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 # 1143
7 Surdan Mountain Road, Sharon, CT 06069
Latitude: 41-51-43.38 N / Longitude: 73-23-58.66 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas on an existing 195-foot self-support tower located at 7 Surdan Mountain Road in Sharon. See Attachment A, Parcel Map and Property Card. The tower is owned by Litchfield County Dispatch ("LCD") and the property is owned by Ann Adele Prindle. LCD has agreed for Eversource to maintain the modified equipment on the tower. Eversource plans to install one 18-foot 6-inch tall omni-directional antenna, to be mounted at 117 feet above ground level ("AGL"), and two 7/8-inch diameter coaxial cables. The antenna will be mounted to the existing tower with a new 4-foot stand-off mount. See Attachment B, Mount Analysis. There will be no other changes to the fenced compound, the tower or the existing antennas and equipment on the tower. The tower and existing and proposed equipment are depicted on Attachment C, Construction Drawings, dated December 29, 2020 and Attachment D, Structural Analysis, dated December 15, 2020. The tower has been under the Connecticut Siting Council's jurisdiction since December 11, 2001 (through AT&T notice of replacement of three existing antennas).

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 Brent Colley, First Selectman for the Town of Sharon; Jamie Casey, Land Use Administrator for the Town of

Sharon; Ann Adele Prindle, the underlying property owner; and LCD, the tower owner, via private carrier. Proof of delivery is attached. See Attachment E, Proof of Delivery of Notice.

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

1. There will be no change to the height of the existing tower.
2. The proposed modifications will not require 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 30, 2020 (Attachment F – 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 has been provided via courier to the Council.

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 Brent Colley, First Selectman, Town of Sharon
Jamie Casey, Land Use Administrator, Town of Sharon
Ann Prindle, Property Owner
LCD

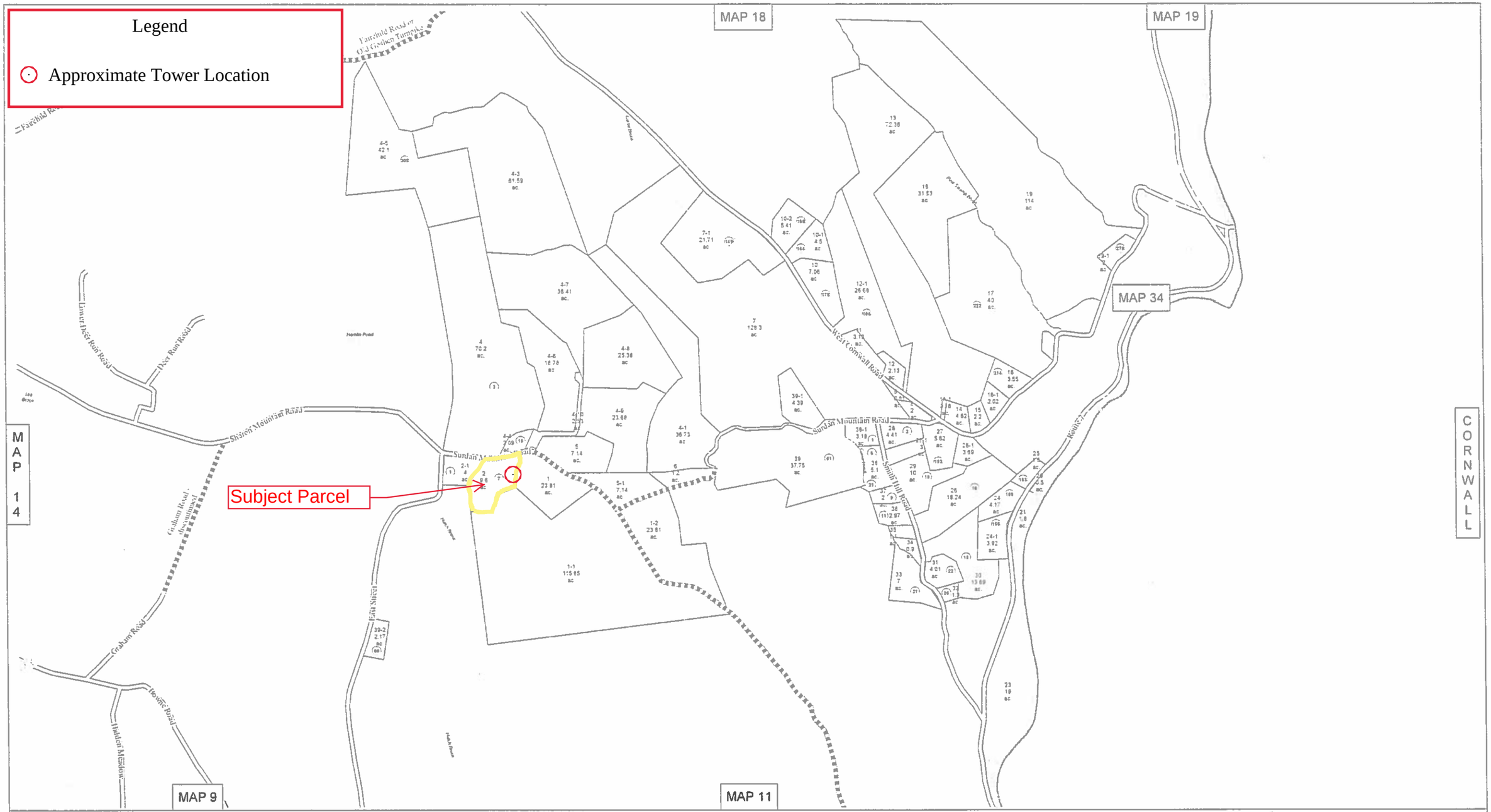
Attachments

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

[1] Any inactive or receive-only antennas are not included in the Power Density Report, as they are irrelevant in terms of the % Maximum Permissible Exposure calculations.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

ES-081 Sharon - Parcel Map



7 SURDAN MOUNTAIN RD

Location	7 SURDAN MOUNTAIN RD	**Mblu**	15/ 2/ / /
Acct#	00173200	**Owner**	PRINDLE ANN ADELE
Assessment	$438,000	**Appraisal**	$625,700
PID	1487	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$403,200	$222,500	$625,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$282,200	$155,800	$438,000

Owner of Record

Owner	PRINDLE ANN ADELE	**Sale Price**	$0
Co-Owner		**Certificate**	
		Book & Page	158/ 453
		Sale Date	04/19/2004

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
PRINDLE ANN ADELE	$0		158/ 453	04/19/2004
PRINDLE DARIEN R & ANN ADELE	$0		136/ 456	09/23/1999
PRINDLE DARIEN R & ANN ADELE	$115,000		132/ 861	08/03/1998
PRINDLE DARIEN	$0		98/ 458	10/19/1981

Building Information

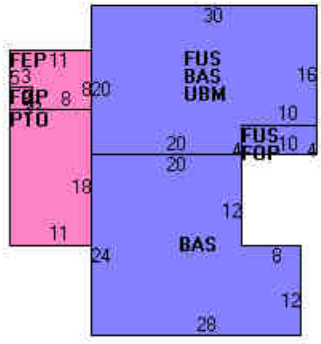
Building 1 : Section 1

Year Built:	1952
Living Area:	1,736
Building Percent Good:	75

Replacement Cost
Less Depreciation: $154,000

Building Attributes	
Field	**Description**
Style	Conventional
Model	Residential
Grade:	C+
Stories:	2 Stories
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Asphalt Shngl.
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Interior Flr 2	Carpet
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	0
Total Rooms:	7
Bath Style:	Average
Kitchen Style:	Average

Building Layout



(http://images.vgsi.com/photos/SharonCTPhotos//Sketches/1487_1487.jpg

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,136	1,136
FUS	Upper Story, Finished	600	600
FEP	Enclosed Porch	79	0
FOP	Open Porch	49	0
PTO	Patio	198	0
UBM	Basement, Unfinished	560	0
		2,622	1,736

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	101
Description	Single Family
Zone	RR
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	9.6
Frontage	
Depth	
Assessed Value	$155,800
Appraised Value	$222,500

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
BRN1	Barn 1 St.			860 S.F.	$11,600	1
SHD1	Shed			100 S.F.	$1,400	1
GAR1	Garage w/Shop			1254 S.F.	$31,000	1
CELL	Cell Tower site			1 UNITS	$205,200	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$403,200	$222,500	$625,700
2017	$412,700	$264,700	$677,400

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$282,200	$155,800	$438,000
2017	$288,900	$185,300	$474,200

ATTACHMENT B – 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 15, 2020

MOUNT EVALUATION LETTER

Site Number: 1143
Site Name: SHARON_LCD
Site Data: 7 Surdan Mountain Road
Litchfield, CT 06069
Latitude: 41° 51' 43.38"
Longitude: -73° 23' 58.66"

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) =	75.0%

Proposed Mounting System
SitePro 1 (USF-4U) 48" Ultimate Universal Stand-off Frame w/ Tieback and Clamps

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.

12/29/2020

TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	126.18	117.5	1	Omni	dbspectra	DS2C03P36D-D

2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 120 mph
WIND SPEED WITH ICE	40 mph with 1.5" radial ice thickness
EXPOSURE CATEGORY	C
RISK CATEGORY	III
TOPO CATEGORY	Flat
CREST HEIGHT	N/A
SPECTRAL RESPONSE FACTORS, Ss & S1	0.18 g & 0.065 g

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	49.5%	Pass	28.6%	Pass
Bracing: Pipe 2.0 Std	75.0%	Pass	41.7%	Pass
Mount Pipe: Pipe 3.0 Std	38.5%	Pass	41.6%	Pass
Tie Back: Pipe 2.0 Std	30.2%	Pass	0.9%	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)
DS2C03P36D-D	75

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: SHARON_LCD (1143)		Date: 12/15/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 12/15/2020

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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 =	120	mph		
Height Above Ground, z =	126.18	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.33		$K_e = e^{-0.000032 z_s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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 =	0.952		$F_A = q_z G_h (EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	44.31	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)
DS2C03P36D-D	18.50	0.25	0.25	2.00	8.33	368.90	2.00	8.33	368.90

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: SHARON_LCD (1143)		Date: 12/15/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 12/15/2020

Member Wind Loading

Exposure Category =	C	
Risk Category =	III	
Topographic Category =	1	
Basic Wind Speed, V =	120	mph
Height Above Ground, z =	126.18	ft
Crest Height, H =	N/A	ft
Velocity Pressure Coefficient, K_z =	1.33	
Topographic Factor, K_{zt} =	1.00	
Wind Directionality Factor, K_d =	0.95	
Shielding Factor, K_a =	0.90	
Ground Elevation Factor, K_e =	0.952	
Wind Velocity Pressure, q_z =	44.31	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	22.16
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	10.52
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	15.51
Tie Back: Pipe 2.0 Std	0.20		1.2	0.20	10.52

Appurtenance Ice Dead Loading

Exposure Category =	C		
Risk Category =	III		
Topographic Category =	1		
Height Above Ground, z =	126.18	ft	
Crest Height, H =	N/A	ft	
Design Ice Thickness, T_i =	1.50	in	
Importance Factor, I =	1.15		
Topographic Factor, K_{zt} =	1.00		
Height Escalation Factor, K_{iz} =	1.14		
Factored Ice Thickness, T_{iz} =	1.97	in	
Grating Ice Dead Load, D_{Gice} =	9.21	psf	

Equations

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

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

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

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

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

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft^3)	DL_{ice} (lb)
DS2C03P36D-D	18.83	0.58	0.58	5.15	288.44

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	SHARON_LCD (1143)	Date: 12/15/2020
			Verified By: JW
	Title:	MOUNT ANALYSIS REPORT	Date: 12/15/2020

Member Ice Dead Loading

Exposure Category =	C		
Risk Category =	III		
Topographic Category =	1		
Height Above Ground, z =	126.18	ft	
Crest Height, H =	N/A	ft	
Design Ice Thickness, T_i =	1.50	in	
Importance Factor, I =	1.15		
Topographic Factor, K_{zt} =	1.00		
Height Escalation Factor, K_{iz} =	1.14		
Factored Ice Thickness, T_{iz} =	1.97	in	
Grating Ice Dead Load, D_{Gice} =	9.21	psf	

Equations

	TIA-222-H
$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
$K_{iz} = (z/33)^{0.10}$	2.6.10
$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$	2.6.10
Aiz = pi*Tiz*(Dc+Tiz)	2.6.10
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	0.58	0.58	0.35	0.27	14.98
Bracing: Pipe 2.0 Std	0.53		0.20	0.19	10.48
Mount Pipe: Pipe 3.0 Std	0.62		0.29	0.24	13.19
Tie Back: Pipe 2.0 Std	0.53		0.20	0.19	10.48

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: SHARON_LCD (1143)		Date: 12/15/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 12/15/2020

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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} =	40	mph		
Height Above Ground, z =	126.18	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.33	psf	$K_e = e^{-0.000032 \cdot zs}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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 =	0.952		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	4.924			
Factored Ice Thickness, T_{iz} =	1.97	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)
DS2C03P36D-D	18.83	0.58	0.58	-	15.10	74.34	-	15.10	74.34

BLACK & VEATCH	Client: Eversource		Computed By: Joohwan Jung
	Site Name: SHARON_LCD (1143)		Date: 12/15/2020
			Verified By: JW
	Title: MOUNT ANALYSIS REPORT		Date: 12/15/2020

Member Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	C		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	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} =	40	mph		
Height Above Ground, z =	126.18	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	N/A	ft		
Velocity Pressure Coefficient, K_z =	1.33	psf	$K_e = e^{-0.000032 z s}$	2.6.8
Topographic Factor, K_{zt} =	1.00			
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 =	0.952		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	4.924			
Factored Ice Thickness, T_{iz} =	1.97	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	0.58	0.58	2	0.58	5.70
Bracing: Pipe 2.0 Std	0.53		1.2	0.53	3.11
Mount Pipe: Pipe 3.0 Std	0.62		1.2	0.62	3.67
Tie Back: Pipe 2.0 Std	0.53		1.2	0.53	3.11

BLACK & VEATCH	Client:	Eversource	Computed By: Joohwan Jung
	Site Name:	SHARON_LCD (1143)	Date: 12/15/2020
			Verified By: JW
	Title:	MOUNT ANALYSIS REPORT	Date: 12/15/2020

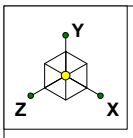
Seismic Loading

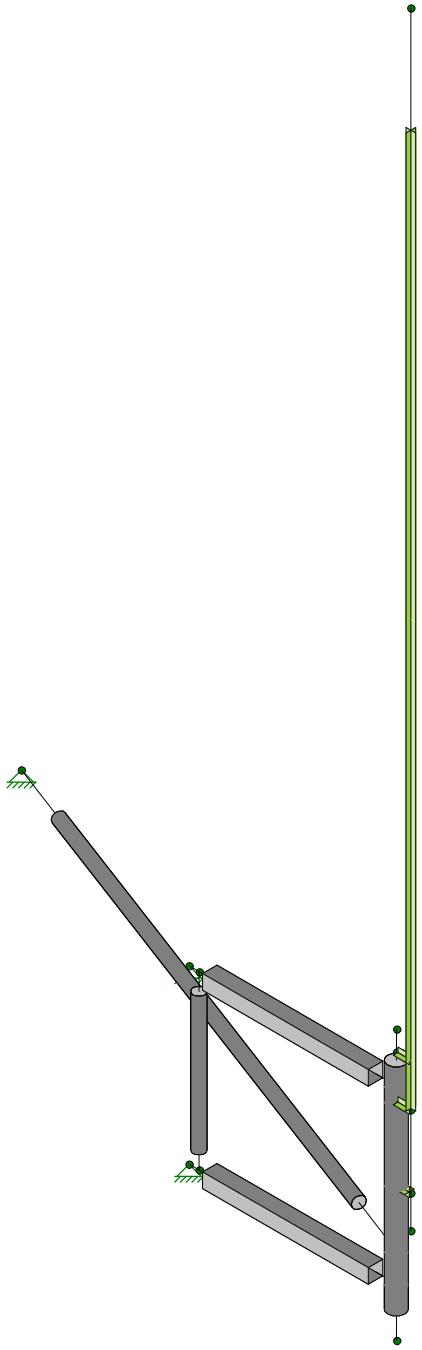
			Equations	TIA-222-H
Site Class =	D			
Spectral Response, S_s =	0.180	g	$S_{D1} = 2/3\ F_v S_1$	2.7.5
Max Spectral Response, S_1 =	0.065	g	$S_{DS} = 2/3\ F_a S_s \geq S_{D1}$	2.7.5
Accel. Site Coefficient, F_a =	1.60			
Vel. Site Coefficient, F_v =	2.40		$C_s = 1/2\ S_{DS}\ I \geq 0.03$	2.7.7.1.1
Design Spec. Response (1 sec), S_{D1} =	0.104			
Design Spec. Response, S_{DS} =	0.192		$E_H = A_s\ C_s\ W$	2.7.7
Importantance Factor, I =	1.25			
Seismic Response Coefficient, C_s =	0.120		$E_V = A_s\ 0.2\ S_{DS}\ W$	2.7.6
Amplification Factor, A_s =	3			

Appurtenance Seismic Loads

Name	Weight (lb)	E_H (lb)	E_V (lb)
DS2C03P36D-D	75	27.00	8.64

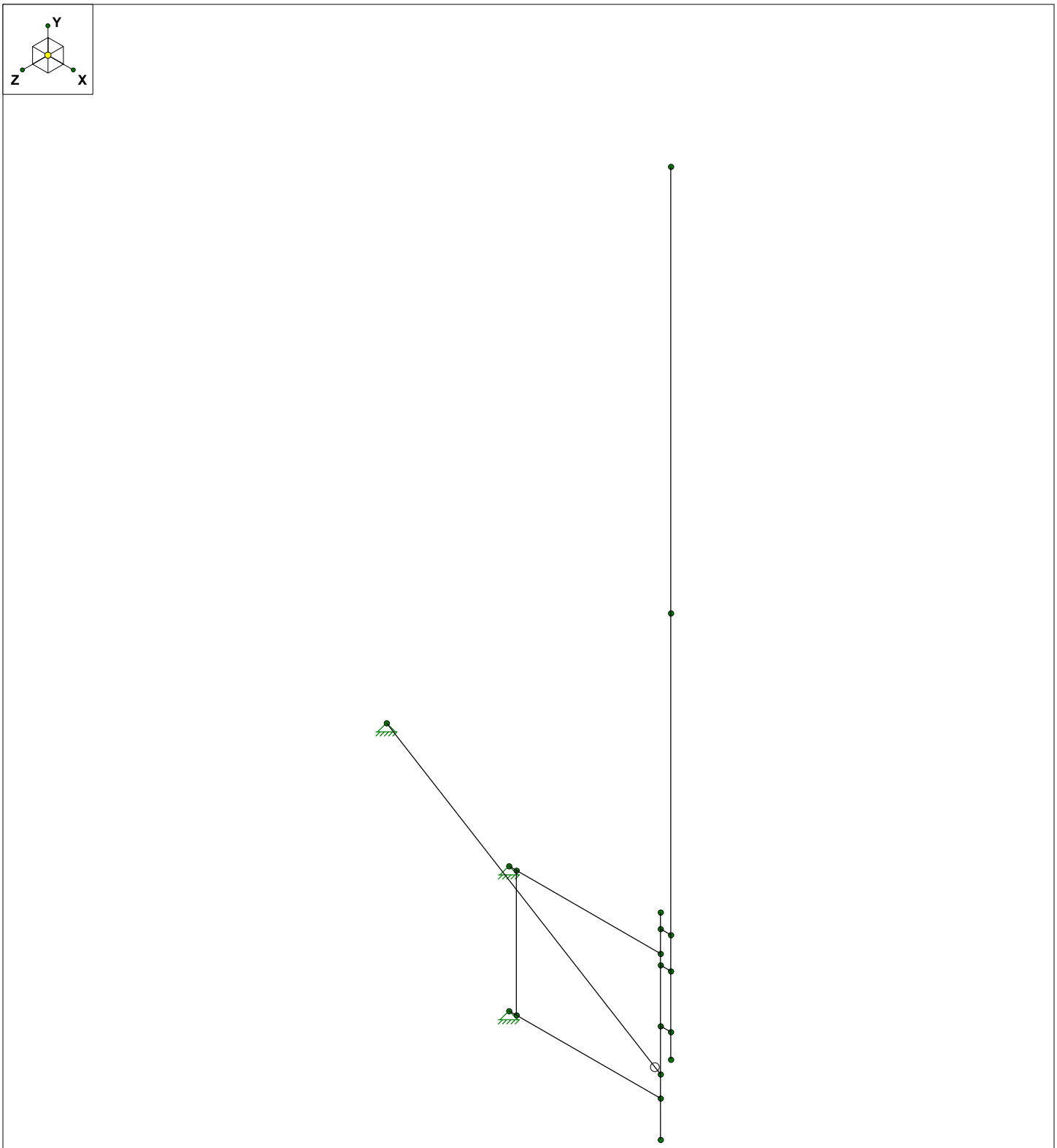
APPENDIX 2:
RISA PRINTOUTS





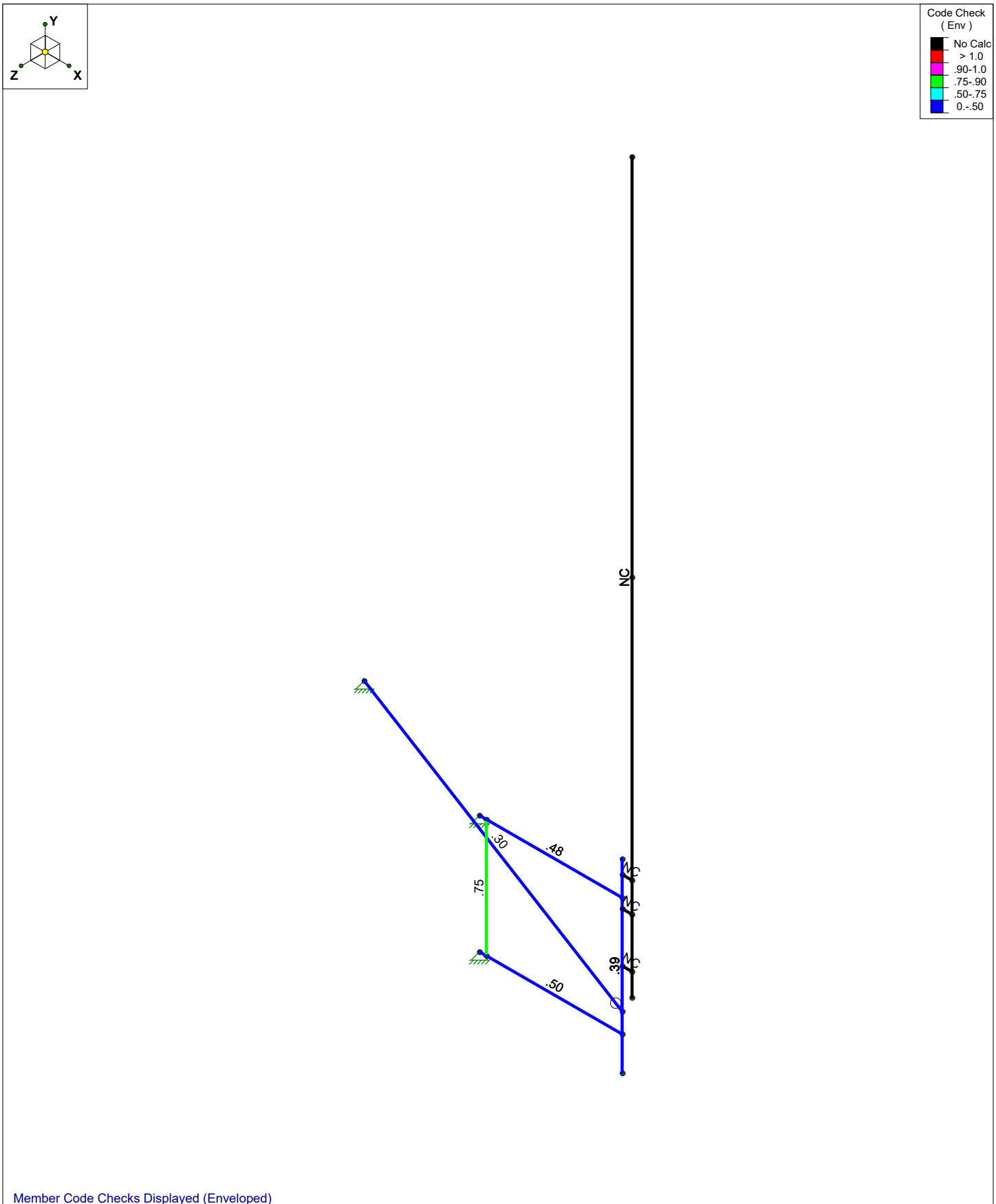
Envelope Only Solution

Black & Veatch	SHARONLCD USF-4U Model	SK - 1
Joohwan Jung		Dec 15, 2020 at 11:30 AM
405025.2021.2200		SHARONLCD USF-4U Model.r3d



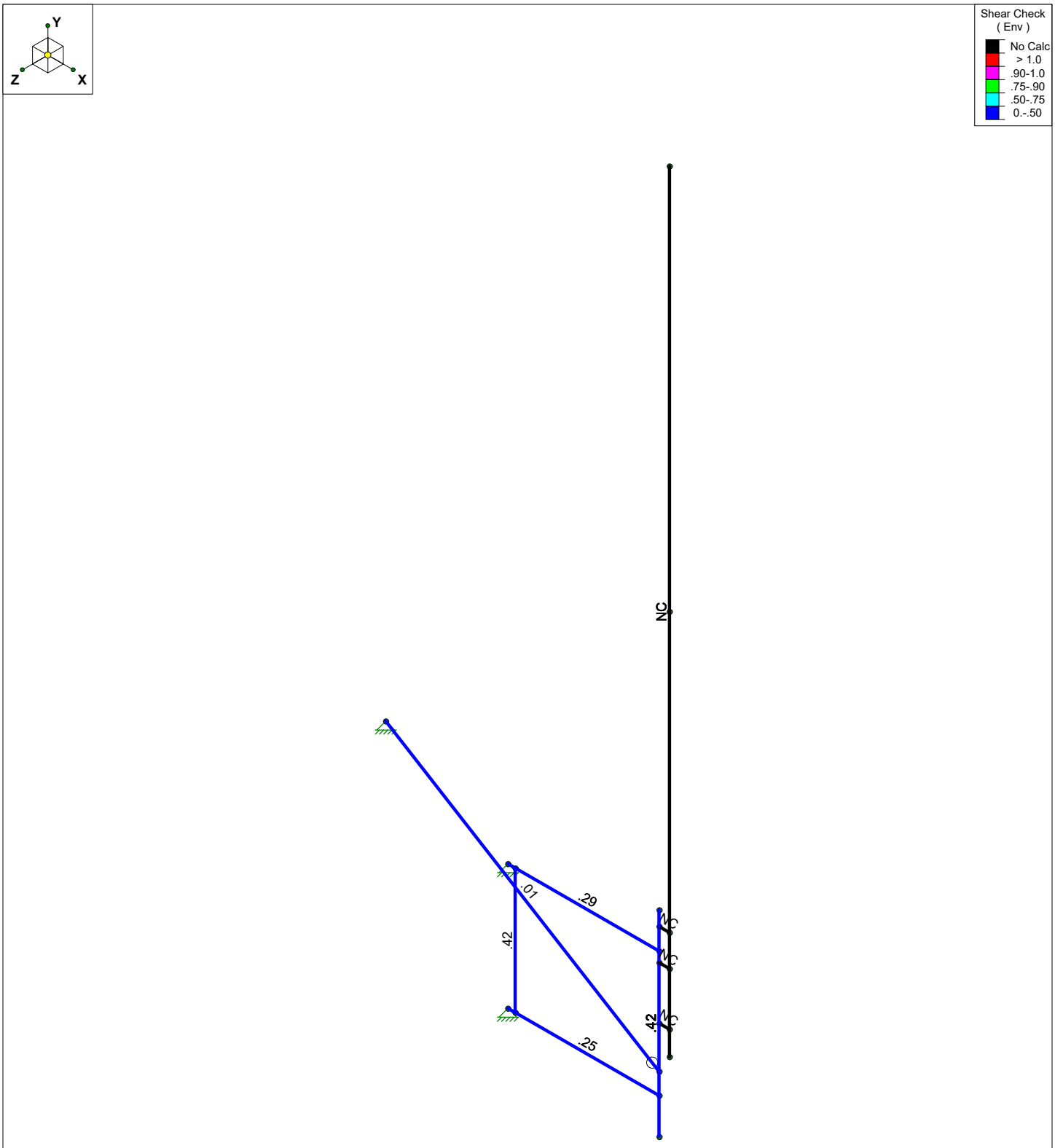
Envelope Only Solution

Black & Veatch	SHARONLCD USF-4U Model	SK - 2
Joohwan Jung		Dec 15, 2020 at 11:30 AM
405025.2021.2200		SHARONLCD USF-4U Model.r3d



