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

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

March 3, 2022

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

RE: **Notice of Exempt Modification**
Eversource Site # 6581
790 Willis Street, Bristol, CT 06010
Latitude: 41-38-56 N / Longitude: 72-56-50 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas and microwave dishes at various mounting heights on an existing 130-foot self-support tower located at 790 Willis Street in Bristol. 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 20-foot dipole antenna to be mounted at 130 feet above ground level ("AGL") on a heavy-duty mounting kit, and the removal of one 24-foot 3 ½-inch omni directional antenna and associated mount at 130 feet. There will be no changes to the area of the fenced compound, the tower or other existing antennas and equipment mounted on the tower. The tower and existing and proposed equipment on the tower are depicted on Attachment B, Construction Drawings, dated January 19, 2022 and Attachment C, Structural Analysis, dated January 13, 2022. The Connecticut Siting Council approved the self-support tower at this location in Petition No. 800 in January 2007.

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-017-200423, dated May 11, 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 Jeffrey Caggiano, Mayor for the City of Bristol and Robert M. Flanagan, AICP, City Planner for the City of Bristol via the United States Postal Service or private carrier. Proof of delivery is attached. See Attachment D, Proof of Delivery of Notice.

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

1. There will be no change to the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the new antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated February 7, 2022 (Attachment E – Power Density Report)[1].
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

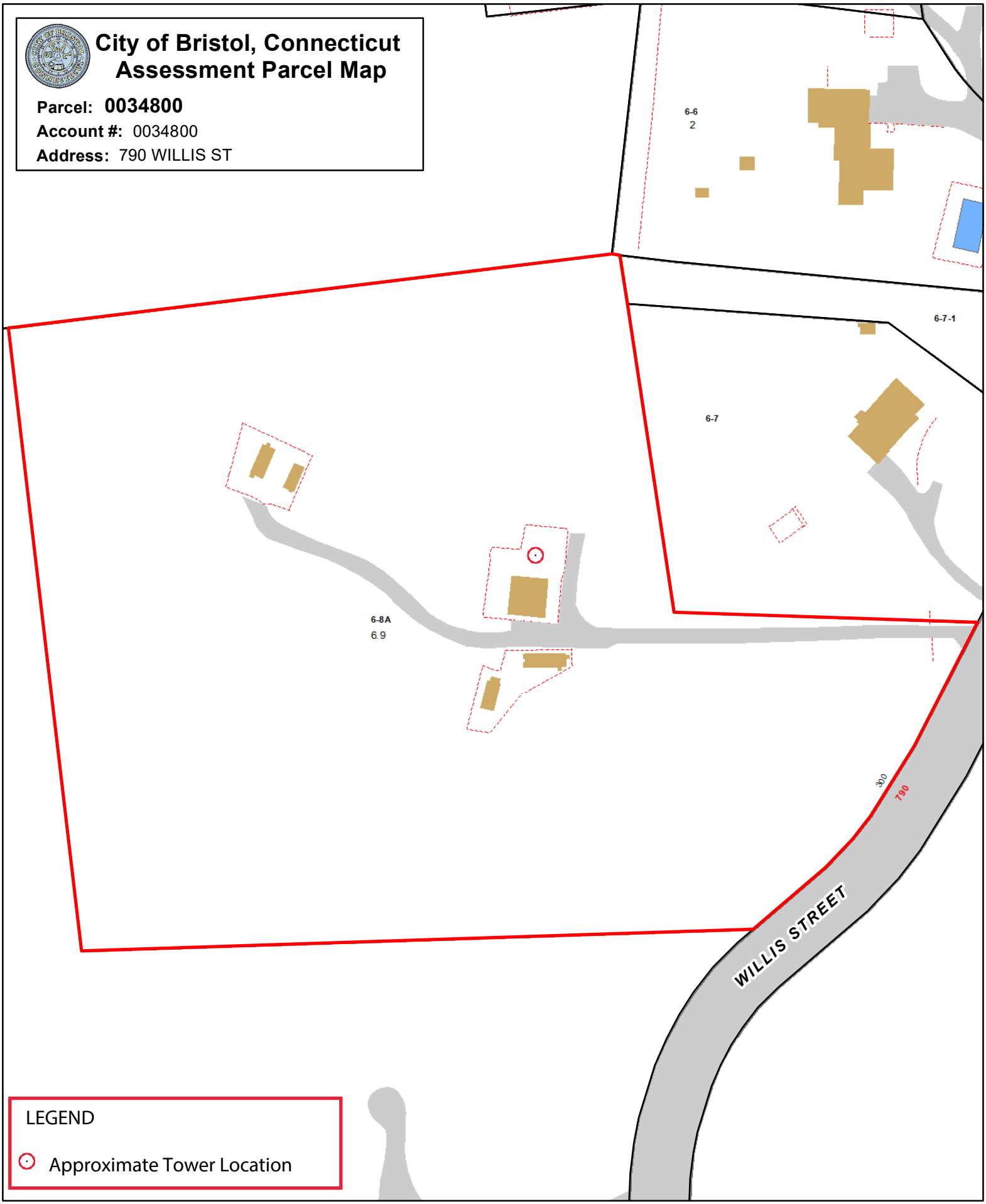
cc: Honorable Jeffrey Caggiano, Mayor, City of Bristol
Robert M. Flanagan, AICP, City Planner, City of Bristol

Attachments

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

[1] It should be noted that the Power Density Report denotes each channel as a transmitter. The depiction of antennas in the Structural Analysis and Construction Drawings accurately reflects the number of antennas. Also, the "Antenna Height" column on Table 1 in the Power Density Report reflects the Transmit or "TX" antenna centerline.

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD



Approximate Scale: 1 inch = 100 feet

Map Produced March 2018

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

790 WILLIS ST

Location	790 WILLIS ST	**Mblu**	06/ / 8A/ /
Acct#	0034800	**Owner**	CONN LIGHT + POWER CO
Assessment	$449,190	**Appraisal**	$641,700
PID	5681	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$392,100	$249,600	$641,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$274,470	$174,720	$449,190

Owner of Record

Owner	CONN LIGHT + POWER CO	**Sale Price**	$0
Co-Owner		**Certificate**	1
Address	107 SELDEN ST BERLIN, CT 06037	**Book & Page**	0277/0293
		Sale Date	01/25/1952

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CONN LIGHT + POWER CO	$0	1	0277/0293	01/25/1952

Building Information

Building 1 : Section 1

Year Built:	1950
Living Area:	900
Replacement Cost:	$40,248
Building Percent Good:	65
Replacement Cost Less Depreciation:	$26,200

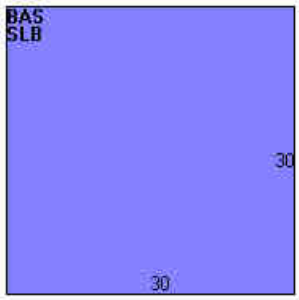
Building Attributes	
Field	**Description**

STYLE	Warehouse
MODEL	Ind/Comm
Stories:	1
Occupancy	1.00
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Electric
Heating Type	Hot Air-no Duc
AC Type	Unit/AC
Struct Class	
Bldg Use	Public Utility
Bedrooms	
Full Baths	
Half Baths	
Usrfld 218	
Usrfld 219	
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Masonry
Baths/Plumbing	Light
Ceiling/Wall	None
Rooms/Prtns	Light
Wall Height	8.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/BristolCTPhotos//\00\05\61\14

Building Layout



(http://images.vgsi.com/photos2/BristolCTPhotos//Sketches/568

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	900	900
SLB	Slab	900	0
		1,800	900

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 436

Land Line Valuation

Size (Acres) 6.9

Description	Public Utility	**Frontage**	300
Zone	R-25	**Depth**	
Neighborhood	50	**Assessed Value**	$174,720
Alt Land Appr	No	**Appraised Value**	$249,600
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CELL	Cell Tower/Site			2.00 UNITS	$210,000	1
CB3	PreCastConcCel			300.00 S.F.	$54,000	1
CB3	PreCastConcCel			300.00 S.F.	$54,000	1
FCP	Carport			900.00 S.F.	$5,600	1
GAR1	Garage	FR	Frame	420.00 S.F.	$6,300	1
CB3	PreCastConcCel			200.00 S.F.	$36,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
19	$392,100	$249,600	$641,700
2018	$392,100	$249,600	$641,700
2017	$392,100	$249,600	$641,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
19	$274,470	$174,720	$449,190
2018	$274,470	$174,720	$449,190
2017	$274,470	$174,720	$449,190

ATTACHMENT B – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. INSTALL (1) NEW DIPOLE ANTENNA AT ELEVATION 150'–0"± AGL INSTEAD OF (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 152'–0"± AGL
2. INSTALL (1) NEW MICROWAVE DISH AT ELEVATION 90'–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:	SOUTH MTN RADIO
SITE ID NUMBER:	#5681
SITE ADDRESS:	790 WILLIS ST BRISTOL, CT 06010
MAP:	6
BLOCK:	8
LOT:	A
ZONE:	R–25
LATITUDE:	41° 38' 56.0" N
LONGITUDE:	72° 56' 50.0" W
ELEVATION:	1047'± AMSL
FEMA/FIRM DESIGNATION:	X

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
SELF–SUPPORT TOWER

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	SITE PLAN
C–2	TOWER ELEVATION
C–3	TOWER ELEVATION
C–4	ANTENNA EQUIPMENT
G–1	GROUNDING DETAILS
N–1	NOTES & SPECIFICATIONS
N–2	NOTES & SPECIFICATIONS
N–3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

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

UNDERGROUND SERVICE ALERT

UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

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

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

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

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

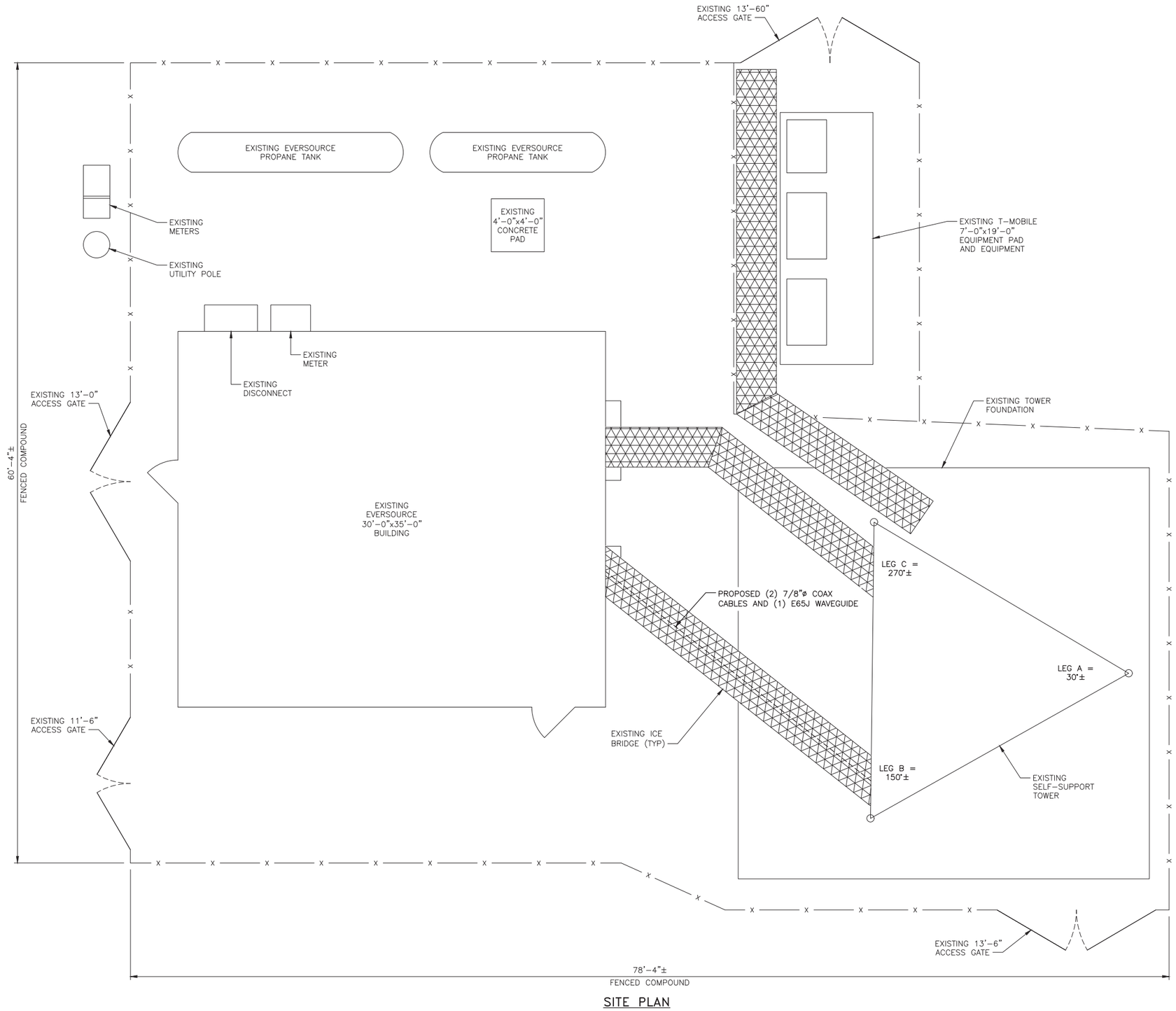
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/19/2022

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.

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

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

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

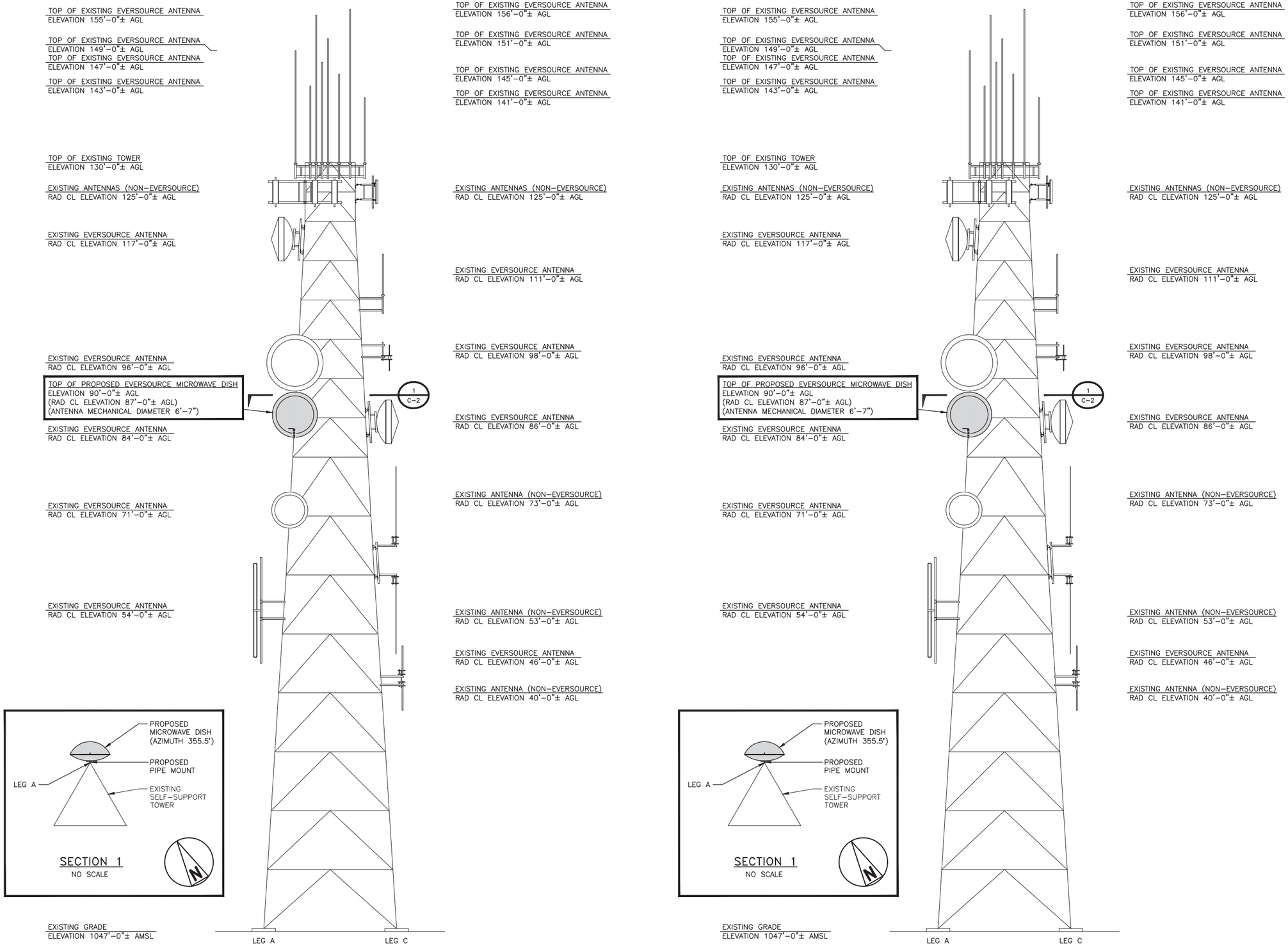
REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/19/2022

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



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:	TYW
CHECKED BY:	JR

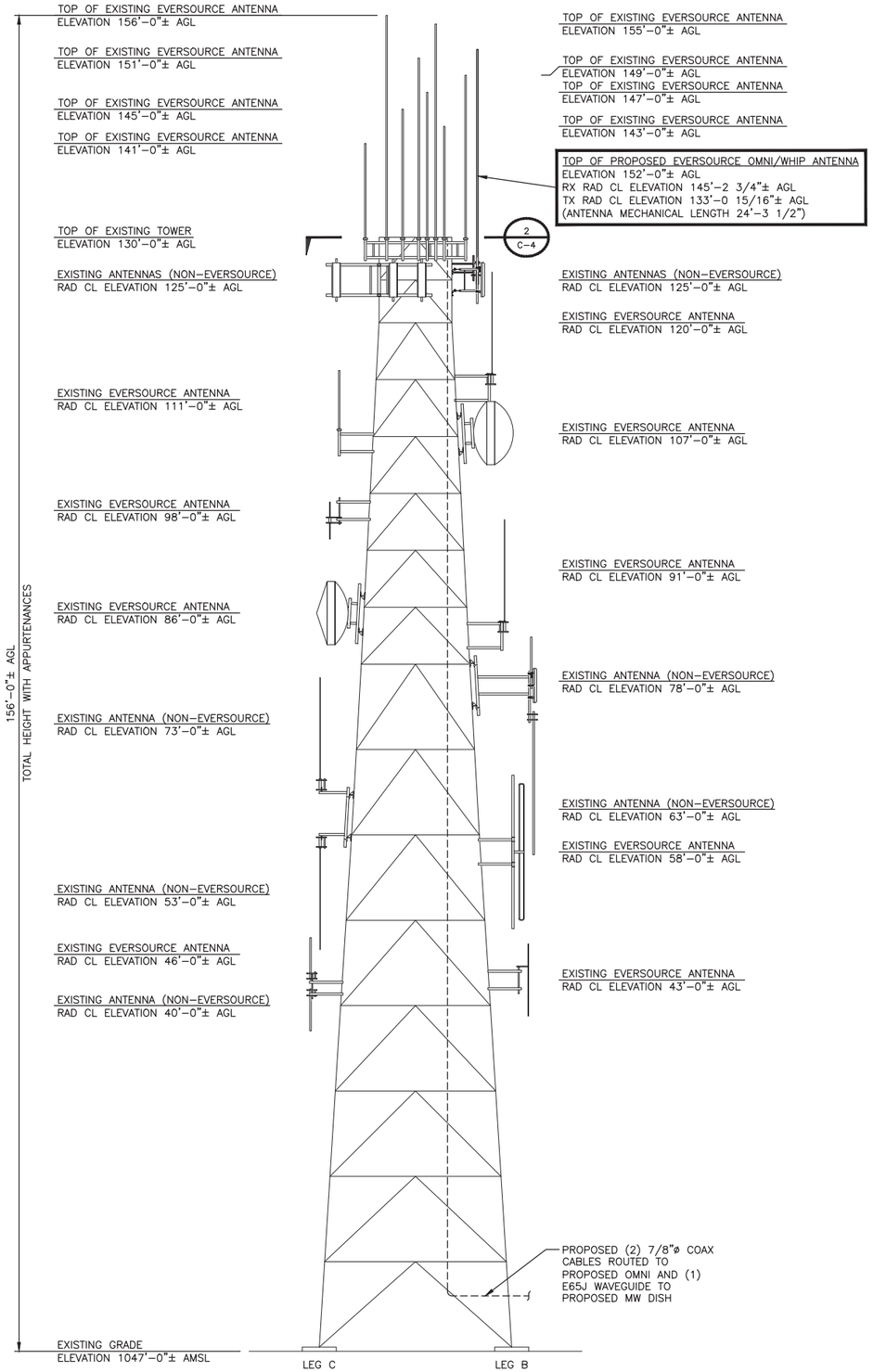
REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/19/2022

