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

May 27, 2010

Thomas J. Regan, Esq.
Brown Rudnick LLP
CityPlace I, 185 Asylum Street
Hartford, CT 06103

RE: **EM-T-MOBILE-017-100326** – T-Mobile USA, Inc. notice of intent to modify an existing telecommunications facility located at 790 Willis Street, Bristol, Connecticut.

Dear Attorney Regan:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated March 26, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/CDM/laf

c: The Honorable Art Ward, Mayor, City of Bristol
Alan Weiner, Planner/Dev. Coordinator, City of Bristol
Daniel J. Garstka, Senior Engineer, Transmission Projects, Northeast Utilities Service Company

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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
www.ct.gov/csc

April 1, 2010

The Honorable Art Ward
Mayor
City of Bristol
City Hall
111 North Main Street
P.O.Box 114
Bristol, CT 06010-0114

RE: **EM-T-MOBILE-017-100326** – T-Mobile USA, Inc. notice of intent to modify an existing telecommunications facility located at 790 Willis Street, Bristol, Connecticut.

Dear Mayor Ward:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by April 15, 2010.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Alan Weiner, Planner/Dev. Coordinator, City of Bristol

BROWNRUDNICK

CityPlace I
185 Asylum
Street
Hartford
Connecticut
06103
tel 860.509.6500
fax 860.509.6501

THOMAS J. REGAN
Direct Dial: (860) 509-6522
tregan@brownrudnick.com

Via Hand Delivery

March 26, 2010

ORIGINAL

RECEIVED
MAR 25 2010
CONNECTICUT
SITING COUNCIL

Daniel F. Caruso, Chairman
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: T-Mobile, Inc. – Notice of Exempt Modification

Dear Mr. Caruso:

On behalf of T-Mobile, Inc., enclosed for filing you will find an original and five (5) copies of a *"Notice of Exempt Modification"* regarding a site located at 790 Willis Street, Bristol. The $625.00 filing fee is also enclosed.

I would appreciate it if you could please date stamp the copy of this transmittal letter and return it to the courier delivering this package.

If you have any questions, please feel free to contact me.

Very truly yours,

BROWN RUDNICK LLP

By: _____
Thomas J. Regan

Enclosures

cc/encl: Mayor Arthur J. Ward

40271200 v1 - REGANTJ - 025064/0016

brownrudnick.com

cc/encls: via 1st Class Mail

Mayor Arthur J. Ward
City of Bristol
City Hall
111 North Main Street
Bristol, CT 06010

RECEIVED
MAR 26 2010
CONNECTICUT
SITING COUNCIL

ING COUNCIL

EM-T-MOBILE-017-100326

In re:
T-Mobile US[illegible] Notice to Make an Exempt Modification to an Existing Facility, 790 Willis Street, Bristol, Connecticut. : EXEMPT MODIFICATION NO. _____

: March 26, 2010

ORIGINAL

NOTICE OF EXEMPT MODIFICATION

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), T-Mobile USA, Inc. ("T-Mobile") hereby gives notice to the Connecticut Siting Council ("Council") and the City of Bristol of T-Mobile's intent to make an exempt modification to an existing lattice tower (the "Tower") located at 790 Willis Street in Bristol, Connecticut. Specifically, T-Mobile plans to upgrade its wireless system in Connecticut by implementing its Universal Mobile Telecommunications System ("UMTS"). UMTS is a third-generation ("3G") technology that utilizes a code division multiple access ("CDMA") base to allow for fast and large data transfers. To accomplish this upgrade, T-Mobile must modify its antenna and equipment configurations at many of its existing sites.

Once the UMTS upgrade is complete, T-Mobile will operate on a more unified communication system, allowing international wireless telephones to function world-wide. Furthermore, UMTS will enhance GPS navigation capabilities and provide emergency responders with more advanced tracking capabilities. The proposed UMTS technology is compatible with the existing second-generation ("2G") Global System for Mobile Communication ("GSM") currently on the Tower and the proposed upgrade is expected to enhance the existing 2G system. In order to accomplish the upgrade at this site, T-Mobile plans to add UMTS technology and install associated equipment at the base of the Tower.

Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), T-Mobile's plans do not constitute a modification subject to the Council's review because T-Mobile will not

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185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500

change the height of the Tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

The Tower is a 130-foot lattice tower located at 790 Willis Street in Bristol, Connecticut, Connecticut (latitude 41° 38' 59" N, longitude 72° 56' 53" W). The Tower is owned by Connecticut Light & Power. Other antenna systems are currently located on the Tower. Currently, T-Mobile has 3 antennas and 3 Tower Mounted Amplifiers ("TMA") located on the Tower with a centerline of 123 feet. A site plan with Tower specifications is attached.

T-Mobile plans to add 3 UMTS antennas and 3 Twin TMA to the Tower. The proposed antennas and TMA will have the same centerline as the existing antennas – 123 feet. To confirm the Tower can support these changes, T-Mobile commissioned Natcomm Consulting Engineers, Inc. to perform a structural analysis of the Tower (attached). According to the structural assessment, dated February 22, 2010, the Tower "... **is adequate** to support the proposed modified antenna configuration" (Section 1-7, Structural Analysis, emphasis in original).

In addition, T-Mobile plans to locate 6, 1-5/8 inch coax cables along the existing ice bridge. T-Mobile proposes to install its UMTS equipment cabinet on its 7-foot by 18-foot (approximately) existing concrete pad. Hence, no increase in the boundaries of the site is necessary.

Therefore, excluding brief, minor, construction-related noise during the addition of the antennas and the installation of the equipment cabinet, T-Mobile's changes to the Tower will not increase noise levels at the site.

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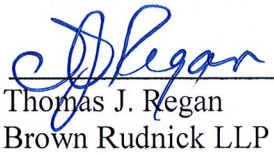
HARTFORD, CT 06103
(860) 509-6500

The proposed antennas and TMA will not adversely impact the health and safety of the surrounding community or the people working on the Tower. The total radio frequency exposure measured around the Tower will be well below the National Council on Radiation

Protection and Measurements' ("NCRP") standard adopted by the Federal Communications Commission ("FCC"). The worst-case power density analysis measured at the base of the Tower indicates that T-Mobile's antennas will emit 7.31% of the NCRP's standard for maximum permissible exposure. A cumulative power density analysis indicates that together, all of the antennas on the Tower will emit only 52.14% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be well below the FCC mandated radio frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions. The power density analysis is attached.

In conclusion, T-Mobile's proposed plan to add antennas, TMA and equipment at this site does not constitute a modification subject to the Council's jurisdiction because T-Mobile will not increase the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and the total radio frequency electromagnetic radiation power density will stay within all applicable standards. *See* Conn. Agencies Regs. § 16-50j-72.

T-Mobile USA, Inc.

By: 

Thomas J. Regan
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185 Asylum Street, CityPlace I
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Phone - 860.509.6522
Fax - 860.509.6622

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HARTFORD, CT 06103
(860) 509-6500

Certificate of Service

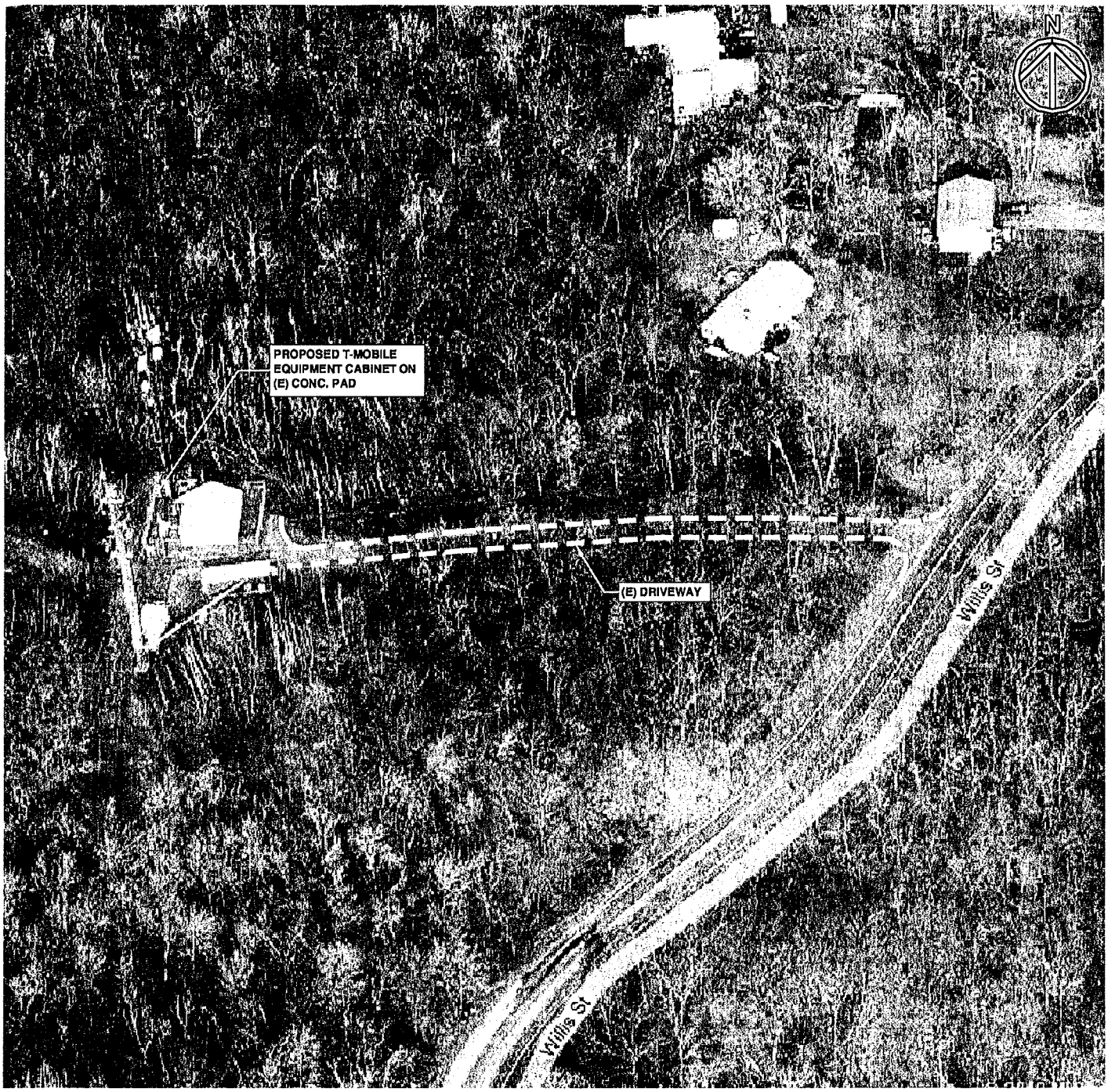
This is to certify that on this 26th day of March, 2010, the foregoing Notice of Exempt Modification was sent, via first class mail, to the following:

City of Bristol
Mayor Arthur J. Ward
City Hall
111 North Main Street
Bristol, CT 06010

By: _____
Thomas J. Regan

40270618 v1 - 025064/0016

BROWN RUDNICK LLP
CITYPLACE I
185 ASYLUM STREET
HARTFORD, CT 06103
(860) 509-6500



OVERALL SITE PLAN

1
LE-1

SCALE: 1"=60'-0"

30 0 30 60 90

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVE.
SUITE 6
MAHWAH, NJ 07430
OFFICE: (201) 684-0055
FAX:(201) 684-0066

FOR

T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX:(860) 692-7159

ATLANTIS GROUP
1340 Centre Street, Suite 203
Newton Center, MA 02459
Office: 617-965-0789
Fax: 617-663-6032

SITE NUMBER:	CT11270C
SITE NAME:	WILLIS STREET
ADDRESS:	790 WILLIS STREET BRISTOL, CT 06010
DRAWN BY	GC
SHEET NUMBER	LE-1

1:	VISED PER COMMENTS	03-15-10
0:	VISED PER COMMENTS	03-11-10
A:	SUED FOR USE	03-04-10
I	VISION	DATE

APPROVALS

Site Owner — Date

Construction Manager — Date

RF Engineer — Date

Site Acquisition — Date

The above parties hereby approve and accept these documents and authorize the contractor to proceed with the construction described herein, all construction documents are subject to review by the local building department and any changes or modifications they may impose.

PROJECT DESCRIPTION:

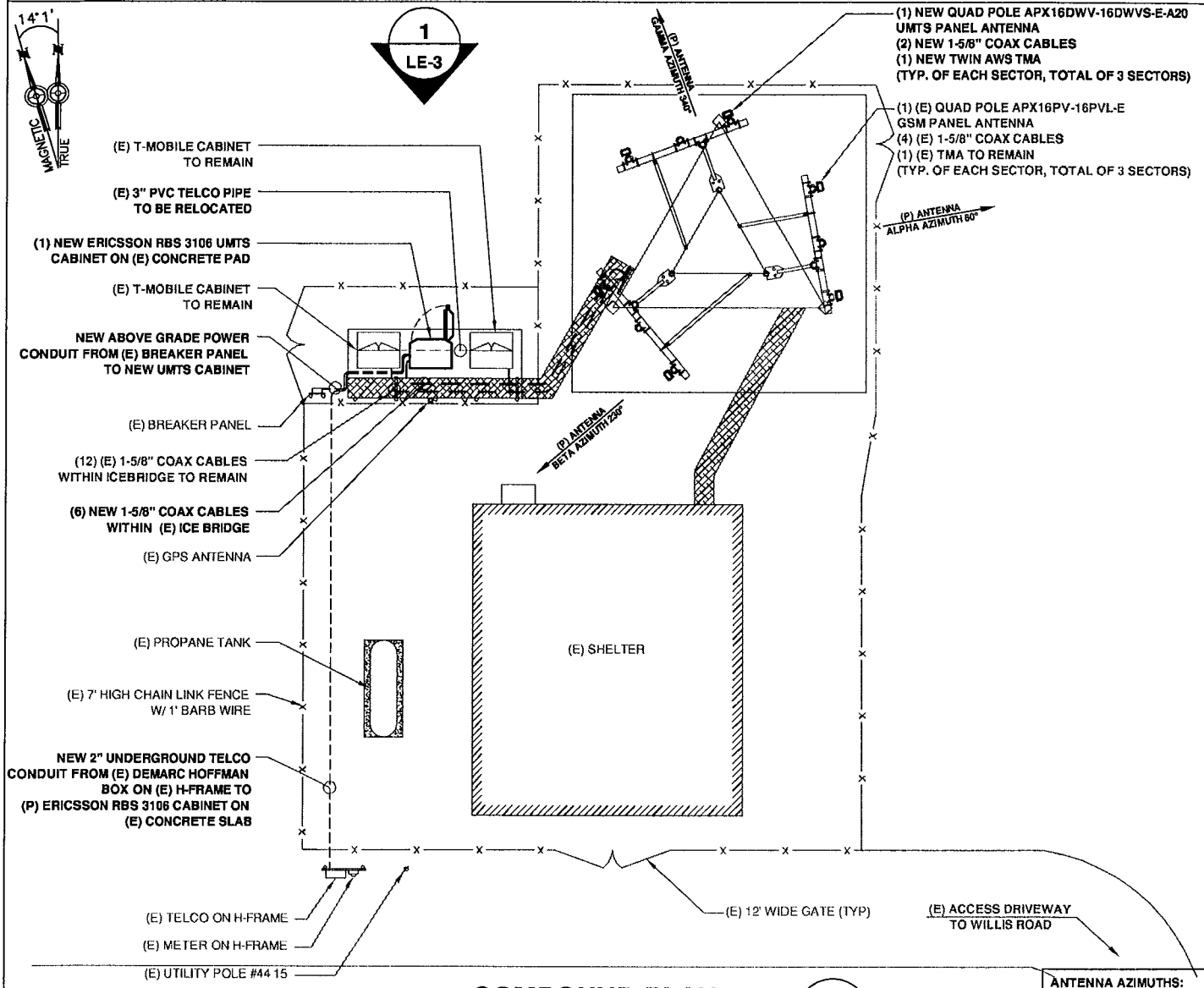
T-MOBILE IS PROPOSING TO INSTALL TELECOMMUNICATIONS EQUIPMENT AT THIS EXISTING SITE THAT CONSISTS OF:

EQUIPMENT CABINETS (3): (1) NEW ERICSSON RBS 3106 UMTS CABINET ON (E) CONCRETE PAD
(2) (E) NORTEL S8000 CABINETS ON CONCRETE PAD TO REMAIN

ALPHA
ANTENNAS (2): (1) NEW QUAD POLE APX16DWV-16DWVS-E-A20 UMTS PANEL ANTENNA TO BE ADDED
(1) (E) QUAD POLE APX16PV-16PVL-E GSM PANEL ANTENNA TO REMAIN
COAX (6): (2) NEW 1-5/8" COAX CABLES TO BE ADDED
(4) (E) 1-5/8" COAX CABLES TO REMAIN
TMAs (1) NEW TWIN AWS TMA TO BE ADDED
(1) (E) TMA TO REMAIN

BETA
ANTENNAS (2): (1) NEW QUAD POLE APX16DWV-16DWVS-E-A20 UMTS PANEL ANTENNA TO BE ADDED
(1) (E) QUAD POLE APX16PV-16PVL-E GSM PANEL ANTENNA TO REMAIN
COAX (6): (2) NEW 1-5/8" COAX CABLES TO BE ADDED
(4) (E) 1-5/8" COAX CABLES TO REMAIN
TMAs (1) NEW TWIN AWS TMA TO BE ADDED
(1) (E) TMA TO REMAIN

GAMMA
ANTENNAS (2): (1) NEW QUAD POLE APX16DWV-16DWVS-E-A20 UMTS PANEL ANTENNA TO BE ADDED
(1) (E) QUAD POLE APX16PV-16PVL-E GSM PANEL ANTENNA TO REMAIN
COAX (6): (2) NEW 1-5/8" COAX CABLES TO BE ADDED
(4) (E) 1-5/8" COAX CABLES TO REMAIN
TMAs (1) NEW TWIN AWS TMA TO BE ADDED
(1) (E) TMA TO REMAIN



COMPOUND PLAN

1 / LE-2

SCALE: 1/16" = 1'-0"

8 0 8 16 24

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

ANTENNA AZIMUTHS:

SECTOR ALPHA: 80°

SECTOR BETA: 230°

SECTOR GAMMA: 340°

TRANSCEND WIRELESS, LLC
10 INDUSTRIAL AVE.
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MAHWAH, NJ 07430
OFFICE: (201) 684-0055
FAX:(201) 684-0066

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SITE NUMBER: CT11270C
SITE NAME: WILLIS STREET
ADDRESS: 790 WILLIS STREET, BRISTOL, CT 06010

DRAWN BY	SHEET NUMBER
GC	LE-2

REVISION	DATE
1: REVISED PER COMMENTS	03-15-10
0: REVISED PER COMMENTS	03-11-10
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APPROVALS

