175.00	1	HSS5x.25	64.134	35.536	C	0.173	0.308	2.086	3.236	1.002	1.946
	1	HSS5x.25	64.134	35.536	A	0.173	0.308	2.086	3.236	1.002	1.946
	2	HSS5x.25	64.134	35.536	C	0.173	0.308	2.086	3.236	1.002	1.946
	2	HSS5x.25	64.134	35.536	B	0.173	0.308	2.086	3.236	1.002	1.946
	3	HSS5x.25	64.134	35.536	B	0.173	0.308	2.086	3.236	1.002	1.946
	3	HSS5x.25	64.134	35.536	A	0.173	0.308	2.086	3.236	1.002	1.946
					A		Sum:	4.171	6.471	2.003	3.892
					B			4.171	6.471	2.003	3.892
					C			4.171	6.471	2.003	3.892
T2 175.00-150.00	16	HSS5x.25	63.699	35.236	C	0.135	0.236	10.428	16.151	4.880	9.397
	16	HSS5x.25	63.699	35.236	A	0.135	0.236	10.428	16.151	4.880	9.397
	17	HSS5x.25	63.699	35.236	C	0.135	0.236	10.428	16.151	4.880	9.397
	17	HSS5x.25	63.699	35.236	B	0.135	0.236	10.428	16.151	4.880	9.397
	18	HSS5x.25	63.699	35.236	B	0.135	0.236	10.428	16.151	4.880	9.397
	18	HSS5x.25	63.699	35.236	A	0.135	0.236	10.428	16.151	4.880	9.397
					A		Sum:	20.856	32.302	9.759	18.793
					B			20.856	32.302	9.759	18.793
					C			20.856	32.302	9.759	18.793
T3 150.00-125.00	55	HSS5x.25	63.064	34.798	C	0.13	0.223	10.428	16.111	4.889	9.327
	55	HSS5x.25	63.064	34.798	A	0.13	0.223	10.428	16.111	4.889	9.327
	56	HSS5x.25	63.064	34.798	C	0.13	0.223	10.428	16.111	4.889	9.327
	56	HSS5x.25	63.064	34.798	B	0.13	0.223	10.428	16.111	4.889	9.327
	57	HSS5x.25	63.064	34.798	B	0.13	0.223	10.428	16.111	4.889	9.327
	57	HSS5x.25	63.064	34.798	A	0.13	0.223	10.428	16.111	4.889	9.327
					A		Sum:	20.856	32.222	9.779	18.655
					B			20.856	32.222	9.779	18.655
					C			20.856	32.222	9.779	18.655
T4 125.00-100.00	94	HSS5x.25	62.611	34.487	C	0.12	0.208	10.428	16.082	4.877	9.261
	94	HSS5x.25	62.611	34.487	A	0.12	0.208	10.428	16.082	4.877	9.261
	95	HSS5x.25	62.611	34.487	C	0.12	0.208	10.428	16.082	4.877	9.261
	95	HSS5x.25	62.611	34.487	B	0.12	0.208	10.428	16.082	4.877	9.261
	96	HSS5x.25	62.611	34.487	B	0.12	0.208	10.428	16.082	4.877	9.261
	96	HSS5x.25	62.611	34.487	A	0.12	0.208	10.428	16.082	4.877	9.261
					A		Sum:	20.856	32.165	9.755	18.523
					B			20.856	32.165	9.755	18.523
					C			20.856	32.165	9.755	18.523
T5 100.00-91.67	133	HSS5x.375	62.451	34.377	C	0.115	0.199	3.476	5.357	1.623	3.077
	133	HSS5x.375	62.451	34.377	A	0.115	0.199	3.476	5.357	1.623	3.077
	134	HSS5x.375	62.451	34.377	C	0.115	0.199	3.476	5.357	1.623	3.077
	134	HSS5x.375	62.451	34.377	B	0.115	0.199	3.476	5.357	1.623	3.077
	135	HSS5x.375	62.451	34.377	B	0.115	0.199	3.476	5.357	1.623	3.077
	135	HSS5x.375	62.451	34.377	A	0.115	0.199	3.476	5.357	1.623	3.077
					A		Sum:	6.952	10.715	3.245	6.155
					B			6.952	10.715	3.245	6.155
					C			6.952	10.715	3.245	6.155
T6 91.67-83.33	148	HSS5x.375	62.422	34.358	C	0.113	0.196	3.476	5.357	1.621	3.074
	148	HSS5x.375	62.422	34.358	A	0.113	0.196	3.476	5.357	1.621	3.074
	149	HSS5x.375	62.422	34.358	C	0.113	0.196	3.476	5.357	1.621	3.074
	149	HSS5x.375	62.422	34.358	B	0.113	0.196	3.476	5.357	1.621	3.074
	150	HSS5x.375	62.422	34.358	B	0.113	0.196	3.476	5.357	1.621	3.074
	150	HSS5x.375	62.422	34.358	A	0.113	0.196	3.476	5.357	1.621	3.074
					A		Sum:	6.952	10.714	3.242	6.147
					B			6.952	10.714	3.242	6.147
					C			6.952	10.714	3.242	6.147
T7 83.33-75.00	163	HSS5x.375	62.428	34.361	C	0.111	0.193	3.476	5.357	1.619	3.071
	163	HSS5x.375	62.428	34.361	A	0.111	0.193	3.476	5.357	1.619	3.071

Section Elevation ft	Elem. Num.	Size	C	C w/Ice	Face	e	e w/Ice	A_r ft²	A_r w/Ice ft²	A_rR_r ft²	A_rR_r w/Ice ft²
	164	HSS5x.375	62.428	34.361	C	0.111	0.193	3.476	5.357	1.619	3.071
	164	HSS5x.375	62.428	34.361	B	0.111	0.193	3.476	5.357	1.619	3.071
	165	HSS5x.375	62.428	34.361	B	0.111	0.193	3.476	5.357	1.619	3.071
	165	HSS5x.375	62.428	34.361	A	0.111	0.193	3.476	5.357	1.619	3.071
					A		Sum:	6.952	10.714	3.237	6.141
					B			6.952	10.714	3.237	6.141
					C			6.952	10.714	3.237	6.141
T8 75.00-50.00	178	HSS6.875x.375	85.972	42.802	C	0.116	0.18	14.338	19.987	5.767	11.419
	178	HSS6.875x.375	85.972	42.802	A	0.116	0.18	14.338	19.987	5.767	11.419
	179	HSS6.875x.375	85.972	42.802	C	0.116	0.18	14.338	19.987	5.767	11.419
	179	HSS6.875x.375	85.972	42.802	B	0.116	0.18	14.338	19.987	5.767	11.419
	180	HSS6.875x.375	85.972	42.802	B	0.116	0.18	14.338	19.987	5.767	11.419
	180	HSS6.875x.375	85.972	42.802	A	0.116	0.18	14.338	19.987	5.767	11.419
					A		Sum:	28.676	39.975	11.534	22.837
					B			28.676	39.975	11.534	22.837
					C			28.676	39.975	11.534	22.837
T9 50.00-37.50	205	HSS6.875x.5	86.108	42.883	C	0.111	0.173	7.169	9.997	2.867	5.701
	205	HSS6.875x.5	86.108	42.883	A	0.111	0.173	7.169	9.997	2.867	5.701
	206	HSS6.875x.5	86.108	42.883	C	0.111	0.173	7.169	9.997	2.867	5.701
	206	HSS6.875x.5	86.108	42.883	B	0.111	0.173	7.169	9.997	2.867	5.701
	207	HSS6.875x.5	86.108	42.883	B	0.111	0.173	7.169	9.997	2.867	5.701
	207	HSS6.875x.5	86.108	42.883	A	0.111	0.173	7.169	9.997	2.867	5.701
					A		Sum:	14.338	19.994	5.734	11.402
					B			14.338	19.994	5.734	11.402
					C			14.338	19.994	5.734	11.402
T10 37.50-25.00	220	HSS6.875x.5	85.777	42.686	C	0.108	0.169	7.169	9.989	2.858	5.691
	220	HSS6.875x.5	85.777	42.686	A	0.108	0.169	7.169	9.989	2.858	5.691
	221	HSS6.875x.5	85.777	42.686	C	0.108	0.169	7.169	9.989	2.858	5.691
	221	HSS6.875x.5	85.777	42.686	B	0.108	0.169	7.169	9.989	2.858	5.691
	222	HSS6.875x.5	85.777	42.686	B	0.108	0.169	7.169	9.989	2.858	5.691
	222	HSS6.875x.5	85.777	42.686	A	0.108	0.169	7.169	9.989	2.858	5.691
					A		Sum:	14.338	19.979	5.715	11.381
					B			14.338	19.979	5.715	11.381
					C			14.338	19.979	5.715	11.381
T11 25.00-0.00	235	HSS6.875x.5	92.61	45.656	C	0.121	0.197	14.338	19.792	5.804	11.361
	235	HSS6.875x.5	92.61	45.656	A	0.121	0.197	14.338	19.792	5.804	11.361
	236	HSS6.875x.5	92.61	45.656	C	0.121	0.197	14.338	19.792	5.804	11.361
	236	HSS6.875x.5	92.61	45.656	B	0.121	0.197	14.338	19.792	5.804	11.361
	237	HSS6.875x.5	92.61	45.656	B	0.121	0.197	14.338	19.792	5.804	11.361
	237	HSS6.875x.5	92.61	45.656	A	0.121	0.197	14.338	19.792	5.804	11.361
					A		Sum:	28.676	39.584	11.607	22.722
					B			28.676	39.584	11.607	22.722
					C			28.676	39.584	11.607	22.722

222-H Section Verification Tables - No Ice

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 180.00-175.00	177.50		1.164	25.211	1.038		52	A	0.173	2.003
								B	0.173	2.003
								C	0.173	2.003

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{zt}	t_z	q_z	Face	e	A_rR_r
ft	ft	ft				in	psf			ft^2
T2 175.00-150.00	162.50		1.135	19.193	1.05		51	A	0.135	9.759
								B	0.135	9.759
								C	0.135	9.759
T3 150.00-125.00	137.50		1.082	12.182	1.08		50	A	0.13	9.779
								B	0.13	9.779
								C	0.13	9.779
T4 125.00-100.00	112.50		1.022	7.733	1.127		49	A	0.12	9.755
								B	0.12	9.755
								C	0.12	9.755
T5 100.00-91.67	95.83		0.976	5.711	1.174		49	A	0.115	3.245
								B	0.115	3.245
								C	0.115	3.245
T6 91.67-83.33	87.50		0.951	4.908	1.204		49	A	0.113	3.242
								B	0.113	3.242
								C	0.113	3.242
T7 83.33-75.00	79.17		0.924	4.218	1.239		49	A	0.111	3.237
								B	0.111	3.237
								C	0.111	3.237
T8 75.00-50.00	62.50		0.864	3.115	1.33		49	A	0.116	11.534
								B	0.116	11.534
								C	0.116	11.534
T9 50.00-37.50	43.75		0.78	2.215	1.477		49	A	0.111	5.734
								B	0.111	5.734
								C	0.111	5.734
T10 37.50-25.00	31.25		0.709	1.765	1.614		49	A	0.108	5.715
								B	0.108	5.715
								C	0.108	5.715
T11 25.00-0.00	12.50		0.7	1.255	1.904		57	A	0.121	11.607
								B	0.121	11.607
								C	0.121	11.607

222-H Section Verification Tables - Ice

Section Elevation	z_{wind}	z_{ice}	K_z	K_h	K_{zt}	t_z	q_z	Face	e	A_rR_r
ft	ft	ft				in	psf			ft^2
T1 180.00-175.00	177.50	177.50	1.164	25.211	1.038	1.3787	7	A	0.308	7.276
								B	0.308	7.276
								C	0.308	7.276
T2 175.00-150.00	162.50	162.50	1.135	19.193	1.05	1.3721	6	A	0.236	31.283
								B	0.236	31.283
								C	0.236	31.283
T3 150.00-125.00	137.50	137.50	1.082	12.182	1.08	1.3626	6	A	0.223	32.302
								B	0.223	32.302
								C	0.223	32.302
T4 125.00-100.00	112.50	112.50	1.022	7.733	1.127	1.3557	6	A	0.208	33.355
								B	0.208	33.355
								C	0.208	33.355
T5 100.00-91.67	95.83	95.83	0.976	5.711	1.174	1.3533	6	A	0.199	11.376
								B	0.199	11.376
								C	0.199	11.376
T6 91.67-83.33	87.50	87.50	0.951	4.908	1.204	1.3528	6	A	0.196	11.512
								B	0.196	11.512
								C	0.196	11.512
T7 83.33-75.00	79.17	79.17	0.924	4.218	1.239	1.3529	6	A	0.193	11.653
								B	0.193	11.653

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
								C	0.193	11.653
T8 75.00-50.00	62.50	62.50	0.864	3.115	1.33	1.3544	6	A	0.18	35.826
								B	0.18	35.826
								C	0.18	35.826
T9 50.00-37.50	43.75	43.75	0.78	2.215	1.477	1.3559	6	A	0.173	18.215
								B	0.173	18.215
								C	0.173	18.215
T10 37.50-25.00	31.25	31.25	0.709	1.765	1.614	1.3522	6	A	0.169	18.386
								B	0.169	18.386
								C	0.169	18.386
T11 25.00-0.00	12.50	12.50	0.7	1.255	1.904	1.3076	7	A	0.197	43.802
								B	0.197	43.802
								C	0.197	43.802

222-H Section Verification Tables - Service

Section Elevation ft	z_{wind} ft	z_{ice} ft	K_z	K_h	K_{zt}	t_z in	q_z psf	Face	e	A_rR_r ft²
T1 180.00-175.00	177.50		1.164	25.211	1.038		9	A	0.173	2.003
								B	0.173	2.003
								C	0.173	2.003
T2 175.00-150.00	162.50		1.135	19.193	1.05		9	A	0.135	9.759
								B	0.135	9.759
								C	0.135	9.759
T3 150.00-125.00	137.50		1.082	12.182	1.08		9	A	0.13	9.779
								B	0.13	9.779
								C	0.13	9.779
T4 125.00-100.00	112.50		1.022	7.733	1.127		9	A	0.12	9.755
								B	0.12	9.755
								C	0.12	9.755
T5 100.00-91.67	95.83		0.976	5.711	1.174		9	A	0.115	3.245
								B	0.115	3.245
								C	0.115	3.245
T6 91.67-83.33	87.50		0.951	4.908	1.204		9	A	0.113	3.242
								B	0.113	3.242
								C	0.113	3.242
T7 83.33-75.00	79.17		0.924	4.218	1.239		9	A	0.111	3.237
								B	0.111	3.237
								C	0.111	3.237
T8 75.00-50.00	62.50		0.864	3.115	1.33		9	A	0.116	11.534
								B	0.116	11.534
								C	0.116	11.534
T9 50.00-37.50	43.75		0.78	2.215	1.477		9	A	0.111	5.734
								B	0.111	5.734
								C	0.111	5.734
T10 37.50-25.00	31.25		0.709	1.765	1.614		9	A	0.108	5.715
								B	0.108	5.715
								C	0.108	5.715
T11 25.00-0.00	12.50		0.7	1.255	1.904		10	A	0.121	11.607
								B	0.121	11.607
								C	0.121	11.607

