STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

August 25, 2022

Kristina Cottone
Real Estate Specialist
Smartlink, LLC
85 Rangeway Road
Building 3, Suite 102
North Billerica, MA 01862
kristina.cottone@smartlinkgroup.com

RE: **EM-AT&T-076-220715** – AT&T notice of intent to modify an existing telecommunications facility located at 864 Opening Hill Road, Madison, Connecticut.

Dear Ms. Cottone:

The Connecticut Siting Council (Council) is in receipt of your correspondence of August 19, 2022 submitted in response to the Council's August 4, 2022 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/RDM/emr

From: Kristina Cottone <kristina.cottone@smartlinkgroup.com>
Sent: Friday, August 19, 2022 2:58 PM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-AT&T-076-220715 (864 Opening Hill Road, Madison)

Hi Evan,

Please see attached revised SA. Please let me know if you need anything else here.

Thank you,

Kristina Cottone
Real Estate Project Manager
Smartlink
c. 978-551-8627

STRUCTURAL ANALYSIS REPORT
FOR PROPOSED ANTENNA AND APPURTENANCE INSTALLATION ON AN EXISTING 180-ft SELF-SUPPORTING TOWER MADISON, CONNECTICUT

Prepared for
North Madison Volunteer Fire Company

AT&T Site Ref.
CTL02033; Madison-SR 79

Site Address: 864 Opening Hill Road, Madison, Connecticut 06443
FA Location Code: 10035048
PACE ID: MRCTB054479
PT Number: 2051A11KRA
Project: 2021 5G NR Radio

APT Filing No. CT656130

August 19, 2022

ALL-POINTS TECHNOLOGY CORPORATION, P.C.
567 VAUXHALL STREET EXTENSION · SUITE 311 · WATERFORD, CT 06385 · PHONE 860-663-1697

STRUCTURAL ANALYSIS REPORT
180-ft SELF-SUPPORTING TOWER
MADISON, CONNECTICUT
prepared for
North Madison Volunteer Fire Company

EXECUTIVE SUMMARY:

All-Points Technology Corporation, P.C. (APT) performed a structural analysis of an existing 180-foot self-supporting lattice tower structure to support a proposed AT&T equipment modification.

The proposed AT&T antenna and appurtenance installation consists of the removal of six (6) existing antennas and six (6) existing TMAs, and installation of nine (9) new antennas, three (3) new Remote Radio Heads (RRHs) and one (1) additional "squid" OVP. Equipment shall be installed on the existing 15' sector mounts at 140' and be fed by six (6) power cables and two (2) fiber lines, as referenced in the following table.

Our analysis indicates that the subject tower structure meets the requirements of the International Building Code 2015 (IBC 2015), as amended by the 2018 Connecticut State Building Code, and the ANSI/TIA-222-H standard with the existing and proposed equipment loading.

Evaluation of the existing base foundation was performed by comparing reactions calculated under the proposed loads with design reactions indicated within the ROHN design drawings previously provided to APT. Reactions imposed by the proposed installation are significantly less than the design reactions, indicating that the tower foundation is adequately sized.

During APT's site visit on 10/15/20, APT observed two (2) loose leg flange connection bolts at 40', one (1) at 100' and one (1) at 120'. All loose bolts should be replaced in kind and not just tightened, prior to the installation of the proposed equipment.

The maximum structure usage is summarized in the table below:

Component/Member	Usage (%)
Legs - 100'-120'	83%
Bracing - 20'-40'	49%

INTRODUCTION:

A structural analysis was performed on the above-mentioned communications tower by APT for the North Madison Volunteer Fire Company. The tower is located at 864 Opening Hill Road in Madison, Connecticut.

The following information was utilized in the preparation of this analysis:

- Field observations conducted on 09/09/20, 10/15/20, 03/23/22 & 08/10/22 by APT. APT climbed the structure in its entirety on 10/15/20 and recorded information regarding physical and dimensional properties of the structure and its appurtenances.
- RFDS detailing AT&T's proposed equipment changes, latest version.
- Tower Structural Analysis Report prepared by Infinigy (Project No. 1106-A0001-B), dated 05/13/22.

- Construction Drawings prepared by Inifinigy (Project No. 1106-A0001-C), marked Rev. 2, dated 05/10/22.
- Structural Analysis Report (SA) prepared by APT (Project No. CT411900), marked Rev. 1, dated 04/28/22.
- Mount Analysis Report prepared by Infinigy (Project No. 1106-A0001-B), dated 03/15/22.
- Structural Analysis Report (SA) prepared by Paul J. Ford & Company (PJF) (Project No. A42921-0018.003.8700), dated 01/13/22, signed and sealed by Justin T. Kline, P.E. (CTPE No. 30301).
- Structural Analysis Report (SA) prepared by APT (Project No. CT656100), dated 10/22/20.
- Structural Analysis Report prepared by American Tower Corporation (ATC) (Project No. OAA745468_C3_01), dated 03/14/19.
- Construction Drawings for AT&T prepared by Infinigy (Project No. 1106-S0001-C), marked Rev. 2 dated 02/13/19.
- Tower and Foundation Drawings prepared by ROHN (File No. 35130AE), dated 11/30/98.

The analysis was conducted using the following equipment inventory (proposed equipment shown in **bold** text; reserved loading shown in *italic* text):

Carrier	Antenna and Appurtenance Make/Model	Elevation (AGL)	Status	Mount Type	Coax/Feed-Line
Unknown	12' 4-bay dipole	180'	ETR	Leg	7/8"
Unknown	Vacant mount	177'	ETR	6' sidearm	N.A.
Unknown	20' omnidirectional whip	177'	ETR	6' sidearm	(2) 7/8"
Verizon	*(3) Andrew LNX-6514DS-A1M, (6) JMA Wireless MX06FRO660-03 antennas, (3) Samsung MT6407-77A antenna w/ integrated RRHs, (3) Samsung B2/B66A RRH-BR049 (RFV01U-D1A) RRHs, (3) Samsung B5/B13 RRH-BR04C (RFV01UD2A) RRHs, (1) Raycap RVZDC-6627-PF-48 OVP, GPS*	*170'*	*R*	*(3) ROHN 6' x 15' Boom Gates*	*(6) 1-5/8", (2) 1-1/4" hybrid, 1/2"*
Sprint	(3) RFS APXVSPP18 & (3) RFS APXVTM14 antennas, (9) RRHs	150'	ETR	(3) ROHN 6' x 15' Boom Gates	(4) 1-1/4"
AT&T	(3) Kathrein 800-10965, **(3) Ericsson AIR6419 B77G,** **(3) Ericsson AIR6449 B77D &** **(3) CCI DMP65R-BU6EA-K** antennas, (3) RRUS 8843 B2, B66A RRHs, (3) RRUS 4449 B5, B12 RRHs, **(3) Ericsson RRUS 4478 B14 RRHs,** **(3)** Raycap DC6-48-60-18-8F	140'	ETR **P** **P** **P** ETR ETR **P** ETR/**P**	(3) ROHN 6' x 15' Boom Gates	**(6)** 3/4" power, (2) 3/8" fiber
T-Mobile	(3) RFS APXVAARR 24_43 & (3) EMS RR90-17-DP panels, (3) RRHs, (3) TMAs	130'	ETR	(3) 12' sector mounts	(12) 1-5/8", (3) 1-1/4"
Unknown	4' omnidirectional whip	120'	ETR	6' sidearm	7/8"
Dish Wireless	*(3) JMA MX08FRO665-21 panels, (3) Fujitsu TA08025-B605 RRHs, (3) Fujitsu TA08025-B604 RRHs, (1) Raycap RDIDC-9181-PF-48 OVP*	*110'*	*R*	*(3) 8' sector mounts (Commscope MTC3975083)*	*(1) 1.6" hybrid*
Unknown	12" x 12" x 12" junction box	108'	ETR	On bracing	2" conduit, 1-1/4" ground conduit
Unknown	RFI dipole array	90'	ETR	6' sidearm	7/8"
Unknown	4' omnidirectional whip	86'	ETR	6' sidearm	7/8"
Sprint	GPS	55'	ETR	3' standoff	1/2"

Notes:

1. ETR = Existing to Remain; P = Proposed; R = Reserved.
2. APT utilized Verizon's equipment loading as detailed in the aforementioned structural analysis report prepared by PJF (Project No. A42921-0018.003.8700), dated 01/13/22.