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

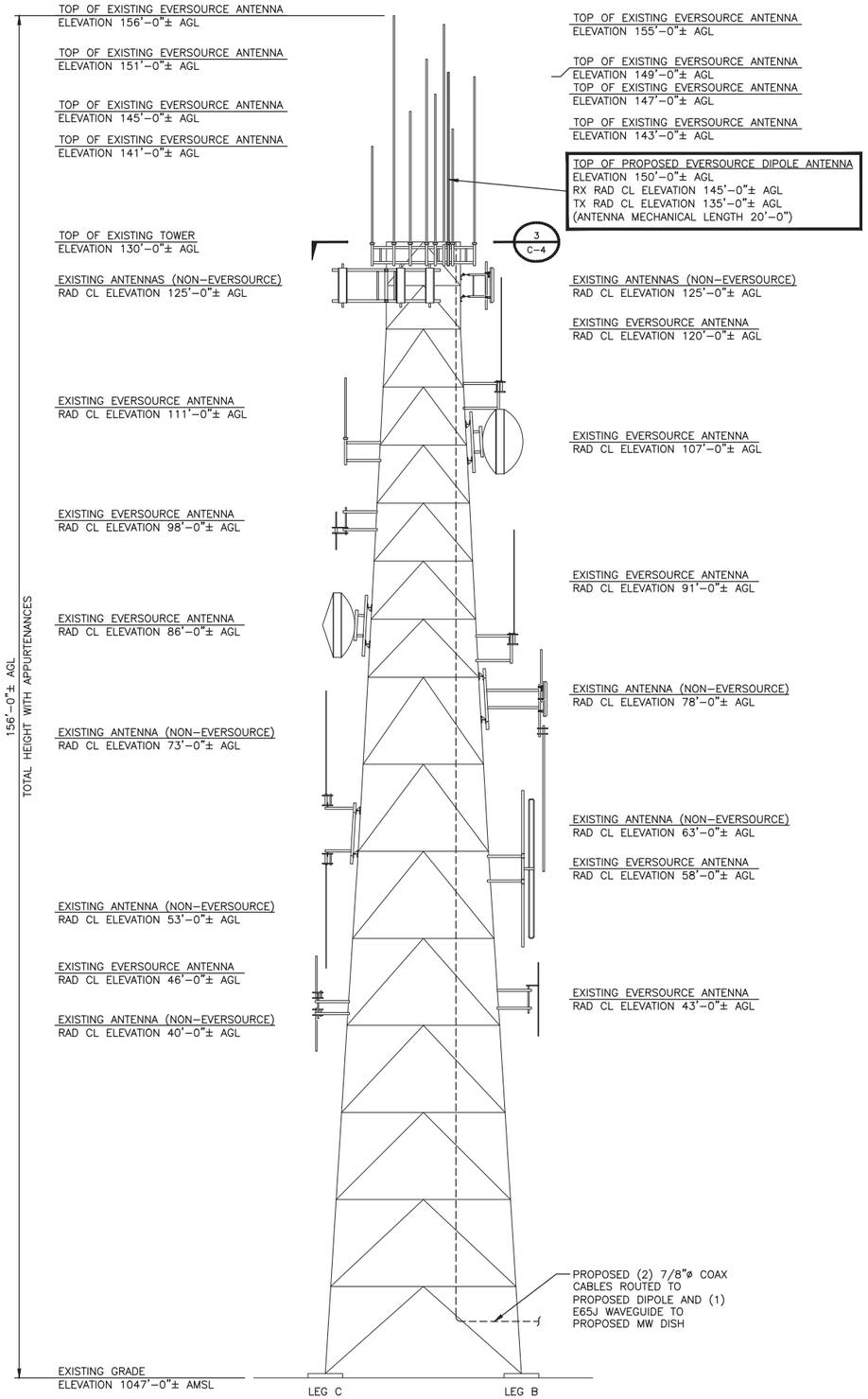
SHEET TITLE
TOWER ELEVATION

SHEET NUMBER
C-2



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:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/19/2022

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

SHEET TITLE

TOWER
ELEVATION

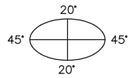
SHEET NUMBER

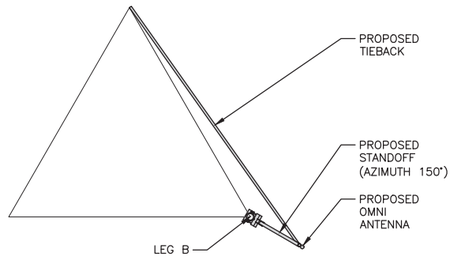
C-3

NOTES

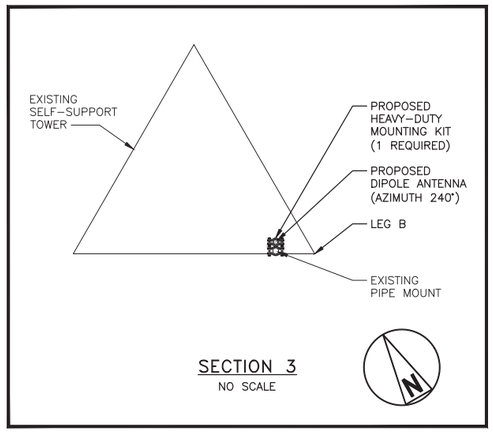
1. ATTACH TIEBACK TO FRAME MAST BETWEEN TOP AND BOTTOM HSS ARMS. ATTACH OPPOSITE END TO EITHER ADJACENT TOWER LEG. REFER TO ALLOWABLE TIEBACK ANGLE DIAGRAM.
2. TRIM TIEBACK PIPE AS REQUIRED TO MAINTAIN A 6" DISTANCE BETWEEN ENDS OF CLAMPS AND ENDS OF PIPE.

ALLOWABLE TIEBACK ANGLE
±20 DEGREES VERTICAL
±45 DEGREES HORIZONTAL





SECTION 2
NO SCALE



SECTION 3
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

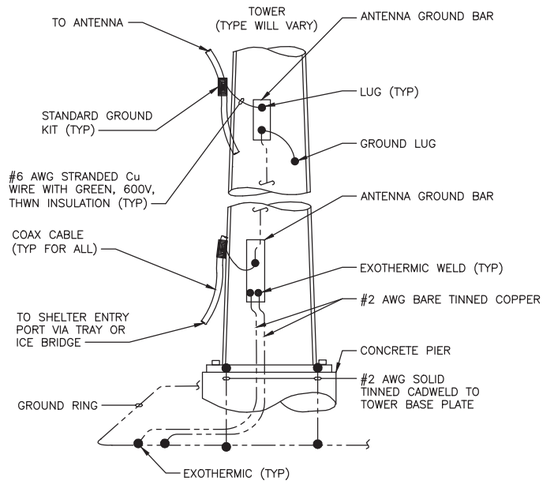
PROJECT NO:	403093
DRAWN BY:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

SHEET TITLE
ANTENNA EQUIPMENT

SHEET NUMBER
C-4

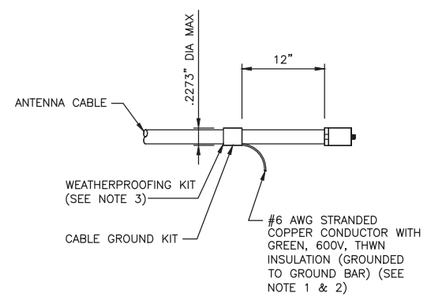


NOTE

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

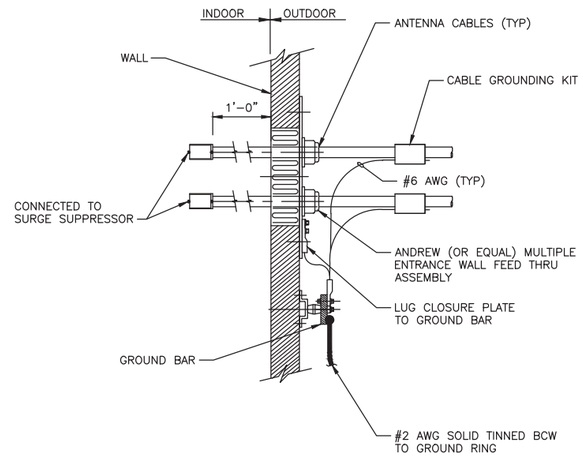


NOTES

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.

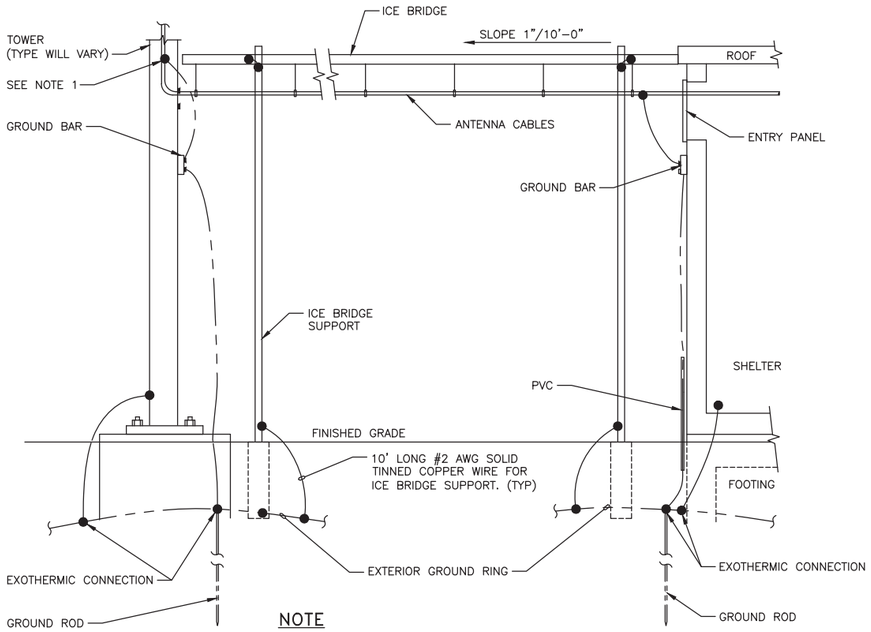
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

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:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

STATE OF CONNECTICUT
MARK P. STILES
24350
LICENSED
PROFESSIONAL ENGINEER
01/19/22

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

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
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:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

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
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:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

STATE OF CONNECTICUT · MARK P. STILES · 24359 · LICENSED PROFESSIONAL ENGINEER
01/19/22

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

SHEET TITLE
NOTES
& SPECIFICATIONS

SHEET NUMBER
N-2

SYMBOLS

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

ABBREVIATIONS

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

EVERSOURCE ENERGY

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:	TYW
CHECKED BY:	JR

REV	DATE	DESCRIPTION
1	01/19/22	ISSUED FOR FILING
0	03/09/20	ISSUED FOR FILING

SOUTH MTN RADIO
790 WILLIS ST
BRISTOL, CT 06010

SHEET TITLE

NOTES
& SPECIFICATIONS

SHEET NUMBER

N-3

REFERENCE CUTSHEETS

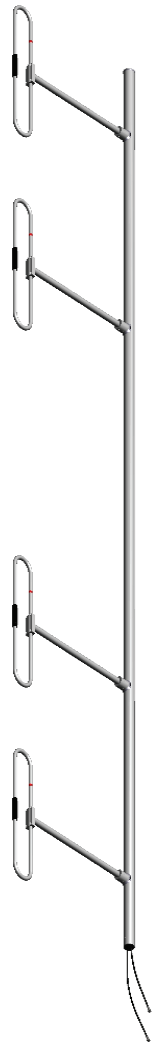
870 SERIES DUAL EXPOSED DIPOLE 215-225 MHz

876F-70-2HSMP40DF1/2

The 876F-70-2HSMP40DF1/2 Dual Exposed Dipole is well suited for multicoupled RF system. It has an extremely rugged design for use in severe environmental conditions. It has internal cabling and a fix dipole-to-mast spacing. This antenna is a special version of the 876F-70 with increased spacing between the two antennas, giving an isolation of 40 dB. It's heavy duty and Low PIM deign. This antenna can be black anodized, please contact technical support for more information.

The ½ wave pattern spacing version offer bidirectional pattern with more than 5 dBd Gain at 220 MHz.

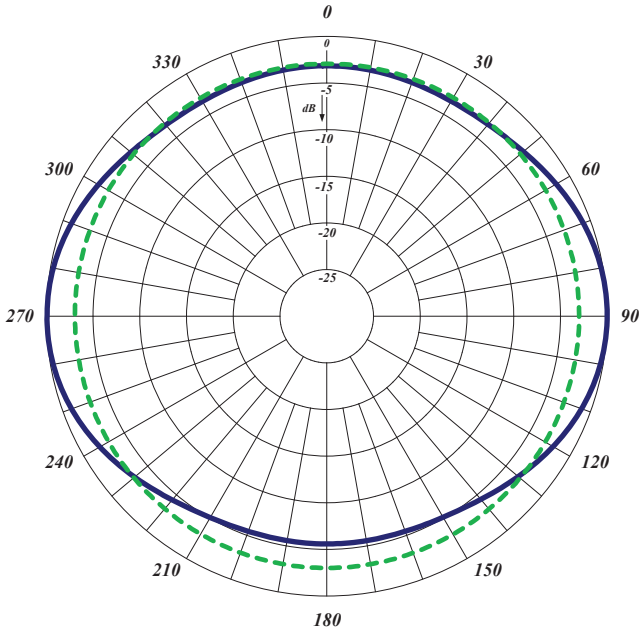
Electrical Specifications	876F-70-2HSMP40DF1/2
Frequency Range, MHz	215-225
Nominal Gain, dBd	5.0 (5.2 @ 220MHz)
Isolation , dB	40
Bandwidth 1.5:1 VSWR, MHz	1.5:1 (10)
Polarization	Vertical
Pattern	Bidirectional
Power Rating, Watts	300
PIM. (2x20W, 3rd ord.), dBc	150
Nominal Impedance, Ohms	50
Lightning Protection	DC Ground
Termination	Dual Feeds Terminating in 7/16 DIN F
Mechanical Specifications	**876F-70-HDWSM-40**
Length, in (mm)	240 (6096)
Width (1/2 Wave Spacing), in (mm)	43 (1092)
Weight, lbs. (kg)	130 (59)
Rated Wind Velocity, No Ice, mph (km/h)	140 (225)
Rated Wind Velocity, 1/2" ice, mph (km/h)	105 (169)
Lateral Thrust @ 100 mph, wind, lbs. (N)	222 (988)
Torsional Moment (N●M)	471 (638)
Projected Area, ft² (m²)	8.5 (0.78)
Mounting Information Mast O.D. (mm)	2.9 (74)



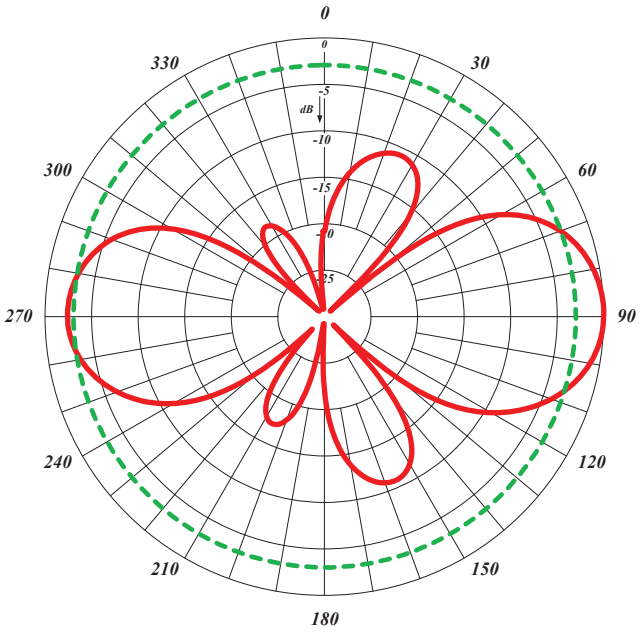
876F-70-2HSMP40DF1/2

870 SERIES DUAL EXPOSED DIPOLE 215-225 MHz

876F-70-2HSMP40DF1/2



876F-70-2HSMP40DF1/2: Horizontal Radiation pattern



876F-70-2HSMP40DF1/2: Vertical Radiation pattern

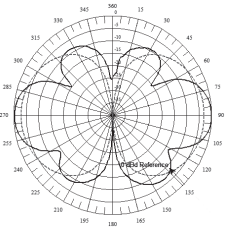
dbSpectra

VHF Omni Antennas (160-222 MHz)

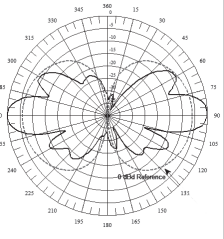
		160-174 MHz						217-222 MHz									
	Model Number	DS1G03F36U-N	DS1G03F36U-D	DS1G06F36U-N	DS1G06F36U-D	DS1G03F36D-N	DS1G03F36D-D	DS2C00F36U-N	DS2C00F36U-D	DS2C03F36U-N	DS2C03F36U-D	DS2C06F36U-N	DS2C06F36U-D	DS2C00F36D-N	DS2C00F36D-D	DS2C03F36D-N	DS2C03F36D-D
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	**Bandwidth**, MHz	14		14		14		5		5		5		5		5	
ELECTRICAL	**Power**, Watts	500		500		350		500		500		500		350		350	
ELECTRICAL	**Gain**, dBd	3		6		3		0		3		6		0		3	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		30		60		30		16		60		30	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	**Number of Connectors**	1		1		2		1		1		1		2		2	
MECHANICAL	**Flat Plate Area**, $ft^2(m^2)$	2.53 (0.24)		4.38 (0.41)		4.5 (0.42)		1.9 (0.18)		1.9 (0.18)		2.58 (0.24)		2.4 (0.22)		4.1 (0.38)	
MECHANICAL	**Lateral Windload Thrust**, lbf(N)	95 (423)		164 (730)		169 (752)		53 (236)		69 (307)		108 (480)		90 (400)		169 (752)	
MECHANICAL	**Survival Wind Speed** **without ice**, mph(kph) **with 0.5" radial ice**, mph(kph)	 110 (177) 93 (150)		 75 (121) 60 (97)		 75 (121) 65 (105)		 222 (357) 193 (311)		 172 (277) 150 (241)		 110 (177) 96 (154)		 130 (209) 115 (185)		 75 (121) 65 (105)	
MECHANICAL	**Mounting Hardware** included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		18.1 (5.5)		13.6 (4.1)		24.3 (7.4)	
DIMENSIONS	**Radome O.D.**, in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
DIMENSIONS	**Mast O.D.**, in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
DIMENSIONS	**Shipping Weight**, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	

VERTICAL PATTERNS

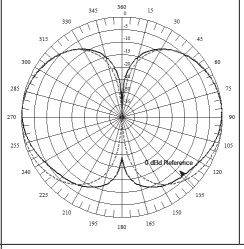
DS1G03F36U-N
DS1G03F36U-D



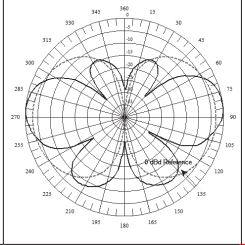
DS1G06F36U-N
DS1G06F36U-D



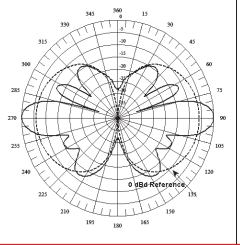
DS2C00F36U-N
DS2C00F36U-D



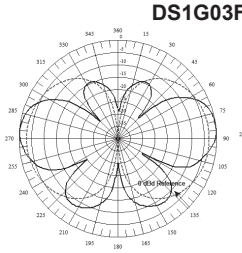
DS2C03F36U-N
DS2C03F36U-D



DS2C06F36U-N
DS2C06F36U-D

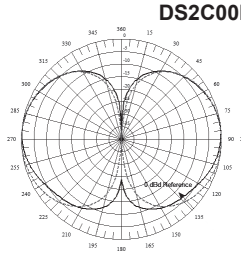


DS1G03F36D-N
DS1G03F36D-D



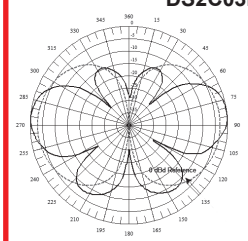
Top Bottom

DS2C00F36D-N
DS2C00F36D-D



Top Bottom

DS2C03F36D-N
DS2C03F36D-D



Top Bottom

MOUNTING KIT TO CONNECT NEW DIPOLE TO EXISTING PIPE MOUNT

dbSpectra

Antenna Mounting Hardware

DSH1V3R

DSH2H3R

REGULAR MOUNTING

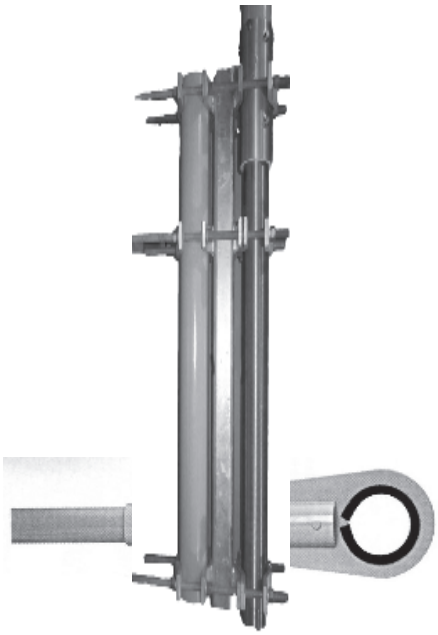
Mount aluminum base station antennas to round or angled tower legs. Center section of each clamp is welded to provide mechanical stability and all parts are hot-dipped galvanized steel.

MODELS	DSH1V3R DSH1V4R	DSH2V3R DSH2V4R	DSH2H3R DSH2H4R	DSH3V3R DSH3V4R
Antenna Length, ft(m)	0 (0) to 3.5 (1)	3.5 (1) to 10 (3.1)	3.5 (1) to 10 (3.1)	10 (3.1) to 14 (4.3)
# of Clamps	1	2	2	3
Mounting	Vertical	Vertical	Horizontal	Vertical
Pipe Mount, in (mm): 3R	1.3 (32) to 3.5 (89)	1.3 (32) to 3.5 (89)	1.3 (32) to 3.5 (89)	1.3 (32) to 3.5 (89)
Pipe Mount, in (mm): 4R	1.3 (32) to 4 (102)	1.3 (32) to 4 (102)	1.3 (32) to 4 (102)	1.3 (32) to 4 (102)
Weight, lb (kg)	4 (1.8)	7 (3.2)	10 (4.5)	9(4.1)
Shipping Weight, lb (kg)	6 (2.7)	8 (3.6)	12(5.5)	10(4.5)

HEAVY-DUTY "NO-TORSION" MOUNTING

Utilizes three clamps on a galvanized steel tube to mount antennas to round tower members.

MODEL	DSH3V3N	DSH3V4N
Antenna Length, ft(m)	14 (4.3) and greater	14 (4.3) and greater
# of Clamps	3	3
Mounting	Vertical	Vertical
Pipe Mount, in (mm)	3 (76.2) MAX.	4 (101.6) MAX.
Weight, lb (kg)	28 (12.7)	28 (12.7)
Shipping Weight, lb (kg)	30 (13.6)	30 (13.6)
Shipping Dimensions (W x H x D), in(mm)	11 x 33 x 4 (279 x 838 x 102)	11 x 33 x 4 (279 x 838 x 102)



TOP SWAY BRACE - OUTRIGGER MOUNTING

Limit tip deflection on 3-inch diameter fiberglass antennas in high wind conditions. Attaches to the tower legs using supplied DSH2H3R hardware kit (above). Recommended on top-mounted antennas >16 feet long.

MODEL	DSH2H3S
# of Clamps	2
Mounting	Horizontal
Flange Inner Diameter, in (mm)	3.38 (85.7)
Tube Diameter, in (mm)	2 (50.8)
Length to Center of Flange ft (m)	12 feet (3.6)
Weight, lb (kg)	10 (4.5)
Shipping Weight, lb (kg)	20 (9.1)
Shipping Dimensions (W x H x D), in (mm)	11 x 33 x 4 (279 x 838 x 102)

DIRECTIONAL ANTENNA MOUNTING HARDWARE

Model	DB380
Antenna Length	N/A
# of Clamps	2
Mounting	Antenna-to-Pipe
Pipe Mount, in(mm)	3.5 (76.2)
Weight, lb (kg)	10 (4.5)
Shipping Weight, lb (kg)	20 (9.1)

RADIO FREQUENCY SYSTEMS
The Clear Choice®

TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

RFS Microwave Antennas are designed for microwave systems in all common frequency ranges from 4 GHz to 24 GHz. This allows the use of antennas in areas where extreme wind conditions are normal. The antennas utilise a conventional feed system and are available in three performance classes offering complete flexibility when designing a network. Standard Performance antennas are economical solutions for systems where side lobe suppression is of less importance. These antennas are required for use in networks where there is a low interference potential. Antennas are available in 2 ft (0.6m) to 12 ft (3.7m) diameters. Antennas from 4ft up to 12 ft (3.7m) can be equipped with a moulded radome to reduce wind load and to protect the feed against the accumulation of ice and snow.