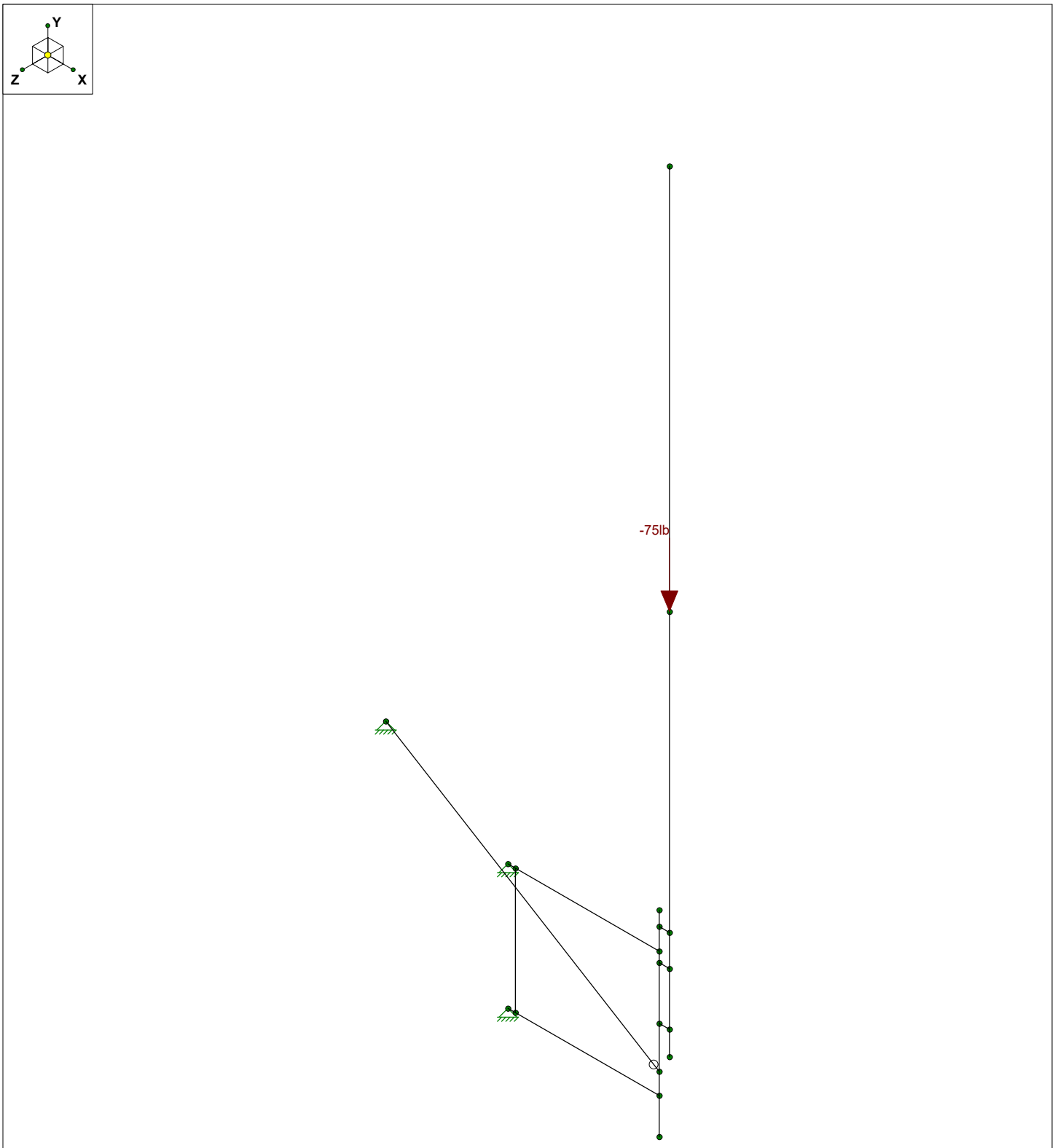
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	SHARONLCD USF-4U Model	SK - 3
Joohwan Jung		Dec 15, 2020 at 11:30 AM
405025.2021.2200		SHARONLCD USF-4U Model.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	SHARONLCD USF-4U Model	SK - 4
Joohwan Jung		Dec 15, 2020 at 11:30 AM
405025.2021.2200		SHARONLCD USF-4U Model.r3d



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch	SHARONLCD USF-4U Model	SK - 5
Joohwan Jung		Dec 15, 2020 at 11:30 AM
405025.2021.2200		SHARONLCD 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 (ft/sec^2)	32.2
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 (ft)	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
4	Tie Back	PIPE_2.0	HBrace	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

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			
2	N3	Reaction	Reaction	Reaction			
3	N19	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	N13	N14			RIGID	None	None	RIGID	Typical
6	M6	N9	N15			RIGID	None	None	RIGID	Typical
7	M7	N10	N16			RIGID	None	None	RIGID	Typical
8	M8	N11	N17			RIGID	None	None	RIGID	Typical
9	M9	N18	N19			Tie Back	HBrace	Pipe	A53 Gr.B	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
8	M8						Yes	** NA **			None
9	M9	BenPIN					Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Arm	3.625			Lbyy						Lateral
2	M2	Arm	3.625			Lbyy						Lateral
3	M3	Bracing	3									Lateral
4	M4	Mount Pipe	4.708									Lateral
5	M9	Tie Back	11.286									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		5		
5	Wind - 30 Deg (X)	WL				1		5		
6	Wind - 60 Deg (X)	WL				1		5		
7	Wind - 90 Deg (X)	WL				1		5		
8	Wind - 120 Deg (X)	WL				1		5		
9	Wind - 150 Deg (X)	WL				1		5		
10	Wind - 180 Deg (X)	WL				1		5		
11	Wind - 210 Deg (X)	WL				1		5		
12	Wind - 240 Deg (X)	WL				1		5		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
13	Wind - 270 Deg (X)	WL				1		5		
14	Wind - 300 Deg (X)	WL				1		5		
15	Wind - 330 Deg (X)	WL				1		5		
16	Wind - 0 Deg (Z)	WL				1		5		
17	Wind - 30 Deg (Z)	WL				1		5		
18	Wind - 60 Deg (Z)	WL				1		5		
19	Wind - 90 Deg (Z)	WL				1		5		
20	Wind - 120 Deg (Z)	WL				1		5		
21	Wind - 150 Deg (Z)	WL				1		5		
22	Wind - 180 Deg (Z)	WL				1		5		
23	Wind - 210 Deg (Z)	WL				1		5		
24	Wind - 240 Deg (Z)	WL				1		5		
25	Wind - 270 Deg (Z)	WL				1		5		
26	Wind - 300 Deg (Z)	WL				1		5		
27	Wind - 330 Deg (Z)	WL				1		5		
28	Ice DL	DL				1		5		
29	Ice Wind - 0 Deg (X)	WL				1		5		
30	Ice Wind - 30 Deg (X)	WL				1		5		
31	Ice Wind - 60 Deg (X)	WL				1		5		
32	Ice Wind - 90 Deg (X)	WL				1		5		
33	Ice Wind - 120 Deg (X)	WL				1		5		
34	Ice Wind - 150 Deg (X)	WL				1		5		
35	Ice Wind - 180 Deg (X)	WL				1		5		
36	Ice Wind - 210 Deg (X)	WL				1		5		
37	Ice Wind - 240 Deg (X)	WL				1		5		
38	Ice Wind - 270 Deg (X)	WL				1		5		
39	Ice Wind - 300 Deg (X)	WL				1		5		
40	Ice Wind - 330 Deg (X)	WL				1		5		
41	Ice Wind - 0 Deg (Z)	WL				1		5		
42	Ice Wind - 30 Deg (Z)	WL				1		5		
43	Ice Wind - 60 Deg (Z)	WL				1		5		
44	Ice Wind - 90 Deg (Z)	WL				1		5		
45	Ice Wind - 120 Deg (Z)	WL				1		5		
46	Ice Wind - 150 Deg (Z)	WL				1		5		
47	Ice Wind - 180 Deg (Z)	WL				1		5		
48	Ice Wind - 210 Deg (Z)	WL				1		5		
49	Ice Wind - 240 Deg (Z)	WL				1		5		
50	Ice Wind - 270 Deg (Z)	WL				1		5		
51	Ice Wind - 300 Deg (Z)	WL				1		5		
52	Ice Wind - 330 Deg (Z)	WL				1		5		
53	Lateral Seismic - Eh (X)	ELX	.36			1				
54	Lateral Seismic - Eh (Z)	ELZ			.36	1				
55	Vertical Seismic - Ev (Y)	ELY		-.115		1				

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 (120 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																

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...
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	.063	16	.063														
19	1.2DL + 1.5LM + WL (30 DEG)	Y...	Y		1	1.2	3	1.5	5	.063	17	.063														
20	1.2DL + 1.5LM + WL (60 DEG)	Y...	Y		1	1.2	3	1.5	6	.063	18	.063														
21	1.2DL + 1.5LM + WL (90 DEG)	Y...	Y		1	1.2	3	1.5	7	.063	19	.063														
22	1.2DL + 1.5LM + WL (120 DEG)	Y...	Y		1	1.2	3	1.5	8	.063	20	.063														
23	1.2DL + 1.5LM + WL (150 DEG)	Y...	Y		1	1.2	3	1.5	9	.063	21	.063														
24	1.2DL + 1.5LM + WL (180 DEG)	Y...	Y		1	1.2	3	1.5	10	.063	22	.063														
25	1.2DL + 1.5LM + WL (210 DEG)	Y...	Y		1	1.2	3	1.5	11	.063	23	.063														
26	1.2DL + 1.5LM + WL (240 DEG)	Y...	Y		1	1.2	3	1.5	12	.063	24	.063														
27	1.2DL + 1.5LM + WL (270 DEG)	Y...	Y		1	1.2	3	1.5	13	.063	25	.063														
28	1.2DL + 1.5LM + WL (300 DEG)	Y...	Y		1	1.2	3	1.5	14	.063	26	.063														
29	1.2DL + 1.5LM + WL (330 DEG)	Y...	Y		1	1.2	3	1.5	15	.063	27	.063														
30																										
31	ICE LOAD COMBOS (1.5", 40 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																										
45	SEISMIC LOAD COMBOS																									
46	1.2DL + Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	1	53	1																
47	1.2DL - Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	-1	53	1																
48	1.2DL + Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	1	53	-1																
49	1.2DL - Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	-1	53	-1																
50	1.2DL + Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	1	54	1																
51	1.2DL - Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	-1	54	1																
52	1.2DL + Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	1	54	-1																
53	1.2DL - Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	-1	54	-1																
54																										

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	1166.614	2	419.78	9	1297.407	5	0	53	0	53	0	53
2		min	-1621.393	8	-273.795	3	-1298.523	11	0	2	0	2	0	2
3	N3	max	1716.087	10	582.318	33	1213.27	11	0	53	0	53	0	53
4		min	-1294.651	4	-198.169	9	-1208.223	5	0	2	0	2	0	2
5	N19	max	1595.891	5	82.901	41	663.676	5	0	53	0	53	0	53
6		min	-1603.282	11	21.218	53	-667.605	11	0	2	0	2	0	2
7	Totals:	max	752.873	2	854.111	40	752.859	5						

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
8		min	-752.873	8	221.705	53	-752.859	11						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear..	Loc[ft]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M1	HSS3X3X3	.477	3.625	5	.286	.189	z	11	55265....	59535	5171.25	5171.25	2..	H3-6
2	M2	HSS3X3X3	.495	3.625	11	.252	3.625	z	11	55265....	59535	5171.25	5171.25	2..	H3-6
3	M3	PIPE_2.0	.750	0	5	.417	0		11	28843....	32130	1871.6...	1871.6...	2..	H3-6
4	M4	PIPE_3.0	.385	3.384	11	.416	3.384		11	57908....	65205	5748.75	5748.75	1..	H3-6
5	M9	PIPE_2.0	.302	5.76	5	.009	0		42	7722.8...	32130	1871.6...	1871.6...	1..	H1-1a

APPENDIX 3:
ATTACHMENTS

220 MHz Antenna – Omnidirectional, Low-PIM/Hi-PIP, 2.9 dBd
Model DS2C03P36D-D

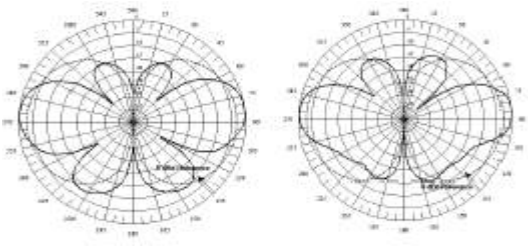
Specifications	
Design Type	True Corporate Feed
Frequency Range	216-222 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	6 MHz
Gain - dBd (average over BW)	2.9 dBd
Isolation, min.	34 dB
Configuration	Dual antenna
Beam Tilt (electrical down-tilt)	None (0°)
Vertical Beamwidth (E-Plane)	30°
Impedance -- Ohms	50
VSWR / Return Loss -- dB	1.5 : 1 / 14 dB (min.)
Average Power Rating	500 W (each antenna)
Peak Instantaneous Power	25 kW (each antenna)
Polarization	Vertical
Lightning Protection	Direct Ground
Connector	7/16 DIN female
Equivalent Flat-Plate Area	3.1 sq. ft.
Lateral Wind-load Thrust @100mph	129 lbf.
Wind Speed rating	160 mph (without ice)
Total Length	18.5 feet
Mounting Mast Length	35 inches
Mounting Hardware (Included)	DSH3V4N
Top Sway Brace (Recommended if side mounting antennas on top)	DSH2H3S (order separately)
Mast O.D.	3.5 inches
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight, antenna, and hardware	75 lbs. (approx.)
Shipping Weight	105 lbs. (approx.)
Invertibility	Antennas are physically invertible, but the patterns are optimized for upright mount.

Features and Benefits

Antennas from dbSpectra provide long term, trouble-free service in severe environments!
Design is tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's 12-channel P25 PIP test bed. High PIP level is demanded by today's digital systems.
True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.
PIM Rated Design – better than -150 dBc.
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.
Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Pattern

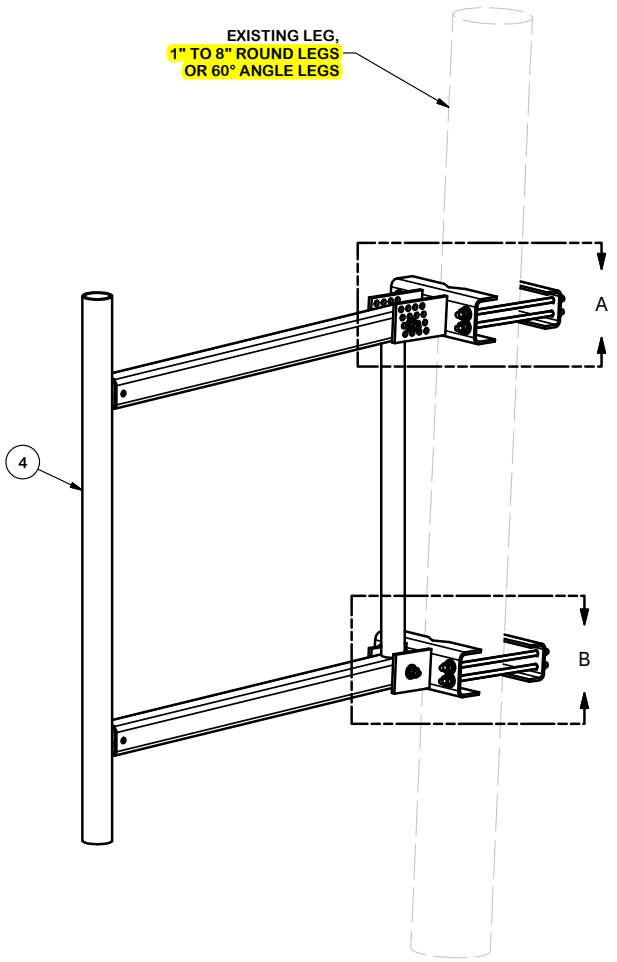
Vertical (No-Tilt)

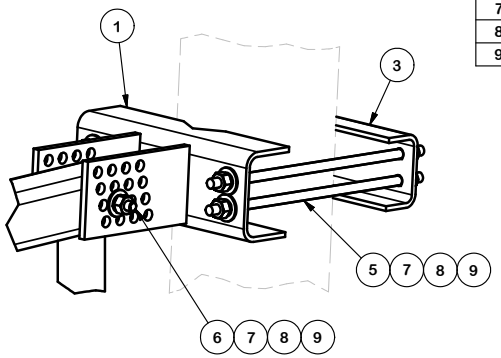


Top **Bottom**

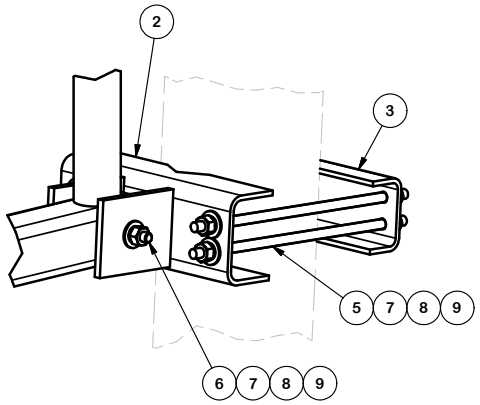
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 5" ± DIAMETER.

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

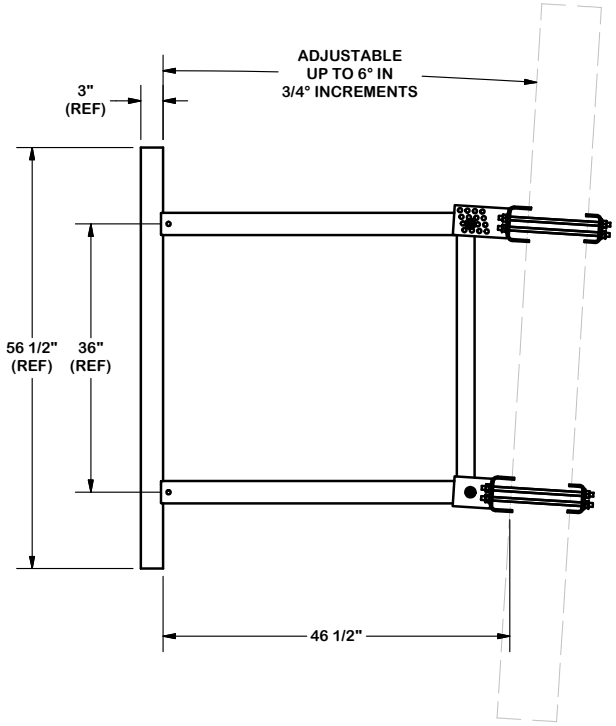




DETAIL A



DETAIL B



TOLERANCE NOTES

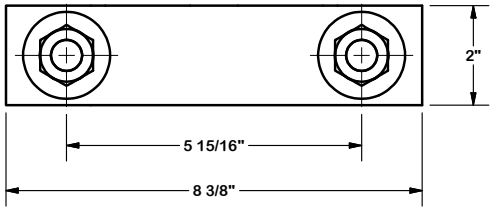
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

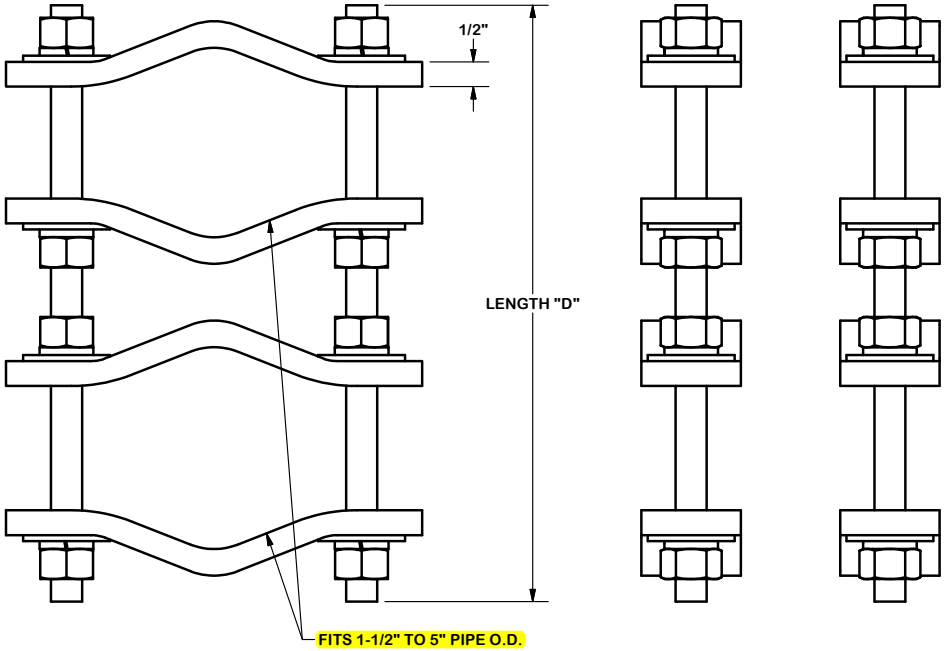
DESCRIPTION: 48" ULTIMATE UNIVERSAL STANDOFF FRAME

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

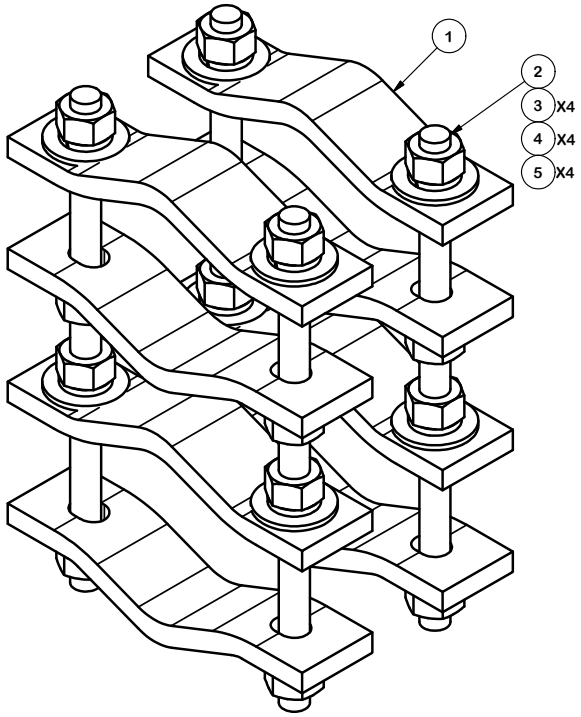
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 2/16/2011	USF-4U





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

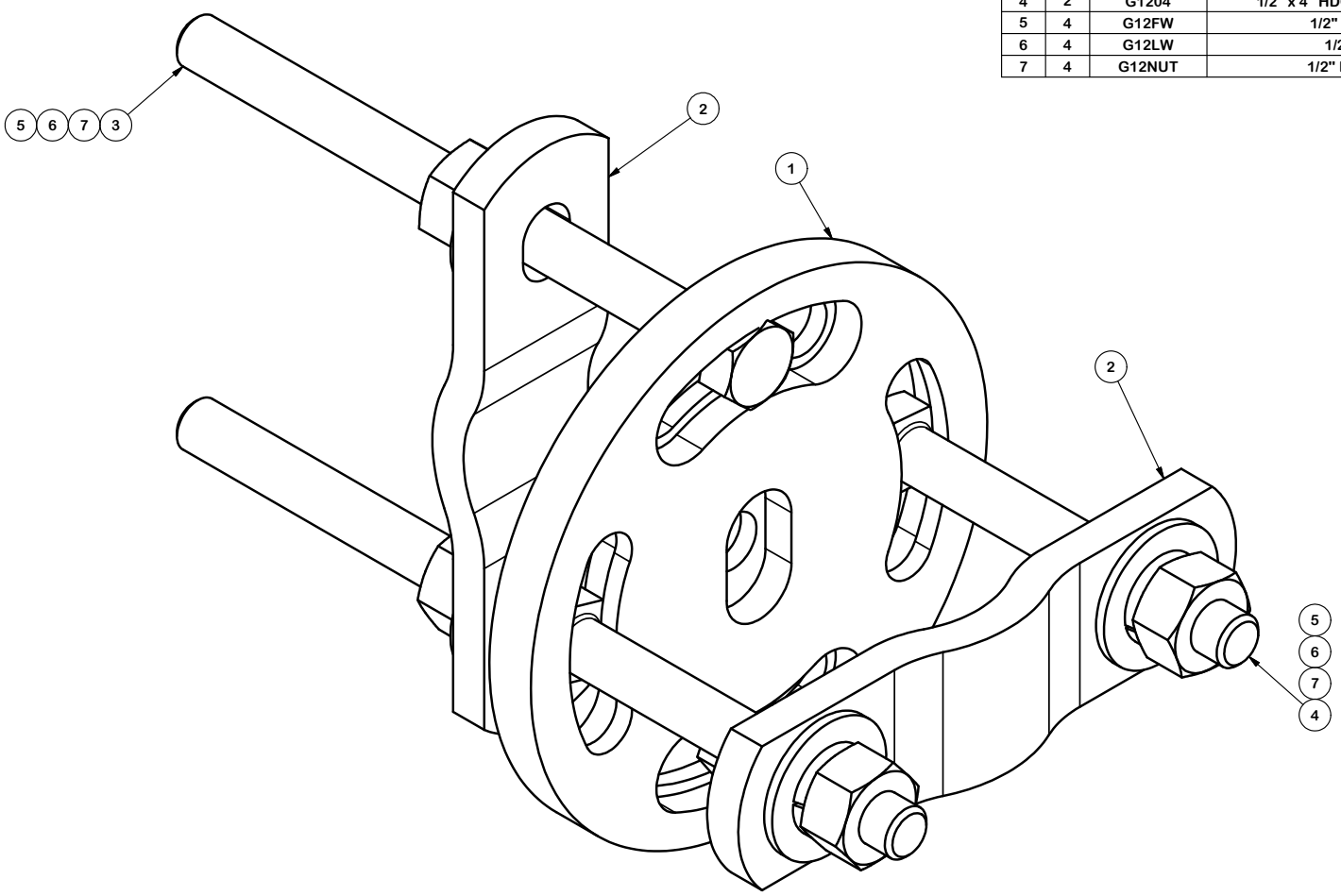
Engineering Support Team: 1-888-753-7446

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

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALVANIZED)		2.48	2.48
2	2	X-100064	CLAMP (S) (4" V-CLAMP) GALVANIZED		0.91	1.83
3	2	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	0.82
4	2	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	0.54
5	4	G12FW	1/2" HDG USS FLATWASHER		0.03	0.14
6	4	G12LW	1/2" HDG LOCKWASHER		0.01	0.06
7	4	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.29
					TOTAL WT. #	6.16



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
ADJUSTABLE CLAMP PLATE
TIE-BACK ASSEMBLY

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.
	CEK 8/30/2010		PUCK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 9/1/2010	PUCK

ATTACHMENT C – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. REMOVE EXISTING BOX ARM MOUNT AT ELEVATION 118'–0"± AGL
2. INSTALL (1) NEW OMNI/WHIP ANTENNA AT THE ELEVATION 135'–5 3/16" AGL
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM
4. INSTALL 450 AH BATTERIES AND RELOCATE EXISTING BATTERIES TO SALISBURY 21J

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:	SHARON LCD
SITE ID NUMBER:	#1143
SITE ADDRESS:	7 SURDAN MOUNTAIN RD SHARON LCD, CT 06069
MAP:	15
BLOCK:	6
ZONE:	RR
LATITUDE:	41° 51' 43.38" N
LONGITUDE:	73° 23' 58.66" W
ELEVATION:	1369'± AMSL
FEMA/FIRM DESIGNATION:	X
ACREAGE:	1.2± AC (BOOK: 47, PAGE: 591)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
DANIEL SOULE EXECUTIVE DIRECTOR
LITCHFIELD COUNTY DISPATCH INC
111 WATERS STREET
TORRINGTON, CT 06790

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

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	SITE PLAN
C–2	TOWER ELEVATION
C–3	ANTENNA EQUIPMENT
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:	JR

