NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Paul Sagristano
4 Davis Road West, Suite 5
Old Lyme, CT 06371
917-841-0247
psagristano@northeastsitesolutions.com

May 7, 2021

Ms. Melanie Bachman
Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Exempt Modification Application
Eversource Site #6581
2 Willis Street, Bristol, CT 06010 (a.k.a. 790 Willis Street)
Latitude: 41.6488
Longitude: -72.9474
T-Mobile Site#: CT11270C_Anchor-L600

Dear Ms. Bachman:

T-Mobile is requesting an exempt modification for an existing tower located at 2 Willis Street (a.k.a. 790 Willis Street), Bristol, CT 06010. T-Mobile currently maintains nine (9) antennas at the 125-foot level of the existing 130-foot tower. The property owner is CT Light and Power and tower is Eversource. T-Mobile now intends to replace six (6) existing antennas with three (3) new 600/700/1900 MHz antenna and three (3) new 2500 MHz antenna. The new/replacement antennas would be installed at the 125-foot level of the tower.

T-Mobile Planned Modifications:
Remove:
(3) Generic Twin Style 1B AWS (TMA)
(6) 1 5/8" Coax
(6) 1 ¼" Coax Cables
(2) Hybrid Cables

Remove and Replace:
(3) LNX 6515DS A1M (REMOVE) – RFS APXVARR24_43-C-NA20 600/700/1900 MHz 5G (REPLACE)
(3) Air 21 KRC118023 1 B2A-B4P Antenna 1900/2100 MHz (REMOVE) – (3) Ericsson 6449 B41 2500 MHz 5G (REPLACE)
(3) RRUS11 B12 (REMOVE) – (3) RRU 4415 B25 (REPLACE)

Install New:
(3) RRU 4449 B71+ B85
(3) 6x24 Hybrid Cables

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Existing to Remain:
(3) Ericsson AIR32 KRD901146-1_B66A_B2A 1900/2100 MHz

Ground Work:
(1) BBU B160
(1) 6160 Cabinet

This facility was approved by the CT Siting Council – Petition # 800 – Dated January 18, 2007. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Ellen Zoppo-Sassu - Mayor, and Robert Flanagan, Zoning Enforcement Officer for the City of Bristol, as well as CT Light and Power the property owner and Eversource the tower owner.

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. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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, T-Mobile 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).

Sincerely,

Paul Sagristano
Mobile: 917-841-0247
Fax: 860-955-2060
Office: 4 Davis Road West, Suite 5 Old Lyme, CT 06371
Email: psagristano@northeastsitesolutions.com

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Turnkey Wireless Development

Attachments cc:

Ellen Zoppo-Sassu - Mayor - as elected official *(via email only to mayorsoffice@bristolct.gov)*
City of Bristol
111 N Main St, Bristol, CT 06010

Robert Flanagan- City Planner *(via email only RobertFlanagan@bristolct.gov)*
City of Bristol
111 N Main St, Bristol, CT 06010

CT Light & Power Co c/o Eversource - as property owner *(via email only christopher.gelinas@eversource.com)*
266 Pearl Street, Hartford, CT 06103

Eversource - as tower owner. *(via email only christopher.gelinas@eversource.com)*
107 Selden St, Berlin, CT 06037

Exhibit A

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
Internet: ct.gov/csc

Daniel F. Caruso
Chairman

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

January 22, 2007

Robert E. Carberry
Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270

RE: **PETITION NO. 800** - Connecticut Light & Power Company petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the replacement of an existing telecommunications facility located at Willis Street, Bristol, Connecticut.

Dear Mr. Carberry:

At a public meeting held on January 18, 2007, the Connecticut Siting Council (Council) considered and ruled that this proposal would not have a substantial adverse environmental effect, and pursuant to General Statutes § 16-50k would not require a Certificate of Environmental Compatibility and Public Need.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition, dated December 22, 2006.

Enclosed for your information is a copy of the staff report on this project.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/CDM/laf

Enclosure: Staff Report dated January 18, 2007

c: The Honorable William T. Stortz, Mayor, City of Bristol
Alan Weiner, Planner/Dev. Coordinator, City of Bristol

Petition No. 800
Connecticut Light & Power
Bristol, Connecticut
Staff Report
January 18, 2007

CL&P is seeking to replace an existing guyed lattice tower that supports microwave, two-way radio, and commercial wireless antennas with a self-supporting tower of the same height at a site on South Mountain in Bristol.

Council member Ed Wilensky and staff member David Martin met with Northeast Utilities Service Company representatives John Natcherly and John D'Ambra at the site to review the proposal.

The existing guyed tower is approximately 40 years old. It is 125 feet high with whip antennas at the top that extend the overall height of the tower to 150 feet. This tower is one of the most important sites in CL&P's wireless communications network. The tower's structural integrity was recently analyzed as part of a company service program and was found to be out of compliance with current engineering standards. The age and condition of the tower make it impossible to reinforce the tower to bring it into compliance. Therefore, CL&P needs to replace it. The replacement tower would be a self-supporting lattice tower, the same height as the one being replaced, that would be located approximately 40 feet to the northeast of the existing tower. The location of the replacement tower would necessitate the expansion of the existing equipment compound by approximately 700 square feet and the removal of some scrub vegetation. The operating antennas (these include T-Mobile antennas) on the existing tower would be relocated to the new tower. Antennas not currently being used would be eliminated.

The site is on the ridge that runs along the top of South Mountain. It is owned by CL&P, which leases space for two other nearby towers — one a guyed tower owned by Comcast and the other a monopole owned by Cingular. There are no residences in view from the tower site. There are, however, a few residences in the vicinity along Willis Street, which is the street that provides access to the site. The relatively low height of the tower(s) and thick stands of trees minimize the visual presence of the tower in the near vicinity. The elimination of the guy wires would make the site less unsightly and would remove a potential hazard for birds.

CL&P contends that the proposed replacement tower would not have any substantial environmental effects and that a Certificate of Environmental Compatibility and Public Need would not be needed.

Existing guyed lattice tower

Exhibit B

790 WILLIS ST

Location	790 WILLIS ST	Assessment	$443,380
Mblu	06/ / 8A/ /	Appraisal	$633,400
Acct#	0034800	PID	5681
Owner	CONN LIGHT + POWER CO	Building Count	1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2014	$377,000	$256,400	$633,400
Assessment			
Valuation Year	Improvements	Land	Total
2014	$263,900	$179,480	$443,380

Owner of Record

Owner	CONN LIGHT + POWER CO	Sale Price	$0
Co-Owner		Certificate	1
Address	107 SELDEN ST BERLIN, CT 06037	Book & Page	277/ 293
		Sale Date	01/25/1952

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CONN LIGHT + POWER CO	$0	1	277/ 293	01/25/1952

Building Information

Building 1 : Section 1

Year Built:	1950
Living Area:	900
Replacement Cost:	$39,240
Building Percent Good:	65
Replacement Cost Less Depreciation:	$25,500

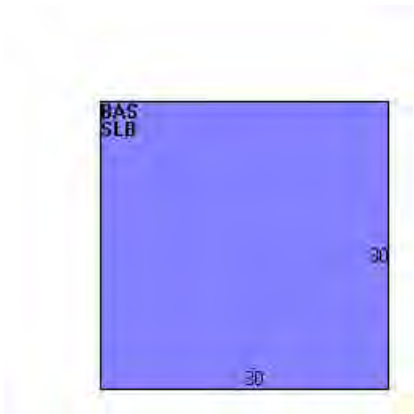
Building Attributes	
Field	Description
STYLE	Warehouse
MODEL	Ind/Comm

Stories:	1
Occupancy	1
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
Bldg Use	Public Utility
Bedrooms	
Full Baths	
Half Baths	
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Masonry
Baths/Plumbing	Light
Ceiling/Wall	None
Rooms/Prtns	Light
Wall Height	8
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/BristolCTPhotos//\00\02\16/96

Building Layout



Building Sub-Areas			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	900	900
SLB	Slab	900	0
		1800	900

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	436
Description	Public Utility
Zone	R-25

Land Line Valuation

Size (Acres)	6.9
Frontage	300
Depth	

Neighborhood	50	Assessed Value	$179,480
Alt Land Appr Category	No	Appraised Value	$256,400

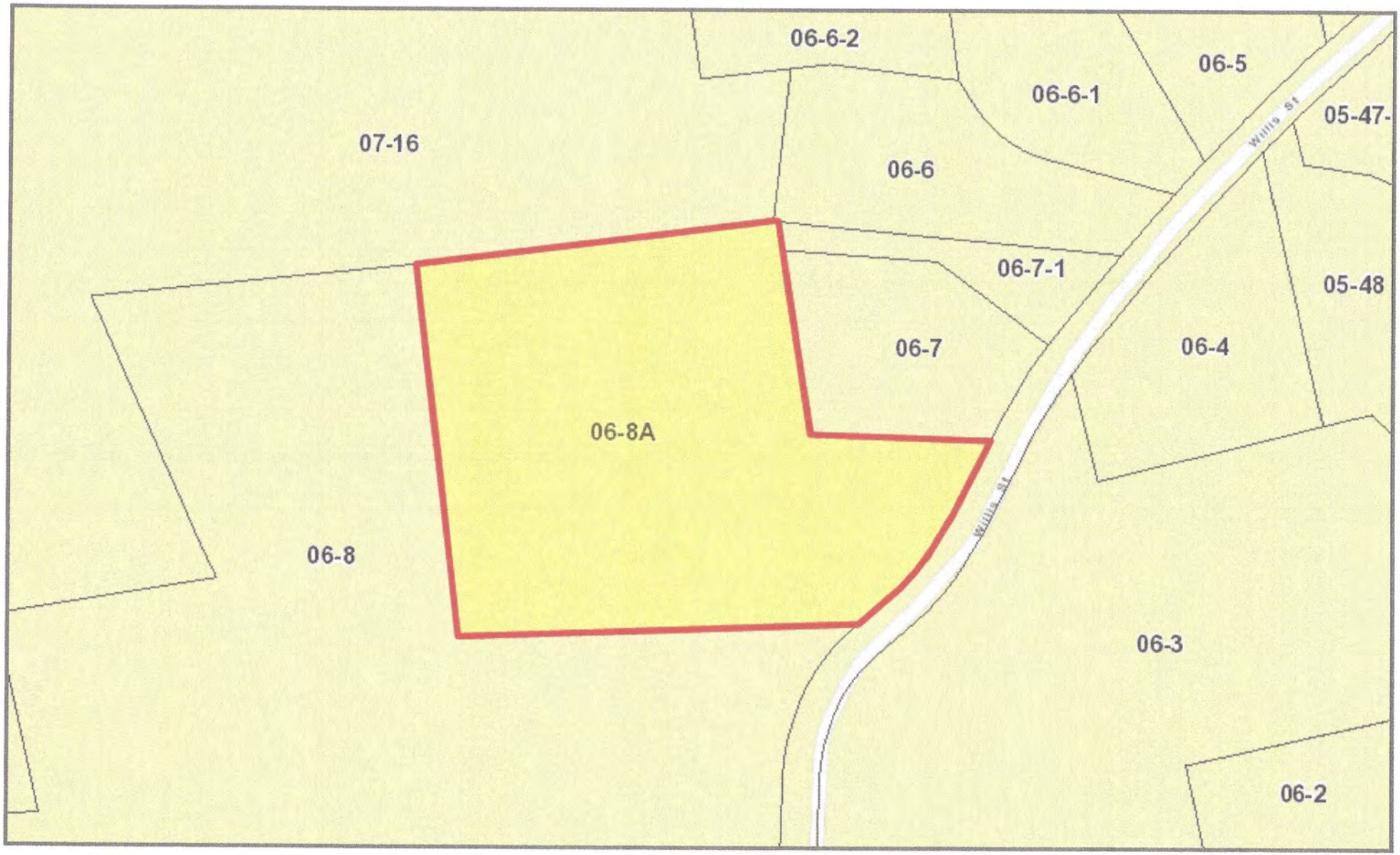
Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
CELL	Cell Tower/Site			2 UNITS	$200,000	1
CB3	PreCastConcCel			300 S.F.	$52,500	1
CB3	PreCastConcCel			300 S.F.	$52,500	1
FCP	Carport			900 S.F.	$5,400	1
GAR1	Garage	FR	Frame	420 S.F.	$6,100	1
CB3	PreCastConcCel			200 S.F.	$35,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2015	$377,000	$256,400	$633,400
2014	$377,000	$256,400	$633,400
2013	$377,000	$256,400	$633,400

Assessment			
Valuation Year	Improvements	Land	Total
2015	$263,900	$179,480	$443,380
2014	$263,900	$179,480	$443,380
2013	$263,900	$179,480	$443,380



790 WILLIS ST BRISTOL, CT

1 inch = 266 feet

N
W E
S

Data and scale shown on this map are provided for planning and informational purposes only. BRISTOL (CT) and Vision Government Solutions are not responsible for any use for other purposes or misuse or misrepresentation of this information.

6/17/2016

Exhibit C

T-Mobile

CL&P BRISTOL
SITE ID: CT11270C
2 WILLIS ST
BRISTOL, CT 06010

T-MOBILE A+L TEMPLATE (PROVIDED BY RFDS)

67D5997DB_2xAIR+1OP

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)

67D5A997DB 6160

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

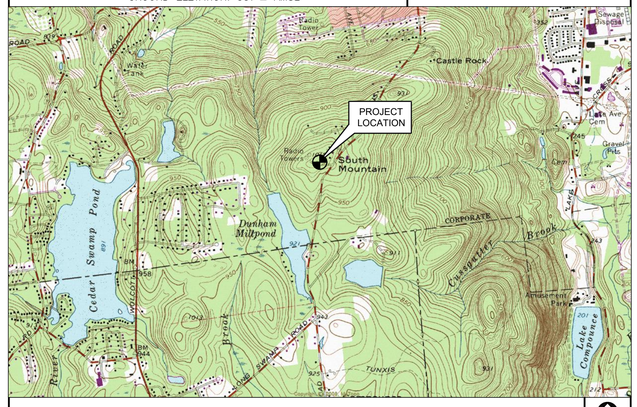
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 2 WILLIS ST, BRISTOL, CT 06010

1.	START OUT GOING NORTH ON GRIFFIN RD TOWARD HARTMAN RD.	0.30 MI.
2.	TAKE THE SECOND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE FIRST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187. CONTINUE TO FOLLOW CT-187	0.64 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE ILLS AVE/CT-187.	1.24 MI.
5.	TURN LEFT ONTO OLD WINDSOR RD/CT-305. CONTINUE TO FOLLOW CT-305.	2.33 MI.
6.	MERGE ONTO I-91 S TOWARD HARTFORD.	5.66 MI.
7.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY	13.29 MI.
8.	MERGE ONTO CT-72 W VIA EXIT 33 TOWARD BRISTOL	4.49 MI.
9.	STAY STRAIGHT TO GO ONTO PINE ST	0.10 MI.
10.	PINE ST BECOMES MOUNTAIN RD.	0.32 MI.
11.	MOUNTAIN RD BECOMES SOUTH ST.	0.21 MI.
12.	TURN LEFT ONTO EAST RD.	0.64 MI.
13.	TURN LEFT ONTO WILLIS ST.	1.23 MI.
14.	2 WILLIS ST, BRISTOL, CT 06010 IS ON THE RIGHT	

SITE COORDINATES: LATITUDE: 41°-33'-32" N
LONGITUDE: 73°-03'-32" W
GROUND ELEVATION: 337'± AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE (1) ERICSSON AIR21 KRC118023-1_B2A_B4P PER SECTOR. TOTAL (3).
   - B. REMOVE (1) ANDREW LNX-6515DS-A1M PER SECTOR. TOTAL (3).
   - C. REMOVE (1) RRUS11 B21 PER SECTOR. TOTAL (3)
   - D. REMOVE (1) GENERIC TWIN STYLE 1B PER SECTOR. TOTAL (3).
   - E. INSTALL (1) ERICSSON AIR6449 B41 PER SECTOR. TOTAL (3).
   - F. INSTALL (1) RFS APXVAALL24_43-U-NA20 PER SECTOR. TOTAL (3).
   - G. INSTALL (1) RADIO 4449 B71+B85 PER SECTOR. TOTAL (3).
   - H. INSTALL (1) RADIO 4415 B25 PER SECTOR. TOTAL (3).
   - I. INSTALL 100A CIRCUIT BREAKER
   - J. INSTALL (3) 6X24 HYBRID CABLES
   - K. REMOVE ALL EXISTING HYBIRD CABLES AND COAX CABLES
   - L. REMOVE EXISTING RBS 6131 CABINET AND BBU

PROJECT INFORMATION

SITE NAME:	CL&P BRISTOL
SITE ID:	CT11270C
SITE ADDRESS:	2 WILLIS ST BRISTOL, CT 06010
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	SHELDON FREINCLE (PROJECT MANAGER) NORTHEAST SITE SOLUTIONS (203) 776-8521
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488-0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41°-33'-32" N LONGITUDE: 73°-03'-32" W GROUND ELEVATION: 337'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN AND ELEVATION	0
C-3	EQUIPMENT PLANS	0
C-4	ANTENNA PLANS AND ELEVATIONS	0
C-5	TYPICAL EQUIPMENT DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/06/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST SITE SOLUTIONS

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

CL&P BRISTOL
SITE ID: CT11270C
2 WILLIS ST
BRISTOL, CT 06010

DATE: 8/13/19
SCALE: AS NOTED
JOB NO. 19066.15

TITLE SHEET

T-1

Sheet No. 1 of 6

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- RISK CATEGORY III (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 101 MPH (Vasd) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
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7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
18. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
19. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
20. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS----ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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SITE ID: CT11270C
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BRISTOL, CT 06010

DATE: 8/13/19
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JOB NO. 19066.15

GENERAL NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 6

NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	125'	80°			(1) 6/24 4AWG HYBRID CABLE
A2	PROPOSED	RFS (APXVAALL24_43-U-NA20)	95.9 x 24 x 8.5	125'	80°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		
A3	EXISTING	ERICSSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	125'	80°			
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	125'	220°			(1) 6/24 4AWG HYBRID CABLE
B2	PROPOSED	RFS (APXVAALL24_43-U-NA20)	95.9 x 24 x 8.5	125'	220°			
B3	EXISTING	ERICSSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	125'	220°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	125'	340°			(1) 6/24 4AWG HYBRID CABLE
C2	PROPOSED	RFS (APXVAALL24_43-U-NA20)	95.9 x 24 x 8.5	125'	340°			
C3	EXISTING	ERICSSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	125'	340°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1)		

1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 200'

APPROX. NORTH

GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

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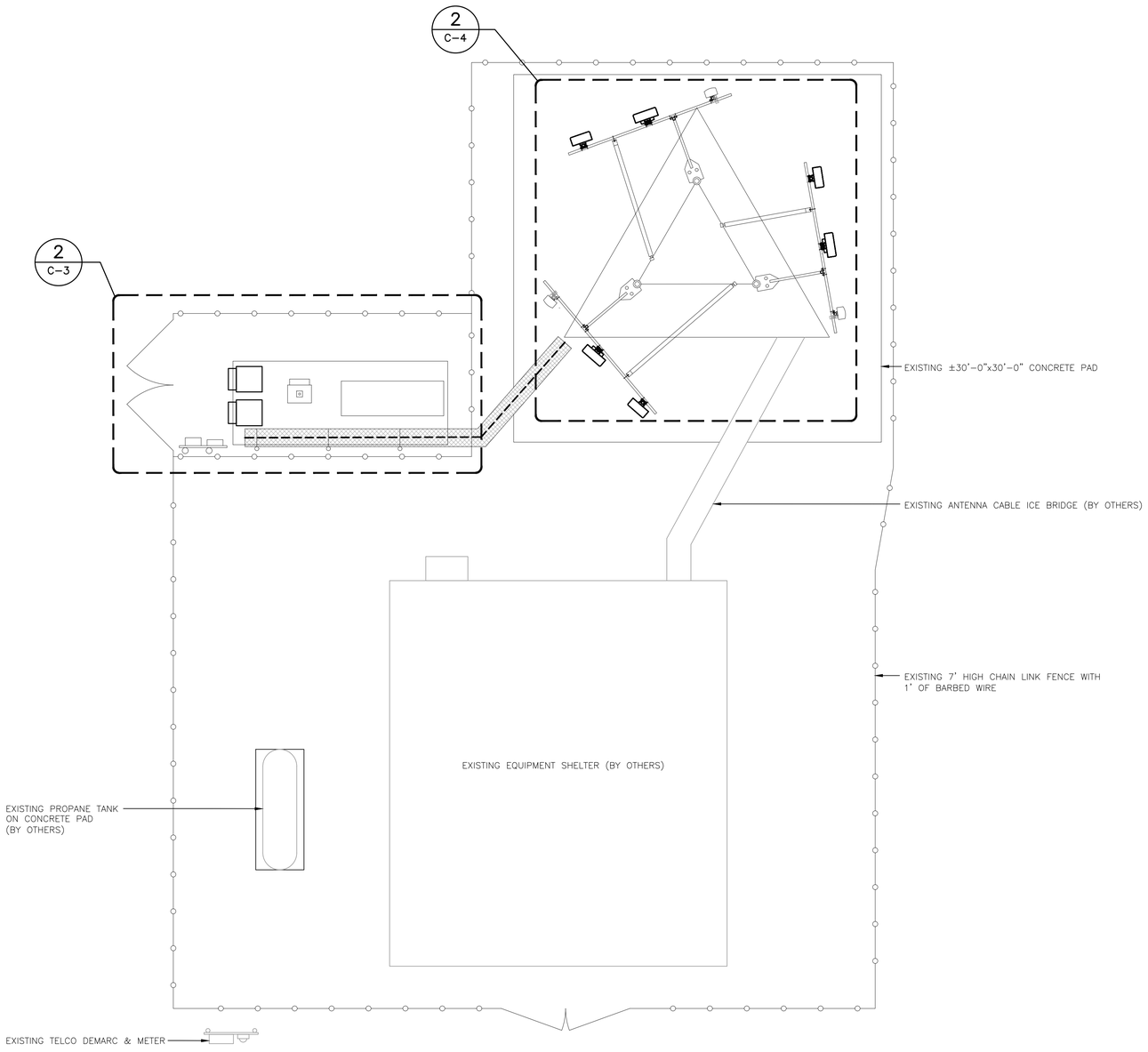
SITE LOCATION PLAN

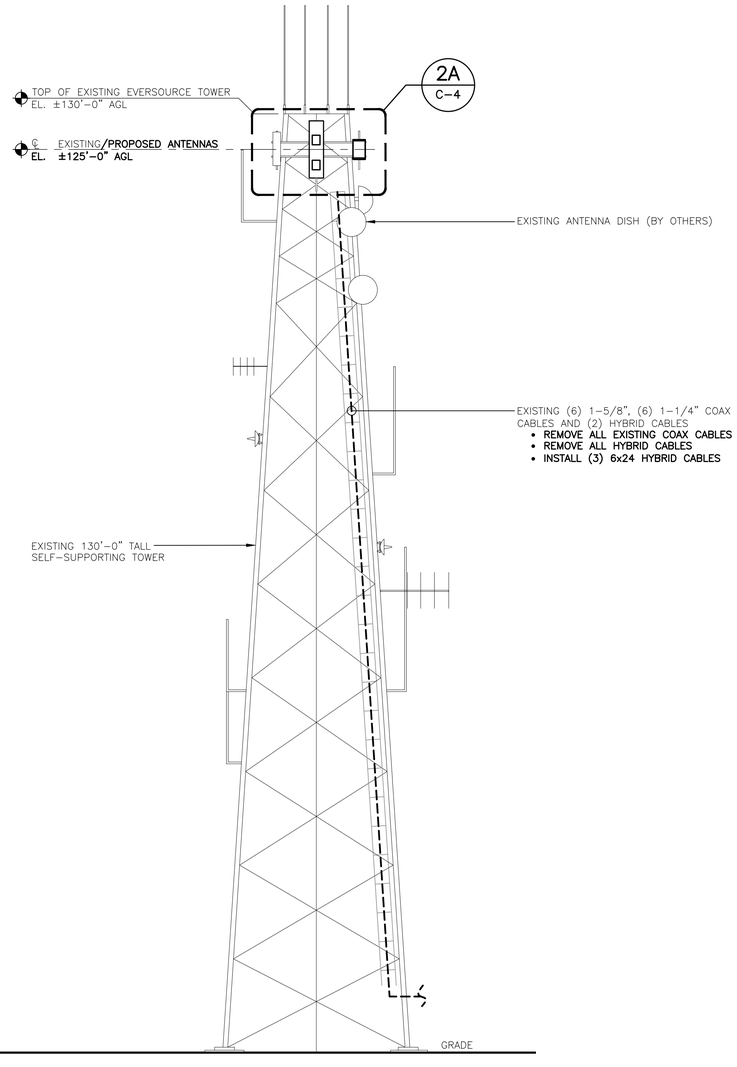
C-1

Sheet No. 3 of 6



1 C-2 **COMPOUND PLAN**
SCALE: 3/8" = 1'

TRUE NORTH



2 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 19066.15) DATED 03/01/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 19066.15) DATED 03/02/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

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COMPOUND PLAN AND ELEVATION

C-2

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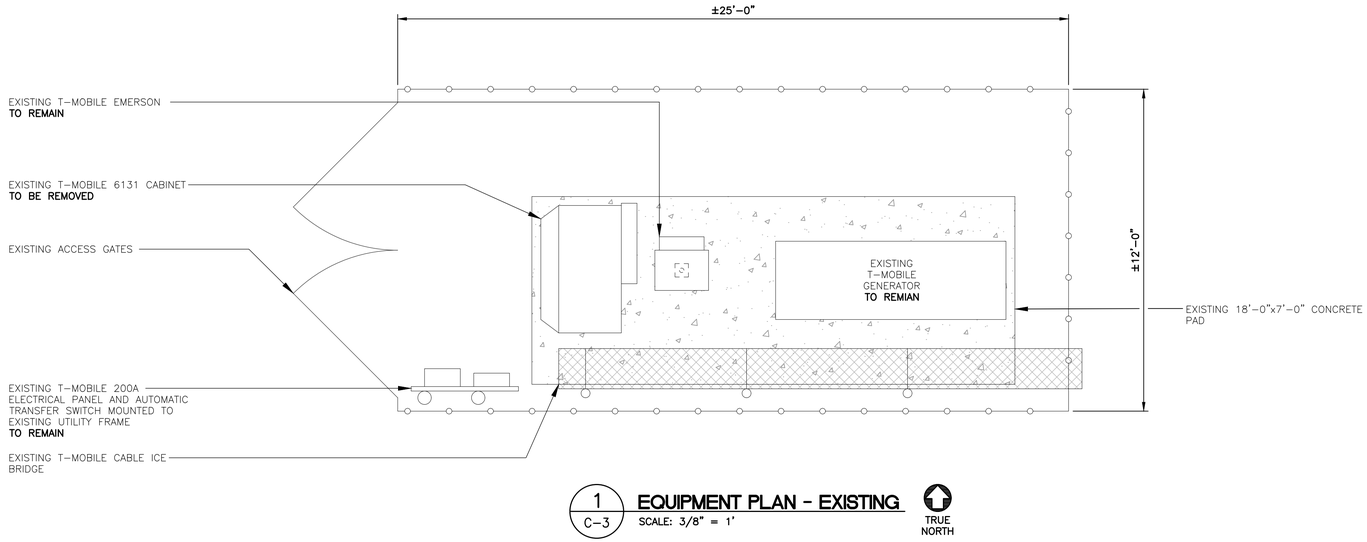
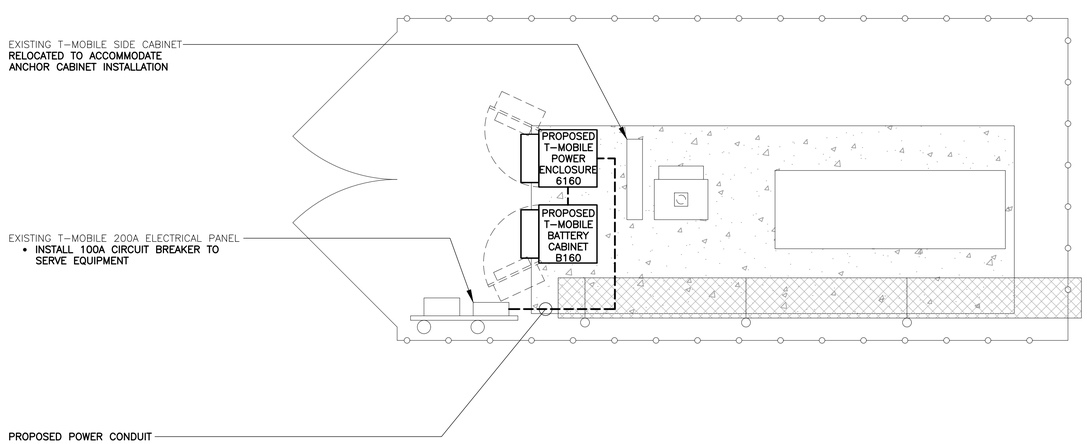


