EVERSOURCE ENERGY

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

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

September 10, 2021

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

RE: **Notice of Exempt Modification**
Eversource Site Ridgefield 22N
Off Prospect Street, Ridgefield, CT 06877
Latitude: 41-17-00.6 N / Longitude: 73-29.16.3 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas and equipment at various mounting heights on an existing 84-foot steel monopole tower located off Prospect Street in Ridgefield. See Attachment A, Parcel Map and Property Card. The tower and property are owned by Eversource. Eversource is seeking the Connecticut Siting Council's authorization for the installation of one 15-foot 6-inch tall omni-directional antenna to be mounted at 83 feet above ground level ("AGL") and the removal of two omni-directional antennas, one upright and one inverted. There will be no other changes to the area of the fenced compound, the tower or the existing antennas and other equipment currently mounted on the tower. The antenna will be mounted to the existing tower on a new 4-foot stand-off mount. See Attachment B, Mount Analysis, dated August 12, 2021. The tower and existing and proposed equipment on the tower are depicted on Attachment C, Construction Drawings, dated August 17, 2021 and Attachment D, Structural Analysis, dated July 29, 2021. The Connecticut Siting Council approved the monopole at this location in Petition No. 1054 in January 2013.

The modification is required to eliminate transmitter induced noise issues from two antennas previously installed as part of Eversource's program to update its obsolete analog voice radio communications system to a modern digital voice communications system (refer to EM-EVER-118-200724, dated August 17, 2020). The transmitter issue manifests as passive intermodulation, or PIM, noise located on the receive frequencies, which limits the system level coverage capability of the site.

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 Rudy Marconi, First Selectman for the Town of Ridgefield and Richard Baldelli, Director of Planning & Zoning for the Town of Ridgefield via the United States Postal Service or 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 modifications will not require the extension of the site boundary.
3. The modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the new antenna 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 August 18, 2021 (Attachment F – Power Density Report)[1].
5. The 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 and two copies of this notice and a check in the amount of $625 are enclosed.

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

By: ______________________________
Kathleen M. Shanley
Manager – Transmission Siting

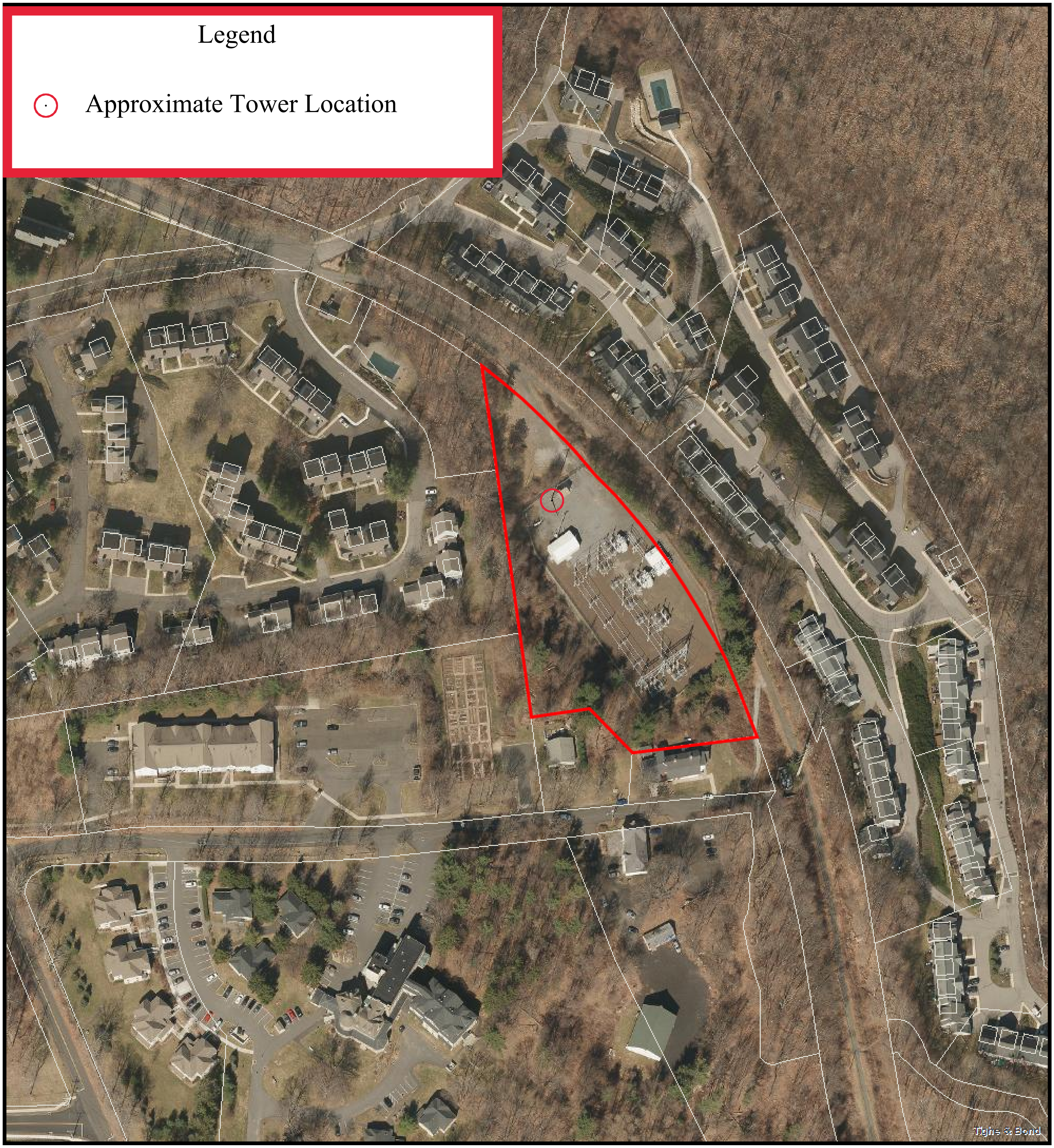
cc: Honorable Rudy Marconi, First Selectman, Town of Ridgefield
Richard Baldelli, Director of Planning & Zoning, Town of Ridgefield

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] It should be noted that the number of transmitting antennas accounted for in the Power Density Report accounts for two channels on the 88' centerline antenna. Also, the "Antenna Height" column on Table 1 in the Power Density Report reflects the centerline of the Transmit or "TX" antenna centerline.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD



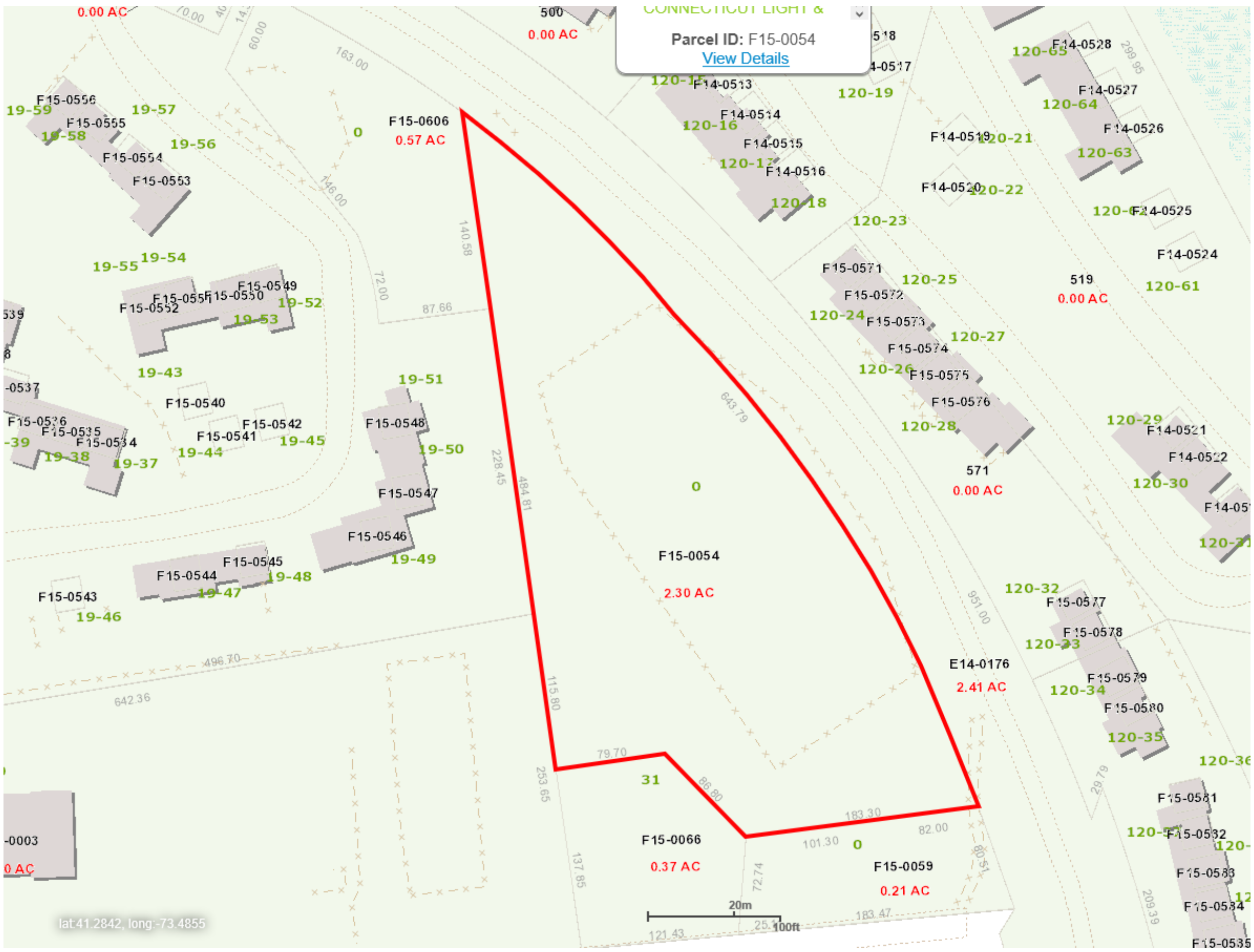
ES-286 Ridgefield22N Parcel

2/20/2020 8:34:14 AM

Scale: 1"=188'

Scale is approximate

The information depicted on this map is for planning purposes only.
It is not adequate for legal boundary definition, regulatory
interpretation, or parcel-level analyses.



Parcel ID: F15-0054
View Details
F15-0054
2.30 AC
F15-0606
0.57 AC
F15-0066
0.37 AC
F15-0059
0.21 AC
E14-0176
2.41 AC
519
0.00 AC
571
0.00 AC
500
0.00 AC
20m
100ft
lat 41.2842, long -73.4855

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2017.

Information on the Property Records for the Municipality of Ridgefield was last updated on 2/17/2020.

Parcel Information

Location:	SUNSET LA	Property Use:	Vacant Land	Primary Use:	Residential
Unique ID:	F150054	Map Block Lot:	F15-0054	Acres:	2.30
490 Acres:	0.00	Zone:	RAA	Volume / Page:	0178/0079
Developers Map / Lot:		Census:	2453		

Value Information

	Appraised Value	Assessed Value
Land	98,900	69,230
Buildings	0	0
Detached Outbuildings	0	0
Total	98,900	69,230

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

August 16, 2021

MOUNT EVALUATION LETTER

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

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

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

Structure Rating (max from all components) =	17.2%

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

This analysis analyzes the worst-case scenario for the proposed USF-4U Stand-off Frame. All levels are deemed sufficient. The proposed mounting system will be capable of supporting the proposed equipment, under the following conditions:

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

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

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

Sincerely,
Black & Veatch Corporation

Prepared By: Shaun Donley
Submitted By: Josh Riley, P.E.

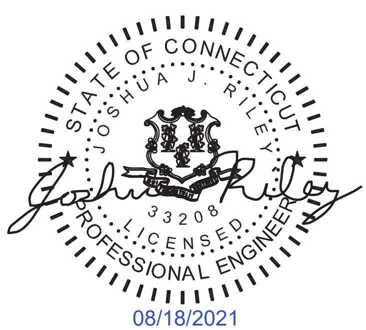


TABLE OF CONTENTS

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	157	154	1	Omni	Telewave	ANT220F2
Eversource	1	-	134	131	1	Dipole	COMPROD	871F-70-2

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

2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 2" radial ice thickness
EXPOSURE CATEGORY	B
RISK CATEGORY	III
TOPO CATEGORY	Hill
CREST HEIGHT	110 ft

3. REFERENCES

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

4. ASSUMPTIONS

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

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

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

5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
Arm: HSS3X3X3	12.8%	Pass	2.8%	Pass
Bracing: Pipe 2.0 Std	17.2%	Pass	2.2%	Pass
Mount Pipe: Pipe 3.0 Std	8.7%	Pass	3.8%	Pass

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

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

APPENDIX 1:
MOUNT ANALYSIS REPORT

Dead and Live Loads

Maintenance Live Load: L_V = 250 lb

Installation Live Load: L_M = 0 lb

Appurtenance Dead Loads	
Name	Weight (lb)
871F-70-2	12.5

Appurtenance Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Basic Wind Speed, V =	140	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07		$K_e = e^{-0.000032*zs}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factor, K_e =	1.000		$F_A = q_z G_h (EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	55.61	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)
871F-70-2	5.50	2.58	0.16	1.20	15.35	853.27	2.00	1.57	87.16

BLACK & VEATCH

Client:	Eversource	Computed By:	Shaun Donley
Site Name:	THOMPSON CSP (848)	Date:	8/16/2021
		Verified By:	JJ
Title:	MOUNT ANALYSIS REPORT	Date:	8/16/2021

Member Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\,(z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Basic Wind Speed, V =	140	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07		$K_e = e^{-0.0000362 \cdot zs}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\,K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factor, K_e =	1.000		$F_A = q_z G_h(EPA)$	2.6.11.2
Wind Velocity Pressure, q_z =	55.61	psf		
Gust Effect Factor, G_h =	1.00		$F_M = q_z G_h C_f D_p$	2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb)
Arm: HSS3X3X3	0.25	0.25	2	0.25	27.80
Bracing: Pipe 2.0 Std	0.20		1.2	0.20	13.21
Mount Pipe: Pipe 3.0 Std	0.29		1.2	0.29	19.46

BLACK & VEATCH	Client: Eversource	Computed By: Shaun Donley	
	Site Name: THOMPSON CSP (848)	Date: 8/16/2021	
		Verified By: JJ	
	Title: MOUNT ANALYSIS REPORT	Date: 8/16/2021	

Appurtenance Ice Dead Loading

Parameter	Value	Unit	*Equations*	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z/H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_cK_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.09		$T_{iz} = T_iI\,K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.15			
Factored Ice Thickness, T_{iz} =	2.72	in	$DL_{ice}=[(H_{ice}*D_{ice}*W_{ice}) - (H*W*D)]*56pcf$	
Grating Ice Dead Load, D_{Gice} =	12.71	psf		

Appurtenance Ice Dead Loads					
Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft^3)	DL_{ice} (lb)
871F-70-2	5.95	3.04	0.61	8.82	493.98

BLACK & VEATCH	Client: Eversource	Computed By: Shaun Donley	
	Site Name: THOMPSON CSP (848)	Date: 8/16/2021	
		Verified By: JJ	
	Title: MOUNT ANALYSIS REPORT	Date: 8/16/2021	

Member Ice Dead Loading

			Equations	TIA-222-H
Exposure Category =	B			
Risk Category =	III		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Topographic Category =	1			
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Design Ice Thickness, T_i =	2.00	in	$K_{iz} = (z/33)^{0.10}$	2.6.10
Importance Factor, I =	1.15			
Topographic Factor, K_{zt} =	1.09		$T_{iz} = T_i I\, K_{iz}(K_{zt})^{0.35}$	2.6.10
Height Escalation Factor, K_{iz} =	1.15			
Factored Ice Thickness, T_{iz} =	2.72	in	Aiz = pi*Tiz*(Dc+Tiz)	2.6.10
Grating Ice Dead Load, D_{Gice} =	12.71	psf		
			DL_{ice}=Aiz*56pcf	

Member Ice Dead Loads					
Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	Aiz (ft^2)	DL_{ice} (lb/ft)
Arm: HSS3X3X3	0.70	0.70	0.35	0.41	23.18
Bracing: Pipe 2.0 Std	0.65		0.20	0.30	16.96
Mount Pipe: Pipe 3.0 Std	0.75		0.29	0.37	20.71

Appurtenance Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01\ (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07	psf	$K_e = e^{-0.000032*zs}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.093			
Factored Ice Thickness, T_{iz} =	2.72	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)
871F-70-2	5.95	3.04	0.61	-	17.79	126.15	-	3.32	23.53

BLACK & VEATCH

Client:	Eversource	Computed By:	Shaun Donley
Site Name:	THOMPSON CSP (848)	Date:	8/16/2021
		Verified By:	JJ
Title:	MOUNT ANALYSIS REPORT	Date:	8/16/2021