Antenna

FEATURES / BENEFITS

- Field-proven reliability and long life
- Withstanding winds up to 200 km/h (125 mph), an optional sway bar is available for added assurance in case mistakes are made during installation
- A single-piece configuration and compact packaging to reduce transportation costs
- Frequencies ranging from 4 GHz to 15 GHz with support for two wideband frequency ranges (5.725-6.875 and 7.125-8.5 GHz) to reduce antenna requirements and simplify logistics

Technical Features

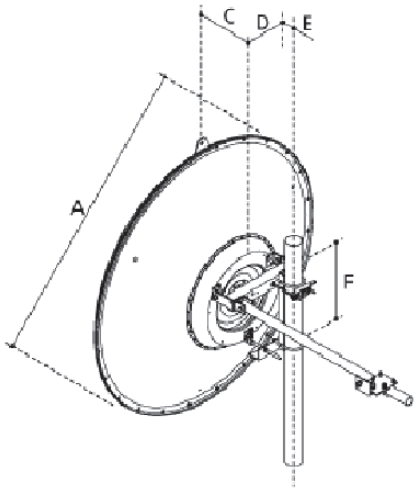
GENERAL SPECIFICATIONS		
Product Type		Point to point antennas
Profile		TrunkLine
Performance		Improved Performance
Polarization		Single
Antenna Input		CPR137G
Reflector		1-part
Radome		Optional
Antenna color		White RAL 9010
Swaybar		1: (2.0 m x Ø60 mm)
ELECTRICAL SPECIFICATIONS		
Frequency	GHz	5.925 - 6.875
3dB beamwidth	degrees	1.7
Low Band Gain	dBi	38.4
Mid Band Gain	dBi	39.1
High Band Gain	dBi	39.7
F/B Ratio	dB	55.0
XPD	dB	30.0
Max VSWR / R L	VSWR / dB	1.08 (28.3)
Regulatory Compliance		FCC Category A
MECHANICAL SPECIFICATIONS		
Diameter	ft (m)	6 (1.8)
Elevation Adjustment	degrees	± 5
Azimuth Adjustment	degrees	± 5
Polarization Adjustment	degrees	± 5
Mounting Pipe Diameter minimum	mm (in)	114 (4.5)
Mounting Pipe Diameter maximum	mm (in)	114 (4.5)
Approximate Weight	kg (lb)	65 (141)
Survival Windspeed	km/h (mph)	200 (125)
Operational Windspeed	km/h (mph)	190 (118)
STRUCTURE		
Radome Material		Fiberglass
FURTHER ACCESSORIES		
optional Swaybar		1: SMA-SK-60-2000A (2.0 m x Ø60mm)
Further Accessories		SMA-SKO-UNIVERSAL-L : Universal sway bar fixation kit

RADIO FREQUENCY SYSTEMS
The Clear Choice®

TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

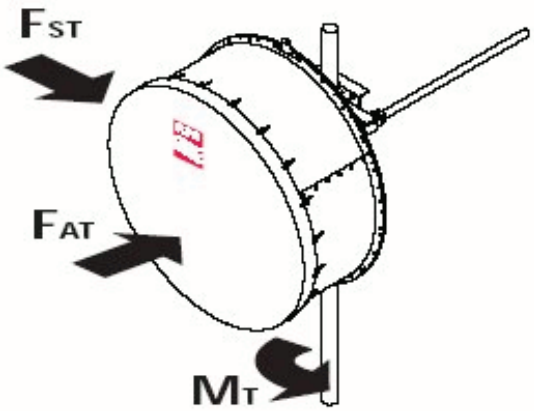
Mount Outline

Dimension A	mm (in)	2000 (79)
Dimension C	mm (in)	364 (14.3)
Dimension D for 114mm (4.5in) Pipe	mm (in)	175 (6.9)
Dimension E	mm (in)	283 (11.1)
Dimension F	mm (in)	590 (23.2)



Wind Load

FST Side force max. @ survival wind speed	N (lb)	2910 (651)
FAT Axial force max. @ survival wind speed	N (lb)	9900 (2217)
MT Torque maximum @ survival wind speed	Nm (lb ft)	3055 (2270)



External Document Links

Complete Antenna installation

RPE (IQ-Link format)

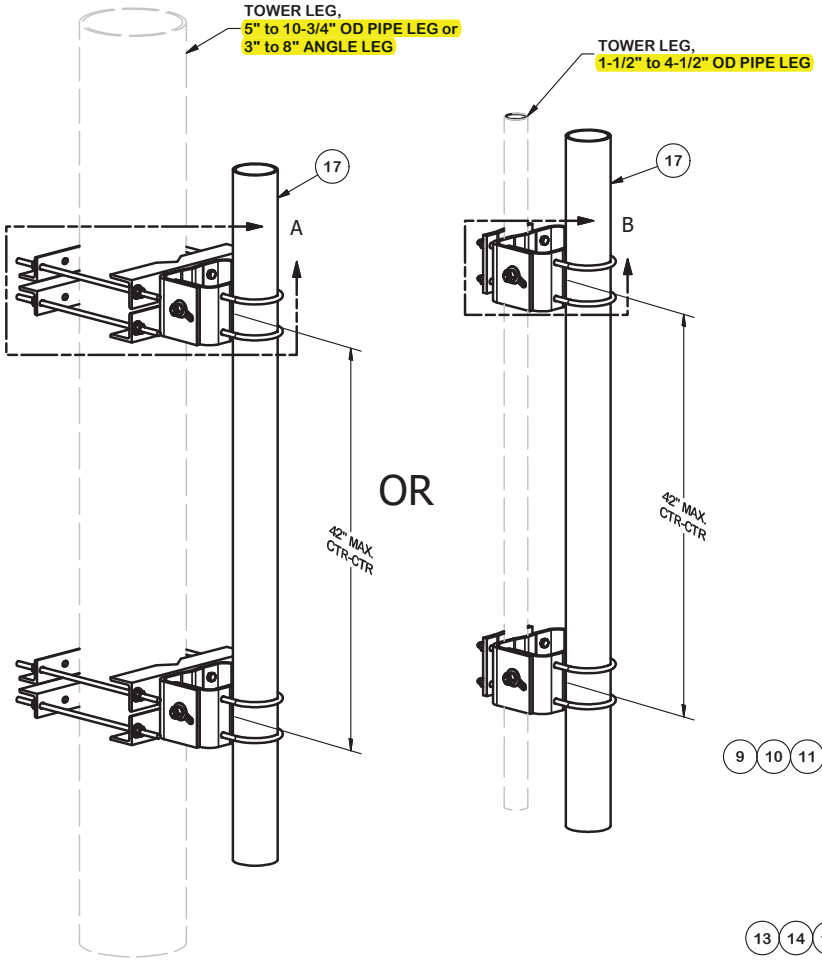
RPE (PDF format)

RPE (Pathloss format)

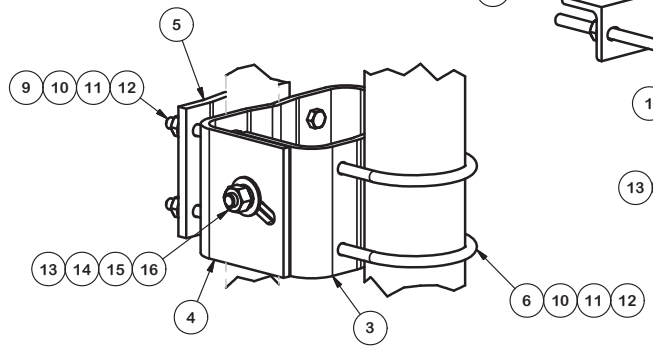
Notes

Only available in North America

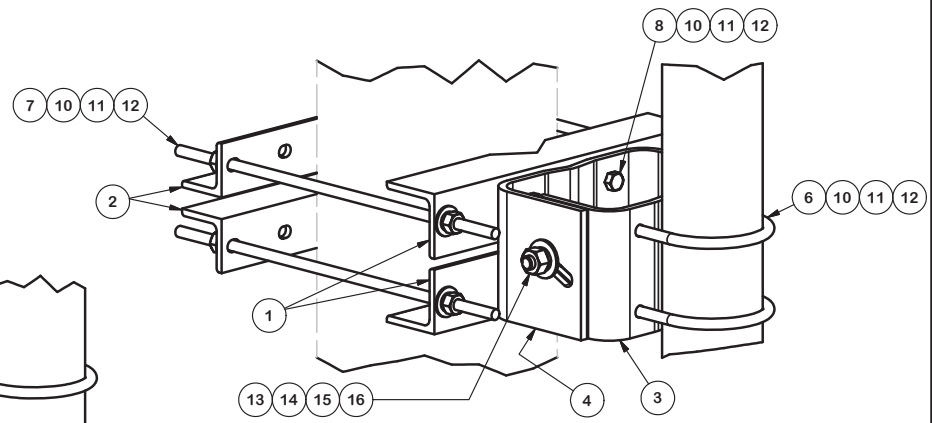
TOWER/MAST SIZE AT PROPOSED ANTENNA ATTACHMENT = 4.5" ± DIAMETER.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-158320	ANGLE CLAMP	16 1/2 in	8.51	34.03
2	4	X-126501	BRACKET ANGLE LEG MOUNTING	16 1/2 in	7.13	28.51
3	2	X-154463	UNIVERSAL PIPE MOUNTING PLATE (INNER)		10.52	21.03
4	2	X-155561	UNIVERSAL PIPE MOUNTING PLATE (OUTER)		13.16	26.31
5	2	X-159999	BACKING PLATE		5.73	11.46
6	4	X-UB1458	1/2" X 4-5/8" X 7" X 3" GALV U-BOLT		0.97	3.89
7	8	G12R-20	1/2" x 20" GALV. THREADED ROD		1.12	8.92
8	8	G1203	1/2" x 3" HDG HEX BOLT GR5 FULL THREAD	3 in	0.22	1.74
9	8	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	2.16
9	8	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	3.28
10	32	G12FW	1/2" HDG USS FLATWASHER		0.03	1.09
11	32	G12LW	1/2" HDG LOCKWASHER		0.01	0.44
12	32	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	2.29
13	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.09
14	4	G58FW	5/8" HDG USS FLATWASHER		0.07	0.28
15	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
16	4	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.52
17	1	P472	4-1/2" X 72" SCH. 40 GALVANIZED PIPE		64.89	64.89
					TOTAL WT. #	148.00



DETAIL B
USED FOR 1-1/2" to 4-1/2" OD PIPE LEGS



DETAIL A
USED FOR 5" to 10-3/4" OD PIPE LEGS
& 3" to 8" ANGLE LEGS

TAPER NOTE:
THE MAXIMUM TAPER ADJUSTMENT IS 5.7° BASED UPON 30" SPACING OF ADJUSTABLE MOUNTING BRACKETS.

THE MAXIMUM TAPER ADJUSTMENT IS 3.8° BASED UPON 45" SPACING OF ADJUSTABLE MOUNTING BRACKET.

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
R5 PIPE MOUNT w/ LARGE LEG ADAPTER
FOR 1-1/2" to 10-3/4" OD PIPE LEGS &
3" TO 8" ANGLE LEGS

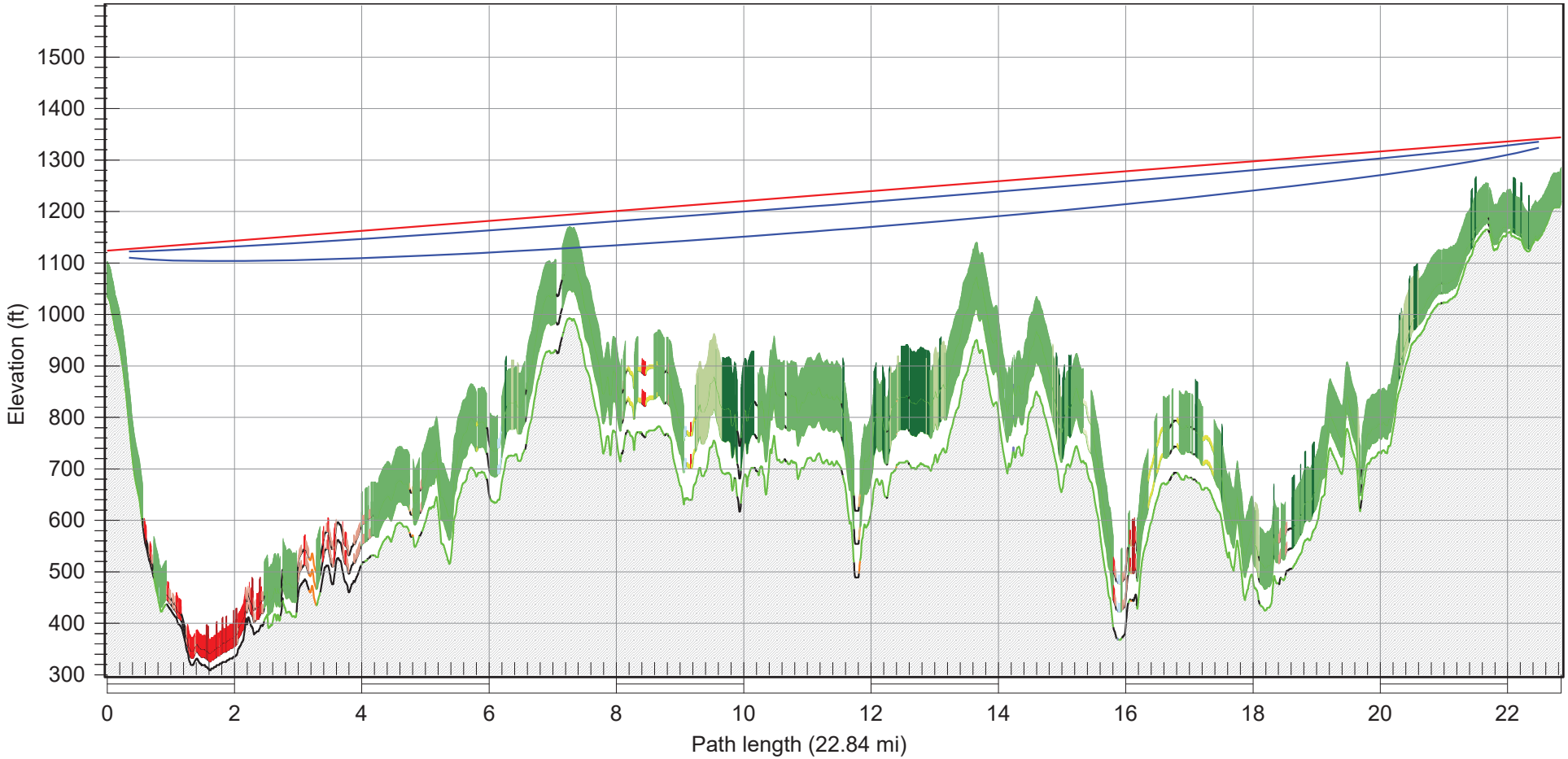
SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4718	RH18 3/30/2010		R5-LL	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/21/2010	R5-LL



CT_SouthMtnRS_ES_130ft_SST	
Latitude	41 38 56.00 N
Longitude	072 56 50.00 W
Azimuth	355.47°
Elevation	1037 ft ASL
Antenna CL	87.0 ft AGL

Frequency (MHz) = 6071.0
K = 1.33, 0.67
%F1 = 100.00, 30.00

CT_WHartland_NESM_180ft_SST	
Latitude	41 58 43.50 N
Longitude	072 58 56.00 W
Azimuth	175.45°
Elevation	1220 ft ASL
Antenna CL	124.0 ft AGL

Microwave Path Data Sheet

COMSEARCH
19700 Janelia Farm Boulevard, Ashburn, VA, 20147
(703)636-5234 www.comsearch.com

PCN Date: 09/18/2019 — New Path
Job Number: 190918COMSDS04 — RCN Number: 19091852

Administrative Information	**SOUTH MTN CT**	**W HARTLAND CT**
City/County	Bristol/Hartford	/Hartford
Status / License Basis	Engineering Proposal / PRIMARY OPERATION	Engineering Proposal / PRIMARY OPERATION
Call Sign	KVG93	
Licensee Code	S68716	S68716
Licensee Name	Eversource Energy Service Company	Eversource Energy Service Company
Radio Service / Station Class	MG -- Microwave Industrial/Business Pool	FXO -- Fixed
Site Information		
Latitude (NAD 83)	41 ° 38’ 56.0" N	41 ° 58’ 43.5" N
Longitude (NAD 83)	72 ° 56’ 50.0" W	72 ° 58’ 56.0" W
Ground Elevation (m/ft-AMSL)	310.60 / 1019.0	371.71 / 1219.5
Antenna Structure Registration #		
Path Azimuth (°)	355.473	175.450
Path Length (km / miles)	36.753 / 22.837	
Transmit Antenna	44008C	44008C
Manufacturer	RFS	RFS
Model	PAD6-59B	PAD6-59B
Gain(dBi) / Beamwidth(°) / Tilt(°)	38.7 / 1.80 / -0.01	38.7 / 1.80 / -0.24
Centerline (m / ft - AGL)	26.52 / 87.0	37.80 / 124.0
Receive Antenna	Same As Transmit	
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Diversity Receive Antenna		
Manufacturer		
Model		
Gain (dBi) / Beamwidth (°)		
Centerline (m / ft - AGL)		
Radio Information	TEEV61	TEEV61
Manufacturer	Aviat Networks, Inc.	Aviat Networks, Inc.
Model	I600V4EHPL6-30M 256Q 179	I600V4EHPL6-30M 256Q 179
Model Description	ECLIPSE IRU 600 RAC 60-6X MAX TP	ECLIPSE IRU 600 RAC 60-6X MAX TP
Emission Designator / Modulation	30M0D7W 256 QAM	30M0D7W 256 QAM
Loading	1 CH DIG 179000.000	1 CH DIG 179000.000
Stability (%)	0.0005	0.0005
	Nominal Coordinated Maximum	Nominal Coordinated Maximum
Power (dBm)	37.0	37.0
Received Level (dBm)	-31.9	-31.9
EIRP (dBm)	72.6	72.1
Fixed Loss: Tx / Common (dB)	0.0 / 3.1	0.0 / 3.6
Free Space Loss (dB)	139.6	
Transmit Frequencies (MHz)	5945.2000V(11T)	6197.2400V(21T)

ATTACHMENT C – STRUCTURAL ANALYSIS REPORT

Date: **January 13, 2022**

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

Subject:	**Structural Analysis Report**	
Eversource Designation:	**Number:**	ES-004
	Site Name:	SouthMtnsRS
Engineering Firm Designation:	**Black & Veatch Corp Project Number:**	405025
Site Data:	**790 Willis Street, Bristol, Hartford County, CT** **Latitude *41° 38' 56.0"*, Longitude *-72° 56' 50.0'*** **130 Foot - Self Support Tower**	

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

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

LC1: Proposed Equipment Configuration **Sufficient Capacity - 41.8%**

This analysis utilizes an ultimate 3-second gust wind of 130 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: Sanyukta R. Arvikar

Respectfully submitted by:

Joshua J Riley, P.E.
Professional Engineer

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
01/13/2022

Riley, Joshua J
Digitally signed by Riley, Joshua J
DN: CN="Riley, Joshua J", O=Black Veatch, C=US
Date: 2022.01.13 11:43:43-06'00'

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Equipment Configuration
Table 2 - Other Considered Equipment

3) ANALYSIS PROCEDURE
Table 3 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 4 - Section Capacity (Summary)
Table 5 – Tower Component Stresses vs. Capacity
4.1) Recommendation

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 130 ft Self Support tower manufactured by Radian in December of 2006.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: III
Wind Speed: 130 mph
Exposure Category: B
Topographic Factor: 1
Ice Thickness: 2 in
Wind Speed with Ice: 50 mph
Seismic Ss: 0.185
Seismic S1: 0.064
Service Wind Speed: 60 mph
Seismic loading does not control per engineering judgement.