1 / C-3 **EQUIPMENT PLAN - EXISTING**
SCALE: 3/8" = 1'

TRUE NORTH



2 / C-3 **EQUIPMENT PLAN - PROPOSED**
SCALE: 3/8" = 1'

TRUE NORTH

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EQUIPMENT PLANS

C-3

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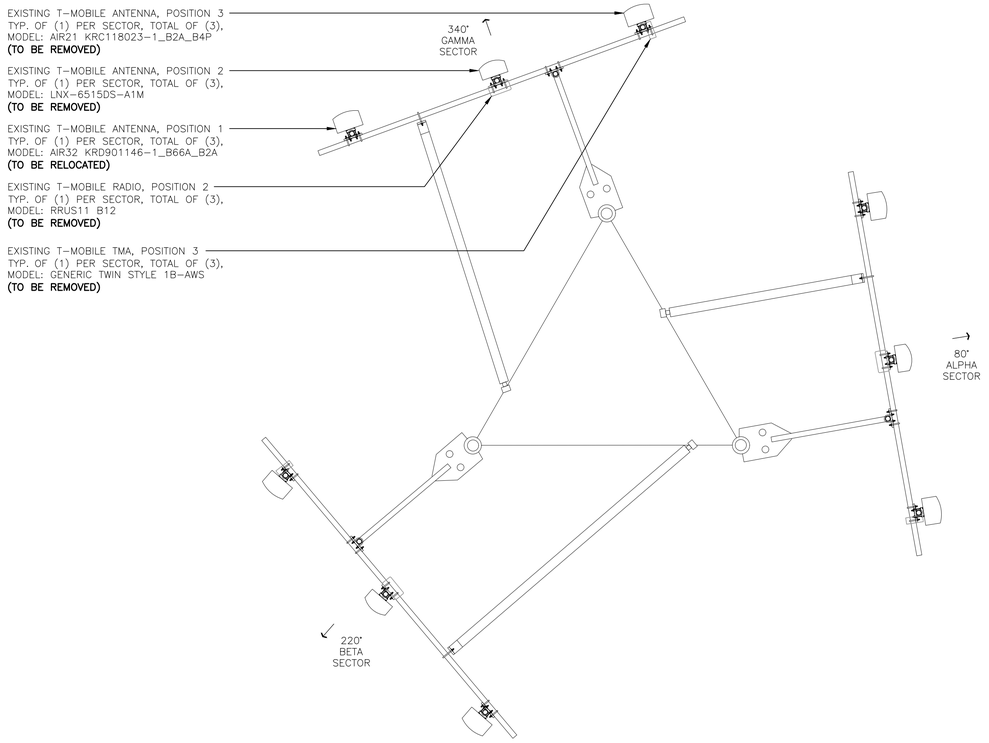
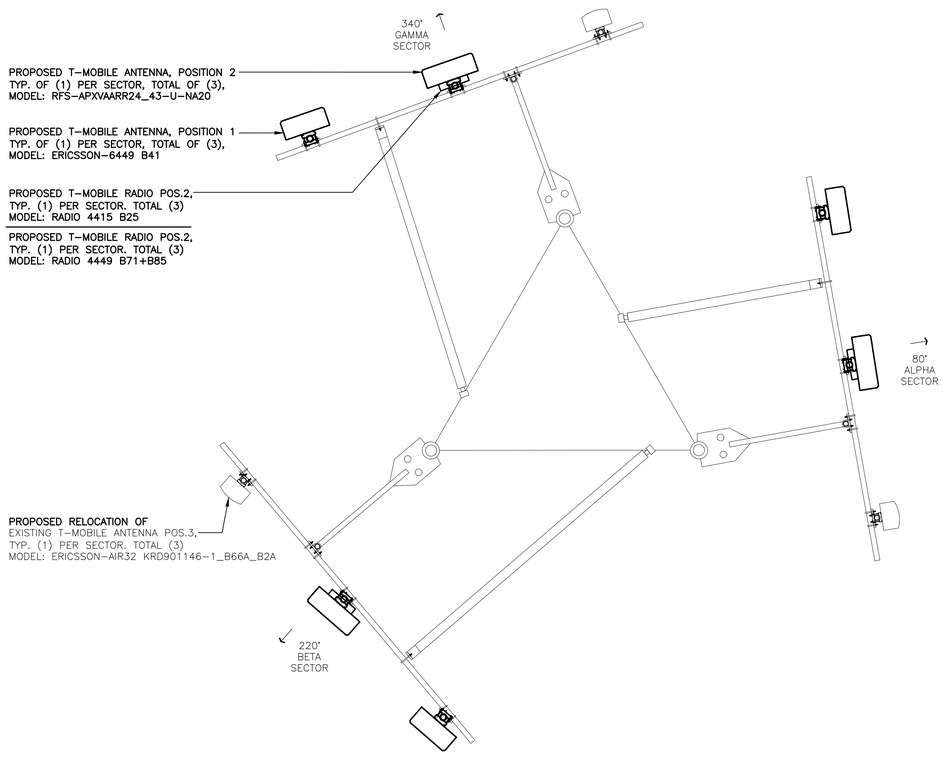


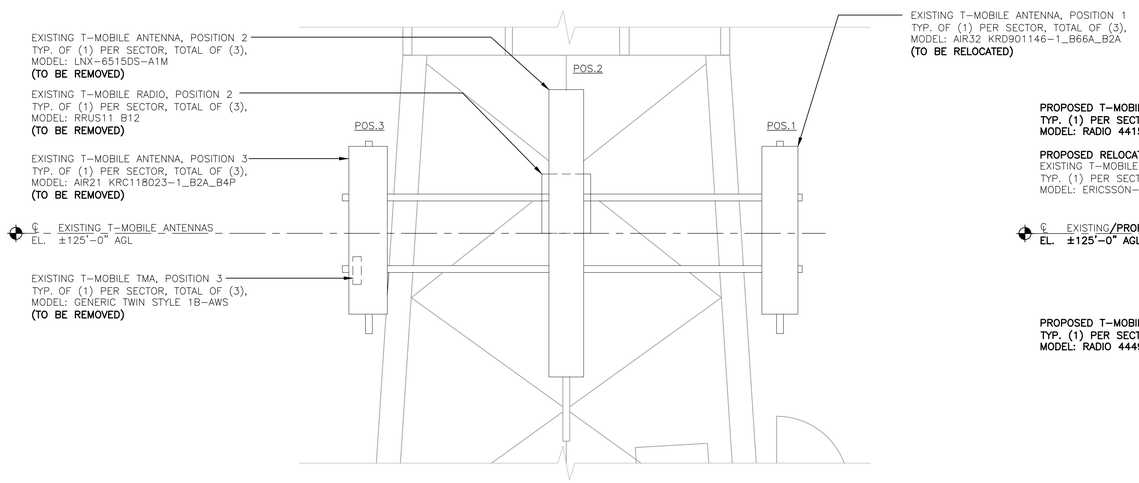
1 C-4 **ANTENNA PLAN - EXISTING**
SCALE: 3/8" = 1'

TRUE NORTH

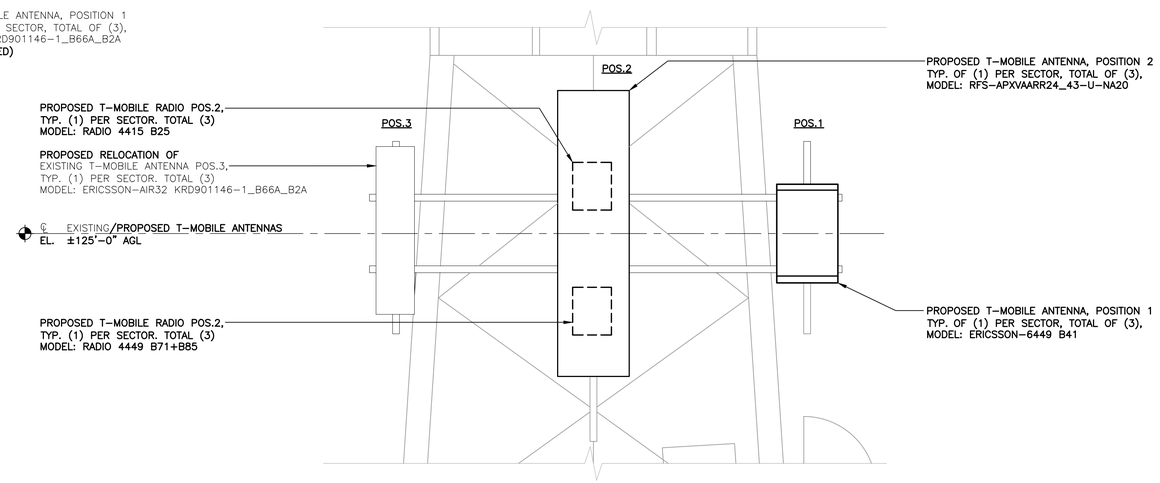


2 C-4 **ANTENNA PLAN - PROPOSED**
SCALE: 3/8" = 1'

TRUE NORTH



1A C-4 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A C-4 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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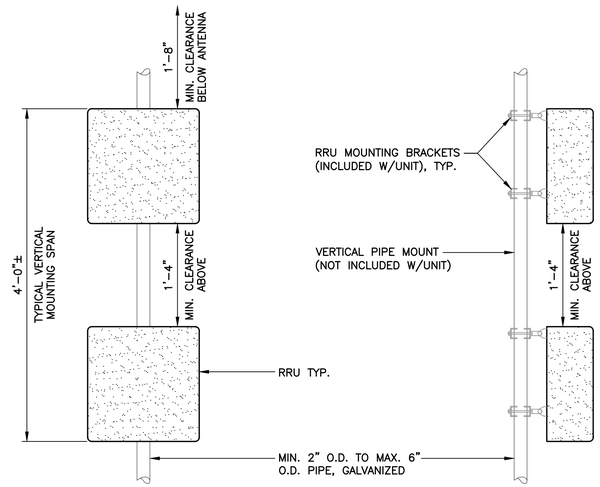
ANTENNA PLANS AND ELEVATIONS

C-4

Sheet No. 5 of 6



FRONT ELEVATION SIDE ELEVATION

NOTES:

1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 C–5 TYPICAL RRU MOUNTING DETAIL

SCALE: NOT TO SCALE

SIDE

AIR6449 B41

APXVAALL24_43-U-NA20

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
MAKE: RFS MODEL: APXVAALL24_43–U–NA20	95.9"L x 24.0"W x 8.5"D	±150 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 C–5 PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE

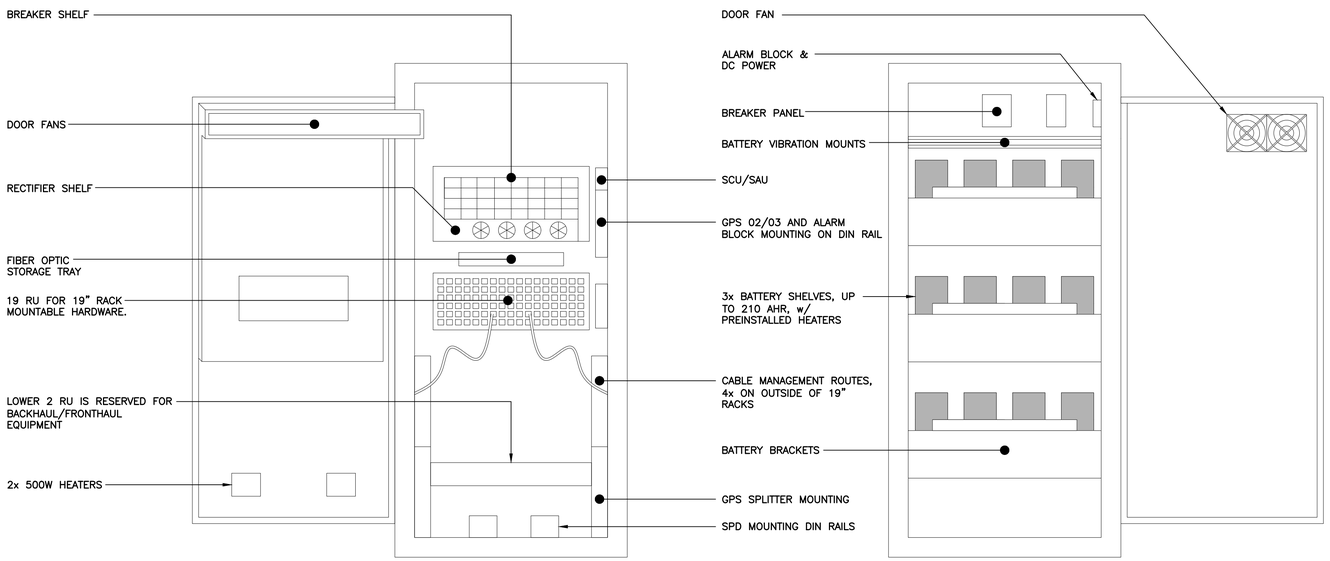
RADIO 4449 B71+B85

RADIO 4415 B25

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B25	16.5"L x 13.5"W x 5.4"D	±88 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4449 B71+B85	14.9"L x 13.2"W x 5.4"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

3 C–5 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE



EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160 CABINET	62.0"H x 26.0"W x 26.0"D	±1200 LBS

4 C–5 ENCLOSURE 6160 CABINET DETAIL

SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY B160 CABINET	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 C–5 BATTERY B160 CABINET DETAIL

SCALE: NOT TO SCALE

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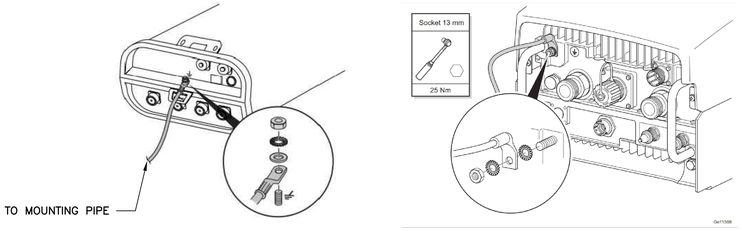
TYPICAL EQUIPMENT DETAILS

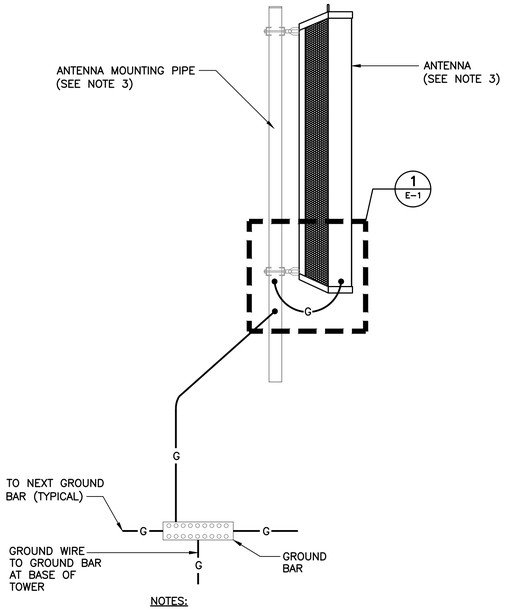
C-5

Sheet No. 5 of 6



1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE

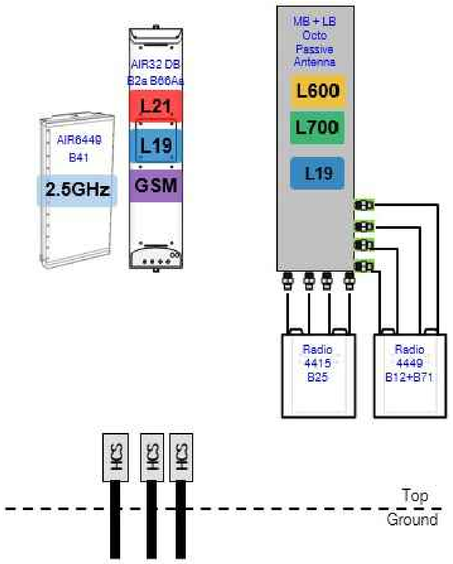


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

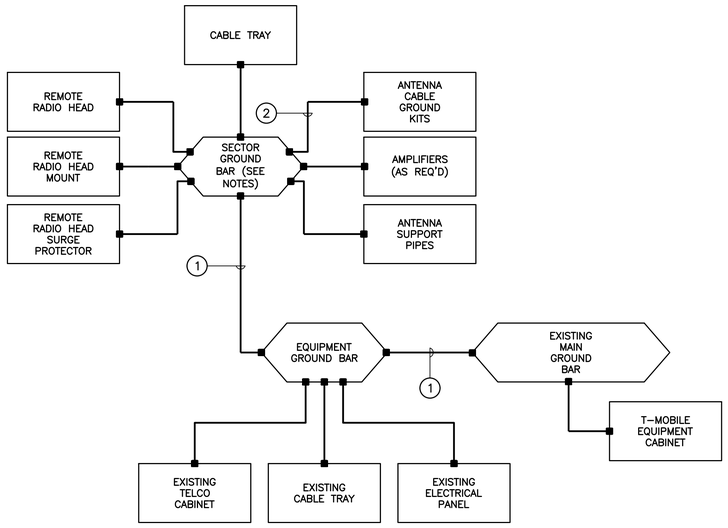
2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE



3 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

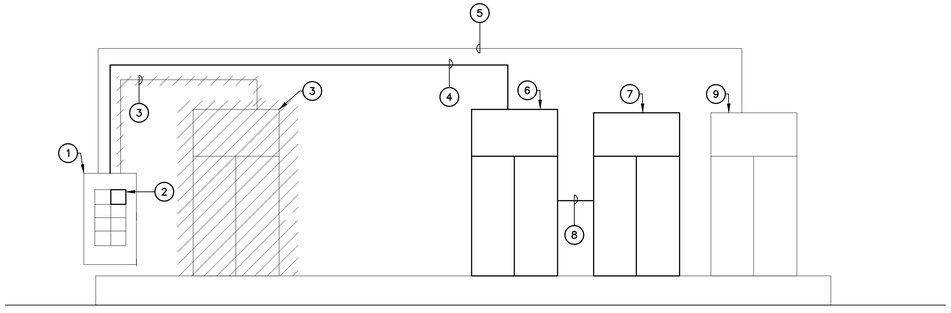
1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

(1) EXISTING 200A, PPC CABINET TO REMAIN.
(2) NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
(3) EXISTING CABINETS AND ASSOCIATED CONDUITS, CONDUCTORS AND CIRCUIT BREAKER TO BE REMOVED.
(4) (3) #1 AWG, (1) #8 AWG GROUND, 1-1/4" CONDUIT.
(5) EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
(6) NEW T-MOBILE EQUIPMENT CABINET
(7) NEW T-MOBILE BATTERY CABINET
(8) DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
(9) EXISTING CABINET TO REMAIN.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	04/06/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile NSS NORTHEAST SITE SOLUTIONS

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC

CL&P BRISTOL
SITE ID: CT11270C
2 WILLIS ST
BRISTOL, CT 06010

DATE: 8/13/19
SCALE: AS NOTED
JOB NO. 19066.15

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 6

Exhibit D

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

130-ft Existing ROHN Lattice Tower

Proposed T-Mobile
Antenna Upgrade

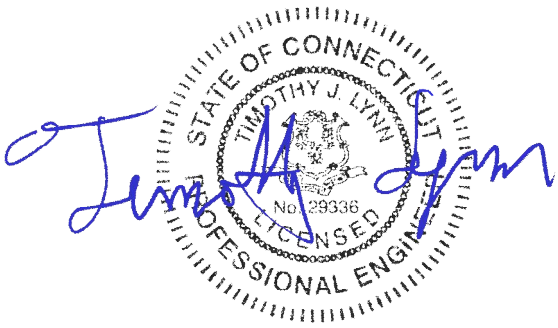
T-Mobile Site Ref: CT11270C

2 Willis Street
Bristol, CT

CENTEK Project No. 19066.15

~~Date: June 14, 2019~~
Rev 1: March 2, 2021

Max Stress Ratio = 76.1%



Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing Eversource lattice tower located in Bristol, Connecticut.

The host tower is a 130-ft three legged, tapered steel lattice tower originally designed and manufactured by ROHN file no: 060-3415 dated January 11, 2007. The tower geometry, structure member sizes and foundation system information were taken from the aforementioned ROHN design documents.

Antenna and appurtenance inventory were obtained from a previous structural analysis report prepared by Centek Engineering job no. 16077.00 dated June 23, 2016 and a previous structural analysis report prepared by Black & Veatch job no. 403093 dated February 26, 2020.

The existing tower consists of seven (7) tapered steel pipe leg sections conforming to ASTM A572-50. Diagonal lateral support bracing consists of steel pipe sections conforming to ASTM A572-50. The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted and welded gusset connections. The tower face width is 8.50-ft at the top and 22.54-ft at the bottom.

Antenna and Appurtenance Summary

- EXISTING:
  Antennas: One (1) Lightning rod leg mounted to the top of the existing tower with a base elevation of 130-ft above the existing tower base plate
- Eversource (Existing):
  Antennas: One (1) dbspectra DS2C03F36D-D antenna, Two (2) RFS PD458-1 Omni antennas, two (2) RFS PD220, one (1) DS5C06F36D-D, one (1) 12-ft x 3in. ∅ Omni antenna, one (1) 21-ft x3in. ∅ Omni antenna and one (1) Sinclair SC229-SFXSN Omni antenna pipe mounted with a base elevation of 130-ft above the existing tower base.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables
- Eversource (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 6-ft ∅ Microwave Dish with a RAD center elevation of 117-ft above the existing tower base.
  Coax Cables: One (1) E60 Elliptical coax cable.
- Eversource (Existing):
  Antennas: Two (2) Celwave 1142-2B Omni antennas on two (2) 4-ft side arms with base elevations of 115-ft and 113-ft above the existing tower base plate
  Coax Cables: One (1) 1/2" ∅ and one (1) 7/8" ∅ coax cables.
- Eversource (Existing):
  Antennas: One (1) 6-ft ∅ Microwave Dish with RAD center elevation of 107-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.

- CSP TROOP H (Existing):
  Antennas: Two (2) Kathrein AP11-850/105N panel antennas on one (1) 4-ft side arm with RAD center elevations of 105-ft and 104-ft above the existing tower base plate
  Coax Cables: Two (2) 7/8" ∅ coax cables.
- Eversource (Existing):
  Antennas: One (1) Andrew/Decibel DB205-A Dipole antenna on (1) 4-ft side arm with a RAD center elevation of 98-ft above the existing tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 8-ft ∅ Microwave Dish with a RAD center elevation of 96-ft above the existing tower base plate
  Coax Cables: One (1) E60 elliptical ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) 6-ft ∅ Microwave Dish with RAD center elevation of 87-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 6ft-8in. x 4in. pipe mount and one (1) 8-ft ∅ Microwave Dish with a RAD center elevation of 86-ft above the existing tower base plate
  Coax Cables: One (1) E60 elliptical ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) Celwave 1142-2B Omni antenna mounted on (1) 4-ft side arm with a base elevation of 84-ft above the existing tower base plate.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) 2-ft YAGI antenna pipe mounted with a RAD center elevation of 84-ft above the existing tower base plate.
  Coax Cables: One (1) 7/8" ∅ coax cable.
- CT Transit Authority (Existing):
  Antennas: Three (3) 20-ft x 3in. ∅ Omni antennas [(1)] (one TX upright, two RX inverted) and one (1) Tower Top Amplifier (TTA) mounted to Leg A on (1) 10-ft T-Arm (Valmont P/N EUSF-10-24) with an elevation of 75-ft above the existing tower base.
  Antennas: Three (3) 20-ft x 3in. ∅ Omni antennas [(1)] (one TX upright, two RX inverted) and one (1) Tower Top Amplifier (TTA) mounted to Leg B on (1) 10-ft T-Arm (Valmont P/N EUSF-10-24) with an elevation of 70-ft above the existing tower base.
  Coax Cables: Six (6) 1-5/8" ∅ and two (2) 1/2" ∅ coax cables routed within a waveguide ladder to be located on Tower Face B, adjacent to Leg B. Refer to feed-line plan within Section 3 of this report for location.

- Eversource (Existing):
  Antennas: One (1) Dish mount assembly, one (1) 5ft-8in. x 4in. pipe mount and one (1) 4-ft ∅ Microwave Dish with a RAD center elevation of 71-ft above the existing tower base plate
  Coax Cables: One (1) E65 elliptical ∅ coax cable.
- Eversource (Existing):
  Antennas: (1) Diamond X-500A Omni antenna mounted on one (1) 4-ft side arm with a base elevation of 65-ft above the existing tower base.
  Coax Cables: None/Disconnected.
- Eversource (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 Dipole antenna mounted on one (1) 3-ft side arm with a RAD center elevation of 58-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 Dipole antenna mounted on one (1) 4-ft side arm with a RAD center elevation of 54-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) DB230-2B Yagi antenna mounted on one (1) 4-ft side arm with a RAD center elevation of 46-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) DB222-C 2-Bay Dipole antenna mounted on one (1) 4-ft side arm with a base elevation of 43-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.
- Eversource (Existing):
  Antennas: One (1) set of Wind Speed cups mounted to the tower leg with a RAD center elevation of 42-ft above the existing tower base.
  Coax Cables: N/A
- T-MOBILE (Existing to Remain):
  Antennas: Three (3) Ericsson AIR32 panel antennas mounted on (3) existing 10-ft ROHN boom gates with a RAD center elevation of 125-ft above the existing tower base.
- T-MOBILE (Existing to Remove):
  Antennas: Three (3) Ericsson AIR21 panel antennas, three (3) Andrew LNX-6515DS panel antennas, three (3) TMAs and three (3) Ericsson RRUS-11 mounted on (3) existing 10-ft ROHN boom gates with a RAD center elevation of 125-ft above the existing tower base.
  Coax Cables: Twelve (12) coax cables and two (2) fiber cables running on a face of the tower on a cable ladder as specified in Section 3 of this report.

- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson 4449 remote radio heads and three (3) Ericsson 4415 remote radio heads mounted on (3) existing 10-ft ROHN boom gates with a RAD center elevation of 125-ft above the existing tower base.
  Coax Cables: Three (3) 6x24 fiber cables running on a face of the tower on a cable ladder as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Bristol; v = 93 mph (Nominal – Structure Class III)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 93 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **73.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	20'-0"-40'-0"	63.6%	**PASS**
Diagonal (T4)	60'-0"-80'-0"	76.1%	**PASS**
Horizontal (T5)	40'-0"-60'-0"	55.7%	**PASS**

- The tower combined deflection is **0.4424 degrees**.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.4155	0.5	**n/a**
Twist	0.1520	0.5	**n/a**
Combined	0.4424	0.5	**PASS**

Foundation and Anchors

The existing foundation system consists of one (1) 31-ft square x 4-ft thick reinforced concrete pad bearing on the existing sub grade. The existing foundation geometry and sub-grade properties were obtained from the aforementioned ROHN design documents. The tower legs are connected to the foundation with (8) 1.00"∅, ASTM F1554-105 (Fu = 125ksi) anchor bolts per leg.

