



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

February 7, 2024

Carolyn Seeley
Smartlink
85 Rangway Rd
North Billerica, MA 01862
Carolyn.seeley@smartlinkgroup.com

RE: **EM-ATT-086-240104** - AT&T Mobility, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 57 Cook Drive, Montville, Connecticut. **Acknowledgement of Complete Request.**

Dear Carolyn Seeley:

The Connecticut Siting Council (Council) is in receipt of your correspondence of February 5, 2024 submitted in response to the Council's January 23, 2024 and January 30, 2024 notifications of an incomplete request for exempt modification with regard to the above-referenced matter.

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

Thank you for your attention and cooperation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Melanie A. Bachman".

Melanie A. Bachman
Executive Director

MAB/ANM/laf

From: Carolyn Seeley <carolyn.seeley@smartlinkgroup.com>
Sent: Monday, February 5, 2024 1:50 PM
To: Fontaine, Lisa <Lisa.Fontaine@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Second Incomplete Letter - EM-ATT-086-240104- (Cook Drive) Montville

Good Afternoon,

Please see the attached revised Structural Analysis.

Thanks,



10 Church Circle
Annapolis, MD, 21401

Carolyn Seeley

Real Estate Specialist

Carolyn.Seeley@smartlinkgroup.com

c. 978-760-5577

www.smartlinkgroup.com

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(REVISED)
STRUCTURAL ANALYSIS REPORT

For

AT&T SITE NUMBER: CT2171 (C-BAND)

TEP PROJECT NUMBER: 83901.923982

SITE NAME: MONTVILLE EAST

57 Cook Drive
Uncasville, CT 06382

Antennas Mounted on the Tower



Prepared for:



Dated: February 1, 2024 (Rev.4)

January 24, 2024 (Rev.3)

April 12, 2023 (Rev. 2)

May 6, 2022 (Rev. 1)

May 2, 2022

Prepared by:



(TEP OPCO, LLC)
45 Beechwood Drive
North Andover, MA 01845
(P) 978.557.5553
www.tepgroup.net





SCOPE OF WORK:

TEP Northeast (TEP NE) has been authorized by AT&T to conduct a structural evaluation of the 193' guyed tower supporting the proposed AT&T's antennas located at elevation 180' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of AT&T's existing and proposed antennas listed below.

This office conducted an on-site visual survey of the above site on April 18, 2022.

The following documents were used for our reference:

- Previous Structural Analysis Report prepared by Hudson Design Group LLC dated March 14, 2013.
- Tower Mapping Report prepared by ProVertic LLC dated April 28, 2022.

CONCLUSION SUMMARY:

Based on our evaluation, we have determined that the existing tower **is in conformance** with the ANSI/TIA-222-H Standard for the loading considered under the criteria listed in this report. The tower structure is rated at 90.6 % - (Bolts at Diagonals at Tower Section T10 from EL.5.3' to EL.20.6' Controlling).

- **TEP NE recommends that all existing guy wires be retensioned to the original design specifications prior to construction.**

FOUNDATION SUMMARY:

Based on our evaluation, we have determined that the existing foundation **is in conformance** with the ANSI/TIA-222-H Standard for the loading considered under the criteria listed in this report. The foundation is rated at 55.7 % - (Bearing at Pier and Pad Foundation Controlling).



APPURTENANCES CONFIGURATION (BASED ON RFDS V4.00 DATED 05/01/2023):

Tenant	Appurtenances	Elev.	Mount
	(3) AIR6449 B41 Antennas	191'	Boom Gate
	(3) AIR 32 Antennas	191'	Boom Gate
	(3) APXVAARR24_43-U-NA20 Antennas	191'	Boom Gate
	(3) 4449 Radios	191'	Boom Gate
	(3) 4415 Radios	191'	Boom Gate
	(1) 20' Omni Antenna	190'	Boom Gate
	(2) 6' Omni Antennas	182'	Boom Gate
AT&T	(2) DC6 Surge Arrestors	180'	Tower Leg
AT&T	(2) 4478 B14 RRH's	180'	Boom Gate
AT&T	(3) 4426 B66 RRH's	180'	Boom Gate
AT&T	(3) RRUS-32 B30 RRH's	180'	Boom Gate
AT&T	(2) TPA65R-BU8DA-K Antennas	180'	Sector Frame
AT&T	(1) TPA65R-BU6DA-K Antenna	180'	Sector Frame
AT&T	(3) AIR6419 Antennas	180'	Sector Frame
AT&T	(3) AIR6449 Antennas	180'	Sector Frame
AT&T	(2) DMP65R-BU8DA Antennas	180'	Sector Frame
AT&T	(1) DMP65R-BU6DA Antenna	180'	Sector Frame
AT&T	(1) 4478 B14 RRH	180'	Sector Frame
AT&T	(3) 4415 B25 RRH's	180'	Sector Frame
AT&T	(3) 4449 B5/B12 RRH's	180'	Sector Frame
AT&T	(1) DC9-48-60-24-8C-EV Surge Arrestors	180'	Sector Frame
	(6) LPA-80080-4CF Antennas	169'	Sector Frame
	(6) SBNHH-1D65B Antennas	169'	Sector Frame
	(3) RRH2x60 700 RRH's	169'	Sector Frame
	(3) RRH2x60 PCS RRH's	169'	Sector Frame
	(3) RRH4x45 RRH's	169'	Sector Frame
	(3) UBFIX RRH's	169'	Sector Frame
	(2) OVP Boxes	169'	Sector Frame
	(6) APXVTM14 Antennas	150'	Boom Gate
	(3) FD-RRH-4X40 1900 RRH's	150'	Boom Gate
	(3) FD-RRH-2X50 800 RRH's	150'	Boom Gate
	(3) FZHN RRH's	150'	Boom Gate
	(1) 10' Dipole	123'	Side Mount
	(1) 20' Omni	118'	Side Mount
	(1) 20' Omni	117'	Side Mount
	(1) Dipole	113'	Side Mount
	(1) 20' Omni	98'	Side Mount

***Proposed AT&T Appurtenances shown in Bold.**



AT&T EXISTING/PROPOSED COAX CABLES:

Tenant	Coax Cables	Elev.	Mount
AT&T	(6) 1-1/4" Cables	180'	Tower Face
AT&T	(4) DC Power Cables	180'	Tower Face
AT&T	(2) Fiber Cables	180'	Tower Face
AT&T	(2) DC Power Cables	180'	Tower Face
AT&T	(1) Fiber Cable	180'	Tower Face

**Proposed AT&T Coax Cables shown in Bold.*

ANALYSIS RESULTS SUMMARY:

Component	Max. Stress Ratio	Elev. of Component (ft)	Pass/Fail	Comments
Legs	65.3%	120.6 – 140.6	PASS	
Diagonals	33.8%	160.6 – 180.6	PASS	Controlling
Sec. Horizontals	28.4%	160.6 – 180.6	PASS	
Top Girt	11.4%	140.6 – 160.6	PASS	
Bottom Girt	39.7%	5.3 – 20.6	PASS	
Mid Girt	1.3%	0.6 – 5.3	PASS	
Guy	56.2%	160.6 – 180.6	PASS	
Torque Arm	55.6%	160.6 – 180.6	PASS	
Bolt Checks	90.6%	5.3 – 20.6	PASS	Controlling

TOWER BASE FOUNDATION RESULTS SUMMARY:

	Max. Stress Ratio	Pass/Fail	Comments
Sliding	1.2%	PASS	
Bearing	55.7%	PASS	Controlling
Overturning	1.7%	PASS	

TOWER ANCHOR FOUNDATION RESULTS SUMMARY:

	Max. Stress Ratio	Pass/Fail	Comments
Shear	45.0%	PASS	Controlling
Uplift	34.3%	PASS	



DESIGN CRITERIA:

1. This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, and the International Building Code 2021 with 2022 Connecticut State Building Code.

County: New London
Ultimate Wind Speed: 125 mph (3 second gust)
Structural Class: II
Exposure Category: B
Topographic Category: 1
Nominal Ice Thickness: 1.0 inch

2. Approximate height above grade to proposed antennas: 180'

***Calculations and referenced documents are attached.**

ASSUMPTIONS:

1. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
2. The tower and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.

SUPPORT RECOMMENDATIONS:

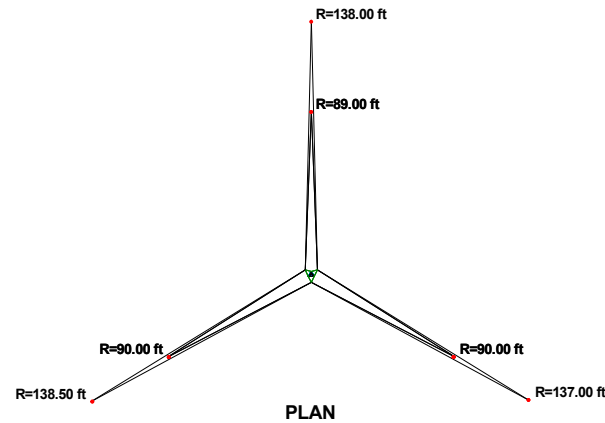
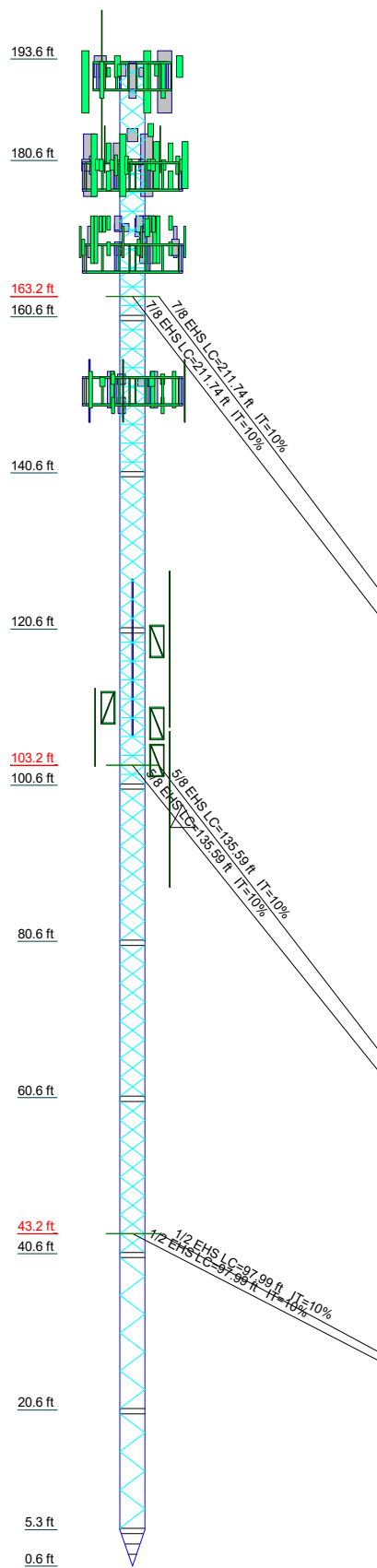
TEP NE recommends that the proposed antennas, RRHs, and surge arrestors be mounted on the existing sector frames supported by the tower.

FIELD PHOTOS:



CALCULATIONS

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Legs	P2.5x0.276 (CT2171)		P2.5x.276		P2.5x.276		P3x0.299		P3x0.299		P2.5x.276
Leg Grade	L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4
Diagonals	A36		A53-B-42		A53-B-42		A36		A53-B-42		A36
Top Girts	L2x2x1/4		P1.5x.120		P1.5x.120		P1.5x.120		P1.5x.120		P1.5x.120
Mid Girts	L2x2x1/4		P1.5x.120		P1.5x.120		N.A.		P1.5x.120		P1.5x.120
Bottom Girts	L2x2x1/4		P1.5x.120		P1.5x.120		N.A.		P1.5x.120		P1.5x.120
Sec. Horizontals	L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4		L2x2x1/4
Face Width (ft)	5 @ 2.46667		5 @ 2.46667		5 @ 2.46667		64 @ 2.41667		6 @ 2.44389		6 @ 2.44389
Weight (lb)	768.3		2438.1		1601.1		862.3		2328.8		1006.1

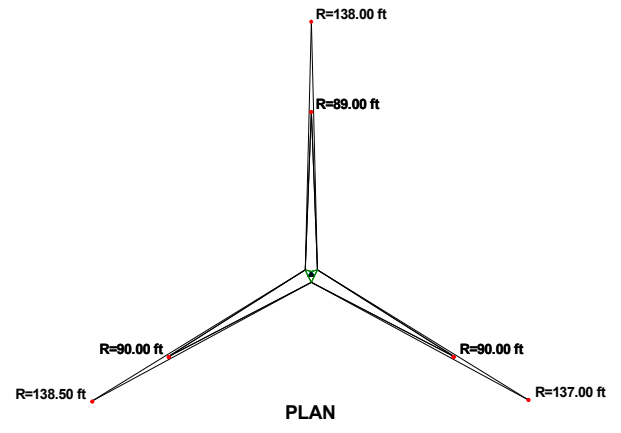
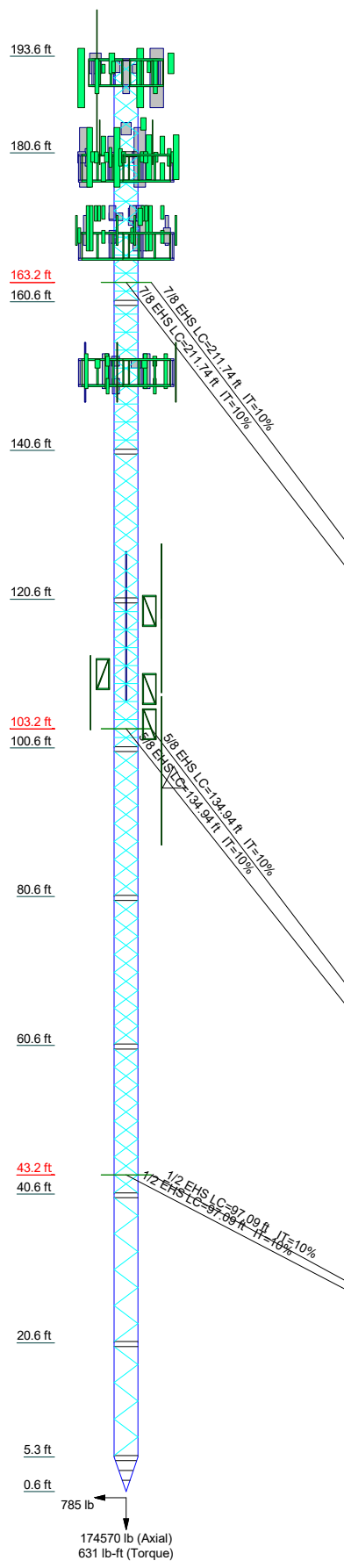


DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10'-0" Boom Gate	191.4	14'-6" Sector Frame	168
10'-0" Boom Gate	191.4	14'-6" Sector Frame	168
10'-0" Boom Gate	191.4	14'-6" Sector Frame	168
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
AIR 32 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
AIR 32 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
AIR 32 Antenna w/ Mounting Pipe	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	191.4	LPA-80080/4CF Antenna w/ Mounting Pipe	168
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
4449 RRH	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
4449 RRH	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
4415 RRH	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
4415 RRH	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
4415 RRH	191.4	SBNHH-1D65B Antenna w/ Mounting Pipe	168
DC6 Surge Arrestor	183.5	SBNHH-1D65B Antenna w/ Mounting Pipe	168
DC6 Surge Arrestor	182.83	SBNHH-1D65B Antenna w/ Mounting Pipe	168
6' Omni	178.5	B13 RRH4X30-4R RRH	168
6' Omni	178.5	B13 RRH4X30-4R RRH	168
Omni 3"x20"	178.5	B13 RRH4X30-4R RRH	168
14'-6" Sector Frame	178.5	B25 RRH4X30-4R RRH	168
14'-6" Sector Frame	178.5	B25 RRH4X30-4R RRH	168
14'-6" Sector Frame	178.5	B25 RRH4X30-4R RRH	168
TPA65R-BU8DA-K Antenna w/ Mounting Pipe	178.5	RRH4x45-1900 RRH	168
TPA65R-BU8DA-K Antenna w/ Mounting Pipe	178.5	RRH4x45-1900 RRH	168
TPA65R-BU6DA-K Antenna w/ Mounting Pipe	178.5	RRH4x45-1900 RRH	168
TPA65R-BU6DA-K Antenna w/ Mounting Pipe	178.5	UBFIX RRH	168
AIR 6419 Antenna w/ Mounting Pipe	178.5	UBFIX RRH	168
AIR 6419 Antenna w/ Mounting Pipe	178.5	UBFIX RRH	168
AIR 6419 Antenna w/ Mounting Pipe	178.5	UBFIX RRH	168
AIR 6449 Antenna w/ Mounting Pipe	178.5	UBFIX RRH	168
AIR 6449 Antenna w/ Mounting Pipe	178.5	OVP	168
AIR 6449 Antenna w/ Mounting Pipe	178.5	OVP	168
DMP65R-BU8DA-K Antenna w/ Mounting Pipe	178.5	Ubiqam Filter	168
DMP65R-BU8DA-K Antenna w/ Mounting Pipe	178.5	Ubiqam Filter	168
DMP65R-BU6DA-K Antenna w/ Mounting Pipe	178.5	14'-6" Sector Frame	151.08
DMP65R-BU6DA-K Antenna w/ Mounting Pipe	178.5	14'-6" Sector Frame	151.08
DMP65R-BU8DA-K Antenna w/ Mounting Pipe	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4426 B66 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4426 B66 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
RRUS-32 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
RRUS-32 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
RRUS-32 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4478 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4478 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4478 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4415 B25 RRH	178.5	APXVTM14-ALU-120 Antenna w/ Mounting Pipe	151.08
4415 B25 RRH	178.5	RRH2x50-800 RRH	151.08
4449 B5/B12 RRH	178.5	RRH2x50-800 RRH	151.08
4449 B5/B12 RRH	178.5	RRH2x50-800 RRH	151.08
4449 B5/B12 RRH	178.5	RRH4x45-1900 RRH	151.08
4449 B5/B12 RRH	178.5	RRH4x45-1900 RRH	151.08
DC9-48-60-0-8C-EV Surge Arrestor w/ Mounting Pipe	178.5	RRH4x45-1900 RRH	151.08

TEP Northeast Job: **CT2171**
 Project: **193 ft Guyed Tower**
 Client: **AT&T** Drawn by: **CL** App'd:
 Phone: (978) 557-5553 Code: **TIA-222-H** Date: **04/12/23** Scale: **NTS**
 FAX: Path: Dwg No. **E-1**

Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs					P3x0.299			P2.5x.276		P2.5x0.276 (CT2171)	P2.5x.276
Leg Grade						A572-50					
Diagonals					L1 3/4x1 3/4x3/16	P1.5x120	L2x2x1/4	P1.5x120		L2x2x1/4	
Diagonal Grade					A36	A53-B-42	A36	A53-B-42		A36	
Top Girts						P1.5x120	L2x2x1/4			L2x2x1/4	
Mid Girts											
Bottom Girts						P1.5x120	L2x2x1/4			L2x2x1/4	
Sec. Horizontals						N.A.	L2x2x1/4			L2x2x1/4	
Face Width (ft)											N.A.
# Panels @ (ft)						6 @ 2.44389					3.42
Weight (lb)	13432.1	279.0	640.8	828.1	1556.5	1006.1	2388.8	852.3	1661.1	2436.1	768.3
											5 @ 2.46667



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L4x4x1/4	B	3 @ 1.33444

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-42	42 ksi	63 ksi
A36	36 ksi	58 ksi			

- TOWER DESIGN NOTES**
1. Tower is located in New London County, Connecticut.
 2. Tower designed for Exposure B to the TIA-222-H Standard.
 3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
 4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
 5. Deflections are based upon a 60 mph wind.
 6. Tower Risk Category II.
 7. Topographic Category 1 with Crest Height of 0.00 ft
 8. TOWER RATING: 90.6%



ALL REACTIONS ARE FACTORED

<p align="center">TEP Northeast</p> <p>45 Beechwood Drive North Andover, MA Phone: (978) 557-5553 FAX:</p>	Job: CT2171		
	Project: 193 ft Guyed Tower		
	Client: AT&T	Drawn by: CL	App'd:
	Code: TIA-222-H	Date: 04/12/23	Scale: NTS
	Path:		Dwg No. E-1

<p><i>tnxTower</i></p> <p><i>TEP Northeast</i> <i>45 Beechwood Drive</i> <i>North Andover, MA</i> <i>Phone: (978) 557-5553</i> <i>FAX:</i></p>	<p>Job</p> <p>CT2171</p>	<p>Page</p> <p>1 of 36</p>
	<p>Project</p> <p>193 ft Guyed Tower</p>	<p>Date</p> <p>14:06:16 04/12/23</p>
	<p>Client</p> <p>AT&T</p>	<p>Designed by</p> <p>CL</p>

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 193.60 ft above the ground line.

The base of the tower is set at an elevation of 0.60 ft above the ground line.

The face width of the tower is 3.42 ft at the top and tapered at the base.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

Tower is located in New London County, Connecticut.

Tower base elevation above sea level: 365.60 ft.

Basic wind speed of 125 mph.

Risk Category II.

Exposure Category B.

Simplified Topographic Factor Procedure for wind speed-up calculations is used.

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

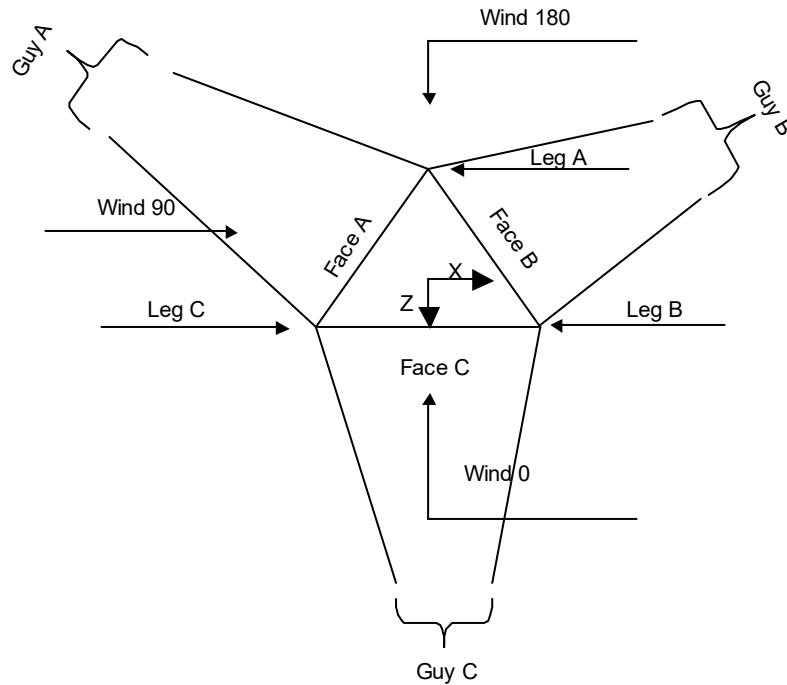
Pressures are calculated at each section.

Stress ratio used in tower member design is 1.

Safety factor used in guy design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

tnxTower TEP Northeast 45 Beechwood Drive North Andover, MA Phone: (978) 557-5553 FAX:	Job CT2171	Page 2 of 36
	Project 193 ft Guyed Tower	Date 14:06:16 04/12/23
	Client AT&T	Designed by CL



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	193.60-180.60			3.42	1	13.00
T2	180.60-160.60			3.42	1	20.00
T3	160.60-140.60			3.42	1	20.00
T4	140.60-120.60			3.42	1	20.00
T5	120.60-100.60			3.42	1	20.00
T6	100.60-80.60			3.42	1	20.00
T7	80.60-60.60			3.42	1	20.00
T8	60.60-40.60			3.42	1	20.00
T9	40.60-20.60			3.42	1	20.00
T10	20.60-5.27			3.42	1	15.33
T11	5.27-0.60			3.42	1	4.67

tnxTower TEP Northeast 45 Beechwood Drive North Andover, MA Phone: (978) 557-5553 FAX:	Job	CT2171	Page	3 of 36
	Project	193 ft Guyed Tower	Date	14:06:16 04/12/23
	Client	AT&T	Designed by	CL

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	193.60-180.60	2.47	X Brace	No	Yes	6.0000	2.0000
T2	180.60-160.60	2.42	X Brace	No	Yes	6.0000	2.0000
T3	160.60-140.60	2.42	X Brace	No	Yes	6.0000	2.0000
T4	140.60-120.60	2.42	CX Brace	No	No	6.0000	2.0000
T5	120.60-100.60	2.42	X Brace	No	Yes	6.0000	2.0000
T6	100.60-80.60	2.42	CX Brace	No	No	6.0000	2.0000
T7	80.60-60.60	2.42	CX Brace	No	No	6.0000	2.0000
T8	60.60-40.60	2.42	CX Brace	No	No	6.0000	2.0000
T9	40.60-20.60	2.42	K Brace Left	No	No	6.0000	2.0000
T10	20.60-5.27	2.44	K Brace Left	No	No	6.0000	2.0000
T11	5.27-0.60	1.33	X Brace	No	Yes	6.0000	2.0000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 193.60-180.60	Pipe	P2.5x.276	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 180.60-160.60	Pipe	P2.5x0.276 (CT2171)	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 160.60-140.60	Pipe	P2.5x0.276 (CT2171)	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 140.60-120.60	Pipe	P2.5x.276	A572-50 (50 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T5 120.60-100.60	Pipe	P3x0.299	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 100.60-80.60	Pipe	P3x0.299	A572-50 (50 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T7 80.60-60.60	Pipe	P3x0.299	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T8 60.60-40.60	Pipe	P3x0.299	A572-50 (50 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T9 40.60-20.60	Pipe	P3x0.299	A572-50 (50 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T10 20.60-5.27	Pipe	P3x0.299	A572-50 (50 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T11 5.27-0.60	Pipe	P3x0.299	A572-50 (50 ksi)	Solid Round		A53-B-42 (42 ksi)

Tower Section Geometry (cont'd)

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<i>Tower Elevation</i> <i>ft</i>	<i>Top Girt Type</i>	<i>Top Girt Size</i>	<i>Top Girt Grade</i>	<i>Bottom Girt Type</i>	<i>Bottom Girt Size</i>	<i>Bottom Girt Grade</i>
T1 193.60-180.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T2 180.60-160.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T3 160.60-140.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T4 140.60-120.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T5 120.60-100.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 100.60-80.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T7 80.60-60.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T8 60.60-40.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T9 40.60-20.60	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T10 20.60-5.27	Pipe	P1.5x.120	A53-B-42 (42 ksi)	Pipe	P1.5x.120	A53-B-42 (42 ksi)
T11 5.27-0.60	Equal Angle	L4x4x1/4	A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry (cont'd)

<i>Tower Elevation</i> <i>ft</i>	<i>No. of Mid Girts</i>	<i>Mid Girt Type</i>	<i>Mid Girt Size</i>	<i>Mid Girt Grade</i>	<i>Horizontal Type</i>	<i>Horizontal Size</i>	<i>Horizontal Grade</i>
T11 5.27-0.60	2	Equal Angle	L4x4x1/4	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry (cont'd)

<i>Tower Elevation</i> <i>ft</i>	<i>Secondary Horizontal Type</i>	<i>Secondary Horizontal Size</i>	<i>Secondary Horizontal Grade</i>	<i>Inner Bracing Type</i>	<i>Inner Bracing Size</i>	<i>Inner Bracing Grade</i>
T2 180.60-160.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T3 160.60-140.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T5 120.60-100.60	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry (cont'd)

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Guy Data

Guy Elevation	Guy Grade	Guy Size	Initial Tension	%	Guy Modulus	Guy Weight	L_u	Anchor Radius	Anchor Azimuth Adj.	Anchor Elevation	End Fitting Efficiency	
ft			lb		ksi	plf	ft	ft	°	ft	%	
163.183	EHS	A	7/8	7970.00	10%	19000	1.581	212.19	138.00	0.0000	0.00	100%
		B	7/8	7970.00	10%	19000	1.581	211.55	137.00	0.0000	0.00	100%
		C	7/8	7970.00	10%	19000	1.581	212.51	138.50	0.0000	0.00	100%
103.183	EHS	A	5/8	4240.00	10%	21000	0.813	134.83	89.00	0.0000	0.00	100%
		B	5/8	4240.00	10%	21000	0.813	135.47	90.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	135.47	90.00	0.0000	0.00	100%
43.1833	EHS	A	1/2	2690.00	10%	21000	0.517	97.01	89.00	0.0000	0.00	100%
		B	1/2	2690.00	10%	21000	0.517	97.91	90.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	97.91	90.00	0.0000	0.00	100%

Guy Data(cont'd)

Guy Elevation	Mount Type	Torque-Arm Spread	Torque-Arm Leg Angle	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
ft		ft	°				
163.183	Torque Arm	7.33	0.0000	Channel	A36	Channel	C15x33.9
					(36 ksi)		
103.183	Torque Arm	7.33	0.0000	Channel	A36	Channel	C15x33.9
					(36 ksi)		
43.1833	Torque Arm	7.33	0.0000	Channel	A36	Channel	C12x25
					(36 ksi)		