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	177.50	1.164	52	56.085	A	5.526	4.171	4.171	43.01	4.621	0.000
180.00-175.00					B	5.526	4.171		43.01	0.000	0.000
					C	5.526	4.171		43.01	0.000	0.000
T2	162.50	1.135	51	310.425	A	20.963	20.856	20.856	49.87	44.530	0.000
175.00-150.00					B	20.963	20.856		49.87	0.000	0.000
					C	20.963	20.856		49.87	0.777	0.000
T3	137.50	1.082	50	360.425	A	25.950	20.856	20.856	44.56	63.151	0.000
150.00-125.00					B	25.950	20.856		44.56	64.584	0.000
					C	25.950	20.856		44.56	3.774	0.000
T4	112.50	1.022	49	410.425	A	28.497	20.856	20.856	42.26	76.130	0.000
125.00-100.00					B	28.497	20.856		42.26	67.275	0.000
					C	28.497	20.856		42.26	5.550	0.000
T5	95.83	0.976	49	147.919	A	10.075	6.952	6.952	40.83	27.744	0.000
100.00-91.67					B	10.075	6.952		40.83	22.425	0.000
					C	10.075	6.952		40.83	1.850	0.000
T6 91.67-83.33	87.50	0.951	49	153.475	A	10.367	6.952	6.952	40.14	28.182	0.000
					B	10.367	6.952		40.14	22.425	0.000
					C	10.367	6.952		40.14	1.850	0.000
T7 83.33-75.00	79.17	0.924	49	159.031	A	10.660	6.952	6.952	39.47	30.951	0.000
					B	10.660	6.952		39.47	22.425	0.000
					C	10.660	6.952		39.47	1.850	0.000
T8 75.00-50.00	62.50	0.864	49	514.334	A	30.955	28.676	28.676	48.09	97.018	0.000
					B	30.955	28.676		48.09	67.275	0.000
					C	30.955	28.676		48.09	5.550	0.000
T9 50.00-37.50	43.75	0.78	49	275.917	A	16.271	14.338	14.338	46.84	50.269	0.000
					B	16.271	14.338		46.84	33.638	0.000
					C	16.271	14.338		46.84	2.775	0.000
T10	31.25	0.709	49	288.417	A	16.805	14.338	14.338	46.04	50.659	0.000
37.50-25.00					B	16.805	14.338		46.04	33.638	0.000
					C	16.805	14.338		46.04	2.775	0.000
T11 25.00-0.00	12.50	0.7	57	614.334	A	45.951	28.676	28.676	38.43	68.896	0.000
					B	45.951	28.676		38.43	45.747	0.000
					C	45.951	28.676		38.43	3.774	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	177.50	1.164	7	1.3787	57.235	A	5.526	12.098	6.471	36.72	13.518	0.000
180.00-175.00						B	5.526	12.098		36.72	0.000	0.000
						C	5.526	12.098		36.72	0.000	0.000
T2	162.50	1.135	6	1.3721	316.147	A	20.963	53.770	32.302	43.22	115.881	0.000
175.00-150.00						B	20.963	53.770		43.22	0.000	0.000
						C	20.963	53.770		43.22	2.698	0.000
T3	137.50	1.082	6	1.3626	366.107	A	25.950	55.794	32.222	39.42	178.080	0.000
150.00-125.00						B	25.950	55.794		39.42	173.464	0.000
						C	25.950	55.794		39.42	13.039	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T4	112.50	1.022	6	1.3557	416.078	A	28.497	57.921	32.165	37.22	224.148	0.000
125.00-100.00						B	28.497	57.921		37.22	180.550	0.000
						C	28.497	57.921		37.22	19.107	0.000
T5 100.00-91.67	95.83	0.976	6	1.3533	149.800	A	10.075	19.805	10.715	35.86	83.226	0.000
						B	10.075	19.805		35.86	60.167	0.000
						C	10.075	19.805		35.86	6.361	0.000
T6 91.67-83.33	87.50	0.951	6	1.3528	155.355	A	10.367	20.063	10.714	35.21	84.729	0.000
						B	10.367	20.063		35.21	60.164	0.000
						C	10.367	20.063		35.21	6.359	0.000
T7 83.33-75.00	79.17	0.924	6	1.3529	160.911	A	10.660	20.329	10.714	34.57	94.131	0.000
						B	10.660	20.329		34.57	60.164	0.000
						C	10.660	20.329		34.57	6.360	0.000
T8 75.00-50.00	62.50	0.864	6	1.3544	519.982	A	30.955	62.711	39.975	42.68	293.932	0.000
						B	30.955	62.711		42.68	180.524	0.000
						C	30.955	62.711		42.68	19.094	0.000
T9 50.00-37.50	43.75	0.78	6	1.3559	278.744	A	16.271	31.941	19.994	41.47	154.525	0.000
						B	16.271	31.941		41.47	90.277	0.000
						C	16.271	31.941		41.47	9.554	0.000
T10 37.50-25.00	31.25	0.709	6	1.3522	291.237	A	16.805	32.274	19.979	40.71	155.728	0.000
						B	16.805	32.274		40.71	90.240	0.000
						C	16.805	32.274		40.71	9.536	0.000
T11 25.00-0.00	12.50	0.7	7	1.3076	619.787	A	45.951	76.309	39.584	32.38	207.279	0.000
						B	45.951	76.309		32.38	122.101	0.000
						C	45.951	76.309		32.38	12.665	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	177.50	1.164	9	56.085	A	5.526	4.171	4.171	43.01	4.621	0.000
180.00-175.00					B	5.526	4.171		43.01	0.000	0.000
					C	5.526	4.171		43.01	0.000	0.000
T2	162.50	1.135	9	310.425	A	20.963	20.856	20.856	49.87	44.530	0.000
175.00-150.00					B	20.963	20.856		49.87	0.000	0.000
					C	20.963	20.856		49.87	0.777	0.000
T3	137.50	1.082	9	360.425	A	25.950	20.856	20.856	44.56	63.151	0.000
150.00-125.00					B	25.950	20.856		44.56	64.584	0.000
					C	25.950	20.856		44.56	3.774	0.000
T4	112.50	1.022	9	410.425	A	28.497	20.856	20.856	42.26	76.130	0.000
125.00-100.00					B	28.497	20.856		42.26	67.275	0.000
					C	28.497	20.856		42.26	5.550	0.000
T5	95.83	0.976	9	147.919	A	10.075	6.952	6.952	40.83	27.744	0.000
100.00-91.67					B	10.075	6.952		40.83	22.425	0.000
					C	10.075	6.952		40.83	1.850	0.000
T6 91.67-83.33	87.50	0.951	9	153.475	A	10.367	6.952	6.952	40.14	28.182	0.000
					B	10.367	6.952		40.14	22.425	0.000
					C	10.367	6.952		40.14	1.850	0.000
T7 83.33-75.00	79.17	0.924	9	159.031	A	10.660	6.952	6.952	39.47	30.951	0.000
					B	10.660	6.952		39.47	22.425	0.000
					C	10.660	6.952		39.47	1.850	0.000
T8 75.00-50.00	62.50	0.864	9	514.334	A	30.955	28.676	28.676	48.09	97.018	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	30.955	28.676		48.09	67.275	0.000
					C	30.955	28.676		48.09	5.550	0.000
T9 50.00-37.50	43.75	0.78	9	275.917	A	16.271	14.338	14.338	46.84	50.269	0.000
					B	16.271	14.338		46.84	33.638	0.000
					C	16.271	14.338		46.84	2.775	0.000
T10 37.50-25.00	31.25	0.709	9	288.417	A	16.805	14.338	14.338	46.04	50.659	0.000
					B	16.805	14.338		46.04	33.638	0.000
					C	16.805	14.338		46.04	2.775	0.000
T11 25.00-0.00	12.50	0.7	10	614.334	A	45.951	28.676	28.676	38.43	68.896	0.000
					B	45.951	28.676		38.43	45.747	0.000
					C	45.951	28.676		38.43	3.774	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	52	1	1	7.529	1008.71	201.74	C
180.00-175.00			B	0.173	2.689		1	1	7.529			
			C	0.173	2.689		1	1	7.529			
T2	146.06	2596.18	A	0.135	2.829	51	1	1	30.722	4931.54	197.26	C
175.00-150.00			B	0.135	2.829		1	1	30.722			
			C	0.135	2.829		1	1	30.722			
T3	529.71	3454.06	A	0.13	2.847	50	1	1	35.729	7653.26	306.13	C
150.00-125.00			B	0.13	2.847		1	1	35.729			
			C	0.13	2.847		1	1	35.729			
T4	597.20	3678.83	A	0.12	2.884	49	1	1	38.252	8339.86	333.59	C
125.00-100.00			B	0.12	2.884		1	1	38.252			
			C	0.12	2.884		1	1	38.252			
T5	207.88	1457.98	A	0.115	2.904	49	1	1	13.321	2904.23	348.51	C
100.00-91.67			B	0.115	2.904		1	1	13.321			
			C	0.115	2.904		1	1	13.321			
T6	209.60	1485.68	A	0.113	2.913	49	1	1	13.608	2952.15	354.26	C
91.67-83.33			B	0.113	2.913		1	1	13.608			
			C	0.113	2.913		1	1	13.608			
T7	216.24	1805.56	A	0.111	2.921	49	1	1	13.897	3061.37	367.36	C
83.33-75.00			B	0.111	2.921		1	1	13.897			
			C	0.111	2.921		1	1	13.897			
T8	657.80	5810.40	A	0.116	2.901	49	1	1	42.488	9377.69	375.11	C
75.00-50.00			B	0.116	2.901		1	1	42.488			
			C	0.116	2.901		1	1	42.488			
T9	333.76	3327.03	A	0.111	2.92	49	1	1	22.005	4858.06	388.65	C
50.00-37.50			B	0.111	2.92		1	1	22.005			
			C	0.111	2.92		1	1	22.005			
T10	334.90	3385.52	A	0.108	2.932	49	1	1	22.520	4903.81	392.30	C
37.50-25.00			B	0.108	2.932		1	1	22.520			
			C	0.108	2.932		1	1	22.520			
T11	455.46	8143.22	A	0.121	2.879	57	1	1	57.558	11443.04	457.72	C
25.00-0.00			B	0.121	2.879		1	1	57.558			
			C	0.121	2.879		1	1	57.558			
Sum Weight:	3706.17	35773.24						OTM	4844.90 kip-ft	61433.72		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	52	0.825	1	6.562	894.76	178.95	C
180.00-175.00			B	0.173	2.689		0.825	1	6.562			
			C	0.173	2.689		0.825	1	6.562			
T2	146.06	2596.18	A	0.135	2.829	51	0.825	1	27.054	4482.99	179.32	C
175.00-150.00			B	0.135	2.829		0.825	1	27.054			
			C	0.135	2.829		0.825	1	27.054			
T3	529.71	3454.06	A	0.13	2.847	50	0.825	1	31.188	7105.45	284.22	C
150.00-125.00			B	0.13	2.847		0.825	1	31.188			
			C	0.13	2.847		0.825	1	31.188			
T4	597.20	3678.83	A	0.12	2.884	49	0.825	1	33.265	7739.19	309.57	C
125.00-100.00			B	0.12	2.884		0.825	1	33.265			
			C	0.12	2.884		0.825	1	33.265			
T5	207.88	1457.98	A	0.115	2.904	49	0.825	1	11.558	2691.48	322.98	C
100.00-91.67			B	0.115	2.904		0.825	1	11.558			
			C	0.115	2.904		0.825	1	11.558			
T6	209.60	1485.68	A	0.113	2.913	49	0.825	1	11.794	2732.77	327.93	C
91.67-83.33			B	0.113	2.913		0.825	1	11.794			
			C	0.113	2.913		0.825	1	11.794			
T7	216.24	1805.56	A	0.111	2.921	49	0.825	1	12.032	2835.11	340.21	C
83.33-75.00			B	0.111	2.921		0.825	1	12.032			
			C	0.111	2.921		0.825	1	12.032			
T8	657.80	5810.40	A	0.116	2.901	49	0.825	1	37.071	8723.21	348.93	C
75.00-50.00			B	0.116	2.901		0.825	1	37.071			
			C	0.116	2.901		0.825	1	37.071			
T9	333.76	3327.03	A	0.111	2.92	49	0.825	1	19.157	4510.63	360.85	C
50.00-37.50			B	0.111	2.92		0.825	1	19.157			
			C	0.111	2.92		0.825	1	19.157			
T10	334.90	3385.52	A	0.108	2.932	49	0.825	1	19.579	4546.28	363.70	C
37.50-25.00			B	0.108	2.932		0.825	1	19.579			
			C	0.108	2.932		0.825	1	19.579			
T11	455.46	8143.22	A	0.121	2.879	57	0.825	1	49.517	10324.07	412.96	C
25.00-0.00			B	0.121	2.879		0.825	1	49.517			
			C	0.121	2.879		0.825	1	49.517			
Sum Weight:	3706.17	35773.24						OTM	4470.12 kip-ft	56585.94		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	52	0.8	1	6.424	878.48	175.70	C
180.00-175.00			B	0.173	2.689		0.8	1	6.424			
			C	0.173	2.689		0.8	1	6.424			
T2	146.06	2596.18	A	0.135	2.829	51	0.8	1	26.530	4418.91	176.76	C
175.00-150.00			B	0.135	2.829		0.8	1	26.530			
			C	0.135	2.829		0.8	1	26.530			
T3	529.71	3454.06	A	0.13	2.847	50	0.8	1	30.539	7027.19	281.09	C
150.00-125.00			B	0.13	2.847		0.8	1	30.539			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.13	2.847		0.8	1	30.539			
T4	597.20	3678.83	A	0.12	2.884	49	0.8	1	32.552	7653.38	306.14	C
125.00-100.00			B	0.12	2.884		0.8	1	32.552			
			C	0.12	2.884		0.8	1	32.552			
T5	207.88	1457.98	A	0.115	2.904	49	0.8	1	11.306	2661.08	319.33	C
100.00-91.67			B	0.115	2.904		0.8	1	11.306			
			C	0.115	2.904		0.8	1	11.306			
T6	209.60	1485.68	A	0.113	2.913	49	0.8	1	11.535	2701.43	324.17	C
91.67-83.33			B	0.113	2.913		0.8	1	11.535			
			C	0.113	2.913		0.8	1	11.535			
T7	216.24	1805.56	A	0.111	2.921	49	0.8	1	11.765	2802.79	336.33	C
83.33-75.00			B	0.111	2.921		0.8	1	11.765			
			C	0.111	2.921		0.8	1	11.765			
T8	657.80	5810.40	A	0.116	2.901	49	0.8	1	36.297	8629.71	345.19	C
75.00-50.00			B	0.116	2.901		0.8	1	36.297			
			C	0.116	2.901		0.8	1	36.297			
T9	333.76	3327.03	A	0.111	2.92	49	0.8	1	18.751	4460.99	356.88	C
50.00-37.50			B	0.111	2.92		0.8	1	18.751			
			C	0.111	2.92		0.8	1	18.751			
T10	334.90	3385.52	A	0.108	2.932	49	0.8	1	19.159	4495.21	359.62	C
37.50-25.00			B	0.108	2.932		0.8	1	19.159			
			C	0.108	2.932		0.8	1	19.159			
T11	455.46	8143.22	A	0.121	2.879	57	0.8	1	48.368	10164.22	406.57	C
25.00-0.00			B	0.121	2.879		0.8	1	48.368			
			C	0.121	2.879		0.8	1	48.368			
Sum Weight:	3706.17	35773.24						OTM	4416.58 kip-ft	55893.40		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	52	0.85	1	6.701	911.04	182.21	C
180.00-175.00			B	0.173	2.689		0.85	1	6.701			
			C	0.173	2.689		0.85	1	6.701			
T2	146.06	2596.18	A	0.135	2.829	51	0.85	1	27.578	4547.07	181.88	C
175.00-150.00			B	0.135	2.829		0.85	1	27.578			
			C	0.135	2.829		0.85	1	27.578			
T3	529.71	3454.06	A	0.13	2.847	50	0.85	1	31.836	7183.71	287.35	C
150.00-125.00			B	0.13	2.847		0.85	1	31.836			
			C	0.13	2.847		0.85	1	31.836			
T4	597.20	3678.83	A	0.12	2.884	49	0.85	1	33.977	7825.00	313.00	C
125.00-100.00			B	0.12	2.884		0.85	1	33.977			
			C	0.12	2.884		0.85	1	33.977			
T5	207.88	1457.98	A	0.115	2.904	49	0.85	1	11.809	2721.87	326.62	C
100.00-91.67			B	0.115	2.904		0.85	1	11.809			
			C	0.115	2.904		0.85	1	11.809			
T6	209.60	1485.68	A	0.113	2.913	49	0.85	1	12.053	2764.11	331.69	C
91.67-83.33			B	0.113	2.913		0.85	1	12.053			
			C	0.113	2.913		0.85	1	12.053			
T7	216.24	1805.56	A	0.111	2.921	49	0.85	1	12.298	2867.43	344.09	C
83.33-75.00			B	0.111	2.921		0.85	1	12.298			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	0.111	2.921		0.85	1	12.298			
T8	657.80	5810.40	A	0.116	2.901	49	0.85	1	37.845	8816.71	352.67	C
75.00-50.00			B	0.116	2.901		0.85	1	37.845			
			C	0.116	2.901		0.85	1	37.845			
T9	333.76	3327.03	A	0.111	2.92	49	0.85	1	19.564	4560.26	364.82	C
50.00-37.50			B	0.111	2.92		0.85	1	19.564			
			C	0.111	2.92		0.85	1	19.564			
T10	334.90	3385.52	A	0.108	2.932	49	0.85	1	19.999	4597.36	367.79	C
37.50-25.00			B	0.108	2.932		0.85	1	19.999			
			C	0.108	2.932		0.85	1	19.999			
T11	455.46	8143.22	A	0.121	2.879	57	0.85	1	50.666	10483.93	419.36	C
25.00-0.00			B	0.121	2.879		0.85	1	50.666			
			C	0.121	2.879		0.85	1	50.666			
Sum Weight:	3706.17	35773.24						OTM	4523.66 kip-ft	57278.48		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	158.09	1730.24	A	0.308	2.275	7	1	1	12.802	208.13	41.63	C
180.00-175.00			B	0.308	2.275		1	1	12.802			
			C	0.308	2.275		1	1	12.802			
T2	1384.56	6929.86	A	0.236	2.479	6	1	1	52.246	1106.39	44.26	C
175.00-150.00			B	0.236	2.479		1	1	52.246			
			C	0.236	2.479		1	1	52.246			
T3	4501.21	8447.54	A	0.223	2.52	6	1	1	58.252	1975.60	79.02	C
150.00-125.00			B	0.223	2.52		1	1	58.252			
			C	0.223	2.52		1	1	58.252			
T4	5185.98	9037.62	A	0.208	2.57	6	1	1	61.852	2201.51	88.06	C
125.00-100.00			B	0.208	2.57		1	1	61.852			
			C	0.208	2.57		1	1	61.852			
T5	1824.77	3393.79	A	0.199	2.598	6	1	1	21.451	771.55	92.59	C
100.00-91.67			B	0.199	2.598		1	1	21.451			
			C	0.199	2.598		1	1	21.451			
T6	1842.02	3468.56	A	0.196	2.61	6	1	1	21.878	782.87	93.94	C
91.67-83.33			B	0.196	2.61		1	1	21.878			
			C	0.196	2.61		1	1	21.878			
T7	1943.94	3836.72	A	0.193	2.621	6	1	1	22.313	820.20	98.42	C
83.33-75.00			B	0.193	2.621		1	1	22.313			
			C	0.193	2.621		1	1	22.313			
T8	5962.38	11466.12	A	0.18	2.664	6	1	1	66.781	2518.19	100.73	C
75.00-50.00			B	0.18	2.664		1	1	66.781			
			C	0.18	2.664		1	1	66.781			
T9	3066.07	6308.01	A	0.173	2.689	6	1	1	34.485	1307.48	104.60	C
50.00-37.50			B	0.173	2.689		1	1	34.485			
			C	0.173	2.689		1	1	34.485			
T10	3073.25	6434.61	A	0.169	2.705	6	1	1	35.191	1314.05	105.12	C
37.50-25.00			B	0.169	2.705		1	1	35.191			
			C	0.169	2.705		1	1	35.191			
T11	4024.61	15416.29	A	0.197	2.605	7	1	1	89.753	2706.48	108.26	C
25.00-0.00			B	0.197	2.605		1	1	89.753			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
Sum Weight:	32966.87	76469.36	C	0.197	2.605		1	1 OTM	89.753 1232.90 kip-ft	15712.44		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	158.09	1730.24	A	0.308	2.275	7	0.825	1	11.835	195.84	39.17	C
180.00-175.00			B	0.308	2.275		0.825	1	11.835			
			C	0.308	2.275		0.825	1	11.835			
T2	1384.56	6929.86	A	0.236	2.479	6	0.825	1	48.577	1056.25	42.25	C
175.00-150.00			B	0.236	2.479		0.825	1	48.577			
			C	0.236	2.479		0.825	1	48.577			
T3	4501.21	8447.54	A	0.223	2.52	6	0.825	1	53.711	1913.74	76.55	C
150.00-125.00			B	0.223	2.52		0.825	1	53.711			
			C	0.223	2.52		0.825	1	53.711			
T4	5185.98	9037.62	A	0.208	2.57	6	0.825	1	56.865	2133.23	85.33	C
125.00-100.00			B	0.208	2.57		0.825	1	56.865			
			C	0.208	2.57		0.825	1	56.865			
T5	1824.77	3393.79	A	0.199	2.598	6	0.825	1	19.688	747.27	89.67	C
100.00-91.67			B	0.199	2.598		0.825	1	19.688			
			C	0.199	2.598		0.825	1	19.688			
T6	1842.02	3468.56	A	0.196	2.61	6	0.825	1	20.064	757.80	90.94	C
91.67-83.33			B	0.196	2.61		0.825	1	20.064			
			C	0.196	2.61		0.825	1	20.064			
T7	1943.94	3836.72	A	0.193	2.621	6	0.825	1	20.447	794.31	95.32	C
83.33-75.00			B	0.193	2.621		0.825	1	20.447			
			C	0.193	2.621		0.825	1	20.447			
T8	5962.38	11466.12	A	0.18	2.664	6	0.825	1	61.363	2441.53	97.66	C
75.00-50.00			B	0.18	2.664		0.825	1	61.363			
			C	0.18	2.664		0.825	1	61.363			
T9	3066.07	6308.01	A	0.173	2.689	6	0.825	1	31.638	1266.68	101.33	C
50.00-37.50			B	0.173	2.689		0.825	1	31.638			
			C	0.173	2.689		0.825	1	31.638			
T10	3073.25	6434.61	A	0.169	2.705	6	0.825	1	32.250	1271.98	101.76	C
37.50-25.00			B	0.169	2.705		0.825	1	32.250			
			C	0.169	2.705		0.825	1	32.250			
T11	4024.61	15416.29	A	0.197	2.605	7	0.825	1	81.711	2577.34	103.09	C
25.00-0.00			B	0.197	2.605		0.825	1	81.711			
			C	0.197	2.605		0.825	1	81.711			
Sum Weight:	32966.87	76469.36						OTM	1190.31 kip-ft	15155.96		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	158.09	1730.24	A	0.308	2.275	7	0.8	1	11.697	194.08	38.82	C
180.00-175.00			B	0.308	2.275		0.8	1	11.697			
			C	0.308	2.275		0.8	1	11.697			
T2	1384.56	6929.86	A	0.236	2.479	6	0.8	1	48.053	1049.09	41.96	C
175.00-150.00			B	0.236	2.479		0.8	1	48.053			
			C	0.236	2.479		0.8	1	48.053			
T3	4501.21	8447.54	A	0.223	2.52	6	0.8	1	53.062	1904.91	76.20	C
150.00-125.00			B	0.223	2.52		0.8	1	53.062			
			C	0.223	2.52		0.8	1	53.062			
T4	5185.98	9037.62	A	0.208	2.57	6	0.8	1	56.153	2123.47	84.94	C
125.00-100.00			B	0.208	2.57		0.8	1	56.153			
			C	0.208	2.57		0.8	1	56.153			
T5	1824.77	3393.79	A	0.199	2.598	6	0.8	1	19.436	743.80	89.26	C
100.00-91.67			B	0.199	2.598		0.8	1	19.436			
			C	0.199	2.598		0.8	1	19.436			
T6	1842.02	3468.56	A	0.196	2.61	6	0.8	1	19.805	754.22	90.51	C
91.67-83.33			B	0.196	2.61		0.8	1	19.805			
			C	0.196	2.61		0.8	1	19.805			
T7	1943.94	3836.72	A	0.193	2.621	6	0.8	1	20.181	790.61	94.87	C
83.33-75.00			B	0.193	2.621		0.8	1	20.181			
			C	0.193	2.621		0.8	1	20.181			
T8	5962.38	11466.12	A	0.18	2.664	6	0.8	1	60.590	2430.58	97.22	C
75.00-50.00			B	0.18	2.664		0.8	1	60.590			
			C	0.18	2.664		0.8	1	60.590			
T9	3066.07	6308.01	A	0.173	2.689	6	0.8	1	31.231	1260.85	100.87	C
50.00-37.50			B	0.173	2.689		0.8	1	31.231			
			C	0.173	2.689		0.8	1	31.231			
T10	3073.25	6434.61	A	0.169	2.705	6	0.8	1	31.830	1265.97	101.28	C
37.50-25.00			B	0.169	2.705		0.8	1	31.830			
			C	0.169	2.705		0.8	1	31.830			
T11	4024.61	15416.29	A	0.197	2.605	7	0.8	1	80.563	2558.89	102.36	C
25.00-0.00			B	0.197	2.605		0.8	1	80.563			
			C	0.197	2.605		0.8	1	80.563			
Sum Weight:	32966.87	76469.36						OTM	1184.23 kip-ft	15076.46		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	158.09	1730.24	A	0.308	2.275	7	0.85	1	11.973	197.59	39.52	C
180.00-175.00			B	0.308	2.275		0.85	1	11.973			
			C	0.308	2.275		0.85	1	11.973			
T2	1384.56	6929.86	A	0.236	2.479	6	0.85	1	49.101	1063.41	42.54	C
175.00-150.00			B	0.236	2.479		0.85	1	49.101			
			C	0.236	2.479		0.85	1	49.101			
T3	4501.21	8447.54	A	0.223	2.52	6	0.85	1	54.359	1922.58	76.90	C
150.00-125.00			B	0.223	2.52		0.85	1	54.359			
			C	0.223	2.52		0.85	1	54.359			
T4	5185.98	9037.62	A	0.208	2.57	6	0.85	1	57.578	2142.98	85.72	C
125.00-100.00			B	0.208	2.57		0.85	1	57.578			
			C	0.208	2.57		0.85	1	57.578			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T5	1824.77	3393.79	A	0.199	2.598	6	0.85	1	19.940	750.74	90.09	C
100.00-91.67			B	0.199	2.598		0.85	1	19.940			
			C	0.199	2.598		0.85	1	19.940			
T6	1842.02	3468.56	A	0.196	2.61	6	0.85	1	20.323	761.38	91.37	C
91.67-83.33			B	0.196	2.61		0.85	1	20.323			
			C	0.196	2.61		0.85	1	20.323			
T7	1943.94	3836.72	A	0.193	2.621	6	0.85	1	20.714	798.01	95.76	C
83.33-75.00			B	0.193	2.621		0.85	1	20.714			
			C	0.193	2.621		0.85	1	20.714			
T8	5962.38	11466.12	A	0.18	2.664	6	0.85	1	62.137	2452.48	98.10	C
75.00-50.00			B	0.18	2.664		0.85	1	62.137			
			C	0.18	2.664		0.85	1	62.137			
T9	3066.07	6308.01	A	0.173	2.689	6	0.85	1	32.045	1272.51	101.80	C
50.00-37.50			B	0.173	2.689		0.85	1	32.045			
			C	0.173	2.689		0.85	1	32.045			
T10	3073.25	6434.61	A	0.169	2.705	6	0.85	1	32.670	1277.99	102.24	C
37.50-25.00			B	0.169	2.705		0.85	1	32.670			
			C	0.169	2.705		0.85	1	32.670			
T11	4024.61	15416.29	A	0.197	2.605	7	0.85	1	82.860	2595.78	103.83	C
25.00-0.00			B	0.197	2.605		0.85	1	82.860			
			C	0.197	2.605		0.85	1	82.860			
Sum Weight:	32966.87	76469.36						OTM	1196.40 kip-ft	15235.46		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	9	1	1	7.529	185.27	37.05	C
180.00-175.00			B	0.173	2.689		1	1	7.529			
			C	0.173	2.689		1	1	7.529			
T2	146.06	2596.18	A	0.135	2.829	9	1	1	30.722	905.79	36.23	C
175.00-150.00			B	0.135	2.829		1	1	30.722			
			C	0.135	2.829		1	1	30.722			
T3	529.71	3454.06	A	0.13	2.847	9	1	1	35.729	1405.70	56.23	C
150.00-125.00			B	0.13	2.847		1	1	35.729			
			C	0.13	2.847		1	1	35.729			
T4	597.20	3678.83	A	0.12	2.884	9	1	1	38.252	1531.81	61.27	C
125.00-100.00			B	0.12	2.884		1	1	38.252			
			C	0.12	2.884		1	1	38.252			
T5	207.88	1457.98	A	0.115	2.904	9	1	1	13.321	533.43	64.01	C
100.00-91.67			B	0.115	2.904		1	1	13.321			
			C	0.115	2.904		1	1	13.321			
T6	209.60	1485.68	A	0.113	2.913	9	1	1	13.608	542.23	65.07	C
91.67-83.33			B	0.113	2.913		1	1	13.608			
			C	0.113	2.913		1	1	13.608			
T7	216.24	1805.56	A	0.111	2.921	9	1	1	13.897	562.29	67.48	C
83.33-75.00			B	0.111	2.921		1	1	13.897			
			C	0.111	2.921		1	1	13.897			
T8	657.80	5810.40	A	0.116	2.901	9	1	1	42.488	1722.43	68.90	C
75.00-50.00			B	0.116	2.901		1	1	42.488			
			C	0.116	2.901		1	1	42.488			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T9	333.76	3327.03	A	0.111	2.92	9	1	1	22.005	892.30	71.38	C
50.00-37.50			B	0.111	2.92		1	1	22.005			
			C	0.111	2.92		1	1	22.005			
T10	334.90	3385.52	A	0.108	2.932	9	1	1	22.520	900.70	72.06	C
37.50-25.00			B	0.108	2.932		1	1	22.520			
			C	0.108	2.932		1	1	22.520			
T11	455.46	8143.22	A	0.121	2.879	10	1	1	57.558	2101.78	84.07	C
25.00-0.00			B	0.121	2.879		1	1	57.558			
			C	0.121	2.879		1	1	57.558			
Sum Weight:	3706.17	35773.24						OTM	889.88 kip-ft	11283.74		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	9	0.825	1	6.562	164.34	32.87	C
180.00-175.00			B	0.173	2.689		0.825	1	6.562			
			C	0.173	2.689		0.825	1	6.562			
T2	146.06	2596.18	A	0.135	2.829	9	0.825	1	27.054	823.41	32.94	C
175.00-150.00			B	0.135	2.829		0.825	1	27.054			
			C	0.135	2.829		0.825	1	27.054			
T3	529.71	3454.06	A	0.13	2.847	9	0.825	1	31.188	1305.08	52.20	C
150.00-125.00			B	0.13	2.847		0.825	1	31.188			
			C	0.13	2.847		0.825	1	31.188			
T4	597.20	3678.83	A	0.12	2.884	9	0.825	1	33.265	1421.48	56.86	C
125.00-100.00			B	0.12	2.884		0.825	1	33.265			
			C	0.12	2.884		0.825	1	33.265			
T5	207.88	1457.98	A	0.115	2.904	9	0.825	1	11.558	494.35	59.32	C
100.00-91.67			B	0.115	2.904		0.825	1	11.558			
			C	0.115	2.904		0.825	1	11.558			
T6	209.60	1485.68	A	0.113	2.913	9	0.825	1	11.794	501.94	60.23	C
91.67-83.33			B	0.113	2.913		0.825	1	11.794			
			C	0.113	2.913		0.825	1	11.794			
T7	216.24	1805.56	A	0.111	2.921	9	0.825	1	12.032	520.73	62.49	C
83.33-75.00			B	0.111	2.921		0.825	1	12.032			
			C	0.111	2.921		0.825	1	12.032			
T8	657.80	5810.40	A	0.116	2.901	9	0.825	1	37.071	1602.22	64.09	C
75.00-50.00			B	0.116	2.901		0.825	1	37.071			
			C	0.116	2.901		0.825	1	37.071			
T9	333.76	3327.03	A	0.111	2.92	9	0.825	1	19.157	828.48	66.28	C
50.00-37.50			B	0.111	2.92		0.825	1	19.157			
			C	0.111	2.92		0.825	1	19.157			
T10	334.90	3385.52	A	0.108	2.932	9	0.825	1	19.579	835.03	66.80	C
37.50-25.00			B	0.108	2.932		0.825	1	19.579			
			C	0.108	2.932		0.825	1	19.579			
T11	455.46	8143.22	A	0.121	2.879	10	0.825	1	49.517	1896.26	75.85	C
25.00-0.00			B	0.121	2.879		0.825	1	49.517			
			C	0.121	2.879		0.825	1	49.517			
Sum Weight:	3706.17	35773.24						OTM	821.04 kip-ft	10393.34		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	9	0.8	1	6.424	161.35	32.27	C
180.00-175.00			B	0.173	2.689		0.8	1	6.424			
			C	0.173	2.689		0.8	1	6.424			
T2	146.06	2596.18	A	0.135	2.829	9	0.8	1	26.530	811.64	32.47	C
175.00-150.00			B	0.135	2.829		0.8	1	26.530			
			C	0.135	2.829		0.8	1	26.530			
T3	529.71	3454.06	A	0.13	2.847	9	0.8	1	30.539	1290.71	51.63	C
150.00-125.00			B	0.13	2.847		0.8	1	30.539			
			C	0.13	2.847		0.8	1	30.539			
T4	597.20	3678.83	A	0.12	2.884	9	0.8	1	32.552	1405.72	56.23	C
125.00-100.00			B	0.12	2.884		0.8	1	32.552			
			C	0.12	2.884		0.8	1	32.552			
T5	207.88	1457.98	A	0.115	2.904	9	0.8	1	11.306	488.77	58.65	C
100.00-91.67			B	0.115	2.904		0.8	1	11.306			
			C	0.115	2.904		0.8	1	11.306			
T6	209.60	1485.68	A	0.113	2.913	9	0.8	1	11.535	496.18	59.54	C
91.67-83.33			B	0.113	2.913		0.8	1	11.535			
			C	0.113	2.913		0.8	1	11.535			
T7	216.24	1805.56	A	0.111	2.921	9	0.8	1	11.765	514.80	61.78	C
83.33-75.00			B	0.111	2.921		0.8	1	11.765			
			C	0.111	2.921		0.8	1	11.765			
T8	657.80	5810.40	A	0.116	2.901	9	0.8	1	36.297	1585.05	63.40	C
75.00-50.00			B	0.116	2.901		0.8	1	36.297			
			C	0.116	2.901		0.8	1	36.297			
T9	333.76	3327.03	A	0.111	2.92	9	0.8	1	18.751	819.37	65.55	C
50.00-37.50			B	0.111	2.92		0.8	1	18.751			
			C	0.111	2.92		0.8	1	18.751			
T10	334.90	3385.52	A	0.108	2.932	9	0.8	1	19.159	825.65	66.05	C
37.50-25.00			B	0.108	2.932		0.8	1	19.159			
			C	0.108	2.932		0.8	1	19.159			
T11	455.46	8143.22	A	0.121	2.879	10	0.8	1	48.368	1866.90	74.68	C
25.00-0.00			B	0.121	2.879		0.8	1	48.368			
			C	0.121	2.879		0.8	1	48.368			
Sum Weight:	3706.17	35773.24						OTM	811.21 kip-ft	10266.13		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	17.55	628.79	A	0.173	2.689	9	0.85	1	6.701	167.33	33.47	C
180.00-175.00			B	0.173	2.689		0.85	1	6.701			
			C	0.173	2.689		0.85	1	6.701			
T2	146.06	2596.18	A	0.135	2.829	9	0.85	1	27.578	835.18	33.41	C
175.00-150.00			B	0.135	2.829		0.85	1	27.578			
			C	0.135	2.829		0.85	1	27.578			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T3	529.71	3454.06	A	0.13	2.847	9	0.85	1	31.836	1319.46	52.78	C
150.00-125.00			B	0.13	2.847		0.85	1	31.836			
			C	0.13	2.847		0.85	1	31.836			
T4	597.20	3678.83	A	0.12	2.884	9	0.85	1	33.977	1437.24	57.49	C
125.00-100.00			B	0.12	2.884		0.85	1	33.977			
			C	0.12	2.884		0.85	1	33.977			
T5	207.88	1457.98	A	0.115	2.904	9	0.85	1	11.809	499.94	59.99	C
100.00-91.67			B	0.115	2.904		0.85	1	11.809			
			C	0.115	2.904		0.85	1	11.809			
T6	209.60	1485.68	A	0.113	2.913	9	0.85	1	12.053	507.69	60.92	C
91.67-83.33			B	0.113	2.913		0.85	1	12.053			
			C	0.113	2.913		0.85	1	12.053			
T7	216.24	1805.56	A	0.111	2.921	9	0.85	1	12.298	526.67	63.20	C
83.33-75.00			B	0.111	2.921		0.85	1	12.298			
			C	0.111	2.921		0.85	1	12.298			
T8	657.80	5810.40	A	0.116	2.901	9	0.85	1	37.845	1619.40	64.78	C
75.00-50.00			B	0.116	2.901		0.85	1	37.845			
			C	0.116	2.901		0.85	1	37.845			
T9	333.76	3327.03	A	0.111	2.92	9	0.85	1	19.564	837.60	67.01	C
50.00-37.50			B	0.111	2.92		0.85	1	19.564			
			C	0.111	2.92		0.85	1	19.564			
T10	334.90	3385.52	A	0.108	2.932	9	0.85	1	19.999	844.41	67.55	C
37.50-25.00			B	0.108	2.932		0.85	1	19.999			
			C	0.108	2.932		0.85	1	19.999			
T11	455.46	8143.22	A	0.121	2.879	10	0.85	1	50.666	1925.62	77.02	C
25.00-0.00			B	0.121	2.879		0.85	1	50.666			
			C	0.121	2.879		0.85	1	50.666			
Sum Weight:	3706.17	35773.24						OTM	830.88 kip-ft	10520.54		