- The tower reactions developed from the governing Load Case were used in the verification of the foundation and anchor bolts:

Load Effect	Proposed Tower Reactions
Leg Shear	27 kips
Leg Compression	199 kips
Leg Tension	177 kips
Base Moment	3658 ft-kips
Base Shear	46 kips

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	37.3%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS(1)	Proposed Loading (FS)[3]	Result
Reinforced Concrete Pad	Overturning	1.00	2.22	**PASS**

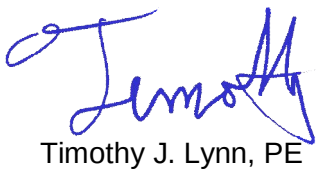
Note 1: FS denotes Factor of Safety

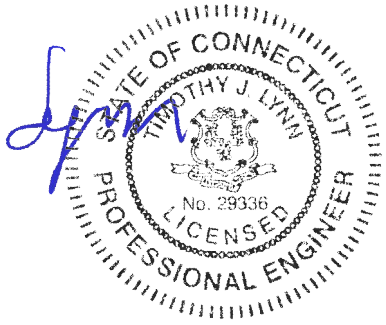
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration with the below recommendations.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.
Respectfully Submitted by:





Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

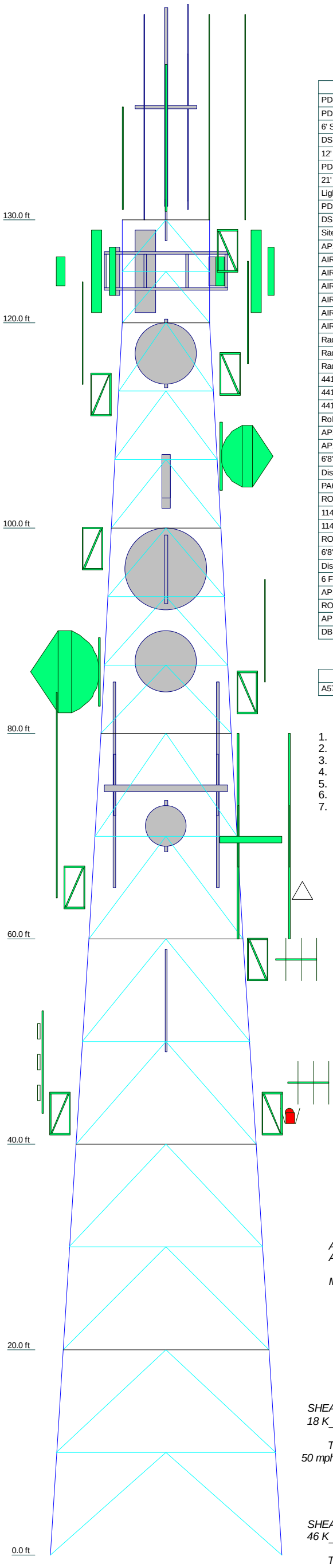
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

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	ROHN 1.5 STD		ROHN 2 STD		ROHN 2.5 STD		
Horizontals	ROHN 1.5 STD		ROHN 2 STD		ROHN 2.5 STD		
Inner Bracing	L2x2x1/8				L2 1/2x2 1/2x3/16	L3x3x3/16	L3 1/2x3 1/2x1/4
Face Width (ft)	8.5	8.54167	10.625	12.7083	14.9583	17.5417	20.0417
# Panels @ (ft)	2 @ 5	6 @ 6.66667	8 @ 10				
Weight (K)	0.6	1.7	2.0	2.4	2.9	3.5	4.1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD458-1 (Eversource)	131	ROHN 4-ft Side Arm (Eversource)	98
PD220 (Eversource)	131	Dish Mount Assy (Eversource)	96
6' Standoff Arm (Eversource)	131	8 FT DISH	96
DS4C06F36D-D (Eversource)	131	6'8"x4" Pipe Mount (Eversource)	96
12' x 3" Dia Omni (Eversource)	130	R5 Universal Pipe Mount w/ Angle (Eversource)	87
PD458-1 (Eversource)	130	PAD6-59BC (Eversource)	87
21' x 3" Dia Omni (Eversource)	130	Dish Mount Assy (Eversource)	86
Lightning Rod	130	PAD8-59AW	86
PD220 (Eversource)	130	6'8"x4" Pipe Mount (Eversource)	86
DS2C03F36D-D (Eversource)	127	2' Yagi (Eversource)	84
SitePro USF-4U (Eversource)	127	1142-2B (Eversource)	84
APXVAALL24-43 (T-Mobile - Proposed)	125	ROHN 4-ft Side Arm (Eversource)	84
AIR32 (T-Mobile - Existing)	125	Valmont T-Arm (1) (CT - Transit)	75
AIR32 (T-Mobile - Existing)	125	TTA 12"x6"x4" (CT - Transit)	75
AIR32 (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	75
AIR6449 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	75
AIR6449 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	75
AIR6449 (T-Mobile - Proposed)	125	6'x2" Pipe Mount (CT - Transit)	75
Radio 4449 B71 B12 (T-Mobile - Proposed)	125	6'x2" Pipe Mount (CT - Transit)	75
Radio 4449 B71 B12 (T-Mobile - Proposed)	125	5'0"x4.5" Pipe Mount (Eversource)	71
Radio 4449 B71 B12 (T-Mobile - Proposed)	125	4 FT DISH	71
4415 B25 (T-Mobile - Proposed)	125	Dish Mount Assy (Eversource)	71
4415 B25 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	70
4415 B25 (T-Mobile - Proposed)	125	20' x 3" Dia Omni (CT - Transit)	70
Rohn 6'x10' Boom Gate (3) (T-Mobile - Existing)	125	20' x 3" Dia Omni (CT - Transit)	70
APXVAALL24-43 (T-Mobile - Proposed)	125	6'x2" Pipe Mount (CT - Transit)	70
APXVAALL24-43 (T-Mobile - Proposed)	125	6'x2" Pipe Mount (CT - Transit)	70
6'8"x4" Pipe Mount (Eversource)	117	TTA 12"x6"x4" (CT - Transit)	70
Dish Mount Assy (Eversource)	117	Valmont T-Arm (1) (CT - Transit)	70
PA6-59	117	Diamond X-500A (Eversource)	65
ROHN 4-ft Side Arm (Eversource)	115	ROHN 4-ft Side Arm (Eversource)	65
1142-2B (Eversource)	115	3' Side arm (Eversource)	58
1142-2B (Eversource)	113	DB212-1 (Eversource)	58
ROHN 4-ft Side Arm (Eversource)	113	DB212-1 (Eversource)	54
6'8"x4" Pipe Mount (Eversource)	107	ROHN 4-ft Side Arm (Eversource)	54
Dish Mount Assy (Eversource)	107	DB230-2B (Eversource)	46
6 FT DISH	107	ROHN 4-ft Side Arm (Eversource)	43
AP11-850/105N (CSP - Troop H)	105	ROHN 4-ft Side Arm (Eversource)	43
ROHN 4-ft Side Arm (Eversource)	104	DB222-C (Eversource)	43
AP11-850/105N (CSP - Troop H)	104	Wind speed cups	42
DB205-A (Eversource)	98		

MATERIAL STRENGTH

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

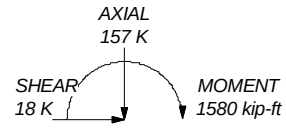
TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 76.1%

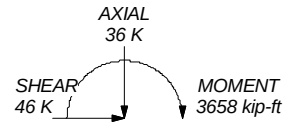
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 199 K
SHEAR: 27 K

UPLIFT: -177 K
SHEAR: 25 K



TORQUE 34 kip-ft
50 mph WIND - 1.0000 in ICE



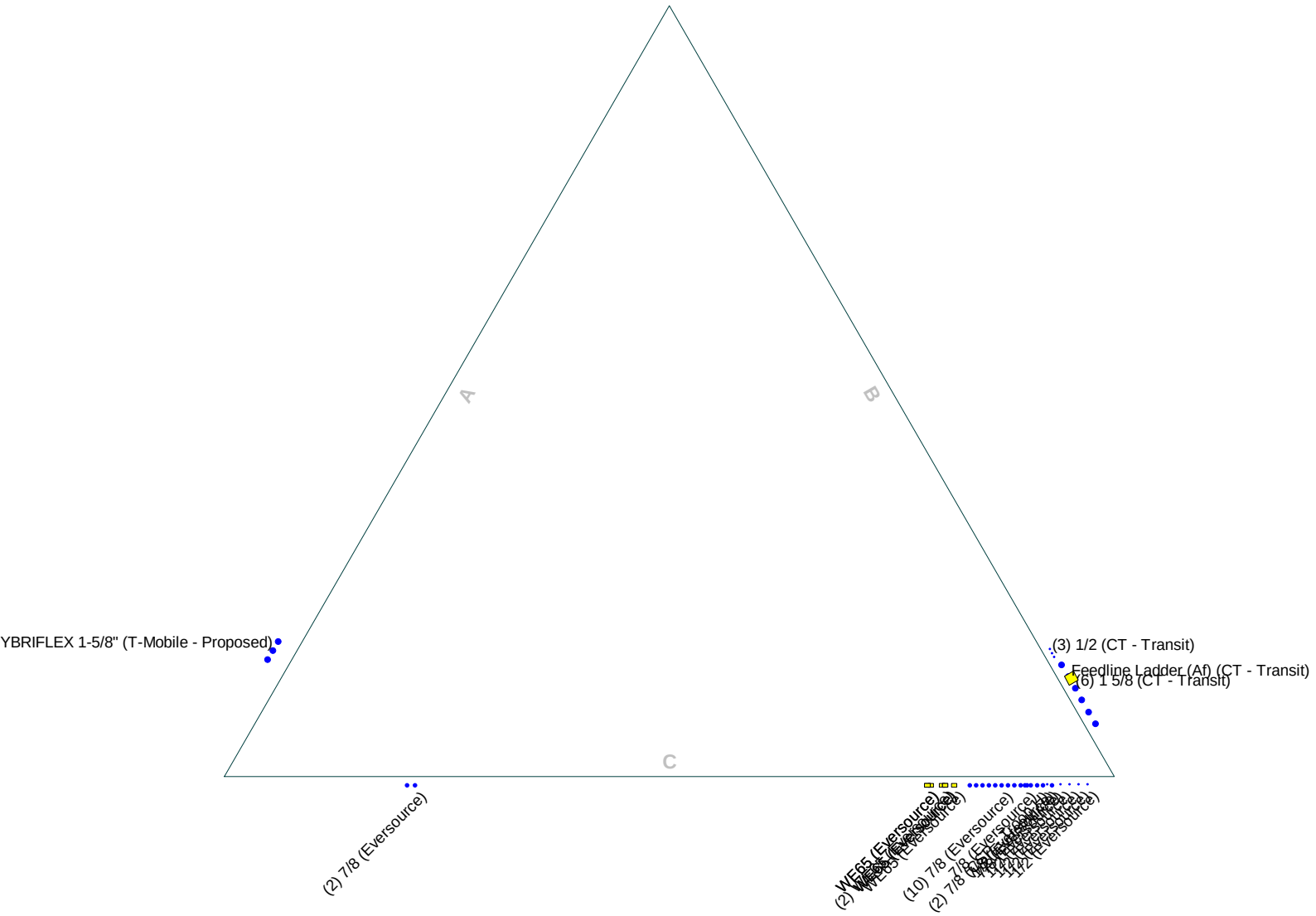
TORQUE 53 kip-ft
REACTIONS - 93 mph WIND

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **19066.15 - CT11270C**			
Project: ***130-ft ROHN SSMW Tower, Willis Street, Bristol, CT***			
Client: T-Mobile	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 03/02/21	Scale: NTS	
Path: J:\Jobs\19066\00 WI\15_CT11270C\DS_Structural\Tower\Backup Documentation\Rev D\ER Files\130-ft ROHN SSMW Lattice Bristol.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face

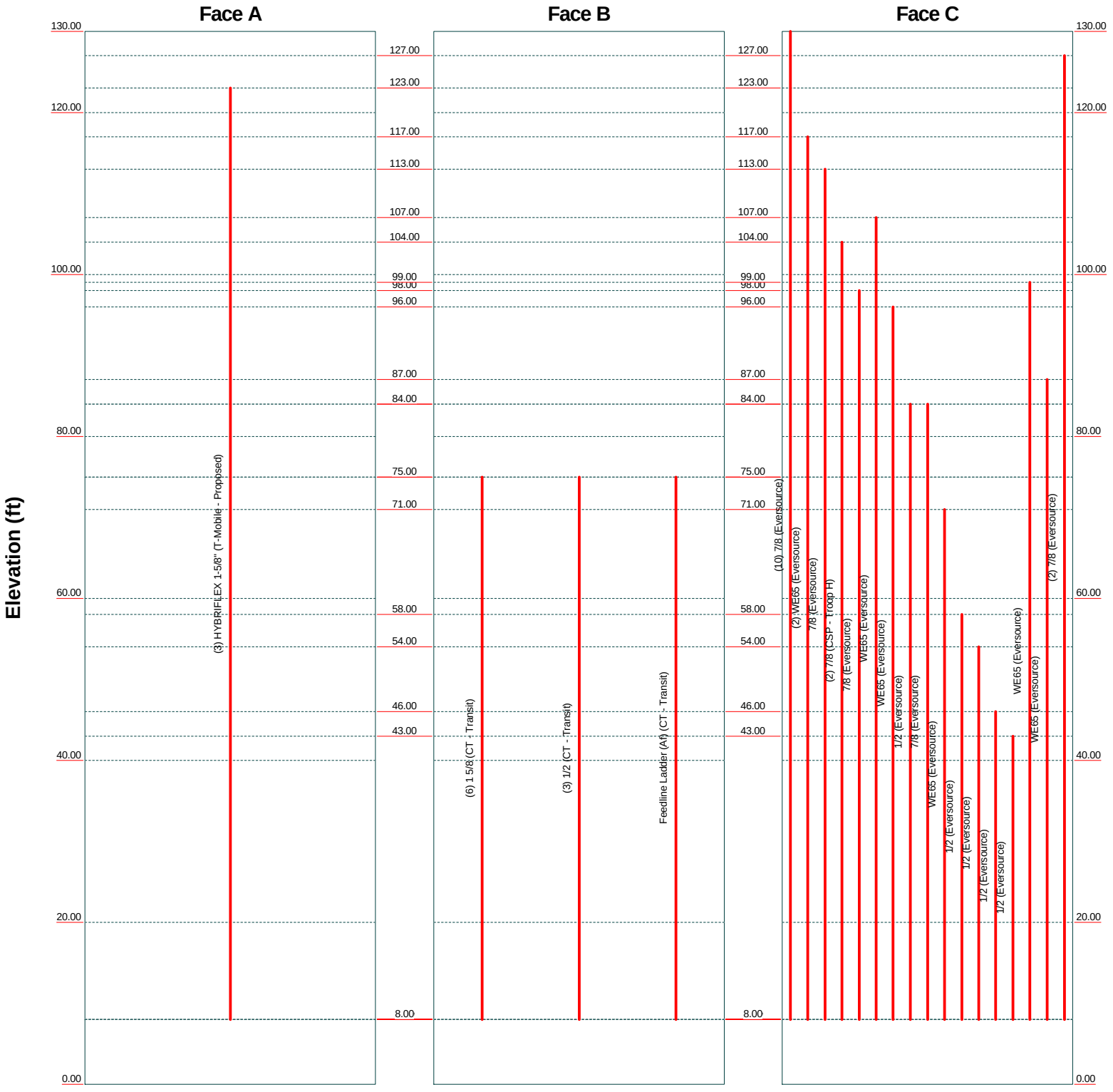


Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***19066.15 - CT11270C***		
Project:	***130-ft ROHN SSMW Tower, Willis Street, Bristol, CT***		
Client: T-Mobile		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 03/02/21	Scale: NTS
Path: J:\Jobs\19066\00 WI\15_CT11270C\D5_Structural\Tower\Backup Documentation\Rev (1)\ERI Files\130-ft ROHN SSMW Lattice Bristol.eri			Dwg No. E-7

Feed Line Distribution Chart
0' - 130'

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



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Job:	***19066.15 - CT11270C***		
Project:	***130-ft ROHN SSMW Tower, Willis Street, Bristol, CT***		
Client: T-Mobile		Drawn by: TJL	App'd:
Code: TIA-222-G		Date: 03/02/21	Scale: NTS
Path: J:\Jobs\19066\00 Wills_CT11270C\05_Structural\Tower\Backup Documentation\Rev (1)\ERI Files\130-ft ROHN SSMW Lattice Bristol.eri			Dwg No. E-7

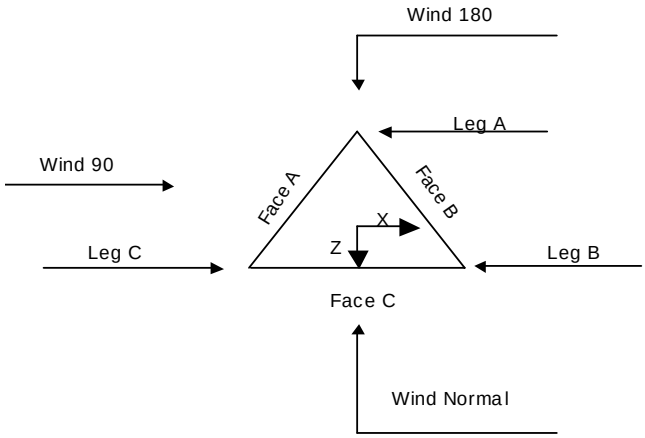
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 130.00 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 8.50 ft at the top and 22.54 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Basic wind speed of 93 mph.
Structure Class III.
Exposure Category C.
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.

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-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G 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 ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	130.00-120.00			8.50	1	10.00
T2	120.00-100.00			8.54	1	20.00
T3	100.00-80.00			10.63	1	20.00
T4	80.00-60.00			12.71	1	20.00
T5	60.00-40.00			14.96	1	20.00
T6	40.00-20.00			17.54	1	20.00
T7	20.00-0.00			20.04	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	130.00-120.00	5.00	K Brace Down	No	Yes	0.0000	0.0000
T2	120.00-100.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T3	100.00-80.00	6.67	K Brace Down	No	Yes	0.0000	0.0000
T4	80.00-60.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T5	60.00-40.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T6	40.00-20.00	10.00	K Brace Down	No	Yes	0.0000	0.0000
T7	20.00-0.00	10.00	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 130.00-120.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 120.00-100.00	Pipe	ROHN 3 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T3 100.00-80.00	Pipe	ROHN 4 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T4 80.00-60.00	Pipe	ROHN 5 STD	A572-50 (50 ksi)	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)
T5 60.00-40.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T6 40.00-20.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T7 20.00-0.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 130.00-120.00	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T2 120.00-100.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T3 100.00-80.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T4 80.00-60.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T5 60.00-40.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T6 40.00-20.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)
T7 20.00-0.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 130.00-120.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 120.00-100.00	None	Flat Bar		A36 (36 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 100.00-80.00	None	Flat Bar		A36	Pipe	ROHN 2 STD	A572-50

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 80.00-60.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2 STD	(50 ksi) A572-50 (50 ksi)
T5 60.00-40.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2 STD	(50 ksi) A572-50 (50 ksi)
T6 40.00-20.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2.5 STD	(50 ksi) A572-50 (50 ksi)
T7 20.00-0.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Pipe	ROHN 2.5 STD	(50 ksi) 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 130.00-120.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 120.00-100.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 100.00-80.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 80.00-60.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T5 60.00-40.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T7 20.00-0.00	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	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 130.00-120.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36	1.02	1	1	36.0000	36.0000	36.0000

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
			(36 ksi)						

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
130.00-120.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1	1	1	1	1	1
T7 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
130.00-120.00														
T2	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
120.00-100.00														
T3	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
100.00-80.00														
T4 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 130.00-120.00	Flange	0.7500 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T2 120.00-100.00	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T3 100.00-80.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T4 80.00-60.00	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T5 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T6 40.00-20.00	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0
T7 20.00-0.00	Flange	1.0000 F1554-105	8	0.6250 A325N	3	0.6250 A325N	2	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8 (Eversource)	C	No	No	Ar (CaAa)	130.00 - 8.00	2.0000	-0.37	10	10	0.7500 1.0000	1.1100		0.54
WE65 (Eversource)	C	No	No	Af (CaAa)	117.00 - 8.00	2.0000	-0.3	2	2	1.5836	1.5836		0.53
7/8 (Eversource)	C	No	No	Ar (CaAa)	113.00 - 8.00	2.0000	-0.4	1	1	0.7500 1.0000	1.1100		0.54
7/8 (CSP - Troop H)	C	No	No	Ar (CaAa)	104.00 - 8.00	2.0000	-0.41	2	2	0.7500 1.0000	1.1100		0.54
7/8 (Eversource)	C	No	No	Ar (CaAa)	98.00 - 8.00	2.0000	-0.42	1	1	0.7500 1.0000	1.1100		0.54
WE65 (Eversource)	C	No	No	Af (CaAa)	107.00 - 8.00	2.0000	-0.32	1	1	0.7500 1.0000	1.5836		0.53
WE65 (Eversource)	C	No	No	Af (CaAa)	96.00 - 8.00	2.0000	-0.31	1	1	0.7500 1.0000	1.5836		0.53
1/2 (Eversource)	C	No	No	Ar (CaAa)	84.00 - 8.00	2.0000	-0.425	1	1	0.7500 1.0000	0.5800		0.25
7/8 (Eversource)	C	No	No	Ar (CaAa)	84.00 - 8.00	2.0000	-0.43	1	1	1.1100	1.1100		0.54
WE65 (Eversource)	C	No	No	Af (CaAa)	71.00 - 8.00	2.0000	-0.31	1	1	0.7500 1.0000	1.5836		0.53
1/2 (Eversource)	C	No	No	Ar (CaAa)	58.00 - 8.00	2.0000	-0.44	1	1	0.7500 1.0000	0.5800		0.25
1/2 (Eversource)	C	No	No	Ar (CaAa)	54.00 - 8.00	2.0000	-0.47	1	1	0.5800	0.5800		0.25
1/2 (Eversource)	C	No	No	Ar (CaAa)	46.00 - 8.00	2.0000	-0.46	1	1	0.5800	0.5800		0.25
1/2 (Eversource)	C	No	No	Ar (CaAa)	43.00 - 8.00	2.0000	-0.45	1	1	0.5800	0.5800		0.25
1 5/8	B	No	No	Ar (CaAa)	75.00 - 8.00	2.0000	0.4	6	6	1.9800	1.9800		1.04

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
(CT - Transit) 1/2	B	No	No	Ar (CaAa)	75.00 - 8.00	2.0000	0.345	3	3	0.7500	0.5800		0.25
(CT - Transit) Feedline Ladder (Af)	B	No	No	Af (CaAa)	75.00 - 8.00	2.0000	0.38	1	1	1.0000 3.0000	3.0000		8.40
(CT - Transit) WE65 (Eversource)	C	No	No	Af (CaAa)	99.00 - 8.00	2.0000	-0.29	1	1	0.7500 1.0000	1.5836		0.53
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	A	No	No	Ar (CaAa)	123.00 - 8.00	5.0000	-0.35	3	3	1.0000	1.9800		1.90
WE65 (Eversource)	C	No	No	Af (CaAa)	87.00 - 8.00	2.0000	-0.29	1	1	0.7500 1.0000	1.5836		0.53
7/8 (Eversource)	C	No	No	Ar (CaAa)	127.00 - 8.00	2.0000	0.29	2	2	1.1100	1.1100		0.54

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	130.00-120.00	A	0.000	0.000	1.782	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	12.654	0.000	0.06
T2	120.00-100.00	A	0.000	0.000	11.880	0.000	0.11
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	39.792	0.000	0.16
T3	100.00-80.00	A	0.000	0.000	11.880	0.000	0.11
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	62.895	0.000	0.23
T4	80.00-60.00	A	0.000	0.000	11.880	0.000	0.11
		B	0.000	0.000	27.930	0.000	0.23
		C	0.000	0.000	73.475	0.000	0.26
T5	60.00-40.00	A	0.000	0.000	11.880	0.000	0.11
		B	0.000	0.000	37.240	0.000	0.31
		C	0.000	0.000	78.228	0.000	0.27
T6	40.00-20.00	A	0.000	0.000	11.880	0.000	0.11
		B	0.000	0.000	37.240	0.000	0.31
		C	0.000	0.000	80.490	0.000	0.28
T7	20.00-0.00	A	0.000	0.000	7.128	0.000	0.07
		B	0.000	0.000	22.344	0.000	0.18
		C	0.000	0.000	48.294	0.000	0.17

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	130.00-120.00	A	2.856	0.000	0.000	5.876	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	40.574	0.000	0.75
T2	120.00-100.00	A	2.820	0.000	0.000	38.929	0.000	0.75

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
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	135.385	0.000	2.42
T3	100.00-80.00	A	2.764	0.000	0.000	38.547	0.000	0.73
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	226.754	0.000	4.12
T4	80.00-60.00	A	2.695	0.000	0.000	38.081	0.000	0.72
		B		0.000	0.000	88.049	0.000	1.82
		C		0.000	0.000	267.955	0.000	4.88
T5	60.00-40.00	A	2.606	0.000	0.000	37.475	0.000	0.69
		B		0.000	0.000	115.875	0.000	2.35
		C		0.000	0.000	293.306	0.000	5.22
T6	40.00-20.00	A	2.476	0.000	0.000	36.596	0.000	0.66
		B		0.000	0.000	113.662	0.000	2.23
		C		0.000	0.000	305.641	0.000	5.22
T7	20.00-0.00	A	2.219	0.000	0.000	20.913	0.000	0.35
		B		0.000	0.000	65.569	0.000	1.20
		C		0.000	0.000	171.183	0.000	2.68

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	130.00-120.00	6.0533	9.0589	3.9502	9.4009
T2	120.00-100.00	5.1719	12.7452	3.9493	15.4245
T3	100.00-80.00	11.7035	18.1814	13.4986	22.4719
T4	80.00-60.00	25.0305	24.2581	28.4554	28.8646
T5	60.00-40.00	30.8835	27.6161	36.8725	33.8327
T6	40.00-20.00	34.2411	30.3513	42.7602	38.2891
T7	20.00-0.00	27.5349	24.3827	37.0226	33.0377

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	7/8	120.00 - 130.00	0.6000	0.5450
T1	23	HYBRIFLEX 1-5/8"	120.00 - 123.00	0.6000	0.5450
T1	26	7/8	120.00 - 127.00	0.6000	0.5450
T2	2	7/8	100.00 - 120.00	0.6000	0.5996
T2	3	WE65	100.00 - 117.00	0.6000	0.5996
T2	4	7/8	100.00 - 113.00	0.6000	0.5996
T2	5	7/8	100.00 - 104.00	0.6000	0.5996
T2	7	WE65	100.00 - 107.00	0.6000	0.5996

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	23	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.5996
T2	26	7/8	100.00 - 120.00	0.6000	0.5996
T3	2	7/8	80.00 - 100.00	0.6000	0.6000
T3	3	WE65	80.00 - 100.00	0.6000	0.6000
T3	4	7/8	80.00 - 100.00	0.6000	0.6000
T3	5	7/8	80.00 - 100.00	0.6000	0.6000
T3	6	7/8	80.00 - 98.00	0.6000	0.6000
T3	7	WE65	80.00 - 100.00	0.6000	0.6000
T3	8	WE65	80.00 - 96.00	0.6000	0.6000
T3	9	1/2	80.00 - 84.00	0.6000	0.6000
T3	10	7/8	80.00 - 84.00	0.6000	0.6000
T3	22	WE65	80.00 - 99.00	0.6000	0.6000
T3	23	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.6000
T3	25	WE65	80.00 - 87.00	0.6000	0.6000
T3	26	7/8	80.00 - 100.00	0.6000	0.6000
T4	2	7/8	60.00 - 80.00	0.6000	0.6000
T4	3	WE65	60.00 - 80.00	0.6000	0.6000
T4	4	7/8	60.00 - 80.00	0.6000	0.6000
T4	5	7/8	60.00 - 80.00	0.6000	0.6000
T4	6	7/8	60.00 - 80.00	0.6000	0.6000
T4	7	WE65	60.00 - 80.00	0.6000	0.6000
T4	8	WE65	60.00 - 80.00	0.6000	0.6000
T4	9	1/2	60.00 - 80.00	0.6000	0.6000
T4	10	7/8	60.00 - 80.00	0.6000	0.6000
T4	11	WE65	60.00 - 71.00	0.6000	0.6000
T4	17	1 5/8	60.00 - 75.00	0.6000	0.6000
T4	18	1/2	60.00 - 75.00	0.6000	0.6000
T4	19	Feedline Ladder (Af)	60.00 - 75.00	0.6000	0.6000
T4	22	WE65	60.00 - 80.00	0.6000	0.6000
T4	23	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.6000
T4	25	WE65	60.00 - 80.00	0.6000	0.6000
T4	26	7/8	60.00 - 80.00	0.6000	0.6000
T5	2	7/8	40.00 - 60.00	0.6000	0.6000
T5	3	WE65	40.00 - 60.00	0.6000	0.6000
T5	4	7/8	40.00 - 60.00	0.6000	0.6000
T5	5	7/8	40.00 - 60.00	0.6000	0.6000
T5	6	7/8	40.00 - 60.00	0.6000	0.6000
T5	7	WE65	40.00 - 60.00	0.6000	0.6000
T5	8	WE65	40.00 - 60.00	0.6000	0.6000
T5	9	1/2	40.00 - 60.00	0.6000	0.6000
T5	10	7/8	40.00 - 60.00	0.6000	0.6000
T5	11	WE65	40.00 - 60.00	0.6000	0.6000
T5	13	1/2	40.00 - 58.00	0.6000	0.6000
T5	14	1/2	40.00 - 54.00	0.6000	0.6000
T5	15	1/2	40.00 - 46.00	0.6000	0.6000
T5	16	1/2	40.00 - 43.00	0.6000	0.6000
T5	17	1 5/8	40.00 - 60.00	0.6000	0.6000
T5	18	1/2	40.00 - 60.00	0.6000	0.6000
T5	19	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T5	22	WE65	40.00 - 60.00	0.6000	0.6000
T5	23	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.6000
T5	25	WE65	40.00 - 60.00	0.6000	0.6000
T5	26	7/8	40.00 - 60.00	0.6000	0.6000
T6	2	7/8	20.00 - 40.00	0.6000	0.6000
T6	3	WE65	20.00 - 40.00	0.6000	0.6000
T6	4	7/8	20.00 - 40.00	0.6000	0.6000
T6	5	7/8	20.00 - 40.00	0.6000	0.6000
T6	6	7/8	20.00 - 40.00	0.6000	0.6000
T6	7	WE65	20.00 - 40.00	0.6000	0.6000
T6	8	WE65	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	9	1/2	20.00 - 40.00	0.6000	0.6000
T6	10	7/8	20.00 - 40.00	0.6000	0.6000
T6	11	WE65	20.00 - 40.00	0.6000	0.6000
T6	13	1/2	20.00 - 40.00	0.6000	0.6000
T6	14	1/2	20.00 - 40.00	0.6000	0.6000
T6	15	1/2	20.00 - 40.00	0.6000	0.6000
T6	16	1/2	20.00 - 40.00	0.6000	0.6000
T6	17	1 5/8	20.00 - 40.00	0.6000	0.6000
T6	18	1/2	20.00 - 40.00	0.6000	0.6000
T6	19	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T6	22	WE65	20.00 - 40.00	0.6000	0.6000
T6	23	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.6000
T6	25	WE65	20.00 - 40.00	0.6000	0.6000
T6	26	7/8	20.00 - 40.00	0.6000	0.6000
T7	2	7/8	8.00 - 20.00	0.6000	0.6000
T7	3	WE65	8.00 - 20.00	0.6000	0.6000
T7	4	7/8	8.00 - 20.00	0.6000	0.6000
T7	5	7/8	8.00 - 20.00	0.6000	0.6000
T7	6	7/8	8.00 - 20.00	0.6000	0.6000
T7	7	WE65	8.00 - 20.00	0.6000	0.6000
T7	8	WE65	8.00 - 20.00	0.6000	0.6000
T7	9	1/2	8.00 - 20.00	0.6000	0.6000
T7	10	7/8	8.00 - 20.00	0.6000	0.6000
T7	11	WE65	8.00 - 20.00	0.6000	0.6000
T7	13	1/2	8.00 - 20.00	0.6000	0.6000
T7	14	1/2	8.00 - 20.00	0.6000	0.6000
T7	15	1/2	8.00 - 20.00	0.6000	0.6000
T7	16	1/2	8.00 - 20.00	0.6000	0.6000
T7	17	1 5/8	8.00 - 20.00	0.6000	0.6000
T7	18	1/2	8.00 - 20.00	0.6000	0.6000
T7	19	Feedline Ladder (Af)	8.00 - 20.00	0.6000	0.6000
T7	22	WE65	8.00 - 20.00	0.6000	0.6000
T7	23	HYBRIFLEX 1-5/8"	8.00 - 20.00	0.6000	0.6000
T7	25	WE65	8.00 - 20.00	0.6000	0.6000
T7	26	7/8	8.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod	A	From Leg	0.00 0.00 0.00	2.0000	130.00	No Ice 1/2" Ice 1" Ice	1.00 2.02 3.05	1.00 2.02 3.05	0.04 0.05 0.06
PD458-1 (Eversource)	B	From Face	0.00 0.00 8.00	0.0000	131.00	No Ice 1/2" Ice 1" Ice	2.88 4.34 5.83	2.88 4.34 5.83	0.02 0.05 0.08
PD220 (Eversource)	B	From Face	0.00 0.00 10.00	0.0000	131.00	No Ice 1/2" Ice 1" Ice	3.08 5.30 7.54	3.08 5.30 7.54	0.02 0.05 0.09
PD220	B	From Leg	0.00	0.0000	130.00	No Ice	3.08	3.08	0.02