Site Owner — Date

Construction Manager — Date

RF Engineer — Date

Site Acquisition — Date

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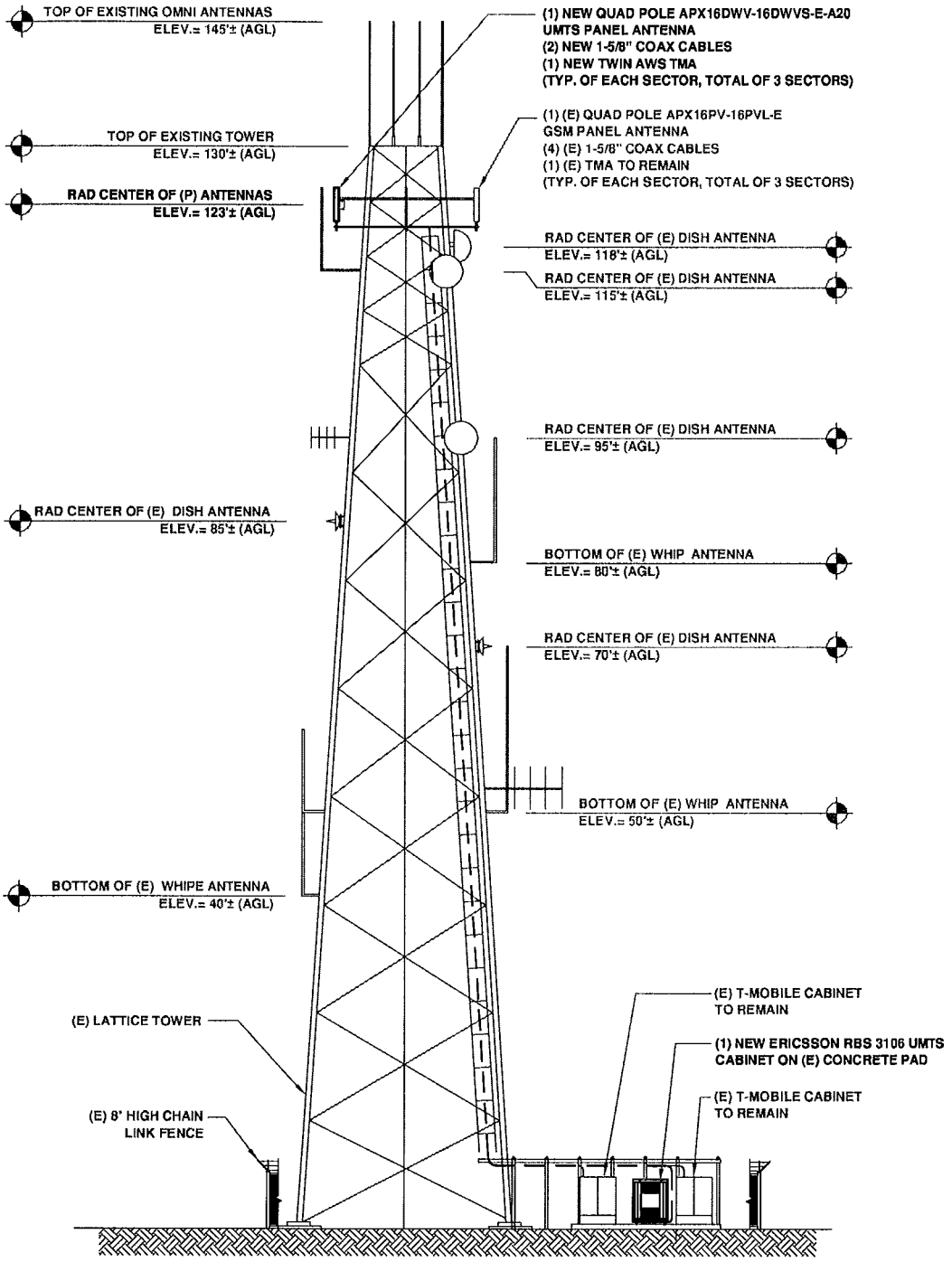

ELEVATION

SCALE: 1" = 20'-0"

10 0 10 20 30

1 / LE-3

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

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FOR

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35 GRIFFIN ROAD SOUTH
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ATLANTIS GROUP
1340 Centre Street, Suite 203
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Office: 617-965-0789
Fax: 617-663-6032

SITE NUMBER:	CT11270C
SITE NAME:	WILLIS STREET
ADDRESS:	790 WILLIS STREET BRISTOL, CT 06010
DRAWN BY: GC	SHEET NUMBER: LE-3

REVISION	DATE
1: REVISED PER COMMENTS	03-15-10
0: REVISED PER COMMENTS	03-11-10
A: ISSUED FOR USE	03-04-10

APPROVALS

Site Owner	Date
Construction Manager	Date
RF Engineer	Date
Site Acquisition	Date

The above parties hereby approve and accept these documents and authorize the contractor to proceed with the construction described herein, all construction documents are subject to review by the local building department and any changes or modifications they may impose.

NATCOMM INC.
CONSULTING ENGINEERS

Structural Analysis Report

130' Existing Lattice Tower

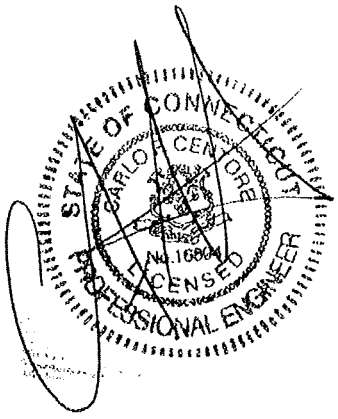
T-Mobile Antenna Modification

T-Mobile Site Ref: CT11270C

South Mountain
790 Willis Street
Bristol, CT

Natcomm Project No. 10021.CO1

Date: February 22, 2010



Prepared for:
Transcend Wireless, LLC
113 N Mountain Blvd.
Mountain Top, PA 18707

p: 203.488.0580
f: 203.488.8587
w: nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

Table of Contents

Natcomm, Inc.
Structural Analysis - 130' Existing Lattice Tower
T-Mobile Site Ref – CT11270C
Bristol, CT
February 22, 2010

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by T-Mobile on the existing lattice (tower) owned and operated by Connecticut Light and Power located in Bristol, Connecticut.

The host tower is a 130-ft, three-legged, tapered steel self-support lattice tower originally designed and manufactured by Radian; file no: 0603415 signed and sealed December 6, 2006 and subsequently revised on December 20, 2006. The tower geometry, structure member sizes and foundation system information were taken from a previous structural analysis report prepared by Natcomm Inc. job no. 08128.CO5 dated October 20, 2008. Antenna and appurtenance information were taken from a T-Mobile RF data sheet and the aforementioned structural report.

The tower is made up of seven (7) tapered steel sections consisting of A572-50 pipe legs. Horizontal and diagonal lateral support bracing consists of A572-50 pipe. Inner bracing and redundant bracing consists of A36 steel angle construction. 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.

T-Mobile is proposing the installation of three (3) panel antennas mounted their existing 12-ft T-Frame mounts. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna configuration.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- EXISTING:
  Antennas: Lightning Rod with a RAD center elevation of 130-ft above the existing tower base plate

- CARRIER UNKNOWN (Existing):
  Antennas: Two (2) 15' X 3" Dia. Omni antennas, three (3) RFS PD220, one (1) DB806D-Y and one (1) 10' X 3" Dia. Omni antennas on three (3) 3' Side-arms with a RAD center elevation of 130-ft above the existing tower base.
  Coax Cables: Nine (9) 7/8" ∅ coax cables

- NEU: (Existing)
  Antennas: One (1) SD210-SF3P4LDF Dipole antenna mounted to the existing tower leg with a RAD center elevation of 130-ft above the existing tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable.

- T-MOBILE (Existing to Remain)
  Antennas: Three (3) APX16PV-16PVL-E panel antennas and three (3) TMA's mounted on three (3) 12' T-Frame Sector Mount with a RAD center elevation of 123-ft above the existing tower base.
  Coax Cables: Twelve (12) 1 5/8" ∅ coax cables.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Dish Mount Assembly, one (1) 6' X 4" Pipe Mount and one (1) 8-ft Dish with RAD center elevation of 115-ft above the existing tower base.
  Coax Cables: Two (2) WE65 Elliptical coax cables.

- CARRIER UNKNOWN (Existing):
  Antennas: Two (2) Celwave 1142-2B antennas on two (2) 3-ft Side arms with a RAD center elevation of 110-ft above the existing tower base plate
  Coax Cables: Two (2) 7/8" ∅ coax cables

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Kathrein AP7-850/065N panel antenna on one (1) 3-ft Side Arm with a RAD center elevation of 108-ft above the existing tower base plate
  Coax Cables: One (1) 7/8" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Dish Mount Assembly, one (1) 6' X 4" Pipe Mount and one (1) 6-ft Dish with RAD center elevation of 106-ft above the existing tower base plate
  Coax Cables: One (1) WE65 elliptical ∅ coax cables

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Kathrein AP7-850/065N panel antenna on one (1) 3-ft Side Arm with a RAD center elevation of 104-ft above the existing tower base plate
  Coax Cables: One (1) 7/8" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Andrew/Decibel DB205-A on one (1) 3' Side Arm with a RAD center elevation of 98-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Dish Mount Assembly, one (1) 6' X 4" Pipe Mount and one (1) 10 FT Dish with a RAD center elevation of 97-ft above the existing tower base plate
  Coax Cables: One (1) WE65 elliptical ∅ coax cable.

- NEU: (Existing)
  Antennas: One (1) SD210-SF3P4LDF Dipole antenna mounted to the existing tower leg with a RAD center elevation of 90-ft above the existing tower base.
  Coax Cables: One (1) 7/8" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) 6' X 4" Pipe Mount and one (1) 12-ft Dish with a RAD center elevation of 86-ft above the existing tower base.
  Coax Cables: One (1) WE65 elliptical ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Celwave 1142-2B on one (1) 3-ft Side arm with RAD center elevation of 84-ft above the existing tower base plate.
  Coax Cables: One (1) 1/2" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) 6' X 4" Pipe Mount and one (1) 4-ft Dish with a RAD center elevation of 71-ft above the existing tower base plate
  Coax Cables: One (1) WE65 Elliptical ∅ coax cable

- CARRIER UNKNOWN (Existing):
  Antennas: Two (2) Diamond X-200A antennas on two (2) 3-ft Side arms with a RAD center elevation of 65-ft above the existing tower base.
  Coax Cables: Two (2) 1/2" ∅ coax cables (RG8)

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 antenna on one (1) Double Side Arm with a RAD center elevation of 56-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) Andrew/Decibel DB212-1 antenna, one (1) 8' X 2½" Pipe Mount on one (1) 3-ft Side Arm with a RAD center elevation of 54-ft above the existing tower base.
  Coax Cables: One (1) 1/2" ∅ coax cable

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) DB230-2B Yagi antenna on one (1) 3-ft Side Arm with a RAD center elevation of 45-ft above the existing tower base.
  Coax Cables: Two (2) 1/2" ∅ coax cables.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) DB222-C 2-Bay Dipole on one (1) 3' Side Arm with RAD center elevation of 42-ft above the existing tower base.
  Coax Cables: One (1) 3/8" ∅ coax cable.

- CARRIER UNKNOWN (Existing):
  Antennas: One (1) set of Wind Speed cups mounted to tower leg with a RAD center elevation of 42-ft above the existing tower base.
  Coax Cables: N/A

- **T-MOBILE (Proposed)**
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas and three (3) RFS Twin TMA's mounted on three (3) existing 12' T-Frame Sector Mounts with a RAD center elevation of 123-ft above the existing tower base.
  Coax Cables: Six (6) 1 5/8" ∅ coax cables.

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 or reinforcement drawings.
- 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.
- All coax cables to be installed as indicated in this report.

Analysis

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

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	NU SUB-090; v = 85 mph (fastest mile)	*[Northeast Utilities Substation Standard 090]*
	Bristol; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	NUS–090 wind speed controls	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 2; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses were found to be within allowable limits. In Load Case 2, per RISATower "Section Capacity Table", this tower was found to be at **84.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T6)	20'-0"-40'-0"	83.2%	**PASS**
Diagonal (T4)	60'-0"-80'-0"	84.4%	**PASS**

- The tower deflection (sway) was found to be within allowable limits.

	Deflection (degrees)	Proposed	Allowable	Result
Existing Tower	Sway (Tilt)	0.4360	0.5	**PASS**
	Twist	0.0747	0.5	**PASS**

Foundation and Anchors

The existing foundation consists of a monolithic reinforced concrete pad bearing directly on existing sub grade. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned Natcomm Inc. structural report. Tower legs are connected to the foundation by means of (8) 1" ∅, ASTM F1554-S2,S5 Grade 105 anchor bolts per leg, embedded into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Reactions	Vector	Proposed Load (kips/ft-kips)
Base	Shear	**54**
	Axial	**46**
	Moment	**4148**
Leg	Shear	**32**
	Compression	**228**
	Uplift	**183**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 FS[1]	Proposed Loading FS[1]	Result
Reinf. Conc. Mat	OTM[2]	2.0	2.07	**PASS**

Note: 1. FS denote Factor of Safety
2. OTM denotes Overturning Moment

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	49.1%	**PASS**

Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

STATE OF CONNECTICUT CARLO F. CENTORE No.16004 LICENSED PROFESSIONAL ENGINEER

Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
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:

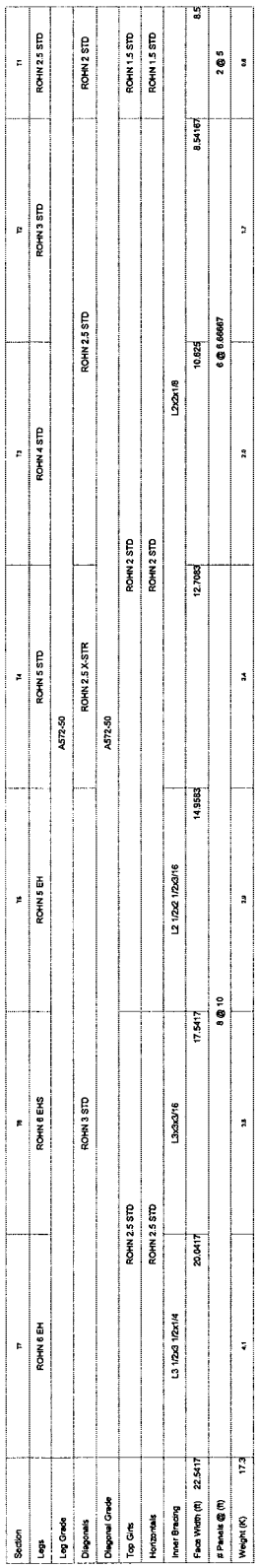
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Natcomm, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to Natcomm, 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. Natcomm, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

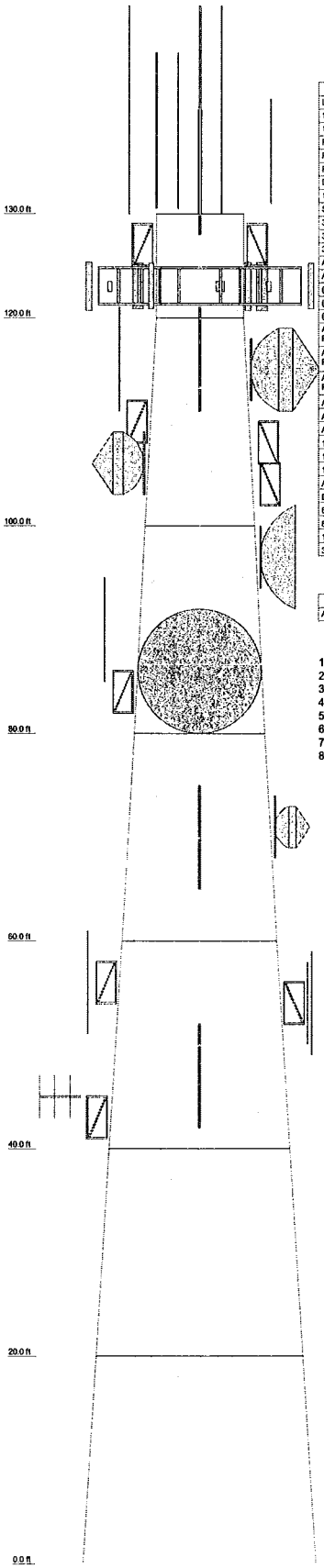
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

RISATower Features:

- RISATower 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.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	130	1142-2B	110
15' x 3" Dia Omni	130	3' Side arm	110
15' x 3" Dia Omni	130	AP7-850/065N	108
PD220	130	3' Side arm	108
PD220	130	Dish Mount Assy	106
PD220	130	6'x4" Pipe Mount	106
DB806D-Y	130	6 FT DISH	106
10' x 3" Dia Omni	130	AP7-850/065N	104
SD210-SF3P4LDF	130	3' Side arm	104
3' Sidearm	127	3' Side arm	98
3' Sidearm	127	DB205-A	98
3' Sidearm	127	Dish Mount Assy	97
APX16PV-16PVL-E (T-Mobile - Existing)	123	6'x4" Pipe Mount	97
APX16PV-16PVL-E (T-Mobile - Existing)	123	10 FT DISH	97
(2) TMA 10"x8"x3" (T-Mobile - Existing)	123	SD210-SF3P4LDF	90
(2) TMA 10"x8"x3" (T-Mobile - Existing)	123	6'x4" Pipe Mount	86
(2) TMA 10"x8"x3" (T-Mobile - Existing)	123	12 FT DISH	86
APX16DWV-16DWVS-E-A20 (T-Mobile - Proposed)	123	1142-2B	84
		3' Side arm	84
APX16DWV-16DWVS-E-A20 (T-Mobile - Proposed)	123	6'x4" Pipe Mount	71
		4 FT DISH	71
APX16DWV-16DWVS-E-A20 (T-Mobile - Proposed)	123	3' Side arm	65
		3' Side arm	65
ATMAA1412D-1A20 TMA (T-Mobile - Proposed)	123	Diamond X-200A	65
ATMAA1412D-1A20 TMA (T-Mobile - Proposed)	123	Diamond X-200A	65
ATMAA1412D-1A20 TMA (T-Mobile - Proposed)	123	Double Side Arm	56
12' T-Frame Sector Mount (1) (T-Mobile)	123	DB212-1	56
12' T-Frame Sector Mount (1) (T-Mobile)	123	DB212-1	54
12' T-Frame Sector Mount (1) (T-Mobile)	123	8'x2 1/2" Pipe Mount	54
APX16PV-16PVL-E (T-Mobile - Existing)	123	3' Side arm	54
Dish Mount Assy	115	DB230-2B	45
6'x4" Pipe Mount	115	3' Side arm	43
6 FT DISH	115	Wind speed cups	42
1142-2B	110	3' Side arm	42
3' Side arm	110	DB222-C	42