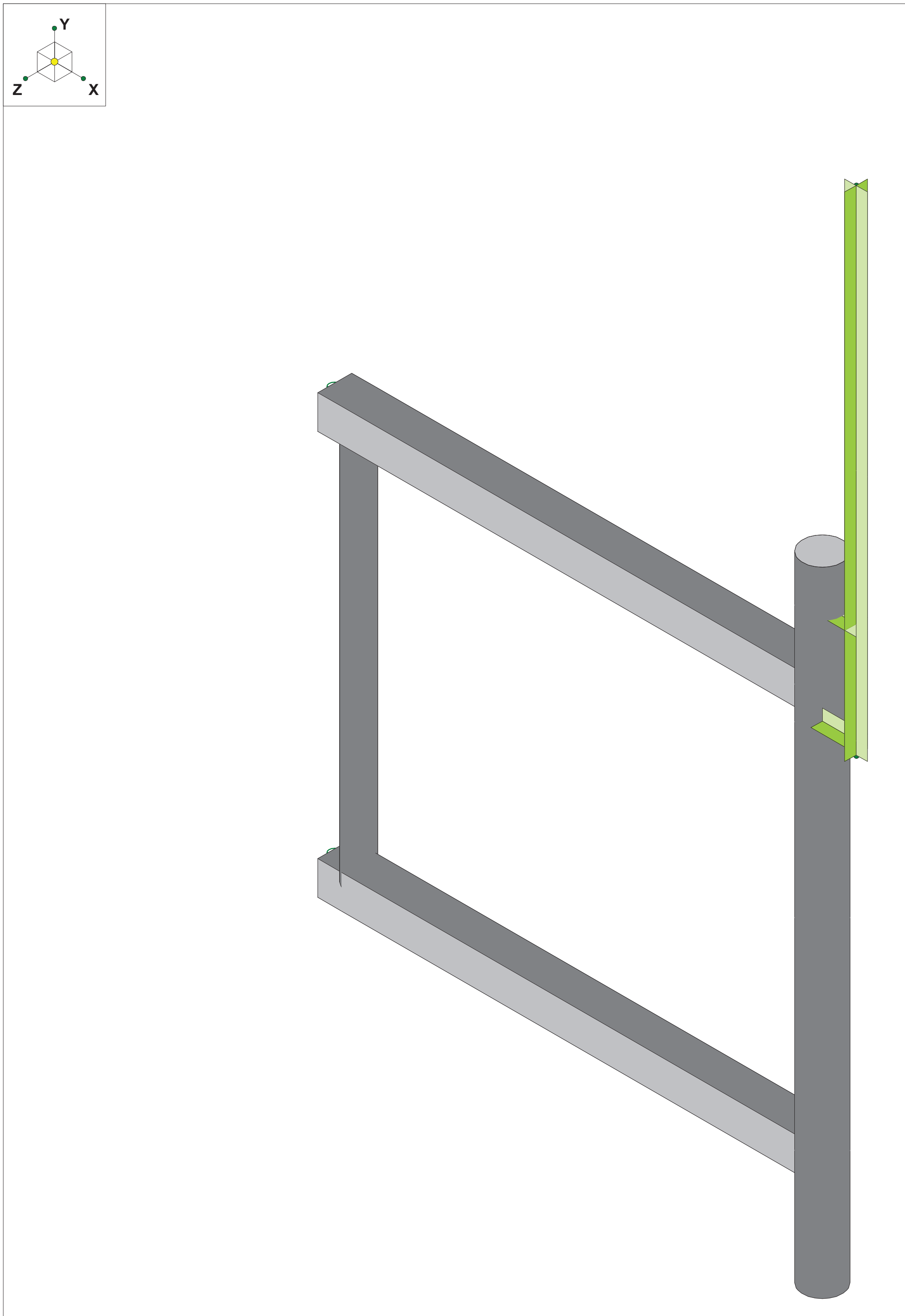
Member Ice Wind Loading

			Equations	TIA-222-H
Exposure Category =	B		$K_z = 2.01 (z / z_g)^{2/\alpha}$	2.6.5.2
Risk Category =	III			
Topographic Category =	1		$K_h = e^{(f \cdot z / H)}$	2.6.6.2.1
Ice Wind Speed, V_{ice} =	50	mph		
Height Above Ground, z =	134	ft	$K_{zt} = [1 + K_c K_t / K_h]^2$	2.6.6.2.1
Crest Height, H =	110 ft	ft		
Velocity Pressure Coefficient, K_z =	1.07	psf	$K_e = e^{-0.0000362 \cdot zs}$	2.6.8
Topographic Factor, K_{zt} =	1.09			
Wind Directionality Factor, K_d =	0.95		$q_z = 0.00256\ K_z K_{zt} K_e K_d V^2$	2.6.11.6
Shielding Factor, K_a =	0.90			
Ground Elevation Factory, K_e =	1.000		$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$	2.6.11.2
Ice Wind Velocity Pressure, $q_{z(ice)}$ =	7.093			
Factored Ice Thickness, T_{iz} =	2.72	in	$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$	2.6.11.2
Gust Effect Factor, G_h =	1			

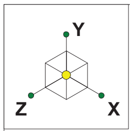
Member Ice Wind Loads

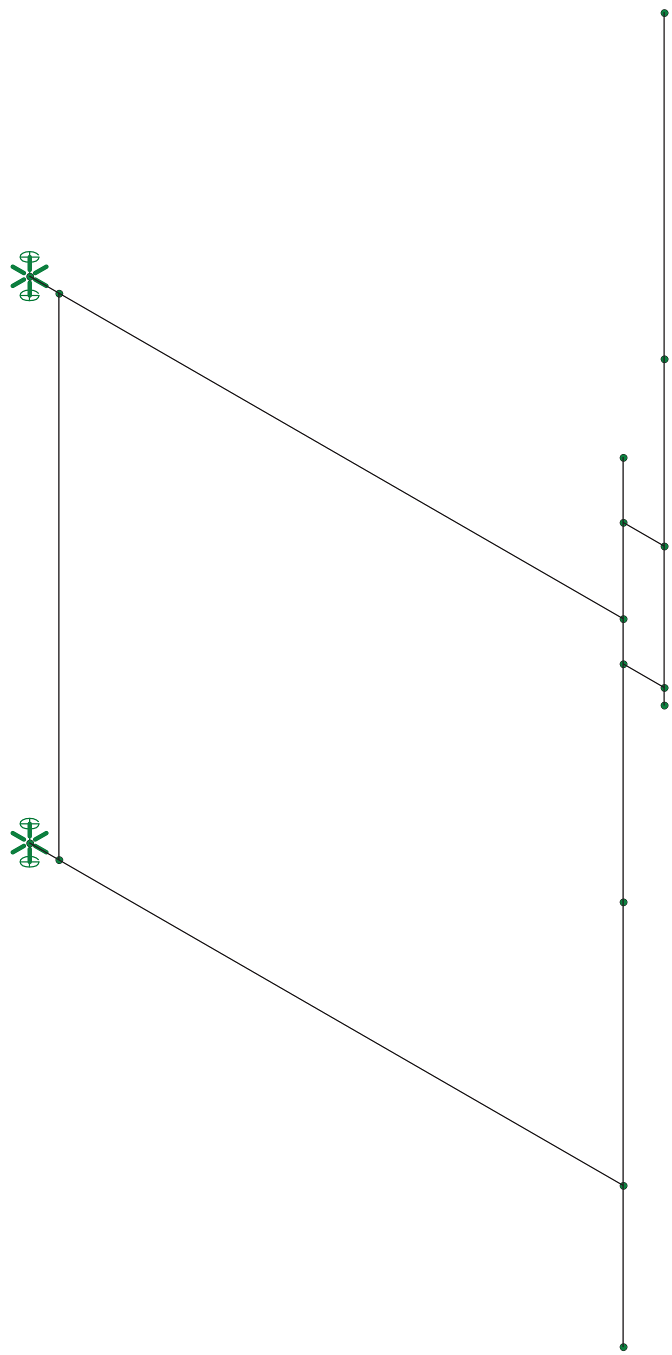
Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Arm: HSS3X3X3	0.70	0.70	2	0.70	9.98
Bracing: Pipe 2.0 Std	0.65		1.2	0.65	5.55
Mount Pipe: Pipe 3.0 Std	0.75		1.2	0.75	6.35

APPENDIX 2:
RISA PRINTOUTS

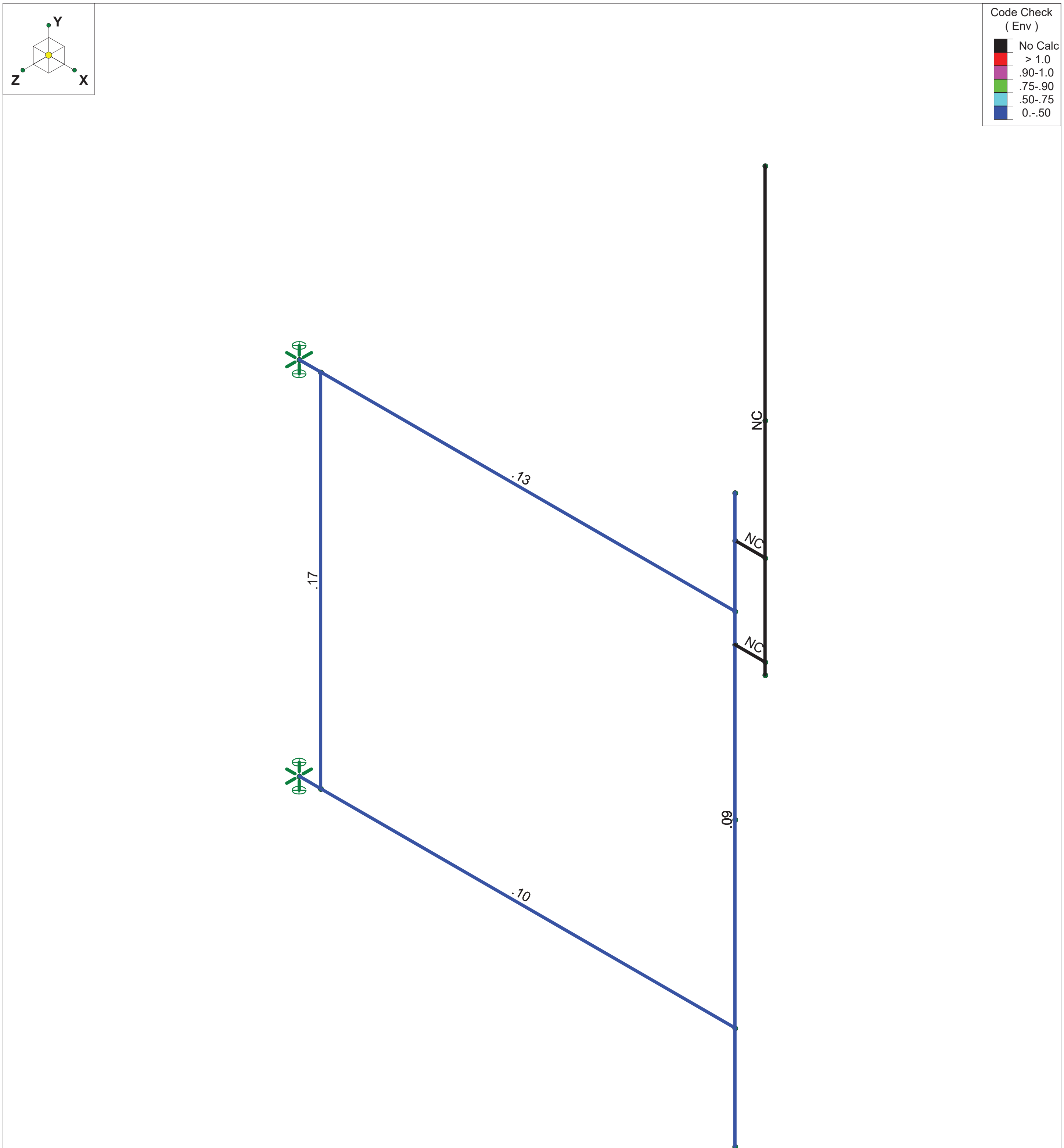


Black & Veatch	THOMPSONCSP USF-4U Model	SK - 1
Shaun Donley		Aug 16, 2021 at 12:37 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



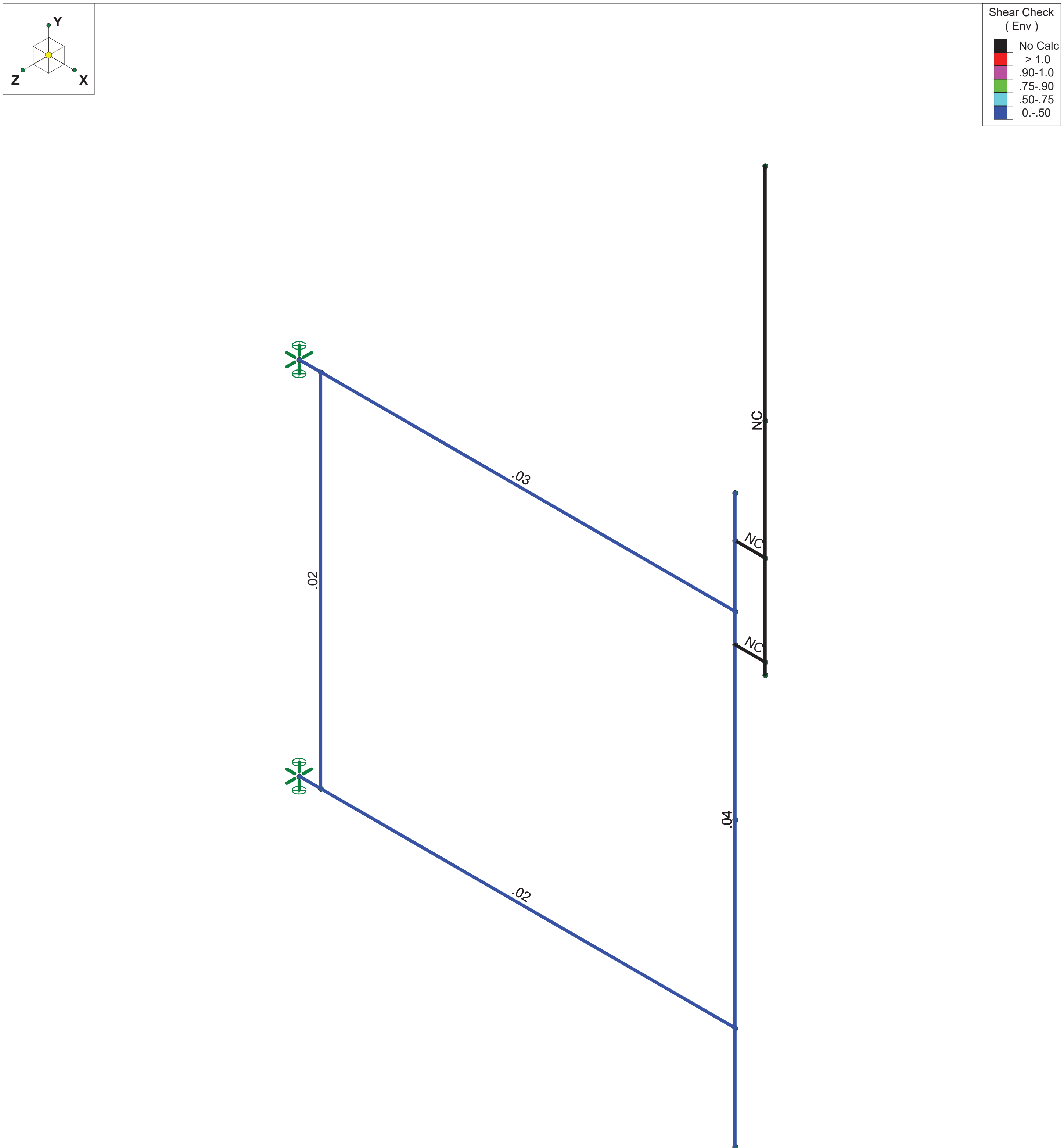


Black & Veatch	THOMPSONCSP USF-4U Model	SK - 2
Shaun Donley		Aug 16, 2021 at 12:38 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