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
130.0	140.0	1	comprod	876F-70-2	2	7/8	1
87.0	87.0	1	rfs	PAD6-W59BC	1	E65J	-
		1	site pro 1	R5-LL [PM 602-1]			

Note:
1) Antenna to be installed on existing pipe mount

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
127.0	141.5	1	unknown	25’ Omni	10	7/8	1
	141.0	1	unknown	24’ Omni			
	139.0	1	unknown	21' Omni			
	138.0	1	unknown	18' Omni			
	137.0	1	unknown	16' Omni			
	136.0	1	unknown	16' Omni			
	135.0	1	unknown	12' Omni			
	134.0	1	unknown	10' Omni			
	129.0	1	unknown	10"x8"x3" TMA			
	127.0	1	tower mounts	Sector Mount [SM 501-3]			
125.0	125.0	3	rfs celwave	APXVAALL24_43 w/ Mount Pipe	3	6x24 fiber	1
		3	ericsson	AIR6449 w/ Mount Pipe			
		3	ericsson	AIR32 w/ Mount Pipe			
		3	ericsson	4449			
		3	ericsson	4415			
		1	tower mounts	Sector Mount [SM 502-3]			
117.0	117.0	1	tower mounts	6' x 3" Mount Pipe	1	E60	1
		1	unknown	PA6-59			
113.0	120.0	1	celwave	PD1142-1	1	1/2	1
	113.0	1	tower mounts	Side Arm Mount [SO 306-1]	1	7/8	
107.0	107.0	1	tower mounts	6' x 3" Mount Pipe	1	E65	1
		1	unknown	6 FT Dish			
104.0	111.0	1	celwave	PD1142-1	1	7/8	1
	104.0	1	tower mounts	Side Arm Mount [SO 306-1]			
98.0	98.0	1	antennae	DB205-A	1	7/8	1
		1	tower mounts	Side Arm Mount [SO 306-1]			
96.0	96.0	1	tower mounts	6' x 3" Mount Pipe	1	E60	1
		1	unknown	8 FT Dish			
86.0	86.0	1	tower mounts	6' x 3" Mount Pipe	1	E60	1
		1	unknown	PAD8-59AW			
84.0	91.0	1	celwave	PD1142-1	1	1/2	1
	84.0	1	tower mounts	Side Arm Mount [SO 306-1]			
84.0	84.0	1	antennae	2' Yagi	1	7/8	1
		1	tower mounts	4’x2” Pipe Mount			
77.0	78.0	1	andrew panel antennas	SBNH-1D6565A w/ Mount Pipe	1 4	1/2 1 5/8	1
	77.0	1	tower mounts	Sector Mount [SM 402-1]			
		1	miscl	TMA			
	67.0	2	antennae	3" Dia 20' Omni			
71.0	71.0	1	tower mounts	6' x 3" Mount Pipe	1	E65	1
		1	unknown	4 FT Dish			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
63.0	73.0	1	antennae	3" Dia 20' Omni	1 1 3	7/8 1/2 1 5/8	1
		1	unknown	Diamond X-500A			
	63.0	1	tower mounts	Sector Mount [SM 402-1]			
		1	miscl	TMA			
	53.0	2	antennae	3" Dia 20' Omni			
58.0	58.0	1	tower mounts	Side Arm Mount [SO 306-1]	1	1/2	1
		1	decibel	DB212-1			
54.0	54.0	1	tower mounts	Side Arm Mount [SO 306-1]	1	1/2	1
		1	decibel	DB212-1			
43.0	46.0	1	antennae	3" Dia. 6' Omni	1 1	3/8 7/8	1
	43.0	1	tower mounts	Side Arm Mount [SO 306-1]			
	40.0	1	antennae	3" Dia. 6' Omni			
43.0	43.0	1	tower mounts	Side Arm Mount [SO 306-1]	1	3/8	1
	43.0	1	decibel	DB230-2B			

Note:
1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
TOWER STRUCTURAL ANALYSIS REPORTS	Centek Engineering, Inc., dated 09/16/2013	Tower geometry and geotechnical data	Eversource
TOWER STRUCTURAL ANALYSIS REPORTS	Centek Engineering, Inc., dated 06/14/2019	Tower geometry, tower loading and geotechnical data	Eversource
TOWER STRUCTURAL ANALYSIS REPORTS	Centek Engineering, Inc., dated 03/02/2021	Tower loading	Connecticut Siting Council

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.
4) Tower loading is based on 2018 drone mapping photos and previous tower analyses.
5) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically and must be replaced if damaged or cracked

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	130 - 120	Leg	ROHN 2.5 STD	1	-12.20	60.05	20.3	Pass
T2	120 - 100	Leg	ROHN 3 STD	29	-23.60	74.43	31.7	Pass
T3	100 - 80	Leg	ROHN 4 STD	69	-42.56	122.04	34.9	Pass
T4	80 - 60	Leg	ROHN 5 STD	107	-62.09	150.53	41.2	Pass
T5	60 - 40	Leg	ROHN 5 EH	134	-85.40	211.17	40.4	Pass
T6	40 - 20	Leg	ROHN 6 EHS	161	-107.07	256.16	41.8	Pass
T7	20 - 0	Leg	ROHN 6 EH	189	-128.00	318.80	40.2	Pass
T1	130 - 120	Diagonal	ROHN 2 STD	9	-3.39	25.36	13.4	Pass
T2	120 - 100	Diagonal	ROHN 2.5 STD	36	-4.71	35.92	13.1	Pass
T3	100 - 80	Diagonal	ROHN 2.5 STD	74	-6.27	31.52	19.9	Pass
T4	80 - 60	Diagonal	ROHN 2.5 X-STR	113	-8.46	21.63	39.1	Pass
T5	60 - 40	Diagonal	ROHN 3 STD	140	-7.88	29.61	26.6	Pass
T6	40 - 20	Diagonal	ROHN 3 STD	165	-8.05	26.21	30.7	Pass
T7	20 - 0	Diagonal	ROHN 3 STD	192	-8.22	22.99	35.7	Pass
T1	130 - 120	Horizontal	ROHN 1.5 STD	7	-2.43	23.71	10.2	Pass
T2	120 - 100	Horizontal	ROHN 2 STD	34	-2.87	34.21	8.4 10.0 (b)	Pass
T3	100 - 80	Horizontal	ROHN 2 STD	73	-4.24	28.55	14.9	Pass
T4	80 - 60	Horizontal	ROHN 2 STD	112	-4.95	23.75	20.8	Pass
T5	60 - 40	Horizontal	ROHN 2 STD	139	-5.04	17.60	28.6	Pass
T6	40 - 20	Horizontal	ROHN 2.5 STD	163	-5.46	30.30	18.0 19.3 (b)	Pass
T7	20 - 0	Horizontal	ROHN 2.5 STD	190	-5.85	23.43	25.0	Pass
T1	130 - 120	Top Girt	ROHN 1.5 STD	4	-0.48	23.77	2.0	Pass
T1	130 - 120	Inner Bracing	L2x2x1/8	16	-0.00	8.80	0.8	Pass
T2	120 - 100	Inner Bracing	L2x2x1/8	42	-0.01	6.48	0.9	Pass
T3	100 - 80	Inner Bracing	L2x2x1/8	79	-0.01	4.43	1.1	Pass
T4	80 - 60	Inner Bracing	L2x2x1/8	120	-0.01	3.34	1.2	Pass
T5	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	147	-0.02	6.99	0.9	Pass
T6	40 - 20	Inner Bracing	L 3x3x3/16	174	-0.02	9.16	0.9	Pass
T7	20 - 0	Inner Bracing	L3 1/2x3 /12x1/4	201	-0.02	14.24	0.8	Pass
							Summary	
						Leg (T6)	41.8	Pass
						Diagonal (T4)	39.1	Pass
						Horizontal (T5)	28.6	Pass
						Top Girt (T1)	2.0	Pass
						Inner Bracing (T4)	1.2	Pass
						Bolt Checks	26.7	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Rating =	41.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	27.3	Pass
1	Base Foundation	0	27.8	Pass
1	Base Foundation Soil Interaction	0	33.6	Pass

Structure Rating (max from all components) =	41.8%

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

4.1) Recommendation

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

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load*	*Tilt*	*Twist*	*Check**
	ft	*in*	*Comb.*	°	°	
T1	130 - 120	1.009	44	0.066	0.007	OK
T2	120 - 100	0.869	44	0.065	0.007	OK
T3	100 - 80	0.606	44	0.057	0.007	OK
T4	80 - 60	0.385	44	0.045	0.006	OK
T5	60 - 40	0.219	44	0.032	0.005	OK
T6	40 - 20	0.1	44	0.021	0.004	OK

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

1) Maximum Rotation = 4 Degrees

2) Maximum Deflection = 0.03 * Tower Height = 47 in.

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

Elevation (ft)	*MW Dish*	*Tilt (°)*	*Twist (°)*	*Diameter, D (ft)*	*Frequency, α (GHz)*	*Decibel Points*	*Deformation Limit (θ)**	*Deformation Limit Exceeded?*
117	PA6-59	0.064	0.007	6	10	10 dB	0.885	Not Exceeded
107	6 FT Dish	0.06	0.007	6	10	10 dB	0.885	Not Exceeded
96	8 FT Dish	0.054	0.007	8	10	10 dB	0.664	Not Exceeded
87	PAD6-W59BC	0.049	0.006	6.58333	10	10 dB	0.807	Not Exceeded
86	PAD8-59AW	0.048	0.006	8	10	10 dB	0.664	Not Exceeded
71	4 FT Dish	0.039	0.006	4	10	10 dB	1.328	Not Exceeded

*Limit per TIA-222-H Annex D

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*	*Combined Max*	*Check**
	ft	*in*		°	°		
T1	130 - 120	2.81	44	0.183	0.021	0.184	OK
T2	120 - 100	2.418	44	0.18	0.021	0.181	OK
T3	100 - 80	1.685	44	0.157	0.019	0.158	OK
T4	80 - 60	1.069	44	0.123	0.018	0.124	OK
T5	60 - 40	0.609	44	0.088	0.015	0.089	OK
T6	40 - 20	0.28	44	0.057	0.01	0.058	OK

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

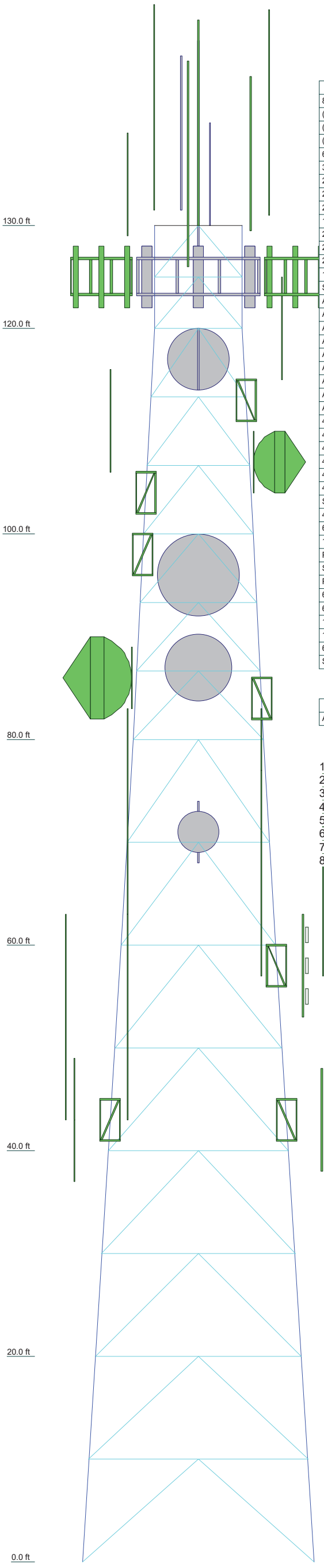
Critical Deflections of Tower at the MW Dish Elevations - Design Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature ft*
ft			*in*	°	°	
117	PA6-59	44	2.303	0.178	0.021	59845.000
107	6 FT Dish	44	1.932	0.167	0.02	47266.000
96	8 FT Dish	44	1.551	0.151	0.019	36745.000
87	PAD6-W59BC	44	1.268	0.136	0.018	31007.000
86	PAD8-59AW	44	1.238	0.134	0.018	30438.000
71	4 FT Dish	44	0.844	0.107	0.017	32092.000

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7
Legs	ROHN 2.5 STD	ROHN 3 STD	ROHN 4 STD	ROHN 5 STD	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH
Leg Grade	A572-50						
Diagonals	ROHN 2.5 STD			ROHN 2.5 X-STR		ROHN 3 STD	
Diagonal Grade	A572-50						
Top Girts	N.A.						
Horizontals	ROHN 2.5 STD			ROHN 2 STD			ROHN 2.5 STD
Inner Bracing	L2x2x1/8			L2 1/2x2 1/2x3/16		L 3x3x3/16	L3 1/2x3 /12x1/4
Face Width (ft) 22.54	8.5	8.54	10.63	12.71	14.96	17.54	20.04
# Panels @ (ft)	2 @ 5	6 @ 6.66667				8 @ 10	
Weight (K) 18.2	0.7	1.8	2.1	2.5	3.1	3.7	4.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
876F-70-2 4-Bay Dipole	130	PD1142-1	104
(2) 14'x2.5" Horizontal Pipe	127	3' Yagi	98
(2) 14'x2.5" Horizontal Pipe	127	Side Arm Mount [SO 306-1]	98
(2) 14'x2.5" Horizontal Pipe	127	4' x 2" Horizontal Face Mount Pipe	96
6'6"x3.5" Mount Pipe	127	12' Hori. 5"x5" Tube	96
3" Dia 12' Omni	127	6' x 3" Mount Pipe	96
2" Dia 10' Omni	127	8 FT Dish	96
2.38" Dia 21' Omni	127	R5-LL [PM 602-1]	87
2.5" Dia 16' Omni	127	PAD6-W59BC	87
18' x 3" Dia Omni	127	8' Horizontal x 2" Mount Pipe	86
2.5" Dia 16' Omni	127	6' x 3" Mount Pipe	86
2" Dia 24' Omni	127	PAD8-59AW	86
2" Dia 25' Omni	127	3' Yagi	84
10"x8"x3" TMA	127	PD1142-1	84
Sector Mount [SM 501-3]	127	Side Arm Mount [SO 306-1]	84
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	125	4' x 2" Pipe Mount	84
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	125	Sector Mount [SM 402-1]	77
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	125	3" Dia. 6' Omni	77
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	125	SBNH-1D6565A w/ Mount Pipe	77
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	125	3" Dia 20' Omni	77
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	125	TMA	77
AIR 32 w/ Mount Pipe	125	3" Dia 20' Omni	77
AIR 32 w/ Mount Pipe	125	4 FT Dish	71
AIR 32 w/ Mount Pipe	125	6' x 3" Mount Pipe	71
4415	125	Sector Mount [SM 402-1]	63
4415	125	3" Dia 20' Omni	63
4415	125	3" Dia 20' Omni	63
4449	125	Diamond X-500A	63
4449	125	3" Dia 20' Omni	63
4449	125	TMA	63
Sector Mount [SM 502-3]	125	DB212-1	58
4' x 2" Horizontal Face Mount Pipe	117	Side Arm Mount [SO 306-1]	58
6' x 3" Mount Pipe	117	(2) 4.5' x 2" horizontal mount pipe	58
10' Hori. 5"x5" Tube	117	8'x2 1/2" Pipe Mount	58
PA6-59	117	Side Arm Mount [SO 306-1]	54
Side Arm Mount [SO 306-1]	113	6' x 2" Mount Pipe	54
PD1142-1	113	DB212-1	54
6'x2" Horizontal Mount Pipe	107	3" Dia. 6' Omni	43
6' x 3" Mount Pipe	107	3" Dia. 6' Omni	43
10' Hori. 5"x5" Tube	107	Side Arm Mount [SO 306-1]	43
10' Hori. 5"x5" Tube	107	Side Arm Mount [SO 306-1]	43
6 FT Dish	107	DB230-2B	43
Side Arm Mount [SO 306-1]	104		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 41.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 138 K
SHEAR: 19 K

UPLIFT: -118 K
SHEAR: 17 K

AXIAL 154 K
SHEAR 12 K *MOMENT 1134 kip-ft*

TORQUE 18 kip-ft
50 mph WIND - 2.000 in ICE

AXIAL 39 K
SHEAR 33 K *MOMENT 2542 kip-ft*

TORQUE 28 kip-ft
REACTIONS - 130 mph WIND

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-6909
FAX: (913) 458-8136

Job: ***ES-004 SouthMtnRS***			
Project: ***405025***			
Client: Eversource	Drawn by: Josh Riley	App'd:	
Code: TIA-222-H	Date: 01/13/22	Scale: NTS	
Path:		Dwg No. E-1	

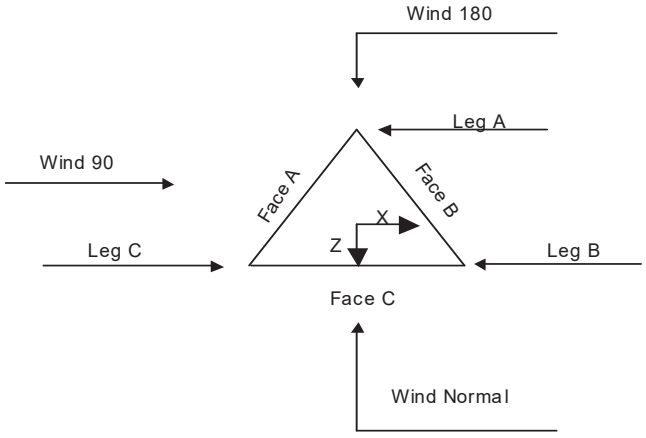
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 130.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 8.500 ft at the top and 22.540 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- Tower base elevation above sea level: 1047.000 ft.
- Basic wind speed of 130 mph.
- Risk Category III.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 2.000 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.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	130.000-120.000			8.500	1	10.000
T2	120.000-100.000			8.540	1	20.000
T3	100.000-80.000			10.630	1	20.000
T4	80.000-60.000			12.710	1	20.000
T5	60.000-40.000			14.960	1	20.000
T6	40.000-20.000			17.540	1	20.000
T7	20.000-0.000			20.040	1	20.000

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	130.000-120.000	5.000	K Brace Down	No	Yes	0.000	0.000
T2	120.000-100.000	6.667	K Brace Down	No	Yes	0.000	0.000
T3	100.000-80.000	6.667	K Brace Down	No	Yes	0.000	0.000
T4	80.000-60.000	10.000	K Brace Down	No	Yes	0.000	0.000
T5	60.000-40.000	10.000	K Brace Down	No	Yes	0.000	0.000
T6	40.000-20.000	10.000	K Brace Down	No	Yes	0.000	0.000
T7	20.000-0.000	10.000	K Brace Down	No	Yes	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 130.000-120.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 120.000-100.000	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T3 100.000-80.000	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T4 80.000-60.000	Pipe	ROHN 5 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)
T5 60.000-40.000	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T6 40.000-20.000	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T7 20.000-0.000	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 130.000-120.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 120.000-100.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 100.000-80.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 80.000-60.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 60.000-40.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T6 40.000-20.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T7 20.000-0.000	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 130.000-120.000	Solid Round		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 120.000-100.000	Solid Round		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T3 100.000-80.000	Solid Round		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T4 80.000-60.000	Solid Round		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 60.000-40.000	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.000-20.000	Solid Round		A572-50 (50 ksi)	Single Angle	L 3x3x3/16	A36 (36 ksi)
T7 20.000-0.000	Solid Round		A572-50 (50 ksi)	Single Angle	L3 1/2x3 /12x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 130.000-120.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T2 120.000-100.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T3 100.000-80.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T4 80.000-60.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T5 60.000-40.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T6 40.000-20.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000
T7 20.000-0.000	0.000	0.375	A36 (36 ksi)	1	1.05	1.05	36.000	36.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 130.000-120.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 120.000-100.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 100.000-80.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 80.000-60.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 60.000-40.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 40.000-20.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 20.000-0.000	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 130.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T4 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 130.000-120.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 120.000-100.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 100.000-80.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 80.000-60.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 60.000-40.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 40.000-20.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 20.000-0.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 130.000-120.000	Flange	0.750 A325N	4	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T2 120.000-100.000	Flange	0.875 A325N	4	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T3 100.000-80.000	Flange	1.000 A325N	4	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T4 80.000-60.000	Flange	1.000 A325N	4	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T5 60.000-40.000	Flange	1.000 A325N	6	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T6 40.000-20.000	Flange	1.000 A325N	6	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0
T7 20.000-0.000	Flange	1.000 A325N	0	0.625 A325N	3	0.625 A325N	0	0.625 A325N	0	0.625 A325N	0	0.625 A325N	2	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder (Af)	C	No	No	Af (CaAa)	130.000 - 0.000	-10.000	0.4	1	1	3.000	3.000		8.40
Safety Line 3/8	C	No	No	Ar (CaAa)	130.000 - 0.000	-10.000	0.4	1	1	0.375	0.375		0.22
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	130.000 - 7.000	0.000	-0.44	10	10	1.000	1.030		0.33
Feedline Ladder (Af)	C	No	No	Af (CaAa)	130.000 - 0.000	0.000	-0.4	1	1	3.000	3.000		8.40
E60	C	No	No	Ar (CaAa)	117.000 - 107.000	0.000	-0.375	1	1	1.000	2.200		1.10
E65+E60	C	No	No	Ar (CaAa)	107.000 - 96.000	0.000	-0.375	2	2	1.000	2.200		1.10
E60+E65+E60	C	No	No	Ar (CaAa)	96.000 - 86.000	0.000	-0.375	3	3	1.000	2.200		1.10
E60+E60+E65+E60	C	No	No	Ar (CaAa)	86.000 - 71.000	0.000	-0.375	4	4	1.000	2.200		1.10
E65+E60+E60+E65+E60	C	No	No	Ar (CaAa)	71.000 - 7.000	0.000	-0.375	5	5	1.000	2.200		1.10
HYBRIFLEX 1-5/8"	A	No	No	Ar (CaAa)	125.000 - 7.000	0.000	-0.42	3	3	1.000	1.980		0.82
Feedline Ladder (Af)	A	No	No	Af (CaAa)	130.000 - 0.000	0.000	-0.42	1	1	3.000	3.000		8.40
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	113.000 - 7.000	3.000	-0.47	1	1	1.000	1.030		0.33
LDF4-75A(1/2)	C	No	No	Ar (CaAa)	113.000 - 7.000	2.000	-0.454	1	1	0.500	0.630		0.16
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	104.000 - 7.000	1.500	-0.47	1	1	1.000	1.030		0.33
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	98.000 - 7.000	4.500	-0.47	1	1	1.000	1.030		0.33
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	84.000 - 7.000	2.000	-0.46	1	1	1.000	1.030		0.33
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	84.000 - 7.000	2.000	-0.445	1	1	0.500	0.625		0.15
Feedline Ladder (Af)	C	No	No	Af (CaAa)	80.000 - 0.000	0.000	0.42	1	1	3.000	3.000		8.40
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	77.000 - 7.000	0.000	0.405	1	1	0.500	0.625		0.15
LDF7-50A(1-5/8)	C	No	No	Ar (CaAa)	77.000 - 7.000	0.000	0.37	4	4	1.000	1.980		0.82
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	63.000 - 7.000	0.000	0.44	1	1	1.000	1.030		0.33
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	63.000 - 7.000	0.000	0.415	1	1	0.500	0.625		0.15
LDF7-50A(1-5/8)	C	No	No	Ar (CaAa)	63.000 - 7.000	0.000	0.47	3	3	1.000	1.980		0.82
LDF4-75A(1/2)	C	No	No	Ar (CaAa)	58.000 - 7.000	2.000	-0.438	1	1	0.500	0.630		0.16
LDF4-75A(1/2)	C	No	No	Ar (CaAa)	54.000 - 7.000	2.000	-0.43	1	1	0.500	0.630		0.16
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	43.000 - 7.000	0.000	0.43	1	1	1.000	1.030		0.33
LDF2-50A(3/8)	C	No	No	Ar (CaAa)	43.000 - 7.000	2.000	-0.418	1	1	0.440	0.440		0.08
LDF2-50A(3/8)	C	No	No	Ar (CaAa)	43.000 - 7.000	2.000	-0.424	1	1	0.440	0.440		0.08
****Proposed ***													
LDF5-50A(7/8)	C	No	No	Ar (CaAa)	127.000 - 0.000	1.500	-0.412	2	1	0.500	1.030		0.33
E65 ** **	C	No	No	Ar (CaAa)	87.000 - 0.000	4.500	-0.412	1	1	0.500	2.200		1.10