Force Totals

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	10768.21					
Bracing Weight	25005.03					
Total Member Self-Weight	35773.24			18.19	1.84	
Total Weight	44718.64			18.19	1.84	
Wind 0 deg - No Ice		-241.07	-80589.15	-7692.92	46.15	-22.63
Wind 30 deg - No Ice		37796.99	-66073.17	-6359.48	-3615.81	41.26
Wind 45 deg - No Ice		53088.10	-53386.77	-5138.06	-5099.36	70.06
Wind 60 deg - No Ice		64507.86	-37315.64	-3584.84	-6215.68	94.09
Wind 90 deg - No Ice		76011.52	241.07	62.49	-7310.19	121.72
Wind 120 deg - No Ice		69546.99	40503.35	3912.11	-6630.91	116.73
Wind 135 deg - No Ice		55387.83	55686.50	5388.52	-5313.45	102.07
Wind 150 deg - No Ice		38214.53	66314.24	6440.16	-3692.54	80.46
Wind 180 deg - No Ice		241.07	75048.83	7300.99	-42.46	22.63
Wind 210 deg - No Ice		-37796.99	66073.17	6395.86	3619.49	-41.26
Wind 225 deg - No Ice		-53088.10	53386.77	5174.44	5103.04	-70.06
Wind 240 deg - No Ice		-69305.92	40085.80	3835.38	6590.29	-94.09
Wind 270 deg - No Ice		-76011.52	-241.07	-26.11	7313.87	-121.72
Wind 300 deg - No Ice		-64748.93	-37733.19	-3661.58	6263.66	-116.73

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 315 deg - No Ice		-53429.03	-53727.70	-5200.71	5165.70	-102.07
Wind 330 deg - No Ice		-38214.53	-66314.24	-6403.78	3696.22	-80.46
Member Ice	40696.12					
Total Weight Ice	124253.80			127.74	44.96	
Wind 0 deg - Ice		-28.67	-19685.71	-1689.48	50.30	-18.75
Wind 30 deg - Ice		9553.09	-16620.91	-1411.73	-835.85	1.95
Wind 45 deg - Ice		13468.74	-13506.14	-1123.33	-1199.16	12.46
Wind 60 deg - Ice		16437.42	-9500.04	-751.90	-1475.46	22.12
Wind 90 deg - Ice		19155.85	28.67	133.08	-1725.92	36.36
Wind 120 deg - Ice		17016.86	9867.69	1040.98	-1522.96	40.87
Wind 135 deg - Ice		13734.14	13771.54	1403.58	-1223.93	38.97
Wind 150 deg - Ice		9602.76	16649.59	1672.55	-845.11	34.42
Wind 180 deg - Ice		28.67	19049.74	1896.28	39.62	18.75
Wind 210 deg - Ice		-9553.09	16620.91	1667.21	925.77	-1.95
Wind 225 deg - Ice		-13468.74	13506.14	1378.81	1289.08	-12.46
Wind 240 deg - Ice		-16988.19	9818.03	1031.72	1607.53	-22.12
Wind 270 deg - Ice		-19155.85	-28.67	122.39	1815.84	-36.36
Wind 300 deg - Ice		-16466.10	-9549.70	-761.16	1570.72	-40.87
Wind 315 deg - Ice		-13509.29	-13546.69	-1130.89	1296.64	-38.97
Wind 330 deg - Ice		-9602.76	-16649.59	-1417.07	935.03	-34.42
Total Weight	44718.64			18.19	1.84	
Wind 0 deg - Service		-44.28	-14802.09	-1410.72	11.23	-4.16
Wind 30 deg - Service		6942.30	-12135.89	-1165.80	-661.37	7.58
Wind 45 deg - Service		9750.88	-9805.73	-941.46	-933.86	12.87
Wind 60 deg - Service		11848.38	-6853.89	-656.17	-1138.90	17.28
Wind 90 deg - Service		13961.30	44.28	13.75	-1339.93	22.36
Wind 120 deg - Service		12773.94	7439.39	720.82	-1215.17	21.44
Wind 135 deg - Service		10173.27	10228.13	992.00	-973.18	18.75
Wind 150 deg - Service		7019.00	12180.17	1185.15	-675.47	14.78
Wind 180 deg - Service		44.28	13784.48	1343.26	-5.04	4.16
Wind 210 deg - Service		-6942.30	12135.89	1177.02	667.56	-7.58
Wind 225 deg - Service		-9750.88	9805.73	952.67	940.05	-12.87
Wind 240 deg - Service		-12729.66	7362.70	706.72	1213.22	-17.28
Wind 270 deg - Service		-13961.30	-44.28	-2.53	1346.12	-22.36
Wind 300 deg - Service		-11892.66	-6930.59	-670.27	1153.22	-21.44
Wind 315 deg - Service		-9813.49	-9868.35	-952.96	951.56	-18.75
Wind 330 deg - Service		-7019.00	-12180.17	-1173.94	681.65	-14.78