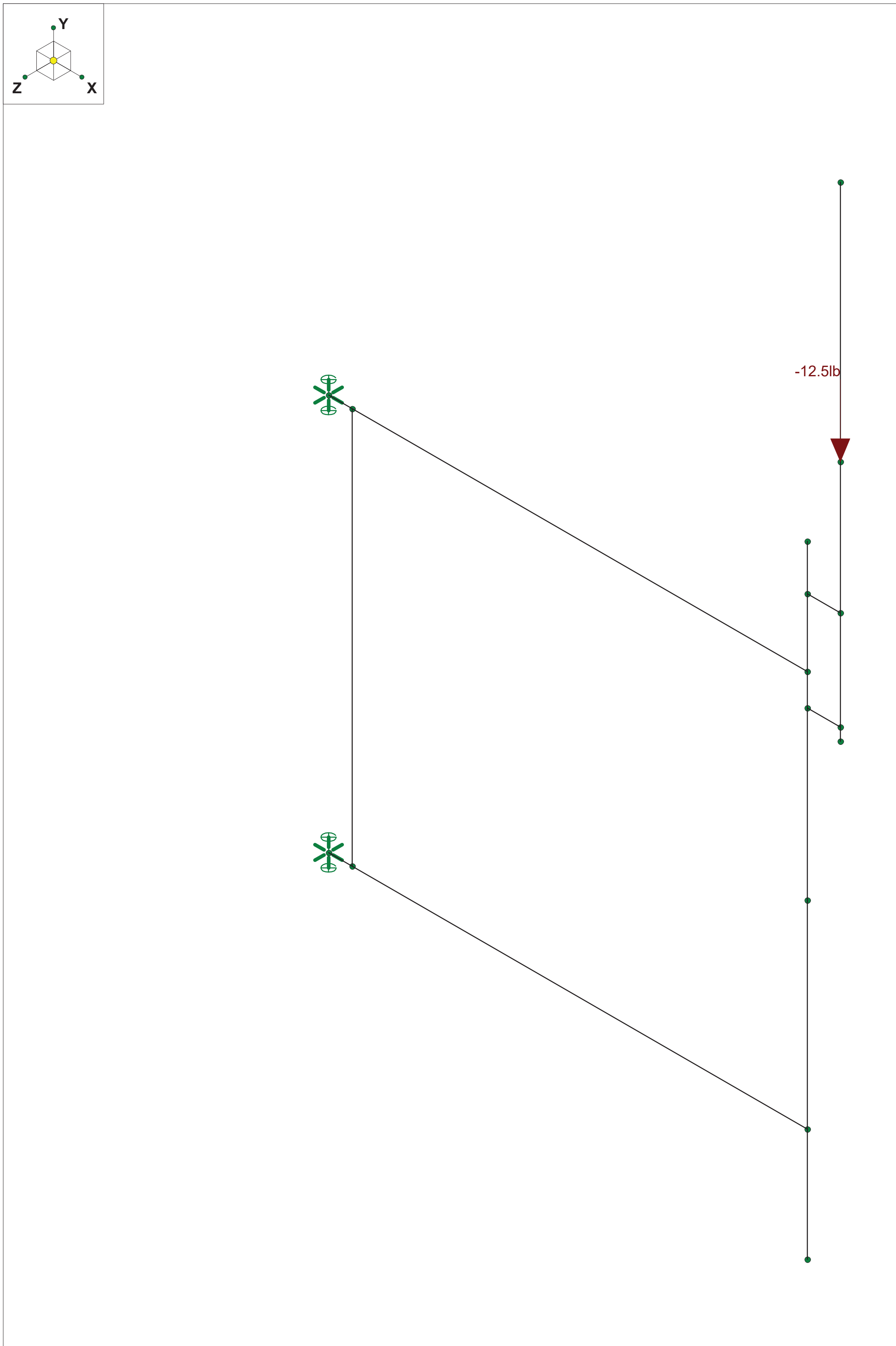
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 3
Shaun Donley		Aug 16, 2021 at 12:39 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 4
Shaun Donley		Aug 16, 2021 at 12:39 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch	THOMPSONCSP USF-4U Model	SK - 5
Shaun Donley		Aug 16, 2021 at 12:40 PM
405025.3022.2200		405025.3022.2200 Risa Model.r3d

(Global) Model Settings

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

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

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	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 R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Arm	HSS3X3X3	Beam	SquareTube	A53 Gr.B	Typical	1.89	2.46	2.46	4.03
2	Bracing	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	Mount Pipe	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69

General Material Properties

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

Joint Boundary Conditions

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

Member Primary Data

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

Member Advanced Data

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

Hot Rolled Steel Design Parameters

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

Basic Load Cases

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

Basic Load Cases (Continued)

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

Load Combinations

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

Load Combinations (Continued)

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

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	288.513	2	310.985	38	297.152	5	0	43	656.451	11	0	43
2		min	-610.651	38	-20.698	2	-297.152	11	0	2	-656.451	5	0	2
3	N3	max	555.139	17	311.915	32	122.811	5	0	43	385.621	11	0	43
4		min	10.189	8	-18.194	8	-122.811	11	0	2	-385.621	5	0	2
5	Totals:	max	482.284	2	580.241	38	419.963	5						
6		min	-482.285	8	123.244	2	-419.963	11						

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

	Member	Shape	Code Check	Loc[in]	LC	Shea...	Loc...	...	L...	phi*Pn...	phi*Pn...	phi*Mn...	phi*Mn...	...	Eqn
1	M1	HSS3X3X3	.128	0	11	.028	2.266	z	11	55265....	59535	5171.25	5171.25	2...	H1-1b
2	M2	HSS3X3X3	.100	43.5	17	.019	0	y	32	55265....	59535	5171.25	5171.25	2...	H1-1b
3	M3	PIPE_2.0	.172	0	17	.022	0		39	28843....	32130	1871.6...	1871.6...	2...	H1-1b
4	M4	PIPE_3.0	.087	45.906	17	.038	10....		17	57908....	65205	5748.75	5748.75	1...	H1-1b

APPENDIX 3:
ATTACHMENTS

EVERSOURCE ENERGY

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) OMNI/WHIP ANTENNA AT ELEVATION 159'–1 1/2" AGL AND INSTALL (1) NEW DIPOLE ANTENNA AT ELEVATION 135'–9"± AGL INSTEAD OF (1) OMNI/WHIP ANTENNA AT ELEVATION 136'–1 1/2± AGL AT A LATER DATE
2. REMOVE (2) EXISTING ANTENNAS AND THEIR ASSOCIATED COAX, (1) AT ELEVATION 127'–0"± AGL AND (1) AT ELEVATION 47'–0"± AGL
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM

GOVERNING CODES

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

GENERAL NOTES

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

SITE INFORMATION

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

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

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

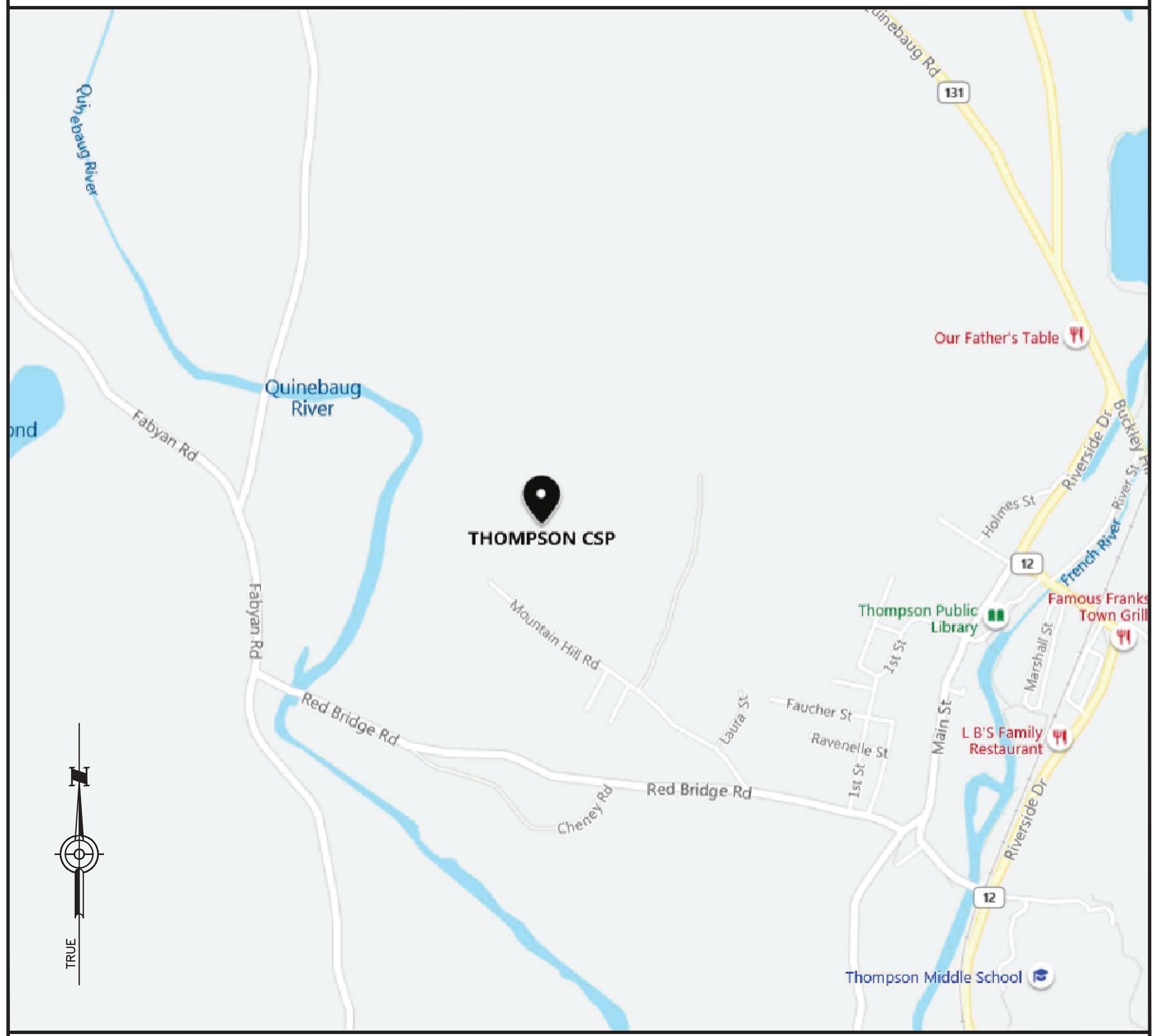
EVERSOURCE ENERGY PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
SELF–SUPPORT TOWER

DRAWING INDEX

DO NOT SCALE DRAWINGS

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

UNDERGROUND SERVICE ALERT

UTILITIES PROTECTION CENTER, INC.

811

48 HOURS BEFORE YOU DIG

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

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–2522

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

REV	DATE	DESCRIPTION
1	07/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

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

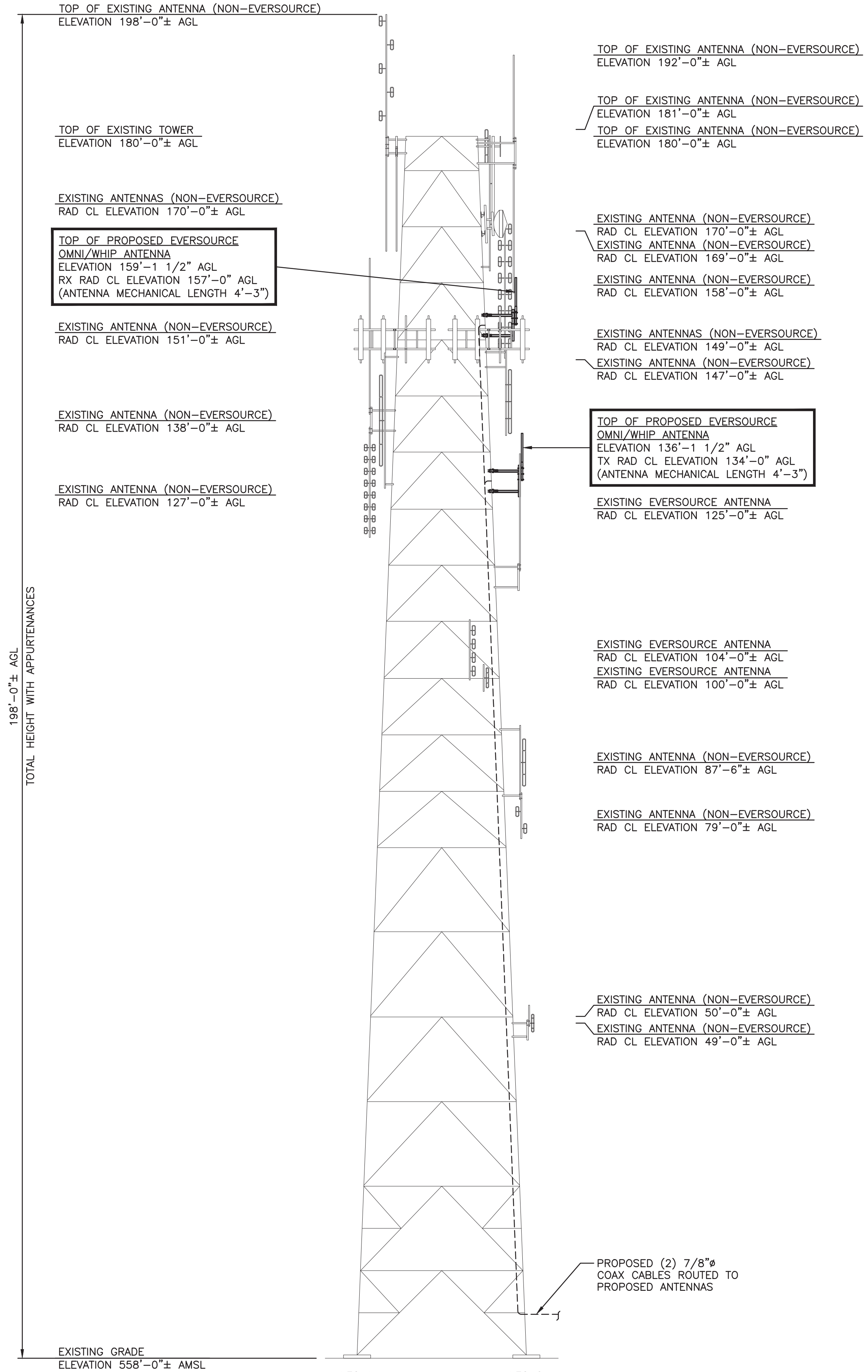
THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE

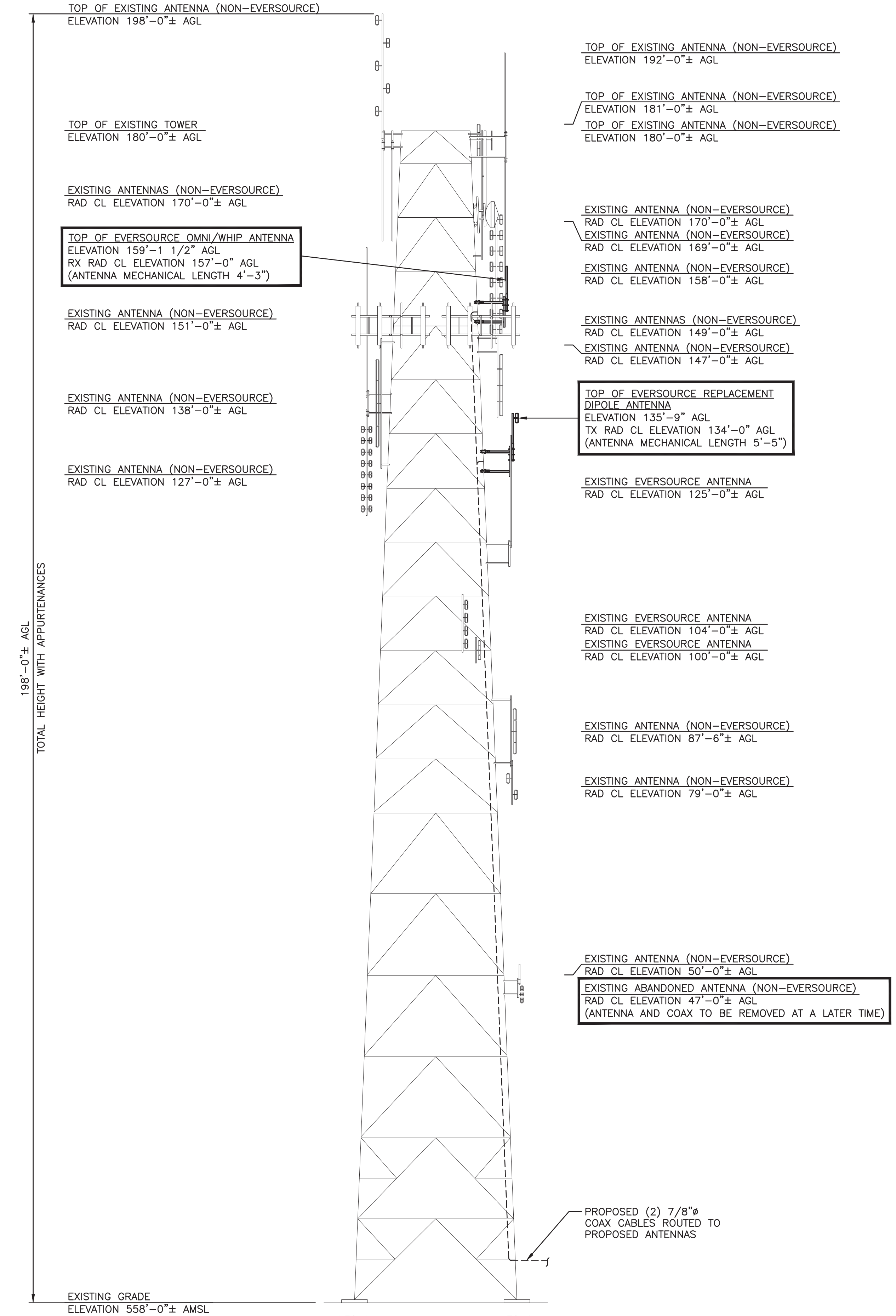
TITLE SHEET

SHEET NUMBER

T-1



CSC SUBMITTED INSTALLATION CONFIGURATION
NO SCALE



CURRENT INSTALLATION CONFIGURATION
NO SCALE

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

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

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

REV	DATE	DESCRIPTION
1	07/13/21	ISSUED FOR FILING
0	12/16/20	ISSUED FOR FILING

THOMPSON CSP
97 MOUNTAIN HILL ROAD
THOMPSON, CT 06255

SHEET TITLE
TOWER ELEVATION & ANTENNA EQUIPMENT

SHEET NUMBER
C-2

TELEWAVE, INC.