Guy Pressures

Guy Elevation	Guy Location	z	q_z	q_z	Ice Thickness
ft		ft	psf	psf	in
163.183	A	81.59	31	5	1.0947
	B	81.59	31	5	1.0947
	C	81.59	31	5	1.0947
103.183	A	51.59	27	4	1.0457
	B	51.59	27	4	1.0457
	C	51.59	27	4	1.0457
43.1833	A	21.59	23	4	0.9585
	B	21.59	23	4	0.9585
	C	21.59	23	4	0.9585

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Guy-Tensioning Information

Temperature At Time Of Tensioning																	
Guy Elevation ft	H ft	V ft	0 F		20 F		40 F		60 F		80 F		100 F		120 F		
			Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	
163.183	A	135.93	163.18	9299	3.78	8853	3.97	8410	4.17	7970	4.40	7535	4.65	7104	4.93	6680	5.23
	B	134.93	163.18	9288	3.76	8846	3.94	8406	4.15	7970	4.37	7538	4.62	7111	4.89	6690	5.20
	C	136.43	163.18	9305	3.79	8856	3.98	8411	4.18	7970	4.41	7533	4.66	7101	4.94	6675	5.25
103.183	A	86.96	103.18	5026	1.46	4763	1.54	4501	1.63	4240	1.73	3980	1.84	3722	1.97	3466	2.11
	B	87.96	103.18	5037	1.47	4770	1.55	4504	1.64	4240	1.74	3977	1.86	3715	1.99	3456	2.14
	C	87.96	103.18	5037	1.47	4770	1.55	4504	1.64	4240	1.74	3977	1.86	3715	1.99	3456	2.14
43.1833	A	86.96	43.18	3658	0.66	3334	0.73	3011	0.81	2690	0.90	2372	1.02	2059	1.18	1753	1.38
	B	87.96	43.18	3662	0.67	3337	0.74	3012	0.82	2690	0.92	2371	1.04	2056	1.20	1750	1.41
	C	87.96	43.18	3662	0.67	3337	0.74	3012	0.82	2690	0.92	2371	1.04	2056	1.20	1750	1.41

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	# Row	# Per Spacing	Clear in	Width or Diameter in	Perimeter in	Weight plf
***** 6X12 Hybrid Cables *****	A	No	No	Ar (CaAa)	193.00 - 8.60	0.3000	0	4	4	0.1250	1.5400		1.70
***** LCF78-50J (7/8 FOAM) *****	C	No	No	Ar (CaAa)	183.50 - 8.60	-0.3000	0.36	3	3	0.1250	1.1000		0.53
***** DC Cable *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.38	2	2	0.1250	0.9570		0.88
Fiber Cable (1-1/4") *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.33	1	1	0.1250	1.2500		0.48
***** DC Cable *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.28	2	2	0.1250	0.9570		0.88
Fiber Cable (1-1/4") *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.23	1	1	0.1250	1.2500		0.48
***** DC Cable *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.18	2	2	0.1250	0.9570		0.88
Fiber Cable (1-1/4") *****	C	No	No	Ar (CaAa)	182.00 - 8.60	2.0000	0.13	1	1	0.1250	1.2500		0.48
***** 6X12 Hybrid Cables *****	C	No	No	Ar (CaAa)	193.00 - 8.60	0.3000	0.28	6	6	0.1250	1.5400		1.70
***** Hybrid Cable (1-5/8") *****	B	No	No	Ar (CaAa)	169.50 - 8.60	-0.3000	0	12	12	0.1250	1.6250		2.38
***** Hybrid Cable (1-1/4") *****	B	No	No	Ar (CaAa)	169.50 - 8.60	-2.0000	0	2	2	0.1250	1.2500		1.70
***** Hybrid Cable (1-1/4") *****	C	No	No	Ar (CaAa)	152.58 - 8.60	0.3000	-0.38	4	4	0.1250	1.2500		1.70
***** Fiber Cable (1-1/4") *****	C	No	No	Ar (CaAa)	121.00 - 8.60	0.3000	-0.29	1	1	0.1250	1.2500		0.48
***** Fiber Cable (1-1/4") *****	C	No	No	Ar (CaAa)	112.50 - 8.60	0.3000	-0.25	1	1	0.1250	1.2500		0.48

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Fiber Cable (1-1/4")	C	No	No	Ar (CaAa)	110.50 - 8.60	0.3000	-0.21	1	1	0.1250	1.2500		0.48
LCF78-50J (7/8 FOAM)	C	No	No	Ar (CaAa)	107.00 - 8.60	0.3000	-0.17	1	1	0.1250	1.1000		0.53

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _{AA} ft ² /ft	Weight plf

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight lb
T1	193.60-180.60	A	0.000	0.000	7.638	0.000	84.32
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	13.743	0.000	140.49
T2	180.60-160.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	19.580	0.000	284.44
		C	0.000	0.000	44.064	0.000	370.08
T3	160.60-140.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	50.054	0.000	451.54
T4	140.60-120.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	54.114	0.000	506.27
T5	120.60-100.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	59.993	0.000	529.70
T6	100.60-80.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	63.764	0.000	545.72
T7	80.60-60.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	63.764	0.000	545.72
T8	60.60-40.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	63.764	0.000	545.72
T9	40.60-20.60	A	0.000	0.000	12.320	0.000	136.00
		B	0.000	0.000	44.000	0.000	639.20
		C	0.000	0.000	63.764	0.000	545.72

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T10	20.60-5.27	A	0.000	0.000	7.392	0.000	81.60
		B	0.000	0.000	26.400	0.000	383.52
		C	0.000	0.000	38.258	0.000	327.43
T11	5.27-0.60	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		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} In Face ft ²	C_{AA} Out Face ft ²	Weight lb
T1	193.60-180.60	A	1.189	0.000	0.000	15.093	0.000	200.95
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	26.849	0.000	351.92
T2	180.60-160.60	A	1.179	0.000	0.000	24.271	0.000	322.23
		B		0.000	0.000	33.065	0.000	550.76
		C		0.000	0.000	112.114	0.000	1206.16
T3	160.60-140.60	A	1.164	0.000	0.000	24.175	0.000	319.71
		B		0.000	0.000	74.118	0.000	1230.29
		C		0.000	0.000	124.159	0.000	1367.18
T4	140.60-120.60	A	1.147	0.000	0.000	24.067	0.000	316.88
		B		0.000	0.000	73.908	0.000	1221.99
		C		0.000	0.000	131.947	0.000	1468.09
T5	120.60-100.60	A	1.129	0.000	0.000	23.943	0.000	313.64
		B		0.000	0.000	73.667	0.000	1212.49
		C		0.000	0.000	147.616	0.000	1627.26
T6	100.60-80.60	A	1.106	0.000	0.000	23.796	0.000	309.86
		B		0.000	0.000	73.383	0.000	1201.34
		C		0.000	0.000	157.033	0.000	1714.27
T7	80.60-60.60	A	1.079	0.000	0.000	23.617	0.000	305.26
		B		0.000	0.000	73.037	0.000	1187.77
		C		0.000	0.000	155.161	0.000	1677.43
T8	60.60-40.60	A	1.044	0.000	0.000	23.386	0.000	299.35
		B		0.000	0.000	72.587	0.000	1170.28
		C		0.000	0.000	152.735	0.000	1630.35
T9	40.60-20.60	A	0.992	0.000	0.000	23.051	0.000	290.90
		B		0.000	0.000	71.937	0.000	1145.16
		C		0.000	0.000	149.223	0.000	1563.58
T10	20.60-5.27	A	0.911	0.000	0.000	13.510	0.000	166.59
		B		0.000	0.000	42.540	0.000	663.31
		C		0.000	0.000	86.167	0.000	876.14
T11	5.27-0.60	A	0.785	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

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Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
T1	193.60-180.60	-3.7683	2.1129	-4.3838	2.3556
T2	180.60-160.60	-3.0501	2.7494	-4.2424	4.0189
T3	160.60-140.60	-0.8439	1.9924	-1.9835	3.2489
T4	140.60-120.60	-0.5948	2.6079	-1.7635	3.8748
T5	120.60-100.60	-0.1593	2.5191	-1.0035	3.8417
T6	100.60-80.60	0.0018	3.1348	-0.8237	4.5194
T7	80.60-60.60	0.0017	2.9377	-0.7866	4.4062
T8	60.60-40.60	0.0018	3.1348	-0.7992	4.4762
T9	40.60-20.60	0.0019	3.2779	-0.8239	4.6996
T10	20.60-5.27	0.0018	3.0588	-0.7397	4.3579
T11	5.27-0.60	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb	

10'-0" Boom Gate	A	From Leg	1.50	0.0000	191.40	No Ice	12.10	9.50	633.00
			0.00			1/2" Ice	18.30	14.60	770.00
			0.00			1" Ice	23.80	19.50	970.00
10'-0" Boom Gate	B	From Leg	1.50	0.0000	191.40	No Ice	12.10	9.50	633.00
			0.00			1/2" Ice	18.30	14.60	770.00
			0.00			1" Ice	23.80	19.50	970.00
10'-0" Boom Gate	C	From Leg	1.50	0.0000	191.40	No Ice	12.10	9.50	633.00
			0.00			1/2" Ice	18.30	14.60	770.00
			0.00			1" Ice	23.80	19.50	970.00
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	191.40	No Ice	20.24	10.79	157.20
			4.50			1/2" Ice	20.89	12.21	290.89
			-0.73			1" Ice	21.55	13.49	435.20
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	191.40	No Ice	20.24	10.79	157.20
			4.50			1/2" Ice	20.89	12.21	290.89
			-0.73			1" Ice	21.55	13.49	435.20
APXVAARR24_43-U-NA20 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	191.40	No Ice	20.24	10.79	157.20
			4.50			1/2" Ice	20.89	12.21	290.89
			-0.73			1" Ice	21.55	13.49	435.20
AIR 32 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	191.40	No Ice	6.81	6.14	154.90
			0.00			1/2" Ice	7.30	6.99	216.61
			-0.48			1" Ice	7.76	7.73	285.26
AIR 32 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	191.40	No Ice	6.81	6.14	154.90
			0.00			1/2" Ice	7.30	6.99	216.61
			-0.48			1" Ice	7.76	7.73	285.26
AIR 32 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	191.40	No Ice	6.81	6.14	154.90
			0.00			1/2" Ice	7.30	6.99	216.61
			-0.48			1" Ice	7.76	7.73	285.26
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	A	From Leg	3.00	0.0000	191.40	No Ice	6.42	3.89	124.90
			-4.50			1/2" Ice	7.00	4.62	179.59

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i>	<i>Azimuth Adjustment</i> <i>°</i>	<i>Placement</i> <i>ft</i>	<i>C_{AA} Front</i> <i>ft²</i>	<i>C_{AA} Side</i> <i>ft²</i>	<i>Weight</i> <i>lb</i>
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	B	From Leg	1.20 3.00 -4.50	0.0000	191.40	1" Ice 7.50 No Ice 6.42 1/2" Ice 7.00	5.22 3.89 4.62	240.17 124.90 179.59
AIR6449 B41 Antenna w/ Mounting Pipe (T-Mobile)	C	From Leg	1.20 3.00 -4.50	0.0000	191.40	1" Ice 7.50 No Ice 6.42 1/2" Ice 7.00	5.22 3.89 4.62	240.17 124.90 179.59
4449 RRH	A	From Leg	1.20 1.00 -1.50	0.0000	191.40	1" Ice 7.50 No Ice 1.97 1/2" Ice 2.15	5.22 1.40 1.56	240.17 74.00 92.48
4449 RRH	B	From Leg	0.77 1.00 -1.50	0.0000	191.40	1" Ice 2.33 No Ice 1.97 1/2" Ice 2.15	1.72 1.40 1.56	113.77 74.00 92.48
4449 RRH	C	From Leg	0.77 1.00 -1.50	0.0000	191.40	1" Ice 2.33 No Ice 1.97 1/2" Ice 2.15	1.72 1.40 1.56	113.77 74.00 92.48
4415 RRH	A	From Leg	0.77 1.00 1.50	0.0000	191.40	1" Ice 2.33 No Ice 1.64 1/2" Ice 1.80	1.72 0.68 0.79	113.77 44.00 56.41
4415 RRH	B	From Leg	0.52 1.00 1.50	0.0000	191.40	1" Ice 1.97 No Ice 1.64 1/2" Ice 1.80	0.91 0.68 0.79	71.18 44.00 56.41
4415 RRH	C	From Leg	0.52 1.00 1.50	0.0000	191.40	1" Ice 1.97 No Ice 1.64 1/2" Ice 1.80	0.91 0.68 0.79	71.18 44.00 56.41

DC6 Surge Arrestor	B	From Leg	1.00 0.00 1.00	0.0000	183.50	No Ice 3.05 1/2" Ice 3.26 1" Ice 3.49	1.10 1.24 1.40	44.00 65.28 89.65

Omni 3"x20'	C	From Leg	3.00 0.00 11.33	0.0000	178.50	No Ice 6.00 1/2" Ice 8.03 1" Ice 10.08	6.00 8.03 10.08	30.00 73.17 129.01
6' Omni	C	From Leg	2.50 0.00 3.50	0.0000	178.50	No Ice 1.50 1/2" Ice 1.97 1" Ice 2.34	1.50 1.97 2.34	25.00 36.31 51.69
6' Omni	B	From Leg	2.50 0.00 3.50	0.0000	178.50	No Ice 1.50 1/2" Ice 1.97 1" Ice 2.34	1.50 1.97 2.34	25.00 36.31 51.69

DC6 Surge Arrestor	A	From Leg	1.00 0.00 1.00	0.0000	182.83	No Ice 3.05 1/2" Ice 3.26 1" Ice 3.49	1.10 1.24 1.40	44.00 65.28 89.65

14'-6" Sector Frame	A	From Leg	1.50 0.00 0.00	0.0000	178.50	No Ice 14.40 1/2" Ice 21.40 1" Ice 27.70	9.20 14.60 19.50	672.00 826.00 1048.00
14'-6" Sector Frame	B	From Leg	1.50 0.00 0.00	0.0000	178.50	No Ice 14.40 1/2" Ice 21.40 1" Ice 27.70	9.20 14.60 19.50	672.00 826.00 1048.00
14'-6" Sector Frame	C	From Leg	1.50 0.00 0.00	0.0000	178.50	No Ice 14.40 1/2" Ice 21.40 1" Ice 27.70	9.20 14.60 19.50	672.00 826.00 1048.00