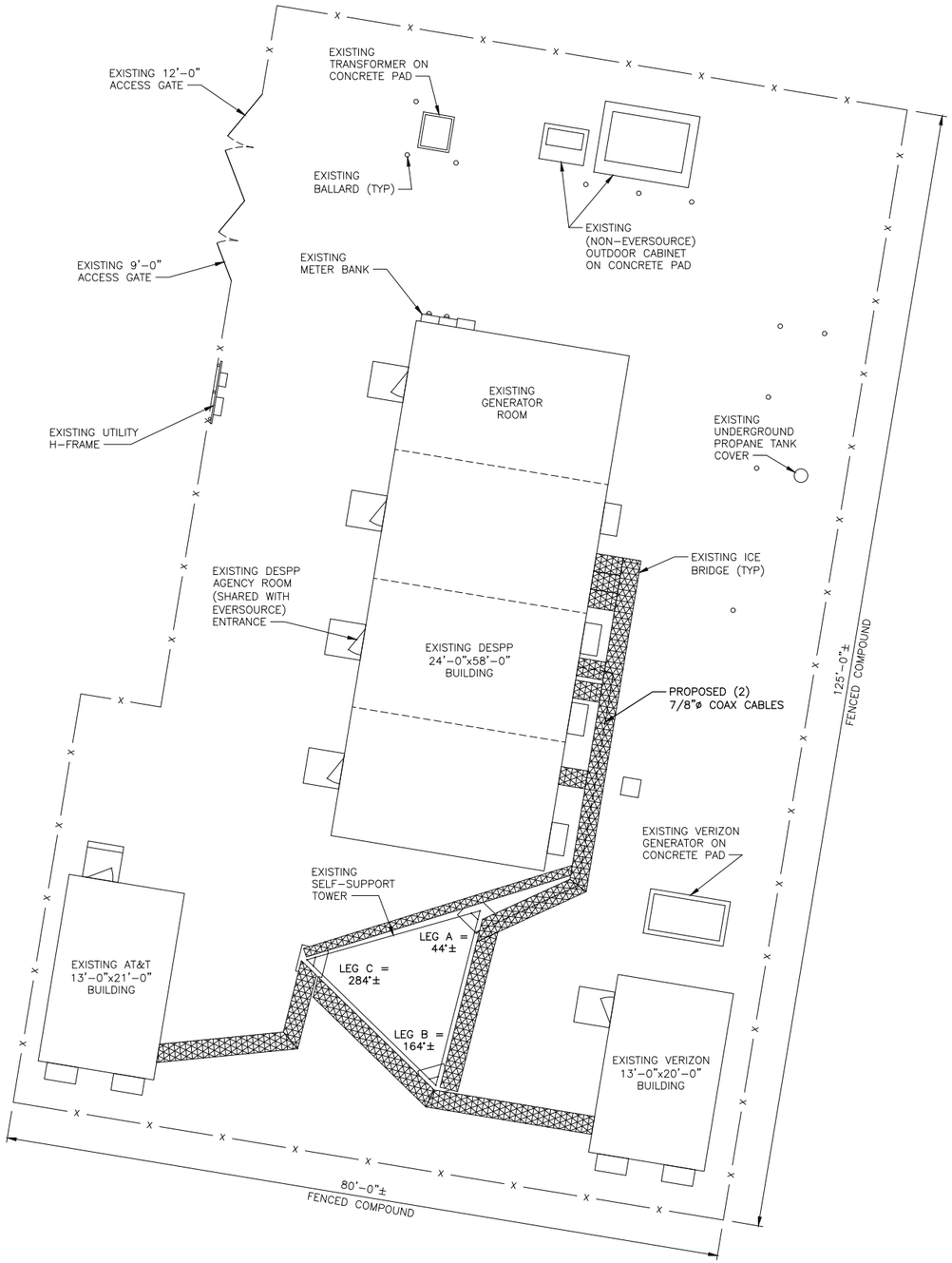
REV	DATE	DESCRIPTION
0	12/29/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

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
PHONE: (913) 458-2522

PROJECT NO:	405025
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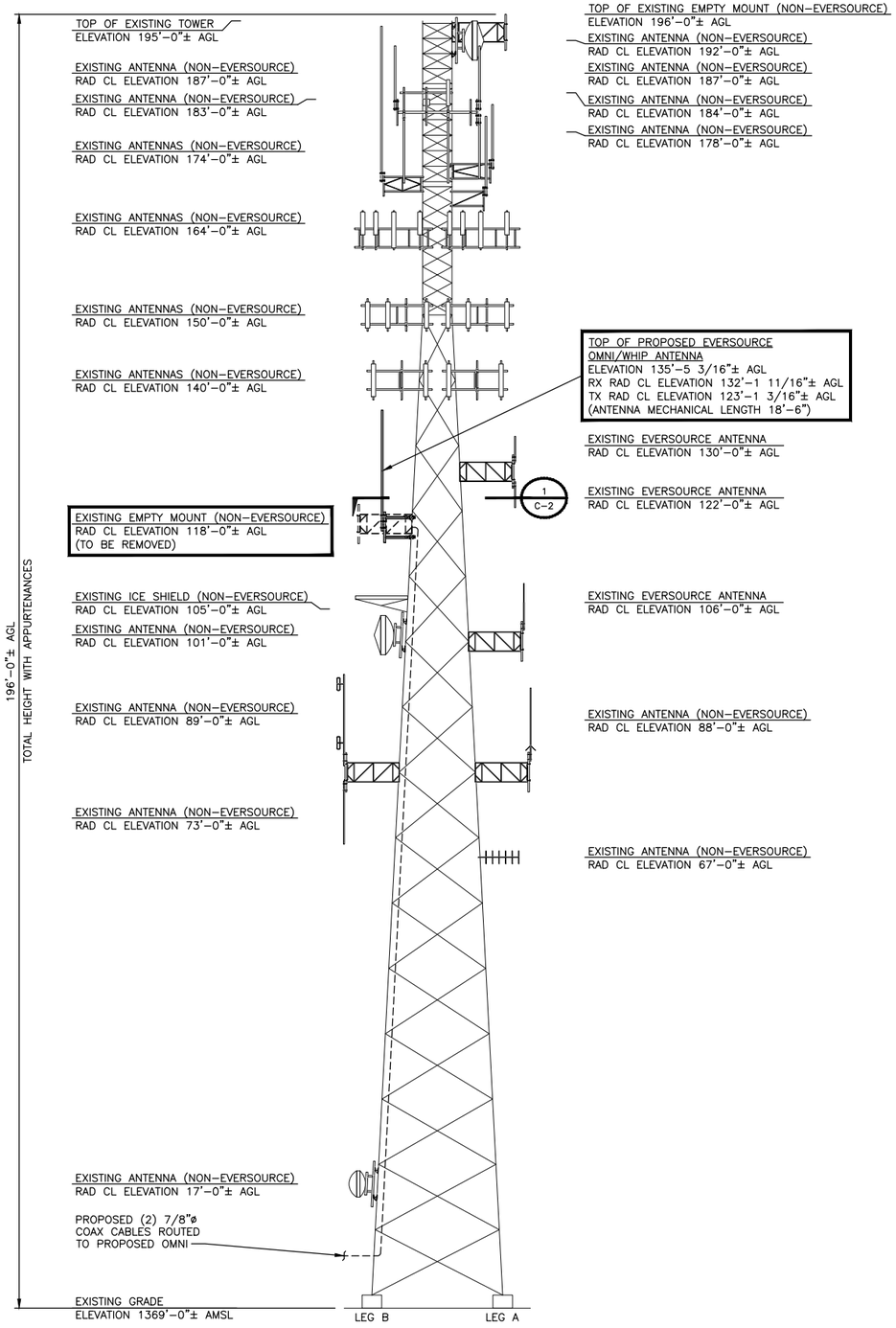
0	12/29/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

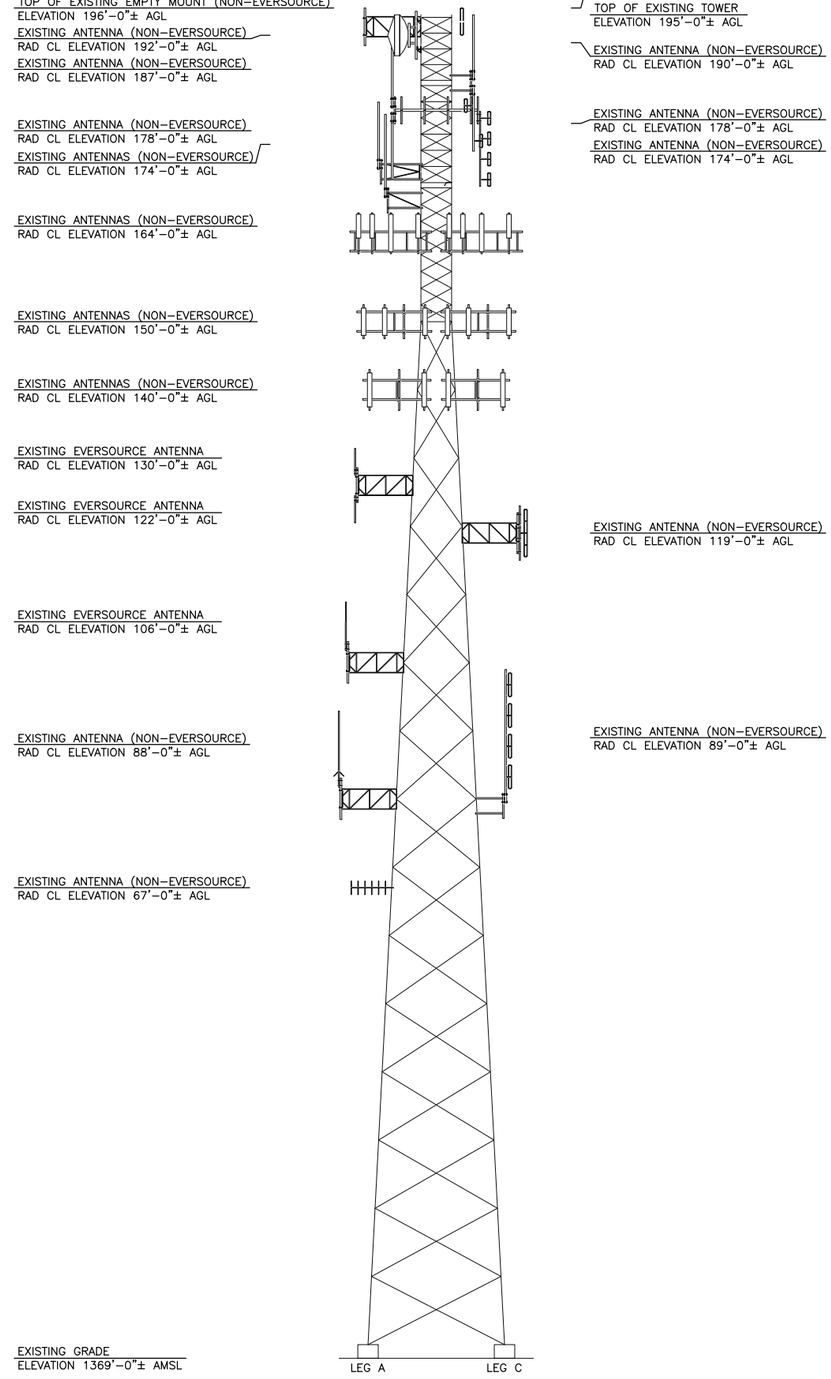
SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



TOWER ELEVATION FACE BA

NO SCALE



TOWER ELEVATION FACE AC

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
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REV	DATE	DESCRIPTION
0	12/29/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER

12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

SHEET TITLE

TOWER ELEVATION

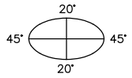
SHEET NUMBER

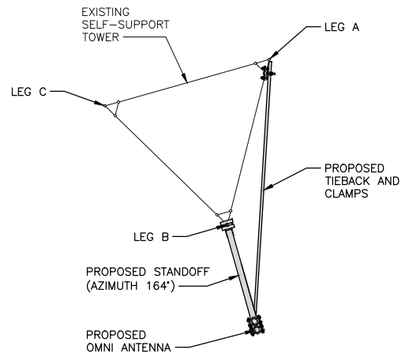
C-2

NOTES

1. ATTACH TIEBACK TO FRAME MAST BETWEEN TOP AND BOTTOM HSS ARMS. ATTACH OPPOSITE END TO EITHER ADJACENT TOWER LEG. REFER TO ALLOWABLE TIEBACK ANGLE DIAGRAM.
2. TRIM TIEBACK PIPE AS REQUIRED TO MAINTAIN A 6" DISTANCE BETWEEN ENDS OF CLAMPS AND ENDS OF PIPE.

ALLOWABLE TIEBACK ANGLE
±20 DEGREES VERTICAL
±45 DEGREES HORIZONTAL





SECTION 1
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
PHONE: (913) 458–2522

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

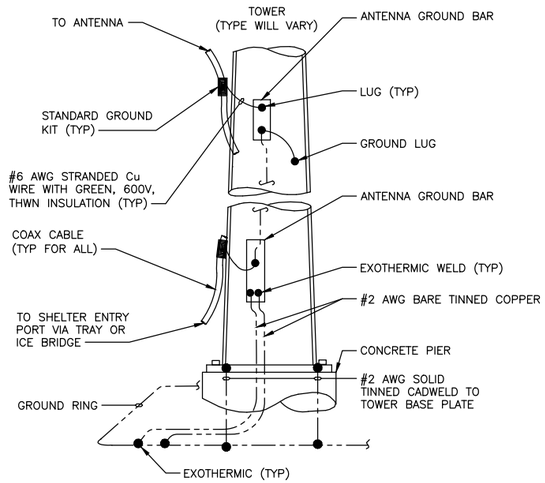
REV	DATE	DESCRIPTION
0	12/29/20	ISSUED FOR FILING

12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

SHEET TITLE
ANTENNA EQUIPMENT

SHEET NUMBER
C-3

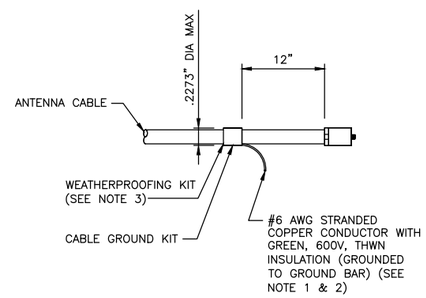


NOTE

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

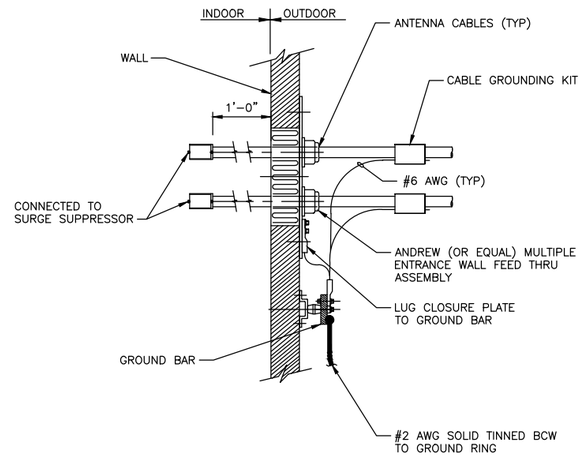


NOTES

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.

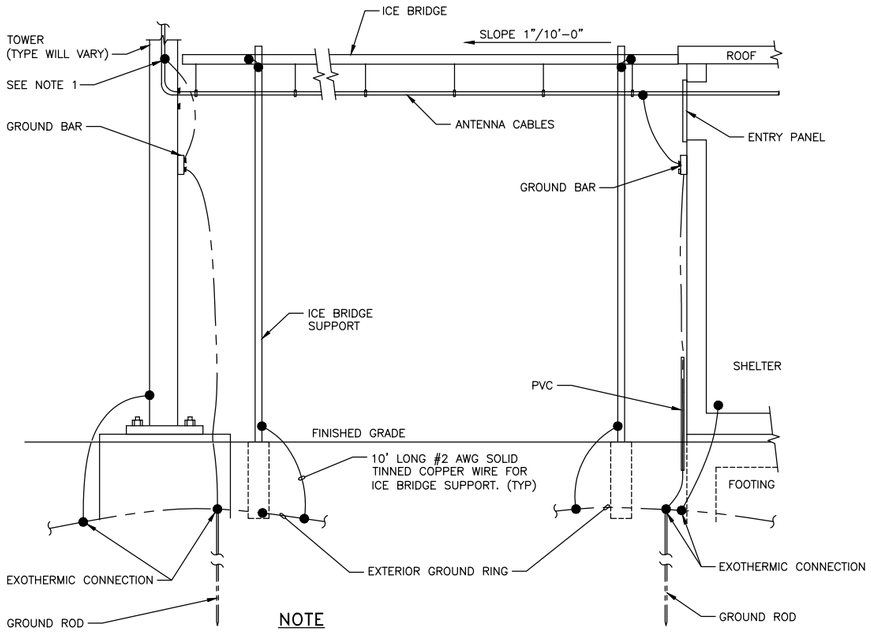
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

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:	JR

REV	DATE	DESCRIPTION
0	12/29/20	ISSUED FOR FILING

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

12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

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.

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

REV	DATE	DESCRIPTION
0	12/29/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

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

12/29/2020

SHARON LCD
7 SURDAN MOUNTAIN RD
SHARON LCD, CT 06069

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)

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SHARON LCD, CT 06069

SHEET TITLE

NOTES
& SPECIFICATIONS

SHEET NUMBER

N-3

REFERENCE CUTSHEETS

220 MHz Antenna – Omnidirectional, Low-PIM/Hi-PIP, 2.9 dBd
Model DS2C03P36D-D

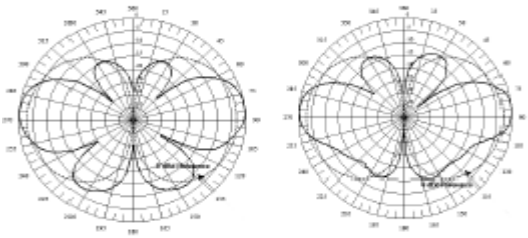
Specifications	
Design Type	True Corporate Feed
Frequency Range	216-222 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	6 MHz
Gain - dBd (average over BW)	2.9 dBd
Isolation, min.	34 dB
Configuration	Dual antenna
Beam Tilt (electrical down-tilt)	None (0°)
Vertical Beamwidth (E-Plane)	30°
Impedance -- Ohms	50
VSWR / Return Loss -- dB	1.5 : 1 / 14 dB (min.)
Average Power Rating	500 W (each antenna)
Peak Instantaneous Power	25 kW (each antenna)
Polarization	Vertical
Lightning Protection	Direct Ground
Connector	7/16 DIN female
Equivalent Flat-Plate Area	3.1 sq. ft.
Lateral Wind-load Thrust @100mph	129 lbf.
Wind Speed rating	160 mph (without ice)
Total Length	18.5 feet
Mounting Mast Length	35 inches
Mounting Hardware (Included)	DSH3V4N
Top Sway Brace (Recommended if side mounting antennas on top)	DSH2H3S (order separately)
Mast O.D.	3.5 inches
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight, antenna, and hardware	75 lbs. (approx.)
Shipping Weight	105 lbs. (approx.)
Invertibility	Antennas are physically invertible, but the patterns are optimized for upright mount.

Features and Benefits

Antennas from dbSpectra provide long term, trouble-free service in severe environments!
Design is tested to stringent Peak Instantaneous Power (PIP) levels of 25 KW using dbSpectra's 12-channel P25 PIP test bed. High PIP level is demanded by today's digital systems.
True Corporate Feed Array – provides for excellent gain and pattern consistency across a wider frequency range.
PIM Rated Design – better than -150 dBc.
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.
Excellent Lightning Protection – heavy internal conductor DC ground.

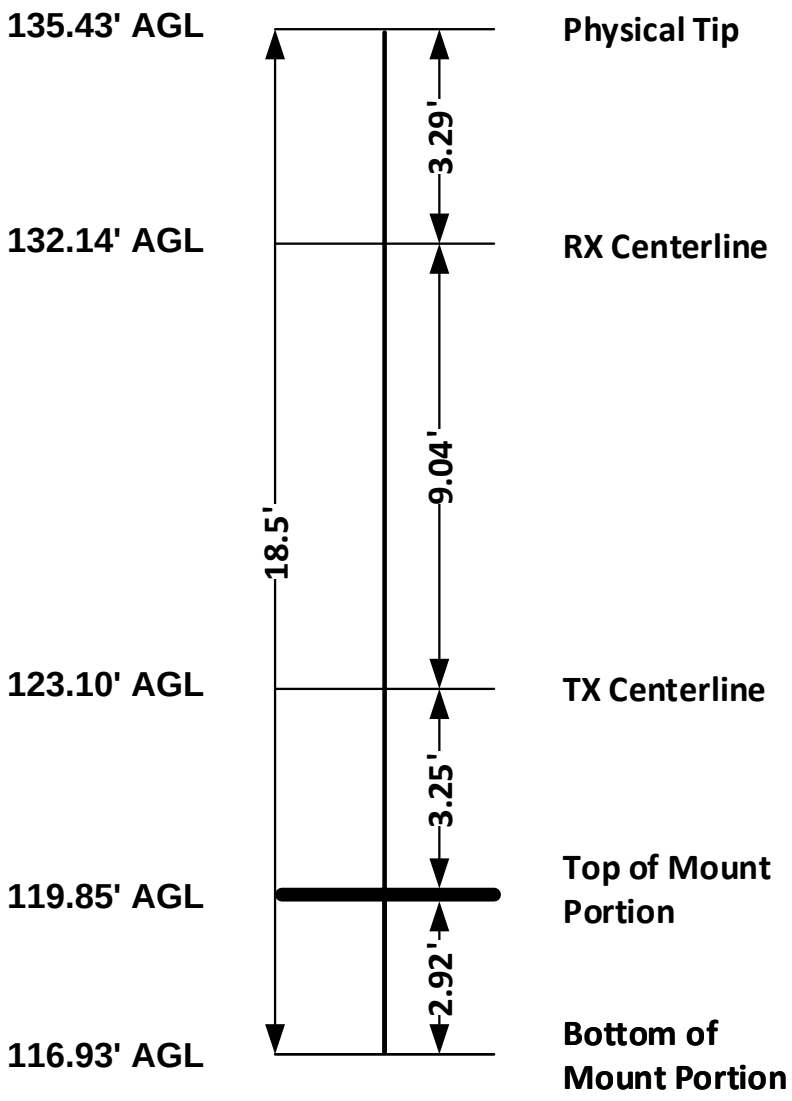
Radiation Pattern

Vertical (No-Tilt)



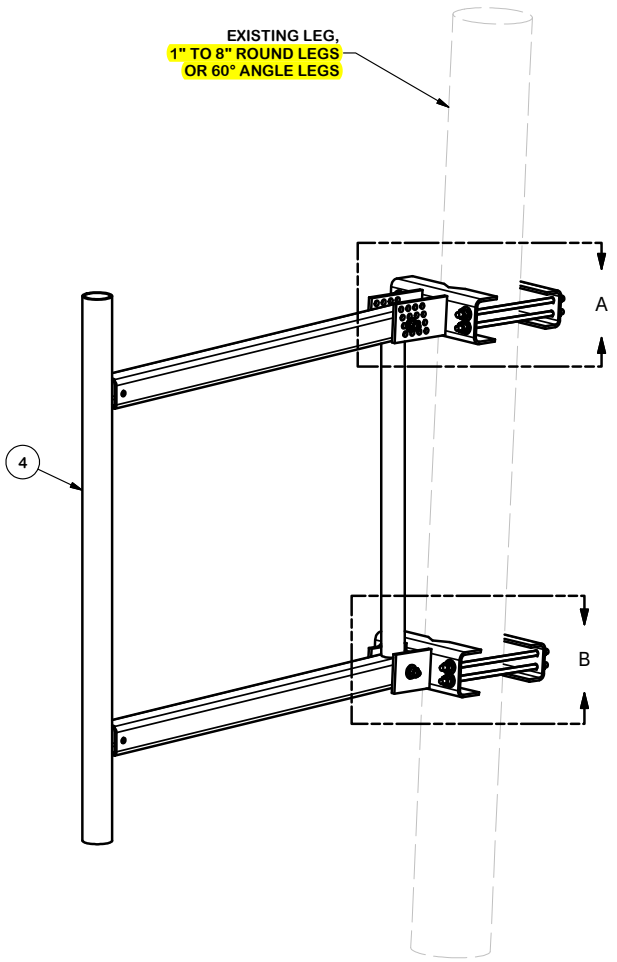
Top **Bottom**

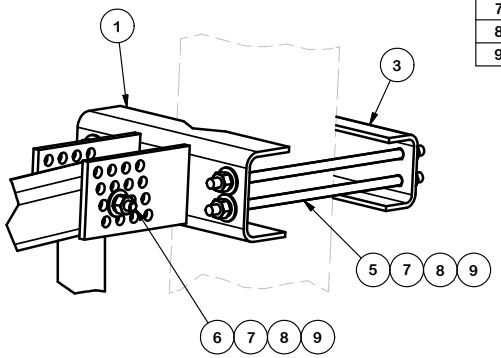
dBSpectra DS2C03P36 (18.5' Total)



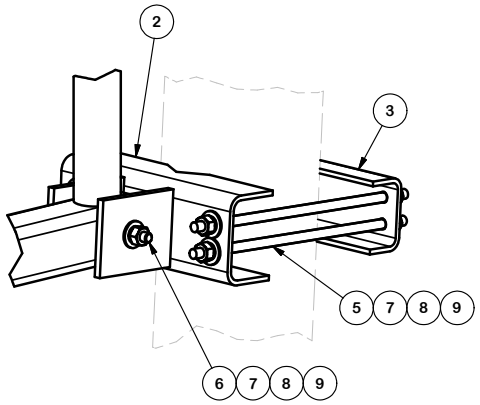
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 1.25"± DIAMETER.

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



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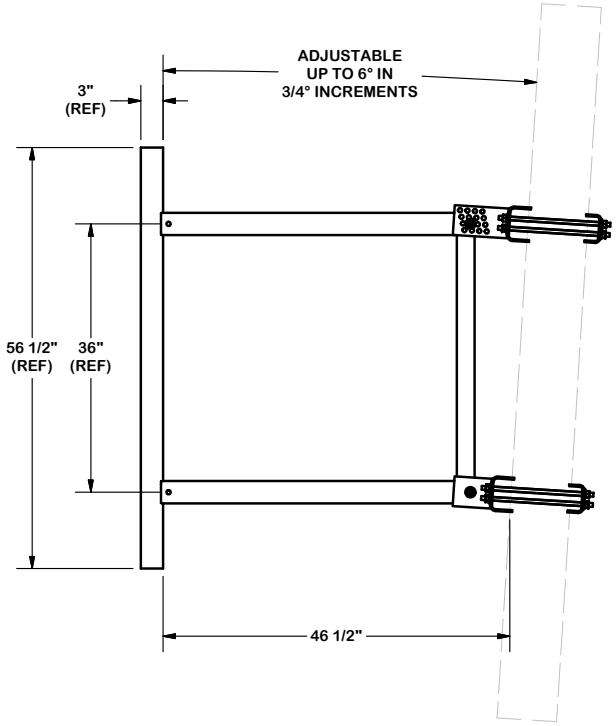

TOLERANCE NOTES

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

TIEBACK REQUIRED PARTS:
(1) SITE PRO 1 SPTB-NP
(1) SITE PRO 1 P2174 (2.375" O.D. X 14.5' LONG SCHEDULE 40 GALVANIZED PIPE)

Products (http://www.sitepro1.com/store/cart.php) > TOWER STEEL (http://www.sitepro1.com/store/cart.php?m=product_list&c=53) > Tower Components (http://www.sitepro1.com/store/cart.php?m=product_list&c=58)

2-3/8" Sliding Pipe Tie-Back Hardware, No Pipe

Qty: 1

Add to Cart

SKU: SPTB-NP
Size: See Description

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Checkout (https://www.sitepro1.com/store/cart.php?m=checkout)

Total: $0.00

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Quick Navigation

Description

- **SPTB-NP**
- **Universal Sliding Pipe Tie-Back Assemblies**
- **2-3/8" Sliding Pipe Tie-Back Hardware, No Pipe**
- **Weight 48 lb**

- **VIEW ALL TOWER COMPONENTS (https://www.sitepro1.com/store/cart.php?m=product_list&c=58)**
- **VIEW ALL TOWER STEEL (https://www.sitepro1.com/store/cart.php?m=product_list&c=53)**
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Need Assistance?

Our support team is available from 8:30 AM - 8:00 PM ET to assist you.