195 - 260 MHz

ORIGINAL RECIEVE (RX) ANTENNA, UNCHANGED

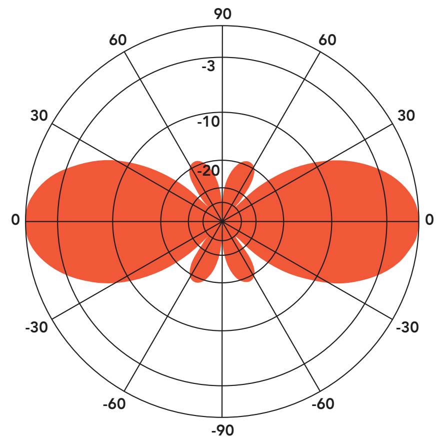
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

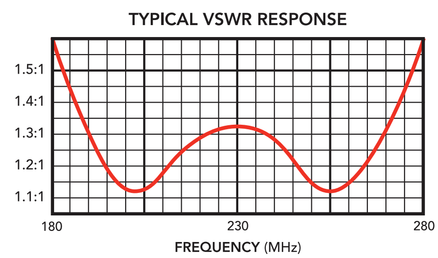
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

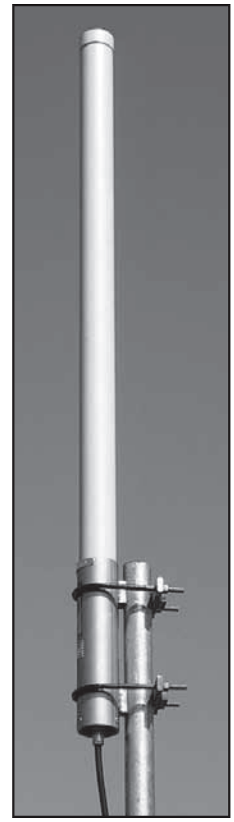
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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

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



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd





SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

TRANSMIT (TX) REPLACEMENT ANTENNA

870 Series 220MHz Exposed Dipoles

The 870 Series 220MHz Exposed Dipoles are available in 1, 2, 4, 8 dipole configurations. All our antennas can be completely customized to your particular applications. Our antennas can be black anodized, adjustable, or fixed, side mount or top mount, and heavy-duty versions are available.

- Each antenna is offered in a 1/4, 3/8 or 1/2 wave spacing versions.
- The 87XA-70 has external cabling and a field-adjustable pattern.
- The 87XF-70 has internal cabling and fixed dipole-mast spacing.
- Heavy-duty versions are available. Please contact our Technical Support team for consultation.

Electrical Specifications	871F-70-2	872F-70-2	874F-70-2
Frequency Range, MHz	215-225	215-225	215-225
Nominal Gain, dBd	2.0-2.5	5.0-5.5	8.0-8.5
Number of Dipoles	1	2	4
Bandwidth 1.5:1 VSWR, MHz	10	10	10
Polarization	Vertical	Vertical	Vertical
Pattern	Offset / bi	Offset / bi	Offset / bi
Power Rating, Watts	200	300	500
Nominal Impedance, Ohms	50	50	50
Lightning Protection	DC Ground	DC Ground	DC Ground
Standard Termination	Type DIN Male	Type N Male	Type N Male
Mechanical Specifications	**871F-70-2**	**872F-70-2**	**874F-70-2**
Length, in (mm)	66 (1676)	112 (2845)	200 (5080)
Width (1/2 Wave Spacing), in (mm)	31 (787)	31 (787)	32 (813)
Weight, lbs. (kg)	12.5 (5.7)	21 (9.5)	51 (23)
Rated Wind Velocity, No Ice, mph (km/h)	165 (266)	150 (241)	145 (233)
Rated Wind Velocity, 0.5" (13mm) ice, mph (km/h)	140 (225)	130 (209)	105 (177)
Lateral Thrust @ 100 mph, wind, lbs. (kg)	40 (18)	66 (30)	143 (65)
Bending Moment @ top clamp: 100 mph, ft.*lb (kg*m)	58 (8)	150 (21)	610 (84)
Projected Area, ft^2 (m^2)	1.5 (0.14)	2.6 (0.24)	5.5 (0.51)
Mounting Information Mast O.D. (mm)	1.9" (48)	1.9" (48)	2.4" (60)

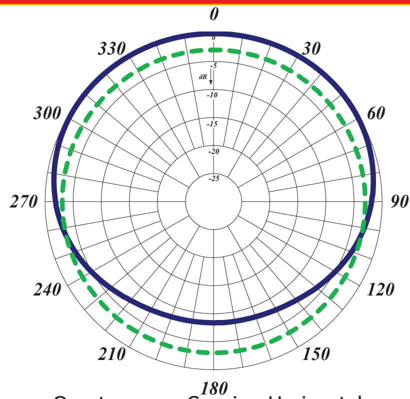
* See next page for ordering information (page 3) *


871F-70-2

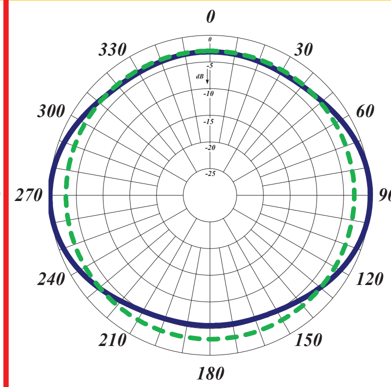
COMPROD Simplifying RF Solutions
Tel: US 1.877.825.2007 / CAN 1.800.603.1454
www.comprodcom.com
Email: sales@comprodcom.com
Fax: 1.800.554.1033

220MHz EXPOSED DIPOLES — 215-225 MHz

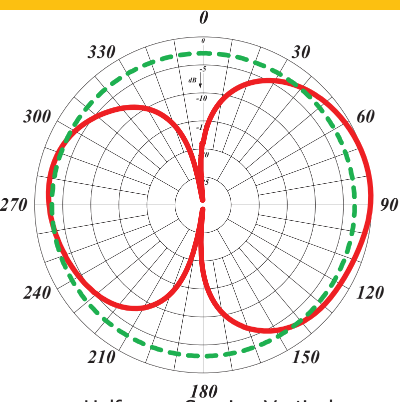

871F-70-2



Quarter-wave Spacing Horizontal

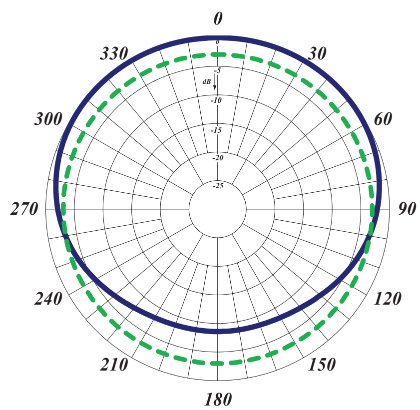


Half-wave Spacing Horizontal

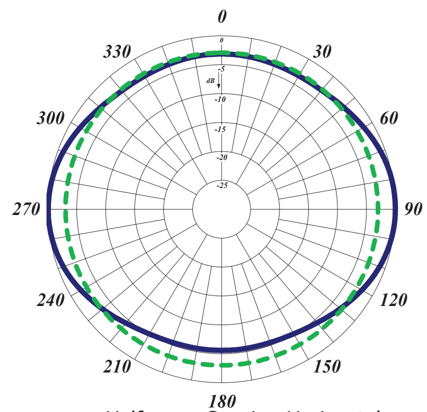


Half-wave Spacing Vertical

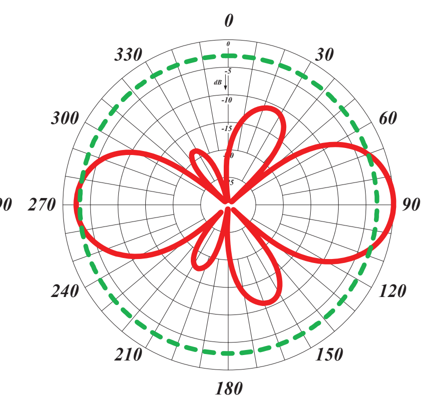

872F-70-2



Quarter-wave Spacing Horizontal

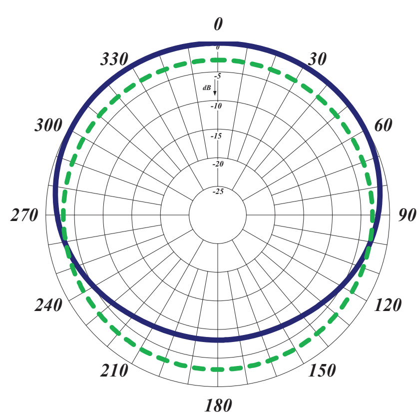


Half-wave Spacing Horizontal

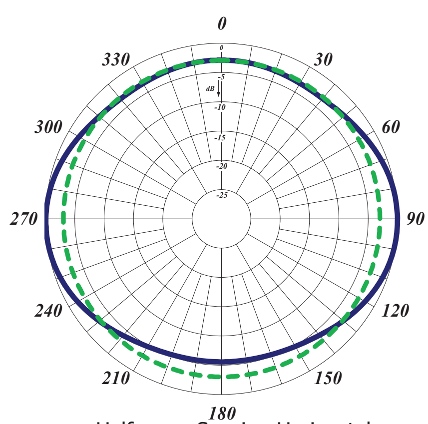


Half-wave Spacing Vertical

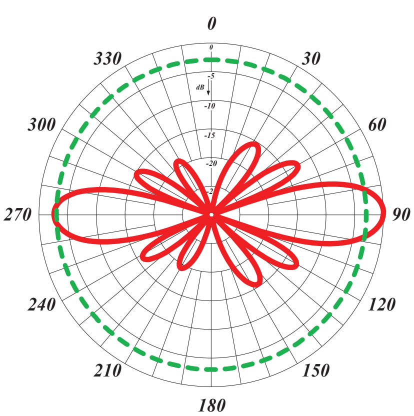

874F-70-2



Quarter-wave Spacing Horizontal



Half-wave Spacing Horizontal



Half-wave Spacing Vertical

Tel: US 1.877.825.2007 / CAN 1.800.603.1454
Email: sales@comprodcom.com
Fax: 1.800.554.1033

TELEWAVE, INC.

195 - 260 MHz

ORIGINAL TRANSMIT (TX) ANTENNA, REMOVED AND REPLACED

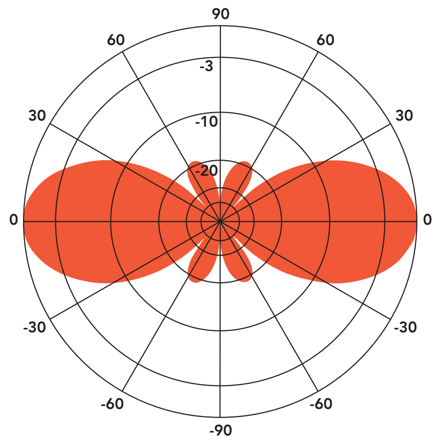
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

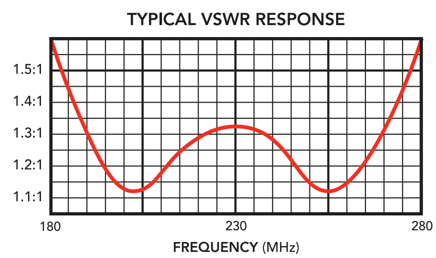
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

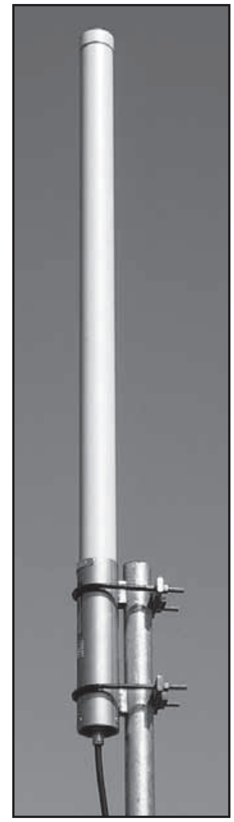
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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

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



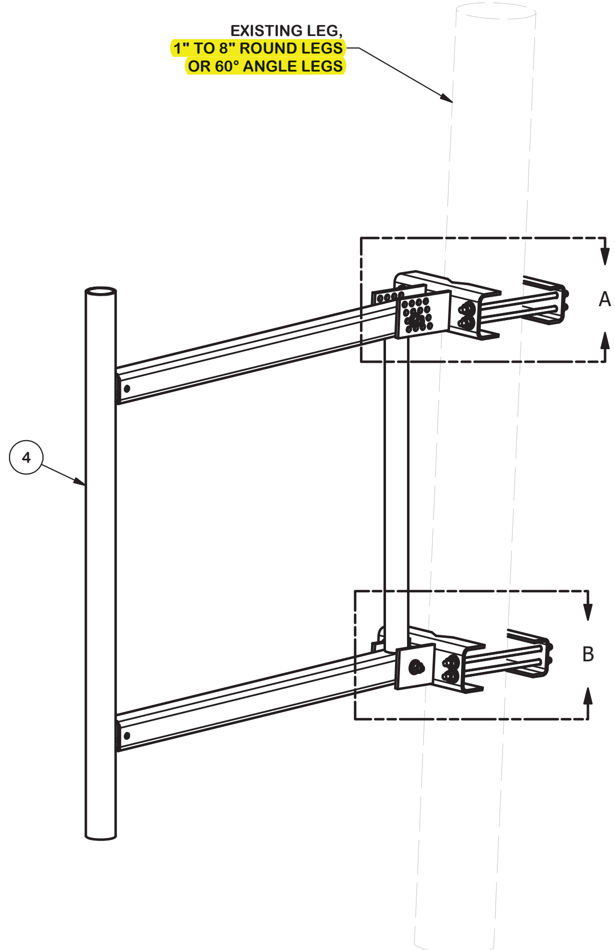
ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd

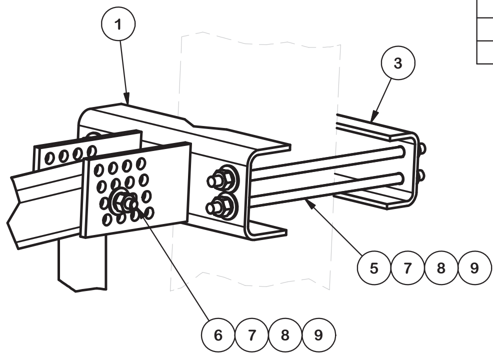




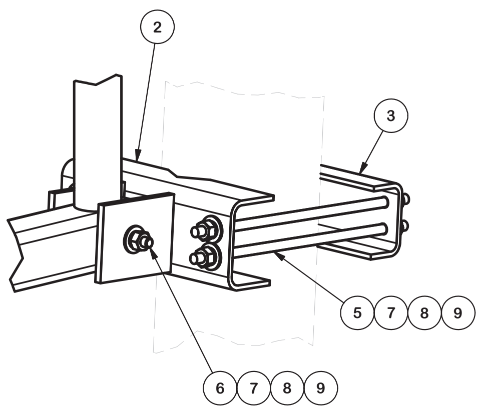
SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.²
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

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

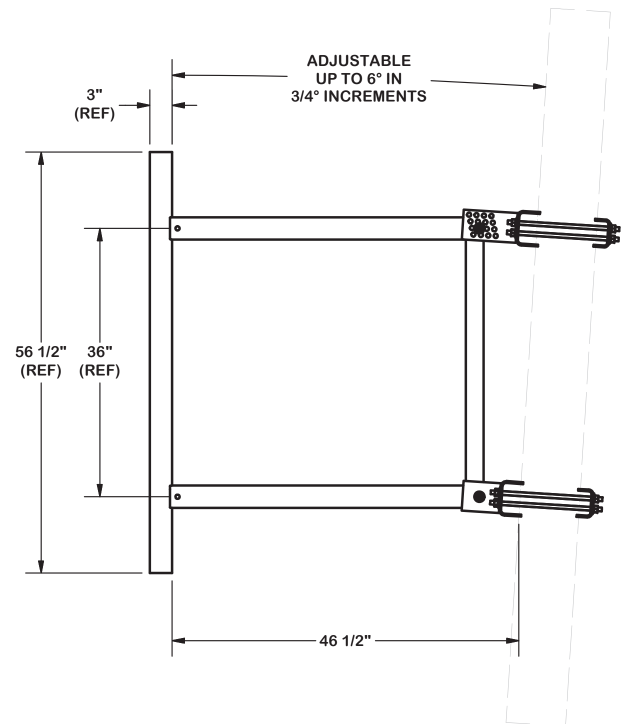




DETAIL A



DETAIL B



PARTS LIST

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

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 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.
		RCH 2/4/2011		USF-4U
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 2/16/2011	USF-4U

ATTACHMENT C – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 98'–4"± AGL INSTEAD OF (2) OMNI/WHIP ANTENNAS, (1) AT ELEVATION 97'–0"± AGL AND (1) AT ELEVATION 82'–0"± AGL
2. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING SHELTER

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:	RIDGEFIELD 22N
SITE ID NUMBER:	#F150054
SITE ADDRESS:	1 PROSPECT STREET RIDGEFIELD, CT 06877
MAP:	F15
LOT:	054
ZONE:	RAA
LATITUDE:	41° 17' 0.59" N
LONGITUDE:	73° 29' 16.27" W
ELEVATION:	666'± AMSL
FEMA/FIRM DESIGNATION:	X
ACREAGE:	2.3± AC (BOOK: 0178, PAGE: 0079)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