Feed Line/Linear Appurtenances - Entered As Area

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	130.000-120.000	A	0.000	0.000	7.970	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	22.117	0.000	0.21
T2	120.000-100.000	A	0.000	0.000	21.880	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	53.320	0.000	0.45
T3	100.000-80.000	A	0.000	0.000	21.880	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	68.546	0.000	0.52
T4	80.000-60.000	A	0.000	0.000	21.880	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	107.445	0.000	0.81
T5	60.000-40.000	A	0.000	0.000	21.880	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	127.489	0.000	0.89
T6	40.000-20.000	A	0.000	0.000	21.880	0.000	0.22
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	131.240	0.000	0.90
T7	20.000-0.000	A	0.000	0.000	17.722	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	99.051	0.000	0.77

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	130.000-120.000	A	2.628	0.000	0.000	19.661	0.000	0.47
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	66.600	0.000	1.45
T2	120.000-100.000	A	2.594	0.000	0.000	57.773	0.000	1.23
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	175.603	0.000	3.68
T3	100.000-80.000	A	2.543	0.000	0.000	57.217	0.000	1.21
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	234.878	0.000	4.67
T4	80.000-60.000	A	2.480	0.000	0.000	56.537	0.000	1.17
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	346.446	0.000	6.85
T5	60.000-40.000	A	2.398	0.000	0.000	55.653	0.000	1.13
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	423.737	0.000	7.97
T6	40.000-20.000	A	2.278	0.000	0.000	54.369	0.000	1.07
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	442.797	0.000	7.97
T7	20.000-0.000	A	2.041	0.000	0.000	40.044	0.000	0.80
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	305.012	0.000	5.27

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	130.000-120.000	3.384	8.185	3.532	9.223
T2	120.000-100.000	4.494	10.970	7.168	14.311
T3	100.000-80.000	9.740	13.955	14.807	19.312
T4	80.000-60.000	5.496	20.381	10.628	27.371
T5	60.000-40.000	1.358	24.024	6.546	33.538
T6	40.000-20.000	1.534	26.372	8.501	38.194
T7	20.000-0.000	-0.374	24.870	5.731	36.017

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Climbing Ladder (Af)	120.00 - 130.00	0.6000	0.5472
T1	2	Safety Line 3/8	120.00 - 130.00	0.6000	0.5472
T1	3	LDF5-50A(7/8)	120.00 - 130.00	0.6000	0.5472
T1	4	Feedline Ladder (Af)	120.00 - 130.00	0.6000	0.5472
T1	10	HYBRIFLEX 1-5/8"	120.00 - 125.00	0.6000	0.5472
T1	13	Feedline Ladder (Af)	120.00 - 130.00	0.6000	0.5472
T1	32	LDF5-50A(7/8)	120.00 - 127.00	0.6000	0.5472
T2	1	Climbing Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T2	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T2	3	LDF5-50A(7/8)	100.00 - 120.00	0.6000	0.6000
T2	4	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T2	5	E60	107.00 - 117.00	0.6000	0.6000
T2	6	E65+E60	100.00 - 107.00	0.6000	0.6000
T2	10	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.6000
T2	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T2	14	LDF5-50A(7/8)	100.00 - 113.00	0.6000	0.6000
T2	15	LDF4-75A(1/2)	100.00 - 113.00	0.6000	0.6000
T2	16	LDF5-50A(7/8)	100.00 - 104.00	0.6000	0.6000
T2	32	LDF5-50A(7/8)	100.00 - 120.00	0.6000	0.6000
T3	1	Climbing Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T3	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T3	3	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	4	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T3	6	E65+E60	96.00 - 100.00	0.6000	0.6000
T3	7	E60+E65+E60	86.00 - 96.00	0.6000	0.6000
T3	8	E60+E60+E65+E60	80.00 - 86.00	0.6000	0.6000
T3	10	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T3	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T3	14	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.6000
T3	15	LDF4-75A(1/2)	80.00 - 100.00	0.6000	0.6000
T3	16	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.6000
T3	17	LDF5-50A(7/8)	80.00 - 98.00	0.6000	0.6000
T3	18	LDF5-50A(7/8)	80.00 - 84.00	0.6000	0.6000
T3	19	LDF4-50A(1/2)	80.00 - 84.00	0.6000	0.6000
T3	32	LDF5-50A(7/8)	80.00 - 100.00	0.6000	0.6000
T3	33	E65	80.00 - 87.00	0.6000	0.6000
T4	1	Climbing Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T4	3	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T4	4	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	8	E60+E60+E65+E60	71.00 - 80.00	0.6000	0.6000
T4	9	E65+E60+E60+E65+E60	60.00 - 71.00	0.6000	0.6000
T4	10	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T4	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	14	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T4	15	LDF4-75A(1/2)	60.00 - 80.00	0.6000	0.6000
T4	16	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T4	17	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T4	18	LDF5-50A(7/8)	60.00 - 80.00	0.6000	0.6000
T4	19	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T4	20	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T4	21	LDF4-50A(1/2)	60.00 - 77.00	0.6000	0.6000
T4	22	LDF7-50A(1-5/8)	60.00 - 77.00	0.6000	0.6000
T4	23	LDF5-50A(7/8)	60.00 - 63.00	0.6000	0.6000
T4	24	LDF4-50A(1/2)	60.00 - 63.00	0.6000	0.6000
T4	25	LDF7-50A(1-5/8)	60.00 - 63.00	0.6000	0.6000
T4	32	LDF5-50A(7/8)	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	33	E65	80.00 60.00 -	0.6000	0.6000
T5	1	Climbing Ladder (Af)	80.00 40.00 -	0.6000	0.6000
T5	2	Safety Line 3/8	60.00 40.00 -	0.6000	0.6000
T5	3	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	4	Feedline Ladder (Af)	60.00 40.00 -	0.6000	0.6000
T5	9	E65+E60+E60+E65+E60	60.00 40.00 -	0.6000	0.6000
T5	10	HYBRIFLEX 1-5/8"	60.00 40.00 -	0.6000	0.6000
T5	13	Feedline Ladder (Af)	60.00 40.00 -	0.6000	0.6000
T5	14	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	15	LDF4-75A(1/2)	60.00 40.00 -	0.6000	0.6000
T5	16	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	17	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	18	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	19	LDF4-50A(1/2)	60.00 40.00 -	0.6000	0.6000
T5	20	Feedline Ladder (Af)	60.00 40.00 -	0.6000	0.6000
T5	21	LDF4-50A(1/2)	60.00 40.00 -	0.6000	0.6000
T5	22	LDF7-50A(1-5/8)	60.00 40.00 -	0.6000	0.6000
T5	23	LDF5-50A(7/8)	60.00 40.00 -	0.6000	0.6000
T5	24	LDF4-50A(1/2)	60.00 40.00 -	0.6000	0.6000
T5	25	LDF7-50A(1-5/8)	60.00 40.00 -	0.6000	0.6000
T5	26	LDF4-75A(1/2)	60.00 40.00 -	0.6000	0.6000
T5	27	LDF4-75A(1/2)	58.00 40.00 -	0.6000	0.6000
T5	28	LDF5-50A(7/8)	54.00 40.00 -	0.6000	0.6000
T5	29	LDF2-50A(3/8)	43.00 40.00 -	0.6000	0.6000
T5	30	LDF2-50A(3/8)	43.00 40.00 -	0.6000	0.6000
T5	32	LDF5-50A(7/8)	43.00 40.00 -	0.6000	0.6000
T5	33	E65	60.00 40.00 -	0.6000	0.6000
T6	1	Climbing Ladder (Af)	60.00 20.00 -	0.6000	0.6000
T6	2	Safety Line 3/8	40.00 20.00 -	0.6000	0.6000
T6	3	LDF5-50A(7/8)	40.00 20.00 -	0.6000	0.6000
T6	4	Feedline Ladder (Af)	40.00 20.00 -	0.6000	0.6000
T6	9	E65+E60+E60+E65+E60	40.00 20.00 -	0.6000	0.6000
T6	10	HYBRIFLEX 1-5/8"	40.00 20.00 -	0.6000	0.6000
T6	13	Feedline Ladder (Af)	40.00 20.00 -	0.6000	0.6000
			40.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	14	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	15	LDF4-75A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	16	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	17	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	18	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	19	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	20	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	21	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	22	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T6	23	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	25	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T6	26	LDF4-75A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	27	LDF4-75A(1/2)	20.00 - 40.00	0.6000	0.6000
T6	28	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	29	LDF2-50A(3/8)	20.00 - 40.00	0.6000	0.6000
T6	30	LDF2-50A(3/8)	20.00 - 40.00	0.6000	0.6000
T6	32	LDF5-50A(7/8)	20.00 - 40.00	0.6000	0.6000
T6	33	E65	20.00 - 40.00	0.6000	0.6000
T7	1	Climbing Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T7	3	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	4	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	9	E65+E60+E60+E65+E60	7.00 - 20.00	0.6000	0.6000
T7	10	HYBRIFLEX 1-5/8"	7.00 - 20.00	0.6000	0.6000
T7	13	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	14	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	15	LDF4-75A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	16	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	17	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	18	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	19	LDF4-50A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	20	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T7	21	LDF4-50A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	22	LDF7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T7	23	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	24	LDF4-50A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	25	LDF7-50A(1-5/8)	7.00 - 20.00	0.6000	0.6000
T7	26	LDF4-75A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	27	LDF4-75A(1/2)	7.00 - 20.00	0.6000	0.6000
T7	28	LDF5-50A(7/8)	7.00 - 20.00	0.6000	0.6000
T7	29	LDF2-50A(3/8)	7.00 - 20.00	0.6000	0.6000
T7	30	LDF2-50A(3/8)	7.00 - 20.00	0.6000	0.6000
T7	32	LDF5-50A(7/8)	0.00 - 20.00	0.6000	0.6000
T7	33	E65	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment ° ft	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Sector Mount [SM 501-3]	A	From Face	0.000 0.000 0.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	20.430 30.050 40.280 64.650	20.430 30.050 40.280 64.650	0.90 1.28 1.80 3.23
(2) 14'x2.5" Horizontal Pipe	A	From Face	0.000 -4.000 0.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.169 5.651 7.150 10.198	0.024 0.097 0.171 0.318	0.08 0.11 0.15 0.26
(2) 14'x2.5" Horizontal Pipe	B	From Face	0.000 -4.000 0.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.169 5.651 7.150 10.198	0.024 0.097 0.171 0.318	0.08 0.11 0.15 0.26
(2) 14'x2.5" Horizontal Pipe	C	From Face	0.000 -4.000 0.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.169 5.651 7.150 10.198	0.024 0.097 0.171 0.318	0.08 0.11 0.15 0.26
6'6"x3.5" Mount Pipe	C	From Face	0.000 0.000 0.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.161 2.554 2.957 3.790	2.161 2.554 2.957 3.790	0.02 0.03 0.06 0.11
3" Dia 12' Omni	B	From Face	0.000 -2.000 8.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.833 6.083 8.017	3.600 4.833 6.083 8.017	0.02 0.05 0.08 0.17
2" Dia 10' Omni	C	From Leg	3.000 0.000 7.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.000 3.030 4.060 6.120	2.000 3.030 4.060 6.120	0.01 0.03 0.04 0.07
2.38" Dia 21' Omni	A	From Face	0.000 1.000 12.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.998 7.126 9.271 13.611	4.998 7.126 9.271 13.611	0.01 0.05 0.10 0.24
2.5" Dia 16' Omni	C	From Face	0.000 1.000 9.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 5.629 7.275 10.617	4.000 5.629 7.275 10.617	0.03 0.06 0.10 0.21
18' x 3" Dia Omni	A	From Leg	3.000 0.000 11.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.400 7.233 9.083 12.833	5.400 7.233 9.083 12.833	0.14 0.18 0.23 0.36
2.5" Dia 16' Omni	B	From Leg	1.000 0.000 10.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 5.629 7.275 10.617	4.000 5.629 7.275 10.617	0.03 0.06 0.10 0.21
2" Dia 24' Omni	B	From Leg	3.000 0.000 14.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.800 7.225 9.667 14.600	4.800 7.225 9.667 14.600	0.05 0.08 0.13 0.28
2" Dia 25' Omni	C	From Leg	0.000	0.000	127.000	No Ice	5.000	5.000	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 14.500			1/2" Ice 1" Ice 2" Ice	7.525 10.067 15.200	7.525 10.067 15.200	0.09 0.14 0.30
10"x8"x3" TMA	C	From Leg	2.000 0.000 2.000	0.000	127.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.000 1.131 1.270 1.570	0.410 0.510 0.618 0.853	0.01 0.02 0.03 0.05
***									
Sector Mount [SM 502-3]	A	None		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	29.820 42.210 54.430 78.490	29.820 42.210 54.430 78.490	1.67 2.27 3.05 5.18
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	A	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	10.869 12.393 13.942 16.291	0.20 0.34 0.48 0.81
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	B	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	10.869 12.393 13.942 16.291	0.20 0.34 0.48 0.81
APXVAA4L24_43-U-NA20_TIA w/ Mount Pipe	C	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	20.480 21.231 21.990 23.444	10.869 12.393 13.942 16.291	0.20 0.34 0.48 0.81
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	A	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	B	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
AIR6449 B41_T-MOBILE_TIA w/ Mount Pipe	C	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.13 0.18 0.23 0.36
AIR 32 w/ Mount Pipe	A	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.760 4.120 4.480 5.240	3.150 3.490 3.840 4.580	0.12 0.18 0.25 0.41
AIR 32 w/ Mount Pipe	B	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.760 4.120 4.480 5.240	3.150 3.490 3.840 4.580	0.12 0.18 0.25 0.41
AIR 32 w/ Mount Pipe	C	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.760 4.120 4.480 5.240	3.150 3.490 3.840 4.580	0.12 0.18 0.25 0.41
4415	A	From Face	3.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.856 2.027 2.204 2.582	0.683 0.801 0.925 1.196	0.04 0.06 0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4415	B	From Face	3.000	0.000	0.000	125.000	No Ice	1.856	0.683	0.04
			0.000				1/2" Ice	2.027	0.801	0.06
			0.000				1" Ice	2.204	0.925	0.07
							2" Ice	2.582	1.196	0.11
4415	C	From Face	3.000	0.000	0.000	125.000	No Ice	1.856	0.683	0.04
			0.000				1/2" Ice	2.027	0.801	0.06
			0.000				1" Ice	2.204	0.925	0.07
							2" Ice	2.582	1.196	0.11
4449	A	From Face	3.000	0.000	0.000	125.000	No Ice	1.969	1.402	0.07
			0.000				1/2" Ice	2.145	1.558	0.09
			0.000				1" Ice	2.329	1.720	0.11
							2" Ice	2.719	2.068	0.16
4449	B	From Face	3.000	0.000	0.000	125.000	No Ice	1.969	1.402	0.07
			0.000				1/2" Ice	2.145	1.558	0.09
			0.000				1" Ice	2.329	1.720	0.11
							2" Ice	2.719	2.068	0.16
4449	C	From Face	3.000	0.000	0.000	125.000	No Ice	1.969	1.402	0.07
			0.000				1/2" Ice	2.145	1.558	0.09
			0.000				1" Ice	2.329	1.720	0.11
							2" Ice	2.719	2.068	0.16
10' Hori. 5"x5" Tube	B	From Face	0.000	0.000	0.000	117.000	No Ice	5.000	0.208	0.16
			0.000				1/2" Ice	5.712	0.268	0.20
			0.000				1" Ice	6.423	0.334	0.25
							2" Ice	7.847	0.490	0.33
4' x 2" Horizontal Face Mount Pipe	A	From Leg	0.500	0.000	0.000	117.000	No Ice	0.870	0.010	0.01
			0.000				1/2" Ice	1.110	0.050	0.02
			0.000				1" Ice	1.370	0.100	0.03
							2" Ice	1.900	0.240	0.06
6' x 3" Mount Pipe	A	From Leg	0.500	0.000	0.000	117.000	No Ice	1.767	1.767	0.03
			0.000				1/2" Ice	2.129	2.129	0.04
			0.000				1" Ice	2.501	2.501	0.06
							2" Ice	3.272	3.272	0.11
Side Arm Mount [SO 306-1]	B	From Leg	0.000	0.000	0.000	113.000	No Ice	0.410	2.260	0.04
			0.000				1/2" Ice	0.810	3.830	0.06
			0.000				1" Ice	1.230	5.480	0.09
							2" Ice	2.080	9.370	0.19
PD1142-1	B	From Leg	4.000	0.000	0.000	113.000	No Ice	1.316	1.316	0.01
			0.000				1/2" Ice	3.210	3.210	0.02
			7.000				1" Ice	5.121	5.121	0.05
							2" Ice	8.993	8.993	0.14
10' Hori. 5"x5" Tube	C	From Face	0.000	0.000	0.000	107.000	No Ice	5.000	0.208	0.16
			0.000				1/2" Ice	5.712	0.268	0.20
			0.000				1" Ice	6.423	0.334	0.25
							2" Ice	7.847	0.490	0.33
10' Hori. 5"x5" Tube	B	From Face	0.000	0.000	0.000	107.000	No Ice	5.000	0.208	0.16
			0.000				1/2" Ice	5.712	0.268	0.20
			0.000				1" Ice	6.423	0.334	0.25
							2" Ice	7.847	0.490	0.33
6'x2" Horizontal Mount Pipe	B	From Face	0.500	0.000	0.000	107.000	No Ice	1.425	0.047	0.03
			0.000				1/2" Ice	1.842	0.077	0.04
			0.000				1" Ice	2.266	0.115	0.06
							2" Ice	3.137	0.212	0.11

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' x 3" Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.03 0.04 0.06 0.11
Side Arm Mount [SO 306-1]	C	From Leg	0.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
PD1142-1	C	From Leg	4.000 0.000 7.000	0.000	104.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.316 3.210 5.121 8.993	1.316 3.210 5.121 8.993	0.01 0.02 0.05 0.14
Side Arm Mount [SO 306-1]	C	From Leg	0.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
3' Yagi	C	From Leg	4.000 0.000 0.000	0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.083 3.787 5.517 9.055	2.083 3.787 5.517 9.055	0.03 0.05 0.09 0.18
12' Hori. 5"x5" Tube	A	From Face	0.000 0.000 0.000	0.000	96.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.000 6.854 7.708 9.416	0.208 0.268 0.334 0.490	0.19 0.24 0.30 0.40
4' x 2" Horizontal Face Mount Pipe	A	From Leg	0.500 0.000 0.000	0.000	96.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.870 1.110 1.370 1.900	0.010 0.050 0.100 0.240	0.01 0.02 0.03 0.06
6' x 3" Mount Pipe	A	From Leg	0.500 0.000 0.000	0.000	96.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.03 0.04 0.06 0.11
8' Horizontal x 2" Mount Pipe	C	From Face	0.500 0.000 0.000	0.000	86.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.450 3.008 4.145	0.047 0.077 0.115 0.212	0.03 0.05 0.07 0.14
6' x 3" Mount Pipe	C	From Leg	0.500 0.000 0.000	0.000	86.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.03 0.04 0.06 0.11
PD1142-1	B	From Leg	4.000 0.000 7.000	0.000	84.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.316 3.210 5.121 8.993	1.316 3.210 5.121 8.993	0.01 0.02 0.05 0.14
Side Arm Mount [SO 306-1]	B	From Leg	0.000 0.000 0.000	0.000	84.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
3' Yagi	A	From Leg	0.500 0.000 0.000	0.000	84.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.083 3.787 5.517 9.055	2.083 3.787 5.517 9.055	0.03 0.05 0.09 0.18

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
4' x 2" Pipe Mount	A	From Leg	0.500 0.000 0.000	0.000	84.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.785 1.028 1.281 1.814	0.785 1.028 1.281 1.814	0.03 0.04 0.04 0.07
Sector Mount [SM 402-1]	B	From Leg	0.000 0.000 0.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.720 13.660 17.550 25.280	7.050 9.870 12.660 18.130	0.28 0.40 0.57 1.01
SBNH-1D6565A w/ Mount Pipe	B	From Leg	3.000 -6.000 1.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.599 6.007 6.417 7.263	4.774 5.446 6.095 7.443	0.06 0.11 0.16 0.30
3" Dia 20' Omni	B	From Leg	3.000 -6.000 -10.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 6.000 8.000 12.000	4.000 6.000 8.000 12.000	0.06 0.10 0.14 0.23
3" Dia. 6' Omni	B	From Leg	3.000 6.000 3.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.05 0.06 0.08 0.12
3" Dia 20' Omni	B	From Leg	3.000 6.000 -10.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 6.000 8.000 12.000	4.000 6.000 8.000 12.000	0.06 0.10 0.14 0.23
TMA	B	From Leg	3.000 0.000 0.000	0.000	77.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.600 0.704 0.815 1.059	0.407 0.497 0.593 0.815	0.01 0.02 0.02 0.04
6' x 3" Mount Pipe	A	From Leg	0.500 0.000 0.000	0.000	71.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.03 0.04 0.06 0.11
Sector Mount [SM 402-1]	C	From Leg	0.000 0.000 0.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.720 13.660 17.550 25.280	7.050 9.870 12.660 18.130	0.28 0.40 0.57 1.01
3" Dia 20' Omni	C	From Leg	3.000 -6.000 10.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 6.000 8.000 12.000	4.000 6.000 8.000 12.000	0.06 0.10 0.14 0.23
3" Dia 20' Omni	C	From Leg	3.000 -6.000 -10.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 6.000 8.000 12.000	4.000 6.000 8.000 12.000	0.06 0.10 0.14 0.23
Diamond X-500A	C	From Leg	3.000 6.000 10.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.998 7.126 9.271 13.611	4.998 7.126 9.271 13.611	0.01 0.05 0.10 0.24
3" Dia 20' Omni	C	From Leg	3.000 6.000 -10.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.000 6.000 8.000 12.000	4.000 6.000 8.000 12.000	0.06 0.10 0.14 0.23