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
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice

Comb. No.	Description
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

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 175	Leg	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	35	-1420.10	0.13	0.10
			Max. Mx	3	-497.59	0.82	0.60
			Max. My	32	-280.40	-0.03	1.51
			Max. Vy	18	372.57	-0.81	-0.60
			Max. Vx	2	-486.69	-0.37	1.37
		Diagonal	Max Tension	25	519.47	0.00	0.00
			Max. Compression	24	-666.11	0.00	0.00
			Max. Mx	34	-187.70	0.09	0.00
			Max. My	34	-171.55	0.00	-0.00
			Max. Vy	34	-49.46	0.00	0.00
			Max. Vx	34	1.54	0.00	0.00
		Top Girt	Max Tension	9	477.73	0.01	-0.00
			Max. Compression	24	-503.73	0.00	0.00
			Max. Mx	48	-11.74	0.05	-0.00
			Max. My	24	-21.54	0.02	-0.00
			Max. Vy	48	-50.85	0.05	-0.00
			Max. Vx	46	1.27	0.05	-0.00
		Inner Bracing	Max Tension	24	8.73	0.00	0.00
			Max. Compression	24	-9.98	0.00	0.00
			Max. Mx	34	0.42	-0.04	0.00
			Max. Vy	34	31.70	0.00	0.00
T2	175 - 150	Leg	Max Tension	19	15129.87	0.12	0.08
			Max. Compression	12	-18567.56	0.62	-0.17
			Max. Mx	2	-891.02	-1.20	0.55
			Max. My	32	-1597.59	-0.02	-2.50
			Max. Vy	28	-1751.69	-0.80	0.49
			Max. Vx	6	-2532.73	0.13	-0.36
		Diagonal	Max Tension	11	9467.87	0.00	0.00
			Max. Compression	10	-9623.08	0.00	0.00
			Max. Mx	34	-133.79	0.15	0.00
			Max. My	34	-144.68	0.00	-0.01
			Max. Vy	34	-58.24	0.00	0.00
			Max. Vx	34	-2.19	0.00	0.00
		Horizontal	Max Tension	26	5710.19	0.03	-0.00
			Max. Compression	11	-5676.86	0.00	0.00
			Max. Mx	43	202.84	0.08	0.00
			Max. My	2	1010.05	0.02	-0.02
			Max. Vy	43	60.72	0.08	0.00
			Max. Vx	2	3.49	0.02	-0.02
		Inner Bracing	Max Tension	3	5.59	0.00	0.00
			Max. Compression	18	-8.49	0.00	0.00
			Max. Mx	34	-5.07	-0.06	0.00
			Max. Vy	34	36.72	0.00	0.00
T3	150 - 125	Leg	Max Tension	19	49381.38	-0.44	-0.03
			Max. Compression	2	-58249.12	0.24	-0.03
			Max. Mx	3	-28005.24	0.63	0.08
			Max. My	14	3755.33	-0.17	-0.76
			Max. Vy	8	-1376.13	-0.62	-0.09
			Max. Vx	16	-1476.13	-0.01	-0.75
		Diagonal	Max Tension	11	13042.07	0.00	0.00
			Max. Compression	10	-13291.42	0.00	0.00
			Max. Mx	34	-205.51	0.25	0.00
			Max. My	34	-201.11	0.00	-0.01
			Max. Vy	34	-88.55	0.00	0.00
			Max. Vx	34	3.06	0.00	0.00
		Horizontal	Max Tension	10	8836.39	0.00	0.00
			Max. Compression	11	-8714.04	0.00	0.00
			Max. Mx	43	194.00	0.12	0.00
			Max. My	2	400.46	0.01	-0.02
			Max. Vy	43	70.86	0.12	0.00
			Max. Vx	2	3.65	0.01	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	3	5.25	0.00	0.00
			Max. Compression	18	-9.38	0.00	0.00
			Max. Mx	34	-6.49	-0.08	0.00
			Max. Vy	34	42.42	0.00	0.00
T4	125 - 100	Leg	Max Tension	19	92612.24	-0.38	-0.02
			Max. Compression	2	-106296.13	0.34	-0.03
			Max. Mx	3	-88484.98	0.40	0.02
			Max. My	14	14627.93	-0.11	-0.47
			Max. Vy	8	-295.76	-0.36	-0.06
			Max. Vx	15	-500.23	-0.10	-0.46
		Diagonal	Max Tension	11	15086.36	0.00	0.00
			Max. Compression	10	-15374.01	0.00	0.00
			Max. Mx	34	-191.62	0.30	0.00
			Max. My	34	-243.32	0.00	-0.01
			Max. Vy	34	-100.03	0.00	0.00
			Max. Vx	34	3.24	0.00	0.00
		Horizontal	Max Tension	10	10920.75	0.00	0.00
			Max. Compression	11	-10760.80	0.00	0.00
			Max. Mx	43	-193.78	0.15	0.00
			Max. My	2	212.85	0.01	-0.02
			Max. Vy	43	-80.37	0.15	0.00
			Max. Vx	2	-3.39	0.01	-0.02
		Inner Bracing	Max Tension	3	4.18	0.00	0.00
			Max. Compression	18	-8.79	0.00	0.00
			Max. Mx	34	-7.09	-0.10	0.00
			Max. Vy	34	48.12	0.00	0.00
T5	100 - 91.6667	Leg	Max Tension	19	107752.28	-0.31	0.03
			Max. Compression	2	-123314.29	0.32	0.14
			Max. Mx	3	-121656.30	0.34	-0.03
			Max. My	16	-7587.87	-0.01	-0.45
			Max. Vy	3	108.75	0.34	-0.03
			Max. Vx	25	162.89	-0.17	0.40
		Diagonal	Max Tension	11	15666.47	0.00	0.00
			Max. Compression	10	-15980.51	0.00	0.00
			Max. Mx	34	-259.05	0.32	0.00
			Max. My	34	-358.21	0.00	0.01
			Max. Vy	34	103.84	0.00	0.00
			Max. Vx	34	-3.30	0.00	0.00
		Horizontal	Max Tension	10	11556.26	0.00	0.00
			Max. Compression	11	-11387.11	0.00	0.00
			Max. Mx	43	-167.85	0.18	0.01
			Max. My	2	245.67	0.03	-0.04
			Max. Vy	43	94.69	0.18	0.01
			Max. Vx	2	-5.76	0.03	-0.04
		Inner Bracing	Max Tension	3	9.00	0.00	0.00
			Max. Compression	18	-13.81	0.00	0.00
			Max. Mx	34	-7.60	-0.11	0.00
			Max. Vy	34	-50.01	0.00	0.00
T6	91.6667 - 83.3333	Leg	Max Tension	19	123105.66	-0.30	-0.14
			Max. Compression	2	-140692.38	0.88	-0.19
			Max. Mx	3	-138977.59	0.88	-0.19
			Max. My	22	23894.72	-0.23	1.21
			Max. Vy	3	-242.49	0.88	-0.19
			Max. Vx	14	367.23	-0.23	-0.96
		Diagonal	Max Tension	11	16131.33	0.00	0.00
			Max. Compression	10	-16460.35	0.00	0.00
			Max. Mx	34	-234.20	0.33	0.00
			Max. My	34	-298.07	0.00	-0.01
			Max. Vy	34	107.73	0.00	0.00
			Max. Vx	34	3.36	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Horizontal	Max Tension	10	12114.68	0.00	0.00
			Max. Compression	11	-11924.86	0.00	0.00
			Max. Mx	43	-175.20	0.19	0.01
			Max. My	2	129.71	0.03	-0.04
			Max. Vy	43	-98.32	0.19	0.01
			Max. Vx	2	5.63	0.03	-0.04
		Inner Bracing	Max Tension	3	8.58	0.00	0.00
			Max. Compression	18	-13.53	0.00	0.00
			Max. Mx	34	-7.83	-0.11	0.00
			Max. Vy	34	-51.95	0.00	0.00
T7	83.3333 - 75	Leg	Max Tension	19	138587.64	-0.85	0.19
			Max. Compression	12	-158754.46	1.19	-0.17
			Max. Mx	3	-156449.13	1.21	-0.41
			Max. My	20	-10580.23	-0.02	1.75
			Max. Vy	3	-490.82	1.21	-0.41
			Max. Vx	20	-847.54	-0.02	1.75
		Diagonal	Max Tension	11	17605.54	0.00	0.00
			Max. Compression	10	-18047.07	0.00	0.00
			Max. Mx	34	-338.21	0.35	0.00
			Max. My	34	-381.42	0.00	-0.01
			Max. Vy	34	-111.66	0.00	0.00
			Max. Vx	34	3.43	0.00	0.00
		Horizontal	Max Tension	10	13455.53	0.00	0.00
			Max. Compression	11	-13258.08	0.00	0.00
			Max. Mx	43	-245.17	0.29	0.00
			Max. My	2	580.16	0.07	-0.04
			Max. Vy	43	-140.18	0.29	0.00
			Max. Vx	2	6.27	0.07	-0.04
		Inner Bracing	Max Tension	3	7.19	0.00	0.00
			Max. Compression	28	-14.07	0.00	0.00
			Max. Mx	34	-9.08	-0.12	0.00
			Max. Vy	34	-53.91	0.00	0.00
T8	75 - 50	Leg	Max Tension	19	180416.85	-0.94	-0.19
			Max. Compression	12	-206994.02	0.80	-0.26
			Max. Mx	3	-174869.43	1.21	-0.41
			Max. My	20	-11261.05	-0.02	1.75
			Max. Vy	3	217.14	1.02	0.19
			Max. Vx	25	310.58	-0.63	1.64
		Diagonal	Max Tension	11	24129.85	0.00	0.00
			Max. Compression	10	-24667.29	0.00	0.00
			Max. Mx	34	-262.89	0.71	0.00
			Max. My	34	-342.84	0.00	-0.03
			Max. Vy	34	174.19	0.00	0.00
			Max. Vx	34	-6.26	0.00	0.00
		Horizontal	Max Tension	10	15738.27	0.00	0.00
			Max. Compression	11	-15490.93	0.00	0.00
			Max. Mx	43	-282.04	0.30	0.00
			Max. My	2	810.09	-0.00	-0.05
			Max. Vy	43	127.52	0.30	0.00
			Max. Vx	2	-5.85	-0.01	-0.05
		Inner Bracing	Max Tension	3	6.75	0.00	0.00
			Max. Compression	28	-16.06	0.00	0.00
			Max. Mx	34	-12.08	-0.15	0.00
			Max. Vy	34	-58.87	0.00	0.00
T9	50 - 37.5	Leg	Max Tension	19	206277.36	-0.78	-0.08
			Max. Compression	12	-236965.64	1.79	-0.21
			Max. Mx	2	-236412.52	1.80	0.12
			Max. My	14	43815.40	-0.24	-1.22
			Max. Vy	3	-291.71	1.79	0.12
			Max. Vx	15	-435.95	-0.23	-1.22
		Diagonal	Max Tension	11	25009.28	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	10	-25598.57	0.00	0.00
			Max. Mx	34	-308.79	0.76	0.00
			Max. My	34	-384.29	0.00	-0.03
			Max. Vy	34	-182.58	0.00	0.00
			Max. Vx	34	6.38	0.00	0.00
		Horizontal	Max Tension	10	16762.82	0.00	0.00
			Max. Compression	11	-16505.16	0.00	0.00
			Max. Mx	43	413.35	0.31	0.00
			Max. My	2	1431.93	0.03	-0.05
			Max. Vy	43	-132.25	0.31	0.00
			Max. Vx	2	5.70	0.03	-0.05
		Inner Bracing	Max Tension	3	5.64	0.00	0.00
			Max. Compression	28	-16.09	0.00	0.00
			Max. Mx	34	-12.93	-0.21	0.00
			Max. Vy	34	-79.56	0.00	0.00
T10	37.5 - 25	Leg	Max Tension	19	232465.48	-1.63	-0.12
			Max. Compression	12	-267502.98	-1.37	-0.34
			Max. Mx	2	-266501.23	1.80	0.12
			Max. My	14	48956.49	0.08	-2.41
			Max. Vy	2	452.58	1.80	0.12
			Max. Vx	14	412.93	0.08	-2.41
		Diagonal	Max Tension	11	25962.59	0.00	0.00
			Max. Compression	10	-26579.99	0.00	0.00
			Max. Mx	34	-340.94	0.81	0.00
			Max. My	34	-411.85	0.00	-0.03
			Max. Vy	34	-190.62	0.00	0.00
			Max. Vx	34	6.50	0.00	0.00
		Horizontal	Max Tension	10	17870.61	0.00	0.00
			Max. Compression	11	-17541.45	0.00	0.00
			Max. Mx	43	-255.49	0.34	0.00
			Max. My	2	505.57	0.04	-0.05
			Max. Vy	43	138.06	0.34	0.00
			Max. Vx	2	-5.55	0.04	-0.05
		Inner Bracing	Max Tension	3	5.04	0.00	0.00
			Max. Compression	28	-15.82	0.00	0.00
			Max. Mx	34	-13.31	-0.23	0.00
			Max. Vy	34	-83.18	0.00	0.00
T11	25 - 0	Leg	Max Tension	19	284456.85	4.80	-0.09
			Max. Compression	12	-329135.88	0.00	0.00
			Max. Mx	12	-328870.17	6.90	0.34
			Max. My	14	54181.94	0.79	-4.07
			Max. Vy	12	-2175.82	6.90	0.34
			Max. Vx	14	1140.24	0.79	-4.07
		Diagonal	Max Tension	27	28330.90	-0.19	0.01
			Max. Compression	10	-29256.20	0.00	0.00
			Max. Mx	28	17390.43	-0.28	-0.02
			Max. My	38	-1980.04	-0.14	0.04
			Max. Vy	43	111.18	-0.21	0.04
			Max. Vx	35	-6.96	0.00	0.00
		Horizontal	Max Tension	26	19864.86	0.29	-0.01
			Max. Compression	11	-19693.89	0.00	0.00
			Max. Mx	43	376.13	0.52	-0.00
			Max. My	2	1221.08	0.13	-0.05
			Max. Vy	43	197.46	0.47	0.00
			Max. Vx	2	-6.60	0.13	-0.05
		Redund Horz 1 Bracing	Max Tension	12	5707.70	0.00	0.00
			Max. Compression	12	-5707.70	0.00	0.00
			Max. Mx	34	753.48	-0.07	0.00
			Max. My	34	818.58	0.00	0.00
			Max. Vy	34	-44.23	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	34	-1.02	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	12	4132.70	0.00	0.00
			Max. Compression	12	-4132.70	0.00	0.00
			Max. Mx	34	528.32	-0.09	0.00
			Max. My	34	619.00	0.00	0.00
			Max. Vy	34	-42.38	0.00	0.00
			Max. Vx	34	-1.45	0.00	0.00
		Inner Bracing	Max Tension	3	2.86	0.00	0.00
			Max. Compression	38	-17.78	0.00	0.00
			Max. Mx	34	-15.55	-0.27	0.00
			Max. Vy	34	88.48	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	24	359342.43	39933.49	-20539.31
	Max. H_x	24	359342.43	39933.49	-20539.31
	Max. H_z	5	-269241.36	-28235.44	20611.07
	Min. Vert	9	-307971.28	-35324.15	17898.27
	Min. H_x	9	-307971.28	-35324.15	17898.27
	Min. H_z	20	301581.19	30312.56	-21790.13
Leg B	Max. Vert	12	362709.97	-40405.58	-20223.58
	Max. H_x	29	-311648.13	35798.49	17586.44
	Max. H_z	33	-273466.50	28942.30	19974.85
	Min. Vert	29	-311648.13	35798.49	17586.44
	Min. H_x	12	362709.97	-40405.58	-20223.58
	Min. H_z	14	344748.79	-36826.11	-21419.52
Leg A	Max. Vert	2	362210.63	-509.48	45152.36
	Max. H_x	27	14705.78	6504.69	1155.14
	Max. H_z	2	362210.63	-509.48	45152.36
	Min. Vert	19	-313640.51	507.23	-39874.18
	Min. H_x	10	14833.02	-6506.94	1199.08
	Min. H_z	19	-313640.51	507.23	-39874.18

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	44718.64	-0.00	0.00	18.19	1.84	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	53662.37	-241.07	-80589.15	-7454.82	46.51	-22.63
0.9 Dead+1.0 Wind 0 deg - No Ice	40246.78	-241.07	-80589.15	-7460.27	45.96	-22.63
1.2 Dead+1.0 Wind 30 deg - No Ice	53662.37	37796.99	-66073.17	-6163.36	-3504.31	41.25
0.9 Dead+1.0 Wind 30 deg - No Ice	40246.78	37796.99	-66073.17	-6168.81	-3504.86	41.25
1.2 Dead+1.0 Wind 45 deg - No Ice	53662.37	53088.10	-53386.78	-4978.69	-4943.27	70.06

Load Combination	*Vertical*	*Shear$_x$*	*Shear$_z$*	*Overturning Moment, M$_x$*	*Overturning Moment, M$_z$*	*Torque*
	lb	*lb*	*lb*	*kip-ft*	*kip-ft*	*kip-ft*
0.9 Dead+1.0 Wind 45 deg - No Ice	40246.78	53088.10	-53386.78	-4984.15	-4943.82	70.06
1.2 Dead+1.0 Wind 60 deg - No Ice	53662.37	64507.86	-37315.64	-3472.11	-6026.35	94.09
0.9 Dead+1.0 Wind 60 deg - No Ice	40246.78	64507.86	-37315.64	-3477.56	-6026.90	94.09
1.2 Dead+1.0 Wind 90 deg - No Ice	53662.37	76011.53	241.07	66.13	-7087.56	121.71
0.9 Dead+1.0 Wind 90 deg - No Ice	40246.78	76011.53	241.07	60.67	-7088.11	121.71
1.2 Dead+1.0 Wind 120 deg - No Ice	53662.37	69546.99	40503.35	3798.52	-6427.49	116.72
0.9 Dead+1.0 Wind 120 deg - No Ice	40246.78	69546.99	40503.35	3793.06	-6428.04	116.72
1.2 Dead+1.0 Wind 135 deg - No Ice	53662.37	55387.83	55686.50	5230.68	-5151.60	102.07
0.9 Dead+1.0 Wind 135 deg - No Ice	40246.78	55387.83	55686.50	5225.22	-5152.15	102.07
1.2 Dead+1.0 Wind 150 deg - No Ice	53662.37	38214.54	66314.24	6251.31	-3581.04	80.46
0.9 Dead+1.0 Wind 150 deg - No Ice	40246.78	38214.54	66314.24	6245.86	-3581.59	80.46
1.2 Dead+1.0 Wind 180 deg - No Ice	53662.37	241.07	75048.83	7086.43	-42.09	22.63
0.9 Dead+1.0 Wind 180 deg - No Ice	40246.78	241.07	75048.83	7080.97	-42.65	22.63
1.2 Dead+1.0 Wind 210 deg - No Ice	53662.37	-37796.99	66073.17	6207.01	3508.72	-41.25
0.9 Dead+1.0 Wind 210 deg - No Ice	40246.78	-37796.99	66073.17	6201.55	3508.17	-41.25
1.2 Dead+1.0 Wind 225 deg - No Ice	53662.37	-53088.10	53386.78	5022.35	4947.68	-70.06
0.9 Dead+1.0 Wind 225 deg - No Ice	40246.78	-53088.10	53386.78	5016.89	4947.13	-70.06
1.2 Dead+1.0 Wind 240 deg - No Ice	53662.37	-69305.92	40085.80	3721.78	6387.60	-94.09
0.9 Dead+1.0 Wind 240 deg - No Ice	40246.78	-69305.92	40085.80	3716.32	6387.05	-94.09
1.2 Dead+1.0 Wind 270 deg - No Ice	53662.37	-76011.53	-241.07	-22.48	7091.98	-121.71
0.9 Dead+1.0 Wind 270 deg - No Ice	40246.78	-76011.53	-241.07	-27.93	7091.42	-121.71
1.2 Dead+1.0 Wind 300 deg - No Ice	53662.37	-64748.93	-37733.19	-3548.84	6075.07	-116.72
0.9 Dead+1.0 Wind 300 deg - No Ice	40246.78	-64748.93	-37733.19	-3554.30	6074.52	-116.72
1.2 Dead+1.0 Wind 315 deg - No Ice	53662.37	-53429.03	-53727.70	-5041.35	5010.34	-102.07
0.9 Dead+1.0 Wind 315 deg - No Ice	40246.78	-53429.03	-53727.70	-5046.80	5009.79	-102.07
1.2 Dead+1.0 Wind 330 deg - No Ice	53662.37	-38214.54	-66314.24	-6207.66	3585.46	-80.46
0.9 Dead+1.0 Wind 330 deg - No Ice	40246.78	-38214.54	-66314.24	-6213.12	3584.91	-80.46
1.2 Dead+1.0 Ice+1.0 Temp	133197.53	-0.00	0.00	131.37	45.33	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	133197.53	-28.67	-19685.71	-1617.76	50.67	-18.75
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	133197.53	9553.09	-16620.91	-1350.47	-802.21	1.95
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	133197.53	13468.75	-13506.14	-1072.83	-1151.92	12.46