STRUCTURAL ANALYSIS:

Methodology:

This structural analysis has been prepared in accordance with the ANSI/TIA-222-H standard entitled "Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures", the American Institute of Steel Construction (AISC) Manual of Steel Construction, and IBC 2015, as amended by the 2018 Connecticut State Building Code.

Antenna, appurtenance and mount assembly loads were evaluated utilizing the ANSI/TIA-222-H standard.

- Load Case 1: 122 mph (3-second gust) Ultimate Wind Speed, 0" ice
- Load Case 2: 50mph (3-second gust) w/ 1.0" ice thickness
- Load Case 3: 105mph (3-second gust) Nominal Wind Speed (Service Load)
- Risk Category II
- Exposure Category B
- Topographic Category 1

Analysis Results:

Analysis of the tower was conducted in accordance with the criteria outlined herein with antenna changes as previously described. The following table summarizes the results of the analysis based on stresses of individual leg and bracing members:

Elevation	Legs [1]	Bracing [2]
160'-180'	7%	24%
140'-160'	17%	32%
120'-140'	79%	47%
100'-120'	83%	32%
80'-100'	67%	32%
60'-80'	57%	39%
40'-60'	62%	38%
20'-40'	51%	42%
0'-20'	55%	28% [3]

Notes:
1. Based on ASTM A572 Gr. 50 pipes. Pipe diameter and thickness vary.
2. Based on ASTM A572 Gr. 50 pipes. Pipe diameter and thickness vary.
3. Member connection controls.

Bracing, Splice and Anchor Bolts:

Connection bolts were evaluated under the proposed loading. All bolts were found to be adequately sized to support the proposed loads. During APT's site visit on 10/15/20, APT observed two (2) loose leg flange connection bolts at 40', one (1) at 100' and one (1) at 120'. All loose bolts should be replaced in kind and not just tightened, prior to the installation of the proposed equipment.

Base Foundation:

Evaluation of the existing base foundation was performed by comparing reactions calculated under the proposed loads with design reactions indicated within aforementioned ROHN dower drawings. Reactions imposed by the proposed installation are significantly less than the design reactions, indicating the tower foundation is adequately sized. Factored reactions are as follows:

Factored base reactions imposed with the equipment changes were calculated as follows:

Load Effect	Original Design (TIA-222-F)	Equivalent Design Reactions (TIA-222-H) [1]	Calculated Reactions (TIA-222-H)
Leg Compression	517.1 k	698.1 k	375 k
Leg Uplift	441.2 k	595.6 k	118 k
Base Shear	66.3 k	89.5 k	50 k
Overturning Moment	10,200.9 ft-kips	13, 771.2 ft-kips	5,231 ft-kips

Notes:

[1] Original TIA-222-F design reactions multiplied by factor of 1.35 per TIA-222-H paragraph 15.6.2.
[2] Based Load Combination (0.9 DL +1.0 WL, no ice).

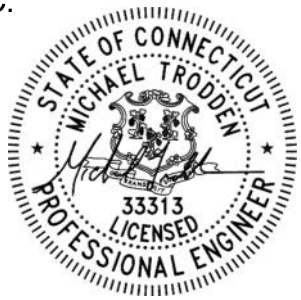
CONCLUSIONS AND RECOMMENDATIONS:

In conclusion, our structural analysis indicates that the existing self-supporting lattice tower structure located at 864 Opening Hill Road in Madison, Connecticut meet the requirements of IBC 2015, as amended by the 2018 Connecticut State Building Code, and the ANSI/TIA-222-H standard with the existing and proposed loading.

During APT's site visit on 10/15/20, APT observed two (2) loose leg flange connection bolts at 40', one (1) at 100' and one (1) at 120'. All loose bolts should be replaced in kind and not just tightened, prior to the installation of the proposed equipment.

Sincerely,
All-Points Technology Corp. P.C.

Michael S. Trodden, P.E.
Senior Structural Engineer



Prepared By:
All-Points Technology Corp. P.C.

Ali M. Adair
Project Scientist

LIMITATIONS:

This report is based on the following:

1. Tower/structure is properly installed and maintained.
2. All members and components are in a non-deteriorated condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower/structure is in plumb condition.
6. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.

All-Points Technology Corporation, P.C. (APT) is not responsible for any modifications completed prior to or hereafter which APT is not or was not directly involved. Modifications include but are not limited to:

1. Replacing or reinforcing bracing members.
2. Reinforcing members in any manner.
3. Installing antenna mounts or waveguide cables.
4. Adding or relocating antennas.
5. Extending tower/structure.

APT hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which is contrary to that which is contained herein, or you are aware of any defects arising from the original design, material, fabrication and erection deficiencies, you should disregard this report and immediately contact APT. APT disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Appendix A

Design Criteria

ASCE 7 Hazards Report

Address:
864 Opening Hill Rd
Madison, Connecticut
06443

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 307.76 ft (NAVD 88)
Latitude: 41.357569
Longitude: -72.638304

Wind

Results:

Wind Speed	122 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Thu Mar 31 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Ice

Results:

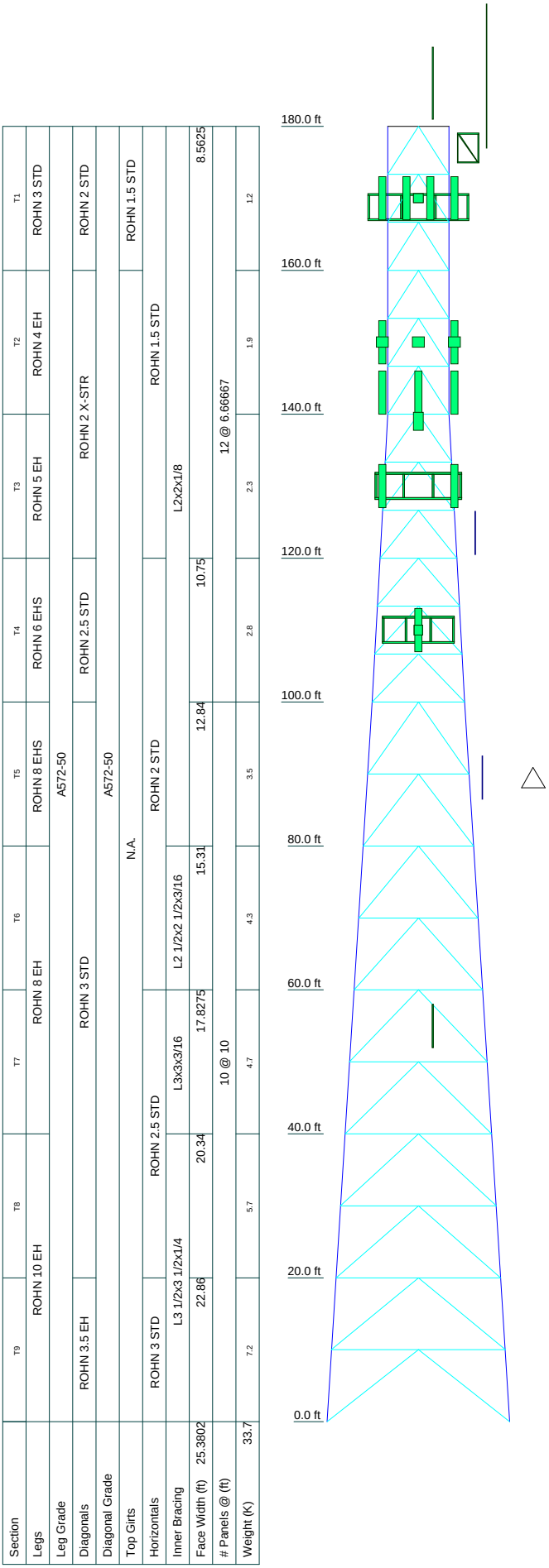
Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Thu Mar 31 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Appendix B

Tower Schematic



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BA40-41-DIN	180	Radio 8843 (AT⊥)	140
6' sidearm (Vacant Mount)	177	Radio 8843 (AT⊥)	140
20' x 3" omni whip	177	Radio 4449 (AT⊥)	140
6' sidearm	177	Radio 4449 (AT⊥)	140
(2) JMA MX06FRO660-03 (VzW)	170	Radio 4449 (AT⊥)	140
(2) JMA MX06FRO660-03 (VzW)	170	Radio 4478 B14 (AT⊥)	140
(2) JMA MX06FRO660-03 (VzW)	170	Radio 4478 B14 (AT⊥)	140
LNX-6514DS-VTM (VzW)	170	Radio 4478 B14 (AT⊥)	140
LNX-6514DS-VTM (VzW)	170	Raycap DC6-48-60-18-8F squid (AT⊥)	140
LNX-6514DS-VTM (VzW)	170	Raycap DC6-48-60-18-8F squid (AT⊥)	140
MT6407-77A (VzW)	170	Raycap DC6-48-60-18-8F squid (AT⊥)	140
MT6407-77A (VzW)	170	Rohn 6'x15' Boom Gate (3) (AT⊥)	140
MT6407-77A (VzW)	170	APXVAARR 24_43 (T-Mobile)	130
B2/B66A RRHBRO49 (RFV01U-D1A) (VzW)	170	APXVAARR 24_43 (T-Mobile)	130
		APXVAARR 24_43 (T-Mobile)	130
B2/B66A RRHBRO49 (RFV01U-D1A) (VzW)	170	RR90-17-DP (T-Mobile)	130
		RR90-17-DP (T-Mobile)	130
B2/B66A RRHBRO49 (RFV01U-D1A) (VzW)	170	RR90-17-DP (T-Mobile)	130
		RRH (T-Mobile)	130
B5/B13 RRHBR04C (RFV01UD2A) (VzW)	170	RRH (T-Mobile)	130
B5/B13 RRHBR04C (RFV01UD2A) (VzW)	170	RRH (T-Mobile)	130
		TMA (T-Mobile)	130
B5/B13 RRHBR04C (RFV01UD2A) (VzW)	170	TMA (T-Mobile)	130
		TMA (T-Mobile)	130
RVZDC-6627-PF-48 (VzW)	170	12' T-frame sector mnt (T-Mobile)	130
GPS on 3' standoff (VzW)	170	12' T-frame sector mnt (T-Mobile)	130
Rohn 6'x15' Boom Gate (3) (VzW)	168.75	12' T-frame sector mnt (T-Mobile)	130
APXVSPP18-C-A20 (Sprint)	150	Sinclair SC323-HF2LDF	120
APXVSPP18-C-A20 (Sprint)	150	6' sidearm	120
APXVSPP18-C-A20 (Sprint)	150	JMA MX08FRO665-21 (Dish)	110
APXVTM14-C-120 (Sprint)	150	JMA MX08FRO665-21 (Dish)	110
APXVTM14-C-120 (Sprint)	150	JMA MX08FRO665-21 (Dish)	110
APXVTM14-C-120 (Sprint)	150	Fujitsu TA08025-B604 Radio (Dish)	110
(3) Ericsson RRUS-11 (Sprint)	150	Fujitsu TA08025-B604 Radio (Dish)	110
(3) Ericsson RRUS-11 (Sprint)	150	Fujitsu TA08025-B604 Radio (Dish)	110
(3) Ericsson RRUS-11 (Sprint)	150	Fujitsu TA08025-B605 Radio (Dish)	110
Rohn 6'x15' Boom Gate (3) (Sprint)	150	Fujitsu TA08025-B605 Radio (Dish)	110
800-10965 (AT⊥)	140	Fujitsu TA08025-B605 Radio (Dish)	110
800-10965 (AT⊥)	140	Raycap RDIDC-9181-PF-48 (Dish)	110
800-10965 (AT⊥)	140	Commscope 3975083 Sector Frame (Dish)	110
DMP65R-BU6EA-K (AT⊥)	140	Commscope 3975083 Sector Frame (Dish)	110
DMP65R-BU6EA-K (AT⊥)	140	Commscope 3975083 Sector Frame (Dish)	110
DMP65R-BU6EA-K (AT⊥)	140		
AIR6419 B77G (AT⊥)	140	12" x 12" x 12" junction box	108
AIR6419 B77G (AT⊥)	140	RFI dipole array	100 - 90
AIR6419 B77G (AT⊥)	140	6' sidearm	90
AIR6449 B77D (AT⊥)	140	Sinclair SC323-HF2LDF	86
AIR6449 B77D (AT⊥)	140	6' sidearm	86
AIR6449 B77D (AT⊥)	140	GPS on 3' standoff	55
Radio 8843 (AT⊥)	140		

MATERIAL STRENGTH

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

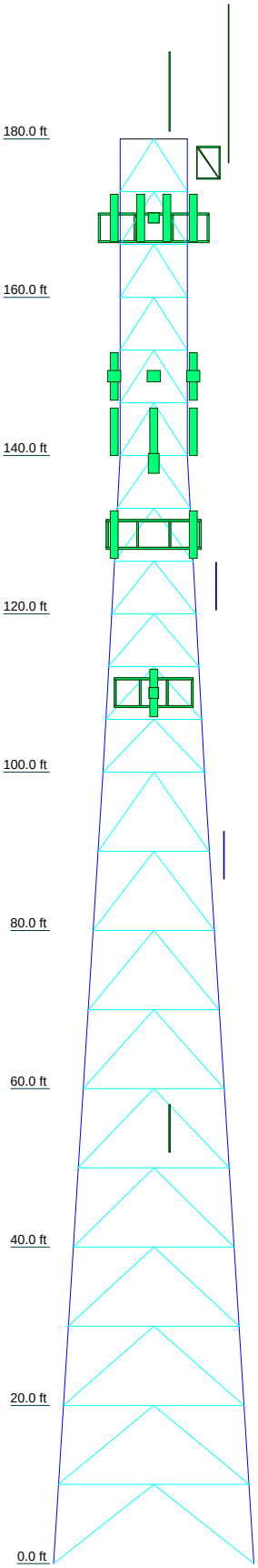
All Points Technology
567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
Phone: (860) 663-1697
FAX: (860) 663-0935