888-438-7761 (tel:888-438-7761)

888-753-7446 (tel:888-753-7446)

SP1Support@Valmont.com (mailto:SP1Support@Valmont.com)

Go Back (https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjXj5e3y-_nAhUK26wKHaL1A80QFjAAegQIBBAB&url=https%3A%2F

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Resources

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Catalogs (https://www.sitepro1.com/request.php)
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Bill of Materials Manager (https://www.sitepro1.com/store/cart.php?m=startBOM)
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Equipment Platforms (https://sitepro1.com/reader/web/viewer.php?link=../../resources/pdf/Modular-

Company

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Customer Service (https://www.sitepro1.com/customer-service)
Customer Testimonials (https://www.sitepro1.com/testimonials-htm/)
Site Capabilities (https://www.sitepro1.com/galleries/)
Holiday Schedule (https://www.sitepro1.com/holiday-schedule-htm/)

SITE PRO 1
A valmont COMPANY

Product Info

Pxxx: Bulk Pipe

Features:

- Factory cut end, hot-dip galvanized pipe

Construction:

- ASTM A53 Grade B
- Schedule 40

Design Criteria:

- ASTM A53 Grade B (Yield Fy = 35 ksi [240 MPa] / Tensile Fu = 60 ksi [415 MPa])
- Hot dip galvanized in accordance with ASTM A123 requirements

Part #	Length	OD x Length (in)	Weight
P263	5′-3″	2-3/8″ x 63″	20 lb
P272	6′-0″	2-3/8″ x 72″	22 lb
P284	7′-0″	2-3/8″ x 84″	26 lb
P296	8′-0″	2-3/8″ x 96″	30 lb
P2120	10′-0″	2-3/8″ x 120″	37 lb
P2126	10′-6″	2-3/8″ x 126″	39 lb
P2150	12′-6″	2-3/8″ x 150″	46 lb
P2174	14′-6″	2-3/8″ x 174″	53 lb
P3084	7′-0″	2-7/8″ x 84″	41 lb
P3096	8′-0″	2-7/8″ x 96″	47 lb
P30120	10'-0"	2-7/8" x 120"	58 lb
P30126	10′-6″	2-7/8″ x 126″	61 lb
P30150	12′-6″	2-7/8″ x 150″	73 lb
P30174	14′-6″	2-7/8″ x 174″	84 lb
P360	5′-0″	3-1/2″ x 60″	38 lb
P372	6′-0″	3-1/2″ x 72″	46 lb
P396	8′-0″	3-1/2″ x 96″	61 lb
P3150	12′-6″	3-1/2″ x 150″	95 lb
P3160	13′-4″	3-1/2″ x 160″	101 lb
P3174	14′-6″	3-1/2″ x 174″	110 lb
P3216	18′-0″	3-1/2″ x 216″	137 lb
P472	6′-0″	4-1/2″ x 72″	65 lb
P4126	10′-6″	4-1/2″ x 126″	114 lb

created on: 04/05/2019

New York 1-888-438-7761
Georgia 1-866-901-0603
Indiana 1-888-753-7446
Oregon 1-888-880-9191
California 1-888-776-1937
Texas 1-888-809-5151
Florida 1-844-278-6371

ATTACHMENT D – STRUCTURAL ANALYSIS REPORT

Date: **December 15, 2020**

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-2522

Subject:	**Structural Analysis Report**	
Eversource Designation:	**Eversource Site Number:**	ES-081
	Eversource Site Name:	Sharon_LCD
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	405025
Site Data:	**7 Surdan Mountain Road, Sharon, Litchfield, CT** **Latitude *41° 51' 43.38"*, Longitude *-73° 23' 58.66"*** **195 Foot - Self Support Tower**	

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Proposed Equipment Configuration **Sufficient Capacity – 79.4%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Phutthiphong Suwantha / Joshua J. Riley

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer

12/29/2020

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 195 ft Self Support tower designed by PiRod, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.500 in
Wind Speed with Ice:	40 mph
Seismic Ss:	0.180
Seismic S1:	0.065
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.5	126.2	1	dbspectra	DS2C03P36D-D	2	7/8	-
	117.5	1	tower mount	4’ Standoff w/ Associated Pipe Mount, Clamps and Tieback			

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
195.0	195.0	1	unknown	Single Bay Dipole	1	7/8	1
194.0	194.0	1	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)	-	-	1
192.0	192.0	1	unknown	PA6-65AC	1	EW65	1
		1	unknown	5’x4” Pipe mount			
184.0	191.0	1	antennae	2" Dia 10' Omni	2	7/8	1
	184.0	1	tower mounts (v2.1)	Side Arm Mount [SO 602-1]			
	178.0	1	unknown	ANT150D6-9			
180.0	188.0	1	antennae	3" Dia 12' Omni	4 5	7/8 1-5/8	1
	187.0	1	antennae	2" Dia 12' Omni			
	186.0	1	antennae	BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)			
	183.0	1	sinclair	SE414-SWBP4LDF w/ Mount Pipe			
	181.0	1	miscl	TMA			
	180.0	1	tower mounts (v2.1)	Platform Mount [15' LP 401-1]			
	174.0	2	antennae	3" Dia 12' Omni			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	antennae	BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)			
	173.0	1	antennae	2" Dia 12' Omni			
172.0	177.0	1	antennae	3" Dia 10' Omni	1	7/8	1
	172.0	1	tower mounts	Pirod 4' Side Mount Standoff (1)			
170.0	180.0	1	celwave	PD220	1	7/8	1
	170.0	1	tower mounts (v2.1)	Side Arm Mount [SO 601-1]			
168.0	174.0	1	antennae	3" Dia 12' Omni	1r	7/8	1
	168.0	1	tower mounts (v2.1)	Side Arm Mount [SO 203-1]			
162.0	166.0	3	andrew	SBNH-1D6565A w/ Mount Pipe	12	1-5/8	1
		3	antel	LPA-70063/4CF w/ Mount Pipe			
		6	antel	LPA-80080/4CF w/ Mount Pipe			
		3	rfs celwave	ATM1900D-1A20			
	162.0	1	tower mounts (v2.1)	Sector Mount [SM 411-3]			
147.0	149.0	3	ericsson	RRUS 8843 B2/B66A	4 2	DC Fiber	2
		3	ericsson	RRUS 4478 B14			
		3	ericsson	RRUS 4449 B5/B12			
	147.0	2	raycap	DC6-48-60-18-8C-EV			
		4	cci	DMP65R-BU6DA w/ Pipe Mount			
		2	cci	DMP65R-BU4DA w/ Pipe Mount			
		3	powerwave	7770 w/ Pipe Mount	12 2 1	1-5/8 DC Fiber	1
		6	powerwave	LGP 13519			
		6	powerwave	LGP 21401			
		1	powerwave	7070			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts (v2.1)	Pipe Mount [PM 601-3]			
		1	tower mounts (v2.1)	Sector Mount [SM 403-3]			
137.0	137.0	3	andrew	LNX-6515DS-A1M	3	1-5/8	1
		1	tower mounts (v2.1)	Sector Mount [SM 401-3]			
		3	ericsson	RRUS 11 B12			
		3	ericsson	RRUS 11 B2			
		3	ericsson	RRUS 11 B4			
		3	rfs celwave	APX16DWV-16DWV-S-E-			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
				A20			
124.0	128.0	1	decibel	DB586-Y	2	7/8	1
	124.0	1	unknown	TMA			
		1	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)			
	120.0	1	decibel	DB586-Y			
118.0	118.0	1	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)	1	7/8	1
		1	sinclair	SRL110A			
		1	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)	-	-	3
101.0	105.0	1	andrew miscl	MD-S6 (for 6' MW) : Ice Shield	1	WE65	1
	101.0	1	unknown	PA6-65AC			
		1	tower mounts (v2.1)	Pipe Mount [PM 602-1]			
99.0	107.0	1	decibel	DB205-L	1	7/8	1
	99.0	1	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)			
79.0	89.0	1	decibel	DB224	1	1/2	1
	79.0	1	tower mounts (v2.1)	Side Arm Mount [SO 301-1]			
78.0	90.0	1	antennae	3" Dia 20' Omni	3	1/2	1
	88.0	1	celwave	PD220			
	78.0	2	tower mounts (v2.1)	Pirod 6-8' Box Arm (1)			
	73.0	1	antennae	2" Dia 10' Omni			
67.0	67.0	1	antennae	3' Yagi	1	1/2	1
17.0	17.0	1	channel master	1.2M	2	1/4	1
		1	unknown	2' Side Mount Standoff (1)			

Notes:
1) Existing Equipment
2) Reserved Equipment; considered in this analysis
3) Equipment To Be Removed; Not Considered In This Analysis

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
TOWER MANUFACTURER DRAWINGS	Pirod, Inc.	Tower geometry / Foundation Information	Eversource
TOWER STRUCTURAL ANALYSIS REPORT	Infinigy Engineering & Surveying, PLLC, dated 02/04/2020	Tower loading	CSC website

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) This analysis was performed under the assumption that all information provide to Black & Veatch is current and correct. This is to include site data, appurtenance loading, tower/foundation detail, and geotechnical data.
4) Tower loading is based on 2018 drone mapping and previous tower analysis.
5) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or crack.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	195 - 185	Leg	1 3/4	1	-3.26	87.78	3.7	Pass
T2	185 - 170	Leg	2	37	21.11	112.02	18.8	Pass
T3	170 - 150	Leg	2 1/4	87	-70.28	156.22	45.0	Pass
T4	150 - 140	Leg	Pirod 105245	144	-81.38	225.60	36.1	Pass
T5	140 - 120	Leg	Pirod 105217	153	-128.88	225.60	57.1	Pass
T6	120 - 100	Leg	Pirod 105218	170	-173.51	315.72	55.0	Pass
T7	100 - 80	Leg	Pirod 105218	185	-218.64	315.72	69.3	Pass
T8	80 - 60	Leg	Pirod 105219	203	-262.53	419.86	62.5	Pass
T9	60 - 40	Leg	Pirod 105219	218	-304.70	419.86	72.6	Pass
T10	40 - 20	Leg	Pirod 105220	233	-345.93	537.99	64.3	Pass
T11	20 - 0	Leg	Pirod 105220	248	-385.10	537.99	71.6	Pass
T1	195 - 185	Diagonal	7/8	11	-1.26	10.02	12.5	Pass
T2	185 - 170	Diagonal	7/8	47	-3.90	9.92	39.3	Pass
T3	170 - 150	Diagonal	1	97	-5.13	14.15	36.2	Pass
T4	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	148	-7.66	18.45	41.5 64.3 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	156	-8.76	14.57	60.1 79.4 (b)	Pass
T6	120 - 100	Diagonal	L3x3x3/16	171	-9.47	20.18	46.9 72.9 (b)	Pass
T7	100 - 80	Diagonal	L3x3x3/16	189	-8.98	16.11	55.8 73.5 (b)	Pass
T8	80 - 60	Diagonal	L3x3x5/16	204	-9.87	20.97	47.1	Pass
T9	60 - 40	Diagonal	L3x3x5/16	219	-10.45	17.12	61.1	Pass
T10	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	234	-11.17	22.81	49.0	Pass
T11	20 - 0	Diagonal	L3 1/2x3 1/2x5/16	252	-13.01	19.10	68.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	195 - 185	Horizontal	3/4	16	-0.08	2.75	2.8	Pass
T2	185 - 170	Horizontal	3/4	59	-0.23	2.78	8.1	Pass
T1	195 - 185	Top Girt	L3x3x5/16	4	-0.04	44.24	0.3	Pass
T2	185 - 170	Top Girt	1	41	-0.71	8.79	8.0	Pass
T3	170 - 150	Top Girt	1	91	-1.58	8.81	17.9	Pass
T7	100 - 80	Top Girt	L3x3x3/16	187	-3.45	10.97	31.4 33.7 (b)	Pass
T1	195 - 185	Bottom Girt	7/8	8	-0.40	5.10	7.9	Pass
T2	185 - 170	Bottom Girt	1	44	-1.44	8.79	16.4	Pass
T3	170 - 150	Bottom Girt	1	94	-0.62	7.17	8.7	Pass
							Summary	
						Leg (T9)	72.6	Pass
						Diagonal (T5)	79.4	Pass
						Horizontal (T2)	8.1	Pass
						Top Girt (T7)	33.7	Pass
						Bottom Girt (T2)	16.4	Pass
						Bolt Checks	79.4	Pass
						Rating =	79.4	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	66.5	Pass
1, 2	Base Foundation (Compared w/ Design Loads)	0	64.8	Pass

Structure Rating (max from all components) =	79.4%

Notes:

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.
2) Foundation capacity determined by comparing analysis reactions to original design reactions.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load*	*Tilt*	*Twist*	*Check**
	ft	*in*	*Comb.*	°	°	
T1	195 - 185	6.895	40	0.3198	0.0837	OK
T2	185 - 170	6.219	40	0.3186	0.0715	OK
T3	170 - 150	5.198	40	0.3081	0.0507	OK
T4	150 - 140	3.939	40	0.2681	0.0401	OK
T5	140 - 120	3.382	40	0.2465	0.035	OK
T6	120 - 100	2.412	46	0.1981	0.026	OK

*Limit State Deformation (TIA-222-H Section 2.8.2)

1) Maximum Rotation = 4 Degrees

2) Maximum Deflection = 0.03 * Tower Height = 70 in.

Critical Deflections of Tower at the MW Dish Elevations - Service Wind

Elevation (ft)	*MW Dish*	*Tilt (°)*	*Twist (°)*	*Diameter, D (ft)*	*Frequency, α (GHz)*	*Decibel Points*	*Deformation Limit (θ)**	*Deformation Limit Exceeded?*
191	PA6-65AC	0.3195	0.079	6	10	10 dB	0.885	Not Exceeded
101	PA6-65AC	0.1609	0.0189	6	10	10 dB	0.885	Not Exceeded
17	1.2M	0.0223	0.0026	4	30	10 dB	0.443	Not Exceeded

*Limit per TIA-222-H Annex D

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °	Combined Max
T1	195 - 185	17.042	40	0.8024	0.0982	0.808
T2	185 - 170	15.338	40	0.8007	0.0701	0.804
T3	170 - 150	12.768	40	0.7715	0.0739	0.775
T4	150 - 140	9.628	40	0.665	0.0788	0.670
T5	140 - 120	8.25	40	0.6086	0.0756	0.613
T6	120 - 100	5.867	40	0.4851	0.0622	0.489

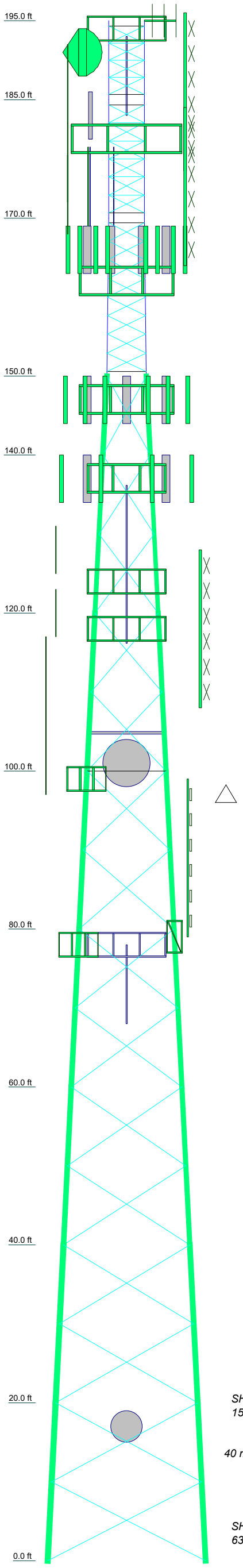
Critical Deflections of Tower at the MW Dish Elevations - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191	PA6-65AC	40	16.362	0.8024	0.0852	59647.000
101	PA6-65AC	40	4.058	0.3925	0.0457	12852.000
17	1.2M	39	0.15	0.0538	0.0063	17743.000

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Legs	SR 1 3/4	SR 2	SR 2 1/4	Pirod 105245	Pirod 105217	Pirod 105218	Pirod 105219	Pirod 105219	Pirod 105219	Pirod 105220	Pirod 105220
Leg Grade	A572-50										
Diagonals	SR 7/8		SR 1		L2 1/2x2 1/2x3/16	L3x3x3/16		L3x3x5/16		L3 1/2x3 1/2x5/16	
Diagonal Grade	A572-50					A36		A36			
Top Girts	L3x3x5/16	SR 1		N.A.		L3x3x3/16			N.A.		
Bottom Girts	SR 7/8	SR 1				N.A.		N.A.			
Horizontals	SR 3/4										
Face Width (ft)	4.5	7 @ 2.27778	8 @ 2.35417	5	6	8	10	12	14	16	18
# Panels @ (ft)	5 @ 2.16667					15 @ 10					
Weight (K)	0.6	1.0	1.6	1.2	2.3	2.9	3.1	4.1	4.2	5.1	5.3
	31.4										



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Single Bay Dipole	195	(2) LGP21401	147
Pirod 6-8' Box Arm (1)	194	7070.50 RET	147
6' x 2" Mount Pipe	194	RRUS 8843 B2/B66A	147
(2) 5' Hor x 3.5" Square Tube	192	RRUS 8843 B2/B66A	147
5'x4" Mount Pipe	192	RRUS 8843 B2/B66A	147
PA6-65AC	192	RRUS 4478 B14	147
5'x2" Mount Pipe	184	RRUS 4478 B14	147
2" Dia 10' Omni	184	RRUS 4478 B14	147
ANT150D6-9	184	RRUS 4449 B5/B12	147
Side Arm Mount [SO 602-1]	184	RRUS 4449 B5/B12	147
10' Hor x 2.5" x 2.5" Angle Mount	180	RRUS 4449 B5/B12	147
(4) 6'x2.5" Mount Pipe	180	DC6-48-60-18-8F	147
(5) 6'x2.5" Mount Pipe	180	DC6-48-60-18-8C-EV	147
(5) 6'x2.5" Mount Pipe	180	Sector Mount [SM 403-3]	147
3" Dia 12' Omni	180	6'x2" Mount Pipe	137
BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)	180	6'x2" Mount Pipe	137
BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)	180	6'x2" Mount Pipe	137
2" Dia 12' Omni	180	LNX-6515DS-A1M_TIA	137
2" Dia 12' Omni	180	LNX-6515DS-A1M_TIA	137
SE414-SWBP4LDF(D00)_TIA w/ Mount Pipe	180	LNX-6515DS-A1M_TIA	137
TMA	180	APX16DWV-16DWV-S-E-A20_TIA	137
3" Dia 12' Omni	180	APX16DWV-16DWV-S-E-A20_TIA	137
3" Dia 12' Omni	180	APX16DWV-16DWV-S-E-A20_TIA	137
Platform Mount [15' LP 401-1]	180	RRUS 11 B2	137
3" Dia 10' Omni	172	RRUS 11 B2	137
Pirod 4' Side Mount Standoff (1)	172	RRUS 11 B2	137
PD220	170	RRUS 11 B4	137
Side Arm Mount [SO 601-1]	170	RRUS 11 B4	137
3" Dia 12' Omni	168	RRUS 11 B4	137
Side Arm Mount [SO 203-1]	168	RRUS 11 B12	137
(2) 5' Hor x 3.5" Square Tube	162	RRUS 11 B12	137
(2) 5' Hor x 3.5" Square Tube	162	RRUS 11 B12	137
(2) 5' Hor x 3.5" Square Tube	162	Sector Mount [SM 401-3]	137
(2) LPA-80080/4CF w/ Mount Pipe	162	6'x2" Mount Pipe	124
(2) LPA-80080/4CF w/ Mount Pipe	162	DB586-Y	124
(2) LPA-80080/4CF w/ Mount Pipe	162	DB586-Y	124
SBNH-1D6565A_TIA w/ Mount Pipe	162	TMA	124
SBNH-1D6565A_TIA w/ Mount Pipe	162	Pirod 6-8' Box Arm (1)	124
SBNH-1D6565A_TIA w/ Mount Pipe	162	8'x2" Mount Pipe	118
LPA-70063/4CF w/ Mount Pipe	162	SRL110A	118
LPA-70063/4CF w/ Mount Pipe	162	Pirod 6-8' Box Arm (1)	118
LPA-70063/4CF w/ Mount Pipe	162	DS2C03P36D-D	117.5
ATM1900D-1A20	162	4' Standoff w/ Associated Pipe Mount, Clamps and Tieback	117.5
ATM1900D-1A20	162	MD-S6 (for 6' MW) : Ice Shield	101
ATM1900D-1A20	162	Pipe Mount [PM 602-1]	101
Sector Mount [SM 411-3]	162	PA6-65AC	101
Pipe Mount [PM 601-3]	147	DB205-L	99
6'x2" Mount Pipe	147	Pirod 6-8' Box Arm (1)	99
6'x2" Mount Pipe	147	Side Arm Mount [SO 301-1]	79
6'x2" Mount Pipe	147	DB224	79
7770.00	147	PD220	78
7770.00	147	2" Dia 10' Omni	78
7770.00	147	Pirod 6-8' Box Arm (1)	78
(2) DMP65R-BU6DA_TIA w/ Mount Pipe	147	6'x2" Mount Pipe	78
(2) DMP65R-BU6DA_TIA w/ Mount Pipe	147	3" Dia 20' Omni	78
(2) DMP65R-BU4DA_TIA w/ Mount Pipe	147	Pirod 6-8' Box Arm (1)	78
(2) LGP13519	147	3' Yagi	67
(2) LGP13519	147	2' Side Mount Standoff (1)	17
(2) LGP13519	147	1.2M	17
(2) LGP21401	147		
(2) LGP21401	147		

MATERIAL STRENGTH

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

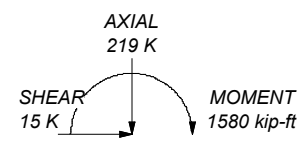
TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.50 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 1 with Crest Height of 0.00 ft
8. TOWER RATING: 79.4%

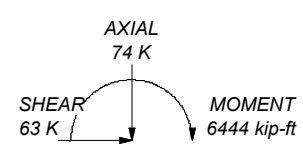
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 396 K
SHEAR: 41 K

UPLIFT: -344 K
SHEAR: 36 K



TORQUE 7 kip-ft
40 mph WIND - 1.5000 in ICE



TORQUE 45 kip-ft
REACTIONS - 120 mph WIND

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Overland Park, KS 66211
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FAX: (913) 458-8136

Job: ***ES-081 Sharon_LCD***			
Project: ***405025***			
Client: Eversource	Drawn by: Josh Riley	App'd:	
Code: TIA-222-H	Date: 12/15/20	Scale: NTS	
Path:		Dwg No. E-1	

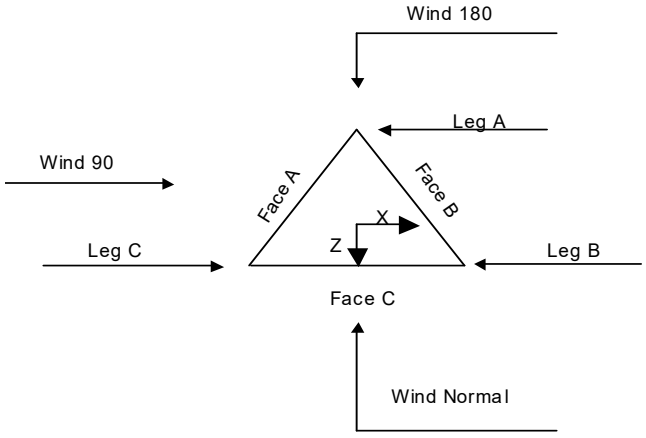
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 195.00 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 4.50 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Litchfield County, Connecticut.
2) Tower base elevation above sea level: 1359.00 ft.
3) Basic wind speed of 120 mph.
4) Risk Category III.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 1.5000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 40 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) Pressures are calculated at each section.
16) Stress ratio used in tower member design is 1.05.
17) 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	195.00-185.00			4.50	1	10.00
T2	185.00-170.00			4.50	1	15.00
T3	170.00-150.00			4.50	1	20.00
T4	150.00-140.00			5.00	1	10.00
T5	140.00-120.00			6.00	1	20.00
T6	120.00-100.00			8.00	1	20.00
T7	100.00-80.00			10.00	1	20.00
T8	80.00-60.00			12.00	1	20.00
T9	60.00-40.00			14.00	1	20.00
T10	40.00-20.00			16.00	1	20.00
T11	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	195.00-185.00	2.17	X Brace	No	Steps	8.0000	8.0000
T2	185.00-170.00	2.28	X Brace	No	Steps	8.0000	8.0000
T3	170.00-150.00	2.35	X Brace	No	Steps	7.0000	7.0000
T4	150.00-140.00	10.00	X Brace	No	No	0.0000	0.0000
T5	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T6	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T7	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	10.00	X Brace	No	No	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 195.00-185.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 170.00-150.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 150.00-140.00	Truss Leg	Pirod 105245	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 140.00-120.00	Truss Leg	Pirod 105217	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 120.00-100.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 100.00-80.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T8 80.00-60.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T9 60.00-40.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T10 40.00-20.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 20.00-0.00	Truss Leg	Pirod 105220	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 195.00-185.00	Equal Angle	L3x3x5/16	A36 (36 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 170.00-150.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T7 100.00-80.00	Equal Angle	L3x3x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 195.00-185.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 185.00-170.00	None	Flat Bar		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
T1 195.00-185.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 185.00-170.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 170.00-150.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T5 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T7 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1 195.00-185.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T2 185.00-170.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T3 170.00-150.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T4 150.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T5 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T6 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T7 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T8 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T9 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T10 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1
T11 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

	Truss-Leg K Factors	
	Truss-Legs Used As Leg Members	Truss-Legs Used As Inner Members

Tower Elevation ft	Leg Panels	X Brace Diagonals	Z Brace Diagonals	Leg Panels	X Brace Diagonals	Z Brace Diagonals
T4 150.00-140.00	1	0.5	0.85	1	0.5	0.85
T5 140.00-120.00	1	0.5	0.85	1	0.5	0.85
T6 120.00-100.00	1	0.5	0.85	1	0.5	0.85
T7 100.00-80.00	1	0.5	0.85	1	0.5	0.85
T8 80.00-60.00	1	0.5	0.85	1	0.5	0.85
T9 60.00-40.00	1	0.5	0.85	1	0.5	0.85
T10 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T11 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 195.00-185.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 185.00-170.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 170.00-150.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 150.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 195.00-185.00	Sleeve DS	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 185.00-170.00	Sleeve DS	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T3 170.00-150.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 150.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 100.00-80.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 80.00-60.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 60.00-40.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 40.00-20.00	Flange	1.2500 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T11 20.00-0.00	Flange	1.2500 A687	0	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	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
Safety Line 3/8	C	No	No	Ar (CaAa)	195.00 - 0.00	0.0000	0.49	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	C	No	No	Af (CaAa)	195.00 - 6.00	0.0000	-0.43	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af)	A	No	No	Af (CaAa)	193.00 - 6.00	0.0000	-0.44	1	1	3.0000	3.0000		8.40
Feedline Bracket (Af)	A	No	No	Af (CaAa)	193.00 - 6.00	-4.0000	-0.45	1	1	1.5000	1.5000		8.40
Feedline Bracket (Af)	B	No	No	Af (CaAa)	193.00 - 6.00	-4.0000	-0.45	1	1	1.5000	1.5000		8.40
Feedline Bracket (Af) ***	C	No	No	Af (CaAa)	193.00 - 6.00	-4.0000	-0.45	1	1	1.5000	1.5000		8.40
HJ7-50A(1-5/8)	A	No	No	Ar (CaAa)	162.00 - 7.00	0.0000	-0.43	9	5	0.5000	1.9800		1.04
HJ7-50A(1-5/8)	A	No	No	Ar (CaAa)	162.00 - 7.00	0.0000	-0.395	1	1	0.5000	1.9800		1.04
HJ7-50A(1-5/8) ***	A	No	No	Ar (CaAa)	162.00 - 7.00	0.0000	-0.48	2	1	0.5000	1.9800		1.04
HJ5 LDF5(7/8)	A	No	No	Ar (CaAa)	172.00 - 7.00	0.0000	-0.485	1	1	0.5000	1.1000		0.54
HJ5 LDF5(7/8)	A	No	No	Ar (CaAa)	170.00 - 7.00	0.0000	-0.455	1	1	0.5000	1.1000		0.54
HJ5 LDF5(7/8) ***	A	No	No	Ar (CaAa)	168.00 - 7.00	0.0000	-0.47	1	1	0.5000	1.1000		0.54
HJ7-50A(1-5/8)	C	No	No	Ar (CaAa)	147.00 - 7.00	0.0000	-0.42	12	6	0.5000	1.9800		1.04
(6) DC + (3) Fiber ***	C	No	No	Ar (CaAa)	147.00 - 7.00	0.0000	-0.465	9	9	0.5000	1.0390		0.71
1" Dia SR	A	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.5	1	1	0.5000	1.3150		2.67
1" Dia SR	A	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.48	1	1	0.5000	1.3150		2.67
1" Dia SR	A	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	0.48	1	1	0.5000	1.3150		2.67