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	133197.53	16437.42	-9500.04	-715.26	-1417.91	22.12
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	133197.53	19155.85	28.67	136.72	-1659.01	36.36
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	133197.53	17016.87	9867.69	1010.57	-1463.62	40.86
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	133197.53	13734.14	13771.54	1359.61	-1175.96	38.97
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	133197.53	9602.76	16649.59	1618.56	-811.47	34.42
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	133197.53	28.67	19049.74	1833.89	39.98	18.75
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	133197.53	-9553.09	16620.91	1613.21	892.87	-1.95
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	133197.53	-13468.75	13506.14	1335.57	1242.58	-12.46
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	133197.53	-16988.19	9818.03	1001.31	1548.93	-22.12
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	133197.53	-19155.85	-28.67	126.03	1749.66	-36.36
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	133197.53	-16466.10	-9549.70	-724.51	1513.91	-40.86
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	133197.53	-13509.29	-13546.69	-1080.38	1250.13	-38.97
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	133197.53	-9602.76	-16649.59	-1355.81	902.12	-34.42
Dead+Wind 0 deg - Service	44718.64	-44.28	-14802.09	-1355.07	9.98	-4.16
Dead+Wind 30 deg - Service	44718.64	6942.30	-12135.89	-1117.86	-642.21	7.58
Dead+Wind 45 deg - Service	44718.64	9750.88	-9805.73	-900.27	-906.51	12.87
Dead+Wind 60 deg - Service	44718.64	11848.38	-6853.89	-623.55	-1105.44	17.28
Dead+Wind 90 deg - Service	44718.64	13961.30	44.28	26.33	-1300.36	22.36
Dead+Wind 120 deg - Service	44718.64	12773.94	7439.39	711.87	-1179.12	21.44
Dead+Wind 135 deg - Service	44718.64	10173.27	10228.13	974.92	-944.78	18.75
Dead+Wind 150 deg - Service	44718.64	7019.00	12180.17	1162.38	-656.31	14.78
Dead+Wind 180 deg - Service	44718.64	44.28	13784.48	1315.77	-6.30	4.16
Dead+Wind 210 deg - Service	44718.64	-6942.30	12135.89	1154.24	645.89	-7.58
Dead+Wind 225 deg - Service	44718.64	-9750.88	9805.73	936.65	910.19	-12.87
Dead+Wind 240 deg - Service	44718.64	-12729.66	7362.70	697.77	1174.67	-17.28
Dead+Wind 270 deg - Service	44718.64	-13961.30	-44.28	10.05	1304.04	-22.36
Dead+Wind 300 deg - Service	44718.64	-11892.66	-6930.59	-637.65	1117.26	-21.44
Dead+Wind 315 deg - Service	44718.64	-9813.49	-9868.35	-911.78	921.70	-18.75
Dead+Wind 330 deg - Service	44718.64	-7019.00	-12180.17	-1126.00	659.99	-14.78

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-44718.64	0.00	0.00	44718.64	-0.00	0.000%
2	-241.07	-53662.37	-80589.15	241.07	53662.37	80589.15	0.000%
3	-241.07	-40246.78	-80589.15	241.07	40246.78	80589.15	0.000%
4	37796.99	-53662.37	-66073.17	-37796.99	53662.37	66073.17	0.000%
5	37796.99	-40246.78	-66073.17	-37796.99	40246.78	66073.17	0.000%
6	53088.10	-53662.37	-53386.77	-53088.10	53662.37	53386.78	0.000%
7	53088.10	-40246.78	-53386.77	-53088.10	40246.78	53386.78	0.000%
8	64507.86	-53662.37	-37315.64	-64507.86	53662.37	37315.64	0.000%
9	64507.86	-40246.78	-37315.64	-64507.86	40246.78	37315.64	0.000%
10	76011.52	-53662.37	241.07	-76011.53	53662.37	-241.07	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
11	76011.52	-40246.78	241.07	-76011.53	40246.78	-241.07	0.000%
12	69546.99	-53662.37	40503.35	-69546.99	53662.37	-40503.35	0.000%
13	69546.99	-40246.78	40503.35	-69546.99	40246.78	-40503.35	0.000%
14	55387.83	-53662.37	55686.50	-55387.83	53662.37	-55686.50	0.000%
15	55387.83	-40246.78	55686.50	-55387.83	40246.78	-55686.50	0.000%
16	38214.53	-53662.37	66314.24	-38214.54	53662.37	-66314.24	0.000%
17	38214.53	-40246.78	66314.24	-38214.54	40246.78	-66314.24	0.000%
18	241.07	-53662.37	75048.83	-241.07	53662.37	-75048.83	0.000%
19	241.07	-40246.78	75048.83	-241.07	40246.78	-75048.83	0.000%
20	-37796.99	-53662.37	66073.17	37796.99	53662.37	-66073.17	0.000%
21	-37796.99	-40246.78	66073.17	37796.99	40246.78	-66073.17	0.000%
22	-53088.10	-53662.37	53386.77	53088.10	53662.37	-53386.78	0.000%
23	-53088.10	-40246.78	53386.77	53088.10	40246.78	-53386.78	0.000%
24	-69305.92	-53662.37	40085.80	69305.92	53662.37	-40085.80	0.000%
25	-69305.92	-40246.78	40085.80	69305.92	40246.78	-40085.80	0.000%
26	-76011.52	-53662.37	-241.07	76011.53	53662.37	241.07	0.000%
27	-76011.52	-40246.78	-241.07	76011.53	40246.78	241.07	0.000%
28	-64748.93	-53662.37	-37733.19	64748.93	53662.37	37733.19	0.000%
29	-64748.93	-40246.78	-37733.19	64748.93	40246.78	37733.19	0.000%
30	-53429.03	-53662.37	-53727.70	53429.03	53662.37	53727.70	0.000%
31	-53429.03	-40246.78	-53727.70	53429.03	40246.78	53727.70	0.000%
32	-38214.53	-53662.37	-66314.24	38214.54	53662.37	66314.24	0.000%
33	-38214.53	-40246.78	-66314.24	38214.54	40246.78	66314.24	0.000%
34	0.00	-133197.53	0.00	0.00	133197.53	-0.00	0.000%
35	-28.67	-133197.53	-19685.71	28.67	133197.53	19685.71	0.000%
36	9553.09	-133197.53	-16620.91	-9553.09	133197.53	16620.91	0.000%
37	13468.74	-133197.53	-13506.14	-13468.75	133197.53	13506.14	0.000%
38	16437.42	-133197.53	-9500.04	-16437.42	133197.53	9500.04	0.000%
39	19155.85	-133197.53	28.67	-19155.85	133197.53	-28.67	0.000%
40	17016.86	-133197.53	9867.69	-17016.87	133197.53	-9867.69	0.000%
41	13734.14	-133197.53	13771.54	-13734.14	133197.53	-13771.54	0.000%
42	9602.75	-133197.53	16649.59	-9602.76	133197.53	-16649.59	0.000%
43	28.67	-133197.53	19049.74	-28.67	133197.53	-19049.74	0.000%
44	-9553.09	-133197.53	16620.91	9553.09	133197.53	-16620.91	0.000%
45	-13468.74	-133197.53	13506.14	13468.75	133197.53	-13506.14	0.000%
46	-16988.19	-133197.53	9818.03	16988.19	133197.53	-9818.03	0.000%
47	-19155.85	-133197.53	-28.67	19155.85	133197.53	28.67	0.000%
48	-16466.10	-133197.53	-9549.70	16466.10	133197.53	9549.70	0.000%
49	-13509.29	-133197.53	-13546.69	13509.29	133197.53	13546.69	0.000%
50	-9602.75	-133197.53	-16649.59	9602.76	133197.53	16649.59	0.000%
51	-44.28	-44718.64	-14802.09	44.28	44718.64	14802.09	0.000%
52	6942.30	-44718.64	-12135.89	-6942.30	44718.64	12135.89	0.000%
53	9750.88	-44718.64	-9805.73	-9750.88	44718.64	9805.73	0.000%
54	11848.38	-44718.64	-6853.89	-11848.38	44718.64	6853.89	0.000%
55	13961.30	-44718.64	44.28	-13961.30	44718.64	-44.28	0.000%
56	12773.94	-44718.64	7439.39	-12773.94	44718.64	-7439.39	0.000%
57	10173.27	-44718.64	10228.13	-10173.27	44718.64	-10228.13	0.000%
58	7019.00	-44718.64	12180.17	-7019.00	44718.64	-12180.17	0.000%
59	44.28	-44718.64	13784.48	-44.28	44718.64	-13784.48	0.000%
60	-6942.30	-44718.64	12135.89	6942.30	44718.64	-12135.89	0.000%
61	-9750.88	-44718.64	9805.73	9750.88	44718.64	-9805.73	0.000%
62	-12729.66	-44718.64	7362.70	12729.66	44718.64	-7362.70	0.000%
63	-13961.30	-44718.64	-44.28	13961.30	44718.64	44.28	0.000%
64	-11892.66	-44718.64	-6930.59	11892.66	44718.64	6930.59	0.000%
65	-9813.49	-44718.64	-9868.35	9813.49	44718.64	9868.35	0.000%
66	-7019.00	-44718.64	-12180.17	7019.00	44718.64	12180.17	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	2.745	56	0.1200	0.0366
T2	175 - 150	2.619	56	0.1201	0.0369
T3	150 - 125	1.975	56	0.1178	0.0284
T4	125 - 100	1.374	56	0.1053	0.0228
T5	100 - 91.6667	0.871	56	0.0819	0.0175
T6	91.6667 - 83.3333	0.730	56	0.0750	0.0157
T7	83.3333 - 75	0.600	56	0.0675	0.0140
T8	75 - 50	0.487	56	0.0592	0.0123
T9	50 - 37.5	0.227	56	0.0391	0.0080
T10	37.5 - 25	0.132	56	0.0303	0.0058
T11	25 - 0	0.061	56	0.0208	0.0037

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.00	OGT9-840	56	2.745	0.1200	0.0366	155978
180.00	Pirod 4' Side Mount Standoff (1)	56	2.745	0.1200	0.0366	155978
178.00	4'x4" Pipe Mount	56	2.694	0.1200	0.0368	155978
177.00	OGT9-840	56	2.669	0.1200	0.0369	155978
175.00	10 FT DISH	56	2.619	0.1201	0.0369	155978
173.00	(inverted) SC479-HF1LDF	56	2.568	0.1201	0.0368	149240
170.00	10'6"x4" Pipe Mount	56	2.491	0.1200	0.0363	187307
169.00	8 FT DISH	56	2.466	0.1200	0.0360	210518
168.00	4'x4" Pipe Mount	56	2.440	0.1200	0.0357	240296
167.00	8 FT DISH	56	2.414	0.1200	0.0354	279885
157.00	ANT220F2 w/clamps	56	2.155	0.1192	0.0314	303506
150.00	Valmont 13' Lightweight T-Frame	56	1.975	0.1178	0.0284	140835
149.00	(2) 7770.00 panel antenna	56	1.950	0.1176	0.0280	133602
148.00	20' 8 Bay Di-Pole	56	1.925	0.1173	0.0277	127949
147.00	(2) LPG21401 TMA	56	1.900	0.1170	0.0274	123341
143.00	Pirod 4' Side Mount Standoff (1)	56	1.800	0.1157	0.0262	109546
140.00	PD200	56	1.726	0.1145	0.0255	101211
138.00	12' Dipole	56	1.677	0.1136	0.0251	96325
136.00	DB224-A	56	1.629	0.1126	0.0247	91889
134.00	ANT220F2 w/clamps	56	1.582	0.1115	0.0243	87843
116.00	DS9A09F36D-N 19 ft Omni w/ Mount Pipe	56	1.180	0.0972	0.0210	67703
105.00	PD458-1	56	0.963	0.0864	0.0186	61937
100.00	DB222	56	0.871	0.0819	0.0175	61319
86.00	DB212-1	56	0.640	0.0700	0.0145	55112
81.00	DB222	56	0.567	0.0652	0.0135	51208
80.00	4'x4" Pipe Mount	56	0.553	0.0642	0.0133	51975
79.00	8 FT DISH	56	0.539	0.0632	0.0131	53006
49.00	DB803M-XT	56	0.218	0.0384	0.0078	87869
48.00	Pirod 4' Side Mount Standoff (1)	56	0.210	0.0377	0.0076	88369

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 175	14.877	12	0.6506	0.1992
T2	175 - 150	14.195	12	0.6507	0.2009
T3	150 - 125	10.708	12	0.6388	0.1547
T4	125 - 100	7.448	12	0.5711	0.1240
T5	100 - 91.6667	4.721	12	0.4433	0.0951
T6	91.6667 - 83.3333	3.954	12	0.4062	0.0855
T7	83.3333 - 75	3.255	12	0.3652	0.0760
T8	75 - 50	2.641	12	0.3204	0.0671
T9	50 - 37.5	1.231	12	0.2115	0.0434
T10	37.5 - 25	0.718	3	0.1640	0.0317
T11	25 - 0	0.333	3	0.1127	0.0202

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181.00	OGT9-840	12	14.877	0.6506	0.1992	29976
180.00	Pirod 4' Side Mount Standoff (1)	12	14.877	0.6506	0.1992	29976
178.00	4'x4" Pipe Mount	12	14.605	0.6507	0.2003	29976
177.00	OGT9-840	12	14.468	0.6507	0.2006	29976
175.00	10 FT DISH	12	14.195	0.6507	0.2009	29976
173.00	(inverted) SC479-HF1LDF	12	13.920	0.6507	0.2002	28843
170.00	10'6"x4" Pipe Mount	12	13.504	0.6505	0.1974	36851
169.00	8 FT DISH	12	13.365	0.6504	0.1960	41819
168.00	4'x4" Pipe Mount	12	13.225	0.6503	0.1945	48335
167.00	8 FT DISH	12	13.085	0.6501	0.1929	57256
157.00	ANT220F2 w/clamps	12	11.682	0.6457	0.1707	63441
150.00	Valmont 13' Lightweight T-Frame	12	10.708	0.6388	0.1547	27114
149.00	(2) 7770.00 panel antenna	12	10.570	0.6375	0.1527	25617
148.00	20' 8 Bay Di-Pole	12	10.433	0.6361	0.1508	24450
147.00	(2) LPG21401 TMA	12	10.296	0.6346	0.1490	23504
143.00	Pirod 4' Side Mount Standoff (1)	12	9.755	0.6274	0.1428	20701
140.00	PD200	12	9.355	0.6209	0.1389	19016
138.00	12' Dipole	12	9.091	0.6160	0.1366	18030
136.00	DB224-A	12	8.830	0.6106	0.1345	17141
134.00	ANT220F2 w/clamps	12	8.572	0.6046	0.1325	16317
116.00	DS9A09F36D-N 19 ft Omni w/ Mount Pipe	12	6.396	0.5269	0.1143	12403
105.00	PD458-1	12	5.216	0.4680	0.1011	11374
100.00	DB222	12	4.721	0.4433	0.0951	11272
86.00	DB212-1	12	3.470	0.3790	0.0790	10164
81.00	DB222	12	3.074	0.3527	0.0735	9463
80.00	4'x4" Pipe Mount	12	2.999	0.3473	0.0724	9608
79.00	8 FT DISH	12	2.925	0.3419	0.0713	9802
49.00	DB803M-XT	12	1.186	0.2077	0.0425	16242
48.00	Pirod 4' Side Mount Standoff (1)	12	1.141	0.2039	0.0416	16334

Bolt Design Data

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
T1	180	Diagonal	A325X	1.0000	1	519.47	18288.30	0.028 ✔	1	Member Block Shear
T2	175	Leg	A325X	0.7500	6	245.23	30101.40	0.008 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	9467.87	18288.30	0.518 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	2855.09	10263.30	0.278 ✔	1	Member Block Shear
T3	150	Leg	A325X	0.7500	6	4051.53	30101.40	0.135 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	13042.10	27103.10	0.481 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	4418.20	10263.30	0.430 ✔	1	Member Block Shear
T4	125	Leg	A325X	0.7500	6	10577.50	30101.40	0.351 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	15086.40	27103.10	0.557 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5460.37	10263.30	0.532 ✔	1	Member Block Shear
T5	100	Leg	A325X	0.7500	6	17958.70	30101.40	0.597 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	15666.50	27103.10	0.578 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	5778.13	10263.30	0.563 ✔	1	Member Block Shear
T6	91.6667	Diagonal	A325X	1.0000	1	16131.30	27103.10	0.595 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	6057.34	10263.30	0.590 ✔	1	Member Block Shear
T7	83.3333	Diagonal	A325X	1.0000	1	17605.50	27103.10	0.650 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	6727.76	17257.30	0.390 ✔	1	Bolt Shear
T8	75	Leg	A325X	1.0000	8	19370.50	54517.00	0.355 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	24129.90	48810.90	0.494 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	7869.13	11622.70	0.677 ✔	1	Member Block Shear
T9	50	Leg	A325X	1.0000	8	25784.70	54517.00	0.473 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	25009.30	48810.90	0.512 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	8381.41	11622.70	0.721 ✔	1	Member Block Shear
T10	37.5	Diagonal	A325X	1.0000	1	25962.60	48810.90	0.532 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	8935.31	11622.70	0.769 ✔	1	Member Block Shear
T11	25	Leg	A325X	1.0000	8	32141.90	54517.00	0.590 ✔	1	Bolt Tension
		Diagonal	A325X	1.0000	1	28330.90	38085.90	0.744 ✔	1	Member Block Shear
		Horizontal	A325X	0.6250	2	9932.43	17257.30	0.576 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	HSS5x.25	5.01	5.01	35.6 K=1.00	3.4894	-1420.10	143130.00	0.010 [1] ✔
T2	175 - 150	HSS5x.25	25.03	8.34	59.3 K=1.00	3.4894	-18567.60	121395.00	0.153 [1] ✔
T3	150 - 125	HSS5x.25	25.03	8.34	59.3 K=1.00	3.4894	-58249.10	121395.00	0.480 [1] ✔
T4	125 - 100	HSS5x.25	25.03	8.34	59.3 K=1.00	3.4894	-106296.00	121395.00	0.876 [1] ✔
T5	100 - 91.6667	HSS5x.375	8.34	8.34	60.7 K=1.00	5.0994	-123314.00	175270.00	0.704 [1] ✔
T6	91.6667 - 83.3333	HSS5x.375	8.34	8.34	60.7 K=1.00	5.0994	-140692.00	199288.00	0.706 [1] ✔
T7	83.3333 - 75	HSS5x.375	8.34	8.34	60.7 K=1.00	5.0994	-158754.00	199288.00	0.797 [1] ✔
T8	75 - 50	HSS6.875x.375	25.03	12.51	65.0 K=1.00	7.1552	-206994.00	266736.00	0.776 [1] ✔
T9	50 - 37.5	HSS6.875x.5	12.51	12.51	66.1 K=1.00	9.3640	-236966.00	344700.00	0.687 [1] ✔
T10	37.5 - 25	HSS6.875x.5	12.51	12.51	66.1 K=1.00	9.3640	-267503.00	344700.00	0.776 [1] ✔
T11	25 - 0	HSS6.875x.5	25.03	6.26	33.0 K=1.00	9.3640	-329136.00	459464.00	0.716 [1] ✔