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
(Eversource)			0.00			1/2" Ice	5.30	5.30	0.05
			10.00			1" Ice	7.54	7.54	0.09
12' x 3" Dia Omni	C	From Leg	0.00	0.0000	130.00	No Ice	3.60	3.60	0.04
(Eversource)			0.00			1/2" Ice	4.83	4.83	0.06
			6.00			1" Ice	6.08	6.08	0.09
PD458-1	C	From Face	0.00	0.0000	130.00	No Ice	2.88	2.88	0.02
(Eversource)			0.00			1/2" Ice	4.34	4.34	0.05
			8.00			1" Ice	5.83	5.83	0.08
21' x 3" Dia Omni	A	From Face	0.00	0.0000	130.00	No Ice	6.30	6.30	0.05
(Eversource)			0.00			1/2" Ice	8.43	8.43	0.10
			10.00			1" Ice	10.58	10.58	0.15
6' Standoff Arm	A	From Leg	0.00	0.0000	131.00	No Ice	2.40	0.13	0.05
(Eversource)			0.00			1/2" Ice	2.83	0.18	0.07
			10.00			1" Ice	3.26	0.24	0.10
DS4C06F36D-D	A	From Leg	0.00	0.0000	131.00	No Ice	5.82	5.82	0.05
(Eversource)			0.00			1/2" Ice	7.79	7.79	0.09
			10.00			1" Ice	9.78	9.78	0.15
APXVAALL24-43	A	From Leg	4.00	0.0000	125.00	No Ice	20.24	8.89	0.15
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAALL24-43	B	From Leg	4.00	0.0000	125.00	No Ice	20.24	8.89	0.15
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAALL24-43	C	From Leg	4.00	0.0000	125.00	No Ice	20.24	8.89	0.15
(T-Mobile - Proposed)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	A	From Leg	4.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile - Existing)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	B	From Leg	4.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile - Existing)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	C	From Leg	4.00	0.0000	125.00	No Ice	6.51	4.71	0.13
(T-Mobile - Existing)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR6449	A	From Leg	4.00	0.0000	125.00	No Ice	5.65	2.42	0.10
(T-Mobile - Proposed)			5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
AIR6449	B	From Leg	4.00	0.0000	125.00	No Ice	5.65	2.42	0.10
(T-Mobile - Proposed)			5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
AIR6449	C	From Leg	4.00	0.0000	125.00	No Ice	5.65	2.42	0.10
(T-Mobile - Proposed)			5.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
Radio 4449 B71 B12	A	From Leg	4.00	0.0000	125.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			2.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Leg	4.00	0.0000	125.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			2.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Leg	4.00	0.0000	125.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-2.00			1/2" Ice	1.80	1.44	0.09
			2.00			1" Ice	1.97	1.59	0.11
4415 B25	A	From Leg	4.00	0.0000	125.00	No Ice	1.84	0.82	0.05
(T-Mobile - Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			-2.00			1" Ice	2.19	1.07	0.08
4415 B25	B	From Leg	4.00	0.0000	125.00	No Ice	1.84	0.82	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
(T-Mobile - Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			-2.00			1" Ice	2.19	1.07	0.08
4415 B25	C	From Leg	4.00	0.0000	125.00	No Ice	1.84	0.82	0.05
(T-Mobile - Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			-2.00			1" Ice	2.19	1.07	0.08
Rohn 6'x10' Boom Gate (3)	A	From Leg	4.00	0.0000	125.00	No Ice	47.40	47.40	1.62
(T-Mobile - Existing)			0.00			1/2" Ice	56.40	56.40	2.01
			0.00			1" Ice	65.40	65.40	2.40
6'8"x4" Pipe Mount	A	From Leg	0.50	0.0000	117.00	No Ice	2.06	2.06	0.07
(Eversource)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00			1" Ice	3.42	3.42	0.12
Dish Mount Assy	A	None		0.0000	117.00	No Ice	24.00	24.00	0.42
(Eversource)						1/2" Ice	30.00	30.00	0.97
						1" Ice	36.00	36.00	1.53
1142-2B	C	From Leg	4.00	0.0000	113.00	No Ice	1.12	1.12	0.01
(Eversource)			0.00			1/2" Ice	2.54	2.54	0.02
			6.00			1" Ice	3.97	3.97	0.04
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	113.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
1142-2B	B	From Leg	4.00	0.0000	115.00	No Ice	1.12	1.12	0.01
(Eversource)			0.00			1/2" Ice	2.54	2.54	0.02
			6.00			1" Ice	3.97	3.97	0.04
ROHN 4-ft Side Arm	B	From Leg	2.00	0.0000	115.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
AP11-850/105N	A	From Leg	4.00	0.0000	104.00	No Ice	4.66	2.25	0.01
(CSP - Troop H)			0.00			1/2" Ice	4.99	2.57	0.04
			0.00			1" Ice	5.33	2.90	0.07
AP11-850/105N	A	From Leg	4.00	0.0000	105.00	No Ice	4.66	2.25	0.01
(CSP - Troop H)			0.00			1/2" Ice	4.99	2.57	0.04
			0.00			1" Ice	5.33	2.90	0.07
ROHN 4-ft Side Arm	A	From Leg	2.00	0.0000	104.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
6'8"x4" Pipe Mount	B	From Leg	0.50	0.0000	107.00	No Ice	2.07	2.07	0.07
(Eversource)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00			1" Ice	3.42	3.42	0.12
Dish Mount Assy	B	None		0.0000	107.00	No Ice	24.00	24.00	0.42
(Eversource)						1/2" Ice	30.00	30.00	0.97
						1" Ice	36.00	36.00	1.53
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	98.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
DB205-A	C	From Leg	4.00	0.0000	98.00	No Ice	1.20	1.20	0.04
(Eversource)			0.00			1/2" Ice	2.16	2.16	0.05
			9.00			1" Ice	3.12	3.12	0.06
2' Yagi	A	From Leg	3.50	0.0000	84.00	No Ice	2.08	2.08	0.03
(Eversource)			0.00			1/2" Ice	3.79	3.79	0.05
			0.00			1" Ice	5.52	5.52	0.08
6'8"x4" Pipe Mount	A	From Leg	0.50	0.0000	96.00	No Ice	2.09	2.09	0.07
(Eversource)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00			1" Ice	3.42	3.42	0.12
Dish Mount Assy	A	None		0.0000	96.00	No Ice	24.00	24.00	0.42
(Eversource)						1/2" Ice	30.00	30.00	0.97
						1" Ice	36.00	36.00	1.53
6'8"x4" Pipe Mount	C	From Leg	0.50	0.0000	86.00	No Ice	2.11	2.11	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Eversource)			0.00			1/2" Ice	3.01	3.01	0.09
			0.00			1" Ice	3.42	3.42	0.12
Dish Mount Assy	C	None		0.0000	86.00	No Ice	24.00	24.00	0.42
(Eversource)						1/2" Ice	30.00	30.00	0.97
						1" Ice	36.00	36.00	1.53
1142-2B	B	From Leg	4.00	0.0000	84.00	No Ice	1.12	1.12	0.01
(Eversource)			0.00			1/2" Ice	2.54	2.54	0.02
			6.00			1" Ice	3.97	3.97	0.04
ROHN 4-ft Side Arm	B	From Leg	2.00	0.0000	84.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
5'0"x4.5" Pipe Mount	A	From Leg	0.50	0.0000	71.00	No Ice	1.50	1.50	0.05
(Eversource)			0.00			1/2" Ice	2.08	2.08	0.07
			0.00			1" Ice	2.40	2.40	0.09
Dish Mount Assy	A	None		0.0000	71.00	No Ice	24.00	24.00	0.42
(Eversource)						1/2" Ice	30.00	30.00	0.97
						1" Ice	36.00	36.00	1.53
Diamond X-500A	C	From Leg	4.00	0.0000	65.00	No Ice	5.40	5.40	0.05
(Eversource)			0.00			1/2" Ice	7.23	7.23	0.09
			9.00			1" Ice	9.08	9.08	0.14
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	65.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
DB212-1	B	From Leg	3.50	0.0000	58.00	No Ice	4.40	4.40	0.03
(Eversource)			0.00			1/2" Ice	8.42	8.42	0.07
			0.00			1" Ice	12.45	12.45	0.13
3' Side arm	B	From Leg	1.50	0.0000	58.00	No Ice	5.90	5.90	0.13
(Eversource)			0.00			1/2" Ice	6.60	6.60	0.15
			0.00			1" Ice	7.30	7.30	0.16
DB212-1	A	From Leg	4.00	0.0000	54.00	No Ice	4.40	4.40	0.03
(Eversource)			0.00			1/2" Ice	8.42	8.42	0.07
			0.00			1" Ice	12.45	12.45	0.13
ROHN 4-ft Side Arm	A	From Leg	2.00	0.0000	54.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
DB230-2B	B	From Leg	4.00	0.0000	46.00	No Ice	2.10	2.10	0.10
(Eversource)			0.00			1/2" Ice	3.78	3.78	0.14
			0.00			1" Ice	5.46	5.46	0.17
ROHN 4-ft Side Arm	B	From Leg	2.00	0.0000	43.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
DB222-C	C	From Leg	4.00	0.0000	43.00	No Ice	1.60	1.60	0.02
(Eversource)			0.00			1/2" Ice	2.88	2.88	0.02
			5.00			1" Ice	4.16	4.16	0.03
ROHN 4-ft Side Arm	C	From Leg	2.00	0.0000	43.00	No Ice	5.28	5.28	0.07
(Eversource)			0.00			1/2" Ice	7.88	7.88	0.08
			0.00			1" Ice	10.48	10.48	0.10
Wind speed cups	B	From Leg	4.00	0.0000	42.00	No Ice	1.80	1.80	0.04
			0.00			1/2" Ice	2.25	2.25	0.05
			0.00			1" Ice	2.70	2.70	0.06
Valmont T-Arm (1)	A	From Leg	1.50	0.0000	75.00	No Ice	10.54	10.54	0.34
(CT - Transit)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00			1" Ice	18.36	18.36	0.49
TTA 12"x6"x4"	A	From Leg	3.00	0.0000	75.00	No Ice	0.70	0.47	0.02
(CT - Transit)			0.00			1/2" Ice	0.82	0.57	0.02
			0.00			1" Ice	0.95	0.69	0.03
TTA 12"x6"x4"	B	From Leg	3.00	0.0000	70.00	No Ice	0.70	0.47	0.02

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
(CT - Transit)			0.00			1/2" Ice	0.82	0.57	0.02
			0.00			1" Ice	0.95	0.69	0.03
Valmont T-Arm (1)	B	From Leg	1.50	0.0000	70.00	No Ice	10.54	10.54	0.34
(CT - Transit)			0.00			1/2" Ice	14.45	14.45	0.41
			0.00			1" Ice	18.36	18.36	0.49
20' x 3" Dia Omni	A	From Leg	3.00	10.0000	75.00	No Ice	6.00	6.00	0.05
(CT - Transit)			5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni	A	From Leg	3.00	-10.0000	75.00	No Ice	6.00	6.00	0.05
(CT - Transit)			5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni	A	From Leg	3.00	-10.0000	75.00	No Ice	6.00	6.00	0.05
(CT - Transit)			-5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni	B	From Leg	3.00	10.0000	70.00	No Ice	6.00	6.00	0.05
(CT - Transit)			5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni	B	From Leg	3.00	-10.0000	70.00	No Ice	6.00	6.00	0.05
(CT - Transit)			5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
20' x 3" Dia Omni	B	From Leg	3.00	-10.0000	70.00	No Ice	6.00	6.00	0.05
(CT - Transit)			-5.00			1/2" Ice	8.03	8.03	0.09
			0.00			1" Ice	10.08	10.08	0.15
6'x2" Pipe Mount	A	From Leg	3.00	0.0000	75.00	No Ice	1.20	1.20	0.02
(CT - Transit)			5.00			1/2" Ice	1.80	1.80	0.03
			0.00			1" Ice	2.17	2.17	0.04
6'x2" Pipe Mount	A	From Leg	3.00	0.0000	75.00	No Ice	1.20	1.20	0.02
(CT - Transit)			-5.00			1/2" Ice	1.80	1.80	0.03
			0.00			1" Ice	2.17	2.17	0.04
6'x2" Pipe Mount	B	From Leg	3.00	0.0000	70.00	No Ice	1.20	1.20	0.02
(CT - Transit)			5.00			1/2" Ice	1.80	1.80	0.03
			0.00			1" Ice	2.17	2.17	0.04
6'x2" Pipe Mount	B	From Leg	3.00	0.0000	70.00	No Ice	1.20	1.20	0.02
(CT - Transit)			-5.00			1/2" Ice	1.80	1.80	0.03
			0.00			1" Ice	2.17	2.17	0.04
DS2C03F36D-D	B	From Leg	4.00	0.0000	127.00	No Ice	7.30	7.30	0.08
(Eversource)			0.00			1/2" Ice	9.77	9.77	0.13
			13.00			1" Ice	12.25	12.25	0.20
SitePro USF-4U	B	From Leg	2.00	0.0000	127.00	No Ice	5.75	5.75	0.16
(Eversource)			0.00			1/2" Ice	8.00	8.00	0.21
			0.00			1" Ice	10.25	10.25	0.26
R5 Universal Pipe Mount w/ Angle	A	From Leg	0.50	0.0000	87.00	No Ice	1.50	1.50	0.20
			0.00			1/2" Ice	2.00	2.00	0.23
(Eversource)			0.00			1" Ice	2.50	2.50	0.26

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 ft²	Weight K
4 FT DISH	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		71.00	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.62	0.14 0.28 0.42
PAD8-59AW	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		86.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.29 52.31	0.29 0.55 0.81
8 FT DISH	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		96.00	8.00	No Ice 1/2" Ice 1" Ice	50.27 51.32 52.37	0.47 1.01 1.55
6 FT DISH	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		107.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.14 0.29 0.44
PA6-59	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		117.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.83	0.09 0.24 0.39
PAD6-59BC (Eversource)	A	Paraboloid w/o Radome	From Leg	1.00 0.00 0.00	Worst		87.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 29.86	0.15 0.29 0.44

Tower Pressures - No Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 130.00-120.00	125.00	1.326	29	87.604	A B C	0.000 0.000 0.000	12.468 12.468 12.468	4.792	38.43 38.43 38.43	1.782 0.000 12.654	0.000 0.000 0.000
T2 120.00-100.00	110.00	1.291	28	197.508	A B C	0.000 0.000 0.000	28.614 28.614 28.614	11.688	40.85 40.85 40.85	11.880 0.000 39.792	0.000 0.000 0.000
T3 100.00-80.00	90.00	1.238	27	240.843	A B C	0.000 0.000 0.000	34.045 34.045 34.045	15.027	44.14 44.14 44.14	11.880 0.000 62.895	0.000 0.000 0.000
T4 80.00-60.00	70.00	1.174	25	285.953	A B C	0.000 0.000 0.000	35.103 35.103 35.103	18.582	52.94 52.94 52.94	11.880 27.930 73.475	0.000 0.000 0.000
T5 60.00-40.00	50.00	1.094	24	334.291	A B C	0.000 0.000 0.000	39.450 39.450 39.450	18.595	47.13 47.13 47.13	11.880 37.240 78.228	0.000 0.000 0.000
T6 40.00-20.00	30.00	0.982	21	386.897	A B C	0.000 0.000 0.000	46.408 46.408 46.408	22.141	47.71 47.71 47.71	11.880 37.240 80.490	0.000 0.000 0.000
T7 20.00-0.00	10.00	0.85	18	436.897	A B C	0.000 0.000 0.000	48.658 48.658 48.658	22.141	45.50 45.50 45.50	7.128 22.344 48.294	0.000 0.000 0.000