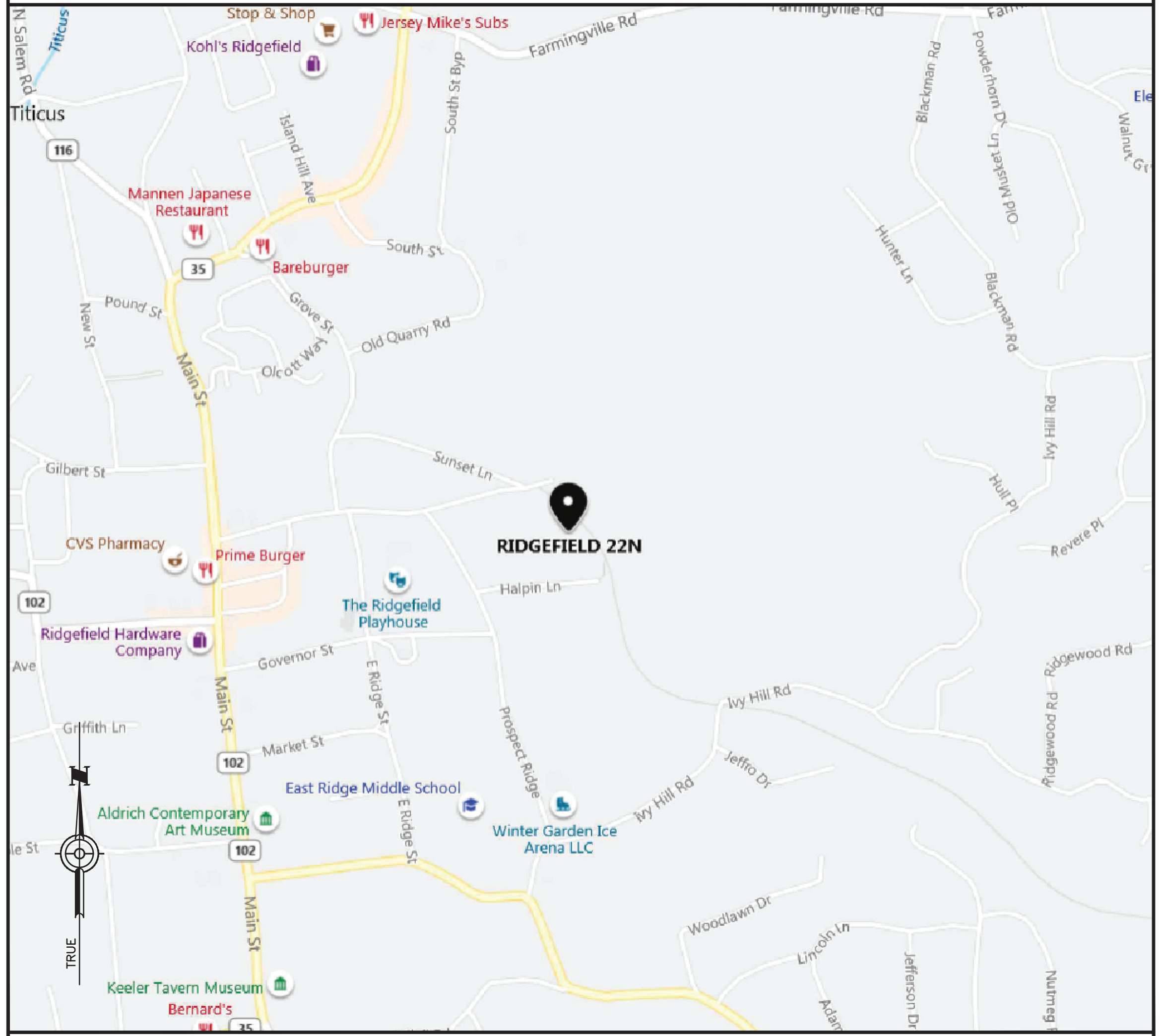
EVERSOURCE ENERGY PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

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
MONOPOLE

DRAWING INDEX

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

DO NOT SCALE DRAWINGS

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

UNDERGROUND SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811
48 HOURS BEFORE YOU DIG

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

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–3595

PROJECT NO:	403093
DRAWN BY:	TCG
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	08/13/21	ISSUED FOR FILING
0	03/26/20	ISSUED FOR FILING

STATE OF CONNECTICUT JOSHUA J. RILEY 33208 LICENSED PROFESSIONAL ENGINEER
08/17/2021

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

RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

SITE PLAN
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) 458-3595

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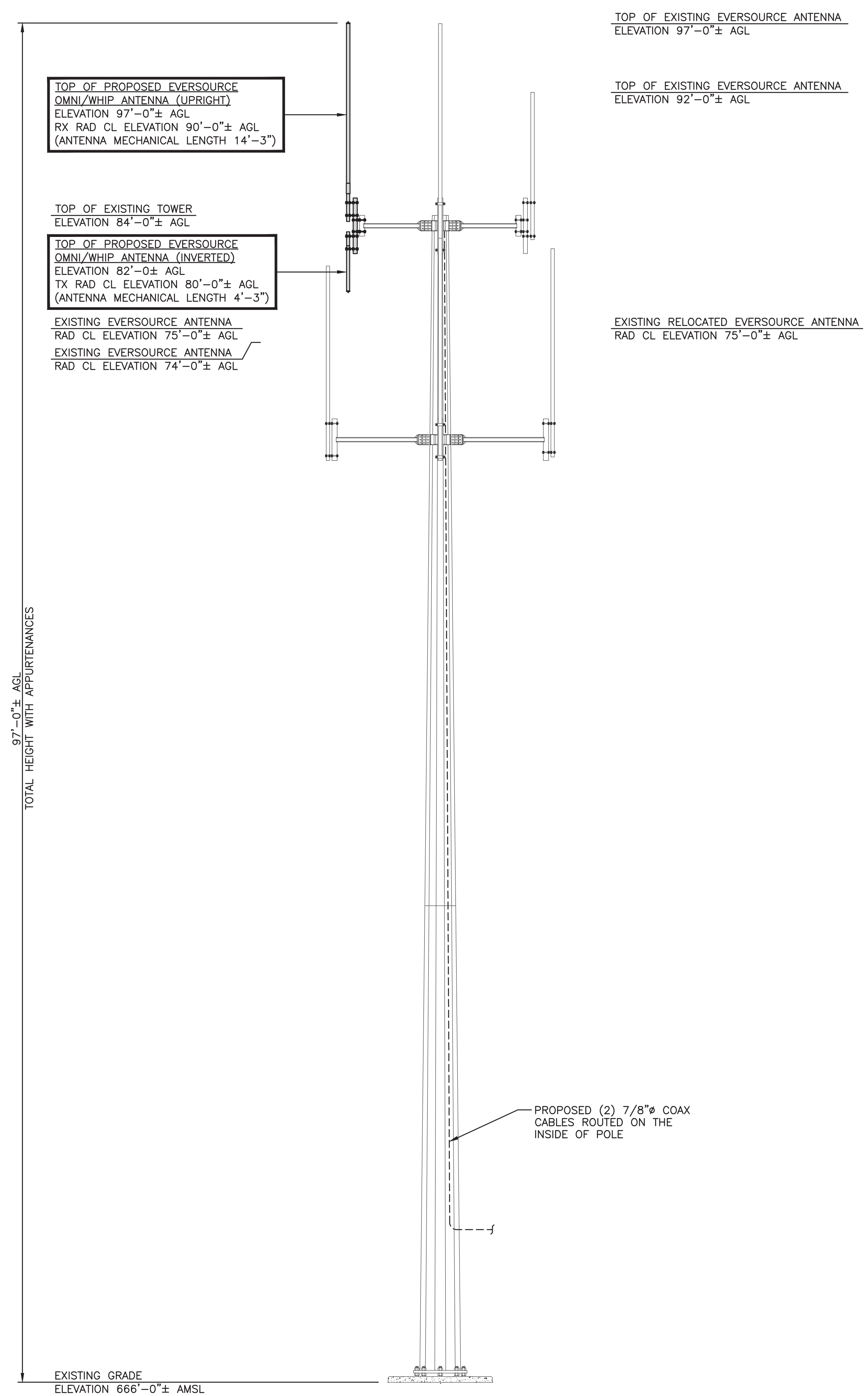
RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

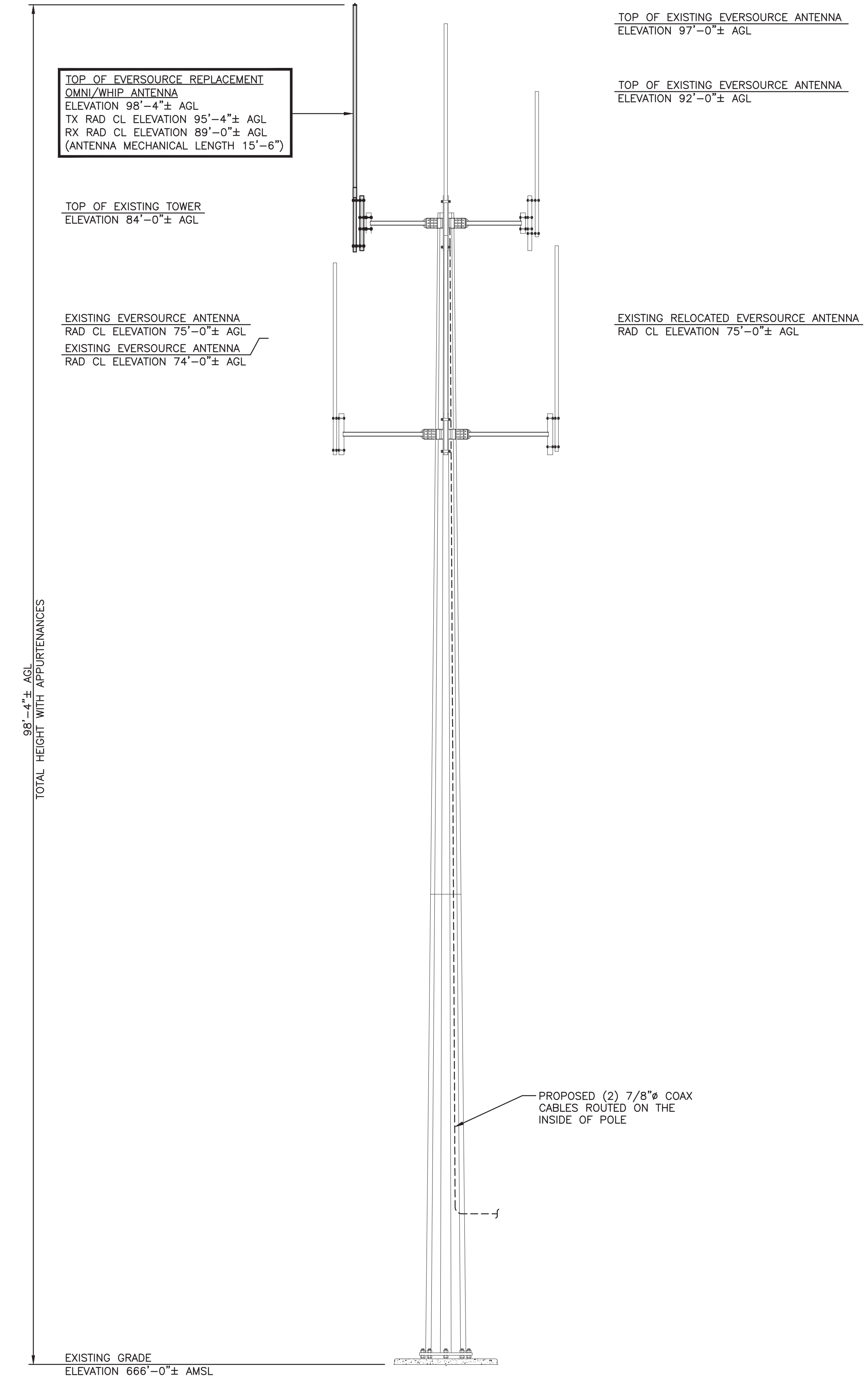
SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



CSC SUBMITTED INSTALLATION CONFIGURATION

NO SCALE



CURRENT INSTALLATION CONFIGURATION

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) 458-3595

PROJECT NO:	403093
DRAWN BY:	TCG
CHECKED BY:	JR

REV	DATE	DESCRIPTION
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STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER

08/17/2021

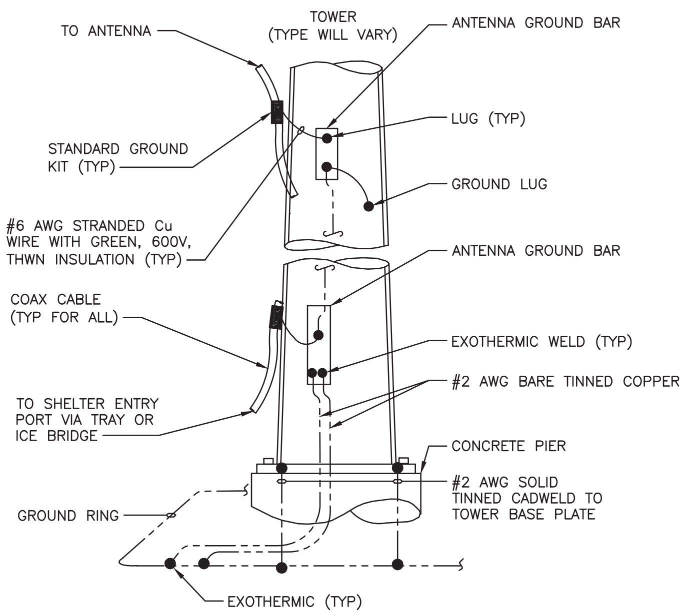
RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

SHEET TITLE

TOWER ELEVATION

SHEET NUMBER

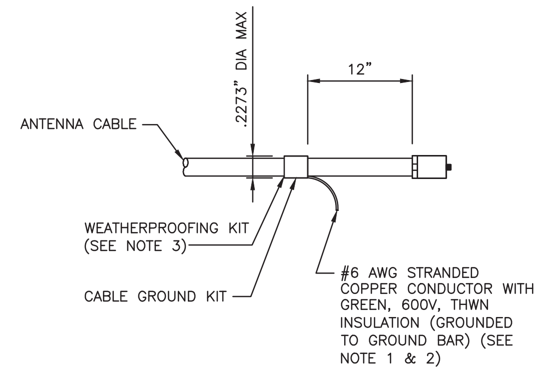
C-2



NOTE

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

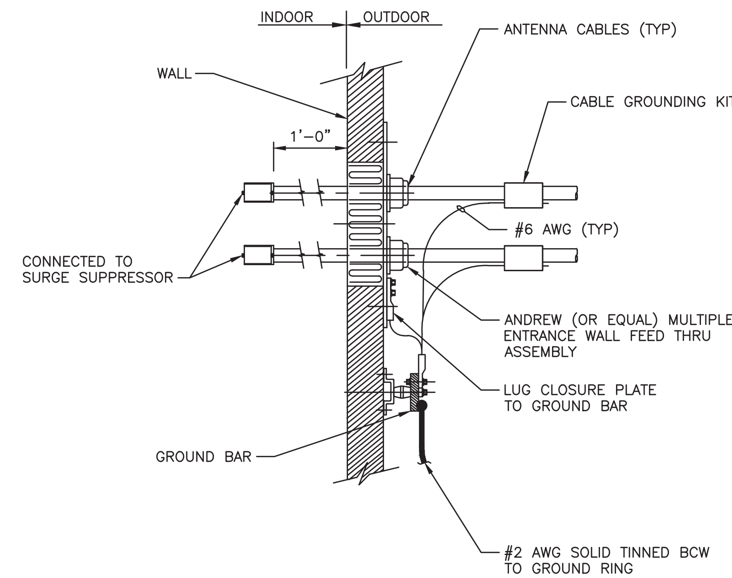
ANTENNA CABLE GROUNDING
NO SCALE



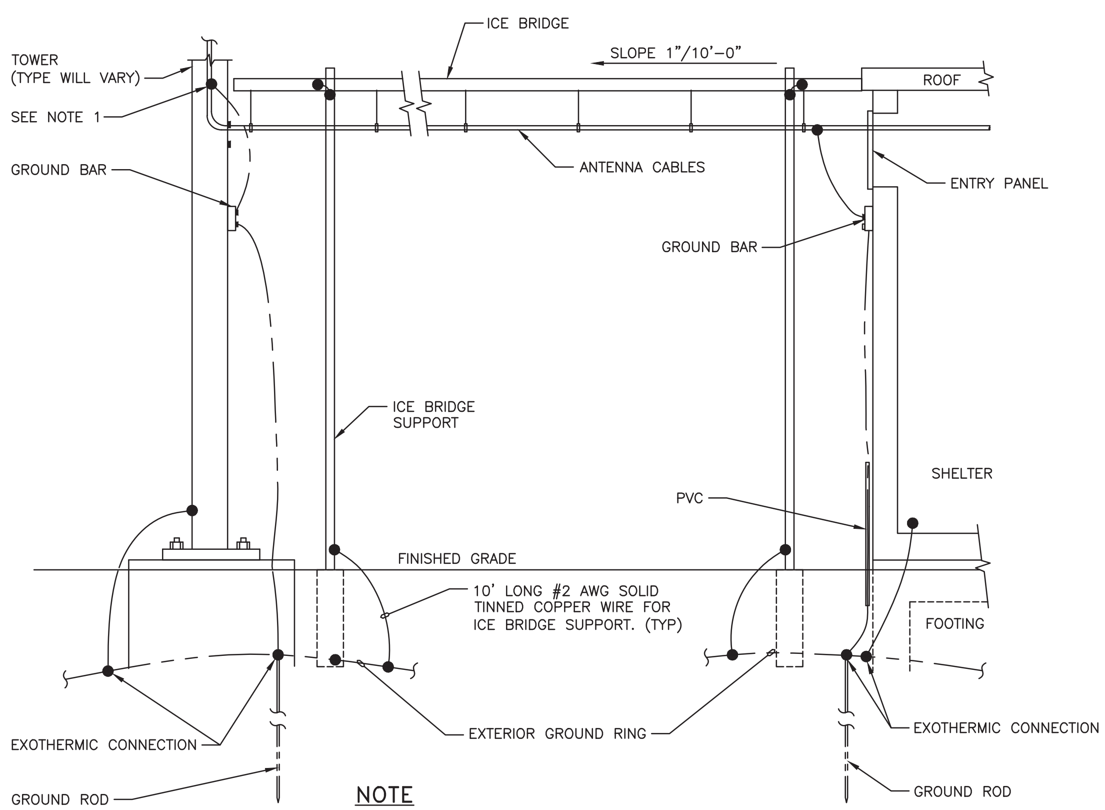
NOTES

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

CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE
NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY
NO SCALE



NOTE

1. PROVIDE GROUND KIT 6" BEFORE TURN

ICE BRIDGE AND ANTENNA CABLE DETAIL
NO SCALE

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

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO: 403093
DRAWN BY: TCG
CHECKED BY: JR

REV	DATE	DESCRIPTION
1	08/13/21	ISSUED FOR FILING
0	03/26/20	ISSUED FOR FILING

STATE OF CONNECTICUT
MARK P. STILES
34358
LICENSED
PROFESSIONAL ENGINEER
08/17/21

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

RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

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
BOLTS:	ASTM A325
GRATING:	TYPE GW-2 (1"x3/16" BARS)
MISC. MATERIAL:	ASTM A36

ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.