Job: ***180' Self-Supporting Tower***
Project: ***CT656130 Madison (Opening Hill Road)***
Client: North Madison Volunteer Fire Company | Drawn by: AMA | App'd:
Code: TIA-222-H | Date: 08/10/22 | Scale: NTS
Path: C:\Users\User\Documents\APT\Work\North Madison Volunteer Fire Company\CT656130 North Madison\CT656130 Madison (Opening Hill Road).eri | Dwg No. E-1

MATERIAL STRENGTH

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	
Legs	ROHN 3 STD	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 8 EHS	ROHN 8 EH	ROHN 10 EH			
Leg Grade	A572-50									
Diagonals	ROHN 2 STD	ROHN 2 X-STR		ROHN 2.5 STD		ROHN 3 STD			ROHN 3.5 EH	
Diagonal Grade	A572-50									
Top Girts	ROHN 1.5 STD	N.A.								
Horizontals	ROHN 1.5 STD		L2x2x1/8		ROHN 2 STD		ROHN 2.5 STD		ROHN 3 STD	
Inner Bracing						L2 1/2x2 1/2x3/16	L3x3x3/16		L3 1/2x3 1/2x1/4	
Face Width (ft)	8.5625			10.75	12.84	15.31	17.8275	20.34	22.86	25.3802
# Panels @ (ft)	12 @ 6.66667						10 @ 10			
Weight (K)	1.2	1.9	2.3	2.8	3.5	4.3	4.7	5.7	7.2	33.7



ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 375 K
SHEAR: 39 K

UPLIFT: -118 K
SHEAR: 20 K

AXIAL 488 K
SHEAR 14 K
MOMENT 1439 kip-ft

TORQUE 12 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 438 K
SHEAR 50 K
MOMENT 5231 kip-ft

TORQUE 32 kip-ft
REACTIONS - 122 mph WIND

All Points Technology
567 Vauxhall St. Ext., Suite 311
Waterford, CT 06385
Phone: (860) 663-1697
FAX: (860) 663-0935

Job:	**180' Self-Supporting Tower**
Project:	**CT656130 Madison (Opening Hill Road)**
Client: North Madison Volunteer Fire Company	Drawn by: AMA / App'd:
Code: TIA-222-H	Date: 08/10/22 / Scale: NTS
Path: C:\Users\User\Documents\APT\Work\North Madison Volunteer Fire Company\CT656130 North Madison\CT656130 Madison (Opening Hill Road).eri	Dwg No. E-1

Appendix C

Calculations

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 25.38 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 0.00 ft.
Basic wind speed of 122 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Feed Line/Linear Appurtenances

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*
3/8" safety cable	C	No	No	Ar (CaAa)	180.00 - 5.00	0.0000	-0.5	1	1	0.3750	0.3750		0.22
1 5/8 (T-Mobile)	B	No	No	Ar (CaAa)	130.00 - 5.00	0.0000	-0.38	12	6	0.5000	1.9800		1.04
1-1/4" Hybrid fiber-power cable (T-Mobile)	B	No	No	Ar (CaAa)	130.00 - 5.00	0.0000	-0.42	3	3	0.7500	1.2500		1.30
3/4" power (AT&T)	B	No	No	Ar (CaAa)	140.00 - 5.00	0.0000	0.36	6	6	0.7950	0.7950		0.58
3/8 fiber (AT&T)	B	No	No	Ar (CaAa)	140.00 - 5.00	6.0000	0.36	2	2	0.7950	0.7950		0.58
1 5/8 (VzW)	C	No	No	Ar (CaAa)	170.00 - 5.00	0.0000	-0.38	6	6	0.5000	1.9800		1.04
1-1/4" Hybrid fiber-power cable (VzW)	C	No	No	Ar (CaAa)	170.00 - 5.00	0.0000	-0.42	1	1	0.7500	1.2500		1.30
1/2 (VzW)	C	No	No	Ar (CaAa)	170.00 - 5.00	0.0000	-0.34	1	1	0.5800	0.5800		0.25

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1-1/4" Hybrid fiber-power cable (VzW)	C	No	No	Ar (CaAa)	170.00 - 5.00	0.0000	-0.32	1	1	0.7500	1.2500		1.30
1.6" Hybrid (Dish)	B	No	No	Ar (CaAa)	110.00 - 5.00	-2.0000	-0.4	1	1	0.7500	1.2500		1.30
7/8	C	No	No	Ar (CaAa)	86.00 - 5.00	0.0000	0.27	1	1	1.1100	1.1100		0.54
7/8	C	No	No	Ar (CaAa)	90.00 - 5.00	0.0000	0.29	1	1	1.1100	1.1100		0.54
7/8	C	No	No	Ar (CaAa)	120.00 - 5.00	0.0000	0.31	1	1	1.1100	1.1100		0.54
7/8	C	No	No	Ar (CaAa)	177.00 - 5.00	0.0000	0.37	2	2	1.1100	1.1100		0.54
1/2	C	No	No	Ar (CaAa)	55.00 - 5.00	3.0000	0.34	1	1	0.5800	0.5800		0.25
7/8	C	No	No	Ar (CaAa)	180.00 - 5.00	0.0000	0.38	1	1	1.1100	1.1100		0.54
2" Rigid Conduit	C	No	No	Ar (CaAa)	108.00 - 6.00	-2.0000	0.38	1	1	2.0000	2.0000		2.80
1 1/4" Rigid Conduit	C	No	No	Ar (CaAa)	108.00 - 6.00	-4.0000	0.38	1	1	1.2500	1.2500		0.70
1 1/4	C	No	No	Ar (CaAa)	109.00 - 108.00	-2.0000	0.38	3	3	1.5500	1.5500		0.66
1 1/4 (Sprint)	C	No	No	Ar (CaAa)	150.00 - 5.00	0.0000	0.34	3	3	0.7500	1.5500		0.66
1 1/4 (Sprint)	C	No	No	Ar (CaAa)	150.00 - 5.00	0.0000	0.25	1	1	0.7500	1.5500		0.66