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16x3/8	7.43	7.15	114.6 K=1.00	1.6200	-666.11	31902.60	0.021 [1] ✔
T2	175 - 150	2L2 1/2x2x3/16x3/8	10.57	10.23	164.0 K=1.00	1.6200	-9297.80	16563.10	0.561 [1] ✔
T3	150 - 125	2L3x2 1/2x1/4x3/8	11.21	10.90	142.2 K=1.00	2.6300	-13291.40	35690.50	0.372 [1] ✔
T4	125 - 100	2L3x2 1/2x1/4x3/8	11.91	11.61	151.5 K=1.00	2.6300	-15374.00	31623.00	0.486 [1] ✔
T5	100 - 91.6667	2L3x2 1/2x1/4x3/8	12.15	11.86	154.7 K=1.00	2.6300	-15980.50	30376.70	0.526 [1] ✔
T6	91.6667 - 83.3333	2L3x2 1/2x1/4x3/8	12.39	12.11	157.9 K=1.00	2.6300	-16460.40	29183.60	0.564 [1] ✔
T7	83.3333 - 75	2L3x2 1/2x1/4x3/8	12.64	12.36	161.3 K=1.00	2.6300	-18047.10	28042.30	0.644 [1] ✔
T8	75 - 50	2L3 1/2x3x3/8x3/8	16.33	15.88	174.8 K=1.00	4.5900	-24667.30	42971.90	0.574 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	50 - 37.5	2L3 1/2x3x3/8x3/8	16.65	16.22	178.6 K=1.00	4.5900	-25598.60	41201.20	0.621 [1] ✔
T10	37.5 - 25	2L3 1/2x3x3/8x3/8	16.99	16.56	182.4 K=1.00	4.5900	-26580.00	39503.20	0.673 [1] ✔
T11	25 - 0	2L3x3 1/2x5/16x3/8	17.68	17.28	137.0 K=1.00	3.8700	-29256.20	57793.70	0.506 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 150	L3x3x1/4	12.33	5.96	120.8 K=1.00	1.4400	-5621.16	28061.80	0.200 [1] ✔
T3	150 - 125	L3x3x1/4	14.33	6.96	141.0 K=1.00	1.4400	-8714.04	20717.20	0.421 [1] ✔
T4	125 - 100	L3x3x1/4	16.33	7.96	161.3 K=1.00	1.4400	-10760.80	15837.90	0.679 [1] ✔
T5	100 - 91.6667	L3x4x1/4	17.00	8.29	152.8 K=1.00	1.6900	-11387.10	20706.20	0.550 [1] ✔
T6	91.6667 - 83.3333	L3x4x1/4	17.67	8.63	159.0 K=1.00	1.6900	-11924.90	19136.60	0.623 [1] ✔
T7	83.3333 - 75	L3x4x1/2	18.33	8.96	168.2 K=1.00	3.2500	-13258.10	32867.40	0.403 [1] ✔
T8	75 - 50	L4x4x1/4	20.00	9.71	146.6 K=1.00	1.9400	-15490.90	25829.50	0.600 [1] ✔
T9	50 - 37.5	L4x4x1/4	21.00	10.21	154.2 K=1.00	1.9400	-16505.20	23362.50	0.706 [1] ✔
T10	37.5 - 25	L4x4x1/4	22.00	10.71	161.7 K=1.00	1.9400	-17541.40	21232.70	0.826 [1] ✔
T11	25 - 0	L4x4x1/2	24.00	11.71	179.7 K=1.00	3.7500	-19693.90	33220.30	0.593 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L3x3x1/4	10.60	5.09	103.2 K=1.00	1.4400	-503.73	34476.00	0.015 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	6.00	5.71	115.8 K=1.00	1.4400	-5707.70	29975.50	0.190 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	25 - 0	L3x3x1/4	8.49	8.07	163.6 K=1.00	1.4400	-4040.04	15399.40	0.262 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	L2 1/2x2 1/2x3/16	5.30	5.30	128.5 K=1.00	0.9020	-9.98	15638.70	0.001 [1] ✔
T2	175 - 150	L2 1/2x2 1/2x3/16	5.83	5.83	141.4 K=1.00	0.9020	-8.49	12909.80	0.001 [1] ✔
T3	150 - 125	L2 1/2x2 1/2x3/16	7.17	7.17	173.7 K=1.00	0.9020	-8.99	8552.99	0.001 [1] ✔
T4	125 - 100	L2 1/2x2 1/2x3/16	8.17	8.17	198.0 K=1.00	0.9020	-8.64	6586.62	0.001 [1] ✔
T5	100 - 91.6667	L2 1/2x2 1/2x3/16	8.50	8.50	206.1 K=1.00	0.9020	-13.81	6080.15	0.002 [1] ✔
T6	91.6667 - 83.3333	L2 1/2x2 1/2x3/16	8.83	8.83	214.1 K=1.00	0.9020	-13.53	5629.93	0.002 [1] ✔
T7	83.3333 - 75	L2 1/2x2 1/2x3/16	9.17	9.17	222.2 K=1.00	0.9020	-14.07	5227.92	0.003 [1] ✔
T8	75 - 50	L2 1/2x2 1/2x3/16	10.00	10.00	242.4 K=1.00	0.9020	-15.78	4392.91	0.004 [1] ✔
T9	50 - 37.5	L3x3x1/4	10.50	10.50	212.8 K=1.00	1.4400	-16.09	9098.35	0.002 [1] ✔
T10	37.5 - 25	L3x3x1/4	11.00	11.00	223.0 K=1.00	1.4400	-15.82	8290.02	0.002 [1] ✔
T11	25 - 0	L3x3x1/4	12.00	12.00	243.2	1.4400	-17.77	6965.92	0.003 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 150	HSS5x.25	25.03	8.34	59.3	3.4894	15129.90	157023.00	0.096 [1] ✔
T3	150 - 125	HSS5x.25	25.03	8.34	59.3	3.4894	49381.40	157023.00	0.314 [1] ✔
T4	125 - 100	HSS5x.25	25.03	8.34	59.3	3.4894	92612.20	157023.00	0.590 [1] ✔
T5	100 - 91.6667	HSS5x.375	8.34	8.34	60.7	5.0994	107752.00	229474.00	0.470 [1] ✔
T6	91.6667 - 83.3333	HSS5x.375	8.34	8.34	60.7	5.0994	123106.00	275369.00	0.447 [1] ✔
T7	83.3333 - 75	HSS5x.375	8.34	8.34	60.7	5.0994	138588.00	275369.00	0.503 [1] ✔
T8	75 - 50	HSS6.875x.375	25.03	12.51	65.0	7.1552	180417.00	386381.00	0.467 [1] ✔
T9	50 - 37.5	HSS6.875x.5	12.51	12.51	66.1	9.3640	206277.00	505655.00	0.408 [1] ✔
T10	37.5 - 25	HSS6.875x.5	12.51	12.51	66.1	9.3640	232465.00	505655.00	0.460 [1] ✔
T11	25 - 0	HSS6.875x.5	25.03	6.26	33.0	9.3640	284457.00	505655.00	0.563 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 175	2L2 1/2x2x3/16x3/8	7.43	7.15	108.2	0.8986	519.47	39088.80	0.013 [1] ✔
T2	175 - 150	2L2 1/2x2x3/16x3/8	10.37	10.03	151.8	0.8986	9467.87	39088.80	0.242 [1] ✔
T3	150 - 125	2L3x2 1/2x1/4x3/8	11.21	10.90	138.4	1.5506	13042.10	67452.20	0.193 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	125 - 100	2L3x2 1/2x1/4x3/8	11.91	11.61	147.5	1.5506	15086.40	67452.20	0.224 [1] ✔
T5	100 - 91.6667	2L3x2 1/2x1/4x3/8	12.15	11.86	150.6	1.5506	15666.50	67452.20	0.232 [1] ✔
T6	91.6667 - 83.3333	2L3x2 1/2x1/4x3/8	12.39	12.11	153.8	1.5506	16131.30	67452.20	0.239 [1] ✔
T7	83.3333 - 75	2L3x2 1/2x1/4x3/8	12.64	12.36	157.0	1.5506	17605.50	67452.20	0.261 [1] ✔
T8	75 - 50	2L3 1/2x3x3/8x3/8	16.33	15.88	174.8	2.8097	24129.90	122221.00	0.197 [1] ✔
T9	50 - 37.5	2L3 1/2x3x3/8x3/8	16.65	16.22	178.6	2.8097	25009.30	122221.00	0.205 [1] ✔
T10	37.5 - 25	2L3 1/2x3x3/8x3/8	16.99	16.56	182.4	2.8097	25962.60	122221.00	0.212 [1] ✔
T11	25 - 0	2L3x3 1/2x5/16x3/8	17.68	17.28	124.9	2.3752	28330.90	115789.00	0.245 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	175 - 150	L3x3x1/4	11.67	5.63	72.6	0.9394	5710.19	40862.80	0.140 [1] ✔
T3	150 - 125	L3x3x1/4	14.33	6.96	89.8	0.9394	8836.39	40862.80	0.216 [1] ✔
T4	125 - 100	L3x3x1/4	16.33	7.96	102.7	0.9394	10920.70	40862.80	0.267 [1] ✔
T5	100 - 91.6667	L3x4x1/4	17.00	8.29	110.9	1.1269	11556.30	49019.10	0.236 [1] ✔
T6	91.6667 - 83.3333	L3x4x1/4	17.67	8.63	115.4	1.1269	12114.70	49019.10	0.247 [1] ✔
T7	83.3333 - 75	L3x4x1/2	18.33	8.96	124.6	2.1563	13455.50	93796.90	0.143 [1] ✔
T8	75 - 50	L4x4x1/4	20.00	9.71	93.3	1.3144	15738.30	57175.30	0.275 [1] ✔
T9	50 - 37.5	L4x4x1/4	21.00	10.21	98.1	1.3144	16762.80	57175.30	0.293 [1] ✔
T10	37.5 - 25	L4x4x1/4	22.00	10.71	102.8	1.3144	17870.60	57175.30	0.313 [1] ✔
T11	25 - 0	L4x4x1/2	24.00	11.71	115.2	2.5313	19864.90	110109.00	0.180 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	180 - 175	L3x3x1/4	10.60	5.09	65.7	1.4400	477.73	46656.00	0.010 [1] ✔

[1] P_u / ϕP_n controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T11	25 - 0	L3x3x1/4	6.00	5.71	73.7	1.4400	5707.70	46656.00	0.122 [1] ✔

[1] P_u / ϕP_n controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T11	25 - 0	L3x3x1/4	8.33	7.90	102.0	1.4400	4132.70	46656.00	0.089 [1] ✔

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	180 - 175	L2 1/2x2 1/2x3/16	5.30	5.30	81.7	0.9020	8.73	29224.80	0.000 [1] ✔
T2	175 - 150	L2 1/2x2 1/2x3/16	5.83	5.83	90.0	0.9020	5.59	29224.80	0.000 [1] ✔
T3	150 - 125	L2 1/2x2 1/2x3/16	6.50	6.50	100.3	0.9020	5.25	29224.80	0.000 [1] ✔
T4	125 - 100	L2 1/2x2 1/2x3/16	7.83	7.83	120.8	0.9020	4.18	29224.80	0.000 [1] ✔
T5	100 - 91.6667	L2 1/2x2 1/2x3/16	8.50	8.50	131.1	0.9020	9.00	29224.80	0.000 [1] ✔
T6	91.6667 -	L2 1/2x2 1/2x3/16	8.83	8.83	136.2	0.9020	8.58	29224.80	0.000 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
	83.3333								✔
T7	83.3333 - 75	L2 1/2x2 1/2x3/16	9.17	9.17	141.4	0.9020	7.19	29224.80	0.000 [1]
									✔
T8	75 - 50	L2 1/2x2 1/2x3/16	9.50	9.50	146.5	0.9020	6.75	29224.80	0.000 [1]
									✔
T9	50 - 37.5	L3x3x1/4	10.50	10.50	135.5	1.4400	5.64	46656.00	0.000 [1]
									✔
T10	37.5 - 25	L3x3x1/4	11.00	11.00	141.9	1.4400	5.04	46656.00	0.000 [1]
									✔
T11	25 - 0	L3x3x1/4	12.00	12.00	154.8	1.4400	2.86	46656.00	0.000 [1]
									✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	180 - 175	Leg	HSS5x.25	1	-737.94	143130.00	1.1	Pass
		Leg	HSS5x.25	2	-156.30	143130.00	0.8	Pass
		Leg	HSS5x.25	3	-1420.10	143130.00	1.0	Pass
T2	175 - 150	Leg	HSS5x.25	16	-18196.10	121395.00	15.0	Pass
		Leg	HSS5x.25	17	-18567.60	121395.00	15.3	Pass
		Leg	HSS5x.25	18	-18157.00	121395.00	15.0	Pass
T3	150 - 125	Leg	HSS5x.25	55	-56771.40	121395.00	46.8	Pass
		Leg	HSS5x.25	56	-58044.70	121395.00	47.8	Pass
		Leg	HSS5x.25	57	-58249.10	121395.00	48.0	Pass
T4	125 - 100	Leg	HSS5x.25	94	-104437.00	121395.00	86.0	Pass
		Leg	HSS5x.25	95	-106217.00	121395.00	87.5	Pass
		Leg	HSS5x.25	96	-106296.00	121395.00	87.6	Pass
T5	100 - 91.6667	Leg	HSS5x.375	133	-121308.00	175270.00	69.2	Pass
		Leg	HSS5x.375	134	-123281.00	175270.00	70.3	Pass
		Leg	HSS5x.375	135	-123314.00	175270.00	70.4	Pass
T6	91.6667 - 83.3333	Leg	HSS5x.375	148	-138658.00	199288.00	69.6	Pass
		Leg	HSS5x.375	149	-140692.00	199288.00	70.6	Pass
		Leg	HSS5x.375	150	-140692.00	199288.00	70.6	Pass
T7	83.3333 - 75	Leg	HSS5x.375	163	-156229.00	199288.00	78.4	Pass
		Leg	HSS5x.375	164	-158754.00	199288.00	79.7	Pass
		Leg	HSS5x.375	165	-158334.00	199288.00	79.4	Pass
T8	75 - 50	Leg	HSS6.875x.375	178	-204148.00	266736.00	76.5	Pass
		Leg	HSS6.875x.375	179	-206994.00	266736.00	77.6	Pass
		Leg	HSS6.875x.375	180	-206475.00	266736.00	77.4	Pass
T9	50 - 37.5	Leg	HSS6.875x.5	205	-234114.00	344700.00	67.9	Pass
		Leg	HSS6.875x.5	206	-236966.00	344700.00	68.7	Pass
		Leg	HSS6.875x.5	207	-236413.00	344700.00	68.6	Pass
T10	37.5 - 25	Leg	HSS6.875x.5	220	-264504.00	344700.00	76.7	Pass
		Leg	HSS6.875x.5	221	-267503.00	344700.00	77.6	Pass
		Leg	HSS6.875x.5	222	-266914.00	344700.00	77.4	Pass
T11	25 - 0	Leg	HSS6.875x.5	235	-325896.00	459464.00	70.9	Pass
		Leg	HSS6.875x.5	236	-329136.00	459464.00	71.6	Pass
		Leg	HSS6.875x.5	237	-328555.00	459464.00	71.5	Pass
T1	180 - 175	Diagonal	2L2 1/2x2x3/16x3/8	7	-303.16	31902.60	1.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	8	-314.27	31902.60	1.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2x3/16x3/8	9	-588.86	31902.60	1.8 2.3 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	10	-566.20	31902.60	1.8 2.4 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	11	-647.02	31902.60	2.0 2.8 (b)	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	12	-666.11	31902.60	2.1 2.8 (b)	Pass
T2	175 - 150	Diagonal	2L2 1/2x2x3/16x3/8	20	-9288.38	16563.10	56.1	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	21	-9297.80	16563.10	56.1	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	23	-6335.69	16563.10	38.3	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	24	-6590.19	16563.10	39.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	26	-6462.83	16563.10	39.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	27	-6198.82	16563.10	37.4	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	32	-9602.06	17204.40	55.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	33	-9623.08	17204.40	55.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	35	-6349.71	17204.40	36.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	36	-6530.89	17204.40	38.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	38	-6544.07	17204.40	38.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	39	-6341.87	17204.40	36.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	44	-5498.06	17858.70	30.8	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	45	-5512.78	17858.70	30.9	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	47	-4288.32	17858.70	24.0	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	48	-4376.90	17858.70	24.5	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	50	-3500.42	17858.70	19.6	Pass
		Diagonal	2L2 1/2x2x3/16x3/8	51	-3397.10	17858.70	19.0	Pass
T3	150 - 125	Diagonal	2L3x2 1/2x1/4x3/8	59	-13278.90	35690.50	37.2 48.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	60	-13291.40	35690.50	37.2 48.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	62	-10342.20	35690.50	29.0 37.3 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	63	-10349.30	35690.50	29.0 37.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	65	-10675.30	35690.50	29.9 38.4 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	66	-10655.70	35690.50	29.9 38.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	71	-12621.00	37104.10	34.0 45.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	72	-12634.50	37104.10	34.1 45.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	74	-9477.20	37104.10	25.5 34.2 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	75	-9495.93	37104.10	25.6 34.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	77	-9825.92	37104.10	26.5 35.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	78	-9734.92	37104.10	26.2 35.3 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	83	-11786.60	38560.40	30.6 42.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	84	-11799.60	38560.40	30.6 42.7 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	86	-8375.39	38560.40	21.7 30.5 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	87	-8498.08	38560.40	22.0 30.1 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	89	-8819.43	38560.40	22.9 30.6 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	90	-8521.23	38560.40	22.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
							31.7 (b)	
T4	125 - 100	Diagonal	2L3x2 1/2x1/4x3/8	98	-15356.10	31623.00	48.6	Pass
							55.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	99	-15374.00	31623.00	48.6	Pass
							55.6 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	101	-11597.10	31623.00	36.7	Pass
							41.8 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	102	-11614.00	31623.00	36.7	Pass
							41.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	104	-12439.90	31623.00	39.3	Pass
							44.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	105	-12405.10	31623.00	39.2	Pass
							44.8 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	110	-14719.50	32890.90	44.8	Pass
							53.4 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	111	-14739.00	32890.90	44.8	Pass
							53.3 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	113	-11087.90	32890.90	33.7	Pass
							40.0 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	114	-11101.80	32890.90	33.8	Pass
							39.9 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	116	-11922.70	32890.90	36.2	Pass
							42.9 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	117	-11889.30	32890.90	36.1	Pass
							43.0 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	122	-13716.00	34206.30	40.1	Pass
							49.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	123	-13725.70	34206.30	40.1	Pass
							49.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	125	-10699.50	34206.30	31.3	Pass
							38.6 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	126	-10711.00	34206.30	31.3	Pass
							38.5 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	128	-10971.70	34206.30	32.1	Pass
							39.5 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	129	-10950.50	34206.30	32.0	Pass
							39.5 (b)	
T5	100 - 91.6667	Diagonal	2L3x2 1/2x1/4x3/8	137	-15965.80	30376.70	52.6	Pass
							57.8 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	138	-15980.50	30376.70	52.6	Pass
							57.8 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	140	-12123.70	30376.70	39.9	Pass
							43.6 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	141	-12144.30	30376.70	40.0	Pass
							43.6 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	143	-12875.50	30376.70	42.4	Pass
							46.2 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	144	-12839.50	30376.70	42.3	Pass
							46.3 (b)	
T6	91.6667 - 83.3333	Diagonal	2L3x2 1/2x1/4x3/8	152	-16444.30	29183.60	56.3	Pass
							59.5 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	153	-16460.40	29183.60	56.4	Pass
							59.5 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	155	-12446.40	29183.60	42.6	Pass
							44.8 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	156	-12467.40	29183.60	42.7	Pass
							44.7 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	158	-13457.90	29183.60	46.1	Pass
							48.3 (b)	
		Diagonal	2L3x2 1/2x1/4x3/8	159	-13410.00	29183.60	46.0	Pass
							48.4 (b)	