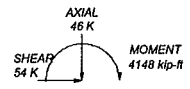
MATERIAL STRENGTH

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

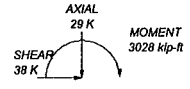
TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 84.4%

MAX. CORNER REACTIONS AT BASE:
DOWN: 228 K
UPLIFT: -183 K
SHEAR: 32 K



TORQUE 27 kip-ft
85 mph WIND - 0.5000 in ICE



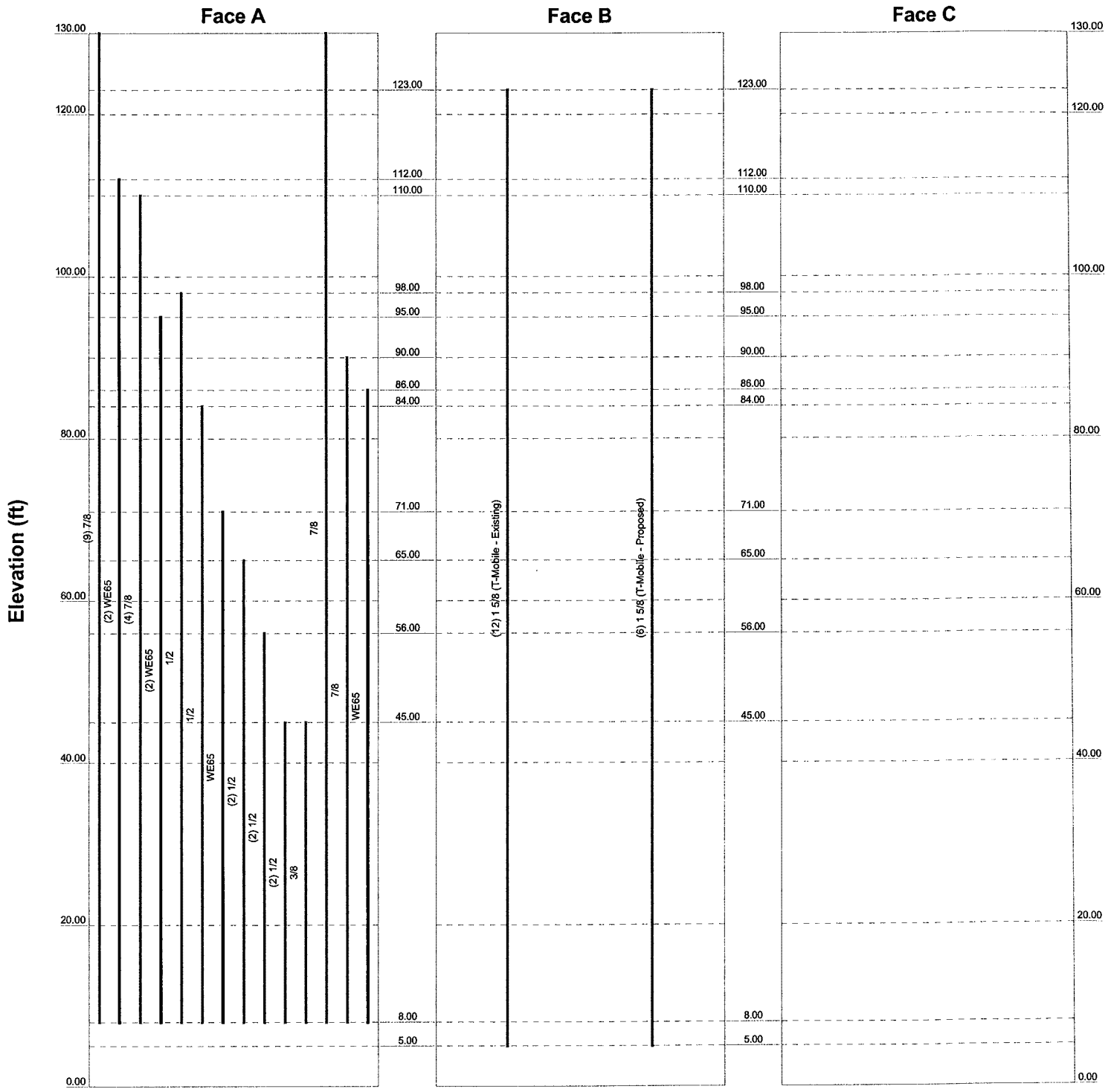
TORQUE 24 kip-ft
REACTIONS - 85 mph WIND

NATCOMM
63-2 N. Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	130' SSMW Tower - Rev 0
Project:	Willis Street, Bristol, CT
Client:	Northeast Utilities
Drawn by:	TJL
App'd:	
Code:	TIA/EIA-222-F
Date:	02/22/10
Scale:	NTS
Path:	
Dwg No.	E-1

Feedline Distribution Chart
0' - 130'

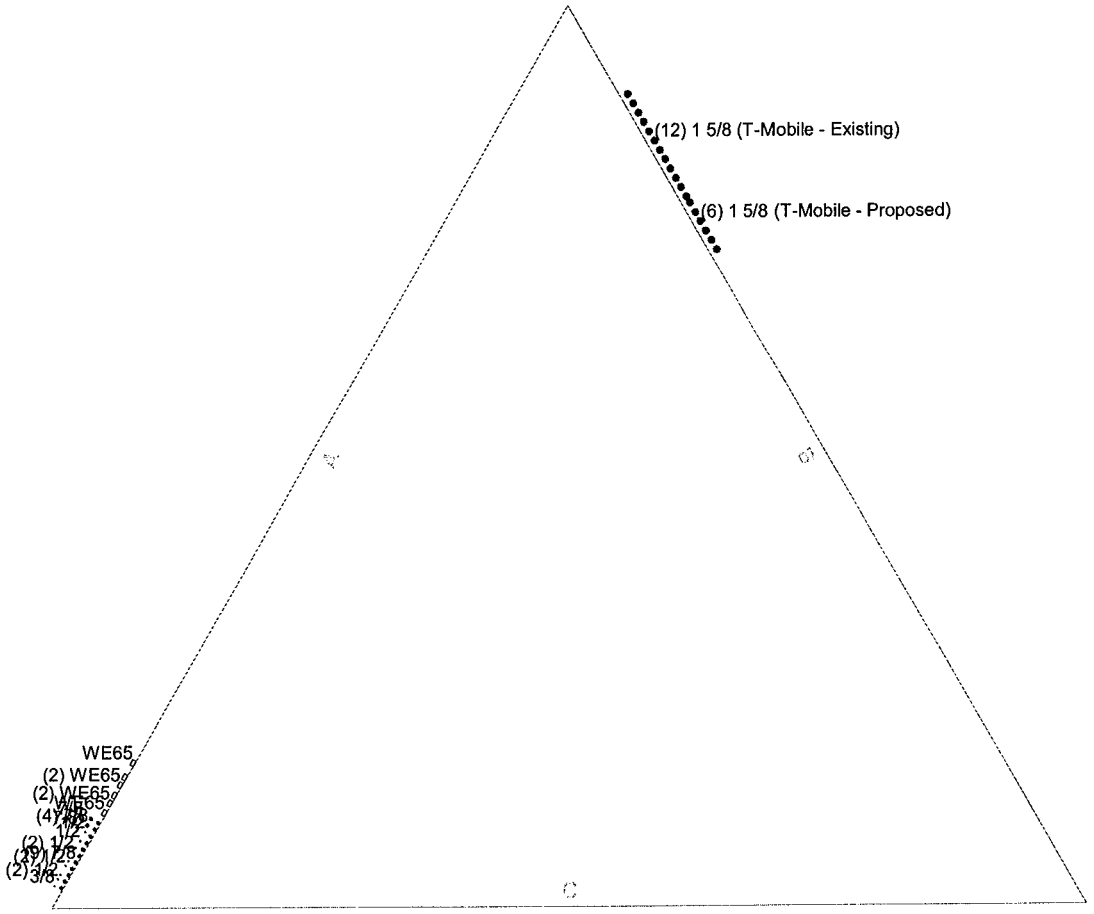
Round Flat App In Face App Out Face Truss Leg



NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: 130' SSMW Tower - Rev 0		
	Project: Willis Street, Bristol, CT		
	Client: Northeast Utilities	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 02/22/10	Scale: NTS
	Path:		Dwg No. E-7

Feedline Plan

_____ Round _____ Flat _____ App In Face App Out Face



NATCOMM 63-2 N. Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***130' SSMW Tower - Rev 0***		
	Project: ***Willis Street, Bristol, CT***		
	Client: Northeast Utilities	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 02/22/10	Scale: NTS
	Path: J:\Jobs\1002\00 WIP\CD1 - CT11270C- 2 Wiles Street, Bristol, CT\Structural\EBI Files\130 ROHN Lattice Basic.dwg		Dwg No. E-7

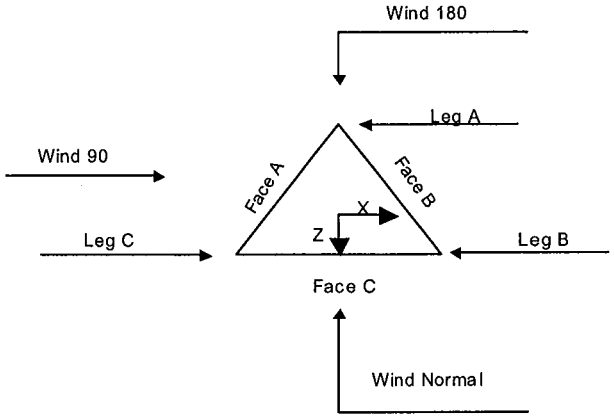
Tower Input Data

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/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 85 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 85 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		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	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	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
T1 130.00-120.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1.02	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36	1.02	1	1	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
ft	ft^2	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	K Brace Diags X	Single Diags X	Girts X	Horiz. X	Sec. Horiz. X	Inner Brace X
ft				Y	Y	Y	Y	Y	Y	Y
T1 130.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 40.00-20.00	Yes	Yes	1	1	1	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]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 130.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
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 Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal 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	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (T-Mobile - Existing)	B	Yes	Ar (CfAe)	123.00 - 5.00	1.0000	-0.34	12	12	0.7500 1.9800	1.9800		1.04
7/8	A	Yes	Ar (CfAe)	130.00 - 8.00	0.0000	-0.45	9	9	0.7500 1.0000	1.1100		0.54
WE65	A	Yes	Af (CfAe)	112.00 - 8.00	0.0000	-0.36	2	2	0.7500 1.0000	1.5836	5.1284	0.53
7/8	A	Yes	Ar (CfAe)	110.00 - 8.00	0.0000	-0.41	4	2	0.7500 1.0000	1.1100		0.54
WE65	A	Yes	Af (CfAe)	95.00 - 8.00	0.0000	-0.38	2	2	0.7500 1.0000	1.5836	5.1284	0.53
1/2	A	Yes	Ar (CfAe)	98.00 - 8.00	2.0000	-0.42	1	1	0.7500 1.0000	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	84.00 - 8.00	2.0000	-0.43	1	1	0.7500 1.0000	0.5800		0.25
WE65	A	Yes	Af (CfAe)	71.00 - 8.00	0.0000	-0.395	1	1	0.7500 1.0000	1.5836	5.1284	0.53
1/2	A	Yes	Ar (CfAe)	65.00 - 8.00	2.0000	-0.44	2	2	0.7500 1.0000	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	56.00 - 8.00	2.0000	-0.455	2	2	0.7500 1.0000	0.5800		0.25
1/2	A	Yes	Ar (CfAe)	45.00 - 8.00	2.0000	-0.47	2	2	0.7500 1.0000	0.5800		0.25
3/8	A	Yes	Ar (CfAe)	45.00 - 8.00	2.0000	-0.48	1	1	0.4500	0.4500		0.09
7/8	A	Yes	Ar (CfAe)	130.00 - 8.00	4.0000	-0.41	1	1	0.7500 1.0000	1.1100		0.54
7/8	A	Yes	Ar (CfAe)	90.00 - 8.00	4.0000	-0.42	1	1	0.7500 1.0000	1.1100		0.54
1 5/8 (T-Mobile - Proposed)	B	Yes	Ar (CfAe)	123.00 - 5.00	1.0000	-0.25	6	6	0.7500 1.9800	1.9800		1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
WE65	A	Yes	Af (CfAe)	86.00 - 8.00	0.0000	-0.34	1	1	0.7500 1.0000	1.5836	5.1284	0.53

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	9.250	0.000	0.000	0.000	0.05
		B	8.910	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.000	0.000	0.00
T2	120.00-100.00	A	20.350	3.167	0.000	0.000	0.14
		B	59.400	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.00
T3	100.00-80.00	A	24.188	10.029	0.000	0.000	0.20
		B	59.400	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.00
T4	80.00-60.00	A	26.467	14.648	0.000	0.000	0.23
		B	59.400	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.00
T5	60.00-40.00	A	30.134	15.836	0.000	0.000	0.26
		B	59.400	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.00
T6	40.00-20.00	A	32.533	15.836	0.000	0.000	0.27
		B	59.400	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.00
T7	20.00-0.00	A	19.520	9.501	0.000	0.000	0.16
		B	44.550	0.000	0.000	0.000	0.28
		C	0.000	0.000	0.000	0.000	0.00

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	0.500	3.517	12.400	0.000	0.000	0.17
		B		1.490	10.920	0.000	0.000	0.16
		C		0.000	0.000	0.000	0.000	0.00
T2	120.00-100.00	A	0.500	8.792	30.934	0.000	0.000	0.44
		B		9.933	72.800	0.000	0.000	1.06
		C		0.000	0.000	0.000	0.000	0.00
T3	100.00-80.00	A	0.500	15.205	42.395	0.000	0.000	0.63
		B		9.933	72.800	0.000	0.000	1.06
		C		0.000	0.000	0.000	0.000	0.00
T4	80.00-60.00	A	0.500	19.992	49.547	0.000	0.000	0.74
		B		9.933	72.800	0.000	0.000	1.06
		C		0.000	0.000	0.000	0.000	0.00
T5	60.00-40.00	A	0.500	25.336	55.224	0.000	0.000	0.83
		B		9.933	72.800	0.000	0.000	1.06
		C		0.000	0.000	0.000	0.000	0.00
T6	40.00-20.00	A	0.500	29.650	57.330	0.000	0.000	0.87
		B		9.933	72.800	0.000	0.000	1.06
		C		0.000	0.000	0.000	0.000	0.00
T7	20.00-0.00	A	0.500	17.790	34.398	0.000	0.000	0.52

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		7.450	54.600	0.000	0.000	0.80
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	130.00-120.00	A	0.857	2.149	0.000	0.000
		B	0.826	1.675	0.000	0.000
		C	0.000	0.000	0.000	0.000
T2	120.00-100.00	A	2.116	4.945	0.000	0.000
		B	5.344	10.212	0.000	0.000
		C	0.000	0.000	0.000	0.000
T3	100.00-80.00	A	2.855	6.733	0.000	0.000
		B	4.956	9.484	0.000	0.000
		C	0.000	0.000	0.000	0.000
T4	80.00-60.00	A	2.501	5.966	0.000	0.000
		B	3.613	6.902	0.000	0.000
		C	0.000	0.000	0.000	0.000
T5	60.00-40.00	A	2.988	7.141	0.000	0.000
		B	3.862	7.137	0.000	0.000
		C	0.000	0.000	0.000	0.000
T6	40.00-20.00	A	3.185	7.684	0.000	0.000
		B	3.911	7.127	0.000	0.000
		C	0.000	0.000	0.000	0.000
T7	20.00-0.00	A	1.841	4.446	0.000	0.000
		B	2.827	5.154	0.000	0.000
		C	0.000	0.000	0.000	0.000

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	-5.9439	-2.7148	-6.2818	-1.4512
T2	120.00-100.00	-3.0449	-12.7760	-3.7624	-10.2575
T3	100.00-80.00	-6.5722	-12.0191	-7.5180	-9.3942
T4	80.00-60.00	-9.9676	-12.6808	-11.5750	-9.6991
T5	60.00-40.00	-12.7253	-12.6547	-14.1158	-9.5550
T6	40.00-20.00	-14.3380	-12.6373	-16.0311	-9.4353
T7	20.00-0.00	-9.6392	-13.5843	-11.3393	-10.9561

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod	A	From Leg	0.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	1.00 2.02	1.00 2.02	0.04 0.05
3' Sidearm	A	From Leg	1.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
3' Sidearm	B	From Leg	1.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
3' Sidearm	C	From Leg	1.50 0.00 0.00	0.0000	127.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
15' x 3" Dia Omni	A	From Face	0.00 0.00 8.00	0.0000	130.00	No Ice 1/2" Ice	4.50 6.03	4.50 6.03	0.04 0.07
15' x 3" Dia Omni	C	From Leg	0.00 0.00 8.00	0.0000	130.00	No Ice 1/2" Ice	4.50 6.03	4.50 6.03	0.04 0.07
PD220	B	From Face	0.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	0.02 0.05
PD220	C	From Face	0.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	0.02 0.05
PD220	C	From Leg	3.00 0.00 10.00	0.0000	130.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	0.02 0.05
DB806D-Y	B	From Leg	3.00 0.00 6.00	0.0000	130.00	No Ice 1/2" Ice	2.21 3.12	2.21 3.12	0.03 0.04
10' x 3" Dia Omni	A	From Leg	3.00 0.00 5.00	0.0000	130.00	No Ice 1/2" Ice	3.00 4.03	3.00 4.03	0.03 0.05
APX16PV-16PVL-E (T-Mobile - Existing)	A	From Leg	4.00 -6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	6.65 7.08	1.98 2.30	0.05 0.08
APX16PV-16PVL-E (T-Mobile - Existing)	B	From Leg	4.00 -6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	6.65 7.08	1.98 2.30	0.05 0.08
APX16PV-16PVL-E (T-Mobile - Existing)	C	From Leg	4.00 -6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	6.65 7.08	1.98 2.30	0.05 0.08
(2) TMA 10"x8"x3" (T-Mobile - Existing)	A	From Leg	4.00 -2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (T-Mobile - Existing)	A	From Leg	4.00 -2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
(2) TMA 10"x8"x3" (T-Mobile - Existing)	A	From Leg	4.00 -2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	0.78 0.90	0.29 0.38	0.02 0.02
APX16DWV-16DWVS-E-A20 (T-Mobile - Proposed)	A	From Leg	4.00 6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07
APX16DWV-16DWVS-E-A20 (T-Mobile - Proposed)	B	From Leg	4.00 6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APX16DWV-16DWVS-E-A20	C	From Leg	4.00 6.00 0.00	0.0000	123.00	No Ice 1/2" Ice	7.07 7.52	2.15 2.49	0.04 0.07
(T-Mobile - Proposed)									
ATMAA1412D-1A20 TMA	A	From Leg	4.00 2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	1.17 1.31	0.47 0.57	0.01 0.02
(T-Mobile - Proposed)									
ATMAA1412D-1A20 TMA	B	From Leg	4.00 2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	1.17 1.31	0.47 0.57	0.01 0.02
(T-Mobile - Proposed)									
ATMAA1412D-1A20 TMA	C	From Leg	4.00 2.00 0.00	0.0000	123.00	No Ice 1/2" Ice	1.17 1.31	0.47 0.57	0.01 0.02
(T-Mobile - Proposed)									
12' T-Frame Sector Mount (1)	A	From Leg	3.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60
(T-Mobile)									
12' T-Frame Sector Mount (1)	B	From Leg	3.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60
(T-Mobile)									
12' T-Frame Sector Mount (1)	C	From Leg	3.00 0.00 0.00	0.0000	123.00	No Ice 1/2" Ice	13.60 18.40	13.60 18.40	0.47 0.60
(T-Mobile)									
DB205-A	A	From Leg	4.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	1.20 2.16	1.20 2.16	0.04 0.05
3' Side arm	A	From Leg	2.00 0.00 0.00	0.0000	98.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
AP7-850/065N	B	From Leg	3.50 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	1.40 1.56	0.35 0.45	0.02 0.03
3' Side arm	B	From Leg	2.00 0.00 0.00	0.0000	108.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
AP7-850/065N	B	From Leg	3.50 0.00 0.00	0.0000	104.00	No Ice 1/2" Ice	1.40 1.56	0.35 0.45	0.02 0.03
3' Side arm	B	From Leg	2.00 0.00 0.00	0.0000	104.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
1142-2B	C	From Leg	3.50 0.00 6.00	0.0000	110.00	No Ice 1/2" Ice	1.12 2.54	1.12 2.54	0.01 0.02
3' Side arm	C	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
1142-2B	A	From Leg	3.50 0.00 6.00	0.0000	110.00	No Ice 1/2" Ice	1.12 2.54	1.12 2.54	0.01 0.02
3' Side arm	A	From Leg	1.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
1142-2B	C	From Leg	3.50 0.00 6.00	0.0000	84.00	No Ice 1/2" Ice	1.12 2.54	1.12 2.54	0.01 0.02
3' Side arm	C	From Leg	1.50 0.00 0.00	0.0000	84.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15