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BA40-41-DIN	C	From Face	0.50 0.00 6.00	0.0000	180.00	No Ice 1/2" Ice 1" Ice	2.50 3.67 4.87	2.50 3.67 4.87	0.04 0.06 0.08
6' sidearm (Vacant Mount)	C	None		0.0000	177.00	No Ice 1/2" Ice 1" Ice	4.17 6.17 8.17	2.09 3.09 4.09	0.07 0.13 0.20
20' x 3" omni whip	B	From Leg	6.00 0.00 10.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	6.00 8.03 10.08	6.00 8.03 10.08	0.05 0.09 0.15
6' sidearm	B	From Leg	3.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	4.17 6.17 8.17	2.09 3.09 4.09	0.07 0.13 0.20
(2) JMA MX06FRO660-03 (VzW)	A	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.87 10.34 10.82	7.34 7.78 8.24	0.07 0.13 0.21
(2) JMA MX06FRO660-03 (VzW)	B	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.87 10.34 10.82	7.34 7.78 8.24	0.07 0.13 0.21
(2) JMA MX06FRO660-03 (VzW)	C	From Face	4.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.87 10.34 10.82	7.34 7.78 8.24	0.07 0.13 0.21
LNX-6514DS-VTM (VzW)	A	From Face	4.00 0.00	0.0000	170.00	No Ice 1/2" Ice	8.17 8.63	4.17 4.61	0.03 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	9.10	5.07	0.13
LNX-6514DS-VTM	B	From Face	4.00	0.0000	170.00	No Ice	8.17	4.17	0.03
(VzW)			0.00			1/2" Ice	8.63	4.61	0.07
			0.00			1" Ice	9.10	5.07	0.13
LNX-6514DS-VTM	C	From Face	4.00	0.0000	170.00	No Ice	8.17	4.17	0.03
(VzW)			0.00			1/2" Ice	8.63	4.61	0.07
			0.00			1" Ice	9.10	5.07	0.13
MT6407-77A	A	From Face	4.00	0.0000	170.00	No Ice	4.69	1.84	0.09
(VzW)			0.00			1/2" Ice	4.98	2.06	0.12
			0.00			1" Ice	5.28	2.29	0.15
MT6407-77A	B	From Face	4.00	0.0000	170.00	No Ice	4.69	1.84	0.09
(VzW)			0.00			1/2" Ice	4.98	2.06	0.12
			0.00			1" Ice	5.28	2.29	0.15
MT6407-77A	C	From Face	4.00	0.0000	170.00	No Ice	4.69	1.84	0.09
(VzW)			0.00			1/2" Ice	4.98	2.06	0.12
			0.00			1" Ice	5.28	2.29	0.15
B2/B66A RRHBRO49	A	From Face	3.50	0.0000	170.00	No Ice	1.88	1.25	0.09
(RFV01U-D1A)			0.00			1/2" Ice	2.05	1.39	0.10
(VzW)			0.00			1" Ice	2.22	1.54	0.12
B2/B66A RRHBRO49	B	From Face	3.50	0.0000	170.00	No Ice	1.88	1.25	0.09
(RFV01U-D1A)			0.00			1/2" Ice	2.05	1.39	0.10
(VzW)			0.00			1" Ice	2.22	1.54	0.12
B2/B66A RRHBRO49	C	From Face	3.50	0.0000	170.00	No Ice	1.88	1.25	0.09
(RFV01U-D1A)			0.00			1/2" Ice	2.05	1.39	0.10
(VzW)			0.00			1" Ice	2.22	1.54	0.12
B5/B13 RRHBR04C	A	From Face	3.50	0.0000	170.00	No Ice	1.88	1.01	0.10
(RFV01UD2A)			0.00			1/2" Ice	2.05	1.14	0.12
(VzW)			0.00			1" Ice	2.22	1.28	0.14
B5/B13 RRHBR04C	B	From Face	3.50	0.0000	170.00	No Ice	1.88	1.01	0.10
(RFV01UD2A)			0.00			1/2" Ice	2.05	1.14	0.12
(VzW)			0.00			1" Ice	2.22	1.28	0.14
B5/B13 RRHBR04C	C	From Face	3.50	0.0000	170.00	No Ice	1.88	1.01	0.10
(RFV01UD2A)			0.00			1/2" Ice	2.05	1.14	0.12
(VzW)			0.00			1" Ice	2.22	1.28	0.14
RVZDC-6627-PF-48	B	None		0.0000	170.00	No Ice	6.13	5.25	0.05
(VzW)						1/2" Ice	6.44	5.55	0.10
						1" Ice	6.76	5.85	0.17
GPS on 3' standoff	B	From Face	3.50	0.0000	170.00	No Ice	0.60	0.60	0.05
(VzW)			0.00			1/2" Ice	0.79	0.79	0.06
			0.00			1" Ice	0.99	0.99	0.06
Rohn 6'x15' Boom Gate (3)	A	None		0.0000	168.75	No Ice	53.20	53.20	1.79
(VzW)						1/2" Ice	63.30	63.30	2.23
						1" Ice	73.40	73.40	2.67
APXVSPP18-C-A20	A	From Face	4.00	0.0000	150.00	No Ice	8.02	5.81	0.07
(Sprint)			0.00			1/2" Ice	8.48	6.27	0.12
			0.00			1" Ice	8.94	6.73	0.18
APXVSPP18-C-A20	B	From Face	4.00	0.0000	150.00	No Ice	8.02	5.81	0.07
(Sprint)			0.00			1/2" Ice	8.48	6.27	0.12
			0.00			1" Ice	8.94	6.73	0.18
APXVSPP18-C-A20	C	From Face	4.00	0.0000	150.00	No Ice	8.02	5.81	0.07
(Sprint)			0.00			1/2" Ice	8.48	6.27	0.12
			0.00			1" Ice	8.94	6.73	0.18
APXVTM14-C-120	A	From Face	4.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			0.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14-C-120	B	From Face	4.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			0.00			1/2" Ice	6.72	3.97	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14-C-120	C	From Face	4.00	0.0000	150.00	No Ice	6.34	3.61	0.06
(Sprint)			0.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
(3) Ericsson RRUS-11	A	From Face	3.50	0.0000	150.00	No Ice	2.79	1.02	0.06
(Sprint)			0.00			1/2" Ice	3.00	1.16	0.08
			0.00			1" Ice	3.21	1.30	0.10
(3) Ericsson RRUS-11	B	From Face	3.50	0.0000	150.00	No Ice	2.79	1.02	0.06
(Sprint)			0.00			1/2" Ice	3.00	1.16	0.08
			0.00			1" Ice	3.21	1.30	0.10
(3) Ericsson RRUS-11	C	From Face	3.50	0.0000	150.00	No Ice	2.79	1.02	0.06
(Sprint)			0.00			1/2" Ice	3.00	1.16	0.08
			0.00			1" Ice	3.21	1.30	0.10
Rohn 6'x15' Boom Gate (3)	A	None		0.0000	150.00	No Ice	53.20	53.20	1.79
(Sprint)						1/2" Ice	63.30	63.30	2.23
						1" Ice	73.40	73.40	2.67
800-10965	A	From Face	4.00	0.0000	140.00	No Ice	13.81	5.83	0.11
(AT&T)			0.00			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
800-10965	B	From Face	4.00	0.0000	140.00	No Ice	13.81	5.83	0.11
(AT&T)			0.00			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
800-10965	C	From Face	4.00	0.0000	140.00	No Ice	13.81	5.83	0.11
(AT&T)			0.00			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
DMP65R-BU6EA-K	A	From Face	4.00	0.0000	140.00	No Ice	12.71	6.77	103.80
(AT&T)			0.00			1/2" Ice	13.21	7.23	103.88
			0.00			1" Ice	13.71	7.68	103.97
DMP65R-BU6EA-K	B	From Face	4.00	0.0000	140.00	No Ice	12.71	6.77	103.80
(AT&T)			0.00			1/2" Ice	13.21	7.23	103.88
			0.00			1" Ice	13.71	7.68	103.97
DMP65R-BU6EA-K	C	From Face	4.00	0.0000	140.00	No Ice	12.71	6.77	103.80
(AT&T)			0.00			1/2" Ice	13.21	7.23	103.88
			0.00			1" Ice	13.71	7.68	103.97
AIR6419 B77G	A	From Face	4.00	0.0000	140.00	No Ice	3.80	1.94	0.07
(AT&T)			0.00			1/2" Ice	4.05	2.14	0.09
			3.00			1" Ice	4.31	2.34	0.13
AIR6419 B77G	B	From Face	4.00	0.0000	140.00	No Ice	3.80	1.94	0.07
(AT&T)			0.00			1/2" Ice	4.05	2.14	0.09
			3.00			1" Ice	4.31	2.34	0.13
AIR6419 B77G	C	From Face	4.00	0.0000	140.00	No Ice	3.80	1.94	0.07
(AT&T)			0.00			1/2" Ice	4.05	2.14	0.09
			3.00			1" Ice	4.31	2.34	0.13
AIR6449 B77D	A	From Face	4.00	0.0000	140.00	No Ice	4.03	2.15	0.08
(AT&T)			0.00			1/2" Ice	4.29	2.36	0.11
			-1.00			1" Ice	4.56	2.57	0.14
AIR6449 B77D	B	From Face	4.00	0.0000	140.00	No Ice	4.03	2.15	0.08
(AT&T)			0.00			1/2" Ice	4.29	2.36	0.11
			-1.00			1" Ice	4.56	2.57	0.14
AIR6449 B77D	C	From Face	4.00	0.0000	140.00	No Ice	4.03	2.15	0.08
(AT&T)			0.00			1/2" Ice	4.29	2.36	0.11
			-1.00			1" Ice	4.56	2.57	0.14
Radio 8843	A	From Face	3.50	0.0000	140.00	No Ice	1.64	1.36	0.07
(AT&T)			0.00			1/2" Ice	1.80	1.51	0.09
			0.00			1" Ice	1.96	1.66	0.11
Radio 8843	B	From Face	3.50	0.0000	140.00	No Ice	1.64	1.36	0.07
(AT&T)			0.00			1/2" Ice	1.80	1.51	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	1.96	1.66	0.11