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
TMA	C	From Leg	3.000 0.000 0.000	0.000	63.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.600 0.704 0.815 1.059	0.407 0.497 0.593 0.815	0.01 0.02 0.02 0.04
***									
(2) 4.5' x 2" horizontal mount pipe	B	From Leg	1.000 0.000 0.000	0.000	58.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.860 1.180 1.460 2.050	0.010 0.040 0.090 0.210	0.01 0.02 0.03 0.06
8'x2 1/2" Pipe Mount	B	From Leg	1.000 0.000 0.000	0.000	58.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.300 3.132 3.620 4.620	2.300 3.132 3.620 4.620	0.04 0.06 0.08 0.14
DB212-1	B	From Leg	3.000 0.000 0.000	0.000	58.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.400 8.418 12.452 20.570	4.400 8.418 12.452 20.570	0.03 0.07 0.13 0.34
Side Arm Mount [SO 306-1]	B	From Leg	0.000 0.000 0.000	0.000	58.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
***									
Side Arm Mount [SO 306-1]	A	From Leg	0.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
6' x 2" Mount Pipe	A	From Leg	0.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.02 0.03 0.05 0.09
DB212-1	A	From Leg	4.000 0.000 0.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.400 8.418 12.452 20.570	4.400 8.418 12.452 20.570	0.03 0.07 0.13 0.34
***									
Side Arm Mount [SO 306-1]	C	From Leg	0.000 0.000 0.000	0.000	43.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
3" Dia. 6' Omni	C	From Leg	4.000 0.000 3.000	0.000	43.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.05 0.06 0.08 0.12
3" Dia. 6' Omni	C	From Leg	4.000 0.000 -3.000	0.000	43.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.767 2.129 2.501 3.272	1.767 2.129 2.501 3.272	0.05 0.06 0.08 0.12
Side Arm Mount [SO 306-1]	B	From Leg	0.000 0.000 0.000	0.000	43.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.410 0.810 1.230 2.080	2.260 3.830 5.480 9.370	0.04 0.06 0.09 0.19
DB230-2B	B	From Leg	4.000 0.000	0.000	43.000	No Ice 1/2"	2.100 3.780	2.100 3.780	0.10 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			Ice	5.460	5.460	0.17
						1" Ice	8.820	8.820	0.23
						2" Ice			
****Proposed***									
876F-70-2 4-Bay Dipole	C	From Face	0.000	0.000	130.000	No Ice	10.680	10.680	0.13
			0.000			1/2"	17.160	17.160	0.17
			10.000			Ice	23.640	23.640	0.21
						1" Ice	36.600	36.600	0.29
						2" Ice			
R5-LL [PM 602-1]	A	From Leg	0.500	0.000	87.000	No Ice	5.250	1.580	0.09
			0.000			1/2"	6.500	1.950	0.12
			0.000			Ice	7.750	2.320	0.14
						1" Ice	10.250	3.060	0.19
						2" Ice			
***									
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
PA6-59	A	Paraboloid w/Radome	From Leg	0.500 0.000 0.000	0.000		117.000	6.000	No Ice 1/2" Ice 1" Ice 2" Ice	28.300 29.050 29.801 31.302	0.19 0.33 0.48 0.78
6 FT Dish	B	Paraboloid w/Radome	From Leg	0.500 0.000 0.000	0.000		107.000	6.000	No Ice 1/2" Ice 1" Ice 2" Ice	28.300 29.050 29.801 31.302	0.19 0.33 0.48 0.78
8 FT Dish	A	Paraboloid w/Radome	From Leg	0.500 0.000 0.000	0.000		96.000	8.000	No Ice 1/2" Ice 1" Ice 2" Ice	50.300 51.292 52.284 54.268	0.04 0.30 0.57 1.09
PAD8-59AW	C	Paraboloid w/Radome	From Leg	0.500 0.000 0.000	0.000		86.000	8.000	No Ice 1/2" Ice 1" Ice 2" Ice	50.300 51.292 52.284 54.268	0.04 0.30 0.57 1.09
4 FT Dish	A	Paraboloid w/Radome	From Leg	0.500 0.000 0.000	0.000		71.000	4.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.570 13.100 13.620 14.680	0.08 0.15 0.21 0.35
*****											
PAD6-W59BC	A	Paraboloid w/Radome	From Leg	1.000 0.000 0.000	-34.500		87.000	6.583	No Ice 1/2" Ice 1" Ice 2" Ice	34.040 34.910 35.770 37.510	0.14 0.29 0.47 0.83

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice

Comb. No.	Description
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
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	130 - 120	Leg	Max Tension	23	2.43	-0.37	0.03
			Max. Compression	35	-12.20	-0.02	0.00
			Max. Mx	14	1.18	0.70	-0.03
			Max. My	8	-0.97	0.01	-0.76
			Max. Vy	22	-1.09	-0.37	0.03
			Max. Vx	25	1.10	0.00	0.39
		Diagonal	Max Tension	9	3.32	0.00	0.00
			Max. Compression	8	-3.39	0.00	0.00
			Max. Mx	26	-0.16	0.07	0.00
			Max. Vy	26	0.04	0.00	0.00
		Horizontal	Max Tension	22	2.48	-0.01	0.00
			Max. Compression	11	-2.43	0.00	0.00
			Max. Mx	37	-0.20	-0.05	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	22	-1.10	-0.01	-0.01
			Max. Vy	37	0.05	-0.05	-0.00
			Max. Vx	22	0.00	0.00	0.00
		Top Girt	Max Tension	23	0.48	-0.00	0.00
			Max. Compression	10	-0.48	0.00	0.00
			Max. Mx	37	-0.15	-0.04	-0.00
			Max. My	18	0.25	-0.01	0.00
			Max. Vy	37	0.05	-0.04	-0.00
			Max. Vx	18	-0.00	-0.01	0.00
		Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	22	-0.00	0.00	0.00
			Max. Mx	26	-0.00	-0.04	0.00
			Max. Vy	26	0.04	0.00	0.00
T2	120 - 100	Leg	Max Tension	15	15.89	-0.22	-0.03
			Max. Compression	31	-23.60	0.06	-0.02
			Max. Mx	14	4.20	0.40	0.02
			Max. My	19	1.35	-0.14	0.45
			Max. Vy	22	0.31	-0.08	0.08
			Max. Vx	18	-0.40	-0.04	0.13
		Diagonal	Max Tension	25	4.59	0.00	0.00
			Max. Compression	24	-4.71	0.00	0.00
			Max. Mx	26	-0.14	0.14	0.00
			Max. Vy	26	-0.07	0.00	0.00
		Horizontal	Max Tension	24	2.89	0.00	0.00
			Max. Compression	25	-2.87	0.00	0.00
			Max. Mx	33	-0.09	-0.09	-0.00
			Max. My	14	-0.32	-0.03	-0.01
			Max. Vy	33	0.07	-0.09	-0.00
			Max. Vx	2	0.00	0.00	0.00
		Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	37	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.06	0.00
			Max. Vy	26	0.05	0.00	0.00
T3	100 - 80	Leg	Max Tension	15	34.00	-0.12	-0.06
			Max. Compression	2	-42.56	0.40	-0.16
			Max. Mx	14	20.49	0.49	0.04
			Max. My	5	-3.44	-0.03	-0.61
			Max. Vy	6	-0.43	-0.19	-0.02
			Max. Vx	11	-0.50	-0.09	-0.19
		Diagonal	Max Tension	13	6.12	0.00	0.00
			Max. Compression	12	-6.27	0.00	0.00
			Max. Mx	26	-0.21	0.18	0.00
			Max. Vy	26	0.08	0.00	0.00
		Horizontal	Max Tension	12	4.26	-0.02	-0.00
			Max. Compression	13	-4.24	-0.02	-0.00
			Max. Mx	33	-0.00	-0.11	-0.00
			Max. My	14	-0.36	-0.04	-0.01
			Max. Vy	33	-0.08	-0.11	-0.00
			Max. Vx	14	-0.00	-0.04	-0.01
		Inner Bracing	Max Tension	11	0.00	0.00	0.00
			Max. Compression	33	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.08	0.00
			Max. Vy	26	0.06	0.00	0.00
T4	80 - 60	Leg	Max Tension	15	51.78	-0.45	-0.18
			Max. Compression	10	-62.09	0.44	-0.25
			Max. Mx	22	36.85	-0.53	0.17
			Max. My	12	-7.46	-0.06	-0.68
			Max. Vy	29	0.26	-0.42	-0.04
			Max. Vx	4	-0.41	-0.04	-0.61
		Diagonal	Max Tension	13	8.26	0.00	0.00
			Max. Compression	12	-8.46	0.00	0.00
			Max. Mx	26	-0.00	0.30	0.00
			Max. Vy	26	-0.10	0.00	0.00
		Horizontal	Max Tension	12	5.00	-0.03	-0.00
			Max. Compression	13	-4.95	-0.02	-0.00
			Max. Mx	33	-0.32	-0.14	-0.00
			Max. My	14	-0.63	-0.05	-0.01
			Max. Vy	33	0.09	-0.14	-0.00
			Max. Vx	14	0.00	-0.05	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Inner Bracing	Max Tension	3	0.00	0.00	0.00
			Max. Compression	37	-0.01	0.00	0.00
			Max. Mx	26	-0.01	-0.11	0.00
			Max. Vy	26	-0.06	0.00	0.00
T5	60 - 40	Leg	Max Tension	15	72.46	-0.35	0.08
			Max. Compression	10	-85.40	0.34	-0.16
			Max. Mx	6	54.95	-0.52	-0.06
			Max. My	12	-7.92	-0.06	-0.68
			Max. Vy	37	-0.19	-0.26	0.12
			Max. Vx	4	-0.24	0.00	-0.41
		Diagonal	Max Tension	13	7.63	0.00	0.00
			Max. Compression	12	-7.88	0.00	0.00
			Max. Mx	26	0.03	0.39	0.00
			Max. Vy	26	0.12	0.00	0.00
		Horizontal	Max Tension	12	5.11	-0.04	-0.00
			Max. Compression	13	-5.04	-0.03	-0.00
			Max. Mx	33	-0.24	-0.17	-0.00
			Max. My	2	0.70	-0.02	0.01
			Max. Vy	33	0.10	-0.17	-0.00
			Max. Vx	2	0.00	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	37	-0.02	0.00	0.00
			Max. Mx	26	-0.02	-0.18	0.00
			Max. Vy	26	-0.09	0.00	0.00
T6	40 - 20	Leg	Max Tension	15	91.77	-0.42	0.01
			Max. Compression	10	-107.07	0.28	-0.07
			Max. Mx	14	80.09	-0.42	0.01
			Max. My	12	-9.92	-0.03	-0.53
			Max. Vy	6	-0.09	-0.41	-0.07
			Max. Vx	22	0.12	0.13	0.50
		Diagonal	Max Tension	9	7.70	0.00	0.00
			Max. Compression	8	-8.05	0.00	0.00
			Max. Mx	26	-0.02	0.46	0.00
			Max. Vy	26	-0.13	0.00	0.00
		Horizontal	Max Tension	8	5.61	0.00	0.00
			Max. Compression	9	-5.46	0.00	0.00
			Max. Mx	33	-0.10	-0.27	-0.00
			Max. My	14	-0.17	-0.10	-0.01
			Max. Vy	33	0.13	-0.27	-0.00
			Max. Vx	14	0.00	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	37	-0.02	0.00	0.00
			Max. Mx	26	-0.02	-0.25	0.00
			Max. Vy	26	0.11	0.00	0.00
T7	20 - 0	Leg	Max Tension	15	109.93	-0.54	-0.00
			Max. Compression	2	-128.00	0.00	-0.00
			Max. Mx	27	-76.15	0.69	-0.00
			Max. My	12	-12.52	-0.04	-0.55
			Max. Vy	6	-0.13	-0.53	-0.07
			Max. Vx	10	-0.14	-0.29	-0.49
		Diagonal	Max Tension	9	7.78	0.00	0.00
			Max. Compression	8	-8.22	0.00	0.00
			Max. Mx	26	-0.08	0.50	0.00
			Max. Vy	26	-0.13	0.00	0.00
		Horizontal	Max Tension	8	6.04	0.00	0.00
			Max. Compression	11	-5.85	0.00	0.00
			Max. Mx	33	0.29	-0.27	-0.00
			Max. My	14	-0.12	-0.12	-0.01
			Max. Vy	33	0.13	-0.27	-0.00
			Max. Vx	14	-0.00	0.00	0.00
		Inner Bracing	Max Tension	1	0.00	0.00	0.00
			Max. Compression	37	-0.02	0.00	0.00
			Max. Mx	26	-0.02	-0.35	0.00
			Max. Vy	26	0.13	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	135.68	16.32	-8.62
	Max. H_x	18	135.68	16.32	-8.62
	Max. H_z	5	-95.84	-11.97	8.13
	Min. Vert	7	-106.97	-14.11	7.37
	Min. H_x	7	-106.97	-14.11	7.37
	Min. H_z	16	123.88	14.12	-9.32
Leg B	Max. Vert	10	137.22	-16.64	-8.77
	Max. H_x	23	-108.24	14.20	7.38
	Max. H_z	25	-98.16	12.09	8.42
	Min. Vert	23	-108.24	14.20	7.38
	Min. H_x	10	137.22	-16.64	-8.77
	Min. H_z	12	125.37	-14.34	-9.68
Leg A	Max. Vert	2	137.76	0.06	19.28
	Max. H_x	21	6.51	2.16	0.64
	Max. H_z	2	137.76	0.06	19.28
	Min. Vert	15	-118.35	-0.11	-17.31
	Min. H_x	8	9.59	-2.26	0.94
	Min. H_z	15	-118.35	-0.11	-17.31

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	32.79	0.00	0.00	25.61	9.16	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	39.35	0.08	-32.03	-2433.00	4.75	2.81
0.9 Dead+1.0 Wind 0 deg - No Ice	29.51	0.08	-32.03	-2440.68	2.01	2.81
1.2 Dead+1.0 Wind 30 deg - No Ice	39.35	15.62	-27.30	-2064.53	-1182.90	21.96
0.9 Dead+1.0 Wind 30 deg - No Ice	29.51	15.62	-27.30	-2072.22	-1185.65	21.96
1.2 Dead+1.0 Wind 60 deg - No Ice	39.35	25.84	-14.77	-1109.99	-1984.87	26.22
0.9 Dead+1.0 Wind 60 deg - No Ice	29.51	25.84	-14.77	-1117.67	-1987.61	26.22
1.2 Dead+1.0 Wind 90 deg - No Ice	39.35	28.48	0.40	68.75	-2232.56	22.94
0.9 Dead+1.0 Wind 90 deg - No Ice	29.51	28.48	0.40	61.07	-2235.31	22.94
1.2 Dead+1.0 Wind 120 deg - No Ice	39.35	26.80	15.69	1256.37	-2071.96	27.69
0.9 Dead+1.0 Wind 120 deg - No Ice	29.51	26.80	15.69	1248.69	-2074.71	27.69
1.2 Dead+1.0 Wind 150 deg - No Ice	39.35	16.43	28.32	2211.97	-1253.07	16.10
0.9 Dead+1.0 Wind 150 deg - No Ice	29.51	16.43	28.32	2204.29	-1255.82	16.10
1.2 Dead+1.0 Wind 180 deg - No Ice	39.35	0.02	32.19	2509.85	11.85	-3.76
0.9 Dead+1.0 Wind 180 deg - No Ice	29.51	0.02	32.19	2502.17	9.10	-3.76
1.2 Dead+1.0 Wind 210 deg - No Ice	39.35	-15.95	27.77	2172.86	1242.01	-23.28
0.9 Dead+1.0 Wind 210 deg - No Ice	29.51	-15.95	27.77	2165.18	1239.27	-23.28
1.2 Dead+1.0 Wind 240 deg - No Ice	39.35	-26.13	15.54	1246.90	2042.63	-27.50
0.9 Dead+1.0 Wind 240 deg - No Ice	29.51	-26.13	15.54	1239.21	2039.88	-27.50
1.2 Dead+1.0 Wind 270 deg	39.35	-28.04	0.42	72.73	2221.16	-24.37

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.0 Wind 270 deg	29.51	-28.04	0.42	65.05	2218.41	-24.37
- No Ice 1.2 Dead+1.0 Wind 300 deg	39.35	-25.88	-14.94	-1122.84	2011.58	-28.42
- No Ice 0.9 Dead+1.0 Wind 300 deg	29.51	-25.88	-14.94	-1130.53	2008.83	-28.42
- No Ice 1.2 Dead+1.0 Wind 330 deg	39.35	-15.75	-27.92	-2110.74	1213.99	-16.77
- No Ice 0.9 Dead+1.0 Wind 330 deg	29.51	-15.75	-27.92	-2118.43	1211.24	-16.77
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	153.69	0.00	0.00	201.03	-21.09	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	153.69	0.03	-12.19	-729.42	-23.08	5.32
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	153.69	5.86	-10.24	-584.59	-468.70	14.30
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	153.69	9.65	-5.59	-232.09	-766.72	17.20
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	153.69	11.01	0.05	206.26	-877.86	17.46
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	153.69	9.88	5.77	649.82	-785.97	15.34
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	153.69	5.99	10.44	1002.60	-480.06	7.03
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	153.69	-0.01	12.22	1134.09	-19.90	-5.48
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	153.69	-5.91	10.32	994.44	432.70	-14.51
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	153.69	-9.69	5.72	646.57	730.50	-17.41
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	153.69	-10.94	0.08	208.94	830.35	-17.69
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	153.69	-9.73	-5.65	-235.94	730.41	-15.46
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	153.69	-5.88	-10.37	-593.99	427.97	-7.14
Dead+Wind 0 deg - Service	32.79	0.02	-6.92	-503.03	7.83	0.60
Dead+Wind 30 deg - Service	32.79	3.38	-5.90	-424.03	-247.07	4.68
Dead+Wind 60 deg - Service	32.79	5.59	-3.20	-219.30	-419.30	5.59
Dead+Wind 90 deg - Service	32.79	6.16	0.08	33.71	-472.58	4.89
Dead+Wind 120 deg - Service	32.79	5.79	3.39	288.60	-437.86	5.90
Dead+Wind 150 deg - Service	32.79	3.55	6.12	493.56	-262.02	3.43
Dead+Wind 180 deg - Service	32.79	0.00	6.95	557.52	9.34	-0.80
Dead+Wind 210 deg - Service	32.79	-3.44	6.00	485.23	273.30	-4.96
Dead+Wind 240 deg - Service	32.79	-5.65	3.36	286.58	445.24	-5.86
Dead+Wind 270 deg - Service	32.79	-6.07	0.09	34.56	483.78	-5.19
Dead+Wind 300 deg - Service	32.79	-5.60	-3.23	-222.03	438.62	-6.05
Dead+Wind 330 deg - Service	32.79	-3.40	-6.03	-433.87	267.33	-3.57

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-32.79	0.00	0.00	32.79	0.00	0.000%
2	0.08	-39.35	-32.03	-0.08	39.35	32.03	0.000%
3	0.08	-29.51	-32.03	-0.08	29.51	32.03	0.000%
4	15.62	-39.35	-27.30	-15.62	39.35	27.30	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
5	15.62	-29.51	-27.30	-15.62	29.51	27.30	0.000%
6	25.84	-39.35	-14.77	-25.84	39.35	14.77	0.000%
7	25.84	-29.51	-14.77	-25.84	29.51	14.77	0.000%
8	28.48	-39.35	0.40	-28.48	39.35	-0.40	0.000%
9	28.48	-29.51	0.40	-28.48	29.51	-0.40	0.000%
10	26.80	-39.35	15.69	-26.80	39.35	-15.69	0.000%
11	26.80	-29.51	15.69	-26.80	29.51	-15.69	0.000%
12	16.43	-39.35	28.32	-16.43	39.35	-28.32	0.000%
13	16.43	-29.51	28.32	-16.43	29.51	-28.32	0.000%
14	0.02	-39.35	32.19	-0.02	39.35	-32.19	0.000%
15	0.02	-29.51	32.19	-0.02	29.51	-32.19	0.000%
16	-15.95	-39.35	27.77	15.95	39.35	-27.77	0.000%
17	-15.95	-29.51	27.77	15.95	29.51	-27.77	0.000%
18	-26.13	-39.35	15.54	26.13	39.35	-15.54	0.000%
19	-26.13	-29.51	15.54	26.13	29.51	-15.54	0.000%
20	-28.04	-39.35	0.42	28.04	39.35	-0.42	0.000%
21	-28.04	-29.51	0.42	28.04	29.51	-0.42	0.000%
22	-25.88	-39.35	-14.94	25.88	39.35	14.94	0.000%
23	-25.88	-29.51	-14.94	25.88	29.51	14.94	0.000%
24	-15.75	-39.35	-27.92	15.75	39.35	27.92	0.000%
25	-15.75	-29.51	-27.92	15.75	29.51	27.92	0.000%
26	0.00	-153.69	0.00	0.00	153.69	0.00	0.000%
27	0.03	-153.69	-12.19	-0.03	153.69	12.19	0.000%
28	5.86	-153.69	-10.24	-5.86	153.69	10.24	0.000%
29	9.65	-153.69	-5.59	-9.65	153.69	5.59	0.000%
30	11.01	-153.69	0.05	-11.01	153.69	-0.05	0.000%
31	9.88	-153.69	5.77	-9.88	153.69	-5.77	0.000%
32	5.99	-153.69	10.44	-5.99	153.69	-10.44	0.000%
33	-0.01	-153.69	12.22	0.01	153.69	-12.22	0.000%
34	-5.91	-153.69	10.32	5.91	153.69	-10.32	0.000%
35	-9.69	-153.69	5.72	9.69	153.69	-5.72	0.000%
36	-10.94	-153.69	0.08	10.94	153.69	-0.08	0.000%
37	-9.73	-153.69	-5.65	9.73	153.69	5.65	0.000%
38	-5.88	-153.69	-10.37	5.88	153.69	10.37	0.000%
39	0.02	-32.79	-6.92	-0.02	32.79	6.92	0.000%
40	3.38	-32.79	-5.90	-3.38	32.79	5.90	0.000%
41	5.59	-32.79	-3.20	-5.59	32.79	3.20	0.000%
42	6.16	-32.79	0.08	-6.16	32.79	-0.08	0.000%
43	5.79	-32.79	3.39	-5.79	32.79	-3.39	0.000%
44	3.55	-32.79	6.12	-3.55	32.79	-6.12	0.000%
45	0.00	-32.79	6.95	-0.00	32.79	-6.95	0.000%
46	-3.44	-32.79	6.00	3.44	32.79	-6.00	0.000%
47	-5.65	-32.79	3.36	5.65	32.79	-3.36	0.000%
48	-6.07	-32.79	0.09	6.07	32.79	-0.09	0.000%
49	-5.60	-32.79	-3.23	5.60	32.79	3.23	0.000%
50	-3.40	-32.79	-6.03	3.40	32.79	6.03	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	1.009	44	0.066	0.007
T2	120 - 100	0.869	44	0.065	0.007
T3	100 - 80	0.606	44	0.057	0.007
T4	80 - 60	0.385	44	0.045	0.006
T5	60 - 40	0.219	44	0.032	0.005
T6	40 - 20	0.100	44	0.021	0.004
T7	20 - 0	0.030	44	0.010	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	876F-70-2 4-Bay Dipole	44	1.009	0.066	0.007	315602
127.000	Sector Mount [SM 501-3]	44	0.967	0.066	0.007	315602
125.000	Sector Mount [SM 502-3]	44	0.939	0.066	0.008	315602
117.000	PA6-59	44	0.828	0.064	0.007	150659
113.000	Side Arm Mount [SO 306-1]	44	0.774	0.063	0.007	140781
107.000	6 FT Dish	44	0.695	0.060	0.007	128868
104.000	Side Arm Mount [SO 306-1]	44	0.656	0.059	0.007	121816
98.000	Side Arm Mount [SO 306-1]	44	0.582	0.055	0.007	106652
96.000	8 FT Dish	44	0.558	0.054	0.007	102394
87.000	PAD6-W59BC	44	0.456	0.049	0.006	86955
86.000	PAD8-59AW	44	0.446	0.048	0.006	85388
84.000	PD1142-1	44	0.425	0.047	0.006	82387
77.000	Sector Mount [SM 402-1]	44	0.356	0.043	0.006	80791
71.000	4 FT Dish	44	0.303	0.039	0.006	89281
63.000	Sector Mount [SM 402-1]	44	0.240	0.034	0.005	103901
58.000	(2) 4.5' x 2" horizontal mount pipe	44	0.205	0.031	0.005	108626
54.000	Side Arm Mount [SO 306-1]	44	0.178	0.028	0.005	106270
43.000	Side Arm Mount [SO 306-1]	44	0.115	0.022	0.004	98935