Tower Pressure - With Ice

G_H = 0.850

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	125.00	1.326	7	2.8561	92.364	A	0.000	42.025	14.312	34.06	5.876	0.000
130.00-120.00						B	0.000	42.025		34.06	0.000	0.000
						C	0.000	42.025		34.06	40.574	0.000
T2	110.00	1.291	7	2.8199	206.920	A	0.000	82.849	30.521	36.84	38.929	0.000
120.00-100.00						B	0.000	82.849		36.84	0.000	0.000
						C	0.000	82.849		36.84	135.385	0.000
T3 100.00-80.00	90.00	1.238	7	2.7638	250.069	A	0.000	91.707	33.486	36.51	38.547	0.000
						B	0.000	91.707		36.51	0.000	0.000
						C	0.000	91.707		36.51	226.754	0.000
T4 80.00-60.00	70.00	1.174	6	2.6952	294.951	A	0.000	86.092	36.589	42.50	38.081	0.000
						B	0.000	86.092		42.50	88.049	0.000
						C	0.000	86.092		42.50	267.955	0.000
T5 60.00-40.00	50.00	1.094	6	2.6061	342.996	A	0.000	92.157	36.017	39.08	37.475	0.000
						B	0.000	92.157		39.08	115.875	0.000
						C	0.000	92.157		39.08	293.306	0.000
T6 40.00-20.00	30.00	0.982	5	2.4763	395.167	A	0.000	99.900	38.692	38.73	36.596	0.000
						B	0.000	99.900		38.73	113.662	0.000
						C	0.000	99.900		38.73	305.641	0.000
T7 20.00-0.00	10.00	0.85	5	2.2186	444.306	A	0.000	99.761	36.970	37.06	20.913	0.000
						B	0.000	99.761		37.06	65.569	0.000
						C	0.000	99.761		37.06	171.183	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	125.00	1.326	10	87.604	A	0.000	12.468	4.792	38.43	1.782	0.000
130.00-120.00					B	0.000	12.468		38.43	0.000	0.000
					C	0.000	12.468		38.43	12.654	0.000
T2	110.00	1.291	10	197.508	A	0.000	28.614	11.688	40.85	11.880	0.000
120.00-100.00					B	0.000	28.614		40.85	0.000	0.000
					C	0.000	28.614		40.85	39.792	0.000
T3	90.00	1.238	10	240.843	A	0.000	34.045	15.027	44.14	11.880	0.000
100.00-80.00					B	0.000	34.045		44.14	0.000	0.000
					C	0.000	34.045		44.14	62.895	0.000
T4 80.00-60.00	70.00	1.174	9	285.953	A	0.000	35.103	18.582	52.94	11.880	0.000
					B	0.000	35.103		52.94	27.930	0.000
					C	0.000	35.103		52.94	73.475	0.000
T5 60.00-40.00	50.00	1.094	9	334.291	A	0.000	39.450	18.595	47.13	11.880	0.000
					B	0.000	39.450		47.13	37.240	0.000
					C	0.000	39.450		47.13	78.228	0.000
T6 40.00-20.00	30.00	0.982	8	386.897	A	0.000	46.408	22.141	47.71	11.880	0.000
					B	0.000	46.408		47.71	37.240	0.000
					C	0.000	46.408		47.71	80.490	0.000
T7 20.00-0.00	10.00	0.85	7	436.897	A	0.000	48.658	22.141	45.50	7.128	0.000
					B	0.000	48.658		45.50	22.344	0.000
					C	0.000	48.658		45.50	48.294	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	29	1	1	7.067	0.69	69.42	C
130.00-120.00			B	0.142	2.8		1	1	7.067			
			C	0.142	2.8		1	1	7.067			
T2	0.28	1.70	A	0.145	2.79	28	1	1	16.167	1.81	90.41	C
120.00-100.00			B	0.145	2.79		1	1	16.167			
			C	0.145	2.79		1	1	16.167			
T3	0.34	2.04	A	0.141	2.804	27	1	1	18.606	2.21	110.48	C
100.00-80.00			B	0.141	2.804		1	1	18.606			
			C	0.141	2.804		1	1	18.606			
T4	0.60	2.37	A	0.123	2.874	25	1	1	18.164	2.60	129.79	C
80.00-60.00			B	0.123	2.874		1	1	18.164			
			C	0.123	2.874		1	1	18.164			
T5	0.69	2.93	A	0.118	2.893	24	1	1	20.753	2.75	137.27	C
60.00-40.00			B	0.118	2.893		1	1	20.753			
			C	0.118	2.893		1	1	20.753			
T6	0.70	3.48	A	0.12	2.885	21	1	1	23.712	2.64	132.08	C
40.00-20.00			B	0.12	2.885		1	1	23.712			
			C	0.12	2.885		1	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	18	1	1	25.342	1.89	94.31	C
			B	0.111	2.919		1	1	25.342			
			C	0.111	2.919		1	1	25.342			
Sum Weight:	3.12	17.31						OTM	901.62 kip-ft	14.58		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	29	0.825	1	7.067	0.69	69.42	C
130.00-120.00			B	0.142	2.8		0.825	1	7.067			
			C	0.142	2.8		0.825	1	7.067			
T2	0.28	1.70	A	0.145	2.79	28	0.825	1	16.167	1.81	90.41	C
120.00-100.00			B	0.145	2.79		0.825	1	16.167			
			C	0.145	2.79		0.825	1	16.167			
T3	0.34	2.04	A	0.141	2.804	27	0.825	1	18.606	2.21	110.48	C
100.00-80.00			B	0.141	2.804		0.825	1	18.606			
			C	0.141	2.804		0.825	1	18.606			
T4	0.60	2.37	A	0.123	2.874	25	0.825	1	18.164	2.60	129.79	C
80.00-60.00			B	0.123	2.874		0.825	1	18.164			
			C	0.123	2.874		0.825	1	18.164			
T5	0.69	2.93	A	0.118	2.893	24	0.825	1	20.753	2.75	137.27	C
60.00-40.00			B	0.118	2.893		0.825	1	20.753			
			C	0.118	2.893		0.825	1	20.753			
T6	0.70	3.48	A	0.12	2.885	21	0.825	1	23.712	2.64	132.08	C
40.00-20.00			B	0.12	2.885		0.825	1	23.712			
			C	0.12	2.885		0.825	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	18	0.825	1	25.342	1.89	94.31	C
			B	0.111	2.919		0.825	1	25.342			
			C	0.111	2.919		0.825	1	25.342			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	3.12	17.31						OTM	901.62 kip-ft	14.58		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	29	0.8	1	7.067	0.69	69.42	C
130.00-120.00			B	0.142	2.8		0.8	1	7.067			
			C	0.142	2.8		0.8	1	7.067			
T2	0.28	1.70	A	0.145	2.79	28	0.8	1	16.167	1.81	90.41	C
120.00-100.00			B	0.145	2.79		0.8	1	16.167			
			C	0.145	2.79		0.8	1	16.167			
T3	0.34	2.04	A	0.141	2.804	27	0.8	1	18.606	2.21	110.48	C
100.00-80.00			B	0.141	2.804		0.8	1	18.606			
			C	0.141	2.804		0.8	1	18.606			
T4	0.60	2.37	A	0.123	2.874	25	0.8	1	18.164	2.60	129.79	C
80.00-60.00			B	0.123	2.874		0.8	1	18.164			
			C	0.123	2.874		0.8	1	18.164			
T5	0.69	2.93	A	0.118	2.893	24	0.8	1	20.753	2.75	137.27	C
60.00-40.00			B	0.118	2.893		0.8	1	20.753			
			C	0.118	2.893		0.8	1	20.753			
T6	0.70	3.48	A	0.12	2.885	21	0.8	1	23.712	2.64	132.08	C
40.00-20.00			B	0.12	2.885		0.8	1	23.712			
			C	0.12	2.885		0.8	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	18	0.8	1	25.342	1.89	94.31	C
			B	0.111	2.919		0.8	1	25.342			
			C	0.111	2.919		0.8	1	25.342			
Sum Weight:	3.12	17.31						OTM	901.62 kip-ft	14.58		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	29	0.85	1	7.067	0.69	69.42	C
130.00-120.00			B	0.142	2.8		0.85	1	7.067			
			C	0.142	2.8		0.85	1	7.067			
T2	0.28	1.70	A	0.145	2.79	28	0.85	1	16.167	1.81	90.41	C
120.00-100.00			B	0.145	2.79		0.85	1	16.167			
			C	0.145	2.79		0.85	1	16.167			
T3	0.34	2.04	A	0.141	2.804	27	0.85	1	18.606	2.21	110.48	C
100.00-80.00			B	0.141	2.804		0.85	1	18.606			
			C	0.141	2.804		0.85	1	18.606			
T4	0.60	2.37	A	0.123	2.874	25	0.85	1	18.164	2.60	129.79	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
80.00-60.00			B	0.123	2.874		0.85	1	18.164			
			C	0.123	2.874		0.85	1	18.164			
T5	0.69	2.93	A	0.118	2.893	24	0.85	1	20.753	2.75	137.27	C
60.00-40.00			B	0.118	2.893		0.85	1	20.753			
			C	0.118	2.893		0.85	1	20.753			
T6	0.70	3.48	A	0.12	2.885	21	0.85	1	23.712	2.64	132.08	C
40.00-20.00			B	0.12	2.885		0.85	1	23.712			
			C	0.12	2.885		0.85	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	18	0.85	1	25.342	1.89	94.31	C
			B	0.111	2.919		0.85	1	25.342			
			C	0.111	2.919		0.85	1	25.342			
Sum Weight:	3.12	17.31						OTM	901.62 kip-ft	14.58		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.86	4.04	A	0.455	1.965	7	1	1	27.810	0.49	49.05	C
130.00-120.00			B	0.455	1.965		1	1	27.810			
			C	0.455	1.965		1	1	27.810			
T2	3.17	8.24	A	0.4	2.063	7	1	1	52.726	1.27	63.68	C
120.00-100.00			B	0.4	2.063		1	1	52.726			
			C	0.4	2.063		1	1	52.726			
T3	4.86	9.32	A	0.367	2.134	7	1	1	57.086	1.61	80.41	C
100.00-80.00			B	0.367	2.134		1	1	57.086			
			C	0.367	2.134		1	1	57.086			
T4	7.42	8.77	A	0.292	2.318	6	1	1	51.349	1.93	96.49	C
80.00-60.00			B	0.292	2.318		1	1	51.349			
			C	0.292	2.318		1	1	51.349			
T5	8.26	9.95	A	0.269	2.383	6	1	1	54.355	2.01	100.52	C
60.00-40.00			B	0.269	2.383		1	1	54.355			
			C	0.269	2.383		1	1	54.355			
T6	8.11	11.03	A	0.253	2.429	5	1	1	58.511	1.89	94.40	C
40.00-20.00			B	0.253	2.429		1	1	58.511			
			C	0.253	2.429		1	1	58.511			
T7 20.00-0.00	4.24	11.27	A	0.225	2.516	5	1	1	57.782	1.18	58.95	C
			B	0.225	2.516		1	1	57.782			
			C	0.225	2.516		1	1	57.782			
Sum Weight:	36.90	62.62						OTM	650.19 kip-ft	10.38		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.86	4.04	A	0.455	1.965	7	0.825	1	27.810	0.49	49.05	C
130.00-120.00			B	0.455	1.965		0.825	1	27.810			
			C	0.455	1.965		0.825	1	27.810			
T2	3.17	8.24	A	0.4	2.063	7	0.825	1	52.726	1.27	63.68	C
120.00-100.00			B	0.4	2.063		0.825	1	52.726			
			C	0.4	2.063		0.825	1	52.726			
T3	4.86	9.32	A	0.367	2.134	7	0.825	1	57.086	1.61	80.41	C
100.00-80.00			B	0.367	2.134		0.825	1	57.086			
			C	0.367	2.134		0.825	1	57.086			
T4	7.42	8.77	A	0.292	2.318	6	0.825	1	51.349	1.93	96.49	C
80.00-60.00			B	0.292	2.318		0.825	1	51.349			
			C	0.292	2.318		0.825	1	51.349			
T5	8.26	9.95	A	0.269	2.383	6	0.825	1	54.355	2.01	100.52	C
60.00-40.00			B	0.269	2.383		0.825	1	54.355			
			C	0.269	2.383		0.825	1	54.355			
T6	8.11	11.03	A	0.253	2.429	5	0.825	1	58.511	1.89	94.40	C
40.00-20.00			B	0.253	2.429		0.825	1	58.511			
			C	0.253	2.429		0.825	1	58.511			
T7 20.00-0.00	4.24	11.27	A	0.225	2.516	5	0.825	1	57.782	1.18	58.95	C
			B	0.225	2.516		0.825	1	57.782			
			C	0.225	2.516		0.825	1	57.782			
Sum Weight:	36.90	62.62						OTM	650.19 kip-ft	10.38		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.86	4.04	A	0.455	1.965	7	0.8	1	27.810	0.49	49.05	C
130.00-120.00			B	0.455	1.965		0.8	1	27.810			
			C	0.455	1.965		0.8	1	27.810			
T2	3.17	8.24	A	0.4	2.063	7	0.8	1	52.726	1.27	63.68	C
120.00-100.00			B	0.4	2.063		0.8	1	52.726			
			C	0.4	2.063		0.8	1	52.726			
T3	4.86	9.32	A	0.367	2.134	7	0.8	1	57.086	1.61	80.41	C
100.00-80.00			B	0.367	2.134		0.8	1	57.086			
			C	0.367	2.134		0.8	1	57.086			
T4	7.42	8.77	A	0.292	2.318	6	0.8	1	51.349	1.93	96.49	C
80.00-60.00			B	0.292	2.318		0.8	1	51.349			
			C	0.292	2.318		0.8	1	51.349			
T5	8.26	9.95	A	0.269	2.383	6	0.8	1	54.355	2.01	100.52	C
60.00-40.00			B	0.269	2.383		0.8	1	54.355			
			C	0.269	2.383		0.8	1	54.355			
T6	8.11	11.03	A	0.253	2.429	5	0.8	1	58.511	1.89	94.40	C
40.00-20.00			B	0.253	2.429		0.8	1	58.511			
			C	0.253	2.429		0.8	1	58.511			
T7 20.00-0.00	4.24	11.27	A	0.225	2.516	5	0.8	1	57.782	1.18	58.95	C
			B	0.225	2.516		0.8	1	57.782			
			C	0.225	2.516		0.8	1	57.782			
Sum Weight:	36.90	62.62						OTM	650.19 kip-ft	10.38		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.86	4.04	A	0.455	1.965	7	0.85	1	27.810	0.49	49.05	C
130.00-120.00			B	0.455	1.965		0.85	1	27.810			
			C	0.455	1.965		0.85	1	27.810			
T2	3.17	8.24	A	0.4	2.063	7	0.85	1	52.726	1.27	63.68	C
120.00-100.00			B	0.4	2.063		0.85	1	52.726			
			C	0.4	2.063		0.85	1	52.726			
T3	4.86	9.32	A	0.367	2.134	7	0.85	1	57.086	1.61	80.41	C
100.00-80.00			B	0.367	2.134		0.85	1	57.086			
			C	0.367	2.134		0.85	1	57.086			
T4	7.42	8.77	A	0.292	2.318	6	0.85	1	51.349	1.93	96.49	C
80.00-60.00			B	0.292	2.318		0.85	1	51.349			
			C	0.292	2.318		0.85	1	51.349			
T5	8.26	9.95	A	0.269	2.383	6	0.85	1	54.355	2.01	100.52	C
60.00-40.00			B	0.269	2.383		0.85	1	54.355			
			C	0.269	2.383		0.85	1	54.355			
T6	8.11	11.03	A	0.253	2.429	5	0.85	1	58.511	1.89	94.40	C
40.00-20.00			B	0.253	2.429		0.85	1	58.511			
			C	0.253	2.429		0.85	1	58.511			
T7 20.00-0.00	4.24	11.27	A	0.225	2.516	5	0.85	1	57.782	1.18	58.95	C
			B	0.225	2.516		0.85	1	57.782			
			C	0.225	2.516		0.85	1	57.782			
Sum Weight:	36.90	62.62						OTM	650.19 kip-ft	10.38		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	10	1	1	7.067	0.25	25.13	C
130.00-120.00			B	0.142	2.8		1	1	7.067			
			C	0.142	2.8		1	1	7.067			
T2	0.28	1.70	A	0.145	2.79	10	1	1	16.167	0.65	32.72	C
120.00-100.00			B	0.145	2.79		1	1	16.167			
			C	0.145	2.79		1	1	16.167			
T3	0.34	2.04	A	0.141	2.804	10	1	1	18.606	0.80	39.99	C
100.00-80.00			B	0.141	2.804		1	1	18.606			
			C	0.141	2.804		1	1	18.606			
T4	0.60	2.37	A	0.123	2.874	9	1	1	18.164	0.94	46.98	C
80.00-60.00			B	0.123	2.874		1	1	18.164			
			C	0.123	2.874		1	1	18.164			
T5	0.69	2.93	A	0.118	2.893	9	1	1	20.753	0.99	49.69	C
60.00-40.00			B	0.118	2.893		1	1	20.753			
			C	0.118	2.893		1	1	20.753			
T6	0.70	3.48	A	0.12	2.885	8	1	1	23.712	0.96	47.80	C
40.00-20.00			B	0.12	2.885		1	1	23.712			
			C	0.12	2.885		1	1	23.712			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	7	1	1	25.342	0.68	34.14	C
			B	0.111	2.919		1	1	25.342			
			C	0.111	2.919		1	1	25.342			
Sum Weight:	3.12	17.31						OTM	326.34 kip-ft	5.28		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	10	0.825	1	7.067	0.25	25.13	C
130.00-120.00			B	0.142	2.8		0.825	1	7.067			
			C	0.142	2.8		0.825	1	7.067			
T2	0.28	1.70	A	0.145	2.79	10	0.825	1	16.167	0.65	32.72	C
120.00-100.00			B	0.145	2.79		0.825	1	16.167			
			C	0.145	2.79		0.825	1	16.167			
T3	0.34	2.04	A	0.141	2.804	10	0.825	1	18.606	0.80	39.99	C
100.00-80.00			B	0.141	2.804		0.825	1	18.606			
			C	0.141	2.804		0.825	1	18.606			
T4	0.60	2.37	A	0.123	2.874	9	0.825	1	18.164	0.94	46.98	C
80.00-60.00			B	0.123	2.874		0.825	1	18.164			
			C	0.123	2.874		0.825	1	18.164			
T5	0.69	2.93	A	0.118	2.893	9	0.825	1	20.753	0.99	49.69	C
60.00-40.00			B	0.118	2.893		0.825	1	20.753			
			C	0.118	2.893		0.825	1	20.753			
T6	0.70	3.48	A	0.12	2.885	8	0.825	1	23.712	0.96	47.80	C
40.00-20.00			B	0.12	2.885		0.825	1	23.712			
			C	0.12	2.885		0.825	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	7	0.825	1	25.342	0.68	34.14	C
			B	0.111	2.919		0.825	1	25.342			
			C	0.111	2.919		0.825	1	25.342			
Sum Weight:	3.12	17.31						OTM	326.34 kip-ft	5.28		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	10	0.8	1	7.067	0.25	25.13	C
130.00-120.00			B	0.142	2.8		0.8	1	7.067			
			C	0.142	2.8		0.8	1	7.067			
T2	0.28	1.70	A	0.145	2.79	10	0.8	1	16.167	0.65	32.72	C
120.00-100.00			B	0.145	2.79		0.8	1	16.167			
			C	0.145	2.79		0.8	1	16.167			
T3	0.34	2.04	A	0.141	2.804	10	0.8	1	18.606	0.80	39.99	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
100.00-80.00			B	0.141	2.804		0.8	1	18.606			
			C	0.141	2.804		0.8	1	18.606			
T4	0.60	2.37	A	0.123	2.874	9	0.8	1	18.164	0.94	46.98	C
80.00-60.00			B	0.123	2.874		0.8	1	18.164			
			C	0.123	2.874		0.8	1	18.164			
T5	0.69	2.93	A	0.118	2.893	9	0.8	1	20.753	0.99	49.69	C
60.00-40.00			B	0.118	2.893		0.8	1	20.753			
			C	0.118	2.893		0.8	1	20.753			
T6	0.70	3.48	A	0.12	2.885	8	0.8	1	23.712	0.96	47.80	C
40.00-20.00			B	0.12	2.885		0.8	1	23.712			
			C	0.12	2.885		0.8	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	7	0.8	1	25.342	0.68	34.14	C
			B	0.111	2.919		0.8	1	25.342			
			C	0.111	2.919		0.8	1	25.342			
Sum Weight:	3.12	17.31						OTM	326.34 kip-ft	5.28		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.08	0.64	A	0.142	2.8	10	0.85	1	7.067	0.25	25.13	C
130.00-120.00			B	0.142	2.8		0.85	1	7.067			
			C	0.142	2.8		0.85	1	7.067			
T2	0.28	1.70	A	0.145	2.79	10	0.85	1	16.167	0.65	32.72	C
120.00-100.00			B	0.145	2.79		0.85	1	16.167			
			C	0.145	2.79		0.85	1	16.167			
T3	0.34	2.04	A	0.141	2.804	10	0.85	1	18.606	0.80	39.99	C
100.00-80.00			B	0.141	2.804		0.85	1	18.606			
			C	0.141	2.804		0.85	1	18.606			
T4	0.60	2.37	A	0.123	2.874	9	0.85	1	18.164	0.94	46.98	C
80.00-60.00			B	0.123	2.874		0.85	1	18.164			
			C	0.123	2.874		0.85	1	18.164			
T5	0.69	2.93	A	0.118	2.893	9	0.85	1	20.753	0.99	49.69	C
60.00-40.00			B	0.118	2.893		0.85	1	20.753			
			C	0.118	2.893		0.85	1	20.753			
T6	0.70	3.48	A	0.12	2.885	8	0.85	1	23.712	0.96	47.80	C
40.00-20.00			B	0.12	2.885		0.85	1	23.712			
			C	0.12	2.885		0.85	1	23.712			
T7 20.00-0.00	0.42	4.15	A	0.111	2.919	7	0.85	1	25.342	0.68	34.14	C
			B	0.111	2.919		0.85	1	25.342			
			C	0.111	2.919		0.85	1	25.342			
Sum Weight:	3.12	17.31						OTM	326.34 kip-ft	5.28		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.50					
Bracing Weight	10.80					
Total Member Self-Weight	17.31			-9.61	-17.29	
Total Weight	30.20			-9.61	-17.29	
Wind 0 deg - No Ice		-0.00	-28.91	-2333.42	-17.14	33.39
Wind 30 deg - No Ice		14.37	-25.04	-2022.01	-1169.05	30.95
Wind 45 deg - No Ice		20.32	-20.44	-1652.68	-1646.21	26.48
Wind 60 deg - No Ice		24.89	-14.45	-1171.38	-2012.35	20.21
Wind 90 deg - No Ice		28.74	0.00	-9.46	-2321.08	4.06
Wind 120 deg - No Ice		24.89	14.46	1152.42	-2012.50	-13.18
Wind 135 deg - No Ice		20.32	20.45	1633.67	-1646.42	-20.74
Wind 150 deg - No Ice		14.37	25.04	2002.94	-1169.32	-26.89
Wind 180 deg - No Ice		0.00	28.91	2314.19	-17.44	-33.39
Wind 210 deg - No Ice		-14.37	25.04	2002.78	1134.47	-30.95
Wind 225 deg - No Ice		-20.32	20.44	1633.46	1611.63	-26.48
Wind 240 deg - No Ice		-24.89	14.45	1152.16	1977.77	-20.21
Wind 270 deg - No Ice		-28.74	-0.00	-9.77	2286.50	-4.06
Wind 300 deg - No Ice		-24.89	-14.46	-1171.65	1977.93	13.18
Wind 315 deg - No Ice		-20.32	-20.45	-1652.90	1611.84	20.74
Wind 330 deg - No Ice		-14.37	-25.04	-2022.16	1134.74	26.89
Member Ice	45.31					
Total Weight Ice	150.90			70.23	-185.80	
Wind 0 deg - Ice		-0.00	-18.19	-1342.21	-185.75	29.98
Wind 30 deg - Ice		9.06	-15.75	-1152.96	-888.43	34.00
Wind 45 deg - Ice		12.82	-12.86	-928.48	-1179.49	32.57
Wind 60 deg - Ice		15.70	-9.09	-635.95	-1402.84	28.91
Wind 90 deg - Ice		18.13	0.00	70.28	-1591.14	16.08
Wind 120 deg - Ice		15.70	9.09	776.50	-1402.89	-1.06
Wind 135 deg - Ice		12.82	12.86	1069.02	-1179.56	-9.83
Wind 150 deg - Ice		9.06	15.75	1293.47	-888.51	-17.92
Wind 180 deg - Ice		0.00	18.19	1482.68	-185.85	-29.98
Wind 210 deg - Ice		-9.06	15.75	1293.42	516.83	-34.00
Wind 225 deg - Ice		-12.82	12.86	1068.95	807.90	-32.57
Wind 240 deg - Ice		-15.70	9.09	776.41	1031.24	-28.91
Wind 270 deg - Ice		-18.13	-0.00	70.18	1219.55	-16.08
Wind 300 deg - Ice		-15.70	-9.09	-636.03	1031.29	1.06
Wind 315 deg - Ice		-12.82	-12.86	-928.55	807.97	9.83
Wind 330 deg - Ice		-9.06	-15.75	-1153.01	516.92	17.92
Total Weight	30.20			-9.61	-17.29	
Wind 0 deg - Service		-0.00	-10.46	-861.86	-6.73	12.09
Wind 30 deg - Service		5.20	-9.06	-749.15	-423.66	11.20
Wind 45 deg - Service		7.35	-7.40	-615.47	-596.36	9.59
Wind 60 deg - Service		9.01	-5.23	-441.27	-728.89	7.32
Wind 90 deg - Service		10.40	0.00	-20.72	-840.63	1.47
Wind 120 deg - Service		9.01	5.23	399.81	-728.94	-4.77
Wind 135 deg - Service		7.36	7.40	573.99	-596.44	-7.51
Wind 150 deg - Service		5.20	9.06	707.65	-423.76	-9.73
Wind 180 deg - Service		0.00	10.46	820.30	-6.84	-12.09
Wind 210 deg - Service		-5.20	9.06	707.59	410.08	-11.20
Wind 225 deg - Service		-7.35	7.40	573.92	582.78	-9.59
Wind 240 deg - Service		-9.01	5.23	399.71	715.31	-7.32
Wind 270 deg - Service		-10.40	-0.00	-20.83	827.05	-1.47
Wind 300 deg - Service		-9.01	-5.23	-441.37	715.36	4.77
Wind 315 deg - Service		-7.36	-7.40	-615.55	582.86	7.51
Wind 330 deg - Service		-5.20	-9.06	-749.20	410.18	9.73

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service

Comb. No.	Description
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	130 - 120	Leg	Max Tension	19	2.87	-0.02	0.12
			Max. Compression	35	-12.48	0.05	-0.01
			Max. Mx	28	2.23	-0.32	-0.16
			Max. My	10	-3.91	-0.00	0.49
			Max. Vy	18	-1.30	-0.02	0.12
			Max. Vx	10	2.06	0.00	-0.13
		Diagonal	Max Tension	14	4.05	0.00	0.00
			Max. Compression	14	-4.12	0.00	0.00
			Max. Mx	36	0.91	0.08	0.00
			Max. My	35	-0.08	0.00	-0.00
			Max. Vy	36	-0.05	0.00	0.00
			Max. Vx	35	-0.00	0.00	0.00
		Horizontal	Max Tension	28	2.96	0.00	0.00
			Max. Compression	12	-2.92	-0.01	-0.00
			Max. Mx	38	0.10	-0.05	-0.00
			Max. My	8	-1.29	-0.01	-0.01
			Max. Vy	38	-0.05	-0.05	-0.00
			Max. Vx	18	0.00	-0.01	-0.01
		Top Girt	Max Tension	18	0.66	-0.01	0.00
			Max. Compression	2	-0.65	-0.01	-0.00
			Max. Mx	38	-0.18	-0.05	-0.00
			Max. My	18	-0.37	-0.01	-0.00
			Max. Vy	38	-0.05	-0.05	-0.00
			Max. Vx	8	0.00	-0.01	-0.00
		Inner Bracing	Max Tension	2	0.01	0.00	0.00
			Max. Compression	2	-0.01	0.00	0.00
			Max. Mx	34	-0.00	-0.05	0.00
			Max. My	38	-0.00	0.00	0.00
			Max. Vy	34	0.05	0.00	0.00
			Max. Vx	38	-0.00	0.00	0.00
T2	120 - 100	Leg	Max Tension	9	19.31	-0.07	-0.04
			Max. Compression	2	-25.60	0.42	0.02
			Max. Mx	18	2.93	0.83	0.08
			Max. My	26	-4.41	-0.01	1.19
			Max. Vy	28	0.61	-0.07	-0.00
			Max. Vx	20	-0.96	0.01	0.13
		Diagonal	Max Tension	16	7.52	0.00	0.00
			Max. Compression	16	-7.65	0.00	0.00
			Max. Mx	39	1.74	0.15	0.00
			Max. My	35	0.06	0.00	-0.00
			Max. Vy	39	-0.07	0.00	0.00
			Max. Vx	35	0.00	0.00	0.00
		Horizontal	Max Tension	16	4.74	-0.02	0.00
			Max. Compression	14	-4.70	-0.02	-0.00
			Max. Mx	38	0.33	-0.10	-0.00
			Max. My	18	-1.14	-0.03	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	38	-0.08	-0.10	-0.00
			Max. Vx	18	0.00	-0.03	-0.01
		Top Girt	Max Tension	31	3.22	-0.01	0.00
			Max. Compression	14	-3.44	-0.02	-0.00
			Max. Mx	38	-0.12	-0.08	-0.00
			Max. My	18	-0.78	-0.02	-0.01
			Max. Vy	38	-0.07	-0.08	-0.00
			Max. Vx	18	0.00	-0.02	-0.01
		Inner Bracing	Max Tension	14	0.06	0.00	0.00
			Max. Compression	14	-0.06	0.00	0.00
			Max. Mx	34	-0.01	-0.07	0.00
			Max. My	38	-0.01	0.00	0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	38	-0.00	0.00	0.00
T3	100 - 80	Leg	Max Tension	9	45.30	-0.26	-0.15
			Max. Compression	2	-55.01	0.69	-0.12
			Max. Mx	18	23.46	1.01	0.02
			Max. My	26	-5.81	-0.03	1.53
			Max. Vy	8	-0.83	-0.26	-0.15
			Max. Vx	16	-1.32	-0.01	-0.37
		Diagonal	Max Tension	16	10.48	0.00	0.00
			Max. Compression	16	-10.63	0.00	0.00
			Max. Mx	39	2.72	0.19	0.00
			Max. My	37	-0.83	0.00	-0.00
			Max. Vy	39	0.08	0.00	0.00
			Max. Vx	37	-0.00	0.00	0.00
		Horizontal	Max Tension	30	7.41	0.00	0.00
			Max. Compression	14	-7.47	-0.03	-0.00
			Max. Mx	38	0.54	-0.12	-0.01
			Max. My	18	-1.02	-0.04	-0.02
			Max. Vy	38	-0.09	-0.12	-0.01
			Max. Vx	18	0.00	-0.04	-0.02
		Top Girt	Max Tension	16	5.31	-0.02	0.00
			Max. Compression	14	-5.29	-0.02	-0.00
			Max. Mx	38	0.02	-0.10	-0.00
			Max. My	18	-0.98	-0.03	-0.01
			Max. Vy	38	-0.08	-0.10	-0.00
			Max. Vx	18	0.00	-0.03	-0.01
		Inner Bracing	Max Tension	14	0.09	0.00	0.00
			Max. Compression	14	-0.09	0.00	0.00
			Max. Mx	34	-0.01	-0.09	0.00
			Max. My	38	-0.01	0.00	0.00
			Max. Vy	34	-0.06	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
T4	80 - 60	Leg	Max Tension	9	72.94	-0.87	0.20
			Max. Compression	2	-85.89	0.42	-0.08
			Max. Mx	18	52.07	-0.91	0.05
			Max. My	26	-8.17	-0.05	1.39
			Max. Vy	18	0.71	-0.91	0.05
			Max. Vx	4	-1.07	-0.02	-0.76
		Diagonal	Max Tension	16	15.46	0.00	0.00
			Max. Compression	16	-15.68	0.00	0.00
			Max. Mx	39	4.27	0.32	0.00
			Max. My	38	-0.07	0.00	-0.00
			Max. Vy	39	-0.10	0.00	0.00
			Max. Vx	38	-0.00	0.00	0.00
		Horizontal	Max Tension	16	9.26	-0.03	0.00
			Max. Compression	14	-9.40	-0.04	-0.00
			Max. Mx	38	0.87	-0.16	-0.01
			Max. My	18	-1.75	-0.06	-0.02
			Max. Vy	38	-0.10	-0.16	-0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	18	0.00	-0.06	-0.02
		Top Girt	Max Tension	31	7.79	-0.01	0.00
			Max. Compression	14	-7.92	-0.03	-0.00
			Max. Mx	38	-0.07	-0.14	-0.01
			Max. My	18	-0.81	-0.05	-0.02
			Max. Vy	38	-0.09	-0.14	-0.01
			Max. Vx	18	0.00	-0.05	-0.02
		Inner Bracing	Max Tension	14	0.14	0.00	0.00
			Max. Compression	14	-0.14	0.00	0.00
			Max. Mx	34	-0.01	-0.12	0.00
			Max. My	40	-0.01	0.00	-0.00
			Max. Vy	34	-0.07	0.00	0.00
			Max. Vx	38	-0.00	0.00	0.00
T5	60 - 40	Leg	Max Tension	9	107.08	-0.61	-0.17
			Max. Compression	2	-122.30	0.59	-0.16
			Max. Mx	28	88.22	-0.65	-0.09
			Max. My	6	-36.82	0.11	-0.89
			Max. Vy	48	-0.23	-0.30	0.08
			Max. Vx	20	0.41	-0.02	0.64
		Diagonal	Max Tension	16	14.17	0.00	0.00
			Max. Compression	16	-14.42	0.00	0.00
			Max. Mx	39	4.19	0.42	0.00
			Max. My	38	-0.99	0.00	-0.00
			Max. Vy	39	-0.13	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
		Horizontal	Max Tension	16	9.32	-0.04	0.00
			Max. Compression	16	-9.34	-0.04	0.00
			Max. Mx	38	1.21	-0.19	-0.01
			Max. My	18	-1.59	-0.06	-0.01
			Max. Vy	38	-0.11	-0.19	-0.01
			Max. Vx	18	0.00	-0.06	-0.01
		Top Girt	Max Tension	16	8.93	-0.03	0.00
			Max. Compression	16	-9.02	-0.03	0.00
			Max. Mx	38	-0.81	-0.16	-0.01
			Max. My	18	-1.67	-0.05	-0.02
			Max. Vy	38	-0.10	-0.16	-0.01
			Max. Vx	18	0.00	-0.05	-0.02
		Inner Bracing	Max Tension	16	0.16	0.00	0.00
			Max. Compression	16	-0.16	0.00	0.00
			Max. Mx	34	-0.02	-0.19	0.00
			Max. My	40	-0.01	0.00	-0.00
			Max. Vy	34	0.09	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
T6	40 - 20	Leg	Max Tension	9	137.22	-0.60	-0.15
			Max. Compression	2	-155.11	0.42	-0.10
			Max. Mx	28	118.98	-0.63	0.14
			Max. My	6	-41.39	0.11	-0.89
			Max. Vy	48	-0.12	-0.39	0.09
			Max. Vx	4	-0.22	-0.02	-0.75
		Diagonal	Max Tension	17	14.01	0.00	0.00
			Max. Compression	16	-14.33	0.00	0.00
			Max. Mx	39	4.41	0.48	0.00
			Max. My	38	-1.60	0.00	-0.00
			Max. Vy	39	-0.14	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
		Horizontal	Max Tension	16	9.82	-0.08	-0.00
			Max. Compression	17	-9.82	-0.06	-0.00
			Max. Mx	38	1.41	-0.29	-0.01
			Max. My	18	-1.68	-0.12	-0.02
			Max. Vy	38	-0.14	-0.29	-0.01
			Max. Vx	18	0.00	-0.12	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	16	9.66	-0.07	-0.00
			Max. Compression	17	-9.67	-0.05	-0.00
			Max. Mx	38	-0.73	-0.26	-0.01
			Max. My	18	-1.59	-0.11	-0.02
			Max. Vy	38	-0.13	-0.26	-0.01
			Max. Vx	18	0.00	-0.11	-0.02
		Inner Bracing	Max Tension	17	0.17	0.00	0.00
			Max. Compression	17	-0.17	0.00	0.00
			Max. Mx	34	-0.02	-0.27	0.00
			Max. My	38	0.05	0.00	0.00
			Max. Vy	34	0.12	0.00	0.00
			Max. Vx	38	-0.00	0.00	0.00
T7	20 - 0	Leg	Max Tension	9	164.90	-0.76	-0.09
			Max. Compression	2	-185.89	0.00	-0.00
			Max. Mx	35	-104.39	0.78	-0.00
			Max. My	4	-10.63	-0.04	-0.81
			Max. Vy	28	-0.16	-0.77	0.01
			Max. Vx	4	-0.21	-0.04	-0.81
		Diagonal	Max Tension	17	13.46	0.00	0.00
			Max. Compression	16	-13.86	0.00	0.00
			Max. Mx	50	5.19	0.52	0.00
			Max. My	38	-1.93	0.00	-0.00
			Max. Vy	50	0.14	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00
		Horizontal	Max Tension	16	10.00	-0.10	-0.00
			Max. Compression	17	-9.94	-0.08	-0.00
			Max. Mx	38	1.63	-0.29	-0.01
			Max. My	18	-1.72	-0.13	-0.02
			Max. Vy	38	-0.14	-0.29	-0.01
			Max. Vx	18	0.00	-0.13	-0.02
		Top Girt	Max Tension	16	9.93	-0.09	-0.00
			Max. Compression	17	-9.89	-0.07	-0.00
			Max. Mx	38	-0.92	-0.29	-0.01
			Max. My	18	-1.70	-0.12	-0.02
			Max. Vy	38	-0.13	-0.29	-0.01
			Max. Vx	18	0.00	-0.12	-0.02
		Inner Bracing	Max Tension	17	0.17	0.00	0.00
			Max. Compression	17	-0.17	0.00	0.00
			Max. Mx	34	-0.02	-0.37	0.00
			Max. My	38	0.05	0.00	0.00
			Max. Vy	34	-0.14	0.00	0.00
			Max. Vx	38	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	196.40	23.97	-12.91
	Max. H_x	24	196.40	23.97	-12.91
	Max. H_z	7	-171.16	-21.23	12.37
	Min. Vert	9	-177.30	-22.46	12.01
	Min. H_x	9	-177.30	-22.46	12.01
	Min. H_z	22	190.26	22.78	-13.25
Leg B	Max. Vert	12	198.26	-23.32	-14.11
	Max. H_x	29	-175.94	21.75	13.19
	Max. H_z	31	-169.80	20.24	14.06