Radio 8843	C	From Face	3.50	0.0000	140.00	No Ice	1.64	1.36	0.07
(AT&T)			0.00			1/2" Ice	1.80	1.51	0.09
			0.00			1" Ice	1.96	1.66	0.11
Radio 4449	A	From Face	3.50	0.0000	140.00	No Ice	1.65	1.16	0.08
(AT&T)			0.00			1/2" Ice	1.81	1.30	0.10
			0.00			1" Ice	1.98	1.45	0.11
Radio 4449	B	From Face	3.50	0.0000	140.00	No Ice	1.65	1.16	0.08
(AT&T)			0.00			1/2" Ice	1.81	1.30	0.10
			0.00			1" Ice	1.98	1.45	0.11
Radio 4449	C	From Face	3.50	0.0000	140.00	No Ice	1.65	1.16	0.08
(AT&T)			0.00			1/2" Ice	1.81	1.30	0.10
			0.00			1" Ice	1.98	1.45	0.11
Radio 4478 B14	A	From Face	3.50	0.0000	140.00	No Ice	2.02	1.25	0.07
(AT&T)			0.00			1/2" Ice	2.20	1.40	0.08
			0.00			1" Ice	2.39	1.56	0.10
Radio 4478 B14	B	From Face	3.50	0.0000	140.00	No Ice	2.02	1.25	0.07
(AT&T)			0.00			1/2" Ice	2.20	1.40	0.08
			0.00			1" Ice	2.39	1.56	0.10
Radio 4478 B14	C	From Face	3.50	0.0000	140.00	No Ice	2.02	1.25	0.07
(AT&T)			0.00			1/2" Ice	2.20	1.40	0.08
			0.00			1" Ice	2.39	1.56	0.10
Raycap DC6-48-60-18-8F	A	None		0.0000	140.00	No Ice	1.19	1.19	0.03
squid						1/2" Ice	1.37	1.37	0.04
(AT&T)						1" Ice	1.56	1.56	0.06
Raycap DC6-48-60-18-8F	B	None		0.0000	140.00	No Ice	1.19	1.19	0.03
squid						1/2" Ice	1.37	1.37	0.04
(AT&T)						1" Ice	1.56	1.56	0.06
Raycap DC6-48-60-18-8F	C	None		0.0000	140.00	No Ice	1.19	1.19	0.03
squid						1/2" Ice	1.37	1.37	0.04
(AT&T)						1" Ice	1.56	1.56	0.06
Rohn 6'x15' Boom Gate (3)	A	None		0.0000	140.00	No Ice	53.20	53.20	1.79
(AT&T)						1/2" Ice	63.30	63.30	2.23
						1" Ice	73.40	73.40	2.67
APXVAARR 24_43	A	From Face	4.00	0.0000	130.00	No Ice	20.24	8.89	0.08
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.19
			0.00			1" Ice	21.54	10.09	0.31
APXVAARR 24_43	B	From Face	4.00	0.0000	130.00	No Ice	20.24	8.89	0.08
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.19
			0.00			1" Ice	21.54	10.09	0.31
APXVAARR 24_43	C	From Face	4.00	0.0000	130.00	No Ice	20.24	8.89	0.08
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	0.19
			0.00			1" Ice	21.54	10.09	0.31
RR90-17-DP	A	From Face	4.00	0.0000	130.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-DP	B	From Face	4.00	0.0000	130.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RR90-17-DP	C	From Face	4.00	0.0000	130.00	No Ice	4.36	1.97	0.02
(T-Mobile)			0.00			1/2" Ice	4.70	2.31	0.04
			0.00			1" Ice	5.06	2.66	0.07
RRH	A	From Face	3.50	0.0000	130.00	No Ice	2.79	1.02	0.06
(T-Mobile)			0.00			1/2" Ice	3.00	1.16	0.08
			0.00			1" Ice	3.21	1.30	0.10
RRH	B	From Face	3.50	0.0000	130.00	No Ice	2.79	1.02	0.06
(T-Mobile)			0.00			1/2" Ice	3.00	1.16	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	3.21	1.30	0.10
RRH	C	From Face	3.50	0.0000	130.00	No Ice	2.79	1.02	0.06
(T-Mobile)			0.00			1/2" Ice	3.00	1.16	0.08
			0.00			1" Ice	3.21	1.30	0.10
TMA	A	From Face	4.00	0.0000	130.00	No Ice	0.63	0.39	0.02
(T-Mobile)			0.00			1/2" Ice	0.74	0.48	0.02
			0.00			1" Ice	0.85	0.58	0.03
TMA	B	From Face	4.00	0.0000	130.00	No Ice	0.63	0.39	0.02
(T-Mobile)			0.00			1/2" Ice	0.74	0.48	0.02
			0.00			1" Ice	0.85	0.58	0.03
TMA	C	From Face	4.00	0.0000	130.00	No Ice	0.63	0.39	0.02
(T-Mobile)			0.00			1/2" Ice	0.74	0.48	0.02
			0.00			1" Ice	0.85	0.58	0.03
12' T-frame sector mnt	A	None		0.0000	130.00	No Ice	10.20	5.10	0.47
(T-Mobile)						1/2" Ice	13.80	6.90	0.60
						1" Ice	17.40	8.70	0.73
12' T-frame sector mnt	B	None		0.0000	130.00	No Ice	10.20	5.10	0.47
(T-Mobile)						1/2" Ice	13.80	6.90	0.60
						1" Ice	17.40	8.70	0.73
12' T-frame sector mnt	C	None		0.0000	130.00	No Ice	10.20	5.10	0.47
(T-Mobile)						1/2" Ice	13.80	6.90	0.60
						1" Ice	17.40	8.70	0.73
Sinclair SC323-HF2LDF	B	From Face	6.00	0.0000	120.00	No Ice	1.33	1.33	0.01
			0.00			1/2" Ice	2.02	2.02	0.02
			3.50			1" Ice	2.49	2.49	0.03
6' sidearm	B	None		0.0000	120.00	No Ice	4.17	2.09	0.07
						1/2" Ice	6.17	3.09	0.13
						1" Ice	8.17	4.09	0.20
JMA MX08FRO665-21	A	From Face	4.00	0.0000	110.00	No Ice	12.49	5.87	0.07
(Dish)			0.00			1/2" Ice	12.99	6.32	0.14
			0.00			1" Ice	13.49	6.79	0.22
JMA MX08FRO665-21	B	From Face	4.00	0.0000	110.00	No Ice	12.49	5.87	0.07
(Dish)			0.00			1/2" Ice	12.99	6.32	0.14
			0.00			1" Ice	13.49	6.79	0.22
JMA MX08FRO665-21	C	From Face	4.00	0.0000	110.00	No Ice	12.49	5.87	0.07
(Dish)			0.00			1/2" Ice	12.99	6.32	0.14
			0.00			1" Ice	13.49	6.79	0.22
Fujitsu TA08025-B604 Radio	A	From Face	4.00	0.0000	110.00	No Ice	1.96	1.03	0.06
(Dish)			0.00			1/2" Ice	2.14	1.17	0.08
			0.00			1" Ice	2.32	1.31	0.10
Fujitsu TA08025-B604 Radio	B	From Face	4.00	0.0000	110.00	No Ice	1.96	1.03	0.06
(Dish)			0.00			1/2" Ice	2.14	1.17	0.08
			0.00			1" Ice	2.32	1.31	0.10
Fujitsu TA08025-B604 Radio	C	From Face	4.00	0.0000	110.00	No Ice	1.96	1.03	0.06
(Dish)			0.00			1/2" Ice	2.14	1.17	0.08
			0.00			1" Ice	2.32	1.31	0.10
Fujitsu TA08025-B605	A	From Face	4.00	0.0000	110.00	No Ice	1.96	1.19	0.08
Radio			0.00			1/2" Ice	2.14	1.33	0.09
(Dish)			0.00			1" Ice	2.32	1.48	0.11
Fujitsu TA08025-B605	B	From Face	4.00	0.0000	110.00	No Ice	1.96	1.19	0.08
Radio			0.00			1/2" Ice	2.14	1.33	0.09
(Dish)			0.00			1" Ice	2.32	1.48	0.11
Fujitsu TA08025-B605	C	From Face	4.00	0.0000	110.00	No Ice	1.96	1.19	0.08
Radio			0.00			1/2" Ice	2.14	1.33	0.09
(Dish)			0.00			1" Ice	2.32	1.48	0.11
Raycap RDIDC-9181-PF-48	C	None		0.0000	110.00	No Ice	1.87	1.07	0.02
(Dish)						1/2" Ice	2.04	1.20	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	2.21	1.35	0.06
Commscope 3975083 Sector Frame (Dish)	A	None		0.0000	110.00	No Ice	15.40	14.00	0.56
						1/2" Ice	21.30	20.81	0.74
						1" Ice	27.20	27.62	0.92
Commscope 3975083 Sector Frame (Dish)	B	None		0.0000	110.00	No Ice	15.40	14.00	0.56
						1/2" Ice	21.30	20.81	0.74
						1" Ice	27.20	27.62	0.92
Commscope 3975083 Sector Frame (Dish)	C	None		0.0000	110.00	No Ice	15.40	14.00	0.56
						1/2" Ice	21.30	20.81	0.74
						1" Ice	27.20	27.62	0.92
12" x 12" x 12" junction box	B	None		0.0000	108.00	No Ice	1.20	0.32	0.01
						1/2" Ice	1.34	0.40	0.02
						1" Ice	1.48	0.49	0.03
RFI dipole array	C	From Face	6.00 0.00 0.00	0.0000	100.00 - 90.00	No Ice	5.64	5.64	0.03
						1/2" Ice	9.00	9.00	0.08
						1" Ice	12.36	12.36	0.13
6' sidearm	C	None		0.0000	90.00	No Ice	4.17	2.09	0.07
						1/2" Ice	6.17	3.09	0.13
						1" Ice	8.17	4.09	0.20
Sinclair SC323-HF2LDF	B	From Face	6.00 0.00 3.50	0.0000	86.00	No Ice	1.33	1.33	0.01
						1/2" Ice	2.02	2.02	0.02
						1" Ice	2.49	2.49	0.03
6' sidearm	B	None		0.0000	86.00	No Ice	4.17	2.09	0.07
						1/2" Ice	6.17	3.09	0.13
						1" Ice	8.17	4.09	0.20
GPS on 3' standoff	B	None		0.0000	55.00	No Ice	0.60	0.60	0.05
						1/2" Ice	0.79	0.79	0.06
						1" Ice	0.99	0.99	0.06