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>	
TPA65R-BU8DA-K Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	178.50	No Ice	17.87	10.02	116.20
			-6.00			1/2" Ice	18.50	11.44	234.88
			1.50			1" Ice	19.14	12.72	363.91
TPA65R-BU6DA-K Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	178.50	No Ice	13.68	7.99	105.50
			-6.00			1/2" Ice	14.59	9.47	205.77
			1.50			1" Ice	15.52	10.97	315.17
TPA65R-BU8DA-K Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	178.50	No Ice	17.87	10.02	116.20
			-6.00			1/2" Ice	18.50	11.44	234.88
			1.50			1" Ice	19.14	12.72	363.91
AIR 6419 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	178.50	No Ice	4.97	3.43	87.90
			-2.00			1/2" Ice	5.52	4.14	132.90
			3.00			1" Ice	6.00	4.73	183.30
AIR 6419 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	178.50	No Ice	4.97	3.43	87.90
			-2.00			1/2" Ice	5.52	4.14	132.90
			3.00			1" Ice	6.00	4.73	183.30
AIR 6419 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	178.50	No Ice	4.97	3.43	87.90
			-2.00			1/2" Ice	5.52	4.14	132.90
			3.00			1" Ice	6.00	4.73	183.30
AIR 6449 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	178.50	No Ice	4.87	4.17	103.90
			-2.00			1/2" Ice	5.42	4.89	153.41
			-0.50			1" Ice	5.90	5.49	208.50
AIR 6449 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	178.50	No Ice	4.87	4.17	103.90
			-2.00			1/2" Ice	5.42	4.89	153.41
			-0.50			1" Ice	5.90	5.49	208.50
AIR 6449 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	178.50	No Ice	4.87	4.17	103.90
			-2.00			1/2" Ice	5.42	4.89	153.41
			-0.50			1" Ice	5.90	5.49	208.50
DMP65R-BU8DA-K Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	178.50	No Ice	17.87	10.02	125.20
			2.00			1/2" Ice	18.50	11.44	243.88
			1.50			1" Ice	19.14	12.72	372.91
DMP65R-BU6DA-K Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	178.50	No Ice	13.68	7.99	132.50
			2.00			1/2" Ice	14.59	9.47	232.77
			1.50			1" Ice	15.52	10.97	342.17
DMP65R-BU8DA-K Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	178.50	No Ice	17.87	10.02	125.20
			2.00			1/2" Ice	18.50	11.44	243.88
			1.50			1" Ice	19.14	12.72	372.91
4426 B66 RRH	A	From Leg	2.50	90.0000	178.50	No Ice	2.14	1.69	104.00
			2.50			1/2" Ice	2.32	1.85	126.16
			1.50			1" Ice	2.51	2.02	151.36
4426 B66 RRH	B	From Leg	2.20	90.0000	178.50	No Ice	2.14	1.69	104.00
			2.50			1/2" Ice	2.32	1.85	126.16
			1.50			1" Ice	2.51	2.02	151.36
4426 B66 RRH	C	From Leg	2.20	90.0000	178.50	No Ice	2.14	1.69	104.00
			2.50			1/2" Ice	2.32	1.85	126.16
			1.50			1" Ice	2.51	2.02	151.36
RRUS-32 RRH	A	From Leg	2.20	90.0000	178.50	No Ice	2.74	1.67	60.00
			-5.50			1/2" Ice	2.96	1.86	81.11
			1.50			1" Ice	3.19	2.05	105.42
RRUS-32 RRH	B	From Leg	2.20	90.0000	178.50	No Ice	2.74	1.67	60.00
			-5.50			1/2" Ice	2.96	1.86	81.11
			1.50			1" Ice	3.19	2.05	105.42
RRUS-32 RRH	C	From Leg	2.20	90.0000	178.50	No Ice	2.74	1.67	60.00
			-5.50			1/2" Ice	2.96	1.86	81.11

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>	
4478 RRH	A	From Leg	1.50	90.0000	178.50	1" Ice	3.19	2.05	105.42
			2.20			No Ice	2.02	1.25	60.00
			1.50			1/2" Ice	2.20	1.40	77.66
4478 RRH	B	From Leg	1.50	90.0000	178.50	1" Ice	2.39	1.56	98.08
			2.20			No Ice	2.02	1.25	60.00
			1.50			1/2" Ice	2.20	1.40	77.66
4478 RRH	C	From Leg	1.50	90.0000	178.50	1" Ice	2.39	1.56	98.08
			2.20			No Ice	2.02	1.25	60.00
			1.50			1/2" Ice	2.20	1.40	77.66
4415 B25 RRH	A	From Leg	1.50	90.0000	178.50	1" Ice	2.39	1.56	98.08
			2.20			No Ice	2.02	1.25	60.00
			1.50			1/2" Ice	2.20	1.40	77.66
4415 B25 RRH	B	From Leg	1.50	90.0000	178.50	1" Ice	2.39	1.56	98.08
			2.20			No Ice	1.84	0.82	46.00
			-1.50			1/2" Ice	2.01	0.94	60.07
4415 B25 RRH	C	From Leg	1.50	90.0000	178.50	1" Ice	2.19	1.07	76.66
			2.20			No Ice	1.84	0.82	46.00
			-1.50			1/2" Ice	2.01	0.94	60.07
4449 B5/B12 RRH	A	From Leg	1.50	90.0000	178.50	1" Ice	2.19	1.07	76.66
			2.20			No Ice	1.97	1.40	73.00
			-6.50			1/2" Ice	2.15	1.56	91.48
4449 B5/B12 RRH	B	From Leg	1.50	90.0000	178.50	1" Ice	2.33	1.72	112.77
			2.20			No Ice	1.97	1.40	73.00
			-6.50			1/2" Ice	2.15	1.56	91.48
4449 B5/B12 RRH	C	From Leg	1.50	90.0000	178.50	1" Ice	2.33	1.72	112.77
			2.20			No Ice	1.97	1.40	73.00
			-6.50			1/2" Ice	2.15	1.56	91.48
DC9-48-60-0-8C-EV Surge Arrestor w/ Mounting Pipe	C	From Leg	1.50	0.0000	178.50	1" Ice	2.33	1.72	112.77
			1.25			No Ice	2.33	2.33	51.25
			-1.00			1/2" Ice	3.28	3.28	84.83

14'-6" Sector Frame	A	From Leg	1.50	0.0000	168.00	No Ice	14.40	9.20	672.00
			0.00			1/2" Ice	21.40	14.60	826.00
			0.00			1" Ice	27.70	19.50	1048.00
14'-6" Sector Frame	B	From Leg	1.50	0.0000	168.00	No Ice	14.40	9.20	672.00
			0.00			1/2" Ice	21.40	14.60	826.00
			0.00			1" Ice	27.70	19.50	1048.00
14'-6" Sector Frame	C	From Leg	1.50	0.0000	168.00	No Ice	14.40	9.20	672.00
			0.00			1/2" Ice	21.40	14.60	826.00
			0.00			1" Ice	27.70	19.50	1048.00
LPA-80080/4CF Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	168.00	No Ice	3.11	6.82	33.90
			-6.00			1/2" Ice	3.58	7.65	82.91
			2.17			1" Ice	4.02	8.35	138.07
LPA-80080/4CF Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	168.00	No Ice	3.11	6.82	33.90
			6.00			1/2" Ice	3.58	7.65	82.91
			2.17			1" Ice	4.02	8.35	138.07
LPA-80080/4CF Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	168.00	No Ice	3.11	6.82	33.90
			-6.00			1/2" Ice	3.58	7.65	82.91
			2.17			1" Ice	4.02	8.35	138.07
LPA-80080/4CF Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	168.00	No Ice	3.11	6.82	33.90
			6.00			1/2" Ice	3.58	7.65	82.91
			2.17			1" Ice	4.02	8.35	138.07

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>	
LPA-80080/4CF Antenna w/ Mounting Pipe	C	From Leg	3.00 -6.00 2.17	0.0000	168.00	No Ice 1/2" Ice 1" Ice	3.11 3.58 4.02	6.82 7.65 8.35	33.90 82.91 138.07
LPA-80080/4CF Antenna w/ Mounting Pipe	C	From Leg	3.00 6.00 2.17	0.0000	168.00	No Ice 1/2" Ice 1" Ice	3.11 3.58 4.02	6.82 7.65 8.35	33.90 82.91 138.07
SBNHH-1D65B Antenna w/ Mounting Pipe	A	From Leg	3.00 2.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
SBNHH-1D65B Antenna w/ Mounting Pipe	A	From Leg	3.00 1.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
SBNHH-1D65B Antenna w/ Mounting Pipe	B	From Leg	3.00 2.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
SBNHH-1D65B Antenna w/ Mounting Pipe	B	From Leg	3.00 1.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
SBNHH-1D65B Antenna w/ Mounting Pipe	C	From Leg	3.00 2.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
SBNHH-1D65B Antenna w/ Mounting Pipe	C	From Leg	3.00 1.50 2.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	8.20 8.66 9.13	6.85 7.81 8.64	62.90 129.42 203.78
B13 RRH4X30-4R RRH	A	From Leg	3.00 -2.00 4.60	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.16 2.35 2.55	1.62 1.79 1.97	58.00 77.61 100.18
B13 RRH4X30-4R RRH	B	From Leg	3.00 -2.00 4.60	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.16 2.35 2.55	1.62 1.79 1.97	58.00 77.61 100.18
B13 RRH4X30-4R RRH	C	From Leg	3.00 -2.00 4.60	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.16 2.35 2.55	1.62 1.79 1.97	58.00 77.61 100.18
B25 RRH4X30-4R RRH	A	From Leg	3.00 -2.00 1.27	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.14 2.33 2.53	1.31 1.46 1.63	51.00 68.46 88.75
B25 RRH4X30-4R RRH	B	From Leg	3.00 -2.00 1.27	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.14 2.33 2.53	1.31 1.46 1.63	51.00 68.46 88.75
B25 RRH4X30-4R RRH	C	From Leg	3.00 -2.00 1.27	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.14 2.33 2.53	1.31 1.46 1.63	51.00 68.46 88.75
RRH4x45-1900 RRH	A	From Leg	2.50 6.00 1.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	60.00 83.90 111.08
RRH4x45-1900 RRH	B	From Leg	2.50 6.00 1.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	60.00 83.90 111.08
RRH4x45-1900 RRH	C	From Leg	2.50 6.00 1.45	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	60.00 83.90 111.08
UBFIX RRH	A	From Leg	2.00 1.00	90.0000	168.00	No Ice 1/2" Ice	2.31 2.52	2.38 2.58	60.00 83.90

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb							
UBFIX RRH	A	From Leg	4.43	90.0000	168.00	1" Ice	2.73	2.79	111.08						
			2.00						No Ice	2.31	2.38	60.00			
			2.00						1/2" Ice	2.52	2.58	83.90			
UBFIX RRH	B	From Leg	4.43	90.0000	168.00	1" Ice	2.73	2.79	111.08						
			2.00						No Ice	2.31	2.38	60.00			
			1.00						1/2" Ice	2.52	2.58	83.90			
UBFIX RRH	B	From Leg	4.43	90.0000	168.00	1" Ice	2.73	2.79	111.08						
			2.00						No Ice	2.31	2.38	60.00			
			2.00						1/2" Ice	2.52	2.58	83.90			
UBFIX RRH	C	From Leg	4.43	90.0000	168.00	1" Ice	2.73	2.79	111.08						
			2.00						No Ice	2.31	2.38	60.00			
			1.00						1/2" Ice	2.52	2.58	83.90			
UBFIX RRH	C	From Leg	4.43	90.0000	168.00	1" Ice	2.73	2.79	111.08						
			2.00						No Ice	2.31	2.38	60.00			
			2.00						1/2" Ice	2.52	2.58	83.90			
OVP	A	From Leg	4.43	0.0000	168.00	1" Ice	2.73	2.79	111.08						
			1.00						No Ice	3.78	2.51	32.00			
			1.00						1/2" Ice	4.03	2.72	63.40			
OVP	B	From Leg	4.00	0.0000	168.00	1" Ice	4.29	2.94	98.56						
			1.00						No Ice	3.78	2.51	32.00			
			1.00						1/2" Ice	4.03	2.72	63.40			
Ubiqam Filter	A	From Leg	4.00	90.0000	168.00	1" Ice	4.29	2.94	98.56						
			2.00						No Ice	1.20	0.60	25.00			
			-1.00						1/2" Ice	1.34	0.70	35.34			
Ubiqam Filter	A	From Leg	4.00	90.0000	168.00	1" Ice	1.48	0.81	47.81						
			2.00						No Ice	1.20	0.60	25.00			
			-2.00						1/2" Ice	1.34	0.70	35.34			
*****	A	From Leg	4.00	90.0000	168.00	1" Ice	1.48	0.81	47.81						
			14'-6" Sector Frame						1.50	0.0000	151.08	No Ice	14.40	9.20	672.00
			0.00												1/2" Ice
0.00	1" Ice	27.70	19.50	1048.00											
14'-6" Sector Frame	B	From Leg	1.50	0.0000	151.08	No Ice	14.40	9.20	672.00						
			0.00						1/2" Ice	21.40	14.60	826.00			
			0.00						1" Ice	27.70	19.50	1048.00			
14'-6" Sector Frame	C	From Leg	1.50	0.0000	151.08	No Ice	14.40	9.20	672.00						
			0.00						1/2" Ice	21.40	14.60	826.00			
			0.00						1" Ice	27.70	19.50	1048.00			
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90						
			-3.00						1/2" Ice	7.14	5.89	134.31			
			0.17						1" Ice	7.60	6.63	196.47			
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	A	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90						
			3.00						1/2" Ice	7.14	5.89	134.31			
			0.17						1" Ice	7.60	6.63	196.47			
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90						
			-3.00						1/2" Ice	7.14	5.89	134.31			
			0.17						1" Ice	7.60	6.63	196.47			
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	B	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90						
			3.00						1/2" Ice	7.14	5.89	134.31			
			0.17						1" Ice	7.60	6.63	196.47			
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90						
			-3.00						1/2" Ice	7.14	5.89	134.31			
			0.17						1" Ice	7.60	6.63	196.47			