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T7	83.3333 - 75	Diagonal	2L3x2 1/2x1/4x3/8	167	-18035.40	28042.30	64.3 65.0 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	168	-18047.10	28042.30	64.4 64.9 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	170	-13597.80	28042.30	48.5 48.6 (b)	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	171	-13628.80	28042.30	48.6	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	173	-14328.50	28042.30	51.1	Pass
		Diagonal	2L3x2 1/2x1/4x3/8	174	-14208.30	28042.30	50.7 51.2 (b)	Pass
T8	75 - 50	Diagonal	2L3 1/2x3x3/8x3/8	182	-24663.50	42971.90	57.4	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	183	-24667.30	42971.90	57.4	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	185	-18797.00	42971.90	43.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	186	-18853.40	42971.90	43.9	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	188	-19278.50	42971.90	44.9	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	189	-19105.50	42971.90	44.5	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	194	-23936.50	44739.90	53.5	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	195	-23939.80	44739.90	53.5	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	197	-18230.40	44739.90	40.7	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	198	-18356.00	44739.90	41.0	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	200	-18344.30	44739.90	41.0	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	201	-18157.00	44739.90	40.6	Pass
T9	50 - 37.5	Diagonal	2L3 1/2x3x3/8x3/8	209	-25590.20	41201.20	62.1	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	210	-25598.60	41201.20	62.1	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	212	-19387.80	41201.20	47.1	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	213	-19440.50	41201.20	47.2	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	215	-20224.40	41201.20	49.1	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	216	-20015.70	41201.20	48.6	Pass
T10	37.5 - 25	Diagonal	2L3 1/2x3x3/8x3/8	224	-26571.50	39503.20	67.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	225	-26580.00	39503.20	67.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	227	-20206.80	39503.20	51.2	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	228	-20259.30	39503.20	51.3	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	230	-21256.30	39503.20	53.8	Pass
		Diagonal	2L3 1/2x3x3/8x3/8	231	-21074.20	39503.20	53.3	Pass
T11	25 - 0	Diagonal	2L3x3 1/2x5/16x3/8	239	-29234.60	57793.70	50.6 74.4 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	242	-29256.20	57793.70	50.6 74.4 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	246	-22713.40	57793.70	39.3 57.4 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	249	-23184.60	57793.70	40.1 57.3 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	253	-24602.80	57793.70	42.6 60.3 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	256	-23870.00	57793.70	41.3 60.4 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	263	-28192.10	60138.30	46.9 71.6 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	266	-28218.20	60138.30	46.9 71.7 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	270	-21958.00	60138.30	36.5 55.4 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	273	-22542.70	60138.30	37.5 55.3 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	277	-23768.30	60138.30	39.5 57.9 (b)	Pass
		Diagonal	2L3x3 1/2x5/16x3/8	280	-22936.70	60138.30	38.1 58.0 (b)	Pass
T2	175 - 150	Horizontal	L3x3x1/4	19	-5621.16	28061.80	20.0 27.7 (b)	Pass
		Horizontal	L3x3x1/4	22	-4068.59	28061.80	14.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
							19.3 (b)	
		Horizontal	L3x3x1/4	25	-3966.90	28061.80	14.1	Pass
							18.8 (b)	
		Horizontal	L3x3x1/4	31	-5676.86	30647.90	18.5	Pass
							27.8 (b)	
		Horizontal	L3x3x1/4	34	-4330.01	30647.90	14.1	Pass
							20.8 (b)	
		Horizontal	L3x3x1/4	37	-4412.36	30647.90	14.4	Pass
							21.1 (b)	
		Horizontal	L3x3x1/4	43	-3401.41	33085.10	10.3	Pass
							16.6 (b)	
		Horizontal	L3x3x1/4	46	-3035.58	33085.10	9.2	Pass
							14.9 (b)	
		Horizontal	L3x3x1/4	49	-2605.50	33085.10	7.9	Pass
							12.7 (b)	
T3	150 - 125	Horizontal	L3x3x1/4	58	-8714.04	20717.20	42.1	Pass
							43.0 (b)	
		Horizontal	L3x3x1/4	61	-6876.68	20717.20	33.2	Pass
							33.5 (b)	
		Horizontal	L3x3x1/4	64	-7205.70	20717.20	34.8	Pass
		Horizontal	L3x3x1/4	70	-8073.39	22854.40	35.3	Pass
							39.9 (b)	
		Horizontal	L3x3x1/4	73	-6298.25	22854.40	27.6	Pass
							29.9 (b)	
		Horizontal	L3x3x1/4	76	-6583.30	22854.40	28.8	Pass
							31.3 (b)	
		Horizontal	L3x3x1/4	82	-7352.33	25340.20	29.0	Pass
							36.0 (b)	
		Horizontal	L3x3x1/4	85	-5795.25	25340.20	22.9	Pass
							27.4 (b)	
		Horizontal	L3x3x1/4	88	-6000.88	25340.20	23.7	Pass
							28.4 (b)	
T4	125 - 100	Horizontal	L3x3x1/4	97	-10760.80	15837.90	67.9	Pass
		Horizontal	L3x3x1/4	100	-8209.63	15837.90	51.8	Pass
		Horizontal	L3x3x1/4	103	-8936.50	15837.90	56.4	Pass
		Horizontal	L3x3x1/4	109	-10116.00	17252.90	58.6	Pass
		Horizontal	L3x3x1/4	112	-7740.49	17252.90	44.9	Pass
		Horizontal	L3x3x1/4	115	-8438.76	17252.90	48.9	Pass
		Horizontal	L3x3x1/4	121	-9210.89	18866.30	48.8	Pass
		Horizontal	L3x3x1/4	124	-7221.07	18866.30	38.3	Pass
		Horizontal	L3x3x1/4	127	-7502.28	18866.30	39.8	Pass
T5	100 - 91.6667	Horizontal	L3x4x1/4	136	-11387.10	20706.20	55.0	Pass
							56.3 (b)	
		Horizontal	L3x4x1/4	139	-8737.16	20706.20	42.2	Pass
							42.7 (b)	
		Horizontal	L3x4x1/4	142	-9396.57	20706.20	45.4	Pass
T6	91.6667 - 83.3333	Horizontal	L3x4x1/4	151	-11924.90	19136.60	62.3	Pass
		Horizontal	L3x4x1/4	154	-9079.74	19136.60	47.4	Pass
		Horizontal	L3x4x1/4	157	-9961.54	19136.60	52.1	Pass
T7	83.3333 - 75	Horizontal	L3x4x1/2	166	-13258.10	32867.40	40.3	Pass
		Horizontal	L3x4x1/2	169	-10281.60	32867.40	31.3	Pass
		Horizontal	L3x4x1/2	172	-10863.50	32867.40	33.1	Pass
T8	75 - 50	Horizontal	L4x4x1/4	181	-15490.90	25829.50	60.0	Pass
							67.7 (b)	
		Horizontal	L4x4x1/4	184	-12176.20	25829.50	47.1	Pass
							51.6 (b)	
		Horizontal	L4x4x1/4	187	-12449.30	25829.50	48.2	Pass
							52.5 (b)	
		Horizontal	L4x4x1/4	193	-14583.30	28709.00	50.8	Pass
							63.9 (b)	

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Horizontal	L4x4x1/4	196	-11518.20	28709.00	40.1 48.7 (b)	Pass
		Horizontal	L4x4x1/4	199	-11508.00	28709.00	40.1 48.6 (b)	Pass
T9	50 - 37.5	Horizontal	L4x4x1/4	208	-16505.20	23362.50	70.6 72.1 (b)	Pass
		Horizontal	L4x4x1/4	211	-12906.00	23362.50	55.2	Pass
		Horizontal	L4x4x1/4	214	-13430.60	23362.50	57.5	Pass
T10	37.5 - 25	Horizontal	L4x4x1/4	223	-17541.40	21232.70	82.6	Pass
		Horizontal	L4x4x1/4	226	-13576.10	21232.70	63.9	Pass
		Horizontal	L4x4x1/4	229	-14296.00	21232.70	67.3	Pass
T11	25 - 0	Horizontal	L4x4x1/2	238	-19693.90	33220.30	59.3	Pass
		Horizontal	L4x4x1/2	245	-15778.70	33220.30	47.5	Pass
		Horizontal	L4x4x1/2	252	-16778.80	33220.30	50.5	Pass
		Horizontal	L4x4x1/2	262	-18667.20	36248.90	51.5 54.6 (b)	Pass
		Horizontal	L4x4x1/2	269	-14572.60	36248.90	40.2 42.2 (b)	Pass
		Horizontal	L4x4x1/2	276	-15427.90	36248.90	42.6 44.7 (b)	Pass
T1	180 - 175	Top Girt	L3x3x1/4	4	-159.29	34476.00	0.5	Pass
		Top Girt	L3x3x1/4	5	-453.03	34476.00	1.3	Pass
		Top Girt	L3x3x1/4	6	-503.73	34476.00	1.5	Pass
T11	25 - 0	Redund Horz 1 Bracing	L3x3x1/4	240	-5651.50	29975.50	18.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	243	-5707.70	29975.50	19.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	247	-5707.70	29975.50	19.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	250	-5697.64	29975.50	19.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	254	-5697.64	29975.50	19.0	Pass
		Redund Horz 1 Bracing	L3x3x1/4	257	-5651.50	29975.50	18.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	264	-5651.50	31847.00	17.7	Pass
		Redund Horz 1 Bracing	L3x3x1/4	267	-5707.70	31847.00	17.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	271	-5707.70	31847.00	17.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	274	-5697.64	31847.00	17.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	278	-5697.64	31847.00	17.9	Pass
		Redund Horz 1 Bracing	L3x3x1/4	281	-5651.50	31847.00	17.7	Pass
T11	25 - 0	Redund Diag 1 Bracing	L3x3x1/4	241	-4000.26	15399.40	26.0	Pass
		Redund Diag 1 Bracing	L3x3x1/4	244	-4040.04	15399.40	26.2	Pass
		Redund Diag 1 Bracing	L3x3x1/4	248	-4040.04	15399.40	26.2	Pass
		Redund Diag 1 Bracing	L3x3x1/4	251	-4032.91	15399.40	26.2	Pass
		Redund Diag 1 Bracing	L3x3x1/4	255	-4032.91	15399.40	26.2	Pass
		Redund Diag 1 Bracing	L3x3x1/4	258	-4000.26	15399.40	26.0	Pass
		Redund Diag 1 Bracing	L3x3x1/4	265	-4092.01	16057.80	25.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Redund Diag 1 Bracing	L3x3x1/4	268	-4132.70	16057.80	25.7	Pass
		Redund Diag 1 Bracing	L3x3x1/4	272	-4132.70	16057.80	25.7	Pass
		Redund Diag 1 Bracing	L3x3x1/4	275	-4125.42	16057.80	25.7	Pass
		Redund Diag 1 Bracing	L3x3x1/4	279	-4125.42	16057.80	25.7	Pass
		Redund Diag 1 Bracing	L3x3x1/4	282	-4092.01	16057.80	25.5	Pass
T1	180 - 175	Inner Bracing	L2 1/2x2 1/2x3/16	13	-9.09	15638.70	0.3	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	14	-9.98	15638.70	0.3	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	15	-9.98	15638.70	0.3	Pass
T2	175 - 150	Inner Bracing	L2 1/2x2 1/2x3/16	28	-6.65	11551.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	29	-6.69	11551.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	30	-6.52	11551.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	40	-8.47	12909.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	41	-8.49	12909.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	42	-8.13	12909.80	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	52	-7.00	14522.00	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	53	-7.08	14522.00	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	54	-6.79	14522.00	0.4	Pass
T3	150 - 125	Inner Bracing	L2 1/2x2 1/2x3/16	67	-8.98	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	68	-8.99	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	69	-8.89	8552.99	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	79	-9.04	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	80	-9.06	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	81	-8.93	9407.78	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	91	-9.35	10397.40	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	92	-9.38	10397.40	0.4	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	93	-9.21	10397.40	0.4	Pass
T4	125 - 100	Inner Bracing	L2 1/2x2 1/2x3/16	106	-8.64	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	107	-8.64	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	108	-8.60	6586.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	118	-8.78	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	119	-8.79	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	120	-8.74	7159.11	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	130	-8.64	7809.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	131	-8.65	7809.62	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	132	-8.55	7809.62	0.5	Pass
T5	100 - 91.6667	Inner Bracing	L2 1/2x2 1/2x3/16	145	-13.80	6080.15	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	146	-13.81	6080.15	0.5	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	147	-13.73	6080.15	0.5	Pass
T6	91.6667 - 83.3333	Inner Bracing	L2 1/2x2 1/2x3/16	160	-13.52	5629.93	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	161	-13.53	5629.93	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	162	-13.46	5629.93	0.6	Pass
T7	83.3333 - 75	Inner Bracing	L2 1/2x2 1/2x3/16	175	-14.07	5227.92	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	176	-14.07	5227.92	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	177	-14.03	5227.92	0.6	Pass
T8	75 - 50	Inner Bracing	L2 1/2x2 1/2x3/16	190	-15.78	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	191	-15.77	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	192	-15.73	4392.91	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	202	-16.06	4867.49	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	203	-16.05	4867.49	0.6	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	204	-16.01	4867.49	0.6	Pass
T9	50 - 37.5	Inner Bracing	L3x3x1/4	217	-16.09	9098.35	0.5	Pass
		Inner Bracing	L3x3x1/4	218	-16.08	9098.35	0.5	Pass
		Inner Bracing	L3x3x1/4	219	-16.05	9098.35	0.5	Pass
T10	37.5 - 25	Inner Bracing	L3x3x1/4	232	-15.82	8290.02	0.6	Pass
		Inner Bracing	L3x3x1/4	233	-15.81	8290.02	0.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Inner Bracing	L3x3x1/4	234	-15.79	8290.02	0.6	Pass
T11	25 - 0	Inner Bracing	L3x3x1/4	259	-17.73	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	260	-17.64	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	261	-17.77	6965.92	0.6	Pass
		Inner Bracing	L3x3x1/4	283	-17.45	7584.82	0.6	Pass
		Inner Bracing	L3x3x1/4	284	-17.35	7584.82	0.6	Pass
		Inner Bracing	L3x3x1/4	285	-17.49	7584.82	0.6	Pass
							Summary	
						Leg (T4)	87.6	Pass
						Diagonal (T11)	74.4	Pass
						Horizontal (T10)	82.6	Pass
						Top Girt (T1)	1.5	Pass
						Redund Horz 1 Bracing (T11)	19.0	Pass
						Redund Diag 1 Bracing (T11)	26.2	Pass
						Inner Bracing (T8)	0.6	Pass
						Bolt Checks	76.9	Pass
						RATING =	**87.6**	**Pass**

ANCHOR BOLT EVALUATION

ANCHOR BOLT ANALYSIS

Input Data

Tower Reactions:

Uplift:	Uplift := 313.641·kips	*user input*
Shear:	Shear := 45.184·kips	*user input*
Compression:	Compression := 362.710·kips	*user input*

Anchor Bolt Data:

Use ASTM A36 Actual material strength unknown, therefore assume minimum design values for anchor

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 58·ksi	*user input*	
Bolt Yield Strength:	Fy := 36·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.75in	*user input*	
Threads per Inch:	n := 5	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-15)
Length from top of pier to bottom of leveling nut:	L_{ar} := 0in	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	

Anchor Bolt Section Properties:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 2.41 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 1.9 \cdot in^2$$

Net Diameter:

$$D_n := D - \frac{0.9743 in}{n} \qquad D_n = 1.56 \cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.39 \cdot in$$

Plastic Section Modulus of Bolt:

$$Z_x := \frac{D_n^3}{6} \qquad Z_x = 0.63 \cdot in^3$$

Forces:

Tension Force:

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

$T_u = 52.27 \cdot kip$ $\quad T_{ub} := T_u$

Compression Force:

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

$P_{uc} = 60.45 \cdot kip$ $\quad P_{ucb} := P_{uc}$

Shear Force:

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

$V_u = 7.53 \cdot kip$ $\quad V_{ub} := V_u$

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 Addedum 1):

$\phi_c := 0.9$

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

$\phi_t := 0.75$

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, Rnt:

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

$R_{nt} = 110.17 \cdot ft \cdot kip$

$\phi_t \cdot R_{nt} = 82.63 \cdot ft \cdot kip$

Design Compression Strength, Rnc:

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

$R_{nc} = 86.59 \cdot ft \cdot kip$

$\phi_c \cdot R_{nc} = 77.93 \cdot ft \cdot kip$

Design Shear Strength (Tension), Rnv:

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

$R_{nv} = 69.75 \cdot ft \cdot kip$

$\phi_v \cdot R_{nv} = 52.31 \cdot ft \cdot kip$

Design Shear Strength (Compression), Rnvc:

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

$R_{nvc} = 38.97 \cdot ft \cdot kip$

$\phi_c \cdot R_{nvc} = 35.07 \cdot ft \cdot kip$

NOTE: Per TIA-222-H The determination of capacity formulas are based on the exising 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:

lar = 3" - 1.75" (nut height) = 1.25" < 1.75" Bolt Diameter

TIA-222-H 4.9.9 Combined Shear and Tension:

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

$$\left[\frac{T_{ub}}{(\phi_t \cdot R_{nt})}\right]^2 + \left(\frac{V_{ub}}{\phi_v \cdot R_{nv}}\right)^2 = 0.42$$

TIA-222-H 4.9.9 Combined Shear and Compression:

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

$$\left[\frac{P_{ucb}}{(\phi_c \cdot R_{nc})}\right] + \left(\frac{V_{ub}}{\phi_c \cdot R_{nvc}}\right)^2 = 0.82$$

NOTE: Larger ratio number shown above Governs design Capacity.