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. Vert	29	-175.94	21.75	13.19
	Min. H_x	12	198.26	-23.32	-14.11
	Min. H_z	14	192.13	-21.84	-14.93
	Max. Vert	2	199.45	1.37	27.37
	Max. H_x	28	106.08	4.41	14.28
	Max. H_z	2	199.45	1.37	27.37
	Min. Vert	19	-177.18	-1.38	-25.56
	Min. H_x	13	-83.85	-4.47	-12.34
	Min. H_z	19	-177.18	-1.38	-25.56

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	30.20	0.00	0.00	-9.64	-17.30	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	36.24	-0.00	-46.26	-3657.88	-20.57	53.49
0.9 Dead+1.6 Wind 0 deg - No Ice	27.18	-0.00	-46.26	-3653.15	-15.37	53.47
1.2 Dead+1.6 Wind 30 deg - No Ice	36.24	22.99	-40.06	-3169.22	-1827.68	49.51
0.9 Dead+1.6 Wind 30 deg - No Ice	27.18	22.99	-40.06	-3164.74	-1821.58	49.51
1.2 Dead+1.6 Wind 45 deg - No Ice	36.24	32.51	-32.71	-2589.71	-2576.23	42.34
0.9 Dead+1.6 Wind 45 deg - No Ice	27.18	32.51	-32.71	-2585.52	-2569.76	42.35
1.2 Dead+1.6 Wind 60 deg - No Ice	36.24	39.82	-23.13	-1834.52	-3150.63	32.27
0.9 Dead+1.6 Wind 60 deg - No Ice	27.18	39.82	-23.13	-1830.69	-3143.88	32.29
1.2 Dead+1.6 Wind 90 deg - No Ice	36.24	45.98	0.00	-11.38	-3634.97	6.38
0.9 Dead+1.6 Wind 90 deg - No Ice	27.18	45.98	0.00	-8.46	-3627.97	6.41
1.2 Dead+1.6 Wind 120 deg - No Ice	36.24	39.83	23.13	1811.70	-3150.92	-21.22
0.9 Dead+1.6 Wind 120 deg - No Ice	27.18	39.83	23.13	1813.71	-3144.15	-21.19
1.2 Dead+1.6 Wind 135 deg - No Ice	36.24	32.52	32.71	2566.83	-2576.63	-33.31
0.9 Dead+1.6 Wind 135 deg - No Ice	27.18	32.52	32.71	2568.46	-2570.15	-33.28
1.2 Dead+1.6 Wind 150 deg - No Ice	36.24	23.00	40.06	3146.24	-1828.16	-43.13
0.9 Dead+1.6 Wind 150 deg - No Ice	27.18	23.00	40.06	3147.59	-1822.05	-43.10
1.2 Dead+1.6 Wind 180 deg - No Ice	36.24	0.00	46.26	3634.65	-21.12	-53.49
0.9 Dead+1.6 Wind 180 deg - No Ice	27.18	0.00	46.26	3635.76	-15.90	-53.47
1.2 Dead+1.6 Wind 210 deg - No Ice	36.24	-22.99	40.06	3146.04	1786.03	-49.52
0.9 Dead+1.6 Wind 210 deg - No Ice	27.18	-22.99	40.06	3147.39	1790.34	-49.52
1.2 Dead+1.6 Wind 225 deg -	36.24	-32.51	32.71	2566.53	2534.61	-42.34

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+1.6 Wind 225 deg - No Ice	27.18	-32.51	32.71	2568.17	2538.55	-42.35
1.2 Dead+1.6 Wind 240 deg - No Ice	36.24	-39.82	23.13	1811.31	3109.04	-32.28
0.9 Dead+1.6 Wind 240 deg - No Ice	27.18	-39.82	23.13	1813.33	3112.70	-32.30
1.2 Dead+1.6 Wind 270 deg - No Ice	36.24	-45.98	-0.00	-11.88	3593.40	-6.38
0.9 Dead+1.6 Wind 270 deg - No Ice	27.18	-45.98	-0.00	-8.96	3596.81	-6.41
1.2 Dead+1.6 Wind 300 deg - No Ice	36.24	-39.83	-23.13	-1835.00	3109.31	21.22
0.9 Dead+1.6 Wind 300 deg - No Ice	27.18	-39.83	-23.13	-1831.17	3112.95	21.19
1.2 Dead+1.6 Wind 315 deg - No Ice	36.24	-32.52	-32.71	-2590.12	2534.99	33.31
0.9 Dead+1.6 Wind 315 deg - No Ice	27.18	-32.52	-32.71	-2585.92	2538.91	33.28
1.2 Dead+1.6 Wind 330 deg - No Ice	36.24	-23.00	-40.06	-3169.52	1786.50	43.13
0.9 Dead+1.6 Wind 330 deg - No Ice	27.18	-23.00	-40.06	-3165.04	1790.79	43.10
1.2 Dead+1.0 Ice+1.0 Temp	156.94	0.00	0.00	68.12	-190.79	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	156.94	-0.00	-18.19	-1317.38	-190.87	30.18
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	156.94	9.06	-15.75	-1131.73	-880.02	34.16
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	156.94	12.82	-12.86	-911.54	-1165.48	32.70
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	156.94	15.70	-9.09	-624.58	-1384.52	29.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	156.94	18.13	0.00	68.19	-1569.20	16.06
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	156.94	15.70	9.09	760.95	-1384.57	-1.18
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	156.94	12.82	12.86	1047.90	-1165.55	-9.98
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	156.94	9.06	15.75	1268.08	-880.10	-18.10
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	156.94	0.00	18.19	1453.69	-190.97	-30.18
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	156.94	-9.06	15.75	1268.06	498.18	-34.16
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	156.94	-12.82	12.86	1047.87	783.64	-32.69
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	156.94	-15.70	9.09	760.91	1002.69	-29.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	156.94	-18.13	-0.00	68.14	1187.38	-16.06
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	156.94	-15.70	-9.09	-624.63	1002.75	1.18
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	156.94	-12.82	-12.86	-911.58	783.72	9.98
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	156.94	-9.06	-15.75	-1131.77	498.27	18.10
Dead+Wind 0 deg - Service	30.20	-0.00	-10.46	-834.24	-17.26	12.10
Dead+Wind 30 deg - Service	30.20	5.20	-9.06	-723.71	-425.93	11.20
Dead+Wind 45 deg - Service	30.20	7.35	-7.40	-592.65	-595.18	9.58
Dead+Wind 60 deg - Service	30.20	9.01	-5.23	-421.90	-725.10	7.30
Dead+Wind 90 deg - Service	30.20	10.40	0.00	-9.61	-834.63	1.45

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
Dead+Wind 120 deg - Service	30.20	9.01	5.23	402.66	-725.16	-4.80
Dead+Wind 135 deg - Service	30.20	7.36	7.40	573.43	-595.29	-7.53
Dead+Wind 150 deg - Service	30.20	5.20	9.06	704.45	-426.02	-9.75
Dead+Wind 180 deg - Service	30.20	0.00	10.46	814.87	-17.38	-12.10
Dead+Wind 210 deg - Service	30.20	-5.20	9.06	704.40	391.28	-11.20
Dead+Wind 225 deg - Service	30.20	-7.35	7.40	573.35	560.57	-9.58
Dead+Wind 240 deg - Service	30.20	-9.01	5.23	402.57	690.47	-7.30
Dead+Wind 270 deg - Service	30.20	-10.40	-0.00	-9.73	799.99	-1.45
Dead+Wind 300 deg - Service	30.20	-9.01	-5.23	-422.00	690.53	4.79
Dead+Wind 315 deg - Service	30.20	-7.36	-7.40	-592.77	560.65	7.53
Dead+Wind 330 deg - Service	30.20	-5.20	-9.06	-723.78	391.39	9.75

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-30.20	0.00	0.00	30.20	0.00	0.000%
2	-0.00	-36.24	-46.26	0.00	36.24	46.26	0.000%
3	-0.00	-27.18	-46.26	0.00	27.18	46.26	0.000%
4	22.99	-36.24	-40.06	-22.99	36.24	40.06	0.000%
5	22.99	-27.18	-40.06	-22.99	27.18	40.06	0.000%
6	32.51	-36.24	-32.71	-32.51	36.24	32.71	0.000%
7	32.51	-27.18	-32.71	-32.51	27.18	32.71	0.000%
8	39.82	-36.24	-23.13	-39.82	36.24	23.13	0.000%
9	39.82	-27.18	-23.13	-39.82	27.18	23.13	0.000%
10	45.98	-36.24	0.00	-45.98	36.24	-0.00	0.000%
11	45.98	-27.18	0.00	-45.98	27.18	-0.00	0.000%
12	39.83	-36.24	23.13	-39.83	36.24	-23.13	0.000%
13	39.83	-27.18	23.13	-39.83	27.18	-23.13	0.000%
14	32.52	-36.24	32.71	-32.52	36.24	-32.71	0.000%
15	32.52	-27.18	32.71	-32.52	27.18	-32.71	0.000%
16	23.00	-36.24	40.06	-23.00	36.24	-40.06	0.000%
17	23.00	-27.18	40.06	-23.00	27.18	-40.06	0.000%
18	0.00	-36.24	46.26	-0.00	36.24	-46.26	0.000%
19	0.00	-27.18	46.26	-0.00	27.18	-46.26	0.000%
20	-22.99	-36.24	40.06	22.99	36.24	-40.06	0.000%
21	-22.99	-27.18	40.06	22.99	27.18	-40.06	0.000%
22	-32.51	-36.24	32.71	32.51	36.24	-32.71	0.000%
23	-32.51	-27.18	32.71	32.51	27.18	-32.71	0.000%
24	-39.82	-36.24	23.13	39.82	36.24	-23.13	0.000%
25	-39.82	-27.18	23.13	39.82	27.18	-23.13	0.000%
26	-45.98	-36.24	-0.00	45.98	36.24	0.00	0.000%
27	-45.98	-27.18	-0.00	45.98	27.18	0.00	0.000%
28	-39.83	-36.24	-23.13	39.83	36.24	23.13	0.000%
29	-39.83	-27.18	-23.13	39.83	27.18	23.13	0.000%
30	-32.52	-36.24	-32.71	32.52	36.24	32.71	0.000%
31	-32.52	-27.18	-32.71	32.52	27.18	32.71	0.000%
32	-23.00	-36.24	-40.06	23.00	36.24	40.06	0.000%
33	-23.00	-27.18	-40.06	23.00	27.18	40.06	0.000%
34	0.00	-156.94	0.00	0.00	156.94	0.00	0.000%
35	-0.00	-156.94	-18.19	0.00	156.94	18.19	0.000%
36	9.06	-156.94	-15.75	-9.06	156.94	15.75	0.000%
37	12.82	-156.94	-12.86	-12.82	156.94	12.86	0.000%
38	15.70	-156.94	-9.09	-15.70	156.94	9.09	0.000%
39	18.13	-156.94	0.00	-18.13	156.94	-0.00	0.000%
40	15.70	-156.94	9.09	-15.70	156.94	-9.09	0.000%
41	12.82	-156.94	12.86	-12.82	156.94	-12.86	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
42	9.06	-156.94	15.75	-9.06	156.94	-15.75	0.000%
43	0.00	-156.94	18.19	-0.00	156.94	-18.19	0.000%
44	-9.06	-156.94	15.75	9.06	156.94	-15.75	0.000%
45	-12.82	-156.94	12.86	12.82	156.94	-12.86	0.000%
46	-15.70	-156.94	9.09	15.70	156.94	-9.09	0.000%
47	-18.13	-156.94	-0.00	18.13	156.94	0.00	0.000%
48	-15.70	-156.94	-9.09	15.70	156.94	9.09	0.000%
49	-12.82	-156.94	-12.86	12.82	156.94	12.86	0.000%
50	-9.06	-156.94	-15.75	9.06	156.94	15.75	0.000%
51	-0.00	-30.20	-10.46	0.00	30.20	10.46	0.000%
52	5.20	-30.20	-9.06	-5.20	30.20	9.06	0.000%
53	7.35	-30.20	-7.40	-7.35	30.20	7.40	0.000%
54	9.01	-30.20	-5.23	-9.01	30.20	5.23	0.000%
55	10.40	-30.20	0.00	-10.40	30.20	-0.00	0.000%
56	9.01	-30.20	5.23	-9.01	30.20	-5.23	0.000%
57	7.36	-30.20	7.40	-7.36	30.20	-7.40	0.000%
58	5.20	-30.20	9.06	-5.20	30.20	-9.06	0.000%
59	0.00	-30.20	10.46	-0.00	30.20	-10.46	0.000%
60	-5.20	-30.20	9.06	5.20	30.20	-9.06	0.000%
61	-7.35	-30.20	7.40	7.35	30.20	-7.40	0.000%
62	-9.01	-30.20	5.23	9.01	30.20	-5.23	0.000%
63	-10.40	-30.20	-0.00	10.40	30.20	0.00	0.000%
64	-9.01	-30.20	-5.23	9.01	30.20	5.23	0.000%
65	-7.36	-30.20	-7.40	7.36	30.20	7.40	0.000%
66	-5.20	-30.20	-9.06	5.20	30.20	9.06	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001

27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
T1	130 - 120	1.541	51	0.1051	0.0344
T2	120 - 100	1.322	52	0.1015	0.0317
T3	100 - 80	0.923	52	0.0862	0.0240
T4	80 - 60	0.587	52	0.0677	0.0174
T5	60 - 40	0.333	52	0.0483	0.0122
T6	40 - 20	0.152	52	0.0315	0.0078
T7	20 - 0	0.045	59	0.0144	0.0038

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131.00	PD458-1	51	1.541	0.1051	0.0344	151730
130.00	Lightning Rod	51	1.541	0.1051	0.0344	151730
127.00	DS2C03F36D-D	52	1.475	0.1042	0.0336	151730
125.00	APXVAALL24-43	52	1.431	0.1036	0.0331	151730
117.00	PA6-59	52	1.258	0.0999	0.0307	77554
115.00	1142-2B	52	1.217	0.0986	0.0299	77964
113.00	1142-2B	52	1.176	0.0972	0.0292	78837
107.00	6 FT DISH	52	1.056	0.0924	0.0268	81576
105.00	AP11-850/105N	52	1.018	0.0907	0.0260	82532
104.00	AP11-850/105N	52	0.998	0.0898	0.0256	82997
98.00	ROHN 4-ft Side Arm	52	0.887	0.0844	0.0233	79162
96.00	8 FT DISH	52	0.850	0.0825	0.0225	74969
87.00	PAD6-59BC	52	0.696	0.0743	0.0194	59251
86.00	PAD8-59AW	52	0.680	0.0733	0.0191	57901
84.00	2' Yagi	52	0.648	0.0715	0.0186	55391
75.00	Valmont T-Arm (1)	52	0.516	0.0628	0.0161	54951
71.00	4 FT DISH	52	0.463	0.0588	0.0150	58649
70.00	TTA 12"x6"x4"	52	0.450	0.0578	0.0147	59653
65.00	Diamond X-500A	52	0.389	0.0530	0.0134	65166
58.00	DB212-1	52	0.312	0.0465	0.0118	70031
54.00	DB212-1	52	0.271	0.0431	0.0110	68725
46.00	DB230-2B	52	0.199	0.0365	0.0092	65718
43.00	ROHN 4-ft Side Arm	52	0.175	0.0340	0.0085	64677
42.00	Wind speed cups	52	0.167	0.0332	0.0083	64379

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	6.504	2	0.4155	0.1520
T2	120 - 100	5.624	2	0.4071	0.1401
T3	100 - 80	3.970	2	0.3584	0.1064
T4	80 - 60	2.546	2	0.2864	0.0772
T5	60 - 40	1.454	2	0.2068	0.0537
T6	40 - 20	0.668	2	0.1359	0.0347
T7	20 - 0	0.199	18	0.0625	0.0170

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131.00	PD458-1	2	6.504	0.4155	0.1520	61935
130.00	Lightning Rod	2	6.504	0.4155	0.1520	61935
127.00	DS2C03F36D-D	2	6.238	0.4136	0.1487	61935
125.00	APXVAALL24-43	2	6.061	0.4122	0.1464	61935
117.00	PA6-59	2	5.365	0.4025	0.1357	31824
115.00	1142-2B	2	5.194	0.3988	0.1326	30194
113.00	1142-2B	2	5.025	0.3946	0.1293	28818
107.00	6 FT DISH	2	4.528	0.3795	0.1188	25350
105.00	AP11-850/105N	2	4.366	0.3738	0.1152	24372

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.00	AP11-850/105N	2	4.286	0.3708	0.1134	23908
98.00	ROHN 4-ft Side Arm	2	3.815	0.3519	0.1030	20645
96.00	8 FT DISH	2	3.663	0.3452	0.0997	19384
87.00	PAD6-59BC	2	3.010	0.3132	0.0859	15055
86.00	PAD8-59AW	2	2.941	0.3095	0.0847	14691
84.00	2' Yagi	2	2.805	0.3019	0.0821	14015
75.00	Valmont T-Arm (1)	2	2.241	0.2664	0.0711	13658
71.00	4 FT DISH	2	2.013	0.2502	0.0663	14406
70.00	TTA 12"x6"x4"	2	1.959	0.2461	0.0651	14605
65.00	Diamond X-500A	2	1.697	0.2261	0.0592	15694
58.00	DB212-1	2	1.362	0.1994	0.0521	16628
54.00	DB212-1	2	1.186	0.1850	0.0485	16224
46.00	DB230-2B	2	0.871	0.1571	0.0407	15357
43.00	ROHN 4-ft Side Arm	2	0.766	0.1466	0.0376	15058
42.00	Wind speed cups	2	0.732	0.1430	0.0366	14972

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	0.7500	4	1.04	29.82	0.035 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	1.37	12.43	0.111 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	1.48	12.43	0.119 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	0.33	12.43	0.027 ✓	1	Bolt Shear
T2	120	Leg	A325N	0.8750	4	4.83	40.59	0.119 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	2.55	12.43	0.205 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	2.37	12.43	0.191 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	1.72	12.43	0.138 ✓	1	Bolt Shear
T3	100	Leg	A325N	1.0000	4	11.32	53.01	0.214 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	3.54	12.43	0.285 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	3.74	12.43	0.301 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	2.65	12.43	0.214 ✓	1	Bolt Shear
T4	80	Leg	A325N	1.0000	4	18.25	53.01	0.344 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	5.23	12.43	0.421 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	4.70	12.43	0.378 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	3.96	12.43	0.319 ✓	1	Bolt Shear
T5	60	Leg	A325N	1.0000	6	17.85	53.01	0.337 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	4.81	12.43	0.387 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	4.67	12.43	0.376 ✓	1	Bolt Shear
		Top Girt	A325N	0.6250	2	4.51	12.43	0.363 ✓	1	Bolt Shear
T6	40	Leg	A325N	1.0000	6	22.87	53.01	0.431 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	3	4.78	12.43	0.384 ✓	1	Bolt Shear
		Horizontal	A325N	0.6250	2	4.91	12.43	0.395 ✓	1	Bolt Shear

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
T7	20	Top Girt	A325N	0.6250	2	4.84	12.43	0.389 ✔	1	Bolt Shear
		Leg	F1554-105	1.0000	8	20.61	55.22	0.373 ✔	1	Bolt Tension
		Diagonal	A325N	0.6250	3	4.62	12.43	0.372 ✔	1	Bolt Shear
		Horizontal	A325N	0.6250	2	5.00	12.43	0.403 ✔	1	Bolt Shear
		Top Girt	A325N	0.6250	2	4.97	12.43	0.400 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3 K=1.00	1.7040	-12.49	57.19	0.218 [1] ✔
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9 K=1.00	2.2285	-25.60	70.89	0.361 [1] ✔
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1 K=1.00	3.1741	-55.01	116.23	0.473 [1] ✔
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0 K=1.00	4.2999	-85.89	143.37	0.599 [1] ✔
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4 K=1.00	6.1120	-122.30	201.11	0.608 [1] ✔
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1 K=1.00	6.7133	-155.11	243.97	0.636 [1] ✔
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8 K=1.00	8.4049	-185.89	303.62	0.612 [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	6.58	6.39	97.4 K=1.00	1.0745	-4.12	24.15	0.171 [1] ✔
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0 K=1.00	1.7040	-7.65	34.23	0.223 [1] ✔
T3	100 - 80	ROHN 2.5 STD	9.21	8.94	113.2 K=1.00	1.7040	-10.63	30.03	0.354 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T4	80 - 60	ROHN 2.5 X-STR	12.49	12.10	157.2 K=1.00	2.2535	-15.68	20.60	0.761 [1] ✔
T5	60 - 40	ROHN 3 STD	13.31	12.96	133.6 K=1.00	2.2285	-14.33	28.20	0.508 [1] ✔
T6	40 - 20	ROHN 3 STD	14.16	13.77	142.0 K=1.00	2.2285	-14.10	24.96	0.565 [1] ✔
T7	20 - 0	ROHN 3 STD	15.07	14.70	151.6 K=1.00	2.2285	-13.60	21.90	0.621 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 1.5 STD	8.52	4.14	79.8 K=1.00	0.7995	-2.92	22.58	0.129 [1] ✔
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5 K=1.00	1.0745	-4.70	32.58	0.144 [1] ✔
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7 K=1.00	1.0745	-7.47	27.20	0.275 [1] ✔
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9 K=1.00	1.0745	-9.40	22.63	0.416 [1] ✔
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3 K=1.00	1.0745	-9.34	16.76	0.557 [1] ✔
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5 K=1.00	1.7040	-9.82	28.85	0.340 [1] ✔
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3 K=1.00	1.7040	-9.94	22.32	0.446 [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	8.50	4.13	79.6 K=1.00	0.7995	-0.65	22.63	0.029 [1] ✔
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3 K=1.00	1.0745	-3.44	36.08	0.095 [1] ✔
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8 K=1.00	1.0745	-5.29	30.72	0.172 [1] ✔
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0 K=1.00	1.0745	-7.92	25.34	0.312 [1] ✔
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5	1.0745	-9.02	19.81	0.455 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2 K=1.00	1.7040	-9.67	32.60	0.297 [1] ✔
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4 K=1.00	1.7040	-9.89	25.27	0.392 [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	4.25	4.25	128.3 K=1.00	0.4844	-0.01	6.56	0.002 [1] ✔
T2	120 - 100	L2x2x1/8	4.27	4.27	128.9 K=1.00	0.4844	-0.06	6.51	0.009 [1] ✔
T3	100 - 80	L2x2x1/8	5.31	5.31	160.4 K=1.00	0.4844	-0.09	4.26	0.022 [1] ✔
T4	80 - 60	L2x2x1/8	6.35	6.35	191.8 K=1.00	0.4844	-0.14	2.97	0.046 [1] ✔
T5	60 - 40	L2 1/2x2 1/2x3/16	7.48	7.48	181.3 K=1.00	0.9020	-0.16	6.20	0.025 [1] ✔
T6	40 - 20	L3x3x3/16	8.77	8.77	176.6 K=1.00	1.0900	-0.17	7.90	0.021 [1] ✔
T7	20 - 0	L3 1/2x3 1/2x1/4	10.02	10.02	173.3 K=1.00	1.6900	-0.17	12.72	0.013 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3	1.7040	2.77	76.68	0.036 [1] ✔
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9	2.2285	19.31	100.28	0.193 [1] ✔
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1	3.1741	45.30	142.83	0.317 [1] ✔
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0	4.2999	72.99	193.49	0.377 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4	6.1120	107.08	275.04	0.389 [1] ✔
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1	6.7133	137.22	302.10	0.454 [1] ✔
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8	8.4049	164.90	378.22	0.436 [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	6.58	6.39	97.4	1.0745	4.05	48.35	0.084 [1] ✔
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0	1.7040	7.52	76.68	0.098 [1] ✔
T3	100 - 80	ROHN 2.5 STD	9.21	8.94	113.2	1.7040	10.48	76.68	0.137 [1] ✔
T4	80 - 60	ROHN 2.5 X-STR	12.49	12.10	157.2	2.2535	15.46	101.41	0.152 [1] ✔
T5	60 - 40	ROHN 3 STD	12.89	12.54	129.3	2.2285	14.17	100.28	0.141 [1] ✔
T6	40 - 20	ROHN 3 STD	13.73	13.34	137.5	2.2285	14.01	100.28	0.140 [1] ✔
T7	20 - 0	ROHN 3 STD	14.61	14.24	146.9	2.2285	13.46	100.28	0.134 [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	8.52	4.14	79.8	0.7995	2.96	35.98	0.082 [1] ✔
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5	1.0745	4.74	48.35	0.098 [1] ✔
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7	1.0745	7.41	48.35	0.153 [1] ✔
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9	1.0745	9.26	48.35	0.192 [1] ✔
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3	1.0745	9.32	48.35	0.193 [1] ✔
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5	1.7040	9.82	76.68	0.128 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3	1.7040	10.00	76.68	0.130 [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	8.50	4.13	79.6	0.7995	0.66	35.98	0.018 [1]
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3	1.0745	3.22	48.35	0.067 [1]
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8	1.0745	5.31	48.35	0.110 [1]
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0	1.0745	7.79	48.35	0.161 [1]
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5	1.0745	8.93	48.35	0.185 [1]
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2	1.7040	9.66	76.68	0.126 [1]
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4	1.7040	9.93	76.68	0.130 [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	4.25	4.25	81.4	0.4844	0.01	15.69	0.001 [1]
T2	120 - 100	L2x2x1/8	4.27	4.27	81.8	0.4844	0.06	15.69	0.004 [1]
T3	100 - 80	L2x2x1/8	5.31	5.31	101.8	0.4844	0.09	15.69	0.006 [1]
T4	80 - 60	L2x2x1/8	6.35	6.35	121.8	0.4844	0.14	15.69	0.009 [1]
T5	60 - 40	L2 1/2x2 1/2x3/16	7.48	7.48	115.4	0.9020	0.16	29.22	0.005 [1]
T6	40 - 20	L3x3x3/16	8.77	8.77	112.1	1.0900	0.17	35.32	0.005 [1]
T7	20 - 0	L3 1/2x3 1/2x1/4	10.02	10.02	110.3	1.6900	0.17	54.76	0.003 [1]

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

[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	3	-12.49	57.19	21.8	Pass
T2	120 - 100	Leg	ROHN 3 STD	30	-25.60	70.89	36.1	Pass
T3	100 - 80	Leg	ROHN 4 STD	69	-55.01	116.23	47.3	Pass
T4	80 - 60	Leg	ROHN 5 STD	108	-85.89	143.37	59.9	Pass
T5	60 - 40	Leg	ROHN 5 EH	135	-122.30	201.11	60.8	Pass
T6	40 - 20	Leg	ROHN 6 EHS	162	-155.11	243.97	63.6	Pass
T7	20 - 0	Leg	ROHN 6 EH	189	-185.89	303.62	61.2	Pass
T1	130 - 120	Diagonal	ROHN 2 STD	11	-4.12	24.15	17.1	Pass
T2	120 - 100	Diagonal	ROHN 2.5 STD	38	-7.65	34.23	22.3	Pass
T3	100 - 80	Diagonal	ROHN 2.5 STD	77	-10.63	30.03	35.4	Pass
T4	80 - 60	Diagonal	ROHN 2.5 X-STR	116	-15.68	20.60	76.1	Pass
T5	60 - 40	Diagonal	ROHN 3 STD	143	-14.33	28.20	50.8	Pass
T6	40 - 20	Diagonal	ROHN 3 STD	170	-14.10	24.96	56.5	Pass
T7	20 - 0	Diagonal	ROHN 3 STD	197	-13.60	21.90	62.1	Pass
T1	130 - 120	Horizontal	ROHN 1.5 STD	10	-2.92	22.58	12.9	Pass
T2	120 - 100	Horizontal	ROHN 2 STD	37	-4.70	32.58	14.4 19.1 (b)	Pass
T3	100 - 80	Horizontal	ROHN 2 STD	76	-7.47	27.20	27.5 30.1 (b)	Pass
T4	80 - 60	Horizontal	ROHN 2 STD	115	-9.40	22.63	41.6	Pass
T5	60 - 40	Horizontal	ROHN 2 STD	142	-9.34	16.76	55.7	Pass
T6	40 - 20	Horizontal	ROHN 2.5 STD	169	-9.82	28.85	34.0 39.5 (b)	Pass
T7	20 - 0	Horizontal	ROHN 2.5 STD	196	-9.94	22.32	44.6	Pass
T1	130 - 120	Top Girt	ROHN 1.5 STD	5	-0.65	22.63	2.9	Pass
T2	120 - 100	Top Girt	ROHN 2 STD	32	-3.44	36.08	9.5 13.8 (b)	Pass
T3	100 - 80	Top Girt	ROHN 2 STD	71	-5.29	30.72	17.2 21.4 (b)	Pass
T4	80 - 60	Top Girt	ROHN 2 STD	110	-7.92	25.34	31.2 31.9 (b)	Pass
T5	60 - 40	Top Girt	ROHN 2 STD	137	-9.02	19.81	45.5	Pass
T6	40 - 20	Top Girt	ROHN 2.5 STD	164	-9.67	32.60	29.7 38.9 (b)	Pass
T7	20 - 0	Top Girt	ROHN 2.5 STD	191	-9.89	25.27	39.2 40.0 (b)	Pass
T1	130 - 120	Inner Bracing	L2x2x1/8	16	-0.00	6.54	1.0	Pass
T2	120 - 100	Inner Bracing	L2x2x1/8	43	-0.01	4.87	1.1	Pass
T3	100 - 80	Inner Bracing	L2x2x1/8	103	-0.09	4.26	2.2	Pass
T4	80 - 60	Inner Bracing	L2x2x1/8	131	-0.14	2.97	4.6	Pass
T5	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	158	-0.16	6.20	2.5	Pass
T6	40 - 20	Inner Bracing	L3x3x3/16	184	-0.17	7.90	2.1	Pass
T7	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	211	-0.17	12.72	1.3	Pass
							Summary	
						Leg (T6)	63.6	Pass
						Diagonal (T4)	76.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
						Horizontal (T5)	55.7	Pass
						Top Girt (T5)	45.5	Pass
						Inner Bracing (T4)	4.6	Pass
						Bolt Checks	43.1	Pass
						RATING =	**76.1**	**Pass**