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	4.631	12	0.302	0.035
T2	120 - 100	3.984	12	0.297	0.035
T3	100 - 80	2.774	12	0.259	0.032
T4	80 - 60	1.759	12	0.203	0.029
T5	60 - 40	1.002	12	0.145	0.024
T6	40 - 20	0.460	12	0.094	0.017
T7	20 - 0	0.138	13	0.043	0.009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	876F-70-2 4-Bay Dipole	12	4.631	0.302	0.035	80042
127.000	Sector Mount [SM 501-3]	12	4.436	0.301	0.035	80042
125.000	Sector Mount [SM 502-3]	12	4.306	0.300	0.035	80042
117.000	PA6-59	12	3.794	0.294	0.035	36828
113.000	Side Arm Mount [SO 306-1]	12	3.545	0.288	0.034	33049
107.000	6 FT Dish	12	3.181	0.276	0.033	28641
104.000	Side Arm Mount [SO 306-1]	12	3.004	0.269	0.033	26597
98.000	Side Arm Mount [SO 306-1]	12	2.663	0.254	0.032	23167
96.000	8 FT Dish	12	2.553	0.249	0.032	22224
87.000	PAD6-W59BC	12	2.086	0.224	0.030	18734
86.000	PAD8-59AW	12	2.038	0.221	0.030	18390
84.000	PD1142-1	12	1.942	0.215	0.030	17743
77.000	Sector Mount [SM 402-1]	12	1.629	0.194	0.029	17449
71.000	4 FT Dish	12	1.388	0.176	0.028	19414
63.000	Sector Mount [SM 402-1]	12	1.101	0.153	0.025	22882
58.000	(2) 4.5' x 2" horizontal mount pipe	12	0.938	0.139	0.024	24079
54.000	Side Arm Mount [SO 306-1]	12	0.817	0.129	0.023	23511
43.000	Side Arm Mount [SO 306-1]	12	0.528	0.102	0.018	21780

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	130	Leg	A325N	0.750	4	1.02	30.10	0.034	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	1.13	13.81	0.082	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	1.24	13.81	0.090	1.05	Bolt Shear
T2	120	Leg	A325N	0.875	4	3.97	41.56	0.096	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	1.57	13.81	0.114	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	1.45	13.81	0.105	1.05	Bolt Shear
T3	100	Leg	A325N	1.000	4	8.50	54.52	0.156	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	2.09	13.81	0.151	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	2.13	13.81	0.154	1.05	Bolt Shear
T4	80	Leg	A325N	1.000	4	12.94	54.52	0.237	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	2.82	13.81	0.204	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	2.50	13.81	0.181	1.05	Bolt Shear
T5	60	Leg	A325N	1.000	6	12.08	54.52	0.222	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	2.63	13.81	0.190	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	2.56	13.81	0.185	1.05	Bolt Shear
T6	40	Leg	A325N	1.000	6	15.29	54.52	0.281	1.05	Bolt Tension
		Diagonal	A325N	0.625	3	2.68	13.81	0.194	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	2.80	13.81	0.203	1.05	Bolt Shear
T7	20	Diagonal	A325N	0.625	3	2.74	13.81	0.198	1.05	Bolt Shear
		Horizontal	A325N	0.625	2	3.02	13.81	0.219	1.05	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2.5 STD	10.000	5.000	63.3 K=1.00	1.704	-12.20	57.19	0.213 [1]
T2	120 - 100	ROHN 3 STD	20.036	6.679	68.9 K=1.00	2.228	-23.60	70.89	0.333 [1]
T3	100 - 80	ROHN 4 STD	20.036	6.679	53.1 K=1.00	3.174	-42.56	116.23	0.366 [1]
T4	80 - 60	ROHN 5 STD	20.042	10.021	64.0 K=1.00	4.300	-62.09	143.37	0.433 [1]
T5	60 - 40	ROHN 5 EH	20.055	10.028	65.4 K=1.00	6.112	-85.40	201.11	0.425 [1]
T6	40 - 20	ROHN 6 EHS	20.052	10.026	54.1 K=1.00	6.713	-107.07	243.97	0.439 [1]
T7	20 - 0	ROHN 6 EH	20.052	10.026	54.8 K=1.00	8.405	-128.00	303.62	0.422 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2 STD	6.575	6.391	97.4	1.075	-3.39	24.16	0.140 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	120 - 100	ROHN 2.5 STD	8.528	8.295	K=1.00 105.1	1.704	-4.71	34.21	0.138 [1]
T3	100 - 80	ROHN 2.5 STD	9.213	8.941	K=1.00 113.2	1.704	-6.27	30.02	0.209 [1]
T4	80 - 60	ROHN 2.5 X-STR	12.492	12.106	K=1.00 157.2	2.254	-8.46	20.60	0.411 [1]
T5	60 - 40	ROHN 3 STD	13.306	12.955	K=1.00 133.6	2.228	-7.88	28.20	0.279 [1]
T6	40 - 20	ROHN 3 STD	14.161	13.771	K=1.00 142.0	2.228	-8.05	24.96	0.322 [1]
T7	20 - 0	ROHN 3 STD	15.071	14.702	K=1.00 151.6	2.228	-8.22	21.90	0.375 [1]
					K=1.00				

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 1.5 STD	8.520	4.140	79.8 K=1.00	0.799	-2.43	22.58	0.107 [1]
T2	120 - 100	ROHN 2 STD	9.933	4.821	73.5 K=1.00	1.075	-2.87	32.58	0.088 [1]
T3	100 - 80	ROHN 2 STD	12.017	5.821	88.7 K=1.00	1.075	-4.24	27.19	0.156 [1]
T4	80 - 60	ROHN 2 STD	13.835	6.686	101.9 K=1.00	1.075	-4.95	22.62	0.219 [1]
T5	60 - 40	ROHN 2 STD	16.250	7.893	120.3 K=1.00	1.075	-5.04	16.76	0.301 [1]
T6	40 - 20	ROHN 2.5 STD	18.790	9.119	115.5 K=1.00	1.704	-5.46	28.86	0.189 [1]
T7	20 - 0	ROHN 2.5 STD	21.290	10.369	131.3 K=1.00	1.704	-5.85	22.32	0.262 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 1.5 STD	8.500	4.130	79.6 K=1.00	0.799	-0.48	22.63	0.021 [1]

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	L2x2x1/8	4.260	4.260	128.6 K=1.00	0.484	-0.00	8.38	0.000 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	120 - 100	L2x2x1/8	4.967	4.967	149.9 K=1.00	0.484	-0.01	6.17	0.001 [1]
T3	100 - 80	L2x2x1/8	6.008	6.008	181.4 K=1.00	0.484	-0.01	4.21	0.002 [1]
T4	80 - 60	L2x2x1/8	6.918	6.918	208.8 K=1.00	0.484	-0.01	3.18	0.004 [1]
T5	60 - 40	L2 1/2x2 1/2x3/16	8.125	8.125	197.0 K=1.00	0.902	-0.02	6.65	0.002 [1]
T6	40 - 20	L 3x3x3/16	9.395	9.395	189.1 K=1.00	1.090	-0.02	8.73	0.002 [1]
T7	20 - 0	L3 1/2x3 /12x1/4	10.645	10.645	184.2 K=1.00	1.688	-0.02	14.24	0.001 [*1]

[*] DL controls
[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2.5 STD	10.000	5.000	63.3	1.704	1.82	76.68	0.024 [1]
T2	120 - 100	ROHN 3 STD	20.036	6.679	68.9	2.228	15.89	100.28	0.158 [1]
T3	100 - 80	ROHN 4 STD	20.036	6.679	53.1	3.174	34.00	142.83	0.238 [1]
T4	80 - 60	ROHN 5 STD	20.042	10.021	64.0	4.300	51.78	193.49	0.268 [1]
T5	60 - 40	ROHN 5 EH	20.055	10.028	65.4	6.112	72.46	275.04	0.263 [1]
T6	40 - 20	ROHN 6 EHS	20.052	10.026	54.1	6.713	91.77	302.10	0.304 [1]
T7	20 - 0	ROHN 6 EH	20.052	10.026	54.8	8.405	109.93	378.22	0.291 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2 STD	6.575	6.391	97.4	1.075	3.32	48.35	0.069 [1]
T2	120 - 100	ROHN 2.5 STD	8.528	8.295	105.1	1.704	4.59	76.68	0.060 [1]
T3	100 - 80	ROHN 2.5 STD	9.213	8.941	113.2	1.704	6.12	76.68	0.080 [1]
T4	80 - 60	ROHN 2.5 X-STR	12.492	12.106	157.2	2.254	8.26	101.41	0.081 [1]
T5	60 - 40	ROHN 3 STD	13.306	12.955	133.6	2.228	7.63	100.28	0.076 [1]
T6	40 - 20	ROHN 3 STD	14.161	13.771	142.0	2.228	7.70	100.28	0.077 [1]
T7	20 - 0	ROHN 3 STD	15.071	14.702	151.6	2.228	7.78	100.28	0.078 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 1.5 STD	8.520	4.140	79.8	0.799	2.48	35.98	0.069 [1]
T2	120 - 100	ROHN 2 STD	9.933	4.821	73.5	1.075	2.89	48.35	0.060 [1]
T3	100 - 80	ROHN 2 STD	12.017	5.821	88.7	1.075	4.26	48.35	0.088 [1]
T4	80 - 60	ROHN 2 STD	13.835	6.686	101.9	1.075	5.00	48.35	0.103 [1]
T5	60 - 40	ROHN 2 STD	16.250	7.893	120.3	1.075	5.11	48.35	0.106 [1]
T6	40 - 20	ROHN 2.5 STD	18.790	9.119	115.5	1.704	5.61	76.68	0.073 [1]
T7	20 - 0	ROHN 2.5 STD	21.290	10.369	131.3	1.704	6.04	76.68	0.079 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 1.5 STD	8.500	4.130	79.6	0.799	0.48	35.98	0.013 [1]

[1] P_u / ϕP_n controls

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	L2x2x1/8	4.260	4.260	81.6	0.484	0.00	15.69	0.000 [1]
T2	120 - 100	L2x2x1/8	4.270	4.270	81.8	0.484	0.00	15.69	0.000 [1]
T3	100 - 80	L2x2x1/8	6.008	6.008	115.1	0.484	0.00	15.69	0.000 [1]
T4	80 - 60	L2x2x1/8	6.355	6.355	121.8	0.484	0.00	15.69	0.000 [1]

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	130 - 120	Leg	ROHN 2.5 STD	1	-12.20	60.05	20.3	Pass
T2	120 - 100	Leg	ROHN 3 STD	29	-23.60	74.43	31.7	Pass
T3	100 - 80	Leg	ROHN 4 STD	69	-42.56	122.04	34.9	Pass
T4	80 - 60	Leg	ROHN 5 STD	107	-62.09	150.53	41.2	Pass
T5	60 - 40	Leg	ROHN 5 EH	134	-85.40	211.17	40.4	Pass
T6	40 - 20	Leg	ROHN 6 EHS	161	-107.07	256.16	41.8	Pass
T7	20 - 0	Leg	ROHN 6 EH	189	-128.00	318.80	40.2	Pass
T1	130 - 120	Diagonal	ROHN 2 STD	9	-3.39	25.36	13.4	Pass
T2	120 - 100	Diagonal	ROHN 2.5 STD	36	-4.71	35.92	13.1	Pass
T3	100 - 80	Diagonal	ROHN 2.5 STD	74	-6.27	31.52	19.9	Pass
T4	80 - 60	Diagonal	ROHN 2.5 X-STR	113	-8.46	21.63	39.1	Pass
T5	60 - 40	Diagonal	ROHN 3 STD	140	-7.88	29.61	26.6	Pass
T6	40 - 20	Diagonal	ROHN 3 STD	165	-8.05	26.21	30.7	Pass
T7	20 - 0	Diagonal	ROHN 3 STD	192	-8.22	22.99	35.7	Pass
T1	130 - 120	Horizontal	ROHN 1.5 STD	7	-2.43	23.71	10.2	Pass
T2	120 - 100	Horizontal	ROHN 2 STD	34	-2.87	34.21	8.4 10.0 (b)	Pass
T3	100 - 80	Horizontal	ROHN 2 STD	73	-4.24	28.55	14.9	Pass
T4	80 - 60	Horizontal	ROHN 2 STD	112	-4.95	23.75	20.8	Pass
T5	60 - 40	Horizontal	ROHN 2 STD	139	-5.04	17.60	28.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T6	40 - 20	Horizontal	ROHN 2.5 STD	163	-5.46	30.30	18.0 19.3 (b)	Pass
T7	20 - 0	Horizontal	ROHN 2.5 STD	190	-5.85	23.43	25.0	Pass
T1	130 - 120	Top Girt	ROHN 1.5 STD	4	-0.48	23.77	2.0	Pass
T1	130 - 120	Inner Bracing	L2x2x1/8	16	-0.00	8.80	0.8	Pass
T2	120 - 100	Inner Bracing	L2x2x1/8	42	-0.01	6.48	0.9	Pass
T3	100 - 80	Inner Bracing	L2x2x1/8	79	-0.01	4.43	1.1	Pass
T4	80 - 60	Inner Bracing	L2x2x1/8	120	-0.01	3.34	1.2	Pass
T5	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	147	-0.02	6.99	0.9	Pass
T6	40 - 20	Inner Bracing	L 3x3x3/16	174	-0.02	9.16	0.9	Pass
T7	20 - 0	Inner Bracing	L3 1/2x3 /12x1/4	201	-0.02	14.24	0.8	Pass
							Summary	
						Leg (T6)	41.8	Pass
						Diagonal (T4)	39.1	Pass
						Horizontal (T5)	28.6	Pass
						Top Girt (T1)	2.0	Pass
						Inner Bracing (T4)	1.2	Pass
						Bolt Checks	26.7	Pass
						RATING =	**41.8**	**Pass**

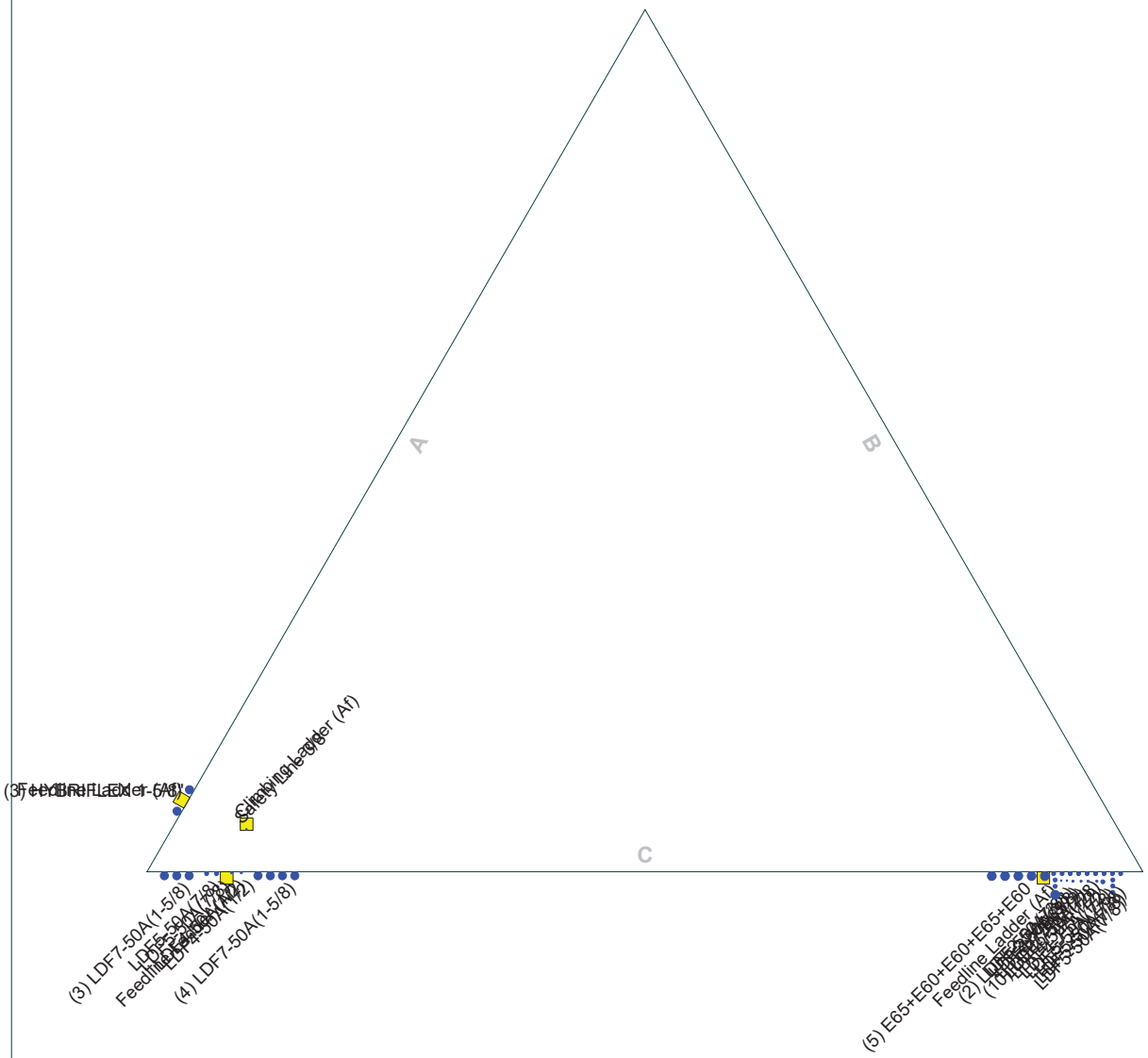
APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan
20'

Round Flat App In Face App Out Face

Section @ 20'



BLACK & VEATCH
Building a world of difference.

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-6909
FAX: (913) 458-8136

Job: ***ES-004 SouthMtnRS***			
Project: ***405025***			
Client: Eversource	Drawn by: Josh Riley	App'd:	
Code: TIA-222-H	Date: 01/13/22	Scale: NTS	
Path:		Dwg No. E-7	

APPENDIX C

ADDITIONAL CALCULATIONS

Eversource #:
Site Name: SouthMtnRS

Designed By SA
Checked By:JR
Date: 1/13/2022

References

ANCHOR ROD ANALYSIS

Project Information

Site Name:ES-004 SouthMtnsRS

TIA Revision: Rev-G / Rev-H

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

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

Max Leg Reactions

Compression	*Uplift*
Axial_C := 138·kip	Axial_U := 18·kip
Shear_C := 19·kip	Shear_U := 17·kip

Anchor Rod Data

Diameter of Anchor Rod: D := 1·in

Number of Anchor Rods: N := 8

Length from top of concrete to bottom of anchor rod leveling nut: lar := 2.5·in

Threads in Shear Plane?: Yes / No

Thread Series: Coarse / Fine / 8-Thread

Consider Base Plate Grout? Yes / No

Grout Factor η: 0.90 / 0.70 / 0.55 / 0.50

Threads per Inch: n = 8 (Thread selection invalid if n = 0)

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

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

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

$$Z := \frac{1}{6} \cdot \left(D - \frac{0.9743\,in}{n} \right)^3 = 0.113 \cdot in^3$$

Radius of Gyration:

$$r := \left(\frac{1}{4} \right) \cdot \left(D - \frac{0.9743\,in}{n} \right) = 0.22 \cdot in$$

Net Area of Anchor Rod:

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

TIA-222-G/H Section 4.9.6.1

Nominal Unthreaded Area of Anchor Rod:

$$Ab := \frac{\pi}{4} \cdot (D)^2 = 0.785 \cdot in^2$$

Anchor Rod Grade:

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

Eversource #:
Site Name: SouthMtnRS

Designed By SA
Checked By:JR
Date: 1/13/2022

BLACK & VEATCH
Building a world of difference.

Anchor Rod Design Capacities

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

$Rnt := Fu \cdot An = 75.718 \cdot kip$

$\phi t = 0.75$

$\phi Rnt := \phi t \cdot Rnt = 56.788 \cdot kip$

Design Compression Strength:

$Rnc := Fy \cdot An = 63.603 \cdot kip$

$\phi c = 1$

$\phi Rnc := \phi c \cdot Rnc = 63.603 \cdot kip$

Design Buckling Strength: TIA-222-H Section 4.5.4.2

$K_0 := 1.2$

$Fcr = 102.033 \cdot ksi$

$Fe = 1.533 \times 10^3 \cdot ksi$

$Rnb := Fcr \cdot An = 61.806 \cdot kip$

$\phi c = 1$

$\phi Rnb := \phi c \cdot Rnb = 61.806 \cdot kip$

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

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

$Rnv = 49.087 \cdot kip$

$Rnvc := 0.6 \cdot Fy \cdot 0.5 \cdot An = 19.081 \cdot kip$ TIA-222-H Section 4.9.9

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

$\phi Rnv := \phi v \cdot Rnv = 36.816 \cdot kip \qquad \phi Rnvc := \phi c \cdot Rnvc = 19.081 \cdot kip$

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

$Rmn := Fy \cdot Z = 11.853 \cdot kip \cdot in$

$\phi f = 0.9$

$\phi Rmn := \phi f \cdot Rmn = 10.668 \cdot kip \cdot in$

BLACK & VEATCH
Building a world of difference.