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" Dia SR	B	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.5	1	1	0.5000	1.3150		2.67
1" Dia SR	B	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.48	1	1	0.5000	1.3150		2.67
1" Dia SR	B	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	0.48	1	1	0.5000	1.3150		2.67
1" Dia SR	C	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.5	1	1	0.5000	1.3150		2.67
1" Dia SR	C	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	-0.48	1	1	0.5000	1.3150		2.67
1" Dia SR	C	No	No	Ar (CaAa)	104.00 - 4.00	0.0000	0.48	1	1	0.5000	1.3150		2.67
***													
HJ7-50A(1-5/8)	B	No	No	Ar (CaAa)	137.00 - 7.00	-4.0000	-0.41	3	3	0.5000	1.9800		1.04
***													
HJ5 LDF5(7/8)	B	No	No	Ar (CaAa)	195.00 - 7.00	-4.0000	-0.46	1	1	0.5000	1.1000		0.54
WE65	B	No	No	Ar (CaAa)	192.00 - 101.00	-4.0000	0.41	1	1	0.5000	1.5836		0.53
WE65	B	No	No	Ar (CaAa)	101.00 - 7.00	-4.0000	0.41	2	2	0.5000	1.5836		0.53
HJ4-50(1/2)	B	No	No	Ar (CaAa)	78.00 - 7.00	-4.0000	0.38	3	3	0.5000	0.5800		0.25
HJ7-50A(1-5/8)	B	No	No	Ar (CaAa)	180.00 - 7.00	-4.0000	0.35	5	5	0.5000	1.9800		1.04
LDF5-50A(7/8)	B	No	No	Ar (CaAa)	180.00 - 7.00	-4.0000	0.31	4	4	0.5000	1.0300		0.33
LDF5-50A(7/8)	A	No	No	Ar (CaAa)	124.00 - 7.00	-10.0000	0.4	2	2	0.5000	1.0300		0.33
LDF5-50A(7/8)	B	No	No	Ar (CaAa)	118.00 - 7.00	-5.0000	0.308	1	1	0.5000	1.0300		0.33
LDF5-50A(7/8)	B	No	No	Ar (CaAa)	99.00 - 7.00	-5.0000	0.315	1	1	0.5000	1.0300		0.33
HJ4-50(1/2)	B	No	No	Ar (CaAa)	79.00 - 7.00	-5.0000	0.31	1	1	0.5000	0.5800		0.25
HJ4-50(1/2)	B	No	No	Ar (CaAa)	67.00 - 7.00	-5.0000	0.3	1	1	0.5000	0.5800		0.25
HJ5 LDF5(7/8)	B	No	No	Ar (CaAa)	184.00 - 7.00	-4.0000	0.31	2	1	0.5000	1.1000		0.54
LDF1-50A(1/4)	B	No	No	Ar (CaAa)	17.00 - 7.00	-5.0000	-0.42	2	2	0.3450	0.3450		0.06
Proposed													
LCF78-50J(7/8)	A	No	No	Ar (CaAa)	117.50 - 0.00	-10.0000	0.42	2	2	0.5000	1.1000		0.53
***													
**													

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
***								
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-185.00	A	0.000	0.000	6.000	0.000	0.13
		B	0.000	0.000	4.209	0.000	0.08
		C	0.000	0.000	7.375	0.000	0.15
T2	185.00-170.00	A	0.000	0.000	11.470	0.000	0.25
		B	0.000	0.000	24.875	0.000	0.22
		C	0.000	0.000	11.813	0.000	0.26
T3	170.00-150.00	A	0.000	0.000	49.892	0.000	0.52
		B	0.000	0.000	42.807	0.000	0.34
		C	0.000	0.000	15.750	0.000	0.34
T4	150.00-140.00	A	0.000	0.000	34.560	0.000	0.31
		B	0.000	0.000	21.404	0.000	0.17
		C	0.000	0.000	31.053	0.000	0.30
T5	140.00-120.00	A	0.000	0.000	69.944	0.000	0.62
		B	0.000	0.000	52.905	0.000	0.39
		C	0.000	0.000	81.972	0.000	0.72
T6	120.00-100.00	A	0.000	0.000	78.668	0.000	0.68
		B	0.000	0.000	58.278	0.000	0.44
		C	0.000	0.000	83.550	0.000	0.75
T7	100.00-80.00	A	0.000	0.000	85.530	0.000	0.81
		B	0.000	0.000	69.761	0.000	0.59
		C	0.000	0.000	89.862	0.000	0.88
T8	80.00-60.00	A	0.000	0.000	85.530	0.000	0.81
		B	0.000	0.000	74.504	0.000	0.61
		C	0.000	0.000	89.862	0.000	0.88
T9	60.00-40.00	A	0.000	0.000	85.530	0.000	0.81
		B	0.000	0.000	75.664	0.000	0.61
		C	0.000	0.000	89.862	0.000	0.88
T10	40.00-20.00	A	0.000	0.000	85.530	0.000	0.81
		B	0.000	0.000	75.664	0.000	0.61
		C	0.000	0.000	89.862	0.000	0.88
T11	20.00-0.00	A	0.000	0.000	59.068	0.000	0.58
		B	0.000	0.000	51.305	0.000	0.43
		C	0.000	0.000	60.606	0.000	0.61

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	195.00-185.00	A	2.055	0.000	0.000	12.576	0.000	0.35
		B		0.000	0.000	14.484	0.000	0.31
		C		0.000	0.000	18.883	0.000	0.46
T2	185.00-170.00	A	2.041	0.000	0.000	24.533	0.000	0.67
		B		0.000	0.000	76.157	0.000	1.30
		C		0.000	0.000	30.182	0.000	0.74
T3	170.00-150.00	A	2.020	0.000	0.000	110.917	0.000	2.27
		B		0.000	0.000	125.669	0.000	2.07
		C		0.000	0.000	39.990	0.000	0.98
T4	150.00-140.00	A	2.000	0.000	0.000	72.247	0.000	1.44
		B		0.000	0.000	62.516	0.000	1.03
		C		0.000	0.000	53.391	0.000	1.12
T5	140.00-120.00	A	1.978	0.000	0.000	147.778	0.000	2.89
		B		0.000	0.000	150.702	0.000	2.39
		C		0.000	0.000	134.969	0.000	2.76
T6	120.00-100.00	A	1.946	0.000	0.000	187.058	0.000	3.32
		B		0.000	0.000	169.804	0.000	2.68
		C		0.000	0.000	140.404	0.000	2.85
T7	100.00-80.00	A	1.907	0.000	0.000	212.169	0.000	3.77
		B		0.000	0.000	214.508	0.000	3.34
		C		0.000	0.000	163.972	0.000	3.29
T8	80.00-60.00	A	1.860	0.000	0.000	209.153	0.000	3.67
		B		0.000	0.000	240.700	0.000	3.57
		C		0.000	0.000	162.231	0.000	3.22

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T9	60.00-40.00	A	1.798	0.000	0.000	205.233	0.000	3.54
		B		0.000	0.000	243.934	0.000	3.53
		C		0.000	0.000	159.969	0.000	3.13
T10	40.00-20.00	A	1.709	0.000	0.000	199.530	0.000	3.36
		B		0.000	0.000	237.063	0.000	3.33
		C		0.000	0.000	156.680	0.000	3.00
T11	20.00-0.00	A	1.531	0.000	0.000	133.861	0.000	2.12
		B		0.000	0.000	156.394	0.000	2.05
		C		0.000	0.000	105.311	0.000	1.92

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	195.00-185.00	0.4573	2.5756	-0.2000	1.2567
T2	185.00-170.00	3.2773	4.7279	1.5887	2.6961
T3	170.00-150.00	-2.0272	7.0475	-2.2643	5.2271
T4	150.00-140.00	2.3850	7.1880	0.1748	4.4338
T5	140.00-120.00	5.0884	6.6930	1.7560	5.2304
T6	120.00-100.00	6.3046	5.8437	3.1152	4.6555
T7	100.00-80.00	7.4493	6.3746	4.4104	5.2465
T8	80.00-60.00	9.4010	7.5989	7.2022	6.9875
T9	60.00-40.00	10.7658	8.4872	8.8057	7.9398
T10	40.00-20.00	11.3843	8.8852	9.7848	8.5675
T11	20.00-0.00	9.2398	6.5925	8.0028	5.7232

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line 3/8	185.00 - 195.00	0.6000	0.3943
T1	3	Feedline Ladder (Af)	185.00 - 195.00	0.6000	0.3943
T1	4	Feedline Ladder (Af)	185.00 - 193.00	0.6000	0.3943
T1	5	Feedline Bracket (Af)	185.00 - 193.00	0.6000	0.3943
T1	6	Feedline Bracket (Af)	185.00 - 193.00	0.6000	0.3943
T1	7	Feedline Bracket (Af)	185.00 - 193.00	0.6000	0.3943
T1	33	HJ5 LDF5(7/8)	185.00 - 195.00	0.6000	0.3943
T1	34	WE65	185.00 - 192.00	0.6000	0.3943
T2	1	Safety Line 3/8	170.00 - 185.00	0.6000	0.4281
T2	3	Feedline Ladder (Af)	170.00 - 185.00	0.6000	0.4281
T2	4	Feedline Ladder (Af)	170.00 - 185.00	0.6000	0.4281
T2	5	Feedline Bracket (Af)	170.00 - 185.00	0.6000	0.4281
T2	6	Feedline Bracket (Af)	170.00 - 185.00	0.6000	0.4281
T2	7	Feedline Bracket (Af)	170.00 -	0.6000	0.4281

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	13	HJ5 LDF5(7/8)	185.00 170.00 - 172.00	0.6000	0.4281
T2	33	HJ5 LDF5(7/8)	170.00 - 185.00	0.6000	0.4281
T2	34	WE65	170.00 - 185.00	0.6000	0.4281
T2	37	HJ7-50A(1-5/8)	170.00 - 180.00	0.6000	0.4281
T2	38	LDF5-50A(7/8)	170.00 - 180.00	0.6000	0.4281
T2	44	HJ5 LDF5(7/8)	170.00 - 184.00	0.6000	0.4281
T3	1	Safety Line 3/8	150.00 - 170.00	0.6000	0.4405
T3	3	Feedline Ladder (Af)	150.00 - 170.00	0.6000	0.4405
T3	4	Feedline Ladder (Af)	150.00 - 170.00	0.6000	0.4405
T3	5	Feedline Bracket (Af)	150.00 - 170.00	0.6000	0.4405
T3	6	Feedline Bracket (Af)	150.00 - 170.00	0.6000	0.4405
T3	7	Feedline Bracket (Af)	150.00 - 170.00	0.6000	0.4405
T3	9	HJ7-50A(1-5/8)	150.00 - 162.00	0.6000	0.4405
T3	10	HJ7-50A(1-5/8)	150.00 - 162.00	0.6000	0.4405
T3	11	HJ7-50A(1-5/8)	150.00 - 162.00	0.6000	0.4405
T3	13	HJ5 LDF5(7/8)	150.00 - 170.00	0.6000	0.4405
T3	14	HJ5 LDF5(7/8)	150.00 - 170.00	0.6000	0.4405
T3	15	HJ5 LDF5(7/8)	150.00 - 168.00	0.6000	0.4405
T3	33	HJ5 LDF5(7/8)	150.00 - 170.00	0.6000	0.4405
T3	34	WE65	150.00 - 170.00	0.6000	0.4405
T3	37	HJ7-50A(1-5/8)	150.00 - 170.00	0.6000	0.4405
T3	38	LDF5-50A(7/8)	150.00 - 170.00	0.6000	0.4405
T3	44	HJ5 LDF5(7/8)	150.00 - 170.00	0.6000	0.4405
T4	1	Safety Line 3/8	140.00 - 150.00	0.6000	0.3007
T4	3	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.3007
T4	4	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.3007
T4	5	Feedline Bracket (Af)	140.00 - 150.00	0.6000	0.3007
T4	6	Feedline Bracket (Af)	140.00 - 150.00	0.6000	0.3007
T4	7	Feedline Bracket (Af)	140.00 - 150.00	0.6000	0.3007
T4	9	HJ7-50A(1-5/8)	140.00 - 150.00	0.6000	0.3007
T4	10	HJ7-50A(1-5/8)	140.00 - 150.00	0.6000	0.3007
T4	11	HJ7-50A(1-5/8)	140.00 - 150.00	0.6000	0.3007
T4	13	HJ5 LDF5(7/8)	140.00 - 150.00	0.6000	0.3007
T4	14	HJ5 LDF5(7/8)	140.00 - 150.00	0.6000	0.3007

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	15	HJ5 LDF5(7/8)	140.00 - 150.00	0.6000	0.3007
T4	17	HJ7-50A(1-5/8)	140.00 - 147.00	0.6000	0.3007
T4	19	(6) DC + (3) Fiber	140.00 - 147.00	0.6000	0.3007
T4	33	HJ5 LDF5(7/8)	140.00 - 150.00	0.6000	0.3007
T4	34	WE65	140.00 - 150.00	0.6000	0.3007
T4	37	HJ7-50A(1-5/8)	140.00 - 150.00	0.6000	0.3007
T4	38	LDF5-50A(7/8)	140.00 - 150.00	0.6000	0.3007
T4	44	HJ5 LDF5(7/8)	140.00 - 150.00	0.6000	0.3007
T5	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.3993
T5	3	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.3993
T5	4	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.3993
T5	5	Feedline Bracket (Af)	120.00 - 140.00	0.6000	0.3993
T5	6	Feedline Bracket (Af)	120.00 - 140.00	0.6000	0.3993
T5	7	Feedline Bracket (Af)	120.00 - 140.00	0.6000	0.3993
T5	9	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.3993
T5	10	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.3993
T5	11	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.3993
T5	13	HJ5 LDF5(7/8)	120.00 - 140.00	0.6000	0.3993
T5	14	HJ5 LDF5(7/8)	120.00 - 140.00	0.6000	0.3993
T5	15	HJ5 LDF5(7/8)	120.00 - 140.00	0.6000	0.3993
T5	17	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.3993
T5	19	(6) DC + (3) Fiber	120.00 - 140.00	0.6000	0.3993
T5	31	HJ7-50A(1-5/8)	120.00 - 137.00	0.6000	0.3993
T5	33	HJ5 LDF5(7/8)	120.00 - 140.00	0.6000	0.3993
T5	34	WE65	120.00 - 140.00	0.6000	0.3993
T5	37	HJ7-50A(1-5/8)	120.00 - 140.00	0.6000	0.3993
T5	38	LDF5-50A(7/8)	120.00 - 140.00	0.6000	0.3993
T5	39	LDF5-50A(7/8)	120.00 - 124.00	0.6000	0.3993
T5	44	HJ5 LDF5(7/8)	120.00 - 140.00	0.6000	0.3993
T6	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.4881
T6	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4881
T6	4	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4881
T6	5	Feedline Bracket (Af)	100.00 - 120.00	0.6000	0.4881
T6	6	Feedline Bracket (Af)	100.00 - 120.00	0.6000	0.4881
T6	7	Feedline Bracket (Af)	100.00 -	0.6000	0.4881

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	9	HJ7-50A(1-5/8)	120.00 100.00 -	0.6000	0.4881
T6	10	HJ7-50A(1-5/8)	120.00 100.00 -	0.6000	0.4881
T6	11	HJ7-50A(1-5/8)	120.00 100.00 -	0.6000	0.4881
T6	13	HJ5 LDF5(7/8)	120.00 100.00 -	0.6000	0.4881
T6	14	HJ5 LDF5(7/8)	120.00 100.00 -	0.6000	0.4881
T6	15	HJ5 LDF5(7/8)	120.00 100.00 -	0.6000	0.4881
T6	17	HJ7-50A(1-5/8)	120.00 100.00 -	0.6000	0.4881
T6	19	(6) DC + (3) Fiber	120.00 100.00 -	0.6000	0.4881
T6	21	1" Dia SR	120.00 100.00 -	0.6000	0.4881
T6	22	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	23	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	24	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	25	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	26	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	27	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	28	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	29	1" Dia SR	104.00 100.00 -	0.6000	0.4881
T6	31	HJ7-50A(1-5/8)	104.00 100.00 -	0.6000	0.4881
T6	33	HJ5 LDF5(7/8)	120.00 100.00 -	0.6000	0.4881
T6	34	WE65	120.00 101.00 -	0.6000	0.4881
T6	35	WE65	120.00 100.00 -	0.6000	0.4881
T6	37	HJ7-50A(1-5/8)	101.00 100.00 -	0.6000	0.4881
T6	38	LDF5-50A(7/8)	120.00 100.00 -	0.6000	0.4881
T6	39	LDF5-50A(7/8)	120.00 100.00 -	0.6000	0.4881
T6	40	LDF5-50A(7/8)	120.00 100.00 -	0.6000	0.4881
T6	44	HJ5 LDF5(7/8)	118.00 100.00 -	0.6000	0.4881
T6	47	LCF78-50J(7/8)	120.00 100.00 -	0.6000	0.4881
T7	1	Safety Line 3/8	117.50 80.00 -	0.6000	0.5374
T7	3	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.5374
T7	4	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.5374
T7	5	Feedline Bracket (Af)	100.00 80.00 -	0.6000	0.5374
T7	6	Feedline Bracket (Af)	100.00 80.00 -	0.6000	0.5374
T7	7	Feedline Bracket (Af)	100.00 80.00 -	0.6000	0.5374
T7	9	HJ7-50A(1-5/8)	100.00 80.00 -	0.6000	0.5374

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	10	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.5374
T7	11	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.5374
T7	13	HJ5 LDF5(7/8)	80.00 - 100.00	0.6000	0.5374
T7	14	HJ5 LDF5(7/8)	80.00 - 100.00	0.6000	0.5374
T7	15	HJ5 LDF5(7/8)	80.00 - 100.00	0.6000	0.5374
T7	17	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.5374
T7	19	(6) DC + (3) Fiber	80.00 - 100.00	0.6000	0.5374
T7	21	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	22	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	23	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	24	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	25	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	26	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	27	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	28	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	29	1" Dia SR	80.00 - 100.00	0.6000	0.5374
T7	31	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.5374
T7	33	HJ5 LDF5(7/8)	80.00 - 100.00	0.6000	0.5374
T7	35	WE65	80.00 - 100.00	0.6000	0.5374
T7	37	HJ7-50A(1-5/8)	80.00 - 100.00	0.6000	0.5374
T7	38	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.5374
T7	39	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.5374
T7	40	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.5374
T7	41	LDF5-50A(7/8)	80.00 - 99.00	0.6000	0.5374
T7	44	HJ5 LDF5(7/8)	80.00 - 100.00	0.6000	0.5374
T7	47	LCF78-50J(7/8)	80.00 - 100.00	0.6000	0.5374
T8	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	5	Feedline Bracket (Af)	60.00 - 80.00	0.6000	0.6000
T8	6	Feedline Bracket (Af)	60.00 - 80.00	0.6000	0.6000
T8	7	Feedline Bracket (Af)	60.00 - 80.00	0.6000	0.6000
T8	9	HJ7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T8	10	HJ7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T8	11	HJ7-50A(1-5/8)	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	13	HJ5 LDF5(7/8)	80.00 60.00 -	0.6000	0.6000
T8	14	HJ5 LDF5(7/8)	80.00 60.00 -	0.6000	0.6000
T8	15	HJ5 LDF5(7/8)	80.00 60.00 -	0.6000	0.6000
T8	17	HJ7-50A(1-5/8)	80.00 60.00 -	0.6000	0.6000
T8	19	(6) DC + (3) Fiber	80.00 60.00 -	0.6000	0.6000
T8	21	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	22	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	23	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	24	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	25	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	26	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	27	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	28	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	29	1" Dia SR	80.00 60.00 -	0.6000	0.6000
T8	31	HJ7-50A(1-5/8)	80.00 60.00 -	0.6000	0.6000
T8	33	HJ5 LDF5(7/8)	80.00 60.00 -	0.6000	0.6000
T8	35	WE65	80.00 60.00 -	0.6000	0.6000
T8	36	HJ4-50(1/2)	80.00 60.00 -	0.6000	0.6000
T8	37	HJ7-50A(1-5/8)	78.00 60.00 -	0.6000	0.6000
T8	38	LDF5-50A(7/8)	80.00 60.00 -	0.6000	0.6000
T8	39	LDF5-50A(7/8)	80.00 60.00 -	0.6000	0.6000
T8	40	LDF5-50A(7/8)	80.00 60.00 -	0.6000	0.6000
T8	41	LDF5-50A(7/8)	80.00 60.00 -	0.6000	0.6000
T8	42	HJ4-50(1/2)	80.00 60.00 -	0.6000	0.6000
T8	43	HJ4-50(1/2)	79.00 60.00 -	0.6000	0.6000
T8	44	HJ5 LDF5(7/8)	67.00 60.00 -	0.6000	0.6000
T8	47	LCF78-50J(7/8)	80.00 60.00 -	0.6000	0.6000
T9	1	Safety Line 3/8	80.00 40.00 -	0.6000	0.6000
T9	3	Feedline Ladder (Af)	60.00 40.00 -	0.6000	0.6000
T9	4	Feedline Ladder (Af)	60.00 40.00 -	0.6000	0.6000
T9	5	Feedline Bracket (Af)	60.00 40.00 -	0.6000	0.6000
T9	6	Feedline Bracket (Af)	60.00 40.00 -	0.6000	0.6000
T9	7	Feedline Bracket (Af)	60.00 40.00 -	0.6000	0.6000
T9	9	HJ7-50A(1-5/8)	60.00 40.00 -	0.6000	0.6000
			60.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	10	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T9	11	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T9	13	HJ5 LDF5(7/8)	40.00 - 60.00	0.6000	0.6000
T9	14	HJ5 LDF5(7/8)	40.00 - 60.00	0.6000	0.6000
T9	15	HJ5 LDF5(7/8)	40.00 - 60.00	0.6000	0.6000
T9	17	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T9	19	(6) DC + (3) Fiber	40.00 - 60.00	0.6000	0.6000
T9	21	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	22	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	23	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	24	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	25	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	26	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	27	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	28	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	29	1" Dia SR	40.00 - 60.00	0.6000	0.6000
T9	31	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T9	33	HJ5 LDF5(7/8)	40.00 - 60.00	0.6000	0.6000
T9	35	WE65	40.00 - 60.00	0.6000	0.6000
T9	36	HJ4-50(1/2)	40.00 - 60.00	0.6000	0.6000
T9	37	HJ7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T9	38	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T9	39	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T9	40	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T9	41	LDF5-50A(7/8)	40.00 - 60.00	0.6000	0.6000
T9	42	HJ4-50(1/2)	40.00 - 60.00	0.6000	0.6000
T9	43	HJ4-50(1/2)	40.00 - 60.00	0.6000	0.6000
T9	44	HJ5 LDF5(7/8)	40.00 - 60.00	0.6000	0.6000
T9	47	LCF78-50J(7/8)	40.00 - 60.00	0.6000	0.6000
T10	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T10	3	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	4	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	5	Feedline Bracket (Af)	20.00 - 40.00	0.6000	0.6000
T10	6	Feedline Bracket (Af)	20.00 - 40.00	0.6000	0.6000
T10	7	Feedline Bracket (Af)	20.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	9	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	10	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	11	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	13	HJ5 LDF5(7/8)	20.00 - 40.00	0.6000	0.6000
T10	14	HJ5 LDF5(7/8)	20.00 - 40.00	0.6000	0.6000
T10	15	HJ5 LDF5(7/8)	20.00 - 40.00	0.6000	0.6000
T10	17	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	19	(6) DC + (3) Fiber	20.00 - 40.00	0.6000	0.6000
T10	21	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	22	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	23	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	24	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	25	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	26	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	27	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	28	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	29	1" Dia SR	20.00 - 40.00	0.6000	0.6000
T10	31	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	33	HJ5 LDF5(7/8)	20.00 - 40.00	0.6000	0.6000
T10	35	WE65	20.00 - 40.00	0.6000	0.6000
T10	36	HJ4-50(1/2)	20.00 - 40.00	0.6000	0.6000
T10	37	HJ7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T10	38	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T10	39	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T10	40	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T10	41	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T10	42	HJ4-50(1/2)	20.00 - 40.00	0.6000	0.6000
T10	43	HJ4-50(1/2)	20.00 - 40.00	0.6000	0.6000
T10	44	HJ5 LDF5(7/8)	20.00 - 40.00	0.6000	0.6000
T10	47	LCF78-50J(7/8)	20.00 - 40.00	0.6000	0.6000
T11	1	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T11	3	Feedline Ladder (Af)	6.00 - 20.00	0.6000	0.6000
T11	4	Feedline Ladder (Af)	6.00 - 20.00	0.6000	0.6000
T11	5	Feedline Bracket (Af)	6.00 - 20.00	0.6000	0.6000
T11	6	Feedline Bracket (Af)	6.00 - 20.00	0.6000	0.6000
T11	7	Feedline Bracket (Af)	6.00 - 20.00	0.6000	0.6000
T11	9	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T11	10	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	11	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T11	13	HJ5 LDF5(7/8)	7.00 - 20.00	0.6000	0.6000
T11	14	HJ5 LDF5(7/8)	7.00 - 20.00	0.6000	0.6000
T11	15	HJ5 LDF5(7/8)	7.00 - 20.00	0.6000	0.6000
T11	17	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T11	19	(6) DC + (3) Fiber	7.00 - 20.00	0.6000	0.6000
T11	21	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	22	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	23	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	24	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	25	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	26	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	27	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	28	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	29	1" Dia SR	4.00 - 20.00	0.6000	0.6000
T11	31	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T11	33	HJ5 LDF5(7/8)	7.00 - 20.00	0.6000	0.6000
T11	35	WE65	7.00 - 20.00	0.6000	0.6000
T11	36	HJ4-50(1/2)	7.00 - 20.00	0.6000	0.6000
T11	37	HJ7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T11	38	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T11	39	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T11	40	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T11	41	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T11	42	HJ4-50(1/2)	7.00 - 20.00	0.6000	0.6000
T11	43	HJ4-50(1/2)	7.00 - 20.00	0.6000	0.6000
T11	44	HJ5 LDF5(7/8)	7.00 - 20.00	0.6000	0.6000
T11	45	LDF1-50A(1/4)	7.00 - 17.00	0.6000	0.6000
T11	47	LCF78-50J(7/8)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Single Bay Dipole	B	From Leg	0.00 0.00 0.00	0.0000	195.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.08 3.79 5.52 9.05	2.08 3.79 5.52 9.05	0.03 0.05 0.09 0.18
***									
Pirod 6-8' Box Arm (1)	C	None		0.0000	194.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.50 9.87 15.24 25.98	4.50 9.87 15.24 25.98	0.21 0.28 0.34 0.46
6' x 2" Mount Pipe	C	From Face	6.00 0.00 0.00	0.0000	194.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
***									
(2) 5' Hor x 3.5" Square Tube	C	From Face	0.00 1.00 0.00	0.0000	192.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.75 2.11 2.47 3.22	0.10 0.14 0.19 0.32	0.04 0.06 0.08 0.14
5'x4" Mount Pipe	C	From Leg	1.00	0.0000	192.00	No Ice	1.44	1.44	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice 2" Ice	2.08 2.40 3.07	2.08 2.40 3.07	0.07 0.09 0.14
***									
Side Arm Mount [SO 602-1]	B	None		0.0000	184.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.58 3.39 4.18 5.70	10.83 13.16 15.84 22.98	0.15 0.22 0.31 0.55
5'x2" Mount Pipe	B	From Leg	6.00 0.00 0.00	0.0000	184.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
2" Dia 10' Omni	B	From Leg	6.00 0.00 7.00	0.0000	184.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.00 3.03 4.06 6.12	2.00 3.03 4.06 6.12	0.01 0.03 0.04 0.07
ANT150D6-9	B	From Leg	6.00 0.00 -6.00	0.0000	184.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 6.83 8.87 13.01	4.80 6.83 8.87 13.01	0.03 0.07 0.11 0.25
***									
Platform Mount [15' LP 401-1]	C	None		0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	27.74 33.38 39.02 50.31	27.74 33.38 39.02 50.31	1.90 2.50 3.10 4.31
10' Hor x 2.5" x 2.5" Angle Mount	A	From Face	4.00 4.00 0.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.50 3.18 3.88 5.28	0.05 0.08 0.12 0.22	0.03 0.05 0.09 0.18
(4) 6'x2.5" Mount Pipe	A	From Face	0.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.73 2.09 2.46 3.23	1.73 2.09 2.46 3.23	0.03 0.05 0.06 0.11
(5) 6'x2.5" Mount Pipe	B	From Face	0.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.73 2.09 2.46 3.23	1.73 2.09 2.46 3.23	0.03 0.05 0.06 0.11
(5) 6'x2.5" Mount Pipe	C	From Face	0.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.73 2.09 2.46 3.23	1.73 2.09 2.46 3.23	0.03 0.05 0.06 0.11
3" Dia 12' Omni	A	From Leg	6.00 0.00 8.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.83 6.08 8.02	3.60 4.83 6.08 8.02	0.02 0.05 0.08 0.17
BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)	B	From Leg	6.00 0.00 6.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.40 9.24 13.08 20.76	5.40 9.24 13.08 20.76	0.03 0.04 0.05 0.07
BA40-41-DIN (4 diploes (2 bays) 11.5' dipole)	B	From Leg	6.00 0.00 -6.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	5.40 9.24 13.08 20.76	5.40 9.24 13.08 20.76	0.03 0.04 0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
2" Dia 12' Omni	C	From Leg	6.00 0.00 7.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.40 3.63 4.87 7.35	2.40 3.63 4.87 7.35	0.01 0.03 0.06 0.13
2" Dia 12' Omni	C	From Leg	6.00 0.00 -7.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.40 3.63 4.87 7.35	2.40 3.63 4.87 7.35	0.01 0.03 0.06 0.13
SE414-SWBP4LDF(D00)_TIA w/ Mount Pipe	A	From Face	4.00 0.00 3.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.53 2.92 3.73	5.56 6.28 6.96 8.36	0.03 0.07 0.11 0.22
TMA	A	From Face	4.00 3.00 1.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.60 0.70 0.81 1.06	0.41 0.50 0.59 0.81	0.01 0.02 0.02 0.04
3" Dia 12' Omni	A	From Face	4.00 0.00 -6.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.83 6.08 8.02	3.60 4.83 6.08 8.02	0.02 0.05 0.08 0.17
3" Dia 12' Omni	A	From Face	4.00 6.00 -6.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.83 6.08 8.02	3.60 4.83 6.08 8.02	0.02 0.05 0.08 0.17
***									
Pirod 4' Side Mount Standoff (1)	C	None		0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.72 4.91 7.10 11.48	2.72 4.91 7.10 11.48	0.05 0.09 0.13 0.21
3" Dia 10' Omni	C	From Leg	6.00 0.00 5.00	0.0000	172.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.00 4.03 5.03 6.26	3.00 4.03 5.03 6.26	0.08 0.10 0.13 0.20
***									
Side Arm Mount [SO 601-1]	A	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.04 1.41 1.78 2.52	5.32 6.43 7.67 10.67	0.16 0.20 0.24 0.36
PD220	A	From Leg	6.00 0.00 10.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.08 5.30 7.54 12.06	3.08 5.30 7.54 12.06	0.02 0.05 0.09 0.21
***									
Side Arm Mount [SO 203-1]	C	None		0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.78 2.24 2.75 3.89	3.79 4.47 5.21 6.78	0.13 0.15 0.19 0.29
3" Dia 12' Omni	C	From Leg	3.00 0.00 6.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.83 6.08 8.02	3.60 4.83 6.08 8.02	0.02 0.05 0.08 0.17
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Sector Mount [SM 411-3]	C	None		0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.53 28.62 36.63 52.73	20.53 28.62 36.63 52.73	1.07 1.46 1.97 3.37
(2) 5' Hor x 3.5" Square Tube	A	From Face	0.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.75 2.11 2.47 3.22	0.10 0.14 0.19 0.32	0.04 0.06 0.08 0.14
(2) 5' Hor x 3.5" Square Tube	B	From Face	0.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.75 2.11 2.47 3.22	0.10 0.14 0.19 0.32	0.04 0.06 0.08 0.14
(2) 5' Hor x 3.5" Square Tube	C	From Face	0.00 0.00 0.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.75 2.11 2.47 3.22	0.10 0.14 0.19 0.32	0.04 0.06 0.08 0.14
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	3.00 0.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.22 3.59 4.34	6.57 7.19 7.84 9.17	0.03 0.08 0.13 0.25
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	3.00 0.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.22 3.59 4.34	6.57 7.19 7.84 9.17	0.03 0.08 0.13 0.25
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	3.00 0.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.22 3.59 4.34	6.57 7.19 7.84 9.17	0.03 0.08 0.13 0.25
SBNH-1D6565A_TIA w/ Mount Pipe	A	From Leg	3.00 -2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.64 6.05 6.46 7.31	4.79 5.47 6.12 7.47	0.05 0.10 0.16 0.29
SBNH-1D6565A_TIA w/ Mount Pipe	B	From Leg	3.00 -2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.64 6.05 6.46 7.31	4.79 5.47 6.12 7.47	0.05 0.10 0.16 0.29
SBNH-1D6565A_TIA w/ Mount Pipe	C	From Leg	3.00 -2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.64 6.05 6.46 7.31	4.79 5.47 6.12 7.47	0.05 0.10 0.16 0.29
LPA-70063/4CF w/ Mount Pipe	A	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.38 6.78 7.19 8.03	6.56 7.19 7.84 9.17	0.04 0.10 0.18 0.34
LPA-70063/4CF w/ Mount Pipe	B	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.38 6.78 7.19 8.03	6.56 7.19 7.84 9.17	0.04 0.10 0.18 0.34
LPA-70063/4CF w/ Mount Pipe	C	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.38 6.78 7.19 8.03	6.56 7.19 7.84 9.17	0.04 0.10 0.18 0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment ° °	Placement ft ft		C_AA_A Front ft^2 ft^2	C_AA_A Side ft^2 ft^2	Weight K K
ATM1900D-1A20	A	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.73 0.84 0.96 1.21	0.25 0.32 0.40 0.58	0.01 0.01 0.02 0.04
ATM1900D-1A20	B	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.73 0.84 0.96 1.21	0.25 0.32 0.40 0.58	0.01 0.01 0.02 0.04
ATM1900D-1A20	C	From Leg	3.00 2.00 4.00	0.0000	162.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.73 0.84 0.96 1.21	0.25 0.32 0.40 0.58	0.01 0.01 0.02 0.04
***									
Sector Mount [SM 403-3]	C	None		0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	19.40 27.20 34.93 50.18	19.40 27.20 34.93 50.18	0.87 1.24 1.74 3.13
Pipe Mount [PM 601-3]	C	None		0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.17 3.79 4.42 5.76	3.17 3.79 4.42 5.76	0.20 0.23 0.28 0.40
6'x2" Mount Pipe	A	From Leg	3.00 -2.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Leg	3.00 -2.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Leg	3.00 -2.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
7770.00	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	B	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	C	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
(2) DMP65R-BU6DA_TIA w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.95 13.55 14.11 15.26	7.26 8.43 9.31 11.13	0.11 0.21 0.31 0.54
(2) DMP65R-BU6DA_TIA w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	12.95 13.55 14.11 15.26	7.26 8.43 9.31 11.13	0.11 0.21 0.31 0.54