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
Diamond X-200A	A	From Leg	3.50 0.00 5.00	0.0000	65.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.02
3' Side arm	A	From Leg	1.50 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
DB212-1	C	From Leg	3.50 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	4.50 8.10	4.50 8.10	0.03 0.04
Double Side Arm	C	From Leg	1.50 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	7.00 8.50	7.00 8.50	0.13 0.15
DB212-1	B	From Leg	3.50 0.00 0.00	0.0000	54.00	No Ice 1/2" Ice	4.50 8.10	4.50 8.10	0.03 0.04
8'x2 1/2" Pipe Mount	B	From Leg	3.00 0.00 0.00	0.0000	54.00	No Ice 1/2" Ice	2.30 3.13	2.30 3.13	0.04 0.06
3' Side arm	B	From Leg	1.50 0.00 0.00	0.0000	54.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
Diamond X-200A	A	From Leg	3.50 0.00 5.00	0.0000	65.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.02
3' Side arm	A	From Leg	1.50 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
Wind speed cups	C	From Leg	0.50 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice	1.80 2.25	1.80 2.25	0.04 0.05
DB230-2B	C	From Leg	3.50 0.00 0.00	0.0000	45.00	No Ice 1/2" Ice	2.10 3.78	2.10 3.78	0.10 0.14
3' Side arm	C	From Leg	1.50 0.00 0.00	0.0000	43.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
DB222-C	A	From Leg	3.50 0.00 5.00	0.0000	42.00	No Ice 1/2" Ice	1.60 2.88	1.60 2.88	0.02 0.02
3' Side arm	A	From Leg	1.50 0.00 0.00	0.0000	42.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
6'x4" Pipe Mount	B	From Leg	0.50 0.00 0.00	0.0000	71.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
6'x4" Pipe Mount	A	From Leg	0.50 0.00 0.00	0.0000	86.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
Dish Mount Assy	B	None		0.0000	97.00	No Ice 1/2" Ice	24.00 30.00	24.00 30.00	0.42 0.97
6'x4" Pipe Mount	B	From Leg	0.50 0.00 0.00	0.0000	97.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
Dish Mount Assy	C	None		0.0000	106.00	No Ice 1/2" Ice	24.00 30.00	24.00 30.00	0.42 0.97
6'x4" Pipe Mount	C	From Leg	0.50 0.00	0.0000	106.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
Dish Mount Assy	B	None		0.0000	115.00	No Ice	24.00	24.00	0.42
						1/2" Ice	30.00	30.00	0.97
6'x4" Pipe Mount	B	From Leg	0.50	0.0000	115.00	No Ice	2.09	2.09	0.05
			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						
SD210-SF3P4LDF	C	From Face	0.00	0.0000	130.00	No Ice	0.90	0.90	0.01
			0.00			1/2" Ice	1.40	1.40	0.03
			0.00						
SD210-SF3P4LDF	C	From Leg	0.50	0.0000	90.00	No Ice	0.90	0.90	0.01
			0.00			1/2" Ice	1.40	1.40	0.03
			0.00						

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		71.00	4.00	No Ice 1/2" Ice	12.57 13.10	0.14 0.28
12 FT DISH	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		86.00	12.00	No Ice 1/2" Ice	113.09 114.62	0.54 1.13
10 FT DISH	B	Paraboloid w/o Radome	From Leg	0.50 0.00 0.00	Worst		97.00	10.00	No Ice 1/2" Ice	78.54 79.81	0.32 0.73
6 FT DISH	C	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		106.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.14 0.29
8 FT DISH	B	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	Worst		115.00	8.00	No Ice 1/2" Ice	50.30 52.00	0.75 1.00

Tower Pressures - No Ice

$G_H = 1.143$

Section Elevation ft	z ft	K_z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
T1 130.00-120.00	125.00	1.463	27	87.604	A	0.000	20.861	4.792	22.97	0.000	0.000
					B	0.000	20.552		23.31	0.000	0.000
					C	0.000	12.468		38.43	0.000	0.000

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
T2 120.00-100.00	110.00	1.411	26	197.508	A	3.167	46.849	11.688	23.37	0.000	0.000
					B	0.000	82.670		14.14	0.000	0.000
					C	0.000	28.614		40.85	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	240.843	A	10.029	55.378	15.027	22.97	0.000	0.000
					B	0.000	88.489		16.98	0.000	0.000
					C	0.000	34.045		44.14	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	285.953	A	14.648	59.069	18.582	25.21	0.000	0.000
					B	0.000	90.890		20.44	0.000	0.000
					C	0.000	35.103		52.94	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	334.291	A	15.836	66.596	18.595	22.56	0.000	0.000
					B	0.000	94.989		19.58	0.000	0.000
					C	0.000	39.450		47.13	0.000	0.000
T6 40.00-20.00	30.00	1	18	386.897	A	15.836	75.756	22.141	24.17	0.000	0.000
					B	0.000	101.897		21.73	0.000	0.000
					C	0.000	46.408		47.71	0.000	0.000
T7 20.00-0.00	10.00	1	18	436.897	A	9.501	66.336	22.141	29.19	0.000	0.000
					B	0.000	90.381		24.50	0.000	0.000
					C	0.000	48.658		45.50	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.143$

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 130.00-120.00	125.00	1.463	27	0.5000	88.438	A	12.400	19.010	6.458	20.56	0.000	0.000
						B	10.920	17.457		22.76	0.000	0.000
						C	0.000	17.642		36.61	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	0.5000	199.177	A	30.934	42.078	15.027	20.58	0.000	0.000
						B	72.800	37.952		13.57	0.000	0.000
						C	0.000	38.231		39.31	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	0.5000	242.512	A	42.395	52.948	18.366	19.26	0.000	0.000
						B	72.800	44.926		15.60	0.000	0.000
						C	0.000	44.477		41.29	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	0.5000	287.622	A	49.547	58.588	21.923	20.27	0.000	0.000
						B	72.800	47.593		18.21	0.000	0.000
						C	0.000	44.562		49.20	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	0.5000	335.961	A	55.224	67.757	21.937	17.84	0.000	0.000
						B	72.800	52.359		17.53	0.000	0.000
						C	0.000	49.563		44.26	0.000	0.000
T6 40.00-20.00	30.00	1	18	0.5000	388.566	A	57.330	79.174	25.483	18.67	0.000	0.000
						B	72.800	60.015		19.19	0.000	0.000
						C	0.000	57.209		44.54	0.000	0.000
T7 20.00-0.00	10.00	1	18	0.5000	438.566	A	34.398	73.518	25.483	23.61	0.000	0.000
						B	54.600	62.470		21.77	0.000	0.000
						C	0.000	60.174		42.35	0.000	0.000

Tower Pressure - Service

$G_H = 1.143$

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	1.463	27	87.604	A	0.000	20.861	4.792	22.97	0.000	0.000
					B	0.000	20.552		23.31	0.000	0.000
					C	0.000	12.468		38.43	0.000	0.000
T2 120.00-100.00	110.00	1.411	26	197.508	A	3.167	46.849	11.688	23.37	0.000	0.000
					B	0.000	82.670		14.14	0.000	0.000
					C	0.000	28.614		40.85	0.000	0.000
T3 100.00-80.00	90.00	1.332	25	240.843	A	10.029	55.378	15.027	22.97	0.000	0.000
					B	0.000	88.489		16.98	0.000	0.000
					C	0.000	34.045		44.14	0.000	0.000
T4 80.00-60.00	70.00	1.24	23	285.953	A	14.648	59.069	18.582	25.21	0.000	0.000
					B	0.000	90.890		20.44	0.000	0.000
					C	0.000	35.103		52.94	0.000	0.000
T5 60.00-40.00	50.00	1.126	21	334.291	A	15.836	66.596	18.595	22.56	0.000	0.000
					B	0.000	94.989		19.58	0.000	0.000
					C	0.000	39.450		47.13	0.000	0.000
T6 40.00-20.00	30.00	1	18	386.897	A	15.836	75.756	22.141	24.17	0.000	0.000
					B	0.000	101.897		21.73	0.000	0.000
					C	0.000	46.408		47.71	0.000	0.000
T7 20.00-0.00	10.00	1	18	436.897	A	9.501	66.336	22.141	29.19	0.000	0.000
					B	0.000	90.381		24.50	0.000	0.000
					C	0.000	48.658		45.50	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	1	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	1	1	12.292			
			C	0.142	2.8	0.58	1	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	1	1	31.403	3.30	164.90	B
			B	0.419	2.028	0.659	1	1	54.509			
			C	0.145	2.79	0.581	1	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	1	1	43.678	3.39	169.74	B
			B	0.367	2.132	0.639	1	1	56.531			
			C	0.141	2.804	0.58	1	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	1	1	50.319	3.33	166.57	B
			B	0.318	2.25	0.622	1	1	56.490			
			C	0.123	2.874	0.578	1	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	1	1	55.861	3.26	162.79	A
			B	0.284	2.339	0.611	1	1	58.055			
			C	0.118	2.893	0.577	1	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	1	1	61.182	3.21	160.29	A
			B	0.263	2.398	0.605	1	1	61.686			
			C	0.12	2.885	0.577	1	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	1	1	48.332	2.91	145.53	B
			B	0.207	2.573	0.592	1	1	53.490			
			C	0.111	2.919	0.576	1	1	28.043			
Sum Weight:	3.53	17.31						OTM	1309.09 kip-ft	20.35		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.825	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.825	1	12.292			
			C	0.142	2.8	0.58	0.825	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.825	1	30.849	3.30	164.90	B
			B	0.419	2.028	0.659	0.825	1	54.509			
			C	0.145	2.79	0.581	0.825	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.825	1	41.923	3.39	169.74	B
			B	0.367	2.132	0.639	0.825	1	56.531			
			C	0.141	2.804	0.58	0.825	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.825	1	47.756	3.33	166.57	B
			B	0.318	2.25	0.622	0.825	1	56.490			
			C	0.123	2.874	0.578	0.825	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.825	1	53.089	3.23	161.67	B
			B	0.284	2.339	0.611	0.825	1	58.055			
			C	0.118	2.893	0.577	0.825	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.825	1	58.411	3.13	156.40	B
			B	0.263	2.398	0.605	0.825	1	61.686			
			C	0.12	2.885	0.577	0.825	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.825	1	46.670	2.91	145.53	B
			B	0.207	2.573	0.592	0.825	1	53.490			
			C	0.111	2.919	0.576	0.825	1	28.043			
Sum Weight:	3.53	17.31						OTM	1305.64 kip-ft	20.25		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.8	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.8	1	12.292			
			C	0.142	2.8	0.58	0.8	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.8	1	30.770	3.30	164.90	B
			B	0.419	2.028	0.659	0.8	1	54.509			
			C	0.145	2.79	0.581	0.8	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.8	1	41.672	3.39	169.74	B
			B	0.367	2.132	0.639	0.8	1	56.531			
			C	0.141	2.804	0.58	0.8	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.8	1	47.390	3.33	166.57	B
			B	0.318	2.25	0.622	0.8	1	56.490			
			C	0.123	2.874	0.578	0.8	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.8	1	52.693	3.23	161.67	B
			B	0.284	2.339	0.611	0.8	1	58.055			
			C	0.118	2.893	0.577	0.8	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.8	1	58.015	3.13	156.40	B
			B	0.263	2.398	0.605	0.8	1	61.686			
			C	0.12	2.885	0.577	0.8	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.8	1	46.432	2.91	145.53	B
			B	0.207	2.573	0.592	0.8	1	53.490			
			C	0.111	2.919	0.576	0.8	1	28.043			
Sum Weight:	3.53	17.31						OTM	1305.64	20.25		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.85	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.85	1	12.292			
			C	0.142	2.8	0.58	0.85	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.85	1	30.928	3.30	164.90	B
			B	0.419	2.028	0.659	0.85	1	54.509			
			C	0.145	2.79	0.581	0.85	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.85	1	42.174	3.39	169.74	B
			B	0.367	2.132	0.639	0.85	1	56.531			
			C	0.141	2.804	0.58	0.85	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.85	1	48.122	3.33	166.57	B
			B	0.318	2.25	0.622	0.85	1	56.490			
			C	0.123	2.874	0.578	0.85	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.85	1	53.485	3.23	161.67	B
			B	0.284	2.339	0.611	0.85	1	58.055			
			C	0.118	2.893	0.577	0.85	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.85	1	58.807	3.13	156.40	B
			B	0.263	2.398	0.605	0.85	1	61.686			
			C	0.12	2.885	0.577	0.85	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.85	1	46.907	2.91	145.53	B
			B	0.207	2.573	0.592	0.85	1	53.490			
			C	0.111	2.919	0.576	0.85	1	28.043			
Sum Weight:	3.53	17.31						OTM	1305.64 kip-ft	20.25		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.33	0.97	A	0.355	2.16	0.634	1	1	24.459	1.63	163.42	A
			B	0.321	2.242	0.623	1	1	21.787			
			C	0.199	2.598	0.59	1	1	10.414			
T2 120.00-100.00	1.50	2.38	A	0.367	2.134	0.639	1	1	57.802	5.50	275.23	B
			B	0.556	1.838	0.728	1	1	100.417			
			C	0.192	2.623	0.589	1	1	22.510			
T3 100.00-80.00	1.70	2.84	A	0.393	2.078	0.649	1	1	76.749	5.61	280.63	B
			B	0.485	1.92	0.69	1	1	103.807			
			C	0.183	2.652	0.587	1	1	26.115			
T4 80.00-60.00	1.80	3.12	A	0.376	2.114	0.642	1	1	87.165	5.54	276.98	B
			B	0.419	2.028	0.659	1	1	104.181			
			C	0.155	2.753	0.582	1	1	25.946			
T5 60.00-	1.89	3.81	A	0.366	2.135	0.638	1	1	98.477	5.37	268.55	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
40.00			B	0.373	2.121	0.641	1	1	106.351			
			C	0.148	2.781	0.581	1	1	28.801			
T6 40.00-20.00	1.94	4.52	A	0.351	2.168	0.633	1	1	107.443	5.12	256.14	B
			B	0.342	2.191	0.63	1	1	110.585			
			C	0.147	2.782	0.581	1	1	33.241			
T7 20.00-0.00	1.32	5.29	A	0.246	2.449	0.601	1	1	78.574	4.67	233.46	B
			B	0.267	2.388	0.606	1	1	92.478			
			C	0.137	2.819	0.58	1	1	34.877			
Sum Weight:	10.48	22.92						OTM	2171.63 kip-ft	33.45		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.33	0.97	A	0.355	2.16	0.634	0.825	1	22.289	1.49	148.92	A
			B	0.321	2.242	0.623	0.825	1	19.876			
			C	0.199	2.598	0.59	0.825	1	10.414			
T2 120.00-100.00	1.50	2.38	A	0.367	2.134	0.639	0.825	1	52.388	4.81	240.32	B
			B	0.556	1.838	0.728	0.825	1	87.677			
			C	0.192	2.623	0.589	0.825	1	22.510			
T3 100.00-80.00	1.70	2.84	A	0.393	2.078	0.649	0.825	1	69.330	4.92	246.19	B
			B	0.485	1.92	0.69	0.825	1	91.067			
			C	0.183	2.652	0.587	0.825	1	26.115			
T4 80.00-60.00	1.80	3.12	A	0.376	2.114	0.642	0.825	1	78.494	4.86	243.11	B
			B	0.419	2.028	0.659	0.825	1	91.441			
			C	0.155	2.753	0.582	0.825	1	25.946			
T5 60.00-40.00	1.89	3.81	A	0.366	2.135	0.638	0.825	1	88.812	4.73	236.38	B
			B	0.373	2.121	0.641	0.825	1	93.611			
			C	0.148	2.781	0.581	0.825	1	28.801			
T6 40.00-20.00	1.94	4.52	A	0.351	2.168	0.633	0.825	1	97.410	4.53	226.63	B
			B	0.342	2.191	0.63	0.825	1	97.845			
			C	0.147	2.782	0.581	0.825	1	33.241			
T7 20.00-0.00	1.32	5.29	A	0.246	2.449	0.601	0.825	1	72.554	4.19	209.34	B
			B	0.267	2.388	0.606	0.825	1	82.923			
			C	0.137	2.819	0.58	0.825	1	34.877			
Sum Weight:	10.48	22.92						OTM	1912.57 kip-ft	29.53		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.33	0.97	A	0.355	2.16	0.634	0.8	1	21.979	1.47	146.85	A
			B	0.321	2.242	0.623	0.8	1	19.603			
			C	0.199	2.598	0.59	0.8	1	10.414			
T2 120.00-	1.50	2.38	A	0.367	2.134	0.639	0.8	1	51.615	4.71	235.33	B