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight lb</i>	
APXVTM14-ALU-120 Antenna w/ Mounting Pipe	C	From Leg	3.00	0.0000	151.08	No Ice	6.65	5.03	78.90
			3.00			1/2" Ice	7.14	5.89	134.31
			0.17			1" Ice	7.60	6.63	196.47
RRH2x50-800 RRH	A	From Leg	2.00	0.0000	151.08	No Ice	1.71	1.84	64.00
			-1.50			1/2" Ice	1.88	2.01	85.14
			1.51			1" Ice	2.05	2.19	109.25
RRH2x50-800 RRH	B	From Leg	2.00	0.0000	151.08	No Ice	1.71	1.84	64.00
			-1.50			1/2" Ice	1.88	2.01	85.14
			1.51			1" Ice	2.05	2.19	109.25
RRH2x50-800 RRH	C	From Leg	2.00	0.0000	151.08	No Ice	1.71	1.84	64.00
			-1.50			1/2" Ice	1.88	2.01	85.14
			1.51			1" Ice	2.05	2.19	109.25
RRH4x45-1900 RRH	A	From Leg	2.00	0.0000	151.08	No Ice	2.31	2.38	60.00
			-1.50			1/2" Ice	2.52	2.58	83.90
			-1.88			1" Ice	2.73	2.79	111.08
RRH4x45-1900 RRH	B	From Leg	2.00	0.0000	151.08	No Ice	2.31	2.38	60.00
			-1.50			1/2" Ice	2.52	2.58	83.90
			-1.88			1" Ice	2.73	2.79	111.08
RRH4x45-1900 RRH	C	From Leg	2.00	0.0000	151.08	No Ice	2.31	2.38	60.00
			-1.50			1/2" Ice	2.52	2.58	83.90
			-1.88			1" Ice	2.73	2.79	111.08
FZHN RRH	A	From Leg	2.00	0.0000	151.08	No Ice	2.02	0.93	51.80
			1.50			1/2" Ice	2.20	1.06	69.08
			1.17			1" Ice	2.38	1.19	89.10
FZHN RRH	B	From Leg	2.00	0.0000	151.08	No Ice	2.02	0.93	51.80
			1.50			1/2" Ice	2.20	1.06	69.08
			1.17			1" Ice	2.38	1.19	89.10
FZHN RRH	C	From Leg	2.00	0.0000	151.08	No Ice	2.02	0.93	51.80
			1.50			1/2" Ice	2.20	1.06	69.08
			1.17			1" Ice	2.38	1.19	89.10
Empty Pipe Mast	A	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21
Empty Pipe Mast	B	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21
Empty Pipe Mast	C	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21
Empty Pipe Mast	A	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21
Empty Pipe Mast	B	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21
Empty Pipe Mast	C	From Leg	3.00	0.0000	151.08	No Ice	1.90	1.90	29.20
			-6.00			1/2" Ice	2.73	2.73	43.57
			0.00			1" Ice	3.40	3.40	63.21

48" Sidearm	B	From Leg	2.00	0.0000	119.00	No Ice	2.43	1.22	50.00
			0.00			1/2" Ice	3.50	1.75	100.00
			0.00			1" Ice	4.50	2.25	175.00
10' Omni	B	From Leg	4.00	0.0000	119.00	No Ice	2.50	2.50	80.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb
			0.00			1/2" Ice 3.53	3.53	98.64
			4.00			1" Ice 4.58	4.58	123.79

48" Sidearm	C	From Leg	2.00	0.0000	110.50	No Ice 2.43	1.22	50.00
			0.00			1/2" Ice 3.50	1.75	100.00
			0.00			1" Ice 4.50	2.25	175.00
10' Omni	C	From Leg	4.00	0.0000	110.50	No Ice 2.50	2.50	80.00
			0.00			1/2" Ice 3.53	3.53	98.64
			-2.50			1" Ice 4.58	4.58	123.79

48" Sidearm	B	From Leg	2.00	0.0000	108.50	No Ice 2.43	1.22	50.00
			0.00			1/2" Ice 3.50	1.75	100.00
			0.00			1" Ice 4.50	2.25	175.00
Omni 3"x20'	B	From Leg	4.00	0.0000	108.50	No Ice 6.00	6.00	30.00
			0.00			1/2" Ice 8.03	8.03	73.17
			9.50			1" Ice 10.08	10.08	129.01

48" Sidearm	B	From Leg	2.00	0.0000	103.75	No Ice 2.43	1.22	50.00
			0.00			1/2" Ice 3.50	1.75	100.00
			0.00			1" Ice 4.50	2.25	175.00
Omni 3"x20'	B	From Leg	4.00	0.0000	103.75	No Ice 6.00	6.00	30.00
			0.00			1/2" Ice 8.03	8.03	73.17
			-6.25			1" Ice 10.08	10.08	129.01

48" Sidearm	A	From Leg	2.00	0.0000	105.00	No Ice 2.43	1.22	50.00
			0.00			1/2" Ice 3.50	1.75	100.00
			0.00			1" Ice 4.50	2.25	175.00
Omni 3"x20'	A	From Leg	4.00	0.0000	105.00	No Ice 6.00	6.00	30.00
			0.00			1/2" Ice 8.03	8.03	73.17
			12.00			1" Ice 10.08	10.08	129.01

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.0 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.0 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.0 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.0 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.0 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.0 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.0 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.0 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy

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Comb. No.	Description
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
Dead Only	105301.45	-8.53	-10.17	0.00	0.00	137.87
1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy	149461.27	-7.59	-335.66	0.00	0.00	200.76
1.2 Dead+1.0 Wind 30 deg - No Ice+1.0 Guy	140755.15	391.45	-394.59	0.00	0.00	451.26
1.2 Dead+1.0 Wind 60 deg - No Ice+1.0 Guy	127011.74	661.61	-401.27	0.00	0.00	575.45
1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy	140734.15	511.70	-170.82	0.00	0.00	631.44
1.2 Dead+1.0 Wind 120 deg - No Ice+1.0 Guy	149441.67	262.96	144.59	0.00	0.00	613.75
1.2 Dead+1.0 Wind 150 deg - No Ice+1.0 Guy	140947.37	107.88	517.18	0.00	0.00	442.50
1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy	127287.59	-18.00	758.80	0.00	0.00	164.82
1.2 Dead+1.0 Wind 210 deg - No Ice+1.0 Guy	141037.45	-141.69	520.25	0.00	0.00	-83.30
1.2 Dead+1.0 Wind 240 deg - No Ice+1.0 Guy	149624.57	-291.67	149.09	0.00	0.00	-230.60
1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy	141058.14	-533.15	-165.17	0.00	0.00	-264.66
1.2 Dead+1.0 Wind 300 deg - No Ice+1.0 Guy	127311.56	-679.45	-392.99	0.00	0.00	-245.01
1.2 Dead+1.0 Wind 330 deg - No Ice+1.0 Guy	140991.15	-407.35	-387.11	0.00	0.00	-74.27

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Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
1.2 Dead+1.0 Ice+1.0 Temp+Guy	173392.31	-9.27	-42.92	0.00	0.00	226.92
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	174483.21	-8.27	-293.53	0.00	0.00	201.60
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	174281.00	101.24	-254.39	0.00	0.00	293.23
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	174139.24	187.17	-156.88	0.00	0.00	361.27
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	174281.96	228.04	-33.39	0.00	0.00	393.84
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	174486.95	206.69	81.42	0.00	0.00	388.19
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	174328.62	116.95	156.83	0.00	0.00	340.02
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	174217.27	-11.08	183.01	0.00	0.00	255.18
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	174373.64	-138.62	157.59	0.00	0.00	163.27
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	174569.82	-227.15	82.96	0.00	0.00	93.70
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	174368.79	-246.92	-31.40	0.00	0.00	62.53
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	174210.07	-204.79	-155.00	0.00	0.00	67.90
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	174322.66	-118.07	-253.24	0.00	0.00	116.43
Dead+Wind 0 deg - Service+Guy	105539.46	-7.74	-210.07	0.00	0.00	140.09
Dead+Wind 30 deg - Service+Guy	105492.60	91.63	-184.58	0.00	0.00	189.49
Dead+Wind 60 deg - Service+Guy	105465.40	165.31	-110.59	0.00	0.00	222.35
Dead+Wind 90 deg - Service+Guy	105491.65	192.27	-9.60	0.00	0.00	232.81
Dead+Wind 120 deg - Service+Guy	105538.20	164.51	89.34	0.00	0.00	220.58
Dead+Wind 150 deg - Service+Guy	105510.92	92.08	162.62	0.00	0.00	186.17
Dead+Wind 180 deg - Service+Guy	105497.15	-9.38	189.73	0.00	0.00	136.25
Dead+Wind 210 deg - Service+Guy	105528.73	-110.61	163.14	0.00	0.00	86.88
Dead+Wind 240 deg - Service+Guy	105571.45	-182.42	90.27	0.00	0.00	53.43
Dead+Wind 270 deg - Service+Guy	105526.92	-209.34	-8.49	0.00	0.00	43.58
Dead+Wind 300 deg - Service+Guy	105494.87	-181.56	-109.62	0.00	0.00	55.36
Dead+Wind 330 deg - Service+Guy	105510.05	-107.30	-184.01	0.00	0.00	90.22

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Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	-0.00	-42704.79	0.00	0.04	42704.34	-0.08	0.001%
2	-26.04	-50807.72	-46440.92	26.04	50807.62	46439.06	0.003%
3	22852.44	-50651.84	-39644.29	-22852.49	50651.73	39641.97	0.003%
4	39424.63	-50495.55	-22768.93	-39424.28	50495.52	22768.28	0.001%
5	45748.56	-50652.24	25.39	-45746.61	50652.14	-24.22	0.003%
6	40193.96	-50808.47	23243.17	-40192.39	50808.38	-23242.26	0.003%
7	22897.99	-50651.36	39672.38	-22895.98	50651.25	-39671.27	0.003%
8	26.04	-50494.22	45583.79	-26.36	50494.19	-45583.14	0.001%
9	-22852.45	-50650.08	39644.29	22850.38	50649.97	-39643.15	0.003%
10	-40166.92	-50806.38	23197.49	40165.29	50806.28	-23196.55	0.003%
11	-45748.56	-50649.69	-25.39	45746.53	50649.57	26.60	0.003%
12	-39451.66	-50493.46	-22814.61	39451.12	50493.43	22814.21	0.001%
13	-22897.99	-50650.56	-39672.38	22898.02	50650.45	39670.04	0.003%
14	-0.00	-102811.79	0.00	-1.78	102811.79	1.42	0.002%
15	-11.74	-102911.85	-12674.91	11.73	102911.84	12673.82	0.001%
16	6318.53	-102812.34	-10956.44	-6318.40	102812.34	10955.67	0.001%
17	10953.82	-102712.55	-6318.50	-10952.58	102712.53	6317.78	0.001%
18	12656.18	-102812.51	11.38	-12655.44	102812.50	-11.10	0.001%
19	10980.90	-102912.20	6347.68	-10979.96	102912.19	-6347.14	0.001%
20	6339.11	-102811.96	10969.33	-6338.52	102811.95	-10968.82	0.001%
21	11.74	-102711.73	12657.85	-11.85	102711.71	-12656.35	0.001%
22	-6318.53	-102811.24	10956.44	6317.85	102811.23	-10955.91	0.001%
23	-10968.60	-102911.03	6327.03	10967.56	102911.02	-6326.43	0.001%
24	-12656.18	-102811.08	-11.38	12655.36	102811.07	11.69	0.001%
25	-10966.12	-102711.38	-6339.15	10964.75	102711.36	6338.49	0.001%
26	-6339.11	-102811.63	-10969.33	6338.95	102811.62	10968.56	0.001%
27	-6.00	-42740.91	-10701.60	5.99	42740.90	10700.69	0.002%
28	5266.01	-42704.99	-9135.44	-5265.88	42704.99	9134.78	0.002%
29	9084.83	-42668.98	-5246.77	-9084.46	42668.98	5246.54	0.001%
30	10542.08	-42705.08	5.85	-10541.46	42705.08	-5.64	0.002%
31	9262.09	-42741.08	5356.03	-9261.32	42741.08	-5355.59	0.002%
32	5276.50	-42704.88	9141.92	-5276.01	42704.88	-9141.47	0.002%
33	6.00	-42668.67	10504.12	-6.01	42668.67	-10503.67	0.001%
34	-5266.01	-42704.59	9135.44	5265.49	42704.58	-9134.99	0.002%
35	-9255.86	-42740.60	5345.51	9255.05	42740.60	-5345.05	0.002%
36	-10542.08	-42704.50	-5.85	10541.42	42704.49	6.07	0.002%
37	-9091.06	-42668.50	-5257.29	9090.66	42668.50	5257.07	0.001%
38	-5276.50	-42704.70	-9141.92	5276.35	42704.70	9141.25	0.002%

Non-Linear Convergence Results

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	8	0.00000001	0.00003066
2	Yes	20	0.00005487	0.00006606
3	Yes	19	0.00007791	0.00008394
4	Yes	14	0.00000001	0.00004408
5	Yes	19	0.00007645	0.00008245
6	Yes	20	0.00005356	0.00006446
7	Yes	19	0.00007687	0.00008287
8	Yes	14	0.00000001	0.00004488
9	Yes	19	0.00007892	0.00008495
10	Yes	20	0.00005546	0.00006658
11	Yes	19	0.00007903	0.00008526
12	Yes	14	0.00000001	0.00004506
13	Yes	19	0.00007844	0.00008478
14	Yes	8	0.00000001	0.00008980
15	Yes	13	0.00000001	0.00005610
16	Yes	13	0.00000001	0.00004240
17	Yes	12	0.00000001	0.00007500
18	Yes	13	0.00000001	0.00004177
19	Yes	13	0.00000001	0.00005516
20	Yes	13	0.00000001	0.00004168
21	Yes	12	0.00000001	0.00007901
22	Yes	13	0.00000001	0.00004647
23	Yes	13	0.00000001	0.00006145
24	Yes	13	0.00000001	0.00004671
25	Yes	12	0.00000001	0.00008078
26	Yes	13	0.00000001	0.00004256
27	Yes	11	0.00000001	0.00007397
28	Yes	11	0.00000001	0.00005762
29	Yes	11	0.00000001	0.00004121
30	Yes	11	0.00000001	0.00005568
31	Yes	11	0.00000001	0.00007140
32	Yes	11	0.00000001	0.00005604
33	Yes	11	0.00000001	0.00004202
34	Yes	11	0.00000001	0.00005888
35	Yes	11	0.00000001	0.00007542
36	Yes	11	0.00000001	0.00005898
37	Yes	11	0.00000001	0.00004303
38	Yes	11	0.00000001	0.00005807

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria
T1	193.6	Leg	A325N	0.8750	4	3819.51	41556.00	0.092 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	2	1212.61	8224.22	0.147 ✓	1	Member Block Shear
		Top Girt	A325N	0.6250	2	91.91	8224.22	0.011 ✓	1	Member Block Shear
		Bottom Girt	A325N	0.6250	2	478.52	8224.22	0.058 ✓	1	Member Block Shear