2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.
3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.
4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.
5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.
6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

SITE GENERAL

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

EVERSOURCE ENERGY

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PROJECT NO:	403093
DRAWN BY:	TCG
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	08/13/21	ISSUED FOR FILING
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08/17/2021

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

RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

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.

12. GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.

13. COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.

14. THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.

15. ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.

16. CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE—INS.

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. 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).

4. 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.

5. 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.

6. 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.

7. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.

8. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.

9. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2—HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.

10. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.

11. 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.

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.

EVERSOURCE ENERGY
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STATE OF CONNECTICUT
MARK P. STILES
34358
LICENSED
PROFESSIONAL ENGINEER
08/17/21

RIDGEFIELD 22N
1 PROSPECT STREET
RIDGEFIELD, CT 06877

SHEET TITLE
NOTES & SPECIFICATIONS

SHEET NUMBER
N-2

SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
	5/8"øx10'-0" COPPER CLAD STEEL GROUND ROD.
	TEST GROUND ROD WITH INSPECTION SLEEVE
— - - —	GROUNDING CONDUCTOR
(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	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

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SHEET TITLE

NOTES & SPECIFICATIONS

SHEET NUMBER

N-3

REPLACEMENT ANTENNA

dbSpectra
Always a Better Value

220 MHz Antenna – Omnidirectional, Low-PIM/Hi-PIP, Unity Gain
Models - SP2D00P36D-D

Specifications	
Design Type	True Corporate Feed
Frequency Range	217-220 MHz
Passive Intermodulation – PIM (2 x 20W sources)	-150 dBc, 3rd Order
Bandwidth	3 MHz
Gain - dBd (average over BW)	0 dBd
Isolation, min.	40 dB
Configuration	Dual antenna
Beam Tilt (electrical down-tilt)	None (0°)
Vertical Beamwidth (E-Plane)	60°
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	2.59 sq. ft.
Lateral Wind-load Thrust @100mph	109 lbf.
Wind Speed rating	160 mph (without ice) 136 mph (½" radial ice)
Total Length	15.6 feet
Mounting Mast Length	35 inches
Mounting Hardware (Included)	DSH3V4N
Top Sway Brace (Recommended if side mounting antennas)	DSH2H3S (order separately)
Mast O.D.	3.5 inches
Radome color	Horizon Blue
Radome O.D.	3.0 inches
Weight, antenna, and hardware	45 lbs. (approx.)
Shipping Weight	80 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.

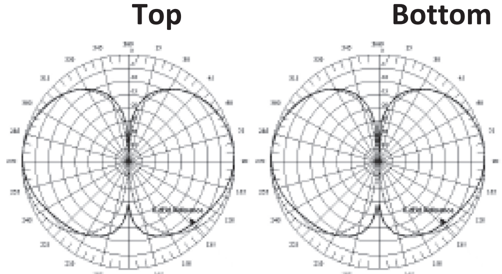
Sturdy Construction – Heavy-wall fiberglass radome minimizes tip deflection.

Excellent Lightning Protection – heavy internal conductor DC ground.

Radiation Pattern

Vertical (No-Tilt)

Top **Bottom**



TELEWAVE, INC.

216 - 225 MHz

REMOVED AND REPLACED

ANT220F6 DIN

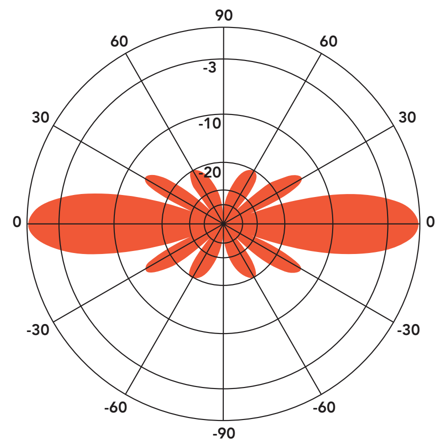
FIBERGLASS COLLINEAR ANTENNA 6 dBd

The Telewave ANT220F6 is an extremely rugged, medium-gain, fiberglass collinear antenna, designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, connected at DC ground potential for lightning impulse protection. The ANT220F6 is an excellent choice for wireless PTC systems in urban or rural areas.

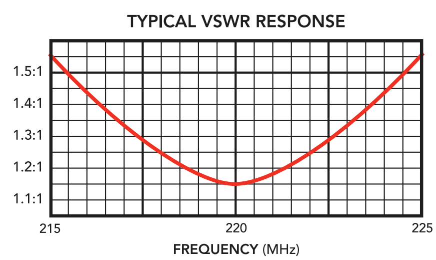
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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

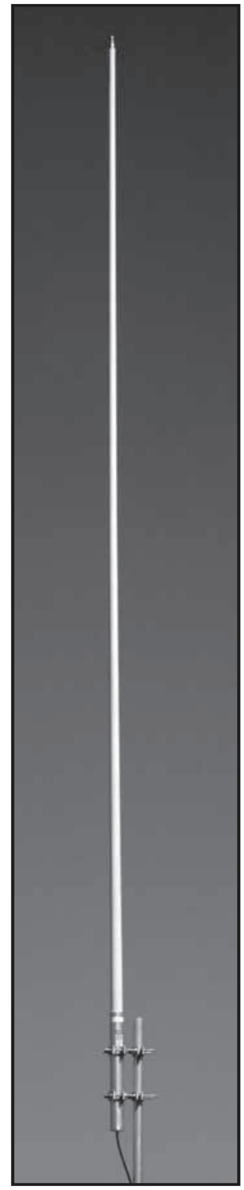
The ANT220F6 includes an ANTC482 dual clamp set for mounting to a 1.5" to 3.5" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper. Stand-off and top mounts are also available.

NOTE: THIS ANTENNA IS SHIPPED VIA TRUCK FREIGHT ONLY



ANT220F6 - 221 MHz
Vertical Plane
Gain = 6.11 dBd





SPECIFICATIONS			
Frequency (continuous)	216-225 MHz	**Dimensions (L x base diam.) in.**	171 x 2.75
Gain	6 dBd	**Tower weight (antenna + clamps)**	35 lb.
Power rating (typ.)	500 watts	**Shipping weight**	50 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	150 / 125 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	3.1 ft.^{2}
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	122 lb.
Vertical beamwidth	20°	**Bending moment at top clamp**	494 ft. lb.
Termination	7-16 DIN-F	**(100 MPH, 40 PSF flat plate equiv.)**	

TELEWAVE, INC.

REMOVED AND REPLACED

195 - 260 MHz

ANT220F2-I w/DIN CONNECTOR to be used for the inverted antenna.

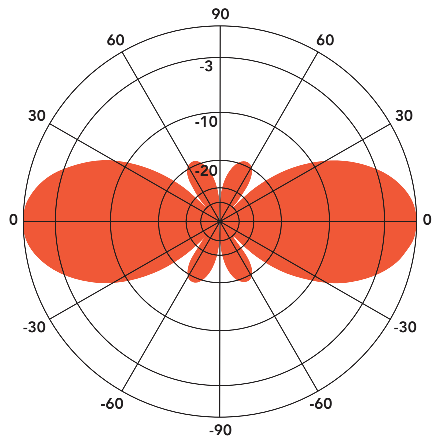
ANT220F2

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

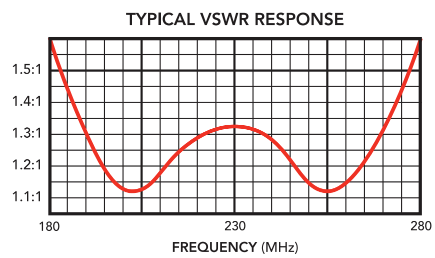
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential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

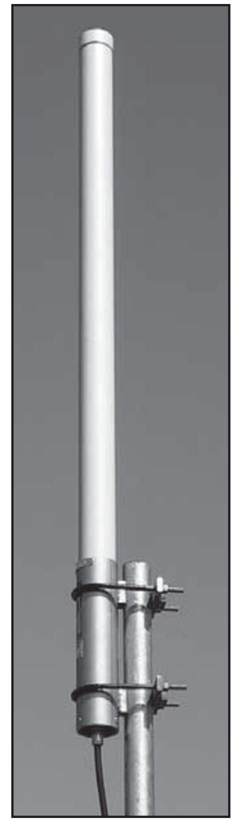
All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray,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

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



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd





SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	**Dimensions (L x base diam.) in.**	51 x 2.75
Gain	2.5 dBd	**Tower weight (antenna + clamps)**	11 lb.
Power rating (typ.)	500 watts	**Shipping weight**	14 lb.
Impedance	50 ohms	**Wind rating / with 0.5" ice**	200 / 150 MPH
VSWR	1.5:1 or less	**Maximum exposed area**	1.1 ft.^{2}
Pattern	Omnidirectional	**Lateral thrust at 100 MPH**	44 lb.
Vertical beamwidth	38°	**Bending moment at top clamp**	47 ft. lb.
Termination	Recessed N Female 7-16 DIN-F opt.	**(100 MPH, 40 PSF flat plate equiv.)**	

ATTACHMENT D – STRUCTURAL ANALYSIS REPORT

Date: **July 29, 2021**

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

Subject:	**Structural Analysis Report**	
Eversource Designation:	**Site Number:** **Site Name:**	ES-286 Ridgefield22N
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	405025
Site Data:	**Off Prospect Street, Ridgefield, Fairfield County, CT** **Latitude *41° 17′ 0.59″*, Longitude *-73° 29′ 16.27″*** **84 Foot - Monopole 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:

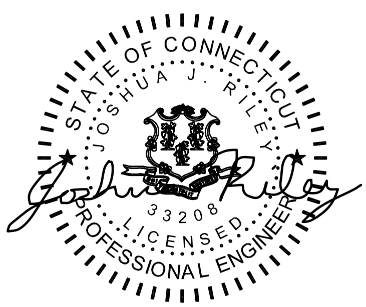
LC1: Proposed Equipment Configuration **Sufficient Capacity – 53.4%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 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: Anthony Reyes / Joshua J. Riley

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer



07/29/2021

TABLE OF CONTENTS

1) INTRODUCTION

This tower is an 84 ft Monopole tower designed by Valmont in July of 2012.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	125 mph ultimate
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.229
Seismic S_1:	0.068
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
83.0	90.67	1	dbspecta	SP2D00P36D-D	2	7/8	1
	83.0	1	generic	4'x3" Mount Pipe			

Note:
1) Proposed equipment to be installed on existing relocated antenna's original antenna mount at 83.0ft Mounting Level.

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
83.0	90.0	1	kreco	CO-41A	2	7/8	1
	88.0	1	commscope	DB589-Y			
	83.0	1	tower mounts	Side Arm Mount [4' SO 701-3]			
67.0	74.0	1	celwave	1151-3	1	7/8	2
		1	kreco	CO-41A	2	7/8	1
	73.0	1	kreco	CO-41A			
	67.0	1	tower mounts	Side Arm Mount [6' SO 701-3]			

Note:
1) Existing equipment
2) Existing equipment to be relocated from 83.0ft Mounting Level to empty antenna mount on 67.0ft Mounting Level.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C., dated 06/14/2012	-	Eversource
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont, dated 7/27/2012	-	Eversource

Document	Remarks	Reference	Source
TOWER MANUFACTURER DRAWINGS	Valmont, dated 7/27/2012	-	Eversource

3.1) Analysis Method

tnxTower (version 8.1.1.0), 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 provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading, tower/foundation details, and geotechnical data.

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 5 - Tower Component Stresses vs. Capacity - LC1

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	84 - 34.25	Pole	TP18.145x12.001x0.1875	1	-2.07	639.52	37.8	Pass
L2	34.25 - 0	Pole	TP22x17.3069x0.2188	2	-4.62	928.93	53.4	Pass
							Summary	
						Pole (L2)	53.4	Pass
						Rating =	53.4	Pass

Table 4 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	52.1	Pass
	Base Plate		22.9	Pass
1	Base Foundation	0	34.7	Pass
	Base Foundation Soil Interaction		47.6	Pass

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.

Structure Rating (max from all components) =	53.4%

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 ft*	*Horz. Deflection in*	*Gov. Load Comb.*	*Tilt °*	*Twist °*	*Check**
L1	84 - 34.25	11.155	44	1.0486	0.0208	OK
L2	38 - 0	2.598	44	0.6092	0.0051	OK

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

1) Maximum Rotation = 4 Degrees

2) Maximum Deflection = 0.03 * Tower Height = 30 in.

Maximum Tower Deflections - Design Wind

Section No.	*Elevation ft*	*Horz. Deflection in*	*Gov. Load Comb.*	*Tilt °*	*Twist °*	*Combined Max*	*Check**
L1	84 - 34.25	28.84	44	2.6937	0.0543	2.694	OK**
L2	38 - 0	6.746	44	1.5807	0.0133	1.581	OK**

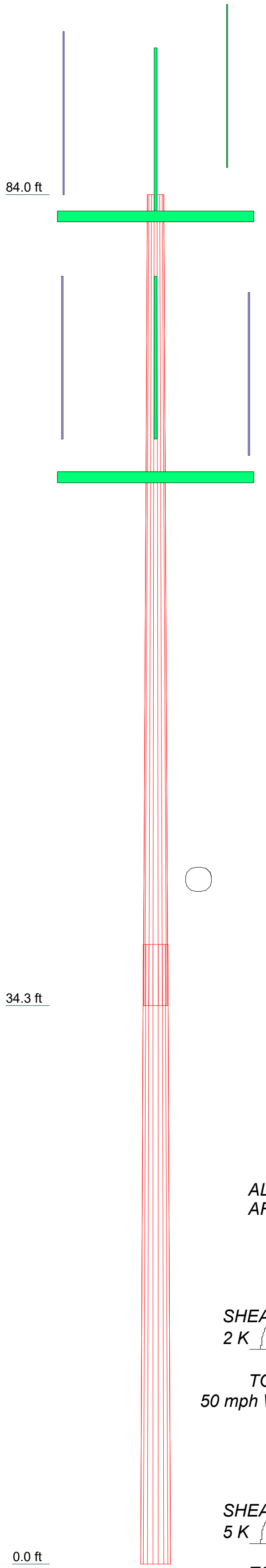
*Up to 0.5 degree is considered acceptable per SUB090 Section 7

** Deflection approved by Eversource Energy

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	49.75	18	0.1875	3.75	12.0010	18.1450	A572-65	1.5
2	38.00	18	0.2188		17.3069	22.0000		1.7
								3.2



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Side Arm Mount [4' SO 701-1]	83	3' x 2" Pipe Mount	67
3' x 2" Pipe Mount	83	3' x 2" Pipe Mount	67
3' x 2" Pipe Mount	83	3' x 2" Pipe Mount	67
3' x 2" Pipe Mount	83	CO-41A	67
DB589-Y	83	CO-41A	67
CO-41A	83	1151-3	67
SP2D00P36D-D	83	Side Arm Mount [6' SO 701-1]	67
4'x3" Mount Pipe	83		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 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: 53.4%

ALL REACTIONS ARE FACTORED

AXIAL 10 K
SHEAR 2 K
MOMENT 102 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 5 K
SHEAR 5 K
MOMENT 275 kip-ft
TORQUE 1 kip-ft
REACTIONS - 125 mph WIND

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FAX: (913) 458-8136

Job: ES-286 Ridgefield22N		
Project: 405025 (Ridgefield22N)		
Client: Eversource	Drawn by: Josh Riley	App'd:
Code: TIA-222-H	Date: 07/29/21	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Fairfield County, Connecticut.
- Tower base elevation above sea level: 666.00 ft.
- Basic wind speed of 125 mph.
- Risk Category III.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 1.0$, $K_{es}(t_i) = 1.0$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile

Include Bolts In Member Capacity

Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.