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
100.00			B	0.556	1.838	0.728	0.8	1	85.857			
			C	0.192	2.623	0.589	0.8	1	22.510			
T3 100.00-80.00	1.70	2.84	A	0.393	2.078	0.649	0.8	1	68.270	4.83	241.27	B
			B	0.485	1.92	0.69	0.8	1	89.247			
			C	0.183	2.652	0.587	0.8	1	26.115			
T4 80.00-60.00	1.80	3.12	A	0.376	2.114	0.642	0.8	1	77.256	4.77	238.27	B
			B	0.419	2.028	0.659	0.8	1	89.621			
			C	0.155	2.753	0.582	0.8	1	25.946			
T5 60.00-40.00	1.89	3.81	A	0.366	2.135	0.638	0.8	1	87.432	4.64	231.78	B
			B	0.373	2.121	0.641	0.8	1	91.791			
			C	0.148	2.781	0.581	0.8	1	28.801			
T6 40.00-20.00	1.94	4.52	A	0.351	2.168	0.633	0.8	1	95.977	4.45	222.42	B
			B	0.342	2.191	0.63	0.8	1	96.025			
			C	0.147	2.782	0.581	0.8	1	33.241			
T7 20.00-0.00	1.32	5.29	A	0.246	2.449	0.601	0.8	1	71.694	4.12	205.89	B
			B	0.267	2.388	0.606	0.8	1	81.558			
			C	0.137	2.819	0.58	0.8	1	34.877			
Sum Weight:	10.48	22.92						OTM	1875.56 kip-ft	28.97		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.33	0.97	A	0.355	2.16	0.634	0.85	1	22.599	1.51	150.99	A
			B	0.321	2.242	0.623	0.85	1	20.149			
			C	0.199	2.598	0.59	0.85	1	10.414			
T2 120.00-100.00	1.50	2.38	A	0.367	2.134	0.639	0.85	1	53.162	4.91	245.30	B
			B	0.556	1.838	0.728	0.85	1	89.497			
			C	0.192	2.623	0.589	0.85	1	22.510			
T3 100.00-80.00	1.70	2.84	A	0.393	2.078	0.649	0.85	1	70.390	5.02	251.11	B
			B	0.485	1.92	0.69	0.85	1	92.887			
			C	0.183	2.652	0.587	0.85	1	26.115			
T4 80.00-60.00	1.80	3.12	A	0.376	2.114	0.642	0.85	1	79.733	4.96	247.95	B
			B	0.419	2.028	0.659	0.85	1	93.261			
			C	0.155	2.753	0.582	0.85	1	25.946			
T5 60.00-40.00	1.89	3.81	A	0.366	2.135	0.638	0.85	1	90.193	4.82	240.98	B
			B	0.373	2.121	0.641	0.85	1	95.431			
			C	0.148	2.781	0.581	0.85	1	28.801			
T6 40.00-20.00	1.94	4.52	A	0.351	2.168	0.633	0.85	1	98.843	4.62	230.85	B
			B	0.342	2.191	0.63	0.85	1	99.665			
			C	0.147	2.782	0.581	0.85	1	33.241			
T7 20.00-0.00	1.32	5.29	A	0.246	2.449	0.601	0.85	1	73.414	4.26	212.78	B
			B	0.267	2.388	0.606	0.85	1	84.288			
			C	0.137	2.819	0.58	0.85	1	34.877			
Sum Weight:	10.48	22.92						OTM	1949.57 kip-ft	30.09		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	1	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	1	1	12.292			
			C	0.142	2.8	0.58	1	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	1	1	31.403	3.30	164.90	B
			B	0.419	2.028	0.659	1	1	54.509			
			C	0.145	2.79	0.581	1	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	1	1	43.678	3.39	169.74	B
			B	0.367	2.132	0.639	1	1	56.531			
			C	0.141	2.804	0.58	1	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	1	1	50.319	3.33	166.57	B
			B	0.318	2.25	0.622	1	1	56.490			
			C	0.123	2.874	0.578	1	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	1	1	55.861	3.26	162.79	A
			B	0.284	2.339	0.611	1	1	58.055			
			C	0.118	2.893	0.577	1	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	1	1	61.182	3.21	160.29	A
			B	0.263	2.398	0.605	1	1	61.686			
			C	0.12	2.885	0.577	1	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	1	1	48.332	2.91	145.53	B
			B	0.207	2.573	0.592	1	1	53.490			
			C	0.111	2.919	0.576	1	1	28.043			
Sum Weight:	3.53	17.31						OTM	1309.09 kip-ft	20.35		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.825	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.825	1	12.292			
			C	0.142	2.8	0.58	0.825	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.825	1	30.849	3.30	164.90	B
			B	0.419	2.028	0.659	0.825	1	54.509			
			C	0.145	2.79	0.581	0.825	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.825	1	41.923	3.39	169.74	B
			B	0.367	2.132	0.639	0.825	1	56.531			
			C	0.141	2.804	0.58	0.825	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.825	1	47.756	3.33	166.57	B
			B	0.318	2.25	0.622	0.825	1	56.490			
			C	0.123	2.874	0.578	0.825	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.825	1	53.089	3.23	161.67	B
			B	0.284	2.339	0.611	0.825	1	58.055			
			C	0.118	2.893	0.577	0.825	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.825	1	58.411	3.13	156.40	B
			B	0.263	2.398	0.605	0.825	1	61.686			
			C	0.12	2.885	0.577	0.825	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.825	1	46.670	2.91	145.53	B
			B	0.207	2.573	0.592	0.825	1	53.490			
			C	0.111	2.919	0.576	0.825	1	28.043			
Sum Weight:	3.53	17.31						OTM	1305.64 kip-ft	20.25		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.8	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.8	1	12.292			
			C	0.142	2.8	0.58	0.8	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.8	1	30.770	3.30	164.90	B
			B	0.419	2.028	0.659	0.8	1	54.509			
			C	0.145	2.79	0.581	0.8	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.8	1	41.672	3.39	169.74	B
			B	0.367	2.132	0.639	0.8	1	56.531			
			C	0.141	2.804	0.58	0.8	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.8	1	47.390	3.33	166.57	B
			B	0.318	2.25	0.622	0.8	1	56.490			
			C	0.123	2.874	0.578	0.8	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.8	1	52.693	3.23	161.67	B
			B	0.284	2.339	0.611	0.8	1	58.055			
			C	0.118	2.893	0.577	0.8	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.8	1	58.015	3.13	156.40	B
			B	0.263	2.398	0.605	0.8	1	61.686			
			C	0.12	2.885	0.577	0.8	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.8	1	46.432	2.91	145.53	B
			B	0.207	2.573	0.592	0.8	1	53.490			
			C	0.111	2.919	0.576	0.8	1	28.043			
Sum Weight:	3.53	17.31						OTM	1305.64 kip-ft	20.25		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 130.00-120.00	0.11	0.64	A	0.238	2.474	0.599	0.85	1	12.494	0.96	95.61	A
			B	0.235	2.484	0.598	0.85	1	12.292			
			C	0.142	2.8	0.58	0.85	1	7.235			
T2 120.00-100.00	0.52	1.70	A	0.253	2.428	0.603	0.85	1	30.928	3.30	164.90	B
			B	0.419	2.028	0.659	0.85	1	54.509			
			C	0.145	2.79	0.581	0.85	1	16.617			
T3 100.00-80.00	0.58	2.04	A	0.272	2.374	0.608	0.85	1	42.174	3.39	169.74	B
			B	0.367	2.132	0.639	0.85	1	56.531			
			C	0.141	2.804	0.58	0.85	1	19.753			
T4 80.00-60.00	0.61	2.37	A	0.258	2.414	0.604	0.85	1	48.122	3.33	166.57	B
			B	0.318	2.25	0.622	0.85	1	56.490			
			C	0.123	2.874	0.578	0.85	1	20.278			
T5 60.00-40.00	0.63	2.93	A	0.247	2.448	0.601	0.85	1	53.485	3.23	161.67	B
			B	0.284	2.339	0.611	0.85	1	58.055			
			C	0.118	2.893	0.577	0.85	1	22.767			
T6 40.00-20.00	0.64	3.48	A	0.237	2.478	0.599	0.85	1	58.807	3.13	156.40	B
			B	0.263	2.398	0.605	0.85	1	61.686			
			C	0.12	2.885	0.577	0.85	1	26.793			
T7 20.00-0.00	0.44	4.15	A	0.174	2.687	0.585	0.85	1	46.907	2.91	145.53	B
			B	0.207	2.573	0.592	0.85	1	53.490			
			C	0.111	2.919	0.576	0.85	1	28.043			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	3.53	17.31						OTM	1305.64 kip-ft	20.25		

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			-10.84	2.08	
Total Weight	28.64			-10.84	2.08	
Wind 0 deg - No Ice		-0.03	-37.89	-3092.55	4.92	8.40
Wind 30 deg - No Ice		18.84	-32.72	-2675.26	-1530.70	-3.87
Wind 45 deg - No Ice		26.66	-26.70	-2185.48	-2167.07	-9.89
Wind 60 deg - No Ice		32.66	-18.87	-1547.51	-2655.62	-15.23
Wind 90 deg - No Ice		37.73	0.03	-8.00	-3068.41	-22.50
Wind 120 deg - No Ice		32.78	18.97	1532.47	-2661.46	-23.77
Wind 135 deg - No Ice		26.70	26.74	2167.82	-2171.09	-21.93
Wind 150 deg - No Ice		18.89	32.74	2656.42	-1535.63	-18.62
Wind 180 deg - No Ice		0.03	37.79	3067.40	-0.77	-8.52
Wind 210 deg - No Ice		-18.84	32.72	2653.58	1534.86	3.87
Wind 225 deg - No Ice		-26.66	26.70	2163.79	2171.23	9.89
Wind 240 deg - No Ice		-32.75	18.92	1527.54	2662.77	15.38
Wind 270 deg - No Ice		-37.73	-0.03	-13.69	3072.57	22.50
Wind 300 deg - No Ice		-32.69	-18.92	-1552.43	2662.62	23.74
Wind 315 deg - No Ice		-26.70	-26.74	-2189.51	2175.25	21.93
Wind 330 deg - No Ice		-18.89	-32.74	-2678.11	1539.79	18.62
Member Ice	5.61					
Total Weight Ice	45.79			-27.60	13.02	
Wind 0 deg - Ice		-0.03	-53.66	-4257.67	16.02	-6.46
Wind 30 deg - Ice		25.09	-43.54	-3497.15	-1984.23	-15.53
Wind 45 deg - Ice		35.10	-35.15	-2833.41	-2786.91	-19.46
Wind 60 deg - Ice		42.52	-24.56	-1992.00	-3385.22	-22.08
Wind 90 deg - Ice		50.23	0.03	-24.60	-3986.68	-24.89
Wind 120 deg - Ice		46.43	26.86	2090.03	-3644.63	-20.64
Wind 135 deg - Ice		35.14	35.19	2782.45	-2791.15	-15.11
Wind 150 deg - Ice		25.14	43.57	3444.94	-1989.43	-9.36
Wind 180 deg - Ice		0.03	49.18	3906.40	10.01	2.60
Wind 210 deg - Ice		-25.09	43.54	3441.94	2010.27	15.53
Wind 225 deg - Ice		-35.10	35.15	2778.20	2812.94	19.46
Wind 240 deg - Ice		-46.40	26.81	2084.83	3667.66	27.10
Wind 270 deg - Ice		-50.23	-0.03	-30.61	4012.72	24.89
Wind 300 deg - Ice		-42.55	-24.61	-1997.21	3414.26	19.49
Wind 315 deg - Ice		-35.14	-35.19	-2837.66	2817.19	15.11
Wind 330 deg - Ice		-25.14	-43.57	-3500.15	2015.47	9.36
Total Weight	28.64			-10.84	2.08	
Wind 0 deg - Service		-0.03	-37.89	-3083.24	-0.98	8.40
Wind 30 deg - Service		18.84	-32.72	-2665.96	-1536.60	-3.87
Wind 45 deg - Service		26.66	-26.70	-2176.18	-2172.98	-9.89
Wind 60 deg - Service		32.66	-18.87	-1538.20	-2661.52	-15.23
Wind 90 deg - Service		37.73	0.03	1.31	-3074.31	-22.50
Wind 120 deg - Service		32.78	18.97	1541.78	-2667.36	-23.77
Wind 135 deg - Service		26.70	26.74	2177.13	-2177.00	-21.93
Wind 150 deg - Service		18.89	32.74	2665.73	-1541.53	-18.62

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
Wind 180 deg - Service		0.03	37.79	3076.71	-6.67	-8.52
Wind 210 deg - Service		-18.84	32.72	2662.88	1528.96	3.87
Wind 225 deg - Service		-26.66	26.70	2173.10	2165.33	9.89
Wind 240 deg - Service		-32.75	18.92	1536.85	2656.87	15.38
Wind 270 deg - Service		-37.73	-0.03	-4.38	3066.66	22.50
Wind 300 deg - Service		-32.69	-18.92	-1543.13	2656.72	23.74
Wind 315 deg - Service		-26.70	-26.74	-2180.20	2169.35	21.93
Wind 330 deg - Service		-18.89	-32.74	-2668.80	1533.88	18.62

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service

Comb. No.	Description
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	130 - 120	Leg	Max Tension	32	2.07	-0.43	-0.01
			Max. Compression	19	-4.07	0.55	-0.08
			Max. Mx	27	0.94	0.69	0.08
			Max. My	23	-1.56	-0.00	-0.72
			Max. Vy	19	0.58	0.44	0.05
			Max. Vx	34	0.60	-0.00	0.46
		Diagonal	Max Tension	20	2.53	0.00	0.00
			Max. Compression	20	-2.63	0.00	0.00
			Max. Mx	20	2.53	0.02	0.00
			Max. My	19	-0.33	0.00	-0.00
			Max. Vy	20	0.01	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	27	1.81	-0.01	0.00
			Max. Compression	19	-1.78	-0.01	-0.00
			Max. Mx	32	-0.44	-0.01	-0.00
			Max. My	19	0.44	-0.01	0.00
			Max. Vy	32	-0.01	-0.01	-0.00
			Max. Vx	19	-0.00	-0.01	0.00
		Top Girt	Max Tension	27	0.68	-0.01	0.00
			Max. Compression	19	-0.67	-0.01	-0.00
			Max. Mx	32	-0.19	-0.01	-0.00
			Max. My	22	-0.31	-0.01	-0.00
			Max. Vy	32	-0.01	-0.01	-0.00
			Max. Vx	22	0.00	-0.01	-0.00
		Inner Bracing	Max Tension	19	0.03	0.00	0.00
			Max. Compression	19	-0.03	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	19	0.01	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T2	120 - 100	Leg	Max Tension	22	15.80	-0.16	0.17
			Max. Compression	24	-23.34	0.70	0.03
			Max. Mx	32	14.61	-0.76	-0.02
			Max. My	20	-4.02	-0.03	-1.16
			Max. Vy	32	0.68	-0.50	-0.05
			Max. Vx	20	0.99	-0.04	-0.67
		Diagonal	Max Tension	31	6.90	0.00	0.00
			Max. Compression	31	-7.06	0.00	0.00
			Max. Mx	20	6.74	0.04	0.00
			Max. My	19	-0.23	0.00	-0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
		Horizontal	Max Tension	31	4.34	-0.02	0.00
			Max. Compression	31	-4.31	-0.02	0.00
			Max. Mx	22	-0.69	-0.04	-0.01
			Max. My	19	0.56	-0.00	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	22	-0.02	-0.04	-0.01
			Max. Vx	19	-0.00	-0.00	0.01
		Top Girt	Max Tension	21	2.30	-0.01	0.00
			Max. Compression	19	-2.40	-0.02	-0.00
			Max. Mx	22	-0.57	-0.02	-0.01
			Max. My	19	0.47	-0.01	0.01
			Max. Vy	22	-0.02	-0.02	-0.01
			Max. Vx	19	-0.00	-0.01	0.01
		Inner Bracing	Max Tension	31	0.07	0.00	0.00
			Max. Compression	31	-0.07	0.00	0.00
			Max. Mx	18	-0.00	-0.01	0.00
			Max. My	24	0.07	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T3	100 - 80	Leg	Max Tension	22	46.14	-0.19	0.38
			Max. Compression	19	-61.56	0.51	0.03
			Max. Mx	32	22.21	2.05	-0.02
			Max. My	28	-5.67	-0.03	-3.62
			Max. Vy	32	-0.98	-0.76	-0.02
			Max. Vx	23	1.83	-0.02	0.47
		Diagonal	Max Tension	26	12.31	0.00	0.00
			Max. Compression	26	-12.51	0.00	0.00
			Max. Mx	34	12.26	0.06	0.00
			Max. My	24	-0.13	0.00	0.00
			Max. Vy	34	-0.03	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	26	8.55	-0.03	-0.00
			Max. Compression	26	-8.53	-0.03	-0.00
			Max. Mx	22	-0.79	-0.05	-0.02
			Max. My	30	0.76	-0.01	0.02
			Max. Vy	22	-0.02	-0.05	-0.02
			Max. Vx	19	-0.00	-0.01	0.02
		Top Girt	Max Tension	31	5.98	-0.02	0.00
			Max. Compression	30	-6.08	-0.03	-0.01
			Max. Mx	22	-1.57	-0.04	-0.02
			Max. My	19	1.53	-0.01	0.02
			Max. Vy	22	-0.02	-0.04	-0.02
			Max. Vx	30	-0.00	-0.01	0.02
		Inner Bracing	Max Tension	26	0.15	0.00	0.00
			Max. Compression	26	-0.15	0.00	0.00
			Max. Mx	18	-0.00	-0.02	0.00
			Max. My	30	0.13	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
T4	80 - 60	Leg	Max Tension	22	77.41	-0.48	0.20
			Max. Compression	19	-98.53	0.63	0.09
			Max. Mx	27	75.36	-0.68	-0.08
			Max. My	23	-9.36	-0.04	0.78
			Max. Vy	32	0.20	-0.47	-0.16
			Max. Vx	31	0.32	-0.04	-0.78
		Diagonal	Max Tension	26	15.22	0.00	0.00
			Max. Compression	26	-15.46	0.00	0.00
			Max. Mx	34	14.98	0.11	0.00
			Max. My	24	1.29	0.00	0.00
			Max. Vy	34	-0.04	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	26	9.04	-0.04	-0.00
			Max. Compression	26	-9.09	-0.04	-0.00
			Max. Mx	22	-0.34	-0.07	-0.02
			Max. My	30	0.89	-0.01	0.02
			Max. Vy	22	-0.03	-0.07	-0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	24	-0.00	-0.01	0.02
		Top Girt	Max Tension	26	8.68	-0.03	-0.00
			Max. Compression	26	-8.70	-0.03	-0.00
			Max. Mx	22	-0.44	-0.06	-0.02
			Max. My	30	0.70	-0.00	0.02
			Max. Vy	22	-0.03	-0.06	-0.02
			Max. Vx	30	-0.00	-0.00	0.02
		Inner Bracing	Max Tension	26	0.16	0.00	0.00
			Max. Compression	26	-0.16	0.00	0.00
			Max. Mx	18	0.00	-0.02	0.00
			Max. My	30	0.14	0.00	-0.00
			Max. Vy	18	0.01	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T5	60 - 40	Leg	Max Tension	32	110.90	-0.57	-0.03
			Max. Compression	19	-139.02	0.57	0.17
			Max. Mx	22	94.71	-0.69	-0.07
			Max. My	34	-8.22	-0.05	0.80
			Max. Vy	22	0.23	-0.69	-0.07
			Max. Vx	30	0.32	-0.34	-0.75
		Diagonal	Max Tension	26	14.02	0.00	0.00
			Max. Compression	26	-14.31	0.00	0.00
			Max. Mx	34	13.53	0.15	0.00
			Max. My	24	1.16	0.00	0.00
			Max. Vy	34	-0.04	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Horizontal	Max Tension	26	9.05	-0.05	-0.00
			Max. Compression	26	-9.08	-0.05	-0.00
			Max. Mx	32	-1.15	-0.07	-0.01
			Max. My	24	0.07	-0.03	0.02
			Max. Vy	32	-0.03	-0.07	-0.01
			Max. Vx	24	-0.00	-0.03	0.02
		Top Girt	Max Tension	26	8.83	-0.04	0.00
			Max. Compression	26	-8.96	-0.04	0.00
			Max. Mx	22	-0.54	-0.06	-0.02
			Max. My	30	1.32	-0.02	0.02
			Max. Vy	22	-0.03	-0.06	-0.02
			Max. Vx	30	-0.00	-0.02	0.02
		Inner Bracing	Max Tension	26	0.16	0.00	0.00
			Max. Compression	26	-0.16	0.00	0.00
			Max. Mx	18	-0.00	-0.04	0.00
			Max. My	24	0.15	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
T6	40 - 20	Leg	Max Tension	32	141.62	-0.59	0.00
			Max. Compression	19	-176.55	0.33	0.06
			Max. Mx	24	-155.25	0.69	-0.01
			Max. My	30	60.34	-0.34	-0.75
			Max. Vy	24	0.11	0.69	-0.01
			Max. Vx	30	-0.14	-0.34	-0.75
		Diagonal	Max Tension	26	13.59	0.00	0.00
			Max. Compression	26	-13.98	0.00	0.00
			Max. Mx	34	13.14	0.18	0.00
			Max. My	30	0.59	0.00	-0.00
			Max. Vy	34	-0.05	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	26	9.53	-0.09	-0.00
			Max. Compression	26	-9.49	-0.09	-0.00
			Max. Mx	32	-0.89	-0.13	-0.02
			Max. My	24	0.07	-0.05	0.02
			Max. Vy	32	-0.05	-0.13	-0.02
			Max. Vx	24	-0.00	-0.05	0.02