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
T2	180.6	Leg	A325N	0.8750	4	9320.69	41556.00	0.224	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	2	4132.04	8224.22	0.502	✓	1	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	6945.25	9107.81	0.763	✓	1	Member Block Shear
		Top Girt	A325N	0.6250	2	826.98	8224.22	0.101	✓	1	Member Block Shear
		Bottom Girt	A325N	0.6250	2	2596.82	8224.22	0.316	✓	1	Member Block Shear
		Torque Arm Top@163.183	A325N	0.6250	6	3121.22	13805.80	0.226	✓	1	Bolt Shear
T3	160.6	Leg	A325N	0.8750	4	5095.97	41556.00	0.123	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	4382.32	9107.81	0.481	✓	1	Member Block Shear
		Secondary Horizontal	A325N	0.6250	1	2263.38	9107.81	0.249	✓	1	Member Block Shear
		Top Girt	A325N	0.6250	1	1543.79	10886.40	0.142	✓	1	Member Bearing
		Bottom Girt	A325N	0.6250	1	1543.79	10886.40	0.142	✓	1	Member Bearing
T4	140.6	Leg	A325N	0.8750	4	4943.98	41556.00	0.119	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1657.04	8835.73	0.188	✓	1	Bolt Shear
		Top Girt	A325N	0.5000	1	1059.22	8618.40	0.123	✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	1059.22	8618.40	0.123	✓	1	Member Bearing
T5	120.6	Leg	A325N	0.8750	4	5864.31	41556.00	0.141	✓	1	Bolt Tension
		Diagonal	A325N	0.6250	2	2075.99	13805.80	0.150	✓	1	Bolt Shear
		Secondary Horizontal	A325N	0.6250	1	3828.81	9107.81	0.420	✓	1	Member Block Shear
		Top Girt	A325N	0.6250	2	637.38	8224.22	0.077	✓	1	Member Block Shear
		Bottom Girt	A325N	0.6250	2	1104.86	8224.22	0.134	✓	1	Member Block Shear
		Torque Arm Top@103.183	A325N	0.6250	6	1164.02	13805.80	0.084	✓	1	Bolt Shear
T6	100.6	Leg	A325N	0.8750	4	4233.86	41556.00	0.102	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2575.39	8835.73	0.291	✓	1	Bolt Shear
		Top Girt	A325N	0.5000	1	1218.93	8618.40	0.141	✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	1218.93	8618.40	0.141	✓	1	Member Bearing
T7	80.6	Leg	A325N	0.8750	4	4223.11	41556.00	0.102	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1454.53	8835.73	0.165	✓	1	Bolt Shear
		Top Girt	A325N	0.5000	1	885.91	8618.40	0.103	✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	885.91	8618.40	0.103	✓	1	Member Bearing
T8	60.6	Leg	A325N	0.8750	4	4961.73	41556.00	0.119	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2605.01	8835.73	0.295	✓	1	Bolt Shear
		Top Girt	A325N	0.5000	1	1067.64	8618.40	0.124	✓	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	1067.64	8618.40	0.124	✓	1	Member Bearing

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load Allowable	Allowable Ratio	Criteria	
T9	40.6	Torque Arm Top@43.1833	A325N	0.6250	6	820.18	13805.80	0.059	✓	1	Bolt Shear
		Leg	A325N	0.8750	4	4839.16	41556.00	0.116	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	2557.52	8835.73	0.289	✓	1	Bolt Shear
		Top Girt	A325N	0.5000	1	1127.31	8618.40	0.131	✓	1	Member Bearing
T10	20.6	Bottom Girt	A325N	0.5000	1	1031.43	8618.40	0.120	✓	1	Member Bearing
		Leg	A325N	0.8750	4	4875.32	41556.00	0.117	✓	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1075.53	8618.40	0.125	✓	1	Member Bearing
		Top Girt	A325N	0.5000	1	1017.65	8618.40	0.118	✓	1	Member Bearing
T11	5.27	Bottom Girt	A325N	0.5000	1	7806.32	8618.40	0.906	✓	1	Member Bearing
		Leg	A325N	0.8750	4	5294.28	41556.00	0.127	✓	1	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	163.18 (A) (591)	7/8 EHS	7970.00	79699.84	26539.40	47820.00	1.000	1.802 ✓
	163.18 (A) (592)	7/8 EHS	7970.00	79699.84	26797.90	47820.00	1.000	1.784 ✓
	163.18 (B) (587)	7/8 EHS	7970.00	79699.84	26859.10	47820.00	1.000	1.780 ✓
	163.18 (B) (588)	7/8 EHS	7970.00	79699.84	26330.00	47820.00	1.000	1.816 ✓
	163.18 (C) (583)	7/8 EHS	7970.00	79699.84	26182.40	47820.00	1.000	1.826 ✓
	163.18 (C) (584)	7/8 EHS	7970.00	79699.84	26445.50	47820.00	1.000	1.808 ✓
T5	103.18 (A) (603)	5/8 EHS	4240.00	42399.99	9775.56	25440.00	1.000	2.602 ✓
	103.18 (A) (604)	5/8 EHS	4240.00	42399.99	9767.70	25440.00	1.000	2.604 ✓
	103.18 (B) (599)	5/8 EHS	4240.00	42399.99	9759.65	25440.00	1.000	2.607 ✓
	103.18 (B) (600)	5/8 EHS	4240.00	42399.99	9496.27	25440.00	1.000	2.679 ✓
	103.18 (C) (595)	5/8 EHS	4240.00	42399.99	9483.57	25440.00	1.000	2.683 ✓
	103.18 (C) (596)	5/8 EHS	4240.00	42399.99	9742.44	25440.00	1.000	2.611 ✓
T8	43.18 (A) (615)	1/2 EHS	2690.00	26900.04	5246.93	16140.00	1.000	3.076 ✓
	43.18 (A) (616)	1/2 EHS	2690.00	26900.04	5230.01	16140.00	1.000	3.086 ✓

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Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
43.18 (B) (611)		1/2 EHS	2690.00	26900.04	5334.55	16140.00	1.000	3.026 ✓
43.18 (B) (612)		1/2 EHS	2690.00	26900.04	5106.08	16140.00	1.000	3.161 ✓
43.18 (C) (607)		1/2 EHS	2690.00	26900.04	5118.52	16140.00	1.000	3.153 ✓
43.18 (C) (608)		1/2 EHS	2690.00	26900.04	5314.51	16140.00	1.000	3.037 ✓

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	P2.5x.276	13.00	0.17	2.2 K=1.00	2.2535	1.00	-19237.80	101375.00	0.190 ¹ ✓
T2	180.6 - 160.6	P2.5x0.276 (CT2171)	20.00	1.21	16.5 K=1.00	3.5323	1.00	-95491.90	155814.00	0.613 ¹ ✓
T3	160.6 - 140.6	P2.5x0.276 (CT2171)	20.00	0.50	6.8 K=1.00	3.5323	0.96	-89130.70	152832.00	0.583 ¹ ✓
T4	140.6 - 120.6	P2.5x.276	20.00	2.42	31.4 K=1.00	2.2535	0.97	-59871.70	91721.60	0.653 ¹ ✓
T5	120.6 - 100.6	P3x0.299	20.00	1.21	12.8 K=1.00	3.0068	0.95	-73597.70	127509.00	0.577 ¹ ✓
T6	100.6 - 80.6	P3x0.299	20.00	0.50	5.3 K=1.00	3.0068	0.93	-70375.10	125768.00	0.560 ¹ ✓
T7	80.6 - 60.6	P3x0.299	20.00	2.42	25.5 K=1.00	3.0068	0.91	-51147.70	117810.00	0.434 ¹ ✓
T8	60.6 - 40.6	P3x0.299	20.00	2.42	25.5 K=1.00	3.0068	0.94	-61640.30	121686.00	0.507 ¹ ✓
T9	40.6 - 20.6	P3x0.299	20.00	2.42	51.0 K=2.00	3.0068	1.00	-58387.50	111851.00	0.522 ¹ ✓
T10	20.6 - 5.27	P3x0.299	15.33	2.44	51.6 K=2.00	3.0068	1.00	-58754.00	111369.00	0.528 ¹ ✓
T11	5.27 - 0.6	P3x0.299	5.07	1.45	15.3 K=1.00	3.0068	0.95	-64116.60	126090.00	0.508 ¹ ✓

¹ $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	4.22	1.76	70.6 K=1.30	0.9380	-2504.68	28479.30	0.088 ¹
T2	180.6 - 160.6	L2x2x1/4	4.19	1.75	70.2 K=1.31	0.9380	-9161.07	28530.20	0.321 ¹
T3	160.6 - 140.6	L2x2x1/4	4.19	1.83	72.0 K=1.29	0.9380	-5437.33	28258.50	0.192 ¹
T4	140.6 - 120.6	P1.5x.120	4.19	3.89	95.4 K=1.00	0.5202	-1657.04	11241.80	0.147 ¹
T5	120.6 - 100.6	L2x2x1/4	4.19	1.72	69.5 K=1.32	0.9380	-4151.98	28634.70	0.145 ¹
T6	100.6 - 80.6	P1.5x.120	4.19	3.83	93.9 K=1.00	0.5202	-2575.39	11447.80	0.225 ¹
T7	80.6 - 60.6	L1 3/4x1 3/4x3/16	4.19	3.62	126.6 K=1.00	0.6211	-1454.53	11098.60	0.131 ¹
T8	60.6 - 40.6	P1.5x.120	4.19	3.83	93.9 K=1.00	0.5202	-2605.01	11447.80	0.228 ¹
T9	40.6 - 20.6	P1.5x.120	4.19	3.83	93.9 K=1.00	0.5202	-2557.52	11447.80	0.223 ¹
T10	20.6 - 5.27	P1.5x.120	4.20	3.84	94.2 K=1.00	0.5202	-954.17	11401.20	0.084 ¹

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180.6 - 160.6	L2x2x1/4	3.42	2.94	89.0 K=1.54	0.9380	-4561.75	25366.20	0.180 ¹
T3	160.6 - 140.6	L2x2x1/4	3.42	2.94	89.0 K=1.54	0.9380	-1543.79	25366.20	0.061 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.89	88.5 K=1.55	0.9380	-1274.75	25459.00	0.050 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

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Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-192.08	22562.10	0.009 ¹
T2	180.6 - 160.6	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-1653.97	22569.10	0.073 ¹
T3	160.6 - 140.6	P1.5x.120	3.42	3.18	77.9 K=1.00	0.5202	-1543.79	13549.70	0.114 ¹
T4	140.6 - 120.6	P1.5x.120	3.42	3.18	77.9 K=1.00	0.5202	-1059.22	13543.10	0.078 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.73	101.9 K=1.22	0.9380	-1274.75	22735.80	0.056 ¹
T6	100.6 - 80.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1218.93	13708.20	0.089 ¹
T7	80.6 - 60.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-885.91	13708.20	0.065 ¹
T8	60.6 - 40.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1067.64	13708.20	0.078 ¹
T9	40.6 - 20.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1031.43	13708.20	0.075 ¹
T10	20.6 - 5.27	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1017.65	13708.20	0.074 ¹
T11	5.27 - 0.6	L4x4x1/4	3.05	2.76	80.8 K=1.94	1.9400	-1179.65	54077.30	0.022 ¹

¹ P_u / φP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-904.83	22562.10	0.040 ¹
T2	180.6 - 160.6	L2x2x1/4	3.42	2.78	102.7 K=1.20	0.9380	-4085.95	22569.10	0.181 ¹
T3	160.6 - 140.6	P1.5x.120	3.42	3.18	77.9 K=1.00	0.5202	-1543.79	13549.70	0.114 ¹
T4	140.6 - 120.6	P1.5x.120	3.42	3.18	77.9 K=1.00	0.5202	-1059.22	13543.10	0.078 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.73	101.9 K=1.22	0.9380	-1274.75	22735.80	0.056 ¹
T6	100.6 - 80.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1218.93	13708.20	0.089 ¹
T7	80.6 - 60.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-885.91	13708.20	0.065 ¹
T8	60.6 - 40.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1067.64	13708.20	0.078 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	40.6 - 20.6	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1031.43	13708.20	0.075 ¹
T10	20.6 - 5.27	P1.5x.120	3.42	3.13	76.7 K=1.00	0.5202	-1017.65	13708.20	0.074 ¹

¹ P_u / φP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T11	5.27 - 0.6	L4x4x1/4	2.08	1.78	73.5 K=2.73	1.9400	-867.10	65301.20	0.013 ¹

¹ P_u / φP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180.6 - 160.6 (585)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-370.24	287159.00	0.001
T2	180.6 - 160.6 (586)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-9527.11	287159.00	0.033
T2	180.6 - 160.6 (589)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-9616.80	287159.00	0.033
T2	180.6 - 160.6 (590)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-9628.93	287159.00	0.034
T2	180.6 - 160.6 (593)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-364.90	287159.00	0.001
T2	180.6 - 160.6 (594)	C15x33.9	3.67	3.55	47.1 K=1.00	9.9600	-723.13	287159.00	0.003
T5	120.6 - 100.6 (597)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-2194.29	287630.00	0.008
T5	120.6 - 100.6 (598)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-2329.87	287630.00	0.008
T5	120.6 - 100.6 (601)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-3570.57	287630.00	0.012
T5	120.6 - 100.6 (602)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-3562.45	287630.00	0.012
T5	120.6 - 100.6 (605)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-2229.23	287630.00	0.008
T5	120.6 - 100.6 (606)	C15x33.9	3.67	3.52	46.8 K=1.00	9.9600	-2365.68	287630.00	0.008

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Section No.	Elevation ft	Size	L ft	L _u ft	KI/r K=1.00	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T8	60.6 - 40.6 (609)	C12x25	3.67	3.52	54.2	7.3500	-1309.98	204038.00	0.006
T8	60.6 - 40.6 (610)	C12x25	3.67	3.52	54.2	7.3500	-1439.29	204038.00	0.007
T8	60.6 - 40.6 (613)	C12x25	3.67	3.52	54.2	7.3500	-1616.49	204038.00	0.008
T8	60.6 - 40.6 (614)	C12x25	3.67	3.52	54.2	7.3500	-1592.56	204038.00	0.008
T8	60.6 - 40.6 (617)	C12x25	3.67	3.52	54.2	7.3500	-1294.52	204038.00	0.006
T8	60.6 - 40.6 (618)	C12x25	3.67	3.52	54.2	7.3500	-1472.49	204038.00	0.007