Combined Shear and Tension/Compression Check:

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

ShearAndTensionCheck = "OK"

FOUNDATION EVALUATION

ROCK ANCHORED FOUNDATION CHECK

INPUT DATA

Factored Max Pier Reactions:

NOTE: Footing Dimensions/Depths obtained from original Construction Drawings (from Stainless, Inc.) Bearing Capacity and bonding strengths are obtained from Welti Geotechnical Report dated 3/26/2018.

Uplift: $Uplift := 313.641 \cdot kips$

Shear: $Shear := 45.184 \cdot kips$

Compression: $Compression := 362.710 \cdot kips$

Foundation Structure

Footing Width: $B_{ftg} := 6ft$

Footing Length: $L_{ftg} := 6ft$

Footing Thickness: $TH_{ftg} := 2.5ft$

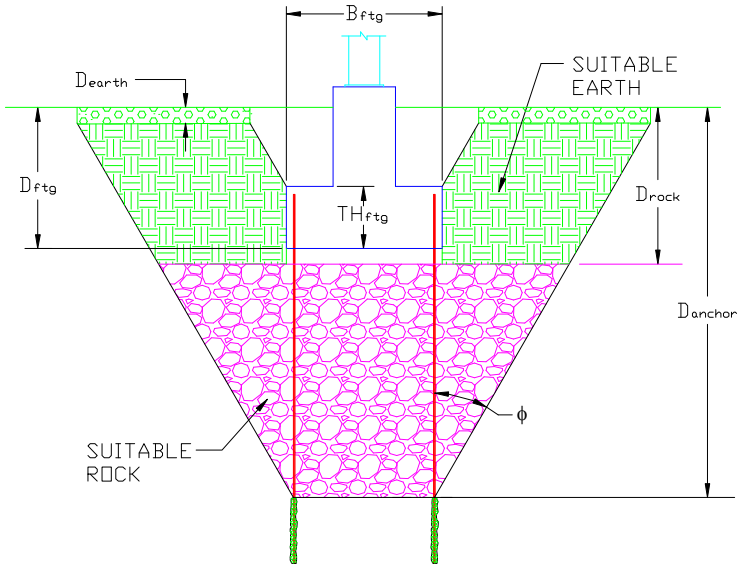
Depths:

Depth to Bottom of Footing: (from grade line) $D_{ftg} := 4.75ft$

Depth to Suitable Rock: (from grade line) $D_{rock} := 3.5ft$

Depth to Suitable Earth: (from grade line) $D_{earth} := 1ft$

Anchor Depth: $D_{anchor} := 21.75ft$



Soil Properties:

Internal Friction Angle: $\phi := 30deg$

Unit Weight of Earth: $\gamma_{earth} := 120 \frac{lb}{ft^3}$

Unit Weight of Rock: $\gamma_{rock} := 165 \frac{lb}{ft^3}$

Allowable Bearing: $Bearing := 20000 \cdot psf$

Ultimate Bearing: $U_{Bearing} := 2 \cdot Bearing$

$$DL_{foot} := 0.90\left[\left[\left[\left(B_{ftg} \cdot L_{ftg} \cdot TH_{ftg}\right) + \left[\frac{\pi}{4} \cdot (3ft)^2 \cdot 3.25ft\right]\right] \cdot 0.150 \frac{kips}{ft^3} + \left[\frac{52yd^3}{3} \cdot \left(0.1500 \frac{kips}{ft^3}\right)\right]\right]\right]$$

KM Concrete Slab DL --> 52 cy / 3 piers applied within "DL.foot"

$DL_{foot} = 78431.34 \cdot lb$

$DL_{Soil} := 0lb$ *NOTE: "0" APPLIED DUE TO REMOVAL OF SOIL PER KM MODIFICATION DEISGN 2017. CONCRETE DL CONSIDERED*

Anchors:

Number of Anchors (along width): $NW_{anchor} := 2$

Number of Anchors (along length): $NL_{anchor} := 2$

Anchor Spacing* (along width): $SW_{anchor} := 3\,ft$

Anchor Spacing* (along length): $SL_{anchor} := 3\,ft$

Hole Diameter: $hole_d := 3\,in$

Ultimate Bond Stress: $\sigma_{bond} := 100 \cdot psi \cdot 2.0$

Value obtained from Welti (geotech) via e-mail dated April 5, 2018.

Ultimate Bond Stress: $\sigma_{Work.bond} := \frac{\sigma_{bond}}{2}$

Force (per anchor): $P_{design} := \frac{Uplift - \left[0.9 \cdot \left(DL_{foot} + DL_{Soil}\right)\right]}{NW_{anchor} + NL_{anchor}}$

$P_{design} = 60.76 \cdot kips$

CALCULATE RESISTANCE

Intermediate Dimensions:

Suitable Earth Height: $H := D_{rock} - D_{earth}$ $H = 2.50\,ft$

Suitable Rock Height: $Z := D_{anchor} - D_{earth} - D_{rock}$ $Z = 17.25\,ft$

Total Anchor Width: $W := \left(NW_{anchor} - 1\right) \cdot SW_{anchor}$ $W = 3.00\,ft$

Total Anchor Length: $L := \left(NL_{anchor} - 1\right) \cdot SL_{anchor}$ $L = 3.00\,ft$

Earth Above Footing: $PD := D_{ftg} - TH_{ftg} - 2.25\,ft$ $PD = 0.00\,ft$

Volumes:

Gross Volume:

$GV_1 := W \cdot L \cdot (Z + H)$ $GV_1 = 177.75 \cdot ft^3$

$GV_2 := \left[\frac{1}{2} \cdot (Z + H) \cdot \tan(\phi) \cdot (Z + H)\right] \cdot (W + L) \cdot 2$ $GV_2 = 1351.22 \cdot ft^3$

$GV_3 := \frac{1}{3} \cdot \pi \cdot [(Z + H) \cdot \tan(\phi)]^2 \cdot (Z + H)$ $GV_3 = 2689.11 \cdot ft^3$

$GV := GV_1 + GV_2 + GV_3$ $GV = 4218.08 \cdot ft^3$

Rock Volume:

$RV_1 := W \cdot L \cdot (Z)$ $RV_1 = 155.25 \cdot ft^3$

$RV_2 := \left[\frac{1}{2} \cdot (Z) \cdot \tan(\phi) \cdot (Z)\right] \cdot (W + L) \cdot 2$ $RV_2 = 1030.79 \cdot ft^3$

$RV_3 := \frac{1}{3} \cdot \pi \cdot [(Z) \cdot \tan(\phi)]^2 \cdot (Z)$ $RV_3 = 1791.74 \cdot ft^3$

$RV := RV_1 + RV_2 + RV_3$ $RV = 2977.78 \cdot ft^3$

Volume of Soil between KM Modification Slab:

NOTE: ***Conservatively,*** consider NO soil uplift resistance within these calculations, therefore, the value of "EV" = 0

AECOM

				Page	of
Job	180' Stainless SST - Thompson, CT	Project No.	EVS-017 Rev.3 (b.2)	Sheet 3	of 3
Description	Foundation with Rock Anchors - TIA-222-H Check	Computed by	CMC	Date	11/25/20
	Modification Analysis	Checked by		Date	

Resisting Forces:

Resisting Rock Force: $F_{rock} := RV \cdot \gamma_{rock}$ $F_{rock} = 491.33 \cdot kips$

Resisting Earth Force: $F_{earth} := 0kips$ $F_{earth} = 0.00 \cdot kips$

Resisting Concrete Force: $F_{conc} := DL_{foot}$ $F_{conc} = 78.43 \cdot kips$

NOTE: "0.9" is TIA-222-H Reducing factor for uplift resistance (LC2)

Total Resisting Force: $F_{total} := \left(F_{rock} + F_{earth} + F_{conc}\right) \cdot 0.9$ $F_{total} = 512.79 \cdot kips$

Check Uplift:

$$Condition1 := if\left(\frac{Uplift}{F_{total} \cdot 0.75} \le 1.00, "OK", "Overstressed"\right)$$

$\frac{Uplift}{F_{total} \cdot 0.75} = 0.82$ Condition1 = "OK"

Embedment Length:

$$L_b := \frac{P_{design}}{\pi \cdot hole_d \cdot \sigma_{Work.bond} \cdot 0.60}$$ $L_b = 8.95\ ft$

NOTE: "0.60" reduction factor from TIA-222-H for uplift resistance for Rock Anchor

$$Condition2 := if\left(\frac{Z}{L_b} \ge 1.00, "OK", "Overstressed"\right)$$

$\frac{Z}{L_b} = 1.93$ Condition2 = "OK"

$\left(\frac{Z}{L_b}\right)^{-1} = 0.52$

Check Bearing:

$$MaxBearing := \frac{Compression + 1.2 \cdot DL_{foot}}{B_{ftg} \cdot L_{ftg}}$$

$$Condition3 := if\left(\frac{MaxBearing}{U_{Bearing} \cdot 0.75} \le 1.00, "OK", "Overstressed"\right)$$

NOTE: "0.75" is TIA-222-H Reducing factor for bearing resistance

$MaxBearing = 12689.66 \cdot psf$

$U_{Bearing} \cdot 0.75 = 30000.00 \cdot psf$

$\frac{MaxBearing}{U_{Bearing} \cdot 0.75} = 0.4230$ Condition3 = "OK"

About AECOM

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ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

Ref: ES-051 THOMPSON Date: 27Jan21
Dep: BL GRAPHICS Wgt: 1.65 LBS
DV:

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4440

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.65 LB
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **HONORABLE AMY ST, ONGE**
TOWN OF THOMPSON
815 RIVERSIDE DRIVE

NORTH GROSVENORDALE CT 06255
REF: ES-051 THOMPSON

DEPT: BL GRAPHICS

56DC1/1136/0542

FedEx Express

J2010191106011w

TRK# 0201 **9544 9955 4440**

THU - 28 JAN 4:30P
PRIORITY OVERNIGHT

EM FICA

06255
CT-US **BOS**

Part # 156148-434 RIT EXP 09/21 ®

Ref: ES-051 THOMPSON Date: 27Jan21
Dep: BL GRAPHICS Wgt: 1.65 LBS

DV:

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4450

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.65 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **TYRA PENN – GESEK**
TOWN OF THOMPSON
815 RIVERSIDE DRIVE

NORTH GROSVENORDALE CT 06255

REF: ES-051 THOMPSON

DEPT: BL GRAPHICS

FedEx Express

J2010191106D1uv

56DC1/1136/05A2

THU – 28 JAN 4:30P
PRIORITY OVERNIGHT

TRK# 0201 **9544 9955 4450**

EM FICA

06255
CT – US **BOS**

Part # 159148-434 RIT EXP 09/21 ©©

Ref: ES-051 THOMPSON Date: 27Jan21
Dep: BL GRAPHICS Wgt: 1.65 LBS

DV:

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4461

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.65 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **BRIAN BENITO**
DEPT OF EMERGENCY SERVICES
1111 COUNTRY CLUB ROAD

MIDDLETOWN CT 06457
REF: ES-051 THOMPSON

DEPT: BL GRAPHICS

56BC1/1136/05A2

FedEx Express

J201019110601uv

TRK# 0201 **9544 9955 4461**

THU - 28 JAN 10:30A
PRIORITY OVERNIGHT

00 BDLA

06457
CT-US **BDL**

Part # 156149-434 RIT EXP 09/21

Ref: ES-051 THOMPSON Date: 27Jan21
Dep: BL GRAPHICS Wgt: 1.65 LBS

DV:

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4472

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.65 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
REF: ES-051 THOMPSON

DEPT: BL GRAPHICS

FedEx Express

J2010191106010v

56DC1/1136/05A2

TRK# 0201 9544 9955 4472

THU - 28 JAN 10:30A
PRIORITY OVERNIGHT

00 BDLA

06051
CT-US **BDL**

Part # 156148-42A RIT EXP 03/21 ee

ATTACHMENT G - POWER DENSITY REPORT

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

ES-051

97 Mountain Hill Road

Thompson, CT 06255

December 18, 2020

Table of Contents

List of Tables

List of Figures

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 at 97 Mountain Hill Road in Thompson, CT. Eversource is proposing to install two omnidirectional antennas – one transmit and one receive-only antenna – 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 of the existing tower to determine FCC compliance of the facility.

Figure 1: View of ES-051 Thompson

Site Address	97 Mountain Hill Road
Latitude	41° 59' 11.7" N
Longitude	71° 54' 49.1" W
Site Elevation AMSL	558’
Survey Engineer	Marc Salas
Survey Date/Time	6/16/2020; 9:00 AM – 9:45 AM

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 (mW/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:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

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 ERP (Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	Telewave ANT220F2	217	2.5	124	4	38°	4.25	134

Table 2: Eversource Antenna Configuration (Proposed)[1] [2]

[1] Transmit power assumes 0 dB of cable loss.

[2] Antenna height listed for the proposed antenna is based on the AECOM Structural Analysis Report dated November 25, 2020 (Rev. 3).

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.

Manufacturer	Narda Microwave			
Probe	EA 5091, Serial# 01116			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Meter	NBM550, Serial# E-1069			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Probe Specifications	**Frequency Range**	**Field Measured**	**Standard**	**Measurement Range**
	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 ±3 dB (0.5% to 6%), ±1 dB (6% to 100%), ±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[3]. Every effort is taken to reduce the overall uncertainty during measurement collection including pointing the probe directly at the likely highest source of emissions.

[3] 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

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 16, 2020 between 9:00 AM and 9:45 AM. The calculated % MPE contribution from the proposed equipment modifications 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 11 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 9.89% (Average Uncontrolled/General Population MPE) and was recorded at Location 10 near 66 Mountain Hill Road. The highest composite (measured + calculated) % MPE value is calculated to be 10.02% (Average Uncontrolled/General Population) and is also calculated to occur at Location 10.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource Proposed)	Composite % MPE (Uncontrolled / General)
1	Western corner of fenced compound	41.98653	-71.91400	100	1.64%	0.02%	1.66%
2	Southwest side of fenced compound gate	41.98648	-71.91392	86	1.82%	0.04%	1.86%
3	Left of fenced compound gate	41.98645	-71.91384	76	2.14%	0.05%	2.20%
4	Fenced compound gate	41.98640	-71.91376	79	2.26%	0.05%	2.31%
5	Parking area in front of compound gate	41.98634	-71.91383	105	2.48%	0.02%	2.49%
6	Along access way to tower	41.98616	-71.91388	172	1.03%	0.22%	1.25%
7	Access road, split with private drive	41.98582	-71.91397	297	2.08%	0.37%	2.45%
8	Tower access road and Mountain Hill Road	41.98500	-71.91471	652	1.87%	0.17%	2.04%
9	Cul-de-sac at end of Mountain Hill Road	41.98529	-71.91526	650	7.22%	0.18%	7.40%
10	**66 Mountain Hill Road**	**41.98458**	**-71.91423**	**755**	**9.89%**	**0.13%**	**10.02%**
11	86 Mountain Hill Road	41.98419	-71.91360	878	9.58%	0.10%	9.67%

Table 4: Measured and Calculated % MPE Results [4] [5]

[4] 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.

[5] 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 values reflected in the table.

Figures 2 and 3 below are aerial views 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

7. Conclusion

A number of accessible areas around the tower at 97 Mountain Hill Road in Thompson, 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 9.89% MPE. This measurement was recorded at Location 10, near 66 Mountain Hill Road.

The highest composite (measured + calculated) power density is **10.02% of the FCC General Population MPE limit** with the proposed Eversource equipment and is also calculated to occur at Location 10.

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.

Report Prepared By: Marc Salas
RF Engineer
C Squared Systems, LLC

December 18~~1~~, 2020
Date

Reviewed/Approved By: Keith Vellante
Director of RF Services
C Squared Systems, LLC

December ~~02~~23, 2020
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[6]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	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[7]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	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)

[6] 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

[7] 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

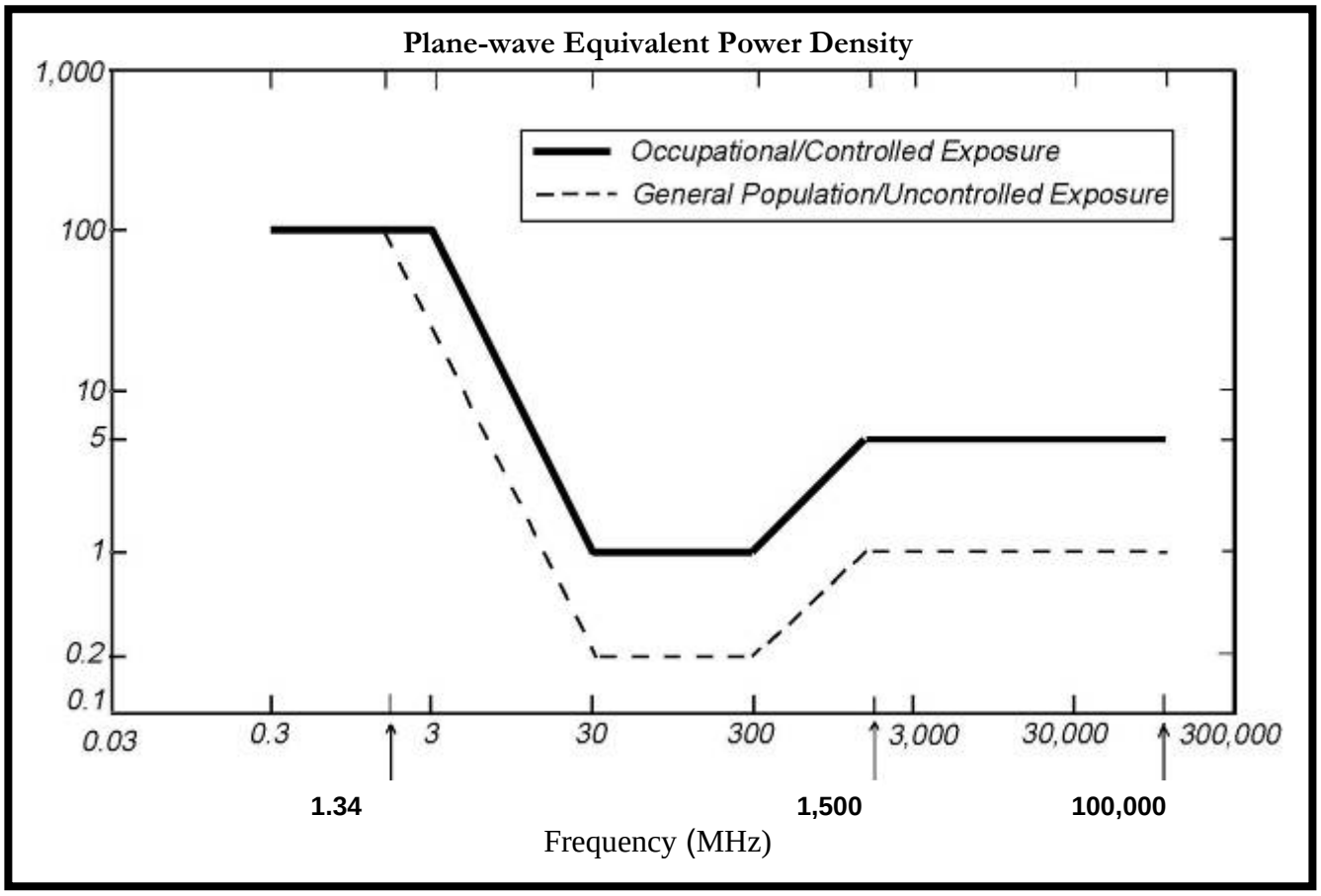

Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns

217 MHz

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’