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Top Girt	Max Tension	26	9.39	-0.08	-0.00
			Max. Compression	26	-9.41	-0.08	-0.00
			Max. Mx	32	-0.96	-0.12	-0.02
			Max. My	24	-0.02	-0.04	0.02
			Max. Vy	32	-0.05	-0.12	-0.02
			Max. Vx	30	-0.00	-0.04	0.02
		Inner Bracing	Max Tension	26	0.16	0.00	0.00
			Max. Compression	26	-0.16	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	19	0.15	0.00	-0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T7	20 - 0	Leg	Max Tension	32	169.75	-0.26	-0.02
			Max. Compression	19	-211.99	0.00	0.00
			Max. Mx	24	-191.70	1.36	0.02
			Max. My	31	-15.09	0.51	-0.79
			Max. Vy	24	0.21	1.36	0.02
			Max. Vx	30	-0.19	0.09	-0.75
		Diagonal	Max Tension	28	13.02	0.00	0.00
			Max. Compression	28	-13.55	0.00	0.00
			Max. Mx	28	13.02	0.21	0.00
			Max. My	30	0.63	0.00	-0.00
			Max. Vy	28	-0.06	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	28	10.01	-0.08	-0.00
			Max. Compression	28	-9.78	-0.08	-0.00
			Max. Mx	32	-0.80	-0.11	-0.02
			Max. My	24	0.24	-0.05	0.02
			Max. Vy	32	-0.05	-0.11	-0.02
			Max. Vx	24	-0.00	-0.05	0.02
		Top Girt	Max Tension	26	9.59	-0.10	-0.00
			Max. Compression	28	-9.63	-0.10	-0.00
			Max. Mx	32	-0.89	-0.13	-0.02
			Max. My	24	0.03	-0.07	0.02
			Max. Vy	32	-0.05	-0.13	-0.02
			Max. Vx	24	-0.00	-0.07	0.02
		Inner Bracing	Max Tension	28	0.17	0.00	0.00
			Max. Compression	28	-0.17	0.00	0.00
			Max. Mx	18	-0.01	-0.13	0.00
			Max. My	24	0.16	0.00	-0.00
			Max. Vy	18	0.05	0.00	0.00
			Max. Vx	24	-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	30	225.74	26.95	-16.38
	Max. H_x	30	225.74	26.95	-16.38
	Max. H_z	21	-176.17	-21.59	14.53
	Min. Vert	22	-181.10	-22.78	13.79
	Min. H_x	22	-181.10	-22.78	13.79
	Min. H_z	30	225.74	26.95	-16.38
Leg B	Max. Vert	24	224.85	-27.05	-16.24
	Max. H_x	32	-182.52	22.85	13.76
	Max. H_z	33	-177.63	21.69	14.47

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. Vert	32	-182.52	22.85	13.76
	Min. H_x	24	224.85	-27.05	-16.24
	Min. H_z	24	224.85	-27.05	-16.24
	Max. Vert	19	227.74	-0.17	31.60
	Max. H_x	31	16.84	5.65	1.37
	Max. H_z	19	227.74	-0.17	31.60
	Min. Vert	27	-180.00	0.05	-26.63
	Min. H_x	23	16.53	-5.67	1.34
	Min. H_z	27	-180.00	0.05	-26.63

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	28.64	0.00	0.00	-10.85	2.08	0.00
Dead+Wind 0 deg - No Ice	28.64	-0.03	-37.89	-3027.53	4.90	8.40
Dead+Wind 30 deg - No Ice	28.64	18.84	-32.72	-2618.53	-1497.94	-3.89
Dead+Wind 45 deg - No Ice	28.64	26.66	-26.70	-2139.16	-2120.73	-9.91
Dead+Wind 60 deg - No Ice	28.64	32.66	-18.87	-1514.76	-2598.85	-15.25
Dead+Wind 90 deg - No Ice	28.64	37.73	0.03	-8.04	-3002.87	-22.53
Dead+Wind 120 deg - No Ice	28.64	32.78	18.97	1499.90	-2605.14	-23.81
Dead+Wind 135 deg - No Ice	28.64	26.70	26.74	2121.44	-2124.79	-21.96
Dead+Wind 150 deg - No Ice	28.64	18.89	32.74	2599.63	-1502.91	-18.65
Dead+Wind 180 deg - No Ice	28.64	0.03	37.79	3001.86	-0.81	-8.52
Dead+Wind 210 deg - No Ice	28.64	-18.84	32.72	2596.81	1502.06	3.89
Dead+Wind 225 deg - No Ice	28.64	-26.66	26.70	2117.44	2124.87	9.91
Dead+Wind 240 deg - No Ice	28.64	-32.75	18.92	1494.99	2606.42	15.40
Dead+Wind 270 deg - No Ice	28.64	-37.73	-0.03	-13.74	3007.02	22.53
Dead+Wind 300 deg - No Ice	28.64	-32.69	-18.92	-1519.73	2605.84	23.78
Dead+Wind 315 deg - No Ice	28.64	-26.70	-26.74	-2143.22	2128.88	21.96
Dead+Wind 330 deg - No Ice	28.64	-18.89	-32.74	-2621.40	1506.98	18.64
Dead+Ice+Temp	45.79	0.00	0.00	-27.60	13.02	0.00
Dead+Wind 0 deg+Ice+Temp	45.79	-0.03	-53.66	-4147.90	16.02	-6.48
Dead+Wind 30 deg+Ice+Temp	45.79	25.09	-43.54	-3412.09	-1935.06	-15.59
Dead+Wind 45 deg+Ice+Temp	45.79	35.10	-35.15	-2765.34	-2718.74	-19.54
Dead+Wind 60 deg+Ice+Temp	45.79	42.52	-24.56	-1944.87	-3303.40	-22.17
Dead+Wind 90 deg+Ice+Temp	45.79	50.23	0.03	-24.70	-3888.38	-24.99
Dead+Wind 120 deg+Ice+Temp	45.79	46.43	26.86	2035.01	-3549.52	-20.73
Dead+Wind 135 deg+Ice+Temp	45.79	35.14	35.19	2714.22	-2723.04	-15.17
Dead+Wind 150 deg+Ice+Temp	45.79	25.14	43.57	3359.74	-1940.32	-9.39
Dead+Wind 180 deg+Ice+Temp	45.79	0.03	49.18	3811.89	9.98	2.61
Dead+Wind 210 deg+Ice+Temp	45.79	-25.09	43.54	3356.75	1961.11	15.59
Dead+Wind 225 deg+Ice+Temp	45.79	-35.10	35.15	2709.98	2744.79	19.54
Dead+Wind 240 deg+Ice+Temp	45.79	-46.40	26.81	2029.81	3572.54	27.19
Dead+Wind 270 deg+Ice+Temp	45.79	-50.23	-0.03	-30.72	3914.42	24.99
Dead+Wind 300 deg+Ice+Temp	45.79	-42.55	-24.61	-1950.09	3332.46	19.56
Dead+Wind 315 deg+Ice+Temp	45.79	-35.14	-35.19	-2769.62	2749.03	15.17
Dead+Wind 330 deg+Ice+Temp	45.79	-25.14	-43.57	-3415.12	1966.30	9.39
Dead+Wind 0 deg - Service	28.64	-0.03	-37.89	-3027.53	4.90	8.40
Dead+Wind 30 deg - Service	28.64	18.84	-32.72	-2618.53	-1497.94	-3.89
Dead+Wind 45 deg - Service	28.64	26.66	-26.70	-2139.16	-2120.73	-9.91
Dead+Wind 60 deg - Service	28.64	32.66	-18.87	-1514.76	-2598.85	-15.25
Dead+Wind 90 deg - Service	28.64	37.73	0.03	-8.04	-3002.87	-22.53
Dead+Wind 120 deg - Service	28.64	32.78	18.97	1499.90	-2605.14	-23.81
Dead+Wind 135 deg - Service	28.64	26.70	26.74	2121.44	-2124.79	-21.96
Dead+Wind 150 deg - Service	28.64	18.89	32.74	2599.63	-1502.91	-18.65

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 180 deg - Service	28.64	0.03	37.79	3001.86	-0.81	-8.52
Dead+Wind 210 deg - Service	28.64	-18.84	32.72	2596.81	1502.06	3.89
Dead+Wind 225 deg - Service	28.64	-26.66	26.70	2117.44	2124.87	9.91
Dead+Wind 240 deg - Service	28.64	-32.75	18.92	1494.99	2606.42	15.40
Dead+Wind 270 deg - Service	28.64	-37.73	-0.03	-13.74	3007.02	22.53
Dead+Wind 300 deg - Service	28.64	-32.69	-18.92	-1519.73	2605.84	23.78
Dead+Wind 315 deg - Service	28.64	-26.70	-26.74	-2143.22	2128.88	21.96
Dead+Wind 330 deg - Service	28.64	-18.89	-32.74	-2621.40	1506.98	18.64

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	-28.64	0.00	0.00	28.64	0.00	0.000%
2	-0.03	-28.64	-37.89	0.03	28.64	37.89	0.000%
3	18.84	-28.64	-32.72	-18.84	28.64	32.72	0.000%
4	26.66	-28.64	-26.70	-26.66	28.64	26.70	0.000%
5	32.66	-28.64	-18.87	-32.66	28.64	18.87	0.000%
6	37.73	-28.64	0.03	-37.73	28.64	-0.03	0.000%
7	32.78	-28.64	18.97	-32.78	28.64	-18.97	0.000%
8	26.70	-28.64	26.74	-26.70	28.64	-26.74	0.000%
9	18.89	-28.64	32.74	-18.89	28.64	-32.74	0.000%
10	0.03	-28.64	37.79	-0.03	28.64	-37.79	0.000%
11	-18.84	-28.64	32.72	18.84	28.64	-32.72	0.000%
12	-26.66	-28.64	26.70	26.66	28.64	-26.70	0.000%
13	-32.75	-28.64	18.92	32.75	28.64	-18.92	0.000%
14	-37.73	-28.64	-0.03	37.73	28.64	0.03	0.000%
15	-32.69	-28.64	-18.92	32.69	28.64	18.92	0.000%
16	-26.70	-28.64	-26.74	26.70	28.64	26.74	0.000%
17	-18.89	-28.64	-32.74	18.89	28.64	32.74	0.000%
18	0.00	-45.79	0.00	0.00	45.79	0.00	0.000%
19	-0.03	-45.79	-53.66	0.03	45.79	53.66	0.000%
20	25.09	-45.79	-43.54	-25.09	45.79	43.54	0.000%
21	35.10	-45.79	-35.15	-35.10	45.79	35.15	0.000%
22	42.52	-45.79	-24.56	-42.52	45.79	24.56	0.000%
23	50.23	-45.79	0.03	-50.23	45.79	-0.03	0.000%
24	46.43	-45.79	26.86	-46.43	45.79	-26.86	0.000%
25	35.14	-45.79	35.19	-35.14	45.79	-35.19	0.000%
26	25.14	-45.79	43.57	-25.14	45.79	-43.57	0.000%
27	0.03	-45.79	49.18	-0.03	45.79	-49.18	0.000%
28	-25.09	-45.79	43.54	25.09	45.79	-43.54	0.000%
29	-35.10	-45.79	35.15	35.10	45.79	-35.15	0.000%
30	-46.40	-45.79	26.81	46.40	45.79	-26.81	0.000%
31	-50.23	-45.79	-0.03	50.23	45.79	0.03	0.000%
32	-42.55	-45.79	-24.61	42.55	45.79	24.61	0.000%
33	-35.14	-45.79	-35.19	35.14	45.79	35.19	0.000%
34	-25.14	-45.79	-43.57	25.14	45.79	43.57	0.000%
35	-0.03	-28.64	-37.89	0.03	28.64	37.89	0.000%
36	18.84	-28.64	-32.72	-18.84	28.64	32.72	0.000%
37	26.66	-28.64	-26.70	-26.66	28.64	26.70	0.000%
38	32.66	-28.64	-18.87	-32.66	28.64	18.87	0.000%
39	37.73	-28.64	0.03	-37.73	28.64	-0.03	0.000%
40	32.78	-28.64	18.97	-32.78	28.64	-18.97	0.000%
41	26.70	-28.64	26.74	-26.70	28.64	-26.74	0.000%
42	18.89	-28.64	32.74	-18.89	28.64	-32.74	0.000%
43	0.03	-28.64	37.79	-0.03	28.64	-37.79	0.000%
44	-18.84	-28.64	32.72	18.84	28.64	-32.72	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
45	-26.66	-28.64	26.70	26.66	28.64	-26.70	0.000%
46	-32.75	-28.64	18.92	32.75	28.64	-18.92	0.000%
47	-37.73	-28.64	-0.03	37.73	28.64	0.03	0.000%
48	-32.69	-28.64	-18.92	32.69	28.64	18.92	0.000%
49	-26.70	-28.64	-26.74	26.70	28.64	26.74	0.000%
50	-18.89	-28.64	-32.74	18.89	28.64	32.74	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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	5.329	35	0.3203	0.0747
T2	120 - 100	4.651	35	0.3174	0.0773
T3	100 - 80	3.324	35	0.2926	0.0756
T4	80 - 60	2.120	35	0.2400	0.0548
T5	60 - 40	1.201	35	0.1733	0.0328
T6	40 - 20	0.547	35	0.1135	0.0173
T7	20 - 0	0.161	40	0.0520	0.0078

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lightning Rod	35	5.329	0.3203	0.0747	353301
127.00	3' Sidearm	35	5.125	0.3198	0.0755	353301
123.00	APX16PV-16PVL-E	35	4.854	0.3187	0.0766	251889
115.00	8 FT DISH	35	4.315	0.3139	0.0782	108913
110.00	1142-2B	35	3.980	0.3086	0.0786	78547
108.00	AP7-850/065N	35	3.848	0.3059	0.0784	70566
106.00	6 FT DISH	35	3.716	0.3030	0.0781	63938
104.00	AP7-850/065N	35	3.585	0.2998	0.0775	58356
98.00	DB205-A	35	3.196	0.2885	0.0743	39194
97.00	10 FT DISH	35	3.132	0.2863	0.0735	35945
90.00	SD210-SF3P4LDF	35	2.695	0.2693	0.0665	21910
86.00	12 FT DISH	35	2.457	0.2583	0.0617	17826
84.00	1142-2B	35	2.341	0.2524	0.0591	16312
71.00	4 FT DISH	35	1.670	0.2101	0.0448	16056
65.00	Diamond X-200A	35	1.404	0.1898	0.0381	17897
56.00	DB212-1	35	1.050	0.1609	0.0289	19288
54.00	DB212-1	35	0.978	0.1548	0.0271	19051
45.00	DB230-2B	35	0.686	0.1283	0.0203	18042
43.00	3' Side arm	35	0.629	0.1224	0.0191	17838
42.00	Wind speed cups	35	0.601	0.1195	0.0185	17750

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	130 - 120	7.211	19	0.4360	0.0747

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	120 - 100	6.289	19	0.4311	0.0773
T3	100 - 80	4.492	19	0.3955	0.0756
T4	80 - 60	2.874	19	0.3232	0.0548
T5	60 - 40	1.641	19	0.2335	0.0328
T6	40 - 20	0.756	19	0.1534	0.0173
T7	20 - 0	0.227	24	0.0706	0.0082