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(2) DMP65R-BU4DA_TIA w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.52 8.96 9.42 10.36	4.69 5.31 5.93 7.22	0.09 0.16 0.23 0.40
(2) LGP13519	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	0.29 0.36 0.44 0.62	0.18 0.24 0.31 0.47	0.01 0.01 0.01 0.02
(2) LGP13519	B	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	0.29 0.36 0.44 0.62	0.18 0.24 0.31 0.47	0.01 0.01 0.01 0.02
(2) LGP13519	C	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	0.29 0.36 0.44 0.62	0.18 0.24 0.31 0.47	0.01 0.01 0.01 0.02
(2) LGP21401	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.35 0.44 0.54 0.77	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.35 0.44 0.54 0.77	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.35 0.44 0.54 0.77	0.01 0.02 0.03 0.05
7070.50 RET	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.51 1.69 1.87 2.23	0.35 0.47 0.61 0.83	0.01 0.01 0.02 0.02
RRUS 8843 B2/B66A	A	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 4478 B14	A	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice Ice 1" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RRUS 4478 B14	C	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4449 B5/B12	A	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	3.00 0.00 2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
DC6-48-60-18-8F	B	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.92 1.46 1.64 2.04	0.92 1.46 1.64 2.04	0.02 0.04 0.06 0.11
DC6-48-60-18-8C-EV	A	From Leg	3.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	2.74 2.96 3.20 3.68	0.03 0.05 0.08 0.15
***									
Sector Mount [SM 401-3]	C	None		0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	17.82 25.01 32.11 46.16	17.82 25.01 32.11 46.16	0.80 1.14 1.60 2.87
6'x2" Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
LNX-6515DS-A1M_TIA	A	From Leg	3.00 -5.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.45 12.06 12.69 13.94	7.70 8.29 8.89 10.11	0.05 0.12 0.19 0.36
LNX-6515DS-A1M_TIA	B	From Leg	3.00 -5.00 0.00	0.0000	137.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.45 12.06 12.69 13.94	7.70 8.29 8.89 10.11	0.05 0.12 0.19 0.36
LNX-6515DS-A1M_TIA	C	From Leg	3.00 -5.00 0.00	0.0000	137.00	No Ice 1/2" Ice	11.45 12.06 12.69	7.70 8.29 8.89	0.05 0.12 0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	13.94	10.11	0.36
						2" Ice			
APX16DWV-16DWV-S-E-A20_TIA	A	From Leg	3.00 5.00 0.00	0.0000	137.00	No Ice	6.59	2.17	0.04
						1/2" Ice	6.96	2.51	0.07
						1" Ice	7.34	2.86	0.11
						2" Ice	8.13	3.58	0.21
APX16DWV-16DWV-S-E-A20_TIA	B	From Leg	3.00 5.00 0.00	0.0000	137.00	No Ice	6.59	2.17	0.04
						1/2" Ice	6.96	2.51	0.07
						1" Ice	7.34	2.86	0.11
						2" Ice	8.13	3.58	0.21
APX16DWV-16DWV-S-E-A20_TIA	C	From Leg	3.00 5.00 0.00	0.0000	137.00	No Ice	6.59	2.17	0.04
						1/2" Ice	6.96	2.51	0.07
						1" Ice	7.34	2.86	0.11
						2" Ice	8.13	3.58	0.21
RRUS 11 B2	A	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B2	B	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B2	C	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B4	A	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B4	B	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B4	C	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B12	A	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B12	B	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
RRUS 11 B12	C	From Leg	3.00 0.00 0.00	0.0000	137.00	No Ice	2.83	1.18	0.05
						1/2" Ice	3.04	1.33	0.07
						1" Ice	3.26	1.48	0.10
						2" Ice	3.71	1.83	0.15
***									
Pirod 6-8' Box Arm (1)	C	None		0.0000	124.00	No Ice	4.50	4.50	0.21
						1/2" Ice	9.87	9.87	0.28

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
						Ice	15.24	15.24	0.34
						1" Ice	25.98	25.98	0.46
						2" Ice			
6'x2" Mount Pipe	C	From Leg	6.00	0.0000	124.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
DB586-Y	C	From Leg	6.00	0.0000	124.00	No Ice	1.01	1.01	0.01
			0.00			1/2"	1.28	1.28	0.02
			4.00			Ice	1.56	1.56	0.03
						1" Ice	2.14	2.14	0.06
						2" Ice			
DB586-Y	C	From Leg	6.00	0.0000	124.00	No Ice	1.01	1.01	0.01
			0.00			1/2"	1.28	1.28	0.02
			-4.00			Ice	1.56	1.56	0.03
						1" Ice	2.14	2.14	0.06
						2" Ice			
TMA	C	From Leg	3.00	0.0000	124.00	No Ice	2.22	1.73	0.06
			0.00			1/2"	2.40	1.90	0.09
			0.00			Ice	2.60	2.08	0.11
						1" Ice	3.01	2.45	0.17
						2" Ice			
***									
Pirod 6-8' Box Arm (1)	B	None		0.0000	118.00	No Ice	4.50	4.50	0.21
						1/2"	9.87	9.87	0.28
						Ice	15.24	15.24	0.34
						1" Ice	25.98	25.98	0.46
						2" Ice			
8'x2" Mount Pipe	B	From Leg	6.00	0.0000	118.00	No Ice	1.90	1.90	0.03
			0.00			1/2"	2.73	2.73	0.04
			0.00			Ice	3.40	3.40	0.06
						1" Ice	4.40	4.40	0.12
						2" Ice			
SRL110A	B	From Leg	6.00	0.0000	118.00	No Ice	9.00	9.00	0.03
			0.00			1/2"	10.58	10.58	0.09
			0.00			Ice	12.16	12.16	0.14
						1" Ice	15.32	15.32	0.27
						2" Ice			
***									
Pipe Mount [PM 602-1]	A	From Leg	2.00	0.0000	101.00	No Ice	2.78	2.78	0.09
			0.00			1/2"	3.21	3.21	0.11
			0.00			Ice	3.64	3.64	0.14
						1" Ice	4.54	4.54	0.21
						2" Ice			
MD-S6 (for 6' MW) : Ice Shield	A	From Leg	2.00	0.0000	101.00	No Ice	1.67	0.80	0.44
			0.00			1/2"	2.24	1.08	0.61
			4.00			Ice	2.81	1.37	0.79
						1" Ice	3.99	1.97	1.18
						2" Ice			
***									
Pirod 6-8' Box Arm (1)	C	From Leg	0.00	0.0000	99.00	No Ice	4.50	4.50	0.21
			0.00			1/2"	9.87	9.87	0.28
			0.00			Ice	15.24	15.24	0.34
						1" Ice	25.98	25.98	0.46
						2" Ice			
DB205-L	C	From Leg	6.00	0.0000	99.00	No Ice	1.72	1.72	0.04
			0.00			1/2"	3.45	3.45	0.05
			8.00			Ice	5.20	5.20	0.08
						1" Ice	8.75	8.75	0.16
						2" Ice			
***									
Side Arm Mount [SO 301-1]	B	From Leg	0.00	0.0000	79.00	No Ice	0.46	0.91	0.02
			0.00			1/2"	0.65	1.30	0.03
			0.00			Ice	0.87	1.71	0.05

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice	1.41	2.62	0.09
						2" Ice			
DB224	B	From Leg	2.00	0.0000	79.00	No Ice	3.15	3.15	0.03
			0.00			1/2"	5.67	5.67	0.04
			10.00			Ice	8.19	8.19	0.05
						1" Ice	13.23	13.23	0.07
						2" Ice			
***									
Pirod 6-8' Box Arm (1)	C	From Leg	0.00	0.0000	78.00	No Ice	4.50	4.50	0.21
			0.00			1/2"	9.87	9.87	0.28
			0.00			Ice	15.24	15.24	0.34
						1" Ice	25.98	25.98	0.46
						2" Ice			
6'x2" Mount Pipe	C	From Leg	6.00	0.0000	78.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
3" Dia 20' Omni	C	From Leg	6.00	0.0000	78.00	No Ice	4.00	4.00	0.06
			0.00			1/2"	6.00	6.00	0.10
			12.00			Ice	8.00	8.00	0.14
						1" Ice	12.00	12.00	0.23
						2" Ice			
***									
Pirod 6-8' Box Arm (1)	A	From Leg	0.00	0.0000	78.00	No Ice	4.50	4.50	0.21
			0.00			1/2"	9.87	9.87	0.28
			0.00			Ice	15.24	15.24	0.34
						1" Ice	25.98	25.98	0.46
						2" Ice			
PD220	A	From Leg	6.00	0.0000	78.00	No Ice	3.08	3.08	0.02
			0.00			1/2"	5.30	5.30	0.05
			10.00			Ice	7.54	7.54	0.09
						1" Ice	12.06	12.06	0.21
						2" Ice			
2" Dia 10' Omni	A	From Leg	6.00	0.0000	78.00	No Ice	2.00	2.00	0.01
			0.00			1/2"	3.03	3.03	0.03
			-5.00			Ice	4.06	4.06	0.04
						1" Ice	6.12	6.12	0.07
						2" Ice			
***									
3' Yagi	C	From Leg	0.00	0.0000	67.00	No Ice	2.08	2.08	0.03
			0.00			1/2"	3.79	3.79	0.05
			0.00			Ice	5.52	5.52	0.09
						1" Ice	9.05	9.05	0.18
						2" Ice			
***									
2' Side Mount Standoff (1)	A	From Leg	0.00	0.0000	17.00	No Ice	1.36	1.36	0.03
			0.00			1/2"	2.46	2.46	0.04
			0.00			Ice	3.55	3.55	0.06
						1" Ice	5.74	5.74	0.10
						2" Ice			
***									
Proposed									
DS2C03P36D-D	A	From Leg	4.00	0.0000	117.50	No Ice	5.82	5.82	0.08
			0.00			1/2"	7.80	7.80	0.12
			8.70			Ice	9.79	9.79	0.17
						1" Ice	13.82	13.82	0.32
						2" Ice			
4' Standoff w/ Associated Pipe Mount, Clamps and Tieback	A	From Leg	2.00	0.0000	117.50	No Ice	6.72	10.82	0.44
			0.00			1/2"	9.08	13.72	0.54
			0.00			Ice	11.22	16.46	0.67
						1" Ice	15.94	22.50	1.03
						2" Ice			
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PA6-65AC	C	Paraboloid w/Radome	From Leg	1.00 0.00 -1.00	0.0000		192.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.27 29.05 29.83 31.39	0.09 0.24 0.39 0.69
PA6-65AC	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		101.00	6.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.27 29.05 29.83 31.39	0.09 0.24 0.39 0.69
1.2M	A	Paraboloid w/o Radome	From Leg	2.00 0.00 0.00	0.0000		17.00	4.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.17 13.09 14.01 15.85	0.17 0.23 0.30 0.43

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105245	1090.3344	3308.2126	0.68	0.77	7.5718	22.9737	5.3014
Pirod 105217	2130.7479	6782.0229	0.62	1.46	7.3984	23.5487	5.3014
Pirod 105218	2263.4687	6825.0482	0.75	1.44	7.8593	23.6981	7.2158
Pirod 105218	2263.4687	6790.8768	0.75	1.40	7.8593	23.5794	7.2158
Pirod 105219	2441.8688	6821.0373	0.94	1.39	8.4787	23.6842	9.4248
Pirod 105219	2441.8688	6766.6418	0.94	1.32	8.4787	23.4953	9.4248
Pirod 105220	2578.8005	6759.4803	1.12	1.24	8.9542	23.4704	11.9282
Pirod 105220	2578.8005	6602.3322	1.12	1.05	8.9542	22.9248	11.9282

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 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice

Comb. No.	Description
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	195 - 185	Leg	Max Tension	7	2.57	0.35	-0.18
			Max. Compression	18	-3.71	0.09	-0.03
			Max. Mx	9	1.53	0.43	0.06
			Max. My	2	0.55	-0.04	-0.46
			Max. Vy	8	0.81	-0.11	0.02
			Max. Vx	3	-0.84	0.00	0.10
		Diagonal	Max Tension	9	1.23	0.00	0.00
			Max. Compression	8	-1.26	0.00	0.00
			Max. Mx	32	0.22	-0.01	0.00
			Max. My	23	1.11	-0.00	-0.00
			Max. Vy	32	0.01	-0.01	0.00
			Max. Vx	23	0.00	0.00	0.00
		Horizontal	Max Tension	2	0.12	0.00	0.00
			Max. Compression	15	-0.08	0.00	0.00
			Max. Mx	26	0.06	0.02	0.00
			Max. Vy	26	-0.02	0.00	0.00
		Top Girt	Max Tension	5	0.03	0.00	0.00
			Max. Compression	37	-0.04	0.00	0.00
			Max. Mx	26	-0.03	-0.06	0.00
			Max. Vy	26	-0.05	0.00	0.00
		Bottom Girt	Max Tension	6	0.46	0.00	0.00
			Max. Compression	19	-0.40	0.00	0.00
			Max. Mx	26	0.03	0.02	0.00
			Max. Vy	26	-0.02	0.00	0.00
T2	185 - 170	Leg	Max Tension	7	21.11	1.20	-0.51
			Max. Compression	18	-24.79	0.44	-0.16
			Max. Mx	8	-19.91	1.33	-0.07
			Max. My	2	-24.34	0.02	-1.26
			Max. Vy	8	2.72	-0.48	0.01
			Max. Vx	2	-2.58	-0.02	0.46
		Diagonal	Max Tension	9	3.81	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	8	-3.90	0.00	0.00
			Max. Mx	33	0.61	-0.01	-0.00
			Max. My	21	-3.78	-0.00	-0.00
			Max. Vy	33	0.01	-0.01	-0.00
			Max. Vx	21	0.00	-0.00	-0.00
		Horizontal	Max Tension	14	0.29	0.00	0.00
			Max. Compression	3	-0.23	0.00	0.00
			Max. Mx	26	0.20	0.02	0.00
			Max. Vy	26	0.02	0.00	0.00
		Top Girt	Max Tension	19	0.65	0.00	0.00
			Max. Compression	6	-0.71	0.00	0.00
			Max. Mx	26	-0.01	0.03	0.00
			Max. Vy	26	-0.02	0.00	0.00
		Bottom Girt	Max Tension	6	1.51	0.00	0.00
			Max. Compression	19	-1.44	0.00	0.00
			Max. Mx	26	0.04	0.03	0.00
			Max. Vy	26	-0.02	0.00	0.00
T3	170 - 150	Leg	Max Tension	7	67.57	0.55	0.04
			Max. Compression	18	-73.83	2.57	0.17
			Max. Mx	7	67.56	-2.59	-0.18
			Max. My	4	-2.44	-0.00	-1.76
			Max. Vy	7	5.38	-2.59	-0.18
			Max. Vx	12	2.55	0.00	-1.20
		Diagonal	Max Tension	9	5.08	0.00	0.00
			Max. Compression	8	-5.13	0.00	0.00
			Max. Mx	35	1.05	-0.01	0.00
			Max. My	20	-4.09	-0.00	-0.00
			Max. Vy	35	0.02	-0.01	0.00
			Max. Vx	20	0.00	-0.00	-0.00
		Top Girt	Max Tension	3	1.54	0.00	0.00
			Max. Compression	6	-1.58	0.00	0.00
			Max. Mx	26	-0.02	0.03	0.00
			Max. Vy	26	0.02	0.00	0.00
		Bottom Girt	Max Tension	6	0.70	0.00	0.00
			Max. Compression	19	-0.62	0.00	0.00
			Max. Mx	26	0.07	0.03	0.00
			Max. Vy	26	-0.03	0.00	0.00
T4	150 - 140	Leg	Max Tension	7	73.89	-2.59	-0.18
			Max. Compression	18	-81.38	4.71	-0.03
			Max. Mx	6	71.58	-5.31	-0.03
			Max. My	5	-4.06	-0.23	-6.95
			Max. Vy	6	0.75	-5.31	-0.03
			Max. Vx	5	1.11	-0.23	-6.95
		Diagonal	Max Tension	23	7.20	0.05	0.02
			Max. Compression	10	-7.66	0.00	0.00
			Max. Mx	6	5.44	0.06	0.00
			Max. My	20	-7.16	-0.04	0.02
			Max. Vy	33	0.03	0.04	0.01
			Max. Vx	20	-0.00	0.00	0.00
T5	140 - 120	Leg	Max Tension	7	116.10	-4.82	-0.05
			Max. Compression	18	-128.88	5.88	0.08
			Max. Mx	18	-128.88	5.88	0.08
			Max. My	5	-4.64	-0.23	-6.95
			Max. Vy	22	-0.76	-5.05	0.00
			Max. Vx	5	-0.90	-0.23	-6.95
		Diagonal	Max Tension	20	8.89	0.00	0.00
			Max. Compression	21	-8.83	0.00	0.00
			Max. Mx	35	0.83	0.07	0.01
			Max. My	35	0.77	0.06	0.01
			Max. Vy	33	0.04	0.06	0.01
			Max. Vx	35	-0.00	0.00	0.00
T6	120 - 100	Leg	Max Tension	7	155.95	-4.30	0.03
			Max. Compression	2	-173.51	7.40	-0.05
			Max. Mx	2	-173.51	7.40	-0.05
			Max. My	5	-6.97	-0.28	-7.61
			Max. Vy	18	-0.70	7.36	0.13
			Max. Vx	5	-0.87	-0.28	-7.61
		Diagonal	Max Tension	7	8.94	0.00	0.00
			Max. Compression	18	-9.47	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	35	0.92	0.11	-0.01
			Max. My	4	7.29	0.08	-0.02
			Max. Vy	34	0.06	0.10	0.02
			Max. Vx	34	-0.00	0.00	0.00
T7	100 - 80	Leg	Max Tension	7	194.85	-3.80	0.03
			Max. Compression	2	-218.64	7.37	-0.16
			Max. Mx	2	-195.24	7.40	-0.05
			Max. My	5	-8.31	-0.35	-8.34
			Max. Vy	2	0.62	7.40	-0.05
			Max. Vx	5	0.94	-0.35	-8.34
		Diagonal	Max Tension	20	9.01	0.00	0.00
			Max. Compression	2	-9.30	0.00	0.00
			Max. Mx	35	1.70	0.13	0.02
			Max. My	30	-2.77	0.07	-0.02
			Max. Vy	33	0.07	0.12	0.02
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	6	4.14	0.00	0.00
			Max. Compression	19	-3.45	0.00	0.00
			Max. Mx	26	1.13	-0.24	0.00
			Max. My	26	1.20	0.00	0.01
			Max. Vy	26	-0.09	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T8	80 - 60	Leg	Max Tension	7	231.84	-5.17	0.02
			Max. Compression	2	-262.53	5.49	-0.02
			Max. Mx	2	-239.99	7.37	-0.16
			Max. My	5	-9.86	0.12	-5.78
			Max. Vy	2	0.52	7.37	-0.16
			Max. Vx	12	-0.42	0.16	-5.29
		Diagonal	Max Tension	20	9.75	0.00	0.00
			Max. Compression	20	-9.87	0.00	0.00
			Max. Mx	35	1.70	0.17	0.02
			Max. My	29	-2.35	0.14	-0.02
			Max. Vy	33	0.09	0.17	0.02
			Max. Vx	29	0.01	0.00	0.00
T9	60 - 40	Leg	Max Tension	7	267.19	-5.11	-0.03
			Max. Compression	2	-304.70	5.88	-0.08
			Max. Mx	2	-304.70	5.88	-0.08
			Max. My	5	-13.59	0.01	-5.96
			Max. Vy	3	-0.20	5.88	-0.08
			Max. Vx	16	-0.23	-0.07	5.72
		Diagonal	Max Tension	20	10.30	0.00	0.00
			Max. Compression	20	-10.45	0.00	0.00
			Max. Mx	31	2.14	0.21	0.03
			Max. My	28	2.11	0.20	-0.03
			Max. Vy	33	0.10	0.20	0.03
			Max. Vx	28	0.01	0.00	0.00
T10	40 - 20	Leg	Max Tension	15	302.18	-5.31	0.03
			Max. Compression	2	-345.93	6.02	-0.00
			Max. Mx	33	14.55	-6.32	0.03
			Max. My	5	-14.20	0.01	-5.96
			Max. Vy	37	0.79	-6.17	0.04
			Max. Vx	5	-0.30	-0.09	-5.16
		Diagonal	Max Tension	20	10.95	0.00	0.00
			Max. Compression	20	-11.17	0.00	0.00
			Max. Mx	31	2.82	0.26	-0.03
			Max. My	29	-1.83	0.23	-0.03
			Max. Vy	33	0.13	0.26	0.03
			Max. Vx	29	0.01	0.00	0.00
T11	20 - 0	Leg	Max Tension	15	335.18	-5.52	0.03
			Max. Compression	2	-385.10	0.00	-0.00
			Max. Mx	31	-150.58	8.38	0.09
			Max. My	5	-17.47	-0.36	-9.84
			Max. Vy	33	-1.30	-6.32	0.03
			Max. Vx	5	-1.13	-0.36	-9.84
		Diagonal	Max Tension	15	12.11	0.00	0.00
			Max. Compression	2	-13.01	0.00	0.00
			Max. Mx	33	-0.35	0.30	0.03
			Max. My	34	5.35	0.24	0.04
			Max. Vy	33	0.13	0.30	0.03

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	34	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	390.44	35.12	-19.37
	Max. H_x	18	390.44	35.12	-19.37
	Max. H_z	7	-341.21	-31.16	17.10
	Min. Vert	7	-341.21	-31.16	17.10
	Min. H_x	7	-341.21	-31.16	17.10
	Min. H_z	18	390.44	35.12	-19.37
Leg B	Max. Vert	10	387.95	-34.77	-19.40
	Max. H_x	23	-331.85	30.47	16.90
	Max. H_z	23	-331.85	30.47	16.90
	Min. Vert	23	-331.85	30.47	16.90
	Min. H_x	10	387.95	-34.77	-19.40
	Min. H_z	10	387.95	-34.77	-19.40
Leg A	Max. Vert	2	395.81	0.77	40.93
	Max. H_x	20	22.80	2.01	1.88
	Max. H_z	2	395.81	0.77	40.93
	Min. Vert	15	-344.18	-0.73	-36.31
	Min. H_x	9	17.08	-1.99	1.40
	Min. H_z	15	-344.18	-0.73	-36.31