Solution Summary

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.000	52	0.0898	0.0359
T2	160 - 140	1.616	52	0.0887	0.0320
T3	140 - 120	1.240	52	0.0820	0.0262
T4	120 - 100	0.891	52	0.0707	0.0190
T5	100 - 80	0.607	52	0.0542	0.0138
T6	80 - 60	0.392	52	0.0408	0.0096
T7	60 - 40	0.225	52	0.0299	0.0061
T8	40 - 20	0.108	52	0.0185	0.0036
T9	20 - 0	0.031	61	0.0094	0.0014

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	BA40-41-DIN	52	2.000	0.0898	0.0359	Inf
177.00	6' sidearm	52	1.942	0.0898	0.0354	Inf
170.00	(2) JMA MX06FRO660-03	52	1.808	0.0897	0.0341	Inf
168.75	Rohn 6'x15' Boom Gate (3)	52	1.784	0.0897	0.0339	889617
150.00	APXVSPP18-C-A20	52	1.426	0.0860	0.0294	284803
140.00	800-10965	52	1.240	0.0820	0.0262	184817
130.00	APXVAARR 24_43	52	1.059	0.0770	0.0225	95780
120.00	Sinclair SC323-HF2LDF	52	0.891	0.0707	0.0190	65198
110.00	JMA MX08FRO665-21	52	0.739	0.0626	0.0161	63346
108.00	12" x 12" x 12" junction box	52	0.711	0.0609	0.0156	63343
100.00	RFI dipole array	52	0.607	0.0542	0.0138	64669
95.00	RFI dipole array	52	0.547	0.0505	0.0127	72275
90.00	RFI dipole array	52	0.492	0.0470	0.0116	84205
86.00	Sinclair SC323-HF2LDF	52	0.451	0.0444	0.0108	96998
55.00	GPS on 3' standoff	52	0.192	0.0271	0.0054	94056