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	Lightning Rod	19	7.211	0.4360	0.0747	191713
127.00	3' Sidearm	19	6.934	0.4349	0.0755	191713
123.00	APX16PV-16PVL-E	19	6.565	0.4331	0.0766	137012
115.00	8 FT DISH	19	5.832	0.4259	0.0782	65449
110.00	1142-2B	19	5.379	0.4182	0.0786	49687
108.00	AP7-850/065N	19	5.199	0.4145	0.0784	45304
106.00	6 FT DISH	19	5.021	0.4103	0.0781	41413
104.00	AP7-850/065N	19	4.843	0.4058	0.0775	38030
98.00	DB205-A	19	4.319	0.3898	0.0743	26832
97.00	10 FT DISH	19	4.233	0.3868	0.0735	24892
90.00	SD210-SF3P4LDF	19	3.645	0.3632	0.0665	15885
86.00	12 FT DISH	19	3.326	0.3480	0.0617	13094
84.00	1142-2B	19	3.171	0.3400	0.0591	12041
71.00	4 FT DISH	19	2.271	0.2828	0.0448	12107
65.00	Diamond X-200A	19	1.914	0.2555	0.0381	13639
56.00	DB212-1	19	1.437	0.2169	0.0289	14766
54.00	DB212-1	19	1.340	0.2088	0.0271	14542
45.00	DB230-2B	19	0.945	0.1734	0.0203	13601
43.00	3' Side arm	19	0.866	0.1655	0.0191	13414
42.00	Wind speed cups	19	0.829	0.1615	0.0185	13333

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	130	Leg	A325N	0.7500	4	0.52	19.44	0.027 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	0.88	6.44	0.136 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	0.90	6.44	0.140 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.34	6.44	0.053 ✓	1.333	Bolt Shear
T2	120	Leg	A325N	0.8750	4	3.95	26.46	0.149 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	2.35	6.44	0.365 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2.17	6.44	0.337 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	1.20	6.44	0.186 ✓	1.333	Bolt Shear
T3	100	Leg	A325N	1.0000	4	11.53	34.55	0.334 ✓	1.333	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.6250	3	4.17	6.44	0.647 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.27	6.44	0.663 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	3.04	6.44	0.472 ✓	1.333	Bolt Shear
T4	80	Leg	A325N	1.0000	4	19.35	34.56	0.560 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	5.15	6.44	0.800 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.54	6.44	0.705 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.35	6.44	0.676 ✓	1.333	Bolt Shear
T5	60	Leg	A325N	1.0000	6	18.48	34.56	0.535 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.77	6.44	0.741 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.54	6.44	0.705 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.48	6.44	0.695 ✓	1.333	Bolt Shear
T6	40	Leg	A325N	1.0000	6	23.60	34.56	0.683 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.66	6.44	0.724 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4.77	6.44	0.740 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.70	6.44	0.730 ✓	1.333	Bolt Shear
T7	20	Leg	F1554-105	1.0000	8	21.22	32.40	0.655 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4.52	6.44	0.701 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5.01	6.44	0.777 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	4.81	6.44	0.747 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3 K=1.00	22.141	1.7040	-4.07	37.73	0.108 ✓
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9 K=1.00	21.145	2.2285	-23.34	47.12	0.495 ✓
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1 K=1.00	23.861	3.1741	-61.56	75.74	0.813 ✓
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0 K=1.00	22.016	4.2999	-98.53	94.67	1.041 ✓
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4 K=1.00	21.769	6.1120	-139.02	133.05	1.045 ✓
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1 K=1.00	23.705	6.7133	-176.55	159.14	1.109 ✓
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8	23.583	8.4049	-211.99	198.21	1.070

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=1.00					✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2 STD	6.58	6.39	97.4 K=1.00	15.294	1.0745	-2.63	16.43	0.160 ✓
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0 K=1.00	13.518	1.7040	-7.06	23.04	0.306 ✓
T3	100 - 80	ROHN 2.5 STD	9.21	8.94	113.2 K=1.00	11.646	1.7040	-12.51	19.85	0.630 ✓
T4	80 - 60	ROHN 2.5 X-STR	12.49	12.10	157.2 K=1.00	6.043	2.2535	-15.32	13.62	1.125 ✓
T5	60 - 40	ROHN 3 STD	13.31	12.96	133.6 K=1.00	8.365	2.2285	-13.97	18.64	0.749 ✓
T6	40 - 20	ROHN 3 STD	14.16	13.77	142.0 K=1.00	7.403	2.2285	-13.71	16.50	0.831 ✓
T7	20 - 0	ROHN 3 STD	15.07	14.70	151.6 K=1.00	6.495	2.2285	-13.55	14.47	0.936 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.52	4.14	79.8 K=1.00	19.051	0.7995	-1.78	15.23	0.117 ✓
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5 K=1.00	20.285	1.0745	-4.31	21.80	0.198 ✓
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7 K=1.00	17.212	1.0745	-8.53	18.50	0.461 ✓
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9 K=1.00	14.260	1.0745	-9.09	15.32	0.593 ✓
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3 K=1.00	10.313	1.0745	-9.08	11.08	0.819 ✓
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5 K=1.00	11.192	1.7040	-9.49	19.07	0.498 ✓
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3 K=1.00	8.656	1.7040	-9.78	14.75	0.663 ✓

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	19.091	0.7995	-0.67	15.26	0.044 ✓
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3 K=1.00	22.149	1.0745	-2.40	23.80	0.101 ✓
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8 K=1.00	19.258	1.0745	-6.08	20.69	0.294 ✓
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0 K=1.00	16.062	1.0745	-8.70	17.26	0.504 ✓
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5 K=1.00	12.233	1.0745	-8.96	13.14	0.682 ✓
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2 K=1.00	12.766	1.7040	-9.41	21.75	0.432 ✓
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4 K=1.00	9.802	1.7040	-9.63	16.70	0.576 ✓

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	L2x2x1/8	4.26	4.26	128.6 K=1.00	9.029	0.4844	-0.03	4.37	0.007 ✓
T2	120 - 100	L2x2x1/8	4.97	4.97	149.9 K=1.00	6.648	0.4844	-0.07	3.22	0.023 ✓
T3	100 - 80	L2x2x1/8	6.01	6.01	181.3 K=1.00	4.542	0.4844	-0.15	2.20	0.067 ✓
T4	80 - 60	L2x2x1/8	6.92	6.92	208.8 K=1.00	3.426	0.4844	-0.16	1.66	0.095 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	8.13	8.13	197.0 K=1.00	3.849	0.9020	-0.16	3.47	0.045 ✓
T6	40 - 20	L3x3x3/16	9.40	9.40	189.2 K=1.00	4.173	1.0900	-0.16	4.55	0.036 ✓
T7	20 - 0	L3 1/2x3 1/2x1/4	10.65	10.65	184.1 K=1.00	4.407	1.6900	-0.17	7.45	0.023 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2.5 STD	10.00	5.00	63.3	30.000	1.7040	2.07	51.12	0.041 ✓
T2	120 - 100	ROHN 3 STD	20.04	6.68	68.9	30.000	2.2285	15.80	66.85	0.236

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T3	100 - 80	ROHN 4 STD	20.04	6.68	53.1	30.000	3.1741	46.14	95.22	0.485
T4	80 - 60	ROHN 5 STD	20.04	10.02	64.0	30.000	4.2999	77.41	129.00	0.600
T5	60 - 40	ROHN 5 EH	20.06	10.03	65.4	30.000	6.1120	110.90	183.36	0.605
T6	40 - 20	ROHN 6 EHS	20.05	10.03	54.1	30.000	6.7133	141.62	201.40	0.703
T7	20 - 0	ROHN 6 EH	20.05	10.03	54.8	30.000	8.4049	169.75	252.15	0.673

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 2 STD	6.58	6.39	97.4	30.000	1.0745	2.53	32.24	0.079
T2	120 - 100	ROHN 2.5 STD	8.53	8.29	105.0	30.000	1.7040	6.90	51.12	0.135
T3	100 - 80	ROHN 2.5 STD	9.21	8.94	113.2	30.000	1.7040	12.31	51.12	0.241
T4	80 - 60	ROHN 2.5 X-STR	12.16	11.78	152.9	30.000	2.2535	15.22	67.61	0.225
T5	60 - 40	ROHN 3 STD	12.89	12.54	129.3	30.000	2.2285	14.02	66.85	0.210
T6	40 - 20	ROHN 3 STD	13.73	13.34	137.5	30.000	2.2285	13.59	66.85	0.203
T7	20 - 0	ROHN 3 STD	15.07	14.70	151.6	30.000	2.2285	13.02	66.85	0.195

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.52	4.14	79.8	30.000	0.7995	1.81	23.98	0.075
T2	120 - 100	ROHN 2 STD	9.93	4.82	73.5	30.000	1.0745	4.34	32.24	0.135
T3	100 - 80	ROHN 2 STD	12.01	5.82	88.7	30.000	1.0745	8.55	32.24	0.265
T4	80 - 60	ROHN 2 STD	13.83	6.68	101.9	30.000	1.0745	9.04	32.24	0.280
T5	60 - 40	ROHN 2 STD	16.25	7.89	120.3	30.000	1.0745	9.05	32.24	0.281

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T6	40 - 20	ROHN 2.5 STD	18.79	9.12	115.5	30.000	1.7040	9.53	51.12	0.186 ✓
T7	20 - 0	ROHN 2.5 STD	21.29	10.37	131.3	30.000	1.7040	10.01	51.12	0.196 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	ROHN 1.5 STD	8.50	4.13	79.6	30.000	0.7995	0.68	23.98	0.028 ✓
T2	120 - 100	ROHN 2 STD	8.54	4.15	63.3	30.000	1.0745	2.30	32.24	0.071 ✓
T3	100 - 80	ROHN 2 STD	10.63	5.17	78.8	30.000	1.0745	5.98	32.24	0.186 ✓
T4	80 - 60	ROHN 2 STD	12.71	6.17	94.0	30.000	1.0745	8.68	32.24	0.269 ✓
T5	60 - 40	ROHN 2 STD	14.96	7.25	110.5	30.000	1.0745	8.83	32.24	0.274 ✓
T6	40 - 20	ROHN 2.5 STD	17.54	8.54	108.2	30.000	1.7040	9.39	51.12	0.184 ✓
T7	20 - 0	ROHN 2.5 STD	20.04	9.74	123.4	30.000	1.7040	9.59	51.12	0.188 ✓

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	130 - 120	L2x2x1/8	4.26	4.26	81.6	21.600	0.4844	0.03	10.46	0.003 ✓
T2	120 - 100	L2x2x1/8	4.97	4.97	95.1	21.600	0.4844	0.07	10.46	0.007 ✓
T3	100 - 80	L2x2x1/8	6.01	6.01	115.1	21.600	0.4844	0.15	10.46	0.014 ✓
T4	80 - 60	L2x2x1/8	6.92	6.92	132.5	21.600	0.4844	0.16	10.46	0.015 ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	8.13	8.13	125.3	21.600	0.9020	0.16	19.48	0.008 ✓
T6	40 - 20	L3x3x3/16	9.40	9.40	120.1	21.600	1.0900	0.16	23.54	0.007 ✓
T7	20 - 0	L3 1/2x3 1/2x1/4	10.65	10.65	117.2	21.600	1.6900	0.17	36.50	0.005 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	130 - 120	Leg	ROHN 2.5 STD	3	-4.07	50.29	8.1	Pass
T2	120 - 100	Leg	ROHN 3 STD	29	-23.34	62.81	37.2	Pass
T3	100 - 80	Leg	ROHN 4 STD	69	-61.56	100.96	61.0	Pass
T4	80 - 60	Leg	ROHN 5 STD	108	-98.53	126.19	78.1	Pass
T5	60 - 40	Leg	ROHN 5 EH	135	-139.02	177.35	78.4	Pass
T6	40 - 20	Leg	ROHN 6 EHS	162	-176.55	212.13	83.2	Pass
T7	20 - 0	Leg	ROHN 6 EH	189	-211.99	264.22	80.2	Pass
T1	130 - 120	Diagonal	ROHN 2 STD	14	-2.63	21.91	12.0	Pass
T2	120 - 100	Diagonal	ROHN 2.5 STD	35	-7.06	30.71	23.0	Pass
							27.4 (b)	
T3	100 - 80	Diagonal	ROHN 2.5 STD	77	-12.51	26.45	47.3	Pass
							48.5 (b)	
T4	80 - 60	Diagonal	ROHN 2.5 X-STR	116	-15.32	18.15	84.4	Pass
T5	60 - 40	Diagonal	ROHN 3 STD	143	-13.97	24.85	56.2	Pass
T6	40 - 20	Diagonal	ROHN 3 STD	170	-13.71	21.99	62.4	Pass
T7	20 - 0	Diagonal	ROHN 3 STD	201	-13.55	19.29	70.2	Pass
T1	130 - 120	Horizontal	ROHN 1.5 STD	13	-1.78	20.30	8.8	Pass
							10.5 (b)	
T2	120 - 100	Horizontal	ROHN 2 STD	34	-4.31	29.06	14.8	Pass
							25.3 (b)	
T3	100 - 80	Horizontal	ROHN 2 STD	76	-8.53	24.65	34.6	Pass
							49.8 (b)	
T4	80 - 60	Horizontal	ROHN 2 STD	115	-9.09	20.43	44.5	Pass
							52.9 (b)	
T5	60 - 40	Horizontal	ROHN 2 STD	142	-9.08	14.77	61.5	Pass
T6	40 - 20	Horizontal	ROHN 2.5 STD	169	-9.49	25.42	37.3	Pass
							55.5 (b)	
T7	20 - 0	Horizontal	ROHN 2.5 STD	199	-9.78	19.66	49.7	Pass
							58.3 (b)	
T1	130 - 120	Top Girt	ROHN 1.5 STD	6	-0.67	20.34	3.3	Pass
							4.0 (b)	
T2	120 - 100	Top Girt	ROHN 2 STD	33	-2.40	31.73	7.6	Pass
							13.9 (b)	
T3	100 - 80	Top Girt	ROHN 2 STD	70	-6.08	27.58	22.0	Pass
							35.4 (b)	
T4	80 - 60	Top Girt	ROHN 2 STD	110	-8.70	23.01	37.8	Pass
							50.7 (b)	
T5	60 - 40	Top Girt	ROHN 2 STD	137	-8.96	17.52	51.1	Pass
							52.2 (b)	
T6	40 - 20	Top Girt	ROHN 2.5 STD	164	-9.41	29.00	32.4	Pass
							54.8 (b)	
T7	20 - 0	Top Girt	ROHN 2.5 STD	192	-9.63	22.27	43.2	Pass
							56.1 (b)	
T1	130 - 120	Inner Bracing	L2x2x1/8	18	-0.03	5.83	0.5	Pass
T2	120 - 100	Inner Bracing	L2x2x1/8	43	-0.07	4.29	1.7	Pass
T3	100 - 80	Inner Bracing	L2x2x1/8	83	-0.15	2.93	5.0	Pass
T4	80 - 60	Inner Bracing	L2x2x1/8	121	-0.16	2.21	7.1	Pass
T5	60 - 40	Inner Bracing	L2 1/2x2 1/2x3/16	148	-0.16	4.63	3.4	Pass
T6	40 - 20	Inner Bracing	L3x3x3/16	176	-0.16	6.06	2.7	Pass
T7	20 - 0	Inner Bracing	L3 1/2x3 1/2x1/4	203	-0.17	9.93	1.7	Pass
							Summary	
						Leg (T6)	83.2	Pass
						Diagonal (T4)	84.4	Pass
						Horizontal (T5)	61.5	Pass
						Top Girt (T7)	56.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						Inner Bracing (T4)	7.1	Pass
						Bolt Checks	60.0	Pass
						RATING =	**84.4**	**Pass**

Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 4148 \cdot ft \cdot kips$	(User Input from RISATower)	
Shear Force =	$S_t := 54 \cdot kip$	(User Input from RISATower)	
Axial Force =	$WT_t := 46 \cdot kip$	(User Input from RISATower)	
Max Compression Force =	$C_t := 228 \cdot kip$	(User Input from RISATower)	
Max Uplift Force =	$U_t := 183 \cdot kip$	(User Input from RISATower)	
Tower Height =	$H_t := 130 \cdot ft$	(User Input)	
Tower Width =	$W_t := 22.54 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Thickness of Footing =	$T_f := 4 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 31 \cdot ft$	(User Input)	
Depth of Footing =	$D_f := 3.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 0 \cdot ft$	(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)	
Allowable Soil Bearing Capacity =	$q_s := 6000 \cdot psf$	(User Input)	
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)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 7$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 0.875 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 32$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 7$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 0.875 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 32$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pad Top Reinforcement Bar Area =

$$A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.601 \cdot in^2$$

Pad Bottom Reinforcement Bar Area =

$$A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.601 \cdot in^2$$

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3.537$$

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft} \right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150\cdot\text{pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 100\cdot\text{pcf}$$

Passive Pressure =

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

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

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

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

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

$$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 3.5$$

$$A_p := W_f\cdot T_p = 108.5$$

Ultimate Shear =

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

Weight of Concrete =

$$WT_c := \left(W_f^2\cdot T_f\right)\cdot\gamma_c = 576.6\cdot\text{kip}$$

Tower Offset =

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

$$X_{t2} := \frac{W_f}{2} - \frac{(W_t\cdot\cos(30\cdot\text{deg}))}{3}$$

$$X_t := \text{if}(Pos_t = 1, X_{t1}, X_{t2})$$

$$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t\cdot\cos(30\cdot\text{deg}))}{3} + X_t\right] = 0$$

Total Weight =

$$WT_{tot} := WT_c = 576.6\cdot\text{kip}$$

Resisting Moment =

$$M_r := (WT_{tot})\cdot\frac{W_f}{2} + S_u\cdot\frac{T_f}{3} = 9027\cdot\text{kip}\cdot\text{ft}$$

Overturning Moment =

$$M_{ot} := OM + S_t\cdot(T_f) = 4364\cdot\text{kip}\cdot\text{ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 2.07$$

Factor of Safety Required =

$$FS_{req} := 2$$

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

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 163.316 \cdot kips$

$Shear\_Check := if(S_p > S_t, "Okay", "No Good")$

$Shear\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_t = 623 \cdot kip$

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 = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.527 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < q_s, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.231 \cdot ksf$

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

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 8.975$

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 = $e := \frac{M_{ot}}{WT_{tot}} = 7.569$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.563 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.563 \cdot ksf$

$Pressure\_Check := if(q_{adj} < q_s, "Okay", "No Good")$

$Pressure\_Check = "Okay"$

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 44.125 \cdot in$

$FL := LF \cdot \frac{C_t}{W_f^2} = 0.316 \cdot ksf$

$V_{req} := FL \cdot \left(X_t - .5 \cdot d_p - d\right) \cdot W_f = 52.12 \cdot kips$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1765 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No\ Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 11.6$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 10.6$

Required Shear Strength = $V_{req} := FL \cdot \left(W_f^2 - A_{bo}\right) = 301 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 1315.3 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No\ Good"\right)$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$$M_{nT} := LF\cdot\left[U_t\cdot\left(W_t\cdot\sin(60\cdot deg) - \frac{d_p}{2}\right) + S_t\cdot(D_f)\right] - WT_t\cdot X_{off} = 5014\cdot ft\cdot kips$$

$$M_{nS} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left[\gamma_s\cdot\left(T_f - T_f\right)\right]\right] = 0\cdot ft\cdot kips$$

$$M_{nC} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left(\gamma_c\cdot T_f\right)\right] = -3274.8\cdot ft\cdot kips$$

Design Moment = $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m} = 1932.1\cdot kips\cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500\cdot psi \le f_c \le 4000\cdot psi \\ 0.65 & \text{if } f_c > 8000\cdot psi \\ \left[\left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000\right)}{1000}\right]\cdot 0.5\right]\right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$b_{eff} := W_t\cdot\cos(30\cdot deg) + d_p = 234.243\cdot in$

$A_s := \frac{M_n}{(f_y\cdot d)} = 8.757\cdot in^2$

$a := \frac{A_s\cdot f_y}{\beta\cdot f_c\cdot b_{eff}} = 0.66\cdot in$

$A_s := \frac{M_n}{f_y\cdot\left(d - \frac{a}{2}\right)} = 8.823\cdot in^2$

$\rho := \frac{A_s}{b_{eff}\,d} = 0.01024\cdot in$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases} = 0.0018$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 9.3 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 19.2 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

$$Pad\_Reinforcement\_Bot = "Okay"$$

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right) = 9.3 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 19.2 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

$$Pad\_Reinforcement\_Top = "Okay"$$

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 10.9 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0$$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 18.2 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in$$ (ACI-2008 12.2.1)

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right) = "Use\ L.dbt"$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 47.76 \cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No Good"\right)$$

$$Lpad\_Check = "Okay"$$

UMTS RFDS v2.0

Site ID	CT11270C	Site Type	Co-Location.
Address	2 Willis St, Bristol CT, 06010	Latitude	41.6488
		Longitude	-72.9474

TMO UMTS Engineer	M Lucey

GSM Impacted?