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M _{ux} lb-ft	φM _{ux} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} lb-ft	φM _{uy} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T2	180.6 - 160.6 (585)	C15x33.9	-74913.33	136080.00	0.551	-0.00	12595.50	0.000
T2	180.6 - 160.6 (586)	C15x33.9	-72650.83	136080.00	0.534	-0.00	12595.50	0.000
T2	180.6 - 160.6 (589)	C15x33.9	-73372.50	136080.00	0.539	-0.00	12595.50	0.000
T2	180.6 - 160.6 (590)	C15x33.9	-72676.67	136080.00	0.534	0.00	12595.50	0.000
T2	180.6 - 160.6 (593)	C15x33.9	-75615.33	136080.00	0.556	0.00	12595.50	0.000
T2	180.6 - 160.6 (594)	C15x33.9	-74955.00	136080.00	0.551	0.00	12595.50	0.000
T5	120.6 - 100.6 (597)	C15x33.9	-25787.58	136080.00	0.190	0.00	12595.50	0.000
T5	120.6 - 100.6 (598)	C15x33.9	-25948.50	136080.00	0.191	-0.00	12595.50	0.000
T5	120.6 - 100.6 (601)	C15x33.9	-26083.67	136080.00	0.192	-0.00	12595.50	0.000
T5	120.6 - 100.6 (602)	C15x33.9	-26025.92	136080.00	0.191	0.00	12595.50	0.000
T5	120.6 - 100.6 (605)	C15x33.9	-25848.50	136080.00	0.190	-0.00	12595.50	0.000
T5	120.6 - 100.6 (606)	C15x33.9	-25930.42	136080.00	0.191	0.00	12595.50	0.000
T8	60.6 - 40.6 (609)	C12x25	-8211.43	77959.25	0.105	0.00	7614.00	0.000
T8	60.6 - 40.6 (610)	C12x25	-8219.92	77959.25	0.105	-0.00	7614.00	0.000
T8	60.6 - 40.6 (613)	C12x25	-8158.26	77959.25	0.105	-0.00	7614.00	0.000
T8	60.6 - 40.6 (614)	C12x25	-8087.73	77959.25	0.104	0.00	7614.00	0.000
T8	60.6 - 40.6 (617)	C12x25	-8150.52	77959.25	0.105	-0.00	7614.00	0.000

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Section No.	Elevation ft	Size	M_{ux}	ϕM_{nx}	Ratio	M_{uy}	ϕM_{ny}	Ratio
			lb-ft	lb-ft	$\frac{M_{ux}}{\phi M_{nx}}$	lb-ft	lb-ft	$\frac{M_{uy}}{\phi M_{ny}}$
T8	60.6 - 40.6 (618)	C12x25	-8284.18	77959.25	0.106	0.00	7614.00	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
			$\frac{P_u}{\phi P_n}$	$\frac{M_{ux}}{\phi M_{nx}}$	$\frac{M_{uy}}{\phi M_{ny}}$			
T2	180.6 - 160.6 (585)	C15x33.9	0.001	0.551	0.000	0.551	1.000	4.8.1 ✓
T2	180.6 - 160.6 (586)	C15x33.9	0.033	0.534	0.000	0.550	1.000	4.8.1 ✓
T2	180.6 - 160.6 (589)	C15x33.9	0.033	0.539	0.000	0.556	1.000	4.8.1 ✓
T2	180.6 - 160.6 (590)	C15x33.9	0.034	0.534	0.000	0.551	1.000	4.8.1 ✓
T2	180.6 - 160.6 (593)	C15x33.9	0.001	0.556	0.000	0.556	1.000	4.8.1 ✓
T2	180.6 - 160.6 (594)	C15x33.9	0.003	0.551	0.000	0.552	1.000	4.8.1 ✓
T5	120.6 - 100.6 (597)	C15x33.9	0.008	0.190	0.000	0.193	1.000	4.8.1 ✓
T5	120.6 - 100.6 (598)	C15x33.9	0.008	0.191	0.000	0.195	1.000	4.8.1 ✓
T5	120.6 - 100.6 (601)	C15x33.9	0.012	0.192	0.000	0.198	1.000	4.8.1 ✓
T5	120.6 - 100.6 (602)	C15x33.9	0.012	0.191	0.000	0.197	1.000	4.8.1 ✓
T5	120.6 - 100.6 (605)	C15x33.9	0.008	0.190	0.000	0.194	1.000	4.8.1 ✓
T5	120.6 - 100.6 (606)	C15x33.9	0.008	0.191	0.000	0.195	1.000	4.8.1 ✓
T8	60.6 - 40.6 (609)	C12x25	0.006	0.105	0.000	0.109	1.000	4.8.1 ✓
T8	60.6 - 40.6 (610)	C12x25	0.007	0.105	0.000	0.109	1.000	4.8.1 ✓
T8	60.6 - 40.6 (613)	C12x25	0.008	0.105	0.000	0.109	1.000	4.8.1 ✓
T8	60.6 - 40.6 (614)	C12x25	0.008	0.104	0.000	0.108	1.000	4.8.1 ✓
T8	60.6 - 40.6 (617)	C12x25	0.006	0.105	0.000	0.108	1.000	4.8.1 ✓
T8	60.6 - 40.6 (618)	C12x25	0.007	0.106	0.000	0.110	1.000	4.8.1 ✓

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Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	P2.5x.276	13.00	0.17	2.2	2.2535	15278.00	101409.00	0.151 ¹
T2	180.6 - 160.6	P2.5x0.276 (CT2171)	20.00	1.21	16.5	3.5323	81848.20	158955.00	0.515 ¹
T3	160.6 - 140.6	P2.5x0.276 (CT2171)	20.00	0.50	6.8	3.5323	37281.80	158955.00	0.235 ¹
T5	120.6 - 100.6	P3x0.299	20.00	1.21	12.8	3.0068	434.02	135307.00	0.003 ¹

¹ P_u / φP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	4.22	1.76	38.6	0.5629	2425.22	24485.10	0.099 ¹
T2	180.6 - 160.6	L2x2x1/4	4.19	1.75	38.3	0.5629	8264.09	24485.10	0.338 ¹
T3	160.6 - 140.6	L2x2x1/4	4.19	1.83	38.3	0.5629	4382.32	24485.10	0.179 ¹
T4	140.6 - 120.6	P1.5x.120	4.19	3.89	95.4	0.5202	1163.48	19665.40	0.059 ¹
T5	120.6 - 100.6	L2x2x1/4	4.19	1.72	37.7	0.5629	1474.73	24485.10	0.060 ¹
T6	100.6 - 80.6	P1.5x.120	4.19	3.83	93.9	0.5202	1810.45	19665.40	0.092 ¹
T7	80.6 - 60.6	L1 3/4x1 3/4x3/16	4.19	3.62	85.6	0.3779	875.77	16439.90	0.053 ¹
T8	60.6 - 40.6	P1.5x.120	4.19	3.83	93.9	0.5202	2323.70	19665.40	0.118 ¹
T9	40.6 - 20.6	P1.5x.120	4.19	3.83	93.9	0.5202	2034.10	19665.40	0.103 ¹
T10	20.6 - 5.27	P1.5x.120	4.20	3.84	94.2	0.5202	1075.53	19665.40	0.055 ¹

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¹ $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180.6 - 160.6	L2x2x1/4	3.42	2.94	62.6	0.5629	6945.25	24485.10	0.284 ¹
T3	160.6 - 140.6	L2x2x1/4	3.42	2.94	62.6	0.5629	2263.38	24485.10	0.092 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.89	61.6	0.5629	3828.81	24485.10	0.156 ¹

¹ $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	3.42	2.78	62.7	0.5629	183.81	24485.10	0.008 ¹
T2	180.6 - 160.6	L2x2x1/4	3.42	2.78	62.6	0.5629	1653.97	24485.10	0.068 ¹
T3	160.6 - 140.6	P1.5x.120	3.42	3.18	77.9	0.5202	1543.79	19665.40	0.079 ¹
T4	140.6 - 120.6	P1.5x.120	3.42	3.18	77.9	0.5202	1059.22	19665.40	0.054 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.73	61.6	0.5629	1274.75	24485.10	0.052 ¹
T6	100.6 - 80.6	P1.5x.120	3.42	3.13	76.7	0.5202	1218.93	19665.40	0.062 ¹
T7	80.6 - 60.6	P1.5x.120	3.42	3.13	76.7	0.5202	885.91	19665.40	0.045 ¹
T8	60.6 - 40.6	P1.5x.120	3.42	3.13	76.7	0.5202	1067.64	19665.40	0.054 ¹
T9	40.6 - 20.6	P1.5x.120	3.42	3.13	76.7	0.5202	1127.31	19665.40	0.057 ¹
T10	20.6 - 5.27	P1.5x.120	3.42	3.13	76.7	0.5202	1017.65	19665.40	0.052 ¹
T11	5.27 - 0.6	L4x4x1/4	3.05	2.76	26.5	1.9400	6985.25	62856.00	0.111 ¹

¹ $P_u / \phi P_n$ controls

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Bottom Girt Design Data (Tension)

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T1	193.6 - 180.6	L2x2x1/4	3.42	2.78	62.7	0.5629	957.03	24485.10	0.039 ¹
T2	180.6 - 160.6	L2x2x1/4	3.42	2.78	62.6	0.5629	5193.64	24485.10	0.212 ¹
T3	160.6 - 140.6	P1.5x.120	3.42	3.18	77.9	0.5202	1543.79	19665.40	0.079 ¹
T4	140.6 - 120.6	P1.5x.120	3.42	3.18	77.9	0.5202	1059.22	19665.40	0.054 ¹
T5	120.6 - 100.6	L2x2x1/4	3.42	2.73	61.6	0.5629	2209.72	24485.10	0.090 ¹
T6	100.6 - 80.6	P1.5x.120	3.42	3.13	76.7	0.5202	1218.93	19665.40	0.062 ¹
T7	80.6 - 60.6	P1.5x.120	3.42	3.13	76.7	0.5202	885.91	19665.40	0.045 ¹
T8	60.6 - 40.6	P1.5x.120	3.42	3.13	76.7	0.5202	1067.64	19665.40	0.054 ¹
T9	40.6 - 20.6	P1.5x.120	3.42	3.13	76.7	0.5202	1031.43	19665.40	0.052 ¹
T10	20.6 - 5.27	P1.5x.120	3.42	3.13	76.7	0.5202	7806.32	19665.40	0.397 ¹

¹ $P_u / \phi P_n$ controls

Torque-Arm Top Design Data

Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
T2	180.6 - 160.6 (585)	C15x33.9	3.67	3.55	47.1	9.9600	7937.40	322704.00	0.025
T2	180.6 - 160.6 (586)	C15x33.9	3.67	3.55	47.1	9.9600	7127.75	322704.00	0.022
T2	180.6 - 160.6 (589)	C15x33.9	3.67	3.55	47.1	9.9600	7336.53	322704.00	0.023
T2	180.6 - 160.6 (590)	C15x33.9	3.67	3.55	47.1	9.9600	7730.10	322704.00	0.024
T2	180.6 - 160.6 (593)	C15x33.9	3.67	3.55	47.1	9.9600	7736.13	322704.00	0.024
T2	180.6 - 160.6 (594)	C15x33.9	3.67	3.55	47.1	9.9600	7309.28	322704.00	0.023
T5	120.6 - 100.6 (597)	C15x33.9	3.67	3.52	46.8	9.9600	196.17	322704.00	0.001
T5	120.6 - 100.6 (598)	C15x33.9	3.67	3.52	46.8	9.9600	2560.42	322704.00	0.008

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Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	120.6 - 100.6 (601)	C15x33.9	3.67	3.52	46.8	9.9600	2733.69	322704.00	0.008
T5	120.6 - 100.6 (602)	C15x33.9	3.67	3.52	46.8	9.9600	2726.70	322704.00	0.008
T5	120.6 - 100.6 (605)	C15x33.9	3.67	3.52	46.8	9.9600	169.64	322704.00	0.001
T5	120.6 - 100.6 (606)	C15x33.9	3.67	3.52	46.8	9.9600	2541.22	322704.00	0.008
T8	60.6 - 40.6 (609)	C12x25	3.67	3.52	54.2	7.3500	121.37	238140.00	0.001
T8	60.6 - 40.6 (610)	C12x25	3.67	3.52	54.2	7.3500	1370.48	238140.00	0.006
T8	60.6 - 40.6 (613)	C12x25	3.67	3.52	54.2	7.3500	1329.01	238140.00	0.006
T8	60.6 - 40.6 (614)	C12x25	3.67	3.52	54.2	7.3500	1391.34	238140.00	0.006
T8	60.6 - 40.6 (617)	C12x25	3.67	3.52	54.2	7.3500	145.35	238140.00	0.001
T8	60.6 - 40.6 (618)	C12x25	3.67	3.52	54.2	7.3500	1360.78	238140.00	0.006

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M _{ux} lb-ft	φM _{ux} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} lb-ft	φM _{uy} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T2	180.6 - 160.6 (585)	C15x33.9	-66436.00	136080.00	0.488	-0.00	12595.50	0.000
T2	180.6 - 160.6 (586)	C15x33.9	-65300.58	136080.00	0.480	-0.00	12595.50	0.000
T2	180.6 - 160.6 (589)	C15x33.9	-65998.42	136080.00	0.485	0.00	12595.50	0.000
T2	180.6 - 160.6 (590)	C15x33.9	-66307.00	136080.00	0.487	0.00	12595.50	0.000
T2	180.6 - 160.6 (593)	C15x33.9	-66578.92	136080.00	0.489	0.00	12595.50	0.000
T2	180.6 - 160.6 (594)	C15x33.9	-65781.50	136080.00	0.483	0.00	12595.50	0.000
T5	120.6 - 100.6 (597)	C15x33.9	-26940.33	136080.00	0.198	-0.00	12595.50	0.000
T5	120.6 - 100.6 (598)	C15x33.9	-23653.92	136080.00	0.174	-0.00	12595.50	0.000
T5	120.6 - 100.6 (601)	C15x33.9	-23935.50	136080.00	0.176	-0.00	12595.50	0.000
T5	120.6 - 100.6 (602)	C15x33.9	-23832.83	136080.00	0.175	-0.00	12595.50	0.000
T5	120.6 - 100.6 (605)	C15x33.9	-26985.42	136080.00	0.198	0.00	12595.50	0.000
T5	120.6 - 100.6 (606)	C15x33.9	-23536.58	136080.00	0.173	0.00	12595.50	0.000
T8	60.6 - 40.6 (609)	C12x25	-7944.92	77959.25	0.102	-0.00	7614.00	0.000