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	8.226	4	0.3707	0.1490
T2	160 - 140	6.641	4	0.3663	0.1328
T3	140 - 120	5.086	4	0.3384	0.1089
T4	120 - 100	3.643	4	0.2915	0.0787
T5	100 - 80	2.473	4	0.2231	0.0571
T6	80 - 60	1.592	4	0.1674	0.0397
T7	60 - 40	0.910	4	0.1225	0.0255
T8	40 - 20	0.436	4	0.0754	0.0149
T9	20 - 0	0.123	23	0.0383	0.0057

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	BA40-41-DIN	4	8.226	0.3707	0.1490	584395
177.00	6' sidearm	4	7.988	0.3708	0.1468	584395
170.00	(2) JMA MX06FRO660-03	4	7.432	0.3705	0.1414	292198
168.75	Rohn 6'x15' Boom Gate (3)	4	7.333	0.3703	0.1404	259731
150.00	APXVSPP18-C-A20	4	5.857	0.3551	0.1221	76406
140.00	800-10965	4	5.086	0.3384	0.1089	46150
130.00	APXVAARR 24_43	4	4.340	0.3178	0.0935	23629
120.00	Sinclair SC323-HF2LDF	4	3.643	0.2915	0.0787	15605
110.00	JMA MX08FRO665-21	4	3.019	0.2580	0.0668	15204
108.00	12" x 12" x 12" junction box	4	2.903	0.2509	0.0647	15219
100.00	RFI dipole array	4	2.473	0.2231	0.0571	15545
95.00	RFI dipole array	4	2.229	0.2073	0.0525	17357
90.00	RFI dipole array	4	2.003	0.1929	0.0481	20197
86.00	Sinclair SC323-HF2LDF	4	1.833	0.1823	0.0447	23240
55.00	GPS on 3' standoff	4	0.774	0.1106	0.0226	22818

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	180	Leg	A325N	0.8750	4	0.46	41.56	0.011 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.42	13.81	0.103 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.23	13.81	0.089 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.07	13.81	0.005 ✔	1	Bolt Shear
T2	160	Leg	A325N	1.0000	4	5.06	54.52	0.093 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	2.51	13.81	0.182 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	2.03	13.81	0.147 ✔	1	Bolt Shear
T3	140	Leg	A325N	1.0000	6	10.55	54.52	0.194 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.14	13.81	0.228 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5.13	13.81	0.372 ✔	1	Bolt Shear
T4	120	Leg	A325N	1.0000	6	12.70	54.52	0.233 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.23	13.81	0.234 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.33	13.81	0.242 ✔	1	Bolt Shear
T5	100	Leg	A325N	1.0000	6	14.32	54.52	0.263 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.55	13.81	0.257 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.51	13.81	0.254 ✔	1	Bolt Shear
T6	80	Leg	A325N	1.0000	6	16.00	54.52	0.293 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.29	13.81	0.238 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.24	13.81	0.234 ✔	1	Bolt Shear
T7	60	Leg	A325N	1.0000	12	8.76	54.52	0.161 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.20	13.81	0.232 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.37	13.81	0.244 ✔	1	Bolt Shear
T8	40	Leg	A325N	1.0000	12	9.47	54.52	0.174 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.14	13.81	0.227 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.47	13.81	0.251 ✔	1	Bolt Shear
T9	20	Leg	A354-BC	1.0000	16	7.61	56.79	0.134 ✔	1	Bolt Tension
		Diagonal	A325N	0.7500	3	3.29	19.88	0.165 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.80	13.81	0.275 ✔	1	Bolt Shear

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	**180 - 160**	**Leg**	**ROHN 3 STD**	**2**	**-5.19**	**70.98**	**7.3**	**Pass**
		Diagonal	ROHN 2 STD	11	-4.27	17.83	23.9	Pass
		Horizontal	ROHN 1.5 STD	10	-2.43	22.61	10.7	Pass
		Top Girt	ROHN 1.5 STD	4	-0.14	22.61	0.6	Pass
		Inner Bracing	L2x2x1/8	30	-0.00	8.30	0.3	Pass
T2	**160 - 140**	**Leg**	**ROHN 4 EH**	**41**	**-26.48**	**160.03**	**16.5**	**Pass**
		Diagonal	ROHN 2 X-STR	47	-7.53	23.72	31.7	Pass
		Horizontal	ROHN 1.5 STD	46	-4.06	22.82	17.8	Pass
		Inner Bracing	L2x2x1/8	78	-0.00	8.30	0.3	Pass
T3	**140 - 120**	**Leg**	**ROHN 5 EH**	**81**	**-189.98**	**239.37**	**79.4**	**Pass**
		Diagonal	ROHN 2 X-STR	87	-9.43	20.26	46.5	Pass
		Horizontal	ROHN 1.5 STD	109	-10.26	23.04	44.5	Pass
		Inner Bracing	L2x2x1/8	93	-0.01	6.06	0.4	Pass
T4	**120 - 100**	**Leg**	**ROHN 6 EHS**	**120**	**-228.67**	**274.76**	**83.2**	**Pass**
		Diagonal	ROHN 2.5 STD	126	-9.69	30.54	31.7	Pass
		Horizontal	ROHN 2 STD	124	-6.67	27.32	24.4	Pass
		Inner Bracing	L2x2x1/8	131	-0.01	4.13	0.5	Pass
T5	**100 - 80**	**Leg**	**ROHN 8 EHS**	**159**	**-257.83**	**386.31**	**66.7**	**Pass**
		Diagonal	ROHN 3 STD	165	-10.40	32.83	31.7	Pass
		Horizontal	ROHN 2 STD	163	-6.40	22.66	28.2	Pass
		Inner Bracing	L2x2x1/8	170	-0.01	3.07	0.5	Pass
T6	**80 - 60**	**Leg**	**ROHN 8 EH**	**186**	**-287.98**	**505.43**	**57.0**	**Pass**
		Diagonal	ROHN 3 STD	192	-9.61	28.62	33.6	Pass
		Horizontal	ROHN 2 STD	190	-6.43	16.63	38.7	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	197	-0.01	6.40	0.4	Pass
T7	**60 - 40**	**Leg**	**ROHN 8 EH**	**213**	**-315.26**	**505.43**	**62.4**	**Pass**
		Diagonal	ROHN 3 STD	219	-9.44	24.99	37.8	Pass
		Horizontal	ROHN 2.5 STD	217	-6.71	28.46	23.6 24.4 (b)	Pass
		Inner Bracing	L3x3x3/16	225	-0.01	8.45	0.5	Pass
T8	**40 - 20**	**Leg**	**ROHN 10 EH**	**240**	**-340.89**	**668.55**	**51.0**	**Pass**
		Diagonal	ROHN 3 STD	249	-9.36	22.22	42.1	Pass
		Horizontal	ROHN 2.5 STD	247	-6.89	22.39	30.8	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	251	-0.01	13.87	0.4	Pass
T9	**20 - 0**	**Leg**	**ROHN 10 EH**	**267**	**-365.19**	**668.55**	**54.6**	**Pass**
		Diagonal	ROHN 3.5 EH	276	-9.86	40.53	24.3	Pass
		Horizontal	ROHN 3 STD	274	-7.41	35.10	21.1 27.5 (b)	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	278	-0.02	11.12	0.5	Pass
						Summary		
						Leg (T4)	83.2	Pass
						Diagonal (T3)	46.5	Pass
						Horizontal (T3)	44.5	Pass
						Top Girt (T1)	0.6	Pass
						Inner Bracing (T5)	0.5	Pass
						Bolt Checks	37.2	Pass
						RATING =	**83.2**	**Pass**