Alpha	
Beta	
Gamma	
Delta	

History (approvals)	Date
RFDS	01/29/09
GSM RF Acceptance	

RFDS Revision	1

Site Leasing/Zoning	Preliminary Leasing	Preliminary Zoning
* # of Sectors	Information not available	---
* # of Antennas	Information not available	Information not available
Antenna Model	Information not available	---
Antenna Size	---	Information not available
* # of TMA	Information not available	---
* # of Feeders	Information not available	Information not available
Feeder Diameter	Information not available	Information not available
Leased area (sq ft)	Information not available	Information not available
* # of Cabinets	Information not available	Information not available
Cabinet Model	Information not available	---
Site Comments	UMTS overlay.	

* Legend: Config under threshold | Config meets threshold | Config above threshold | Text / Not checked

GSM Information

Existing Configuration					Proposed Configuration			
Alpha	Beta	Gamma	Delta		Alpha	Beta	Gamma	Delta
123	123	123		Ant. Height (ft)	123	123	123	
YES	YES	YES		RET deployed	YES	YES	YES	
1 5/8"	1 5/8"	1 5/8"		Feeder Type	1 5/8"	1 5/8"	1 5/8"	
160	160	120		Feeder Length	160	160	120	
4	2	5		# Current TRX	4	2	5	
4	2	5		# Forec. TRX	4	2	5	
		5		# of Nortel HePA			5	
			S8000 outdoor	Cabinet Type	S8000 outdoor			
			2	Cabinet #	2			

UMTS Information

Existing Configuration					Proposed Configuration			
Alpha	Beta	Gamma	Delta		Alpha	Beta	Gamma	Delta
---	---	---	---	Ant. Height (ft)	123	123	123	
---	---	---	---	RET deployed	YES	YES	YES	
---	---	---	---	Feeder Type	1 5/8"	1 5/8"	1 5/8"	
---	---	---	---	Feeder Length	160	160	120	
			---	Cabinet Type	RBS 3106			
			---	Cabinet #	1			

UMTS RFDS v2.0

Site ID	CT11270C	Site Type	Co-Location.
Address	2 Willis St, Bristol CT, 06010	Latitude	41.6488
		Longitude	-72.9474

TMO UMTS Engineer	M Lucey

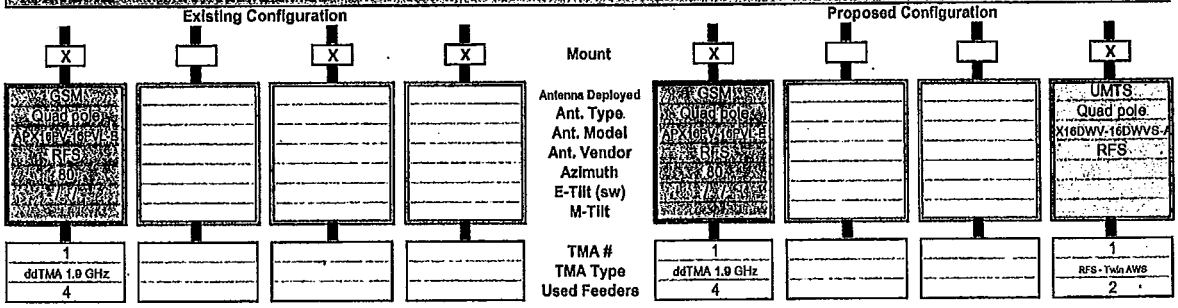
GSM Impacted?

Alpha	
Beta	
Gamma	
Delta	

History (approvals)	Date
RFDS	01/29/09
GSM RF Acceptance	

RFDS Revision	1

ALPHA



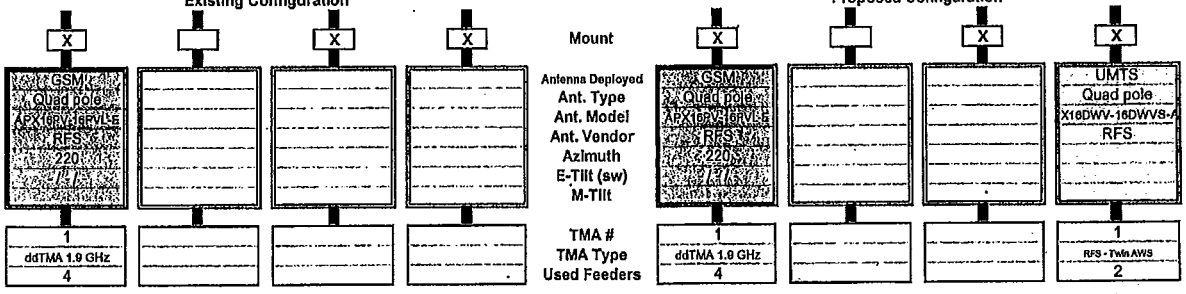
GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
		Swap GSM antenna
		Consolidate GSM feeders
X		Add Twin TMA
		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

Tie in RET system to 2G after upgrading 2G motors for all 3 antenna.

BETA



GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
		Swap GSM antenna
		Consolidate GSM feeders
X		Add Twin TMA
		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

UMTS RFDS v2.0

Site ID	CT11270C	Site Type	Co-Location.
Address	2 Willis St, Bristol CT, 06010	Latitude	41.6488
		Longitude	-72.9474

TMO UMTS Engineer	M Lucey

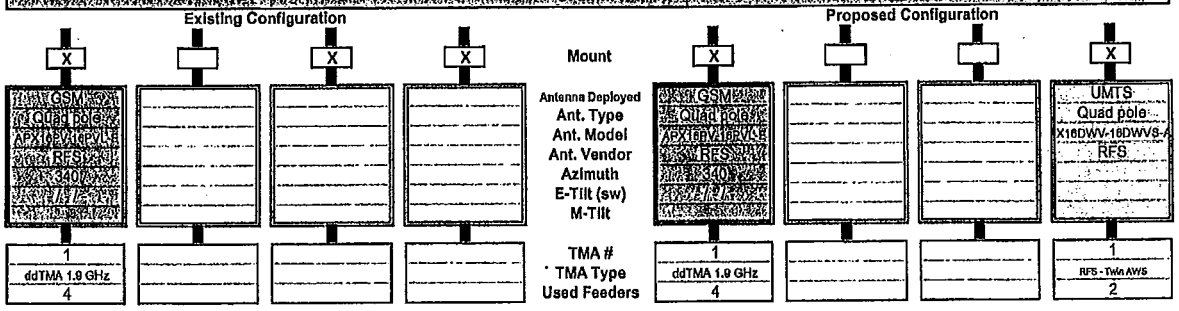
GSM Impacted?

Alpha	
Beta	
Gamma	
Delta	

History (approvals)	Date
RFDS	01/29/09
GSM RF Acceptance	

RFDS Revision	1

GAMMA

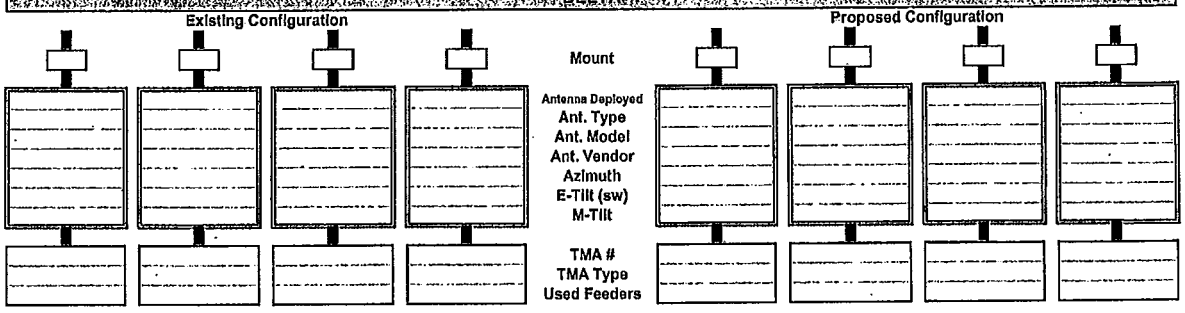


GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
		Swap GSM antenna
		Consolidate GSM feeders
X		Add Twin TMA
		Swap single TMA with twin TMA
		Add Booster
X		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

DELTA



GSM Lost Spatial Diversity

Req	OK	
		Add new Mount
		Relocate GSM antenna
		Swap GSM antenna
		Consolidate GSM feeders
		Add Twin TMA
		Swap single TMA with twin TMA
		Add Booster
		Add two new feeders for UMTS
		Reuse GSM feeders for UMTS

Comments

Product Data Sheet APX16DWV-16DWVS-E-A20

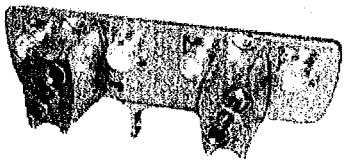
Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**



Technical Specifications

Electrical Specifications

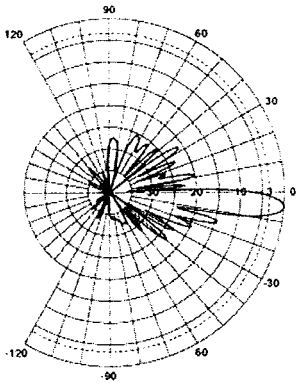
Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female

Mechanical Specifications

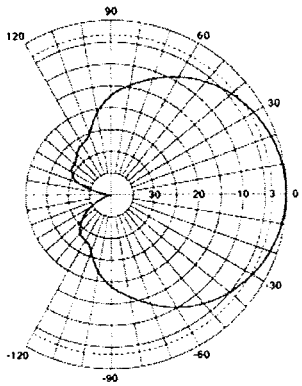
Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Vertical Pattern



Horizontal Pattern

Other Documentation

APM40 Series Datasheet
APM40 Series Installation Instructions

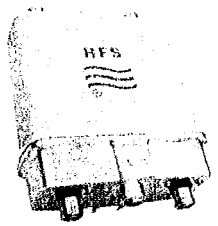
All information contained in the present datasheet is subject to confirmation at time of ordering

Product Data Sheet | **ATMAA1412D-1A20**

AWS Twin Wideband Dual Duplex TMA

Product Description

Designed for use in AWS projects, these units improve base station receiver sensitivity and enhance coverage. Use of these TMAs can increase data rates without a reduction in capacity. These TMAs are wideband and cover the entire 45 MHz in the AWS frequency band. The unit is extremely lightweight, weighing just 13 lbs (5.9 kg) for a twin unit. It is easy to install and meets IP66 requirements for ingress protection. The TMA has a metallic base and the radome cap is light grey allowing them to blend with antenna radomes. Its dual-duplex configuration enables the use of a single feeder for both Downlink and Uplink.



Features/Benefits

- **AISG 2.0 compliant**
- **Two TMAs in a single enclosure – Reduces tower load and installation time.**
- **Low noise figure overcomes feeder losses and enhances site coverage**
- **Filtering improves Tx-Rx isolation by reducing noise and interference**
- **Dual-duplex configuration enables use of a single feeder for both Downlink and Uplink**
- **Low insertion loss of Tx filter provides increased downlink coverage**
- **Extremely light weight – Reduces tower loading and facilitates installation.**
- **Equipped with breather valve – Guards against internal condensation.**
- **Option: AISG connector location at bottom or top**

Technical Specifications

Product Type	Tower Mount Amplifier
Frequency Band, MHz	1710-1755, 2110-2155
Noise Figure, Typical, dB	1.3 @ midband, 1.5 @ band edge
Gain, dB	12 ± 1
Configuration	AWS double dual-duplex TMA
Mounting	Wall, pole
Uplink Frequency, MHz	1710-1755
Downlink Frequency, MHz	2110-2155
Bandwidth Tx & Rx, MHz	45
Input IP3, Min, dBm	+13
Tx Loss, Max, dB	0.4
Return Loss All Ports, Min, dB	18
Tx Rejection in Rx Branch, Min, dB	80
Rx Rejection in Tx Branch, Min, dB	60
Tx Power Handling, Max, W	250 cw, 5000 peak
IMP Level at the ANT Port, Min, dBm	-117 @ 2 * 43
Nominal Current (ATMAA1412D-1A20), mA	AISG Mode: AWS 1 Port = 120-200 (AISG RS485 port), AWS 2 Port = 100 ± 20 ; Non-AISG Mode: Each port = 100 ± 20
Alarm Current (ATMAA1412D-1A20), mA	AISG Mode: AWS 1 port = AISG alarm, AWS 2 port = 190 ± 10 ; Non-AISG Mode: Each port = 190 ± 10
Impedance, Ohms	50
Temperature Range, °C (°F)	-40 to +65 (-40 to +149)
Ingress Protection	IP66
Connectors	7/16-Female Long-neck
Weight, kg (lb)	5.9 (13)
Application	AWS
Dimensions, H x W x D, mm (in)	305 x 254 x 101 (12 x 10 x 4), includes connector length
Supporting Power Distribution Unit	CNI-P1A20 and CNI-P2A20 with bias-T BITA2S-AL20

Notes

All information contained in the present datasheet is subject to confirmation at time of ordering

T-Mobile

T-Mobile USA Inc.
35 Griffin Rd South, Bloomfield, CT 06002-1853
Phone: (860) 692-7100
Fax: (860) 692-7159

Technical Memo

To: Transcend
From: Farid Marbouh - Radio Frequency Engineer
cc: Jason Overbey
Subject: Power Density Report for CT11270C
Date: March 12, 2010

1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile antenna installation on a Utility Lattice Tower at 790 Willis Street, Bristol, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

2. Discussion:

The following assumptions were used in the calculations:

1) The emissions from T-Mobile transmitters are in the (1935-1944.8), (2140-2145), (2110-2120)MHz frequency Band.
2) The antenna array consists of three sectors, with 2 antennas per sector.
3) The model number for GSM antenna is APX16PV-16PVL.
3) The model number for UMTS antenna is APX16DWV-16DWV.
4) GSM antenna center line height is 123 ft.
4) UMTS antenna center line height is 123 ft.
5) The maximum transmit power from any GSM sector is 2231.1 Watts Effective Radiated Power (EiRP) assuming 8 channels per sector.
5) The maximum transmit power from any UMTS sector is 2330.72 Watts Effective Radiated Power (EiRP) assuming 2 channels per sector.
6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
7) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
8) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile antenna installation on a Utility Lattice Tower at 790 Willis Street, Bristol, CT, is 0.07311 mW/cm^2. This value represents 7.311% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm^2) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.
The combined Power Density from other carriers is 44.83%. The combined Power Density for the site is 52.141% of the M.P.E. standard.

VoiceStream Wireless Corporation Proprietary

Connecticut Market

T-Mobile

Worst Case Power Density

Site:	**CT11270C**
Site Address:	**790 Willis Street**
Town:	**Bristol**
Tower Height:	**130 ft.**
Tower Style:	**Utility Lattice Tower**

GSM Data		**UMTS Data**	
Base Station TX output	20 W	**Base Station TX output**	40 W
Number of channels	8	**Number of channels**	2
Antenna Model	APX16PV-16PVL	**Antenna Model**	APX16DWV-16DWV
Cable Size	1 5/8 in.	**Cable Size**	1 5/8 in.
Cable Length	160 ft.	**Cable Length**	160 ft.
Antenna Height	123.0 ft.	**Antenna Height**	123.0 ft.
Ground Reflection	1.6	**Ground Reflection**	1.6
Frequency	1945.0 MHz	**Frequency**	2.1 GHz
Jumper & Connector loss	4.50 dB	**Jumper & Connector loss**	1.50 dB
Antenna Gain	17.8 dBi	**Antenna Gain**	18.0 dBi
Cable Loss per foot	0.0116 dB	**Cable Loss per foot**	0.0116 dB
Total Cable Loss	1.8560 dB	**Total Cable Loss**	1.8560 dB
Total Attenuation	6.3560 dB	**Total Attenuation**	3.3560 dB
Total EIRP per Channel	54.45 dBm	**Total EIRP per Channel**	60.66 dBm
(In Watts)	278.89 W	**(In Watts)**	1165.36 W
Total EIRP per Sector	63.49 dBm	**Total EIRP per Sector**	63.67 dBm
(In Watts)	2231.10 W	**(In Watts)**	2330.72 W
nsg	11.4440	**nsg**	14.6440
Power Density (S) =	**0.035758 mW/cm^2**	**Power Density (S) =**	**0.037354 mW/cm^2**

T-Mobile Worst Case % MPE = 7.3112%

Equation Used :

$$S = \frac{(1000)(grf)^2(Power)*10^{(nsg/10)}}{4\pi(R)^2}$$

Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997

Co-Location Total

Carrier	**% of Standard**
Verizon	
Cingular	
Sprint	
AT&T Wireless	
Pocket	
MetroPCS	
Nextel	
Other Antenna Systems	44.8300 %
Total Excluding T-Mobile	**44.8300 %**
T-Mobile	7.3112
Total % MPE for Site	**52.1412%**