Anchor Rod Loading Demands

Tension Demand:

$$Put := \frac{Axial\_U}{N} = 2.25 \cdot kip$$

Compression Demand:

$$Puc := \frac{Axial\_C}{N} = 17.25 \cdot kip$$

Shear Demand:

$$Vut := \frac{Shear\_U}{N} = 2.125 \cdot kip$$

$$Vuc := \frac{Shear\_C}{N} = 2.375 \cdot kip$$

Moment Demand:

$$Mut := 0.65 \cdot lar \cdot Vut = 3.453 \cdot kip \cdot in$$

$$Muc := 0.65 \cdot lar \cdot Vuc = 3.859 \cdot kip \cdot in$$

Anchor Rod Interaction Check

TIA-222-G Section 4.9.9

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

$$SR\_g = 0.108$$

Anchor Rod Interaction Check

TIA-222-H Section 4.9.9

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

$$SR\_Pt = 4.901 \times 10^{-3}$$

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

$$SR\_Pc = 0.287$$

$$SR := \begin{cases} SR\_g & \text{if } TIA = \text{"Rev-G"} \\ \max(SR\_Pt, SR\_Pc) & \text{if } TIA = \text{"Rev-H"} \wedge S15 = \text{"No"} \\ \frac{\max(SR\_Pt, SR\_Pc)}{1.05} & \text{if } TIA = \text{"Rev-H"} \wedge S15 = \text{"Yes"} \end{cases} = 0.273$$

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

Eversource #:
Site Name: SouthMtnRS

Designed By SA
Checked By:JR
Date: 1/13/2022

BLACK & VEATCH
Building a world of difference.

Anchor Rod Results

Axial Tension Demand:	$Put = 2.25 \cdot kip$
Axial Tension Capacity:	$\phi Rnt = 56.788 \cdot kip$
Axial Compression Demand:	$Puc = 17.25 \cdot kip$
Axial Compression Capacity:	$\phi Rnc = 63.603 \cdot kip$
Shear Tension Demand:	$Vut = 2.125 \cdot kip$
Tension Shear Capacity:	$\phi Rnv = 36.816 \cdot kip$
Shear Compression Demand:	$Vuc = 2.375 \cdot kip$
Compresison Shear Capacity:	$\phi R_{nvc} = 19.081 \cdot kip$
Moment Tension Demand:	$M_{ut} = 3.453 \cdot kip \cdot in$
Moment Compression Demand:	$M_{uc} = 3.859 \cdot kip \cdot in$
Moment Capacity:	$\phi R_{mn} = 10.668 \cdot kip \cdot in$

Governing Stress Ratio

$SR = 27.305 \cdot \%$

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

SST Unit Base Foundation

ES-004
SouthMtnsRS

TIA-222 Revision: H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☐
Block Foundation?:	☑

Superstructure Analysis Reactions		
Global Moment, **M**:	2542	ft-kips
Global Axial, **P**:	39	kips
Global Shear, **V**:	33	kips
Leg Compression, $\mathbf{P_{comp}}$:	138	kips
Leg Comp. Shear, $\mathbf{V_{u\_comp}}$:	19	kips
Leg Uplift, $\mathbf{P_{uplift}}$:	118	kips
Leg Uplift. Shear, $\mathbf{V_{u\_uplift}}$:	17	kips
Tower Height, **H**:	130	ft
Base Face Width, **BW**:	22.5417	ft
BP Dist. Above Fdn, $\mathbf{bp_{dist}}$:	2	in
Anchor Bolt Circle, **BC**:	10	in

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating***	**Check**
Lateral (Sliding) (kips)	206.03	33.00	**15.3%**	**Pass**
Bearing Pressure (ksf)	9.00	1.14	**12.1%**	**Pass**
*Overturning (kip*ft)*	7965.51	2679.50	**33.6%**	**Pass**
*Pad Flexure (kip*ft)*	1877.46	547.49	**27.8%**	**Pass**
Pad Shear - 1-way (kips)	1541.78	75.55	**4.7%**	**Pass**
Pad Shear - Comp 2-way (ksi)	0.190	0.018	**9.2%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	978.81	0.00	**0.0%**	**Pass**
Pad Shear - Tension 2-way (ksi)	0.190	0.016	**7.9%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	978.81	0.00	**0.0%**	**Pass**

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

Soil Rating*:	**33.6%**
Structural Rating*:	**27.8%**

Pad Properties		
Depth, **D**:	4.00	ft
Pad Width, **W**:	31.00	ft
Pad Thickness, **T**:	4.00	ft
Pad Rebar Size (Bottom), **Sp**:	7	
Pad Rebar Quantity (Bottom), **mp**:	16	
Pad Clear Cover, $\mathbf{cc_{pad}}$:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	100	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, $\mathbf{N_{blows}}$:	10	
Base Friction, μ:	0.45	
Neglected Depth, **N**:	3.3	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<-- Toggle between Gross and Net

ATTACHMENT D – PROOF OF DELIVERY OF NOTICE

Ref:
Dep:

Date: 02Mar22
Wgt: 2.00 LBS

DV: 100.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 6437 3911 1991

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
60 HAMILTON STREET

NEW HAVEN, CT 065115920
UNITED STATES US

SHIP DATE: 02MAR22
ACTWGT: 2.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO

ROBERT M. FLANAGAN
CITY OF BRISTOL
111 NORTH MAIN STREET

BRISTOL CT 06010

PO: S0424674

FedEx Express

THU - 03 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 6437 3911 1991

00 BNHA

06010
CT-US BDL

Part # 156148-434 RIT2 01/14

Ref:
Dep:

Date: 02Mar22
Wgt: 5.00 LBS

DV: 200.00

SHIPPING: 0.0
SPECIAL: 0.0
HANDLING: 0.0
TOTAL: 0.0

Svcs: PRIORITY OVERNIGHT
TRCK: 6437 3911 2005

RIGIN ID:EFBA (203) 562-9885
.IPPING
OSEPH MERRITT CO.
HAMILTON STREET

EW HAVEN, CT 065115920
NITED STATES US

SHIP DATE: 02MAR22
ACTWGT: 5.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051

PO: S0424674

FedEx Expres

THU - 03 MAR 10:30

PRIORITY OVERNIGH

TRK# 6437 3911 2005

00 BDLA

06051

CT-US BDL

Part # 156148-434 RIT2 01/14

Ref:
Dep:

Date: 02Mar22
Wgt: 2.00 LBS

DV: 100.00

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

Svcs: PRIORITY OVERNIGHT
TRCK: 6437 3911 1980

ORIGIN ID:EFBA (203) 562-9885
SHIPPING
JOSEPH MERRITT CO.
60 HAMILTON STREET

NEW HAVEN, CT 065115920
UNITED STATES US

SHIP DATE: 02MAR22
ACTWGT: 2.00 LB MAN
CAD: 0517347/CAFE3509

BILL THIRD PARTY

TO HONORABLE JEFFREY CAGGIANO, MAYOR
CITY OF BRISTOL
111 NORTH MAIN STREET

BRISTOL CT 06010

PO: S0424674

FedEx Express

THU - 03 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 6437 3911 1980

00 BNHA

06010
CT-US BDL

ATTACHMENT E - 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-004

790 Willis Street

Bristol, CT 06010

February 7, 2022

Table of Contents

1. Introduction 1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits 1
3. Power Density Calculation Methods 2
4. Calculated % MPE Results 3
5. Conclusion 4
6. Statement of Certification 4
Attachment A: References 5
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE) 6
Attachment C: Eversource Antenna Data Sheets and Electrical Patterns 8
Attachment D: Connecticut Siting Council Data 9

List of Tables

Table 1: Proposed Facility % MPE 3
Table 2: FCC Limits for Maximum Permissible Exposure (MPE) 6

List of Figures

Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE) 7

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the Eversource installation on the existing self-support tower located at 790 Willis Street in Bristol, CT.

Eversource has recently installed one omnidirectional antenna (Comprod 876F-70-2HSMP40DF1/2) for both transmit and receive purposes as part of its 220 MHz communications system and one microwave dish for backhaul communications. The original proposal also consisted of one omnidirectional antenna and one microwave dish, however the model of the original omni-directional antenna (db Spectra DS20C03F36D-D) has changed. This report provides an updated analysis based on the current installation as reflected in the updated plans[1].

This report considers the existing antenna configuration as detailed by Eversource along with power density information of the other existing antennas to calculate the cumulative % 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 1/19/2022 (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 Eversource omnidirectional and microwave antennas have narrow vertical beamwidths of 40° and 1.7°, respectively; therefore, the majority of the RF power is focused out towards the horizon. Please refer to Attachment C, for the vertical patterns of the recently installed Eversource antennas. 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 for the omnidirectional and panel antennas, and 30 dB off-beam pattern loss for the highly directional microwave dish to account for the lower relative gain below the antennas. Any inactive or receive-only antennas are not listed in the table unless specified otherwise, 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
Eversource	141.5	154.46375	1	250	0.0005	0.2000	0.24%
Eversource	141	153.695	1	250	0.0005	0.2000	0.25%
Eversource	139	145.14	1	250	0.0005	0.2000	0.25%
Eversource	138	224.22	1	250	0.0005	0.2000	0.26%
Eversource	137	451.1	1	250	0.0005	0.3007	0.17%
Eversource	135	939.4375	1	250	0.0005	0.6263	0.09%
Eversource	134	939.95	1	250	0.0005	0.6266	0.09%
Eversource	117	6034.15	1	7000	0.0002	1.0000	0.02%
Eversource	120	47.76	1	250	0.0007	0.2000	0.35%
Eversource	107	6735	1	7000	0.0002	1.0000	0.02%
Eversource	111	37.76	1	250	0.0008	0.2000	0.41%
Eversource	98	174	1	250	0.0011	0.2000	0.53%
Eversource	96	6805	1	7000	0.0003	1.0000	0.03%
Eversource	86	6004.5	1	7000	0.0004	1.0000	0.04%
Eversource	91	37.46	1	250	0.0012	0.2000	0.62%
Eversource	84	900	1	250	0.0015	0.6000	0.25%
Eversource	71	6805	1	7000	0.0006	1.0000	0.06%
Eversource	73	146.52	1	250	0.0020	0.2000	1.00%
Eversource	73	448.375	1	250	0.0020	0.2989	0.67%
Eversource	58	48.34	1	250	0.0033	0.2000	1.66%
Eversource	54	48.4	1	250	0.0039	0.2000	1.95%
Eversource	46	173.25	1	250	0.0056	0.2000	2.81%
Eversource	43	37.6	1	250	0.0066	0.2000	3.28%
CSP	78	851	1	315	0.0022	0.5673	0.39%
CSP	67	775	1	250	0.0024	0.5167	0.47%
CSP	53	775	1	199	0.0032	0.5167	0.63%
CSP	40	851.0125	1	158	0.0049	0.5673	0.87%
T-Mobile	125	2500	1	3590	0.0091	1.0000	0.91%
T-Mobile	125	2500	1	3590	0.0091	1.0000	0.91%
T-Mobile	125	700	1	2256	0.0057	0.4667	1.23%
T-Mobile	125	600	1	1128	0.0029	0.4000	0.72%
T-Mobile	125	600	1	1128	0.0029	0.4000	0.72%
T-Mobile	125	1900	1	3166	0.0080	1.0000	0.80%
T-Mobile	125	2100	1	4308	0.0109	1.0000	1.09%
T-Mobile	125	1900	1	2034	0.0052	1.0000	0.52%
T-Mobile	125	1900	1	4034	0.0102	1.0000	1.02%
Eversource	87	5945.2	1	11147	0.0006	1.0000	0.06%
Eversource	135	217	4	124	0.0011	0.2000	0.54%
						Total	**25.92%**

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

[2] The operating parameters for the Eversource and CSP (CT State Police) were provided directly by each respective operator. The T-Mobile information was sourced from the CSC Power Density Database dated 07/16/2021. For reference, this data is included as Attachment D. 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] Antenna heights listed for Eversource are in reference to the antenna centerline and based upon information provided by Eversource with respect to the Black & Veatch Structural Analysis Report dated 01/13/2022. The available data for the CSP antennas do not have a one-to-one match with the structural analysis, so a worst-case antenna height was applied for those antennas.

5. Conclusion

The above analysis concludes that RF exposure at ground level with the new Eversource 220 MHz and microwave antenna installation is 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 with the proposed installation is **25.92% of the FCC General Population/Uncontrolled limit**.

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

Sohail Usmani

February 7, 2022

Report Prepared By: Sohail Usmani
Senior RF Engineer
C Squared Systems, LLC

Date

Keith Vellante

February 8, 2022

Reviewed/Approved 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

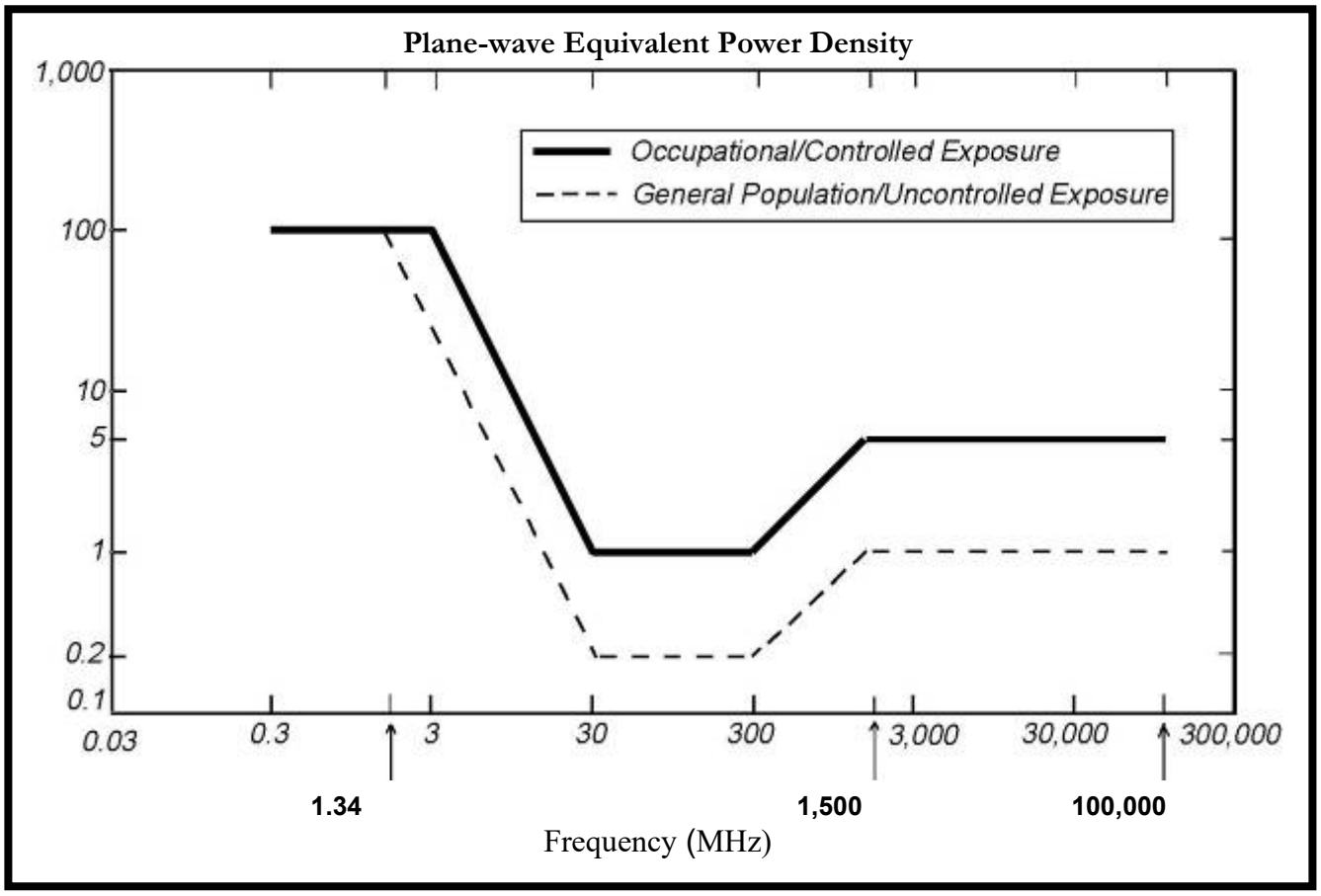
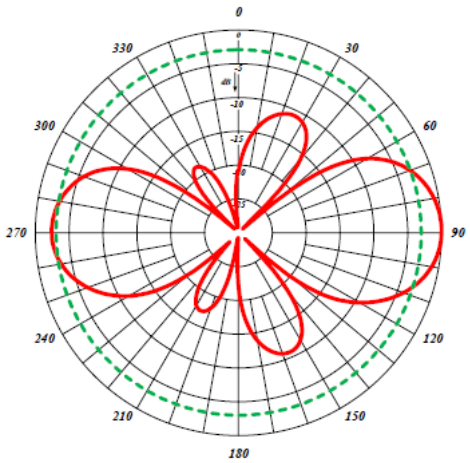


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheets and Electrical Patterns

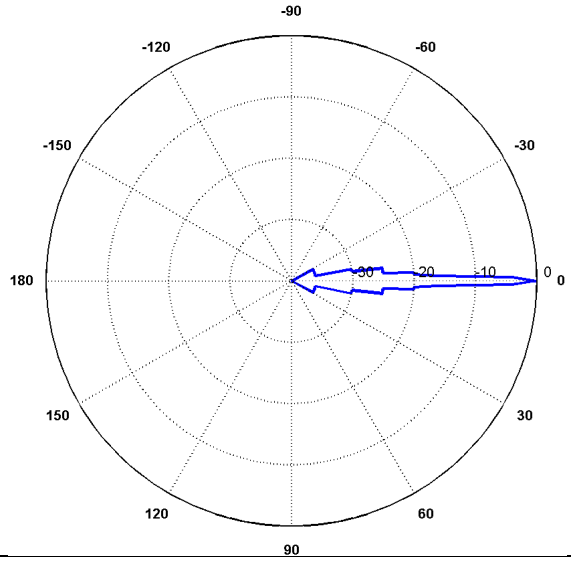
217 MHz

Manufacturer:	COMPROD
Model #:	876F-70-2HSMP40DF1/2
Frequency Band:	215-225 MHz
Gain:	5.0 dBd
Vertical Beamwidth:	~ 40°
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	20.0’



5945.2 MHz

Manufacturer:	RFS
Model #:	PAD6-59
Frequency Band:	5.925-6.875 MHz
Gain:	38.4 dBi
Vertical Beamwidth:	1.7°
Horizontal Beamwidth:	1.7°
Polarization:	Single
Diameter:	6’



Attachment D: Current CSC Power Density Data for the Subject Facility (07/16/2021)

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	% MPE
Amateur Radio	126	448.325	1	650	0.00162	0.2989	0.54%
Amateur Radio	126	224.22	1	100	0.00025	0.2000	0.12%
CL&P	127	153.695	1	5	0.00001	0.2000	0.01%
CL&P	127	451.1	1	189	0.00046	0.3007	0.15%
CL&P	127	154.46375	1	990	0.00243	0.2000	1.22%
CL&P	122	952.55625	1	71	0.00019	0.6350	0.03%
CL&P	125	937	3	200	0.00152	0.6247	0.24%
CL&P	115	48.34	1	100	0.00030	0.2000	0.15%
CL&P	109	6765	1	5250	0.01780	1.0000	1.78%
CL&P	102	6835	1	309	0.00121	1.0000	0.12%
CL&P	102	6735	1	1738	0.00678	1.0000	0.68%
CTSP	108	800	5	100	0.00173	0.5333	0.32%
CL&P	92	6805	1	1660	0.00807	1.0000	0.81%
CL&P	81	6865	1	288	0.00184	1.0000	0.18%
CL&P	81	37.76	1	100	0.00064	0.2000	0.32%
CL&P	58	48.4	1	120	0.00160	0.2000	0.80%
CL&P	53	53.05	1	100	0.00163	0.2000	0.81%
CL&P	52	37.46	1	115	0.00195	0.2000	0.98%
CL&P	38	37.6	1	446	0.01566	0.2000	7.83%
CL&P	37	173.25	1	204	0.00763	0.2000	3.82%
CL&P	37	928.55625	1	32	0.00120	0.6190	0.19%
T-Mobile	125	2500	1	3590	0.0091	1.0000	0.91%
T-Mobile	125	2500	1	3590	0.0091	1.0000	0.91%
T-Mobile	125	700	1	2256	0.0057	0.4667	1.23%
T-Mobile	125	600	1	1128	0.0029	0.4000	0.72%
T-Mobile	125	600	1	1128	0.0029	0.4000	0.72%
T-Mobile	125	1900	1	3166	0.0080	1.0000	0.80%
T-Mobile	125	2100	1	4308	0.0109	1.0000	1.09%
T-Mobile	125	1900	1	2034	0.0052	1.0000	0.52%
T-Mobile	125	1900	1	4034	0.0102	1.0000	1.02%
						Total	**29.04%**

⑈003319⑈ ⑆211170114⑆ 2202560372⑈

Verify check at https://echecks.com/verify

Memo CSC Filing Fee - ES-004 South Mountain

Rbs Citizens, National
Association

Six hundred twenty-five and 00/100 Dollars

PAY TO THE ORDER OF Connecticut Siting Council $ 625.00

Void after 90 days

Date 03/03/2022

ALL-POINTS TECHNOLOGY CORP, P.C.
567 Vauxhall Street Extension
Suite 311
Waterford, CT 06385

This is a Deluxe eCheck. The PAY TO THE ORDER OF line designates the Payee. For questions, call Deluxe Payment Exchange customer support at 877-333-6964. Ref: E82F-7814

VV3319

Official eCheck

Cut along this line

Check appears upside down intentionally

How to use this check

Need help? Visit eChecks.com or call 877-333-6964

Step 1 **Print the check**	**Step 2** **Validate it printed correctly**	**Step 3** **Deposit like normal**
✓ **Any printer works** ✓ **Black or color ink** ✓ **Basic white paper**	✓ **Correct if bank numbers are:** Centered in white space Parallel to edge of the page Clearly printed in dark black ink ✗ **Reprint if bank numbers are:** Cut off, skewed, or off-center Smudged or wrinkled Too light to read	1. **Cut on the dotted line above** 2. **Endorse the back** 3. **Deposit like normal:** In-person at a bank or credit union Using an ATM Via smartphone mobile deposit With an office check scanner

Does your financial institution have questions about this check?

- This check was printed from an authorized check record. It is not a Check 21 Image Replacement Document.
- To confirm this check was issued by the account holder and details (pay to, amount, routing/account number) remain unmodified, the item's authenticity can be verified using the Deluxe Inc. Check Verification service at https://echecks.com/verify.

Questions? Visit **eChecks.com** or call 877-333-6964

For your records

Issued date: 03/03/2022
Check number: VV3319
From: ALL-POINTS TECHNOLOGY CORP, P.C.
Amount: $625.00
Payable to: Connecticut Siting Council
Delivery email: bgaudet@allpointstech.com
Memo: CSC Filing Fee - ES-004 South...
Documents: Yes - see Remittance below

ALL-POINTS TECHNOLOGY CORP, P.C. 567 Vauxhall Street Extension Suite 311 Waterford, CT 06385

Date Created: 03/03/2022 Check Number: #VV3319

DATE	MEMO	AMOUNT
03/03/2022	CSC Filing Fee - ES-004 South Mountain	625.00