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Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{ux} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} lb-ft	ϕM_{uy} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T8	60.6 - 40.6 (610)	C12x25	-7574.13	77959.25	0.097	0.00	7614.00	0.000
T8	60.6 - 40.6 (613)	C12x25	-7584.46	77959.25	0.097	-0.00	7614.00	0.000
T8	60.6 - 40.6 (614)	C12x25	-7511.77	77959.25	0.096	0.00	7614.00	0.000
T8	60.6 - 40.6 (617)	C12x25	-7856.76	77959.25	0.101	0.00	7614.00	0.000
T8	60.6 - 40.6 (618)	C12x25	-7642.34	77959.25	0.098	-0.00	7614.00	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	180.6 - 160.6 (585)	C15x33.9	0.025	0.488	0.000	0.501	1.000	4.8.1 ✓
T2	180.6 - 160.6 (586)	C15x33.9	0.022	0.480	0.000	0.491	1.000	4.8.1 ✓
T2	180.6 - 160.6 (589)	C15x33.9	0.023	0.485	0.000	0.496	1.000	4.8.1 ✓
T2	180.6 - 160.6 (590)	C15x33.9	0.024	0.487	0.000	0.499	1.000	4.8.1 ✓
T2	180.6 - 160.6 (593)	C15x33.9	0.024	0.489	0.000	0.501	1.000	4.8.1 ✓
T2	180.6 - 160.6 (594)	C15x33.9	0.023	0.483	0.000	0.495	1.000	4.8.1 ✓
T5	120.6 - 100.6 (597)	C15x33.9	0.001	0.198	0.000	0.198	1.000	4.8.1 ✓
T5	120.6 - 100.6 (598)	C15x33.9	0.008	0.174	0.000	0.178	1.000	4.8.1 ✓
T5	120.6 - 100.6 (601)	C15x33.9	0.008	0.176	0.000	0.180	1.000	4.8.1 ✓
T5	120.6 - 100.6 (602)	C15x33.9	0.008	0.175	0.000	0.179	1.000	4.8.1 ✓
T5	120.6 - 100.6 (605)	C15x33.9	0.001	0.198	0.000	0.199	1.000	4.8.1 ✓
T5	120.6 - 100.6 (606)	C15x33.9	0.008	0.173	0.000	0.177	1.000	4.8.1 ✓
T8	60.6 - 40.6 (609)	C12x25	0.001	0.102	0.000	0.102	1.000	4.8.1 ✓
T8	60.6 - 40.6 (610)	C12x25	0.006	0.097	0.000	0.100	1.000	4.8.1 ✓
T8	60.6 - 40.6 (613)	C12x25	0.006	0.097	0.000	0.100	1.000	4.8.1 ✓

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Section No.	Elevation ft	Size	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
			ϕP_n	ϕM_{ux}	ϕM_{uy}			
T8	60.6 - 40.6 (614)	C12x25	0.006	0.096	0.000	0.099	1.000	4.8.1 ✓
T8	60.6 - 40.6 (617)	C12x25	0.001	0.101	0.000	0.101	1.000	4.8.1 ✓
T8	60.6 - 40.6 (618)	C12x25	0.006	0.098	0.000	0.101	1.000	4.8.1 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	193.6 - 180.6	Leg	P2.5x.276	1	-19237.80	101375.00	19.0	Pass
T2	180.6 - 160.6	Leg	P2.5x0.276 (CT2171)	40	-95491.90	155814.00	61.3	Pass
T3	160.6 - 140.6	Leg	P2.5x0.276 (CT2171)	121	-89130.70	152832.00	58.3	Pass
T4	140.6 - 120.6	Leg	P2.5x.276	204	-59871.70	91721.60	65.3	Pass
T5	120.6 - 100.6	Leg	P3x0.299	261	-73597.70	127509.00	57.7	Pass
T6	100.6 - 80.6	Leg	P3x0.299	342	-70375.10	125768.00	56.0	Pass
T7	80.6 - 60.6	Leg	P3x0.299	398	-51147.70	117810.00	43.4	Pass
T8	60.6 - 40.6	Leg	P3x0.299	455	-61640.30	121686.00	50.7	Pass
T9	40.6 - 20.6	Leg	P3x0.299	512	-58387.50	111851.00	52.2	Pass
T10	20.6 - 5.27	Leg	P3x0.299	544	-58754.00	111369.00	52.8	Pass
T11	5.27 - 0.6	Leg	P3x0.299	572	-64116.60	126090.00	50.8	Pass
T1	193.6 - 180.6	Diagonal	L2x2x1/4	11	2425.22	24485.10	9.9	Pass
T2	180.6 - 160.6	Diagonal	L2x2x1/4	71	8264.09	24485.10	33.8	Pass
T3	160.6 - 140.6	Diagonal	L2x2x1/4	193	-5437.33	28258.50	19.2	Pass
T4	140.6 - 120.6	Diagonal	P1.5x.120	256	-1657.04	11241.80	14.7	Pass
T5	120.6 - 100.6	Diagonal	L2x2x1/4	269	-4151.98	28634.70	14.5	Pass
T6	100.6 - 80.6	Diagonal	P1.5x.120	392	-2575.39	11447.80	22.5	Pass
T7	80.6 - 60.6	Diagonal	L1 3/4x1 3/4x3/16	453	-1454.53	11098.60	13.1	Pass
T8	60.6 - 40.6	Diagonal	P1.5x.120	467	-2605.01	11447.80	22.8	Pass
T9	40.6 - 20.6	Diagonal	P1.5x.120	541	-2557.52	11447.80	22.3	Pass
T10	20.6 - 5.27	Diagonal	P1.5x.120	569	-954.17	11401.20	8.4	Pass
T2	180.6 - 160.6	Secondary Horizontal	L2x2x1/4	64	6945.25	24485.10	28.4	Pass
T3	160.6 - 140.6	Secondary Horizontal	L2x2x1/4	199	2263.38	24485.10	9.2	Pass
T5	120.6 - 100.6	Secondary Horizontal	L2x2x1/4	285	3828.81	24485.10	15.6	Pass
T1	193.6 - 180.6	Top Girt	L2x2x1/4	5	-192.08	22562.10	0.9	Pass
T2	180.6 - 160.6	Top Girt	L2x2x1/4	45	-1653.97	22569.10	7.3	Pass
T3	160.6 - 140.6	Top Girt	P1.5x.120	126	-1543.79	13549.70	11.4	Pass
T4	140.6 - 120.6	Top Girt	P1.5x.120	206	-1059.22	13543.10	7.8	Pass
T5	120.6 - 100.6	Top Girt	L2x2x1/4	263	-1274.75	22735.80	5.6	Pass
T6	100.6 - 80.6	Top Girt	P1.5x.120	344	-1218.93	13708.20	8.9	Pass
T7	80.6 - 60.6	Top Girt	P1.5x.120	400	-885.91	13708.20	6.5	Pass
T8	60.6 - 40.6	Top Girt	P1.5x.120	457	-1067.64	13708.20	7.8	Pass
T9	40.6 - 20.6	Top Girt	P1.5x.120	514	-1031.43	13708.20	7.5	Pass
T10	20.6 - 5.27	Top Girt	P1.5x.120	549	-1017.65	13708.20	7.4	Pass
T11	5.27 - 0.6	Top Girt	L4x4x1/4	574	6985.25	62856.00	11.1	Pass
T1	193.6 - 180.6	Bottom Girt	L2x2x1/4	9	-904.83	22562.10	4.0	Pass
T2	180.6 - 160.6	Bottom Girt	L2x2x1/4	48	5193.64	24485.10	21.2	Pass
T3	160.6 - 140.6	Bottom Girt	P1.5x.120	129	-1543.79	13549.70	11.4	Pass
T4	140.6 - 120.6	Bottom Girt	P1.5x.120	209	-1059.22	13543.10	7.8	Pass
T5	120.6 - 100.6	Bottom Girt	L2x2x1/4	267	2209.72	24485.10	9.0	Pass
T6	100.6 - 80.6	Bottom Girt	P1.5x.120	347	-1218.93	13708.20	8.9	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail	
T7	80.6 - 60.6	Bottom Girt	P1.5x.120	403	-885.91	13708.20	6.5	Pass	
T8	60.6 - 40.6	Bottom Girt	P1.5x.120	460	-1067.64	13708.20	7.8	Pass	
T9	40.6 - 20.6	Bottom Girt	P1.5x.120	517	-1031.43	13708.20	7.5	Pass	
T10	20.6 - 5.27	Bottom Girt	P1.5x.120	550	7806.32	19665.40	39.7	Pass	
T11	5.27 - 0.6	Mid Girt	L4x4x1/4	580	-867.10	65301.20	1.3	Pass	
T2	180.6 - 160.6	Guy A@163.183	7/8	592	26797.90	47820.00	56.0	Pass	
T5	120.6 - 100.6	Guy A@103.183	5/8	603	9775.56	25440.00	38.4	Pass	
T8	60.6 - 40.6	Guy A@43.1833	1/2	615	5246.93	16140.00	32.5	Pass	
T2	180.6 - 160.6	Guy B@163.183	7/8	587	26859.10	47820.00	56.2	Pass	
T5	120.6 - 100.6	Guy B@103.183	5/8	599	9759.65	25440.00	38.4	Pass	
T8	60.6 - 40.6	Guy B@43.1833	1/2	611	5334.55	16140.00	33.1	Pass	
T2	180.6 - 160.6	Guy C@163.183	7/8	584	26445.50	47820.00	55.3	Pass	
T5	120.6 - 100.6	Guy C@103.183	5/8	596	9742.44	25440.00	38.3	Pass	
T8	60.6 - 40.6	Guy C@43.1833	1/2	608	5314.51	16140.00	32.9	Pass	
T2	180.6 - 160.6	Torque Arm Top@163.183	C15x33.9	593	7736.13	322704.00	55.6	Pass	
T5	120.6 - 100.6	Torque Arm Top@103.183	C15x33.9	605	-2229.23	287630.00	19.9	Pass	
T8	60.6 - 40.6	Torque Arm Top@43.1833	C12x25	618	-1472.49	204038.00	11.0	Pass	
							Summary		
							Leg (T4)	65.3	Pass
							Diagonal (T2)	33.8	Pass
							Secondary Horizontal (T2)	28.4	Pass
							Top Girt (T3)	11.4	Pass
							Bottom Girt (T10)	39.7	Pass
							Mid Girt (T11)	1.3	Pass
							Guy A (T2)	56.0	Pass
							Guy B (T2)	56.2	Pass
							Guy C (T2)	55.3	Pass
							Torque Arm Top (T2)	55.6	Pass
							Bolt Checks	90.6	Pass
							RATING =	90.6	Pass

Pier and Pad Foundation



Site Number:	CT2171
Site Name:	MONTVILLE EAST
TEP Site Number:	354218

TIA-222 Revision:	H
Tower Type:	Guyed

Top & Bot. Pad Rein. Different?:	<input type="checkbox"/>
Block Foundation?:	<input type="checkbox"/>
Rectangular Pad?:	<input type="checkbox"/>

Superstructure Analysis Reactions		
Compression, P_{comp} :	174.57	kips
Base Shear, V_{u_comp} :	0.785	kips
Moment, M_u :	0.631	ft-kips
Tower Height, H :	193.6	ft
BP Dist. Above Fdn, bp_{dist} :	0	in
Bolt Circle / Bearing Plate Width, BC :	16	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	2.5	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	7	
Pier Rebar Quantity, mc :	6	
Pier Tie/Spiral Size, St :	3	
Pier Tie/Spiral Quantity, mt :	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

Pad Properties		
Depth, D :	5	ft
Pad Width, W_1 :	7	ft
Pad Thickness, T :	1.75	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	7	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	3	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Net Bearing, Q_{net} :	12.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	35	degrees
SPT Blow Count, N_{blows} :	30	
Base Friction, μ :	0.45	
Neglected Depth, N :	0.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	61.19	0.79	1.2%	Pass
Bearing Pressure (ksf)	7.58	4.43	55.7%	Pass
Overtuning (kip*ft)	286.54	4.95	1.7%	Pass
Pier Flexure (Comp.) (kip*ft)	308.27	3.57	1.1%	Pass
Pier Compression (kip)	2983.50	178.79	5.7%	Pass
Pad Flexure (kip*ft)	133.13	64.75	46.3%	Pass
Pad Shear - 1-way (kips)	115.17	22.03	18.2%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.031	17.8%	Pass
Flexural 2-way (Comp) (kip*ft)	266.25	2.14	0.8%	Pass

*Rating per TIA-222-H Section 15.5

Structural Rating*:	46.3%
Soil Rating*:	55.7%

<-- Toggle between Gross and Net

Anchor Block Foundation

Checks capacity of anchor blocks with or without a berm
for a guyed tower

AT&T Site Number: CT2171

TEP Site Number: 354218

Site Name: MONTVILLE EAST

Design Reactions		
Shear, S :	21.67	kips
Uplift, Ua :	18.85	kips
Resultant Force, Rf :	28.72	kips
Tower Height, H :	193.00	ft
Guy Anchor Radius, R :	89.00	ft

Guyed Anchor Properties		
Depth to Bottom of Deadman, Da :	8.0	ft
Anchor Width, Wa :	6.0	ft
Anchor Thickness, Ta :	4.0	ft
Anchor Length, La :	12.0	ft
Concrete Volume, Vc :	10.7	yd ³
Frost Depth, Fd :	4	ft

Material Properties		
Rebar Tensile, Fy :	60000	psi
Concrete Strength, F'c :	3000	psi
Concrete Density, δx :	0.150	kcf
Clear Cover, cc :	3	in
Strength Reduction Factor, φ :	0.9	

Skin Friction		
Ultimate Soil Friction, f_s =	0.45	ksf

Design Checks				
	Capacity/ Availability	Demand/ Limits	Check	%
Shear (kips):	178.32	21.67	OK	12.1%
Uplift Capacity (kips):	106.28	18.85	OK	17.7%

Warning: Maximum soil depth is not equal to bottom of deadman.

Soil Properties		No. of Soil Layers? 1		
Layer	φ, deg	c, ksf	δ, kcf	d, ft
Berm	0	0.000	0.000	0.00
1	30	0.000	0.110	12.00

Backfill	30	0.500	0.110	<input type="checkbox"/> use
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*key: φ = Internal Angle of Friction

δ = Soil Unit Weight

d = Depth to Bottom of Layer

Anchor Block Foundation

Checks capacity of anchor blocks with or without a berm for a guyed tower

AT&T Site Number: CT2171

TEP Site Number: 354218

Site Name: MONTVILLE EAST

Design Reactions		
Shear, S :	33.02	kips
Uplift, Ua :	38.98	kips
Resultant Force, Rf :	51.09	kips
Tower Height, H :	193.00	ft
Guy Anchor Radius, R :	137.00	ft

Guyed Anchor Properties		
Depth to Bottom of Deadman, Da :	10.0	ft
Anchor Width, Wa :	5.0	ft
Anchor Thickness, Ta :	2.0	ft
Anchor Length, La :	9.0	ft
Concrete Volume, Vc :	3.3	yd ³
Frost Depth, Fd :	4	ft

Material Properties		
Rebar Tensile, Fy :	60000	psi
Concrete Strength, F'c :	3000	psi
Concrete Density, δc :	0.150	kcf
Clear Cover, cc :	3	in
Strength Reduction Factor, φ :	0.9	

Skin Friction		
Ultimate Soil Friction, f_s =	0.45	ksf

Design Checks				
	Capacity/Availability	Demand/Limits	Check	%
Shear (kips):	73.42	33.02	OK	45.0%
Uplift Capacity (kips):	113.79	38.98	OK	34.3%

Warning: Maximum soil depth is not equal to bottom of deadman.

Soil Properties		No. of Soil Layers? 1		
Layer	φ, deg	c, ksf	δ, kcf	d, ft
Berm	0	0.000	0.000	0.00
1	30	0.000	0.110	12.00

Backfill	30	0.500	0.110	<input type="checkbox"/> use
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*key: φ = Internal Angle of Friction

δ = Soil Unit Weight

d = Depth to Bottom of Layer