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	61.37	0.00	0.00	14.13	-4.15	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	73.64	0.09	-62.73	-6430.46	-23.89	26.10
0.9 Dead+1.0 Wind 0 deg - No Ice	55.23	0.09	-62.73	-6434.70	-22.64	26.10
1.2 Dead+1.0 Wind 30 deg - No Ice	73.64	30.95	-53.73	-5576.05	-3223.17	44.01
0.9 Dead+1.0 Wind 30 deg - No Ice	55.23	30.95	-53.73	-5580.29	-3221.93	44.01
1.2 Dead+1.0 Wind 60 deg - No Ice	73.64	51.35	-29.71	-3104.85	-5398.59	27.28
0.9 Dead+1.0 Wind 60 deg - No Ice	55.23	51.35	-29.71	-3109.08	-5397.34	27.28
1.2 Dead+1.0 Wind 90 deg - No Ice	73.64	59.41	0.11	27.32	-6250.19	18.83
0.9 Dead+1.0 Wind 90 deg - No Ice	55.23	59.41	0.11	23.09	-6248.94	18.83
1.2 Dead+1.0 Wind 120 deg - No Ice	73.64	52.48	30.76	3163.15	-5441.86	21.56
0.9 Dead+1.0 Wind 120 deg - No Ice	55.23	52.48	30.76	3158.91	-5440.62	21.56
1.2 Dead+1.0 Wind 150 deg - No Ice	73.64	29.71	51.74	5349.57	-3096.97	8.69
0.9 Dead+1.0 Wind 150 deg - No Ice	55.23	29.71	51.74	5345.33	-3095.73	8.69
1.2 Dead+1.0 Wind 180 deg - No Ice	73.64	0.05	60.75	6284.52	-14.60	-25.68
0.9 Dead+1.0 Wind 180 deg - No Ice	55.23	0.05	60.75	6280.28	-13.36	-25.68
1.2 Dead+1.0 Wind 210 deg	73.64	-30.76	53.82	5572.31	3186.59	-45.15

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.0 Wind 210 deg - No Ice	55.23	-30.76	53.82	5568.07	3187.84	-45.15
1.2 Dead+1.0 Wind 240 deg - No Ice	73.64	-52.84	31.07	3205.36	5467.19	-28.19
0.9 Dead+1.0 Wind 240 deg - No Ice	55.23	-52.84	31.07	3201.12	5468.43	-28.19
1.2 Dead+1.0 Wind 270 deg - No Ice	73.64	-59.02	0.12	30.33	6166.66	-19.32
0.9 Dead+1.0 Wind 270 deg - No Ice	55.23	-59.02	0.12	26.09	6167.90	-19.32
1.2 Dead+1.0 Wind 300 deg - No Ice	73.64	-50.45	-29.25	-3035.40	5249.09	-21.07
0.9 Dead+1.0 Wind 300 deg - No Ice	55.23	-50.45	-29.25	-3039.63	5250.33	-21.07
1.2 Dead+1.0 Wind 330 deg - No Ice	73.64	-29.46	-51.45	-5316.23	3030.72	-7.07
0.9 Dead+1.0 Wind 330 deg - No Ice	55.23	-29.46	-51.45	-5320.47	3031.96	-7.07
1.2 Dead+1.0 Ice+1.0 Temp	218.96	0.00	0.00	75.85	-32.46	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	218.96	0.01	-14.89	-1462.53	-34.88	4.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	218.96	7.44	-12.90	-1262.93	-803.88	7.05
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	218.96	12.74	-7.36	-691.23	-1358.86	5.97
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	218.96	14.53	0.01	77.01	-1549.14	4.40
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	218.96	12.48	7.27	822.36	-1323.45	3.96
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	218.96	7.20	12.51	1364.13	-777.49	1.40
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	218.96	0.01	14.62	1579.28	-33.53	-3.97
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	218.96	-7.36	12.83	1394.33	726.58	-7.20
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	218.96	-12.77	7.45	839.44	1283.29	-6.09
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	218.96	-14.38	0.02	77.58	1457.05	-4.46
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	218.96	-12.30	-7.11	-661.73	1240.71	-3.88
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	218.96	-7.17	-12.47	-1212.46	705.72	-1.18
Dead+Wind 0 deg - Service	61.37	0.02	-15.68	-1597.73	-8.87	6.53
Dead+Wind 30 deg - Service	61.37	7.74	-13.43	-1384.12	-808.70	11.00
Dead+Wind 60 deg - Service	61.37	12.84	-7.43	-766.32	-1352.55	6.82
Dead+Wind 90 deg - Service	61.37	14.85	0.03	16.72	-1565.45	4.71
Dead+Wind 120 deg - Service	61.37	13.12	7.69	800.68	-1363.37	5.39
Dead+Wind 150 deg - Service	61.37	7.43	12.94	1347.28	-777.15	2.17
Dead+Wind 180 deg - Service	61.37	0.01	15.19	1581.02	-6.55	-6.42
Dead+Wind 210 deg - Service	61.37	-7.69	13.46	1402.97	793.75	-11.29
Dead+Wind 240 deg - Service	61.37	-13.21	7.77	811.23	1363.89	-7.05
Dead+Wind 270 deg - Service	61.37	-14.75	0.03	17.47	1538.76	-4.83
Dead+Wind 300 deg - Service	61.37	-12.61	-7.31	-748.96	1309.37	-5.27
Dead+Wind 330 deg - Service	61.37	-7.37	-12.86	-1319.17	754.78	-1.77

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-61.37	0.00	0.00	61.37	-0.00	0.000%
2	0.09	-73.64	-62.73	-0.09	73.64	62.73	0.000%
3	0.09	-55.23	-62.73	-0.09	55.23	62.73	0.000%
4	30.95	-73.64	-53.73	-30.95	73.64	53.73	0.000%
5	30.95	-55.23	-53.73	-30.95	55.23	53.73	0.000%
6	51.35	-73.64	-29.71	-51.35	73.64	29.71	0.000%
7	51.35	-55.23	-29.71	-51.35	55.23	29.71	0.000%
8	59.41	-73.64	0.11	-59.41	73.64	-0.11	0.000%
9	59.41	-55.23	0.11	-59.41	55.23	-0.11	0.000%
10	52.48	-73.64	30.76	-52.48	73.64	-30.76	0.000%
11	52.48	-55.23	30.76	-52.48	55.23	-30.76	0.000%
12	29.71	-73.64	51.74	-29.71	73.64	-51.74	0.000%
13	29.71	-55.23	51.74	-29.71	55.23	-51.74	0.000%
14	0.05	-73.64	60.75	-0.05	73.64	-60.75	0.000%
15	0.05	-55.23	60.75	-0.05	55.23	-60.75	0.000%
16	-30.76	-73.64	53.82	30.76	73.64	-53.82	0.000%
17	-30.76	-55.23	53.82	30.76	55.23	-53.82	0.000%
18	-52.84	-73.64	31.07	52.84	73.64	-31.07	0.000%
19	-52.84	-55.23	31.07	52.84	55.23	-31.07	0.000%
20	-59.02	-73.64	0.12	59.02	73.64	-0.12	0.000%
21	-59.02	-55.23	0.12	59.02	55.23	-0.12	0.000%
22	-50.45	-73.64	-29.25	50.45	73.64	29.25	0.000%
23	-50.45	-55.23	-29.25	50.45	55.23	29.25	0.000%
24	-29.46	-73.64	-51.45	29.46	73.64	51.45	0.000%
25	-29.46	-55.23	-51.45	29.46	55.23	51.45	0.000%
26	0.00	-218.96	0.00	0.00	218.96	-0.00	0.000%
27	0.01	-218.96	-14.89	-0.01	218.96	14.89	0.000%
28	7.44	-218.96	-12.90	-7.44	218.96	12.90	0.000%
29	12.74	-218.96	-7.36	-12.74	218.96	7.36	0.000%
30	14.53	-218.96	0.01	-14.53	218.96	-0.01	0.000%
31	12.48	-218.96	7.27	-12.48	218.96	-7.27	0.000%
32	7.20	-218.96	12.51	-7.20	218.96	-12.51	0.000%
33	0.01	-218.96	14.62	-0.01	218.96	-14.62	0.000%
34	-7.36	-218.96	12.83	7.36	218.96	-12.83	0.000%
35	-12.77	-218.96	7.45	12.77	218.96	-7.45	0.000%
36	-14.38	-218.96	0.02	14.38	218.96	-0.02	0.000%
37	-12.30	-218.96	-7.11	12.30	218.96	7.11	0.000%
38	-7.17	-218.96	-12.47	7.17	218.96	12.47	0.000%
39	0.02	-61.37	-15.68	-0.02	61.37	15.68	0.000%
40	7.74	-61.37	-13.43	-7.74	61.37	13.43	0.000%
41	12.84	-61.37	-7.43	-12.84	61.37	7.43	0.000%
42	14.85	-61.37	0.03	-14.85	61.37	-0.03	0.000%
43	13.12	-61.37	7.69	-13.12	61.37	-7.69	0.000%
44	7.43	-61.37	12.94	-7.43	61.37	-12.94	0.000%
45	0.01	-61.37	15.19	-0.01	61.37	-15.19	0.000%
46	-7.69	-61.37	13.46	7.69	61.37	-13.46	0.000%
47	-13.21	-61.37	7.77	13.21	61.37	-7.77	0.000%
48	-14.75	-61.37	0.03	14.75	61.37	-0.03	0.000%
49	-12.61	-61.37	-7.31	12.61	61.37	7.31	0.000%
50	-7.37	-61.37	-12.86	7.37	61.37	12.86	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 185	6.895	40	0.3198	0.0837
T2	185 - 170	6.219	40	0.3186	0.0715
T3	170 - 150	5.198	40	0.3081	0.0507
T4	150 - 140	3.939	40	0.2681	0.0401
T5	140 - 120	3.382	40	0.2465	0.0350
T6	120 - 100	2.412	46	0.1981	0.0260
T7	100 - 80	1.639	46	0.1589	0.0186
T8	80 - 60	1.026	46	0.1177	0.0130

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T9	60 - 40	0.579	46	0.0853	0.0096
T10	40 - 20	0.266	46	0.0523	0.0061
T11	20 - 0	0.079	39	0.0261	0.0031

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Single Bay Dipole	40	6.895	0.3198	0.0837	152028
194.00	Pirod 6-8' Box Arm (1)	40	6.827	0.3198	0.0826	152028
192.00	(2) 5' Hor x 3.5" Square Tube	40	6.693	0.3196	0.0802	152028
191.00	PA6-65AC	40	6.625	0.3195	0.0790	152028
184.00	Side Arm Mount [SO 602-1]	40	6.151	0.3183	0.0701	113110
180.00	Platform Mount [15' LP 401-1]	40	5.877	0.3168	0.0643	652495
172.00	Pirod 4' Side Mount Standoff (1)	40	5.332	0.3106	0.0531	46788
170.00	Side Arm Mount [SO 601-1]	40	5.198	0.3081	0.0507	39230
168.00	Side Arm Mount [SO 203-1]	40	5.065	0.3052	0.0485	35187
162.00	Sector Mount [SM 411-3]	40	4.674	0.2942	0.0441	29233
147.00	Sector Mount [SM 403-3]	40	3.767	0.2617	0.0387	23150
137.00	Sector Mount [SM 401-3]	40	3.224	0.2395	0.0335	25133
124.00	Pirod 6-8' Box Arm (1)	46	2.590	0.2074	0.0276	23427
118.00	Pirod 6-8' Box Arm (1)	46	2.327	0.1938	0.0252	23741
117.50	DS2C03P36D-D	46	2.306	0.1928	0.0250	23889
101.00	PA6-65AC	46	1.674	0.1609	0.0189	31526
99.00	Pirod 6-8' Box Arm (1)	46	1.605	0.1569	0.0183	31808
79.00	Side Arm Mount [SO 301-1]	46	1.000	0.1159	0.0128	27099
78.00	Pirod 6-8' Box Arm (1)	46	0.974	0.1141	0.0125	27354
67.00	3' Yagi	46	0.718	0.0962	0.0107	32894
17.00	1.2M	39	0.062	0.0223	0.0026	42899

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	195 - 185	27.785	5	1.2892	0.3349
T2	185 - 170	25.047	5	1.2859	0.2858
T3	170 - 150	20.915	5	1.2441	0.2027
T4	150 - 140	15.835	5	1.0810	0.1605
T5	140 - 120	13.591	5	0.9929	0.1401
T6	120 - 100	9.689	5	0.7963	0.1040
T7	100 - 80	6.572	5	0.6384	0.0744
T8	80 - 60	4.109	5	0.4723	0.0518
T9	60 - 40	2.316	5	0.3414	0.0384
T10	40 - 20	1.067	3	0.2090	0.0246
T11	20 - 0	0.317	3	0.1043	0.0122

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	Single Bay Dipole	5	27.785	1.2892	0.3349	40398
194.00	Pirod 6-8' Box Arm (1)	5	27.513	1.2891	0.3302	40398
192.00	(2) 5' Hor x 3.5" Square Tube	5	26.967	1.2889	0.3209	40398
191.00	PA6-65AC	5	26.693	1.2888	0.3161	40398

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
184.00	Side Arm Mount [SO 602-1]	5	24.771	1.2850	0.2803	30196
180.00	Platform Mount [15' LP 401-1]	5	23.663	1.2793	0.2573	161200
172.00	Pirod 4' Side Mount Standoff (1)	5	21.458	1.2542	0.2124	11298
170.00	Side Arm Mount [SO 601-1]	5	20.915	1.2441	0.2027	9500
168.00	Side Arm Mount [SO 203-1]	5	20.377	1.2323	0.1940	8539
162.00	Sector Mount [SM 411-3]	5	18.800	1.1880	0.1762	7141
147.00	Sector Mount [SM 403-3]	5	15.140	1.0548	0.1549	5728
137.00	Sector Mount [SM 401-3]	5	12.956	0.9642	0.1340	6278
124.00	Pirod 6-8' Box Arm (1)	5	10.405	0.8337	0.1105	5827
118.00	Pirod 6-8' Box Arm (1)	5	9.343	0.7788	0.1008	5890
117.50	DS2C03P36D-D	5	9.258	0.7745	0.1000	5927
101.00	PA6-65AC	5	6.711	0.6464	0.0757	7875
99.00	Pirod 6-8' Box Arm (1)	5	6.433	0.6304	0.0730	7949
79.00	Side Arm Mount [SO 301-1]	5	4.004	0.4649	0.0510	6753
78.00	Pirod 6-8' Box Arm (1)	5	3.900	0.4577	0.0502	6816
67.00	3' Yagi	5	2.874	0.3855	0.0427	8184
17.00	1.2M	3	0.249	0.0891	0.0104	10716

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	195	Leg	A325N	0.6250	5	0.74	27.61	0.027	1.05	Bolt DS
T2	185	Leg	A325N	0.7500	5	4.96	39.76	0.125	1.05	Bolt DS
T3	170	Leg	A325N	1.0000	6	11.26	54.52	0.207	1.05	Bolt Tension
T4	150	Leg	A325N	1.0000	6	12.32	54.52	0.226	1.05	Bolt Tension
		Diagonal	A325N	1.0000	1	7.20	10.66	0.676	1.05	Member Block Shear
T5	140	Leg	A325N	1.0000	6	19.35	54.52	0.355	1.05	Bolt Tension
		Diagonal	A325N	1.0000	1	8.89	10.66	0.834	1.05	Member Block Shear
T6	120	Leg	A325N	1.0000	6	25.99	54.52	0.477	1.05	Bolt Tension
		Diagonal	A325N	1.0000	1	8.94	11.68	0.766	1.05	Member Block Shear
T7	100	Leg	A325N	1.0000	6	32.48	54.52	0.596	1.05	Bolt Tension
		Diagonal	A325N	1.0000	1	9.01	11.68	0.771	1.05	Member Block Shear
		Top Girt	A325N	1.0000	1	4.14	11.68	0.354	1.05	Member Block Shear
T8	80	Leg	A325N	1.2500	6	38.64	87.22	0.443	1.05	Bolt Tension
		Diagonal	A325N	1.2500	1	9.75	20.30	0.480	1.05	Member Block Shear
T9	60	Leg	A325N	1.2500	6	44.53	87.22	0.511	1.05	Bolt Tension
		Diagonal	A325N	1.2500	1	10.30	20.30	0.507	1.05	Member Block Shear
T10	40	Leg	A325N	1.2500	6	50.36	87.22	0.577	1.05	Bolt Tension
		Diagonal	A325N	1.2500	1	10.95	23.70	0.462	1.05	Member Block Shear
T11	20	Diagonal	A325N	1.2500	1	12.11	23.70	0.511	1.05	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	1 3/4	10.00	2.17	59.4 K=1.00	2.4053	-3.26	83.60	0.039 [1]
T2	185 - 170	2	15.00	2.28	54.7 K=1.00	3.1416	-22.14	113.62	0.195 [1]
T3	170 - 150	2 1/4	20.00	2.35	50.2 K=1.00	3.9761	-70.28	148.78	0.472 [1]
T4	150 - 140	Pirod 105245	10.02	10.02	37.8 K=1.00	5.3014	-81.38	214.86	0.379 [1]
T5	140 - 120	Pirod 105217	20.03	10.02	37.8 K=1.00	5.3014	-128.88	214.86	0.600 [1]
T6	120 - 100	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-173.51	300.68	0.577 [1]
T7	100 - 80	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	-218.64	300.68	0.727 [1]
T8	80 - 60	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-262.53	399.87	0.657 [1]
T9	60 - 40	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	-304.70	399.87	0.762 [1]
T10	40 - 20	Pirod 105220	20.03	10.02	25.2 K=1.00	11.928 2	-345.93	512.38	0.675 [1]
T11	20 - 0	Pirod 105220	20.03	10.02	25.2 K=1.00	11.928 2	-385.10	512.38	0.752 [1]

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	150 - 140	0.5	1.47	120.0	238.57	0.1963	1.11	3.45	0.324
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	0.91	3.34	0.272
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.87	3.38	0.259
T7	100 - 80	0.5	1.46	119.0	324.71	0.1963	0.94	3.38	0.280
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.52	6.96	0.075
T9	60 - 40	0.625	1.45	94.4	424.12	0.3068	0.23	6.96	0.034
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	0.79	7.01	0.113
T11	20 - 0	0.625	1.43	93.6	536.77	0.3068	1.30	7.01	0.185

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.99	2.42	119.3 K=0.90	0.6013	-1.26	9.55	0.132 [1]
T2	185 - 170	7/8	5.04	2.43	119.9 K=0.90	0.6013	-3.90	9.45	0.412 [1]
T3	170 - 150	1	5.49	2.66	114.7 K=0.90	0.7854	-5.13	13.48	0.381 [1]
T4	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	120.8 K=1.00	0.9020	-7.66	17.58	0.436 [1]
T5	140 - 120	L2 1/2x2 1/2x3/16	12.50	5.63	136.4 K=1.00	0.9020	-8.76	13.87	0.631 [1]
T6	120 - 100	L3x3x3/16	13.80	6.33	127.4 K=1.00	1.0900	-9.47	19.22	0.493 [1]
T7	100 - 80	L3x3x3/16	15.24	7.08	142.6 K=1.00	1.0900	-8.98	15.35	0.585 [1]
T8	80 - 60	L3x3x5/16	16.80	7.84	159.7 K=1.00	1.7800	-9.87	19.97	0.494 [1]
T9	60 - 40	L3x3x5/16	18.45	8.68	176.8	1.7800	-10.45	16.30	0.641 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T10	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.54	K=1.00 165.9	2.0900	-11.17	21.73	0.514 [1]
T11	20 - 0	L3 1/2x3 1/2x5/16	21.92	10.43	K=1.00 181.3 K=1.00	2.0900	-13.01	18.19	0.715 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	4.50	4.35	195.1 K=0.70	0.4418	-0.08	2.62	0.030 [1]
T2	185 - 170	3/4	4.50	4.33	194.1 K=0.70	0.4418	-0.23	2.65	0.086 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	L3x3x5/16	4.50	4.35	104.4 K=1.18	1.7800	-0.04	42.14	0.001 [1]
T2	185 - 170	1	4.50	4.33	145.6 K=0.70	0.7854	-0.71	8.37	0.084 [1]
T3	170 - 150	1	4.51	4.33	145.4 K=0.70	0.7854	-1.58	8.39	0.188 [1]
T7	100 - 80	L3x3x3/16	10.00	8.58	172.8 K=1.00	1.0900	-3.45	10.45	0.330 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	167.2 K=0.70	0.6013	-0.40	4.86	0.083 [1]
T2	185 - 170	1	4.50	4.33	145.6 K=0.70	0.7854	-1.44	8.37	0.172 [1]
T3	170 - 150	1	4.99	4.80	161.2 K=0.70	0.7854	-0.62	6.83	0.091 [1]

[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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	1 3/4	10.00	0.67	18.3	1.7942	2.57	87.47	0.029 [1] #
T2	185 - 170	2	15.00	0.67	16.0	2.1885	21.11	106.69	0.198 [1] #
T3	170 - 150	2 1/4	20.00	0.58	12.4	3.9761	67.57	178.92	0.378 [1]
T4	150 - 140	Pirod 105245	10.02	10.02	37.8	5.3014	73.89	238.57	0.310 [1]
T5	140 - 120	Pirod 105217	20.03	10.02	37.8	5.3014	116.10	238.57	0.487 [1]
T6	120 - 100	Pirod 105218	20.03	10.02	32.4	7.2158	155.95	324.71	0.480 [1]
T7	100 - 80	Pirod 105218	20.03	10.02	32.4	7.2158	194.85	324.71	0.600 [1]
T8	80 - 60	Pirod 105219	20.03	10.02	28.4	9.4248	231.84	424.12	0.547 [1]
T9	60 - 40	Pirod 105219	20.03	10.02	28.4	9.4248	267.19	424.12	0.630 [1]
T10	40 - 20	Pirod 105220	20.03	10.02	25.2	11.9282	302.18	536.77	0.563 [1]
T11	20 - 0	Pirod 105220	20.03	10.02	25.2	11.9282	335.18	536.77	0.624 [1]

[1] P_u / ϕP_n controls
Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T4	150 - 140	0.5	1.47	120.0	238.57	0.1963	1.11	3.45	0.324
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	0.91	3.34	0.272
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.87	3.38	0.259
T7	100 - 80	0.5	1.46	119.0	324.71	0.1963	0.94	3.38	0.280
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.52	6.96	0.075
T9	60 - 40	0.625	1.45	94.4	424.12	0.3068	0.23	6.96	0.034
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	0.79	7.01	0.113
T11	20 - 0	0.625	1.43	93.6	536.77	0.3068	1.30	7.01	0.185

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.99	2.42	132.6	0.6013	1.23	27.06	0.045 [1]
T2	185 - 170	7/8	5.04	2.43	133.2	0.6013	3.81	27.06	0.141 [1]
T3	170 - 150	1	5.49	2.66	127.5	0.7854	5.08	35.34	0.144 [1]
T4	150 - 140	L2 1/2x2 1/2x3/16	11.42	4.98	80.1	0.5183	7.20	22.55	0.320 [1]
T5	140 - 120	L2 1/2x2 1/2x3/16	11.93	5.38	86.2	0.5183	8.89	22.55	0.394 [1]
T6	120 - 100	L3x3x3/16	13.80	6.33	83.5	0.6593	8.94	28.68	0.312 [1]
T7	100 - 80	L3x3x3/16	15.24	7.08	93.2	0.6593	9.01	28.68	0.314 [1]
T8	80 - 60	L3x3x5/16	16.80	7.84	105.3	1.0127	9.75	44.05	0.221 [1]
T9	60 - 40	L3x3x5/16	18.45	8.68	116.2	1.0127	10.30	44.05	0.234 [1]
T10	40 - 20	L3 1/2x3 1/2x5/16	20.16	9.54	108.8	1.2452	10.95	54.17	0.202 [1]
T11	20 - 0	L3 1/2x3 1/2x5/16	21.92	10.43	118.6	1.2452	12.11	54.17	0.224 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	3/4	4.50	4.35	278.7	0.4418	0.12	19.88	0.006 [1]
T2	185 - 170	3/4	4.50	4.33	277.3	0.4418	0.29	19.88	0.015 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	L3x3x5/16	4.50	4.35	56.7	1.7800	0.03	57.67	0.001 [1]
T2	185 - 170	1	4.50	4.33	208.0	0.7854	0.65	35.34	0.018 [1]
T3	170 - 150	1	4.51	4.33	207.7	0.7854	1.54	35.34	0.043 [1]
T7	100 - 80	L3x3x3/16	10.00	8.58	115.0	0.6593	4.14	28.68	0.144 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	195 - 185	7/8	4.50	4.35	238.9	0.6013	0.46	27.06	0.017 [1]
T2	185 - 170	1	4.50	4.33	208.0	0.7854	1.51	35.34	0.043 [1]
T3	170 - 150	1	4.99	4.80	230.3	0.7854	0.70	35.34	0.020 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	195 - 185	Leg	1 3/4	1	-3.26	87.78	3.7	Pass
T2	185 - 170	Leg	2	37	21.11	112.02	18.8	Pass
T3	170 - 150	Leg	2 1/4	87	-70.28	156.22	45.0	Pass
T4	150 - 140	Leg	Pirod 105245	144	-81.38	225.60	36.1	Pass
T5	140 - 120	Leg	Pirod 105217	153	-128.88	225.60	57.1	Pass
T6	120 - 100	Leg	Pirod 105218	170	-173.51	315.72	55.0	Pass
T7	100 - 80	Leg	Pirod 105218	185	-218.64	315.72	69.3	Pass
T8	80 - 60	Leg	Pirod 105219	203	-262.53	419.86	62.5	Pass
T9	60 - 40	Leg	Pirod 105219	218	-304.70	419.86	72.6	Pass
T10	40 - 20	Leg	Pirod 105220	233	-345.93	537.99	64.3	Pass
T11	20 - 0	Leg	Pirod 105220	248	-385.10	537.99	71.6	Pass
T1	195 - 185	Diagonal	7/8	11	-1.26	10.02	12.5	Pass
T2	185 - 170	Diagonal	7/8	47	-3.90	9.92	39.3	Pass
T3	170 - 150	Diagonal	1	97	-5.13	14.15	36.2	Pass
T4	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	148	-7.66	18.45	41.5 64.3 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x3/16	156	-8.76	14.57	60.1 79.4 (b)	Pass
T6	120 - 100	Diagonal	L3x3x3/16	171	-9.47	20.18	46.9 72.9 (b)	Pass