Autocalc Torque Arm Areas

Add IBC .6D+W Combination
Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	84.00-34.25	49.75	3.75	18	12.0010	18.1450	0.1875	0.7500	A572-65 (65 ksi)
L2	34.25-0.00	38.00		18	17.3069	22.0000	0.2188	0.8750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.1572	7.0305	123.9600	4.1938	6.0965	20.3329	248.0830	3.5159	1.7822	9.505
	18.3960	10.6870	435.3948	6.3749	9.2177	47.2349	871.3626	5.3445	2.8635	15.272
L2	18.0104	11.8645	437.6998	6.0663	8.7919	49.7845	875.9756	5.9334	2.6610	12.165
	22.3056	15.1230	906.4437	7.7323	11.1760	81.1063	1814.0801	7.5629	3.4870	15.941

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 84.00-34.25				1	1	1			
L2 34.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
miscl										
Safety Line 3/8	C	No	Surface Ar (CaAa)	84.00 - 10.00	1	1	0.000 0.010	0.3750		0.22

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
83									
LDF5-50A(7/8)	C	No	No	Inside Pole	83.00 - 0.00	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
66									
LDF5-50A(7/8)	C	No	No	Inside Pole	67.00 - 0.00	3	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
Proposed									
LDF5-50A(7/8)	A	No	No	Inside Pole	83.00 - 0.00	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33

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
L1	84.00-34.25	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.866	0.000	0.08
L2	34.25-0.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.909	0.000	0.06

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
L1	84.00-34.25	A	1.825	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	20.025	0.000	0.32
L2	34.25-0.00	A	1.614	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	9.761	0.000	0.18

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	84.00-34.25	-0.0031	0.2996	-0.0142	1.3545
L2	34.25-0.00	-0.0022	0.2081	-0.0112	1.0668

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8	34.25 - 84.00	1.0000	1.0000
L2	2	Safety Line 3/8	10.00 - 34.25	1.0000	1.0000

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
83									
Side Arm Mount [4' SO 701-1]	C	None		0.0000	83.00	No Ice	1.13	2.23	0.09
						1/2" Ice	1.52	3.12	0.11
						1" Ice	1.91	4.01	0.12
						2" Ice	2.68	5.80	0.16
3' x 2" Pipe Mount	A	From Face	6.00	0.0000	83.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	B	From Face	6.00	0.0000	83.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	C	From Face	6.00	0.0000	83.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
DB589-Y	C	From Face	6.00	0.0000	83.00	No Ice	1.38	1.38	0.01
			0.00			1/2" Ice	2.31	2.31	0.02
			5.00			1" Ice	3.27	3.27	0.04
						2" Ice	4.81	4.81	0.09
CO-41A	A	From Face	6.00	0.0000	83.00	No Ice	3.15	3.15	0.01
			0.00			1/2" Ice	4.38	4.38	0.04
			6.00			1" Ice	5.63	5.63	0.07
						2" Ice	7.77	7.77	0.15
Relocated to 67									
1151-3	C	From Face	6.00	0.0000	67.00	No Ice	4.18	4.18	0.02
			0.00			1/2" Ice	5.73	5.73	0.05
			7.00			1" Ice	7.30	7.30	0.09
						2" Ice	10.48	10.48	0.20
67									
Side Arm Mount [6' SO 701-1]	C	None		0.0000	67.00	No Ice	1.70	3.34	0.13
						1/2" Ice	2.28	4.68	0.16
						1" Ice	2.86	6.02	0.19
						2" Ice	4.02	8.70	0.24
3' x 2" Pipe Mount	A	From Face	6.00	0.0000	67.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	B	From Face	6.00	0.0000	67.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	C	From Face	6.00	0.0000	67.00	No Ice	0.58	0.58	0.01
			0.00			1/2" Ice	0.77	0.77	0.02
			0.00			1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
CO-41A	A	From Face	6.00	0.0000	67.00	No Ice	3.15	3.15	0.01
			0.00			1/2" Ice	4.38	4.38	0.04
			7.00			1" Ice	5.63	5.63	0.07
						2" Ice	7.77	7.77	0.15
CO-41A	B	From Face	6.00	0.0000	67.00	No Ice	3.15	3.15	0.01
			0.00			1/2"	4.38	4.38	0.04

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
			6.00			Ice 1" Ice 2" Ice	5.63 7.77	5.63 7.77	0.07 0.15
Proposed SP2D00P36D-D	B	From Leg	4.50 0.00 7.67	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.36 7.06 8.67 11.95	5.36 7.06 8.67 11.95	0.05 0.08 0.13 0.26
4'x3" Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.09 1.36 1.62 2.16	1.09 1.36 1.62 2.16	0.03 0.04 0.05 0.09
*** ***									

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
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

Comb. No.	Description
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
L1	84 - 34.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-5.51	-0.71	-1.51
			Max. Mx	8	-2.07	-108.95	-0.35
			Max. My	14	-2.07	-0.33	-108.97
			Max. Vy	8	3.55	-108.95	-0.35
			Max. Vx	14	3.55	-0.33	-108.97
			Max. Torque	19			1.15
L2	34.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.78	-0.73	-1.68
			Max. Mx	8	-4.62	-275.32	-0.37
			Max. My	14	-4.62	-0.34	-275.35
			Max. Vy	8	5.16	-275.32	-0.37
			Max. Vx	14	5.16	-0.34	-275.35
			Max. Torque	19			1.15

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	9.78	-0.00	-1.73
	Max. H_x	21	3.47	5.15	-0.00
	Max. H_z	2	4.62	-0.00	5.15
	Max. M_x	2	274.60	-0.00	5.15
	Max. M_z	8	275.32	-5.15	-0.00
	Max. Torsion	19	1.15	4.46	-2.58
	Min. Vert	7	3.47	-4.46	2.58
	Min. H_x	8	4.62	-5.15	-0.00
	Min. H_z	14	4.62	-0.00	-5.15
	Min. M_x	14	-275.35	-0.00	-5.15
	Min. M_z	20	-274.63	5.15	-0.00
	Min. Torsion	7	-1.15	-4.46	2.58

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	3.85	0.00	0.00	0.31	-0.29	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	4.62	0.00	-5.15	-274.60	-0.34	0.47

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
0.9 Dead+1.0 Wind 0 deg - No Ice	3.47	0.00	-5.15	-272.87	-0.26	0.48
1.2 Dead+1.0 Wind 30 deg - No Ice	4.62	2.58	-4.46	-237.76	-137.83	0.93
0.9 Dead+1.0 Wind 30 deg - No Ice	3.47	2.58	-4.46	-236.28	-136.83	0.94
1.2 Dead+1.0 Wind 60 deg - No Ice	4.62	4.46	-2.58	-137.11	-238.48	1.15
0.9 Dead+1.0 Wind 60 deg - No Ice	3.47	4.46	-2.58	-136.30	-236.81	1.15
1.2 Dead+1.0 Wind 90 deg - No Ice	4.62	5.15	0.00	0.37	-275.32	1.05
0.9 Dead+1.0 Wind 90 deg - No Ice	3.47	5.15	0.00	0.28	-273.41	1.05
1.2 Dead+1.0 Wind 120 deg - No Ice	4.62	4.46	2.58	137.86	-238.48	0.67
0.9 Dead+1.0 Wind 120 deg - No Ice	3.47	4.46	2.58	136.85	-236.81	0.67
1.2 Dead+1.0 Wind 150 deg - No Ice	4.62	2.58	4.46	238.51	-137.83	0.12
0.9 Dead+1.0 Wind 150 deg - No Ice	3.47	2.58	4.46	236.84	-136.83	0.11
1.2 Dead+1.0 Wind 180 deg - No Ice	4.62	0.00	5.15	275.35	-0.34	-0.47
0.9 Dead+1.0 Wind 180 deg - No Ice	3.47	0.00	5.15	273.43	-0.26	-0.48
1.2 Dead+1.0 Wind 210 deg - No Ice	4.62	-2.58	4.46	238.51	137.14	-0.93
0.9 Dead+1.0 Wind 210 deg - No Ice	3.47	-2.58	4.46	236.83	136.32	-0.94
1.2 Dead+1.0 Wind 240 deg - No Ice	4.62	-4.46	2.58	137.86	237.79	-1.15
0.9 Dead+1.0 Wind 240 deg - No Ice	3.47	-4.46	2.58	136.85	236.30	-1.15
1.2 Dead+1.0 Wind 270 deg - No Ice	4.62	-5.15	0.00	0.37	274.63	-1.05
0.9 Dead+1.0 Wind 270 deg - No Ice	3.47	-5.15	0.00	0.28	272.90	-1.05
1.2 Dead+1.0 Wind 300 deg - No Ice	4.62	-4.46	-2.58	-137.11	237.79	-0.67
0.9 Dead+1.0 Wind 300 deg - No Ice	3.47	-4.46	-2.58	-136.30	236.30	-0.67
1.2 Dead+1.0 Wind 330 deg - No Ice	4.62	-2.58	-4.46	-237.76	137.14	-0.12
0.9 Dead+1.0 Wind 330 deg - No Ice	3.47	-2.58	-4.46	-236.28	136.32	-0.11
1.2 Dead+1.0 Ice+1.0 Temp	9.78	0.00	0.00	1.68	-0.73	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	9.78	0.00	-1.73	-98.49	-0.73	0.12
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	9.78	0.87	-1.50	-85.07	-50.82	0.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	9.78	1.50	-0.87	-48.40	-87.48	0.44
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	9.78	1.73	0.00	1.68	-100.91	0.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	9.78	1.50	0.87	51.77	-87.48	0.33
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	9.78	0.87	1.50	88.44	-50.82	0.12
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	9.78	0.00	1.73	101.86	-0.73	-0.12
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	9.78	-0.87	1.50	88.44	49.36	-0.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	9.78	-1.50	0.87	51.77	86.03	-0.44
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	9.78	-1.73	0.00	1.68	99.45	-0.44
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	9.78	-1.50	-0.87	-48.40	86.03	-0.32

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
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	9.78	-0.87	-1.50	-85.07	49.36	-0.12
Dead+Wind 0 deg - Service	3.85	0.00	-1.06	-56.30	-0.29	0.10
Dead+Wind 30 deg - Service	3.85	0.53	-0.92	-48.71	-28.60	0.20
Dead+Wind 60 deg - Service	3.85	0.92	-0.53	-27.99	-49.32	0.24
Dead+Wind 90 deg - Service	3.85	1.06	0.00	0.31	-56.90	0.22
Dead+Wind 120 deg - Service	3.85	0.92	0.53	28.62	-49.32	0.14
Dead+Wind 150 deg - Service	3.85	0.53	0.92	49.34	-28.60	0.02
Dead+Wind 180 deg - Service	3.85	0.00	1.06	56.93	-0.29	-0.10
Dead+Wind 210 deg - Service	3.85	-0.53	0.92	49.34	28.02	-0.20
Dead+Wind 240 deg - Service	3.85	-0.92	0.53	28.62	48.74	-0.24
Dead+Wind 270 deg - Service	3.85	-1.06	0.00	0.31	56.32	-0.22
Dead+Wind 300 deg - Service	3.85	-0.92	-0.53	-27.99	48.74	-0.14
Dead+Wind 330 deg - Service	3.85	-0.53	-0.92	-48.71	28.02	-0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-3.85	0.00	0.00	3.85	0.00	0.000%
2	0.00	-4.62	-5.15	-0.00	4.62	5.15	0.000%
3	0.00	-3.47	-5.15	-0.00	3.47	5.15	0.000%
4	2.58	-4.62	-4.46	-2.58	4.62	4.46	0.000%
5	2.58	-3.47	-4.46	-2.58	3.47	4.46	0.000%
6	4.46	-4.62	-2.58	-4.46	4.62	2.58	0.000%
7	4.46	-3.47	-2.58	-4.46	3.47	2.58	0.000%
8	5.15	-4.62	0.00	-5.15	4.62	-0.00	0.000%
9	5.15	-3.47	0.00	-5.15	3.47	-0.00	0.000%
10	4.46	-4.62	2.58	-4.46	4.62	-2.58	0.000%
11	4.46	-3.47	2.58	-4.46	3.47	-2.58	0.000%
12	2.58	-4.62	4.46	-2.58	4.62	-4.46	0.000%
13	2.58	-3.47	4.46	-2.58	3.47	-4.46	0.000%
14	0.00	-4.62	5.15	-0.00	4.62	-5.15	0.000%
15	0.00	-3.47	5.15	-0.00	3.47	-5.15	0.000%
16	-2.58	-4.62	4.46	2.58	4.62	-4.46	0.000%
17	-2.58	-3.47	4.46	2.58	3.47	-4.46	0.000%
18	-4.46	-4.62	2.58	4.46	4.62	-2.58	0.000%
19	-4.46	-3.47	2.58	4.46	3.47	-2.58	0.000%
20	-5.15	-4.62	0.00	5.15	4.62	-0.00	0.000%
21	-5.15	-3.47	0.00	5.15	3.47	-0.00	0.000%
22	-4.46	-4.62	-2.58	4.46	4.62	2.58	0.000%
23	-4.46	-3.47	-2.58	4.46	3.47	2.58	0.000%
24	-2.58	-4.62	-4.46	2.58	4.62	4.46	0.000%
25	-2.58	-3.47	-4.46	2.58	3.47	4.46	0.000%
26	0.00	-9.78	0.00	-0.00	9.78	-0.00	0.000%
27	0.00	-9.78	-1.73	-0.00	9.78	1.73	0.000%
28	0.87	-9.78	-1.50	-0.87	9.78	1.50	0.000%
29	1.50	-9.78	-0.87	-1.50	9.78	0.87	0.000%
30	1.73	-9.78	0.00	-1.73	9.78	-0.00	0.000%
31	1.50	-9.78	0.87	-1.50	9.78	-0.87	0.000%
32	0.87	-9.78	1.50	-0.87	9.78	-1.50	0.000%
33	0.00	-9.78	1.73	-0.00	9.78	-1.73	0.000%
34	-0.87	-9.78	1.50	0.87	9.78	-1.50	0.000%
35	-1.50	-9.78	0.87	1.50	9.78	-0.87	0.000%
36	-1.73	-9.78	0.00	1.73	9.78	-0.00	0.000%
37	-1.50	-9.78	-0.87	1.50	9.78	0.87	0.000%
38	-0.87	-9.78	-1.50	0.87	9.78	1.50	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
39	0.00	-3.85	-1.06	0.00	3.85	1.06	0.000%
40	0.53	-3.85	-0.92	-0.53	3.85	0.92	0.000%
41	0.92	-3.85	-0.53	-0.92	3.85	0.53	0.000%
42	1.06	-3.85	0.00	-1.06	3.85	0.00	0.000%
43	0.92	-3.85	0.53	-0.92	3.85	-0.53	0.000%
44	0.53	-3.85	0.92	-0.53	3.85	-0.92	0.000%
45	0.00	-3.85	1.06	0.00	3.85	-1.06	0.000%
46	-0.53	-3.85	0.92	0.53	3.85	-0.92	0.000%
47	-0.92	-3.85	0.53	0.92	3.85	-0.53	0.000%
48	-1.06	-3.85	0.00	1.06	3.85	0.00	0.000%
49	-0.92	-3.85	-0.53	0.92	3.85	0.53	0.000%
50	-0.53	-3.85	-0.92	0.53	3.85	0.92	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00045030
3	Yes	4	0.00000001	0.00026285
4	Yes	5	0.00000001	0.00007940
5	Yes	5	0.00000001	0.00003247
6	Yes	5	0.00000001	0.00005347
7	Yes	5	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00094922
9	Yes	4	0.00000001	0.00055649
10	Yes	5	0.00000001	0.00007431
11	Yes	5	0.00000001	0.00003003
12	Yes	5	0.00000001	0.00006135
13	Yes	5	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00045117
15	Yes	4	0.00000001	0.00026295
16	Yes	5	0.00000001	0.00005374
17	Yes	5	0.00000001	0.00000001
18	Yes	5	0.00000001	0.00008390
19	Yes	5	0.00000001	0.00003446
20	Yes	4	0.00000001	0.00094807
21	Yes	4	0.00000001	0.00055664
22	Yes	5	0.00000001	0.00005475
23	Yes	5	0.00000001	0.00000001
24	Yes	5	0.00000001	0.00006353
25	Yes	5	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00003689
27	Yes	5	0.00000001	0.00008590
28	Yes	5	0.00000001	0.00014014
29	Yes	5	0.00000001	0.00012552
30	Yes	5	0.00000001	0.00010894
31	Yes	5	0.00000001	0.00015104
32	Yes	5	0.00000001	0.00013248
33	Yes	5	0.00000001	0.00009114
34	Yes	5	0.00000001	0.00012732
35	Yes	5	0.00000001	0.00015389
36	Yes	5	0.00000001	0.00010589
37	Yes	5	0.00000001	0.00011911
38	Yes	5	0.00000001	0.00012464
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00007604
41	Yes	4	0.00000001	0.00005715
42	Yes	4	0.00000001	0.00006222
43	Yes	4	0.00000001	0.00006224
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00008699
48	Yes	4	0.00000001	0.00006095