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: FOUNDATION ANALYSIS

Location: 300-ft Lattice Tower
Bristol, CT

Rev. 1: 3/2/21

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 19066.15

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 3658 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 46 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 36 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 199 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 177 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 130 \cdot ft$	(User Input)	
Tower Width =	$W_t := 22.5 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 3.5 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4.0 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 31.0 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 34 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_u := 12000 \cdot psf$		
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.537$

Load Factor = $LF := 1 = 1$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if\left(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if\left(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = -0.177 \cdot ksf$

$P_{top} := if\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 0 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.238 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0.619 \cdot ksf$

$T_p := if\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 3.5$

$A_p := W_f \cdot T_p = 108.5$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 67.161 \cdot kip$

Weight of Concrete Pad = $WT_{pad} := \left(W_f^2 \cdot T_f\right) \cdot \gamma_c = 576.6 \cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} = 577 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{3}$

$X_t := if\left(Pos_t, X_{t1}, X_{t2}\right) = 5.757$

$X_{off} := \frac{W_f}{2} - \left[\frac{\left(W_t \cdot \cos(30 \cdot deg)\right)}{3} + X_t\right] = 3.248$

Resisting Moment = $M_r := \left(0.9 \cdot WT_c + 0.75 \cdot WT_t\right) \cdot \frac{W_f}{2} + 0.75 \cdot S_u \cdot \frac{T_f}{3} = 8529 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot T_f = 3842 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.22$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning\_Moment\_Check := if\left(FS \geq FS_{req}, "Okay", "No Good"\right)$

$OverTurning\_Moment\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_t = 613 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 961$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 4965.17 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.411 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < 0.75 \cdot q_u, "Okay", "No\ Good"\right)$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.136 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < 0.75 \cdot q_u\right), "Okay", "No\ Good"\right]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.423$

Distance to Kern = $X_k := \frac{W_f}{6} = 5.167$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 6.272$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.428 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 1.428 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < 0.75 \cdot q_u, "Okay", "No\ Good"\right)$

Pressure_Check = "Okay"

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Section 1 - Site Information

Site ID: CT11270C
Status: Draft
Version: 7
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 2/12/2021 5:20:11 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

Site Name: CL&P Bristol
Site Class: Self Support Tower
Site Type: Structure Non Building
Plan Year: 2021
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.64880000
Longitude: -72.94740000
Address: 2 Willis St
City, State: Bristol, CT
Region: NORTHEAST

RAN Template: 67D5A997DB 6160 (GSM only)		**AL Template:** 67D5997DB_2xAIR+1OP (GSM only)		
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 6

Section 2 - Existing Template Images

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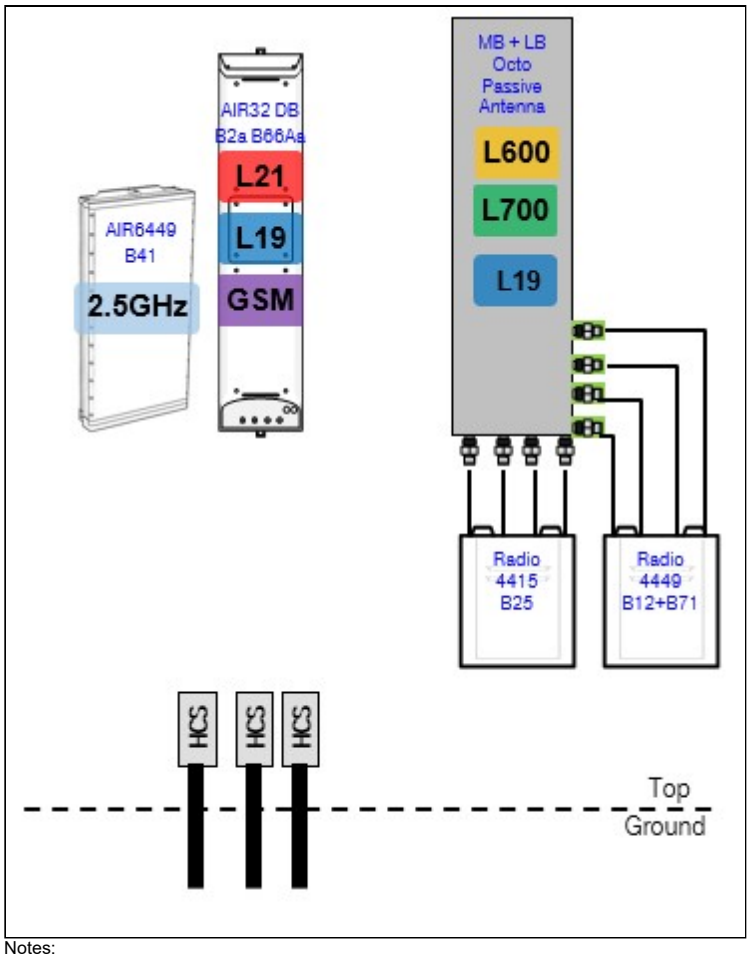
Section 3 - Proposed Template Images

67D5A997DB_2xAIR+1xOP.jpg



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 792DB Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	RBS 6102
Baseband	DUW30 (U2100); DUW30; DUG20 (G1900); BB 6630 (L700, L2100, L1900)	
Hybrid Cable System	Ericsson 9x18 HCS *Select Length*; Ericsson 6x12 HCS *Select Length & AWG*	
Multiplexer	XMU	
Radio	RU22 **(x 6)** (U2100)	

Proposed RAN Equipment

Template: 67D5A997DB 6160 (GSM only)

Enclosure	1	2
Enclosure Type	Enclosure 6160	B160
Baseband	DUG20 (G1900); BB 6630 (L2100, L1900); BB 6648 (L700, L600, N600); BB 6648 (L2500, N2500); RBS6601	
Hybrid Cable System	Ericsson Hybrid Trunk 6/24 4AWG 50m **(x 3)**; PSU 4813	
Transport System	CSR IXRe V2 (Gen2)	

RAN Scope of Work:

AAV now in Emerson AAV Cabinet.

Nortel cabinet removed for generator.

U2100 will be decommissioned. Remove all DUW30 and all cabinet radios from existing RBS6131 base station cabinet.

Remove RBS6131 from site.

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Move DUG20 and BB6630 to new Enclosure 6160.

Add (1) BB6648 for L600, L700, and N600 (MMBB - Mixed Mode Baseband) to new Enclosure 6160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) BB6648 for L2500 and N2500 (MMBB- Mixed Mode Baseband) to new Enclosure 6160.

Add (1) PSU4813 Voltage Booster to new Enclosure 6160.

Existing: (6) 1-5/8" Coaxial Lines; (6) 1-1/4"; (2) HCS

Remove all coaxial lines.

Remove all existing HCS.

Add (3) 6X24 HCS ([1] per sector).

Connect DC for the AIR6449 B41 to the PSU4813 Voltage Booster.

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 792DB_2xAIR+1DP
Proposed Template: 67D5997DB_2xAIR+1OP (GSM only)

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1		2	3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	80		80	80			
M. Tilt	2		0	2			
Height	125		125	125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	G1900	U2100	L700	L2100	L1900	L2100	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.	U1900						
E. Tilt	4	7	2	7	7	7	7
Cables	Fiber Jumper - 15 ft. **(x2)**	1-5/8" Coax - 150 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	80		80				80			
M. Tilt	2		0				2			
Height	125		125				125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900	L2100	L2100	G1900 L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	4	7	2	2	7	7	7	7	7	7
Cables	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.
TMAs										
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Remove AWS TMA from Position 1.

Remove all Coaxial Lines.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.

Move GSM to AIR32 Dual Band antenna in Position 3. GSM will share B2 radios with L1900 1st Carrier.

Replace Low-Band Dual with (1) Low-Band/Mid-Band Octo in Position 2.

Replace RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1		2	3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	220		220	220			
M. Tilt	2		0	2			
Height	125		125	125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	G1900	U2100	L700	L2100	L1900	L2100	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.	U1900						
E. Tilt	3	3	2	4	4	4	4
Cables	Fiber Jumper - 15 ft. **(x2)**	1-5/8" Coax - 150 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	220		220				220			
M. Tilt	2		0				2			
Height	125		125				125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	4	7	2	2	7	7	7	7	7	7
Cables	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.
TMAs										
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Remove AWS TMA from Position 1.

Remove all Coaxial Lines.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.

Move GSM to AIR32 Dual Band antenna in Position 3. GSM will share B2 radios with L1900 1st Carrier.

Replace Low-Band Dual with (1) Low-Band/Mid-Band Octo in Position 2.

Replace RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro						
Antenna	1		2	3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	340		340	340			
M. Tilt	2		0	2			
Height	125		125	125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
Active Tech.	G1900	U2100	L700	L2100	L1900	L2100	L1900
Dark Tech.							
Restricted Tech.							
Decomm. Tech.	U1900						
E. Tilt	5	5	2	6	6	6	6
Cables	Fiber Jumper - 15 ft. **(x2)**	1-5/8" Coax - 150 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)					
Diplexers / Combiners							
Radio			RRUS11 B12 (At Antenna)				
Sector Equipment							

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAALL24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	340		340				340			
M. Tilt	2		0				2			
Height	125		125				125			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt	4	7	2	2	7	7	7	7	7	7
Cables	Fiber Jumper - 15 ft. **(x2)**	Fiber Jumper - 15 ft. **(x2)**	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Coax Jumper **(x2)** Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.	Fiber Jumper - 15 ft.
TMAs										
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Remove AWS TMA from Position 1.

Remove all Coaxial Lines.

Install (1) AIR6449 B41 for L2500 and N2500 in Position 1.

Move GSM to AIR32 Dual Band antenna in Position 3. GSM will share B2 radios with L1900 1st Carrier.

Replace Low-Band Dual with (1) Low-Band/Mid-Band Octo in Position 2.

Replace RRUS11 B12 with (1) Radio 4449 B71+B85 for L600, L700, and N600 in Position 2 at antenna, and connect its ports to the Low-Band ports of the Octo Antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the Mid-Band ports of the Octo Antenna.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB 6160 (GSM only)	67D5997DB_2xAIR+1OP (GSM only)

CT11270C_Anchor_7_draft

Print Name: Preliminary (RFDS_for_Scoping)
PORs: L600_Phase 3
Anchor_Phase 3

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

Exhibit E

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

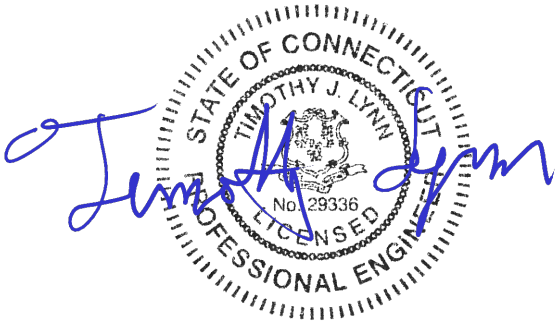
T-Mobile Site #: CT11270C

2 Willis Street
Bristol, CT

Centek Project No. 19066.15

Date: March 1, 2021

Max Stress Ratio = 98.7%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

March 1, 2021

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main Street, Building 4
Sturbridge, MA 01566

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11270C
2 Willis Street
Bristol, CT 06010

Centek Project No. 19066.15

Dear Mr. Freincle,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the proposed mount, consisting of three (3) V-frame sector mounts (SitePro P/N: VFA10-U) to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  V-Frames: Three (3) Ericsson AIR6449 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAALL24_43-U-NA20 panel antennas, three (3) Ericsson 4449 remote radio heads and three (3) Ericsson 4415 remote radio heads mounted on three (3) V-Frames with a RAD center elevation of 125-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 93 mph for Bristol as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Bristol, CT

Rev. 0: 6/13/19

Prepared by: T.J.L. Checked by: C.A.G.
Job No. 19066.15

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 93$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Lattice (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 130$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 125$ ft (User Input)

Radial Ice Thickness = $t_i := 1.00$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 0.85$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.85$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.142$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.285$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.326$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 24.965$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.216$$

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Subject:	TIA-222-G Loads
Location:	Bristol, CT
Rev. 0: 6/13/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 19066.15

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAALL24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 150$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 430$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 152$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 155$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 9.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 71$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 150$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 2 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 582$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 582$	lbs

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Subject:	TIA-222-G Loads
Location:	Bristol, CT
Rev. 0: 6/13/19	Prepared by: T.J.L. Checked by: C.A.G. Job No. 19066.15

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 120$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 49$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.6$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 48$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 25$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 103$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 6522$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 211$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 211$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 138$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 93$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 58$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.6$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 44$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7828$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 254$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 254$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4449

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 35$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 27$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 18$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 2$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 15$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 3134$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 102$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 102$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4415

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 16.5$ in (User Input)

RRUS Width = $W_{RRUS} := 13.4$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.9$ in (User Input)

RRUS Weight = $WT_{RRUS} := 46$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.5$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 39$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.7$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 17$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.6$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 19$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.5$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 11$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 46$ lbs

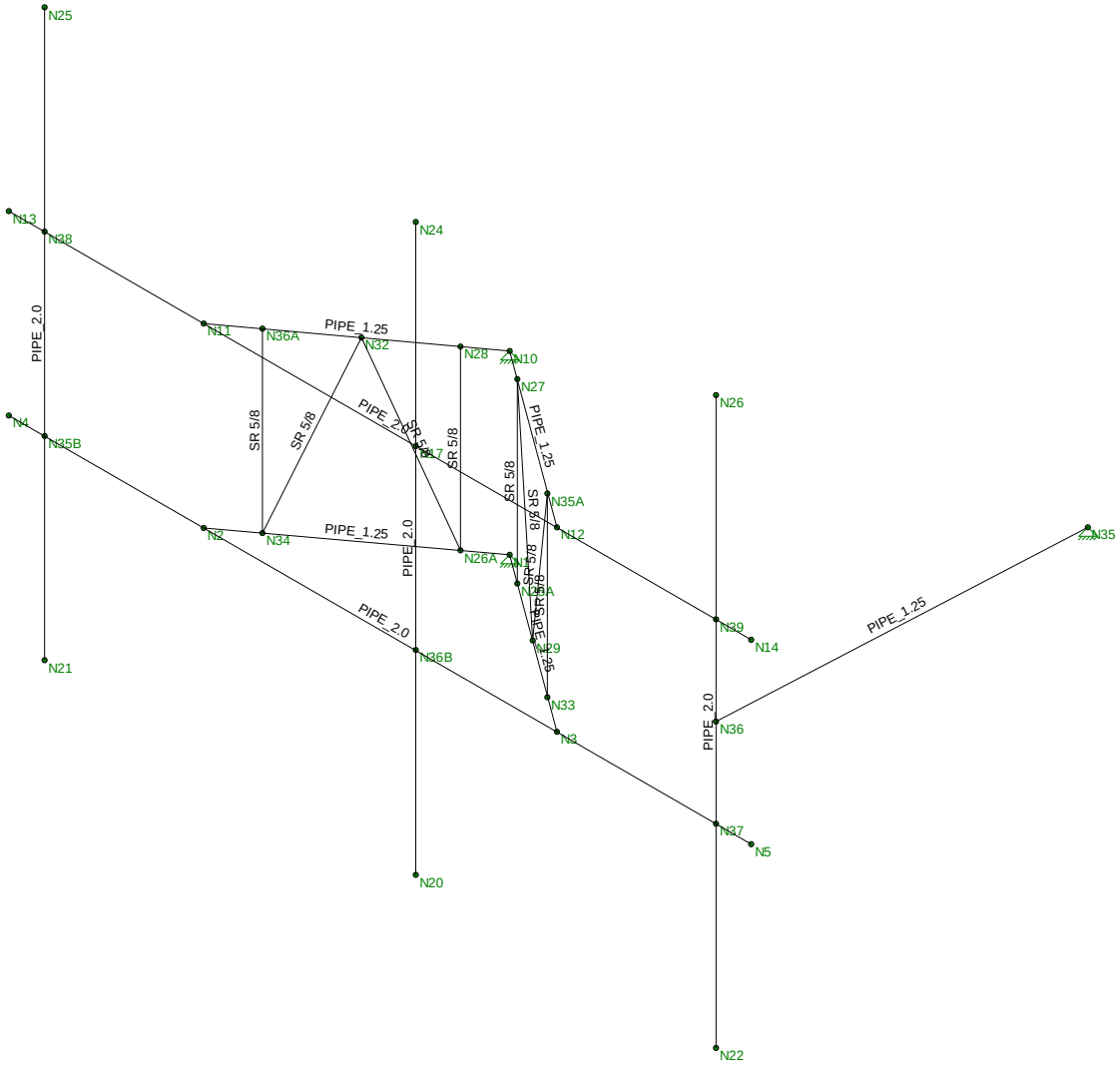
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1304$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2660$

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 86$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 86$ lbs



Envelope Only Solution

Centek		
TJL	CT11270C	Mar 1, 2021 at 11:38 AM
19066.15	Member Framing	Mount.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Grade B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz	PIPE 2.0	Beam	Pipe	A36 Gr.36	Typical	1.02	.627	.627	1.25
2	Pipe 1.25	PIPE 1.25	Column	Wide Flange	A53 Grade B	Typical	.625	.184	.184	.368
3	Antenna Mast Pipe 2.0	PIPE 2.0	Column	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	SR5/8	SR 5/8	Column	Wide Flange	A36 Gr.36	Typical	.307	.007	.007	.015

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Pipe 1.25	3.1	Segment	Segment	Segment	Segment	Segm...				Lateral
2	M2	Pipe 1.25	3.1	Segment	Segment	Segment	Segment	Segm...				Lateral
3	M3	Horz	10.5	Segment	Segment	Segment	Segment	Segm...				Lateral
4	M4	Pipe 1.25	3.1	Segment	Segment	Segment	Segment	Segm...				Lateral
5	M5	Pipe 1.25	3.1	Segment	Segment	Segment	Segment	Segm...				Lateral
6	M6	Horz	10.5	Segment	Segment	Segment	Segment	Segm...				Lateral
7	M7	Antenna Mast Pipe ...	8	Segment	Segment	Segment	Segment	Segm...				Lateral
8	M9	Antenna Mast Pipe ...	8	Segment	Segment	Segment	Segment	Segm...				Lateral
9	M10	Antenna Mast Pipe ...	8	Segment	Segment	Segment	Segment	Segm...				Lateral
10	M17	Pipe 1.25	5.019			Lbyy						Lateral
11	M11	SR5/8	2.503			Lbyy						Lateral
12	M12	SR5/8	2.695			Lbyy						Lateral
13	M13	SR5/8	2.695			Lbyy						Lateral
14	M14	SR5/8	2.503			Lbyy						Lateral
15	M15	SR5/8	2.503			Lbyy						Lateral
16	M16	SR5/8	2.695			Lbyy						Lateral
17	M17A	SR5/8	2.695			Lbyy						Lateral
18	M18	SR5/8	2.503			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N3		270	Pipe 1.25	Column	Wide Flange	A53 Grade B	Typical
2	M2	N1	N2			Pipe 1.25	Column	Wide Flange	A53 Grade B	Typical
3	M3	N4	N5		180	Horz	Beam	Pipe	A36 Gr.36	Typical
4	M4	N10	N12		180	Pipe 1.25	Column	Wide Flange	A53 Grade B	Typical
5	M5	N10	N11		90	Pipe 1.25	Column	Wide Flange	A53 Grade B	Typical
6	M6	N13	N14		270	Horz	Beam	Pipe	A36 Gr.36	Typical
7	M7	N25	N21			Antenna Mast Pipe 2.0	Column	Pipe	A53 Grade B	Typical
8	M9	N20	N24			Antenna Mast Pipe 2.0	Column	Pipe	A53 Grade B	Typical
9	M10	N26	N22			Antenna Mast Pipe 2.0	Column	Pipe	A53 Grade B	Typical
10	M17	N36	N35			Pipe 1.25	Column	Wide Flange	A53 Grade B	Typical
11	M11	N28	N26A			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
12	M12	N26A	N32			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
13	M13	N32	N34			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
14	M14	N34	N36A			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
15	M15	N25A	N27			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
16	M16	N27	N29			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
17	M17A	N29	N35A			SR5/8	Column	Wide Flange	A36 Gr.36	Typical
18	M18	N35A	N33			SR5/8	Column	Wide Flange	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	-1.25	0	0	
2	N2	-2.5	-1.25	1.833	0	
3	N3	2.5	-1.25	1.833	0	
4	N4	-5.25	-1.25	1.833	0	
5	N5	5.25	-1.25	1.833	0	
6	N10	0	1.253	0	0	
7	N11	-2.5	1.253	1.833	0	
8	N12	2.5	1.253	1.833	0	
9	N13	-5.25	1.253	1.833	0	
10	N14	5.25	1.253	1.833	0	
11	N17	.5	1.253	1.833	0	
12	N20	.5	-4	1.833	0	
13	N21	-4.75	-4	1.833	0	
14	N22	4.75	-4	1.833	0	
15	N24	.5	4	1.833	0	
16	N25	-4.75	4	1.833	0	
17	N26	4.75	4	1.833	0	
18	N35	5	0	-3.18	0	
19	N36	4.75	0	1.833	0	
20	N25A	0.403228	-1.25	0.295647	0	
21	N26A	-0.403228	-1.25	0.295647	0	
22	N27	0.403228	1.253	0.295647	0	
23	N28	-0.403228	1.253	0.295647	0	
24	N29	1.209684	-1.25	0.886941	0	
25	N32	-1.209684	1.253	0.886941	0	
26	N33	2.016141	-1.25	1.478234	0	
27	N34	-2.016141	-1.25	1.478234	0	
28	N35A	2.016141	1.253	1.478234	0	
29	N36A	-2.016141	1.253	1.478234	0	
30	N35B	-4.75	-1.25	1.833	0	
31	N36B	.5	-1.25	1.833	0	
32	N37	4.75	-1.25	1.833	0	
33	N38	-4.75	1.253	1.833	0	
34	N39	4.75	1.253	1.833	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction			
2	N10	Reaction	Reaction	Reaction			
3	N35	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Y	-.067	.5
2	M7	Y	-.067	5.5
3	M10	Y	-.052	.5
4	M10	Y	-.052	3.5
5	M9	Y	-.075	.5

Member Point Loads (BLC 2 : Dead Load) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
6	M9	Y	-.075	7.5
7	M9	Y	-.074	2
8	M9	Y	-.046	4

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Y	-.127	.5
2	M7	Y	-.127	5.5
3	M10	Y	-.106	.5
4	M10	Y	-.106	3.5
5	M9	Y	-.291	.5
6	M9	Y	-.291	7.5
7	M9	Y	-.102	2
8	M9	Y	-.086	4

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	X	.022	.5
2	M7	X	.022	5.5
3	M10	X	.013	.5
4	M10	X	.013	3.5
5	M9	X	.036	.5
6	M9	X	.036	7.5
7	M9	X	.015	2
8	M9	X	.011	4

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	X	.047	.5
2	M7	X	.047	5.5
3	M10	X	.025	.5
4	M10	X	.025	3.5
5	M9	X	.076	.5
6	M9	X	.076	7.5
7	M9	X	.027	2
8	M9	X	.017	4

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Z	.029	.5
2	M7	Z	.029	5.5
3	M10	Z	.024	.5
4	M10	Z	.024	3.5
5	M9	Z	.078	.5
6	M9	Z	.078	7.5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M7	Z	.069	.5

Member Point Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M7	Z	.069	5.5
3	M10	Z	.06	.5
4	M10	Z	.06	3.5
5	M9	Z	.215	.5
6	M9	Z	.215	7.5

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f..	Start Location[ft,%]	End Location[ft,%]
1	M7	X	.002	.002	0	0
2	M9	X	.002	.002	0	0
3	M10	X	.002	.002	0	0
4	M17	X	.002	.002	0	0
5	M5	X	.002	.002	0	0
6	M2	X	.002	.002	0	0
7	M4	X	.002	.002	0	0
8	M1	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f..	Start Location[ft,%]	End Location[ft,%]
1	M7	X	.006	.006	0	0
2	M9	X	.006	.006	0	0
3	M10	X	.006	.006	0	0
4	M17	X	.006	.006	0	0
5	M5	X	.006	.006	0	0
6	M2	X	.006	.006	0	0
7	M4	X	.006	.006	0	0
8	M1	X	.006	.006	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f..	Start Location[ft,%]	End Location[ft,%]
1	M6	Z	.002	.002	0	0
2	M3	Z	.002	.002	0	0
3	M2	Z	.002	.002	0	0
4	M5	Z	.002	.002	0	0
5	M4	Z	.002	.002	0	0
6	M1	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f..	Start Location[ft,%]	End Location[ft,%]
1	M6	Z	.006	.006	0	0
2	M3	Z	.006	.006	0	0
3	M2	Z	.006	.006	0	0
4	M5	Z	.006	.006	0	0
5	M4	Z	.006	.006	0	0
6	M1	Z	.006	.006	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
1	Self Weight	DL		-1						
2	Dead Load	None					8			
3	Ice Load	None					8			
4	Wind with Ice X	None					8	8		
5	Wind X	None					8	8		
6	Wind with Ice Z	None					6	6		
7	Wind Z	None					6	6		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.097	6	1.066	6	1.468	3	0	6	0	6	0	6
2		min	-.346	2	.314	2	-.004	5	0	1	0	1	0	1
3	N10	max	-.029	5	1.057	3	-.624	2	0	6	0	6	0	6
4		min	-.549	1	.235	5	-1.735	6	0	1	0	1	0	1
5	N35	max	-.001	6	.007	1	.332	2	0	6	0	6	0	6
6		min	-.051	2	-.005	5	-.04	5	0	1	0	1	0	1
7	Totals:	max	0	6	2.104	6	0	3						
8		min	-.942	1	.651	2	-1.421	4						