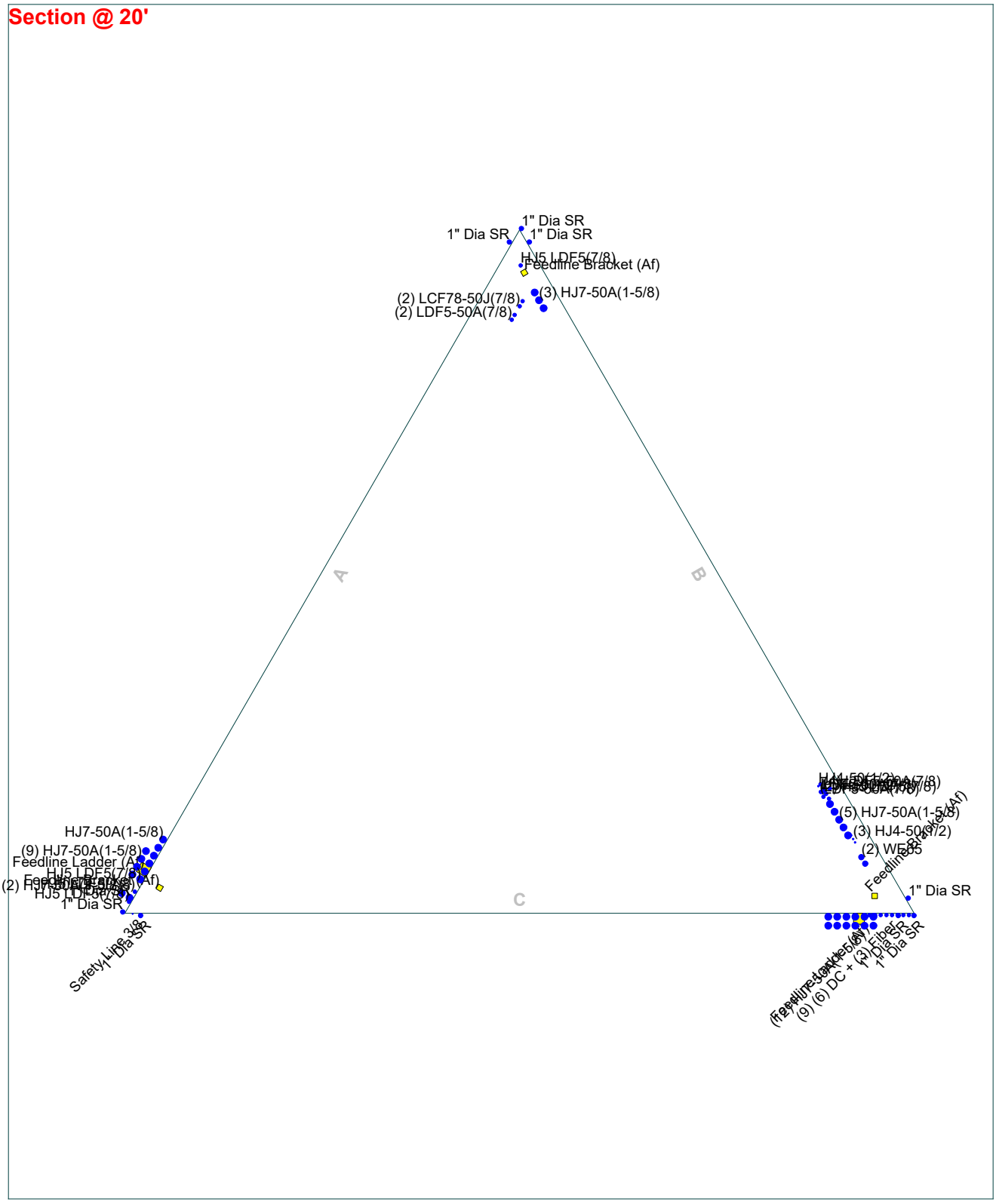
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T7	100 - 80	Diagonal	L3x3x3/16	189	-8.98	16.11	55.8 73.5 (b)	Pass
T8	80 - 60	Diagonal	L3x3x5/16	204	-9.87	20.97	47.1	Pass
T9	60 - 40	Diagonal	L3x3x5/16	219	-10.45	17.12	61.1	Pass
T10	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	234	-11.17	22.81	49.0	Pass
T11	20 - 0	Diagonal	L3 1/2x3 1/2x5/16	252	-13.01	19.10	68.1	Pass
T1	195 - 185	Horizontal	3/4	16	-0.08	2.75	2.8	Pass
T2	185 - 170	Horizontal	3/4	59	-0.23	2.78	8.1	Pass
T1	195 - 185	Top Girt	L3x3x5/16	4	-0.04	44.24	0.3	Pass
T2	185 - 170	Top Girt	1	41	-0.71	8.79	8.0	Pass
T3	170 - 150	Top Girt	1	91	-1.58	8.81	17.9	Pass
T7	100 - 80	Top Girt	L3x3x3/16	187	-3.45	10.97	31.4 33.7 (b)	Pass
T1	195 - 185	Bottom Girt	7/8	8	-0.40	5.10	7.9	Pass
T2	185 - 170	Bottom Girt	1	44	-1.44	8.79	16.4	Pass
T3	170 - 150	Bottom Girt	1	94	-0.62	7.17	8.7	Pass
							Summary	
						Leg (T9)	72.6	Pass
						Diagonal (T5)	79.4	Pass
						Horizontal (T2)	8.1	Pass
						Top Girt (T7)	33.7	Pass
						Bottom Girt (T2)	16.4	Pass
						Bolt Checks	79.4	Pass
						RATING =	**79.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan
20'

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



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Job: ***ES-081 Sharon_LCD***			
Project: ***405025***			
Client: Eversource	Drawn by: Josh Riley	App'd:	
Code: TIA-222-H	Date: 12/15/20	Scale: NTS	
Path:		Dwg No. E-7	

APPENDIX C

ADDITIONAL CALCULATIONS

Eversource #:081
Site Name:Sharon_LCD

Designed By: PSA
Checked By: JR
Date: 12/15/2020

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References

ANCHOR ROD ANALYSIS

Project Information

Site Name:Sharon_LCD

TIA Revision: Rev-G / Rev-H

TIA-222-G 105% Allowable? No / Yes

Apply TIA-222-H Section 15.5? No / Yes

Max Leg Reactions

Compression	*Uplift*
Axial_C := 396·kip	Axial_U := 344·kip
Shear_C := 41·kip	Shear_U := 36·kip

Anchor Rod Data

Diameter of Anchor Rod: D := 1.25·in

Number of Anchor Rods: N := 6

Length from top of concrete to bottom of anchor rod leveling nut: lar := 1.75·in

Threads in Shear Plane?: Yes / No

Thread Series: Coarse / Fine / 8-Thread

Consider Base Plate Grout? Yes / No

Grout Factor η: 0.90 / 0.70 / 0.55 / 0.50

Threads per Inch: n = 7 (Thread selection invalid if n = 0)

Rod Ultimate Strength: $Fu = 125\cdot ksi$

Rod Yield Strength: $Fy = 105\cdot ksi$

Anchor Rod Plastic Section Modulus: (based on tension root diameter)

$$Z := \frac{1}{6}\cdot\left(D - \frac{0.9743in}{n}\right)^3 = 0.228\cdot in^3$$

Radius of Gyration:

$$r := \left(\frac{1}{4}\right)\cdot\left(D - \frac{0.9743in}{n}\right) = 0.278\cdot in$$

Net Area of Anchor Rod:

$$An := \frac{\pi}{4}\cdot\left(D - \frac{0.9743in}{n}\right)^2 = 0.969\cdot in^2$$

TIA-222-G/H Section 4.9.6.1

Nominal Unthreaded Area of Anchor Rod:

$$Ab := \frac{\pi}{4}\cdot(D)^2 = 1.227\cdot in^2$$

Anchor Rod Grade:

F1554-105
A687
A354-BC
A354-BD
A449
A572-42
A572-50
A572-55
A572-60
A572-65
A588-42
A588-46
A588-50
A36M-42
A36M-45
A36M-50
A36M-55
A500-50
A514-GR100
A53-B-35
A53-B-42
A607-60
A607-65
S-128
S-22

Eversource #:081
Site Name:Sharon_LCD

Designed By: PSA
Checked By: JR
Date: 12/15/2020

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Anchor Rod Design Capacities

Design Tension Strength: TIA-222-G/H Section 4.9.6.1

$Rnt := Fu \cdot An = 121.139 \cdot kip$

$\phi t = 0.75$

$\phi Rnt := \phi t \cdot Rnt = 90.854 \cdot kip$

Design Compression Strength:

$Rnc := Fy \cdot An = 101.756 \cdot kip$

$\phi c = 1$

$\phi Rnc := \phi c \cdot Rnc = 101.756 \cdot kip$

Design Buckling Strength: TIA-222-H Section 4.5.4.2

$K_0 := 1.2$

$Fcr = 104.082 \cdot ksi$

$Fe = 5.005 \times 10^3 \cdot ksi$

$Rnb := Fcr \cdot An = 100.867 \cdot kip$

$\phi c = 1$

$\phi Rnb := \phi c \cdot Rnb = 100.867 \cdot kip$

Design Shear Strength: TIA-222-G/H Section 4.9.6.3

$$Rnv := \begin{cases} 0.55 \cdot Fu \cdot Ab & \text{if } Thread\_Type = \text{"No"} \wedge TIA = \text{"Rev-G"} \\ 0.45 \cdot Fu \cdot Ab & \text{if } Thread\_Type = \text{"Yes"} \wedge TIA = \text{"Rev-G"} \\ 0.625 \cdot Fu \cdot Ab & \text{if } Thread\_Type = \text{"No"} \wedge TIA = \text{"Rev-H"} \\ 0.5 \cdot Fu \cdot Ab & \text{if } Thread\_Type = \text{"Yes"} \wedge TIA = \text{"Rev-H"} \end{cases}$$

$Rnv = 76.699 \cdot kip$

$Rnvc := 0.6 \cdot Fy \cdot 0.5 \cdot An = 30.527 \cdot kip$ TIA-222-H Section 4.9.9

$\phi v = 0.75 \qquad \phi c = 1$

$\phi Rnv := \phi v \cdot Rnv = 57.524 \cdot kip \qquad \phi Rnvc := \phi c \cdot Rnvc = 30.527 \cdot kip$

Design Flexural Strength: TIA-222-G/H Section 4.7.1

$Rmn := Fy \cdot Z = 23.986 \cdot kip \cdot in$

$\phi f = 0.9$

$\phi Rmn := \phi f \cdot Rmn = 21.588 \cdot kip \cdot in$

Anchor Rod Loading Demands

Tension Demand:

$$Put := \frac{Axial\_U}{N} = 57.333 \cdot kip$$

Compression Demand:

$$Puc := \frac{Axial\_C}{N} = 66 \cdot kip$$

Shear Demand:

$$Vut := \frac{Shear\_U}{N} = 6 \cdot kip$$

$$Vuc := \frac{Shear\_C}{N} = 6.833 \cdot kip$$

Moment Demand:

$$Mut := 0.65 \cdot lar \cdot Vut = 6.825 \cdot kip \cdot in$$

$$Muc := 0.65 \cdot lar \cdot Vuc = 7.773 \cdot kip \cdot in$$

Anchor Rod Interaction Check TIA-222-G Section 4.9.9

$$SR\_g := \begin{cases} \dfrac{Put + \dfrac{Vut}{\eta}}{\phi Rnt} & \text{if } \eta > 0.50 \\ \dfrac{Put + \dfrac{Vut}{\eta}}{\phi Rnt} & \text{if } \eta = 0.50 \wedge lar \le D \wedge Put > Puc \\ \dfrac{Puc + \dfrac{Vuc}{\eta}}{\phi Rnt} & \text{if } \eta = 0.50 \wedge lar \le D \wedge Put < Puc \\ \left(\dfrac{Vut}{\phi Rnv}\right)^2 + \left(\dfrac{Put}{\phi Rnt} + \dfrac{Mut}{\phi Rmn}\right)^2 & \text{if } \eta = 0.5 \wedge lar > D \wedge Put > Puc \\ \left(\dfrac{Vuc}{\phi Rnv}\right)^2 + \left(\dfrac{Puc}{\phi Rnt} + \dfrac{Muc}{\phi Rmn}\right)^2 & \text{if } \eta = 0.5 \wedge lar > D \wedge Put < Puc \end{cases}$$

$$SR\_g = 0.751$$

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Anchor Rod Interaction Check

TIA-222-H Section 4.9.9

$$SR\_Pt := \begin{cases} \left(\frac{Put}{\phi Rnt}\right)^2 + \left(\frac{Vut}{\phi Rnv}\right)^2 & \text{if } lar \le D \\ \left(\frac{Put}{\phi Rnt}\right)^2 + \left(\frac{Vut}{\phi Rnv}\right)^2 & \text{if } D < lar \le 3\cdot in \wedge Grout = \text{"Yes"} \\ \left(\frac{Put}{\phi Rnt} + \frac{Mut}{\phi Rmn}\right)^2 + \left(\frac{Vut}{\phi Rnv}\right)^2 & \text{if } 3\cdot in < lar \wedge Grout = \text{"Yes"} \\ \left(\frac{Put}{\phi Rnt} + \frac{Mut}{\phi Rmn}\right)^2 + \left(\frac{Vut}{\phi Rnv}\right)^2 & \text{if } D < lar \wedge Grout = \text{"No"} \end{cases}$$

$SR\_Pt = 0.409$

$$SR\_Pc := \begin{cases} \left(\frac{Puc}{\phi Rnc}\right) + \left(\frac{Vuc}{\phi Rnvc}\right)^2 & \text{if } lar \le D \\ \left(\frac{Puc}{\phi Rnc}\right) + \left(\frac{Vuc}{\phi Rnvc}\right)^2 & \text{if } D < lar \le 3\cdot in \wedge Grout = \text{"Yes"} \\ \left(\frac{Puc}{\phi Rnc} + \frac{Muc}{\phi Rmn}\right) + \left(\frac{Vuc}{\phi Rnvc}\right)^2 & \text{if } 3\cdot in < lar \wedge Grout = \text{"Yes"} \\ \left(\frac{Puc}{\phi Rnc} + \frac{Muc}{\phi Rmn}\right) + \left(\frac{Vuc}{\phi Rnvc}\right)^2 & \text{if } D < lar \le 4\cdot D \wedge Grout = \text{"No"} \\ \left(\frac{Puc}{\phi Rnb} + \frac{Muc}{\phi Rmn}\right) + \left(\frac{Vuc}{\phi Rnvc}\right)^2 & \text{if } lar > 4\cdot D \wedge Grout = \text{"No"} \end{cases}$$

$SR\_Pc = 0.699$

$$SR := \begin{cases} SR\_g & \text{if } TIA = \text{"Rev-G"} \\ \max(SR\_Pt, SR\_Pc) & \text{if } TIA = \text{"Rev-H"} \wedge S15 = \text{"No"} \\ \frac{\max(SR\_Pt, SR\_Pc)}{1.05} & \text{if } TIA = \text{"Rev-H"} \wedge S15 = \text{"Yes"} \end{cases} = 0.665$$

$$Check_{SR} := \begin{cases} \text{"Passing"} & \text{if } SR \le 1.00 \wedge TIA = \text{"Rev-G"} \wedge S105 = \text{"Yes"} \\ \text{"Acceptable"} & \text{if } 1.00 < SR \le 1.05 \wedge TIA = \text{"Rev-G"} \wedge S105 = \text{"Yes"} \\ \text{"Failing"} & \text{if } SR > 1.05 \wedge TIA = \text{"Rev-G"} \wedge S105 = \text{"Yes"} \\ \text{"Passing"} & \text{if } SR \le 1.00 \wedge TIA = \text{"Rev-G"} \wedge S105 = \text{"No"} \\ \text{"Failing"} & \text{if } SR > 1.00 \wedge TIA = \text{"Rev-G"} \wedge S105 = \text{"No"} \\ \text{"Passing"} & \text{if } SR \le 1.0 \wedge TIA = \text{"Rev-H"} \\ \text{"Failing"} & \text{if } SR > 1.0 \wedge TIA = \text{"Rev-H"} \end{cases} = \text{"Passing"}$$

Eversource #:081
Site Name:Sharon_LCD

Designed By: PSA
Checked By: JR
Date: 12/15/2020

BLACK & VEATCH
Building a world of difference.

Anchor Rod Results

Axial Tension Demand:	$Put = 57.333 \cdot kip$
Axial Tension Capacity:	$\phi Rnt = 90.854 \cdot kip$
Axial Compression Demand:	$Puc = 66 \cdot kip$
Axial Compression Capacity:	$\phi Rnc = 101.756 \cdot kip$
Shear Tension Demand:	$Vut = 6 \cdot kip$
Tension Shear Capacity:	$\phi Rnv = 57.524 \cdot kip$
Shear Compression Demand:	$Vuc = 6.833 \cdot kip$
Compresison Shear Capacity:	$\phi R_{nvc} = 30.527 \cdot kip$
Moment Tension Demand:	$M_{ut} = 6.825 \cdot kip \cdot in$
Moment Compression Demand:	$M_{uc} = 7.773 \cdot kip \cdot in$
Moment Capacity:	$\phi R_{mn} = 21.588 \cdot kip \cdot in$

Governing Stress Ratio

$SR = 66.544 \cdot \%$

$Check_{SR} = \text{"Passing"}$

BLACK & VEATCH
Building a world of difference.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-6909

Client:	Eversource	***Design:***	PSA
Project:	405025	***Date:***	12/15/2020
Site:	Sharon_LCD	***Verify:***	J. Riley
Title:	Foundation Design Reaction Comparison	***Date:***	12/15/2020
		Code:	TIA-222-H

Template Version 1.8

FOUNDATION ANALYSIS:

Original Tower Design Reactions:

Unit Base Foundation:

Shear:	92.7	Kip
Overturning moment:	9677.3	Kip-ft
Uplift:	535.1	Kip
Compression:	582.4	Kip

Note: Design reactions are multiplied by 1.35 for comparison as allowed by TIA-222-H Section 15.6.2.

TnxTower Reactions:

Unit Base Foundation:

Shear:	63.0	Kip
Overturning moment:	6444.0	Kip-ft
Uplift:	344.0	Kip
Compression:	396.0	Kip

Stress Ratio:

Unit Base Foundation:

Shear:	**64.7%**
Overturning moment:	**63.4%**
Uplift:	**61.2%**
Compression:	**64.8%**

Note: Ratings per TIA-222-H Section 15.5.

Conclusion:

When the calculated reactions are compared to the original design reactions, the existing foundation is considered to have been designed and constructed with adequate capacity to support the existing and proposed loads.

ATTACHMENT E – PROOF OF DELIVERY OF NOTICE

Ref: ES-081 SHARON
Dep: BL GRAPHICS

Date: 27Jan21
Wgt: 1.35 LBS

DV:

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4542

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.35 LB
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **HONORABLE BREN COLLEY**
TOWN OF SHARON
63 MAIN STREET

SHARON CT 06069

REF: ES-081 SHARON

DEPT: BL GRAPHICS

5GDC1/1136/0582

FedEx Express

J2010191106011av

THU - 28 JAN 12:00P
PRIORITY OVERNIGHT

TRK# 0201 **9544 9955 4542**

00 HFDA

06069
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21

Ref: ES-081 SHARON
Dep: BL GRAPHICS

Date: 27Jan21
Wgt: 1.35 LBS

DV: 0.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4553

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.35 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **JAMIE CASEY**
TOWN OF SHARON
63 MAIN STREET

SHARON CT 06069

REF: ES-081 SHARON

DEPT: BL GRAPHICS

56DC1/1136/0562

FedEx Express

J2010191106O1av

THU - 28 JAN 12:00P
PRIORITY OVERNIGHT

TRK# 0201 **9544 9955 4553**

00 HFDA

06069
CT-US **BDL**

Part # 1561R2-434 RIT EXP 09/21 ®

Ref: ES-081 SHARON
Dep: BL GRAPHICS

Date: 27Jan21
Wgt: 1.35 LBS

DV: 0.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4564

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.35 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **C/O EMERGENCY MED SERVICES**
LITCHFIELD COUNTY DISPATCH
111 WATER STREET

TORRINGTON CT 06790
REF: ES-081 SHARON

DEPT: BL GRAPHICS

56DC1/1136/0562

FedEx Express

J2010191110601uv

TRK# 0201 **9544 9955 4564**

THU - 28 JAN 10:30A
PRIORITY OVERNIGHT

00 HFDA

06790
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21

Ref: ES-081 SHARON
Dep: BL GRAPHICS

Date: 27Jan21
Wgt: 1.35 LBS

DV: 0.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4575

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.35 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **ANN A. PRINDLE**

7 SURDAN MOUNTAIN ROAD

SHARON CT 06069

REF: ES-081 SHARON

DEPT: BL GRAPHICS

5GDC1/1136/0562

FedEx Express

J2018191106011av

TRK# 0201 **9544 9955 4575**

THU - 28 JAN 12:00P
PRIORITY OVERNIGHT

00 HFDA

06069
CT-US **BDL**

Ref: ES-081 SHARON
Dep: BL GRAPHICS

Date: 27Jan21
Wgt: 1.35 LBS

DV: 0.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 9544 9955 4586

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 27JAN21
ACTWGT: 1.35 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051

REF: ES-081 SHARON

DEPT: BL GRAPHICS

5EDC1/1136/05A2

FedEx Express

J201019110601uv

TRK# 0201 **9544 9955 4586**

THU - 28 JAN 10:30A
PRIORITY OVERNIGHT

00 BDLA

06051
CT-US **BDL**

Part # 150140-434 RIT EXP 09/21

ATTACHMENT F - POWER DENSITY REPORT

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

Calculated Radio Frequency Emissions Report

EVERSOURCE ENERGY

ES-081

7 Surdan Mountain Road

Sharon, CT 06069

December 30, 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 off at 7 Surdan Mountain Road in Sharon, CT. Eversource is proposing to install one omnidirectional antenna with two internal elements – one element is for transmit and one element is receive-only – as part of its 220 MHz communications system.

This report considers the proposed antenna configuration as detailed by Eversource along with % MPE (Maximum Permissible Exposure) measurements around the site to determine FCC compliance of the facility.

Figure 1: View of ES-081 Sharon

Site Address	7 Surdan Mountain Road
Latitude	41° 51' 43.38" N
Longitude	73° 23' 58.66" W
Site Elevation AMSL	1369’
Survey Engineer	Marc Salas
Survey Date/Time	6/17/2020; 11:00 AM – 11:40 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 per Channel (ERP - Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	dbSpectra DS2C03P36D-D	217	2.9	124	4	30°	18.5	123.1

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

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

[2] Transmit antenna height is based on the Black & Veatch Structural Analysis Report dated December 15, 2020, and the overall mechanical length of the antenna. The proposed antenna consists of two internally stacked antennas – upper is for receive, lower is for transmit. Due to the unavailability of the digital pattern for this specific antenna, the pattern of a similar antenna was substituted in the calculations.

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# 0116			
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 17, 2020 between 11:00 AM and 11:40 AM. The calculated % MPE contribution from the proposed equipment was then added to the measured % MPE values in the "Composite % MPE" column. These calculated values incorporate the antenna pattern of the antenna model specified by Eversource to determine the "Off Beam Loss" factor shown in the power density formula from Section 3. All % MPE values are in reference to the FCC Uncontrolled/General Population exposure limit.

Table 4 below lists 16 measurements recorded in the vicinity of the tower. The highest spatially averaged measurement was 5.50% (Average Uncontrolled/General Population MPE) and was recorded at Location 16 along Surdan Mountain Road. The highest composite (measured + calculated) % MPE value is calculated to be 5.72% (Average Uncontrolled/General Population) and is also calculated to occur at Location 16.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource Proposed)	Composite % MPE (Uncontrolled / General)
1	Compound Gate	41.86234	-73.39970	105	< 1.00%	0.02%	0.02%
2	North Edge of Compound	41.86235	-73.39954	107	< 1.00%	0.02%	0.02%
3	Northeast Corner of compound	41.86233	-73.39943	110	< 1.00%	0.05%	0.05%
4	East Edge of Compound	41.86217	-73.39945	62	< 1.00%	0.07%	0.07%
5	Southeast Corner of Compound	41.86196	-73.39948	53	< 1.00%	0.08%	0.08%
6	South Edge of Compound	41.86197	-73.39961	31	< 1.00%	0.08%	0.08%
7	Southwest Corner of Compound	41.86199	-73.39979	53	2.55%	0.07%	2.62%
8	West Edge of Compound	41.86215	-73.39972	43	3.85%	0.07%	3.92%
9	Intersection of Driveway and Access Road	41.86250	-73.39990	180	< 1.00%	0.23%	0.23%
10	Intersection of Access Road and Surdan Mountain Road	41.86287	-73.39981	303	< 1.00%	0.38%	0.38%
11	Surdan Mountain Road Parking Area	41.86295	-73.39910	355	4.26%	0.38%	4.63%
12	Intersection of Private Road and Surdan Mountain Road	41.86311	-73.39874	452	1.84%	0.30%	2.14%
13	Along Walking Trail	41.86356	-73.39842	639	1.45%	0.19%	1.64%
14	Along Walking Trail	41.86361	-73.39748	812	3.95%	0.12%	4.07%
15	Along Surdan Mountain Road	41.86269	-73.40082	401	4.74%	0.29%	5.03%
16	**Along Surdan Mountain Road**	**41.86273**	**-73.40139**	**539**	**5.50%**	**0.22%**	**5.72%**

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 value reflected in the table.

Figures 2 and 3 below are aerial views[6] 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

[6] Map showing location of telecommunications facility and the surrounding area. *Google Earth*, https://earth.google.com/web/.

7. Conclusion

A number of accessible areas around the tower at 7 Surdan Mountain Road in Sharon, CT were surveyed and found to be well within the mandated General Population/Uncontrolled limits for Maximum Permissible Exposure, as delineated in the Federal Communications Commission's Radio Frequency exposure rules published in 47 CFR 1.1307(b)(1)-(b)(3).

The highest spatially averaged % MPE measurement of all surveyed points based on the 1997 FCC standard for exposure to the general population is 5.50% MPE. This measurement was recorded at Location 16 along Surdan Mountain Road.

The highest composite (measured + calculated) power density is **5.72% of the FCC General Population MPE limit** with the proposed Eversource equipment and is also calculated to occur at Location 16.

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.

Marc Salas — November 6, 2020

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

Keith Vellante — December 30, 2020

Report Reviewed/Approved/Updated By: Keith Vellante, Director of RF Services, C Squared Systems, LLC — 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[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)
0.3-3.0	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[8]

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)

[7] 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

[8] 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

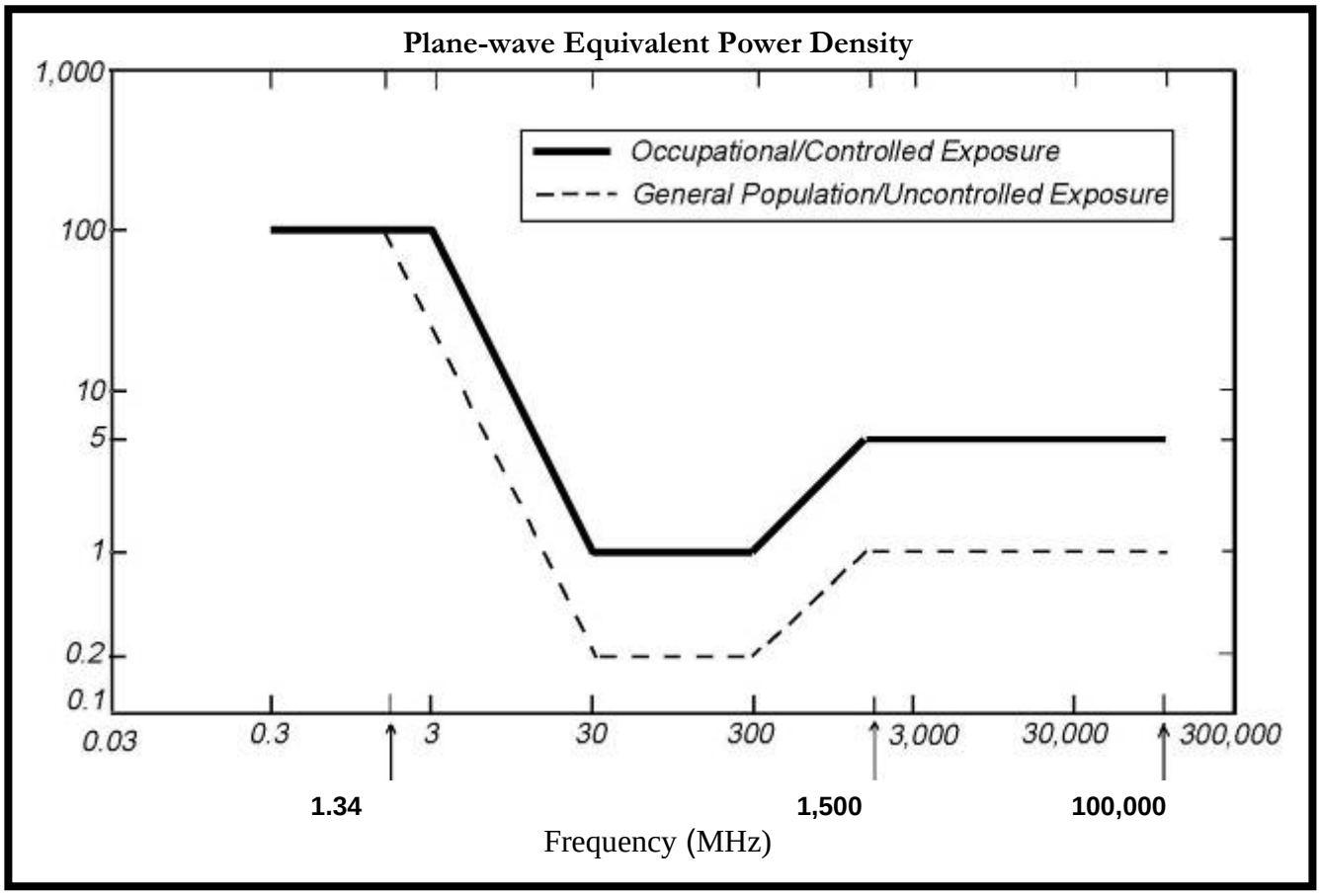
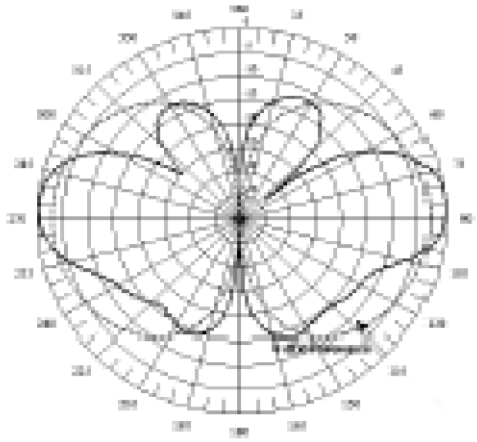


Figure 4: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns[9]

217 MHz

Manufacturer:	dbSpectra
Model #:	DS2C03P36D-D
Frequency Band:	216 - 222 MHz
Gain:	2.9 dBd
Vertical Beamwidth:	30°
Horizontal Beamwidth:	360°
Polarization:	Vertical-Polarization
Length:	18.5’



[9] In the case where pattern data was unavailable from the manufacturer, vertical patterns shown are for antennas with similar specifications.