49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	84 - 34.25	11.155	44	1.0486	0.0208
L2	38 - 0	2.598	44	0.6092	0.0051

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
83.00	Side Arm Mount [4' SO 701-1]	44	10.936	1.0408	0.0204	26287
67.00	1151-3	44	7.520	0.9122	0.0142	7731

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	84 - 34.25	53.438	12	4.9853	0.0982
L2	38 - 0	12.525	12	2.9349	0.0240

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
83.00	Side Arm Mount [4' SO 701-1]	12	52.395	4.9496	0.0963	5584
67.00	1151-3	12	36.068	4.3587	0.0668	1640

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	84 - 34.25 (1)	TP18.145x12.001x0.1875	49.75	0.00	0.0	10.411 3	-2.07	609.06	0.003
L2	34.25 - 0 (2)	TP22x17.3069x0.2188	38.00	0.00	0.0	15.123 0	-4.62	884.70	0.005

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	84 - 34.25 (1)	TP18.145x12.001x0.1875	109.09	277.48	0.393	0.00	277.48	0.000
L2	34.25 - 0 (2)	TP22x17.3069x0.2188	275.46	496.47	0.555	0.00	496.47	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	84 - 34.25 (1)	TP18.145x12.001x0.1875	3.55	182.72	0.019	0.67	279.94	0.002
L2	34.25 - 0 (2)	TP22x17.3069x0.2188	5.16	265.41	0.019	0.67	506.26	0.001

Pole Interaction Design Data

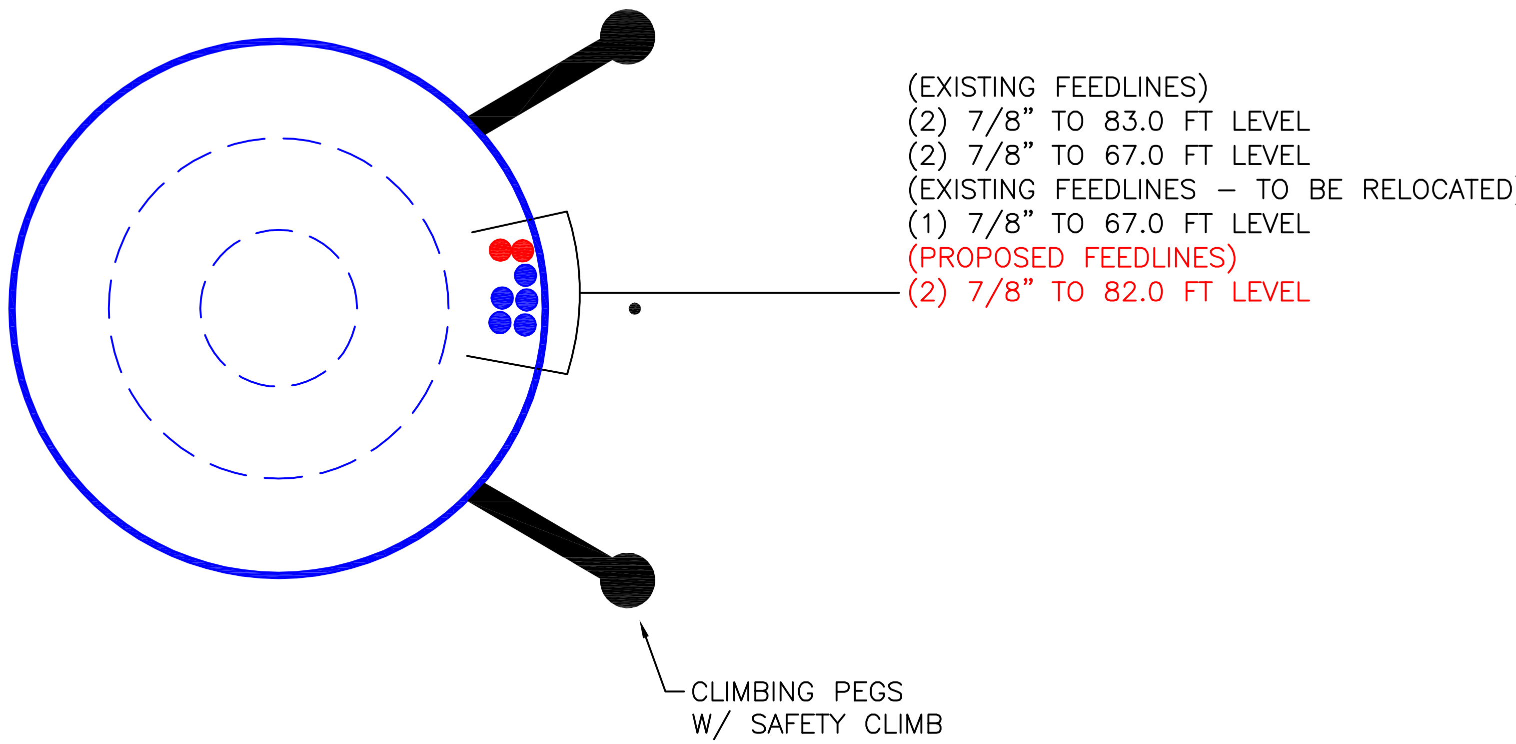
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	84 - 34.25 (1)	0.003	0.393	0.000	0.019	0.002	0.397	1.050	4.8.2
L2	34.25 - 0 (2)	0.005	0.555	0.000	0.019	0.001	0.560	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
L1	84 - 34.25	Pole	TP18.145x12.001x0.1875	1	-2.07	639.52	37.8	Pass
L2	34.25 - 0	Pole	TP22x17.3069x0.2188	2	-4.62	928.93	53.4	Pass
							Summary	
						Pole (L2)	53.4	Pass
						RATING =	**53.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



RIDGEFIELD 22N

APPENDIX C

ADDITIONAL CALCULATIONS

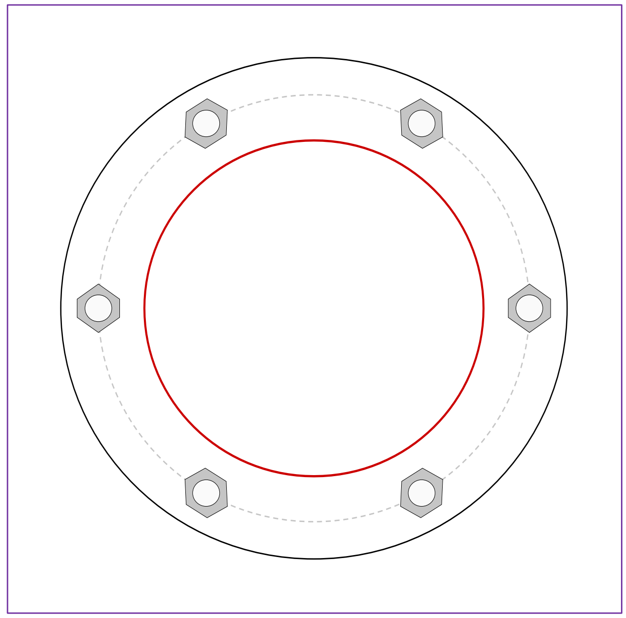
Monopole Base Plate Connection

Site Info	
	ES-074
	NewMilfordRS

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	2.125

Applied Loads	
Moment (kip-ft)	275.47
Axial Force (kips)	4.62
Shear Force (kips)	5.16

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(6) 1-3/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 27.96" BC

Base Plate Data

32.84" OD x 2.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

22" x 0.21875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 77.93	ϕPn_t = 142.5	**Stress Rating**
Vu = 0.86	ϕVn = 90.2	**52.1%**
Mu = 1.19	ϕMn = 60.29	**Pass**

Base Plate Summary

Max Stress (ksi):	10.84	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**22.9%**	**Pass**

Pier and Pad Foundation

ES-286
Ridgefield22N

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☑
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	4.62	kips
Base Shear, Vu_comp:	5.15	kips
Moment, M_u:	275.47	ft-kips
Tower Height, **H**:	84	ft
BP Dist. Above Fdn, bp_{dist}:	6	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	81.43	5.15	**6.0%**	**Pass**
Bearing Pressure (ksf)	6.00	1.71	**28.5%**	**Pass**
*Overturning (kip*ft)*	648.41	308.95	**47.6%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	1147.42	296.07	**24.6%**	**Pass**
Pier Compression (kip)	7592.08	16.07	**0.2%**	**Pass**
*Pad Flexure (kip*ft)*	424.27	82.23	**18.5%**	**Pass**
Pad Shear - 1-way (kips)	235.14	25.59	**10.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.013	**7.4%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	487.12	177.64	**34.7%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**34.7%**
Soil Rating*:	**47.6%**

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	4.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	12	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	6	in

Pad Properties		
Depth, **D**:	5.5	ft
Pad Width, W_1:	12	ft
Pad Thickness, **T**:	2	ft
Pad Rebar Size (Top dir.2), Sp_{top2}:	4	
Pad Rebar Quantity (Top dir. 2), mp_{top2}:	9	
Pad Rebar Size (Bottom dir. 2), Sp_2:	6	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	11	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	8.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.6	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Version 4.1.0

ATTACHMENT E – PROOF OF DELIVERY OF NOTICE

ORIGIN ID:SKKA (860) 798-6597
BRIAN GAUDET
ALL-POINTS TECHNOLOGY CORP, P.C
567 VAUXHALL STREET EXTENSION
SUITE 311
WATERFORD, CT 06385
UNITED STATES US

SHIP DATE: 10SEP21
ACTWGT: 3.00 LB
CAD: 4762401/INET4400

BILL SENDER

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400 MAIN STREET
SELECTMAN'S OFFICE
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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-286

Off Prospect Street

Ridgefield, CT 06877

August 18, 2021

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the existing Eversource installation located off Prospect Street in Ridgefield, CT.

Eversource has recently installed one omnidirectional antenna for both transmit and receive purposes as part of its 220 MHz communications system. The original proposal consisted of two omnidirectional antennas – separate transmit and receive antennas. This report provides an updated analysis based on the current installation as reflected in the update site plans[1].

This report considers the existing antenna configuration as provided by Eversource along with power density information of the other existing antennas to calculate the overall % MPE (Maximum Permissible Exposure) of the facility at ground level.

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.

[1] Stamped Black & Veatch site drawings dated 8/13/2021 (Rev. 1).

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. Calculated % MPE Results

Table 1 below outlines the power density information for the site. The new Eversource omnidirectional antenna has a vertical beamwidth of 60°; therefore, the majority of the RF power is focused out towards the horizon. Please refer to Attachment C for the vertical pattern of the recently installed 220 MHz Eversource antenna. Likewise, the other transmit antennas exhibit similar directionality of varying vertical beamwidths. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the facility. The calculated results in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas. Any inactive or receive-only antennas are not listed in the table, as they are irrelevant in terms of the % MPE calculations.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
CL&P	*85*	*37.74*	*1*	*100*	*0.0006*	*0.2000*	*0.29%*
CL&P	*70*	*44*	*1*	*100*	*0.0009*	*0.2000*	*0.44%*
CL&P	*70*	*48*	*1*	*100*	*0.0009*	*0.2000*	*0.44%*
CL&P	*85*	*450*	*1*	*251*	*0.0014*	*0.3000*	*0.48%*
CL&P	*85*	*937*	*2*	*240*	*0.0028*	*0.6247*	*0.44%*
Eversource	90	44.34	1	100	0.0005	0.2000	0.25%
Eversource	88	936.6375	1	240	0.0013	0.6244	0.21%
Eversource	88	938.45	1	240	0.0013	0.6256	0.21%
Eversource	74	37.74	1	100	0.0008	0.2000	0.39%
Eversource	74	451.675	1	251	0.0020	0.3011	0.65%
Eversource	73	48.34	1	100	0.0008	0.2000	0.40%
Eversource	95.3	217	4	124	0.0022	0.2000	1.12%
						Total	**3.22%**

Table 1: Proposed Facility % MPE [2] [3]

The CT Siting Council power density database reflects entries for pre-existing Eversource (f.k.a. CL&P) antennas. These entries are shown as grey in the table above and should be replaced by the unshaded entries, which are based upon updated operating parameters provided by Eversource as part of this project. The blue entry reflects the parameters of the recently installed Eversource antenna. Therefore, the total % MPE calculated is based upon only the unshaded and blue entries.

[2] Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

[3] The antenna heights listed for Eversource are in reference to the Black & Veatch Structural Analysis Report dated 07/29/2021.

5. Conclusion

The above analysis concludes that RF exposure at ground level with the new Eversource 220 MHz antenna installation will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods discussed herein, the highest expected percent of Maximum Permissible Exposure at ground level from the existing installation is **3.22% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual measured levels will be from the installation.

6. 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.

Keith Vellante

August 18, 2021

Report Prepared By: Keith Vellante
Director – 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[4]

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[5]

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 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] 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

[5] 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

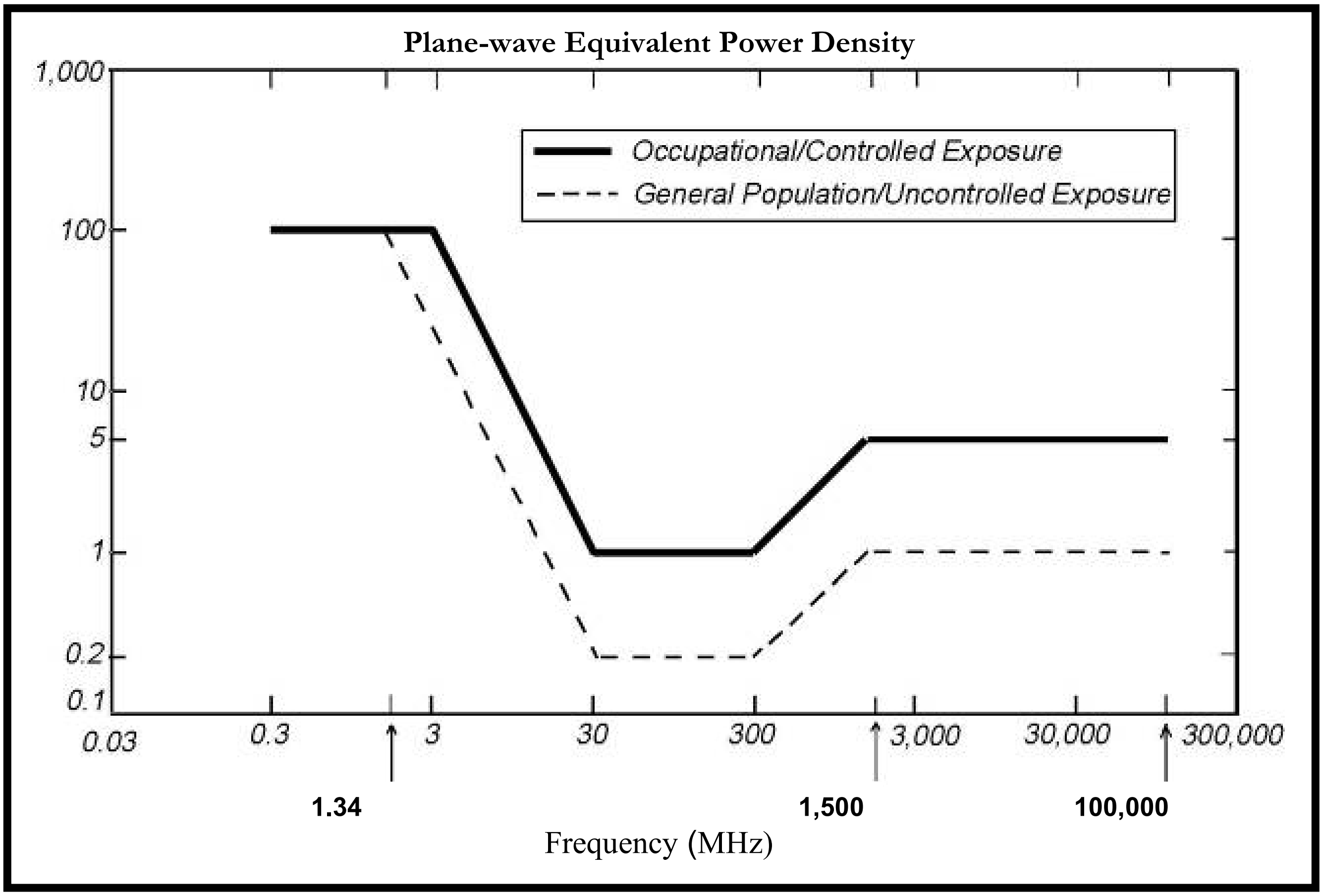

Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheets and Electrical Patterns

217 MHz	
Manufacturer:	dbSpectra
Model #:	SP2D00P36D-D
Frequency Band:	217-220 MHz
Gain:	0 dBd
Vertical Beamwidth:	60°
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	15.6’