Envelope Joint Displacements

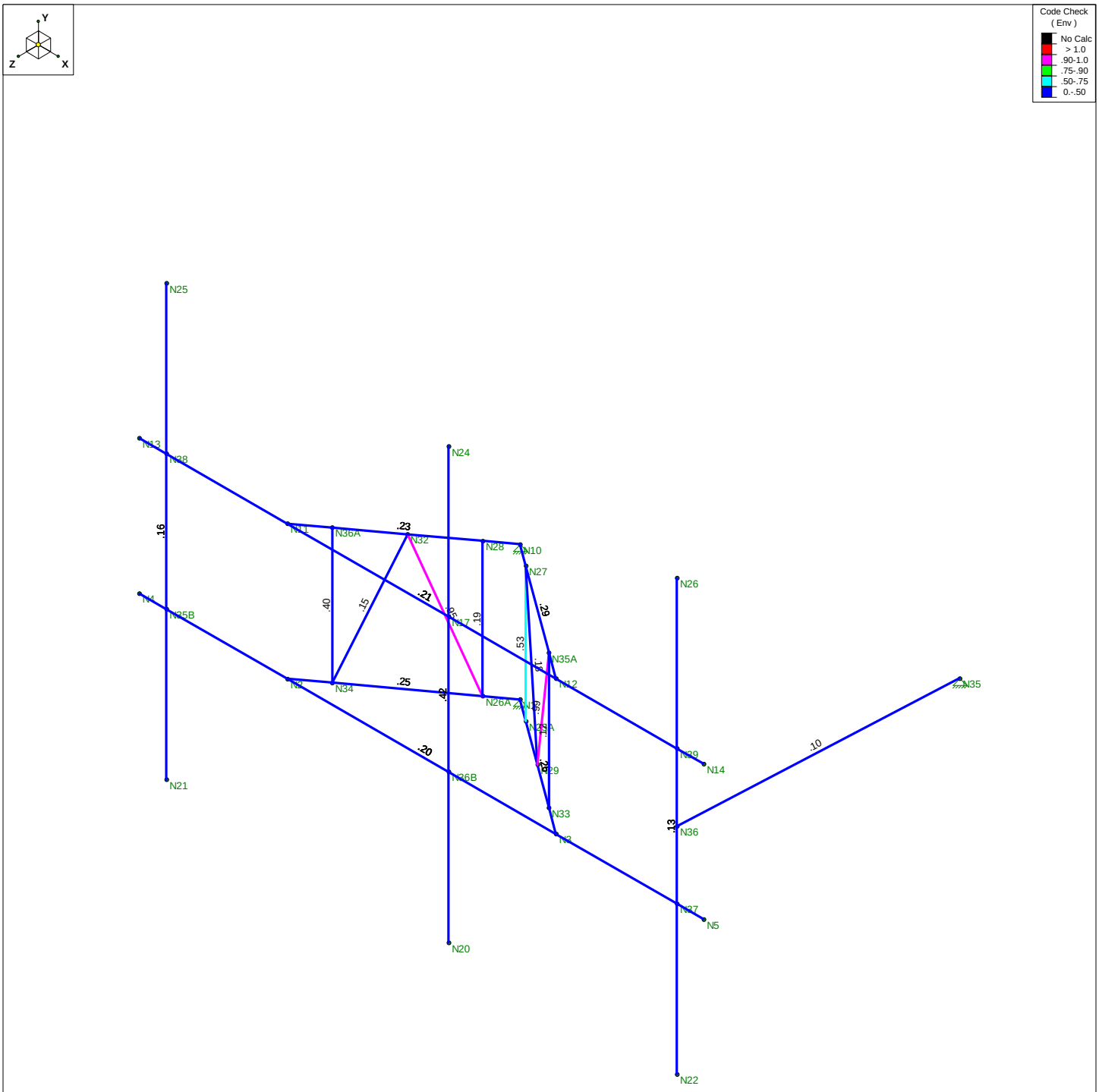
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	0	6	0	6	0	6	6.69e-03	3	3.609e-03	1	3.505e-04	4
2		min	0	1	0	1	0	1	1.901e-03	5	2.047e-04	5	-1.372e-04	2
3	N2	max	.064	1	-.016	5	.087	1	2.321e-03	3	3.9e-03	2	1.14e-03	6
4		min	.01	6	-.058	6	.011	6	-1.73e-03	5	3.035e-04	6	1.397e-04	2
5	N3	max	.064	1	-.017	5	-.013	5	2.805e-03	3	1.577e-03	4	-2.121e-04	6
6		min	.009	6	-.068	3	-.087	1	-1.418e-03	5	-5.026e-04	2	-8.069e-04	1
7	N4	max	.065	1	-.036	2	.214	2	8.594e-04	3	3.915e-03	2	1.6e-03	6
8		min	.01	6	-.133	6	.021	6	-3.971e-04	5	5.251e-04	6	6.124e-04	2
9	N5	max	.064	1	-.037	5	.014	2	1.985e-03	6	2.496e-04	6	-2.575e-04	5
10		min	.009	6	-.103	3	-.033	4	1.044e-03	2	-3.862e-03	2	-4.513e-04	3
11	N10	max	0	6	0	6	0	6	6.891e-03	6	3.836e-03	2	1.45e-04	5
12		min	0	1	0	1	0	1	1.972e-03	2	-2.929e-04	4	-7.513e-04	3
13	N11	max	.069	2	-.019	2	.095	2	4.825e-03	4	4.125e-03	1	1.136e-03	3
14		min	-.004	6	-.065	6	-.001	6	7.07e-04	2	4.991e-04	6	3.616e-04	5
15	N12	max	.069	2	-.021	2	.009	6	5.667e-03	4	-2.165e-04	5	-1.31e-04	6
16		min	-.004	6	-.066	6	-.091	2	3.792e-04	2	-4.085e-04	1	-3.964e-04	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
17	N13	max	.069	2	-.029	2	.233	1	4.121e-03	4	4.959e-03	4	1.364e-03	6
18		min	-.004	6	-.131	6	.054	6	5.493e-04	2	1.553e-03	3	-6.72e-04	2
19	N14	max	.069	2	-.035	5	.079	4	5.446e-03	4	-1.05e-03	6	1.931e-04	5
20		min	-.004	6	-.105	3	.017	2	-7.834e-04	2	-4.187e-03	1	-1.086e-03	1
21	N17	max	.069	2	-.023	2	.029	4	7.022e-03	4	3.176e-03	2	4.634e-04	6
22		min	-.004	6	-.098	6	-.051	2	1.629e-04	2	-4.379e-05	6	-8.558e-04	2
23	N20	max	.177	1	-.023	2	.433	5	1.155e-03	3	2.935e-03	1	4.303e-03	1
24		min	.02	5	-.098	6	-.069	1	-1.457e-02	5	3.814e-04	6	2.91e-04	5
25	N21	max	.099	1	-.033	2	.171	2	8.559e-04	3	3.915e-03	2	1.593e-03	6
26		min	.042	5	-.123	6	-.003	6	-4.307e-04	5	5.247e-04	6	9.239e-04	5
27	N22	max	.062	2	-.036	5	-.044	2	1.984e-03	6	2.5e-04	6	3.303e-05	2
28		min	-.005	6	-.101	3	-.095	6	1.044e-03	2	-3.862e-03	2	-4.23e-04	6
29	N24	max	.179	2	-.023	2	.468	4	1.564e-02	4	3.176e-03	2	4.668e-04	6
30		min	-.019	6	-.098	6	-.045	2	1.631e-04	2	-4.379e-05	6	-4.228e-03	2
31	N25	max	.145	2	-.033	2	.318	4	6.89e-03	4	4.957e-03	4	1.368e-03	6
32		min	-.049	6	-.123	6	.092	3	5.5e-04	2	1.553e-03	3	-2.883e-03	2
33	N26	max	.137	1	-.036	5	.302	4	7.855e-03	4	-1.049e-03	6	1.939e-04	5
34		min	-.007	5	-.101	3	-.034	2	-7.842e-04	2	-4.187e-03	1	-2.416e-03	1
35	N35	max	0	6	0	6	0	6	2.027e-03	3	4.272e-03	2	8.033e-04	6
36		min	0	1	0	1	0	1	-4.409e-04	5	2.391e-04	6	7.102e-05	2
37	N36	max	.064	2	-.036	5	.002	2	3.082e-03	4	-3.536e-04	6	8.267e-04	6
38		min	.003	6	-.101	3	0	6	2.873e-05	2	-3.661e-03	2	9.745e-06	2
39	N25A	max	.014	1	-.006	5	0	5	5.428e-03	3	4.09e-03	1	2.004e-04	6
40		min	0	5	-.025	3	-.019	1	1.404e-03	5	5.072e-05	5	-4.624e-05	2
41	N26A	max	.012	1	-.006	2	.016	1	5.276e-03	3	2.987e-03	1	5.9e-04	5
42		min	.001	5	-.024	6	.002	5	1.314e-03	5	3.454e-04	6	-2.72e-04	3
43	N27	max	.015	2	-.007	5	.002	6	5.632e-03	6	4.246e-03	2	7.791e-04	5
44		min	0	6	-.028	3	-.02	2	1.523e-03	2	-3.534e-04	6	-3.4e-04	3
45	N28	max	.012	2	-.006	2	.017	2	5.55e-03	6	3.283e-03	2	-2.467e-04	2
46		min	-.001	4	-.021	6	-.001	4	1.581e-03	2	-2.619e-04	4	-7.671e-04	6
47	N29	max	.042	1	-.01	5	-.001	5	2.677e-03	3	3.602e-03	1	1.815e-03	3
48		min	0	5	-.036	3	-.058	1	1.496e-04	5	2.184e-04	5	-5.593e-05	5
49	N32	max	.033	2	-.009	2	.046	2	2.769e-03	6	2.755e-03	2	-4.985e-04	2
50		min	-.004	4	-.032	6	-.002	4	6.795e-04	2	-1.875e-04	6	-1.991e-03	6
51	N33	max	.061	1	-.014	5	-.006	5	3.403e-03	3	1.474e-03	1	-3.585e-04	2
52		min	.005	5	-.048	3	-.084	1	-3.044e-04	5	4.507e-04	6	-1.077e-03	4
53	N34	max	.05	1	-.011	2	.067	1	2.638e-03	3	3.03e-03	1	1.066e-03	4
54		min	.008	6	-.039	6	.009	6	-8.889e-04	5	4.073e-04	6	2.259e-05	2
55	N35A	max	.066	2	-.013	5	.008	6	4.164e-03	4	1.655e-03	2	9.047e-04	5
56		min	-.003	6	-.045	3	-.087	2	7.068e-04	2	-1.716e-04	6	-5.056e-04	1
57	N36A	max	.054	2	-.012	2	.074	2	3.522e-03	4	3.241e-03	2	8.199e-04	3
58		min	-.005	6	-.042	6	-.003	6	7.729e-04	2	7.483e-05	6	-6.178e-04	5
59	N35B	max	.065	1	-.033	2	.191	2	8.594e-04	3	3.915e-03	2	1.599e-03	6
60		min	.01	6	-.123	6	.018	6	-3.971e-04	5	5.247e-04	6	6.117e-04	2
61	N36B	max	.064	1	-.023	2	.027	5	1.168e-03	3	2.935e-03	1	8.187e-04	1
62		min	.009	6	-.098	6	-.055	1	-5.983e-03	5	3.814e-04	6	2.918e-04	5
63	N37	max	.064	1	-.036	5	-.009	2	1.985e-03	6	2.5e-04	6	-2.568e-04	5
64		min	.009	6	-.101	3	-.034	4	1.044e-03	2	-3.862e-03	2	-4.505e-04	3
65	N38	max	.069	2	-.033	2	.208	1	4.121e-03	4	4.957e-03	4	1.363e-03	6
66		min	-.004	6	-.123	6	.042	6	5.493e-04	2	1.553e-03	3	-6.727e-04	2
67	N39	max	.069	2	-.036	5	.064	4	5.446e-03	4	-1.049e-03	6	1.937e-04	5
68		min	-.004	6	-.101	3	-.008	2	-7.834e-04	2	-4.187e-03	1	-1.085e-03	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M17A	SR 5/8	.987	2....	6	.012	2....		1	1.617	9.94	.104	.104	2.3..	H1-...
2	M12	SR 5/8	.954	0	6	.007	2....		4	1.617	9.94	.104	.104	2.0..	H1-...
3	M15	SR 5/8	.529	2....	6	.008	0		6	1.876	9.94	.104	.104	1.2..	H1-...
4	M9	PIPE_2.0	.415	2.75	4	.046	2.75		4	29.345	32.13	1.872	1.872	4.9..	H1-...
5	M14	SR 5/8	.398	2....	6	.004	0		6	1.876	9.94	.104	.104	2.2..	H1-...
6	M4	PIPE_1.25	.292	.484	6	.165	0		3	19.565	19.688	.801	.801	2.1..	H1-...
7	M1	PIPE_1.25	.264	.484	3	.168	0		6	19.565	19.688	.801	.801	1.3..	H1-...
8	M2	PIPE_1.25	.251	.484	6	.181	0		6	19.565	19.688	.801	.801	2.1..	H1-...
9	M5	PIPE_1.25	.234	.484	6	.168	0		3	19.565	19.688	.801	.801	1.4..	H1-...
10	M6	PIPE_2.0	.210	2....	4	.082	7....		3	31.048	33.048	1.925	1.925	1.8..	H1-...
11	M3	PIPE_2.0	.196	2....	6	.159	7....		4	29.576	33.048	1.925	1.925	2.2..	H1-...
12	M11	SR 5/8	.186	0	6	.006	0		6	1.876	9.94	.104	.104	2.2..	H1-...
13	M16	SR 5/8	.183	0	6	.009	2....		6	1.617	9.94	.104	.104	2.0..	H1-...
14	M7	PIPE_2.0	.157	2.75	4	.054	2.75		4	29.805	32.13	1.872	1.872	2.21	H1-...
15	M13	SR 5/8	.146	0	6	.005	2....		4	1.617	9.94	.104	.104	2.3..	H1-...
16	M10	PIPE_2.0	.131	2.75	4	.074	2.75		4	31.531	32.13	1.872	1.872	1.7..	H1-...
17	M18	SR 5/8	.116	0	6	.007	0		4	1.876	9.94	.104	.104	2.2..	H1-...
18	M17	PIPE_1.25	.095	1....	1	.006	5....		1	10.478	19.688	.801	.801	1.1..	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CT11270C	Mar 1, 2021 at 11:39 AM
19066.15	Unity Check	Mount.r3d

Exhibit F

INFINIGY

Non-Ionizing Radiation Report

Compiled For: Northeast Site Solutions on behalf of T-Mobile

Site Name: CT11270C

Site ID: CT11270C

2 Willis Street, Bristol, CT 06010

Latitude: 41.6488; Longitude: -72.9474

Structure Type: Self-Support

Report Date: March 3, 2021

Report Written By: Tim Harris

Status: T-Mobile will be compliant with FCC rules on RF Exposure.

Table of Contents

1. Executive Summary:

Northeast Site Solutions on behalf of T-Mobile has contracted Infinigy Solutions, LLC to determine whether the site CT11270C located at 2 Willis Street in Bristol, CT Will Be Compliant with all Federal Communications Commission (FCC) rules and regulations for radio frequency (RF) exposure as indicated in **47CFR§1.1310**.

The report incorporates a theoretical RF field analysis in accordance with the FCC Rules and Regulations for all individuals classified as "Occupational or Controlled" and "General Public or Uncontrolled" (see Appendix A and B).

This document and the conclusions herein are based on information provided by Northeast Site Solutions on behalf of T-Mobile.

As a result of the analysis, **T-Mobile Will Be Compliant with FCC rules.**

T-Mobile, All Bands Cumulative Exposure %		
Uncontrolled / General Population	Exposure values at the site (mW/cm^2)	0.0255
	% Exposure	3.12 %
Controlled / Occupational	Exposure values at the site (mW/cm^2)	0.0255
	% Exposure	0.63 %

2. Site Summary:

Site Information	
Site Name: CT11270C	
Site Address: 2 Willis Street, Bristol, CT 06010	
Site Type: Self-Support	
Compliance Status	Will Be Compliant
Mitigation Required	No
Signage Required	Yes
Barriers Required	No
Access Locked	No
Area Controlled or Uncontrolled	Uncontrolled

3. Site Compliance

This report also incorporates overview of the site information:

- Antenna Inventory Table
- Calculation Tables showing exposure for each carrier transmit frequency
- Total exposure for all carriers existing and proposed at ground level considering the centerline of all antennas and horizontal distance from the tower.
- Maximum Effective Radiated Power Assumed as Worst Case for Calculations used in this study
- Calculations based on flat ground around base of the structure

4. Site Compliance Recommendations

Infinigy recommends the following upon the installation of antennas at the site:

Base of tower

Install an RF caution sign. Note: The recommendation for alerting signage is moot if there is an RF caution, or greater already installed.

5. Antenna Inventory Table

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
1a	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	125	80	3590
1b	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	125	80	3590
2a	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	125	80	2256
2b	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	125	80	1128
2c	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	125	80	1128
2d	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	125	80	3166
3a	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	125	80	4308
3b	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	125	80	2034
3c	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	125	80	4034
4a	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	125	220	3590
4b	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	125	220	3590
5a	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	125	220	2256
5b	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	125	220	1128
5c	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	125	220	1128
5d	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	125	220	3166
6a	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	125	220	4308
6b	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	125	220	2034
6c	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	125	220	4034
7a	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	125	340	3590
7b	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	125	340	3590
8a	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	125	340	2256
8b	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	125	340	1128
8c	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	125	340	1128
8d	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	125	340	3166

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
9a	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	125	340	4308
9b	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	125	340	2034
9c	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	125	340	4034

6. RF Guidelines

To ensure safety of company workers, the following points need to be taken into consideration and implemented at wireless sites in accordance with the Carriers policies:

a) Worksite: Any employee at the site should avoid working directly in front of the antenna or in areas predicted to exceed general population exposure limits by 100%. Workers should insist that the transmitters be switched off during the work period.

b) RF Safety Training and Awareness: All employees working in areas exceeding the general population limits should have a basic awareness of RF safety measures. Videos, classroom lectures and online courses are all appropriate training methods on these topics.

c) Site Access: Restricting access to transmitting antenna locations is one of the most important elements of RF safety. This can be done with:
   - Locked doors/gates/ladder access
   - Alarmed doors
   - Restrictive barriers

d) Three-foot Buffer: There is an inverse relationship between the strength of the field and the distance from the antenna. The RF field diminishes with distance from the antenna. Workers should maintain a three-foot distance from the antennas.

e) Antennas: Workers should always assume that the antenna is transmitting and should never stop right in front of the antenna. If someone must pass by an antenna, he/she should move quickly, thus reducing RF exposure.

7. T-Mobile Exposure Analysis By Band and Technology

T-Mobile 600 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**0.4**
	Exposure values at the site (mW/cm^2)	**0.0011**
	% Exposure	**0.29%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**2.0**
	Exposure values at the site (mW/cm^2)	**0.0011**
	% Exposure	**0.06%**

T-Mobile 600 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**0.4**
	Exposure values at the site (mW/cm^2)	**0.0011**
	% Exposure	**0.29%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**2.0**
	Exposure values at the site (mW/cm^2)	**0.0011**
	% Exposure	**0.06%**

T-Mobile 700 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**0.5**
	Exposure values at the site (mW/cm^2)	**0.0023**
	% Exposure	**0.46%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**2.3**
	Exposure values at the site (mW/cm^2)	**0.0023**
	% Exposure	**0.10%**

T-Mobile 1900 MHz GSM		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0021**
	% Exposure	**0.21%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0021**
	% Exposure	**0.04%**

T-Mobile 1900 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0073**
	% Exposure	**0.73%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0073**
	% Exposure	**0.15%**

T-Mobile 2100 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0044**
	% Exposure	**0.44%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0044**
	% Exposure	**0.09%**

T-Mobile 2500 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0036**
	% Exposure	**0.36%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0036**
	% Exposure	**0.07%**

T-Mobile 2500 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0036**
	% Exposure	**0.36%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0036**
	% Exposure	**0.07%**

8. Appendix A: FCC Guidelines

FCC Policies

The Federal Communications Commission (FCC) in 1996 implemented regulations and policies for analysis of RF propagation to evaluate RF emissions. All the analysis and results of this report are compared with FCC's (Federal Communications Commission) rules to determine whether a site is compliant for Occupational/Controlled or General Public/Uncontrolled exposure. All the analysis of RF propagation is done in terms of a percentage. The limits primarily indicate the power density and are generally expressed in terms of milliwatts per centimeter square, mW/cm^2.

FCC guidelines incorporate two separate tiers of exposure limits that are dependent on the scenario/ situation in which that exposure takes place or the status of the individuals who are subjected to that exposure. The decision as to which tier is applied to a scenario is based on the following definitions:

Occupational / Controlled

These limits apply in situations when someone is exposed to RF energy through his/her occupation, is fully aware of the harmful effects of the RF exposure and has an ability to exercise control over this exposure. Occupational / controlled exposure limits also apply when exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. limits for Occupational/Controlled exposure can be found on Table 1(A).

General Population / Uncontrolled

These limits apply to situations in which the general public may be exposed or in which persons who are exposed because of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure to RF. Therefore, members of the general public would always be considered under this category, for example, in the case of a telecommunications tower that exposes people in a nearby residential area. Exposure limits for General Population/Uncontrolled can be found on Table 1(B).

Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

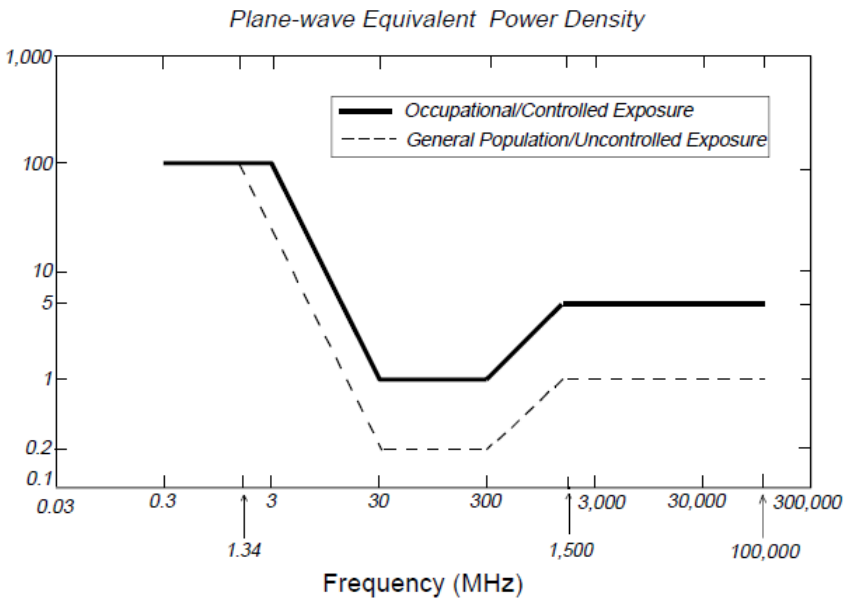
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (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

Figure 1. *FCC Limits for Maximum Permissible Exposure (MPE)*



OSHA Statement:

The objective of the OSHA Act is to ensure the safety and health of the working men and women by enforcing certain standards. The act also assists and encourages the states in their efforts to ensure safe and healthy working conditions through means of research, information, education and training in the field of occupational safety and health and for other purposes.

According to OSHA Act section 5, important duties to be considered are:

(a) Each employer

1) Shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees
2) Shall comply with occupational safety and health standards promulgated under this act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

9. Preparer Certification

I, Tim Harris, preparer of this report, certify that I am fully trained and aware of the rules and regulations of both the Federal Communications Commission and the Occupational Safety and Heath Administration regarding Human Exposure to Radio Frequency Radiation. In addition, I have been trained in RF safety practices, rules, and regulations.

I certify that the information contained in this report is true and correct to the best of my knowledge.

Timothy A. Harris *3/3/2021*

Signature Date

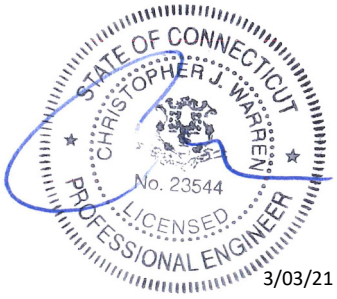
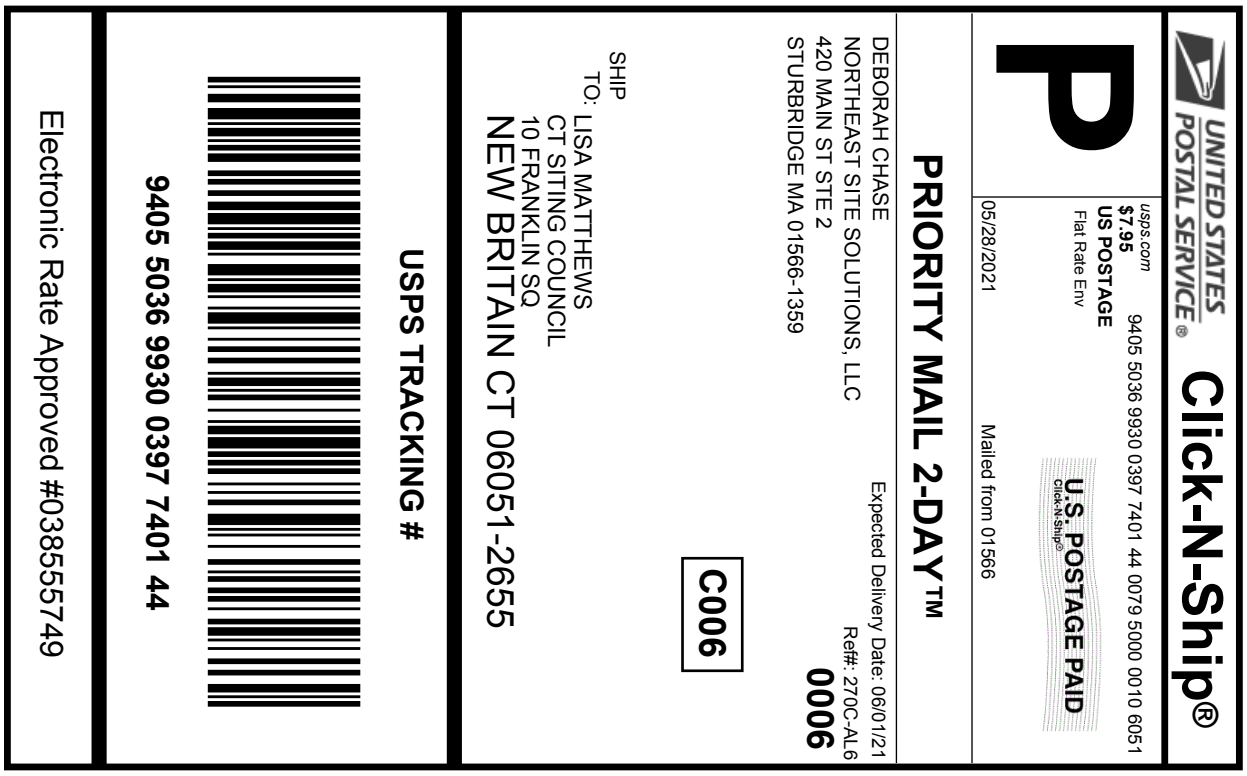


Exhibit G



Cut on dotted line.

Instructions

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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0397 7401 44

Trans. #:	534558005
Print Date:	05/26/2021
Ship Date:	05/28/2021
Expected Delivery Date:	06/01/2021

Priority Mail® Postage:	**$7.95**
Total:	**$7.95**

From: DEBORAH CHASE Ref#: 270C-AL6
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: LISA MATTHEWS
CT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN CT 06051-2655

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

Exhibit H

Deborah Chase

From: Deborah Chase
Sent: Wednesday, May 26, 2021 2:30 PM
To: 'mayorsoffice@bristolct.gov'
Subject: 2 WILLIS STREET BRISTOL CT (AKA 790 WILLIS ST) T-MOBILE EM APPLICATION (CT11270C-ANCHOR-L600)
Attachments: 2 WILLIS STREET BRISTOL CT 06010 (AKA 790 WILLIS ST) T-MOBILE EM APPLICATION (CT11270-Anchor).pdf

Dear Mayor Zoppo-Sassu

Attached please find T-Mobile's exempt modification application that is being submitted to the

Connecticut Siting Council today, May 26, 2021 for the above referenced address.

In light of the present circumstances with Covid-19, the Council has advised that electronic notification of this filing is acceptable.

If you could kindly confirm receipt.

Thank you very much

Deborah Chase
Senior Project Coordinator & Analyst
Mobile: 860-490-8839

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Deborah Chase

From: Deborah Chase
Sent: Wednesday, May 26, 2021 2:33 PM
To: 'RobertFlanagan@bristolct.gov'
Subject: 2 WIILIS STREET BRISTOL CT 06010 (AKA 790 WILL ST) T-MOBILE EM APPLICATION (CT11270C-ANCHOR-L600)
Attachments: 2 WILLIS STREET BRISTOL CT 06010 (AKA 790 WILLIS ST) T-MOBILE EM APPLICATION (CT11270-Anchor).pdf

Dear Mr. Flanagan,

Attached please find T-Mobile's exempt modification application that is being submitted to the

Connecticut Siting Council today, May 26, 2021 for the above referenced address.

In light of the present circumstances with Covid-19, the Council has advised that electronic notification of this filing is acceptable.

If you could kindly confirm receipt.

Thank you very much

Deborah Chase
Senior Project Coordinator & Analyst
Mobile: 860-490-8839

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Deborah Chase

From: Deborah Chase
Sent: Wednesday, May 26, 2021 2:35 PM
To: 'christopher.gelinas@eversource.com'
Subject: 2 WILLIS STREET BRISTOL CT (AKA 790 WILLIS ST) T-MOBILE EM APPLICATION (CT11270C-ANCHOR-L600)
Attachments: 2 WILLIS STREET BRISTOL CT 06010 (AKA 790 WILLIS ST) T-MOBILE EM APPLICATION (CT11270-Anchor).pdf

Hello Chris,

Attached please find T-Mobile's exempt modification application that is being submitted to the

Connecticut Siting Council today, May 26, 2021 for the above referenced address.

In light of the present circumstances with Covid-19, the Council has advised that electronic notification of this filing is acceptable.

If you could kindly confirm receipt.

Thank you very much

Deborah Chase
Senior Project Coordinator & Analyst
Mobile: 860-490-8839

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