RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED

December 11, 2018

David Ford
Centerline Communications LLC
750 West Center Street, Suite #301
West Bridgewater, MA 02379

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **STRUCTURAL ASSESSMENT**
185-FOOT SELF-SUPPORT TOWER

CARRIER: **AT&T**

SITE: **WESTON GODFREY ROAD (CT2380)**
237 GODFREY ROAD
WESTON, FAIRFIELD COUNTY, CONNECTICUT 06883
RAMAKER & ASSOCIATES PROJECT NUMBER: 28737

RESULTS:			
	TOWER:	**96.4%**	**PASS**
	FOUNDATION:	**95.8%**	**PASS**

Dear David Ford:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above-mentioned site. The purpose of this report is to determine the structural integrity of the structure(s) with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the tower using tnxTower analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the tower loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2018 CT State Building Code
Adopted Building Code	2015 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	120 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	B
Topographic Feature	None

SUPPORTING DOCUMENTATION

- Tower and foundation drawings by Sabre, proposal number 06-8653-MJB-R3, dated June 20, 2006
- Tower member data from Sabre, by email, on September 26, 2017
- Geotechnical report by JGI Eastern, Inc., job number 06113G, dated February 16, 2006
- Structural analysis by CHA, job number 22702-1018-28000-R1, dated July 22, 2011
- Structural analysis by Centek Engineering, job number 14001.010, dated April 09, 2014
- Structural analysis by RAMAKER, job number 28737, dated September 27, 2017
- Structural analysis by Destek Engineering, job number 1675003, dated January 24, 2017
- Structural analysis by Hudson Design Group LLC, job name CT2380, dated October 24, 2018
- Construction drawings by Hudson Design Group LLC, job name CT2380, dated November 1, 2018
- Construction drawings by RAMAKER, project number 28737
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

TOWER LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antenna equipment, mount, and cable configurations as shown in the following chart:

Elevation	Appurtenance	Mount	Coax	Owner	Status
185	(1) 12' Omni	Leg Mount	(3) 7/8	Municipal	Existing
	(2) 6' Dipole				
	(2) Ericsson AIR 21 B2A B4P	(3) T-Frame	(12) 1-5/8 (1) 1-1/4 Hybrid	T-Mobile	Existing
	(4) Ericsson AIR 21 B2A B2P				
	(3) Ericsson KRY 112 71				
	(3) Commscope LNX-6515DS-A1M				
	(3) Ericsson RRUS-11				
174	(3) RFS APXVSPP18-C	(3) T-Frame	(4) 1-1/4 Hybrid	Sprint	Existing
	(3) ALU 1900MHz RRH				
	(3) ALU 800MHz RRH				
	(3) RFS APXV9TM14-ALU-120				
	(3) ALU TD-RRH8x20				
164	(3) Antel BXA-70063-6CF	(3) T-Frame	(18) 1-5/8 (1) 1-5/8 Hybrid	Verizon	Existing
	(4) Decibel DB846F65ZAXY				
	(2) Decibel DB846H80E-SX				
	(6) Kathrein Scala 742 213				
	(3) ALU RRH2x40-AWS				
	(1) RFS DB-T1-6Z-8AB-0Z				
154	**(3) Powerwave 7770**	(3) T-Frame	(12) 1-5/8 (2) Power (1) Fiber	AT&T	**Remove**
	(3) Powerwave 7770				Existing
	(3) Powerwave P65-16-XLH-RR				
	(6) Powerwave LGP214nn				
	(3) Ericsson RRUS-11				
	(1) Raycap DC6-48-60-18-8F				
	(3) CCI HPA65R-BU6A				**Proposed**
	(3) Ericsson RRUS 4415 B25				
146	(1) 15' Omni	(2) 6' Standoff	(4) 7/8	Municipal	Existing
	(2) 8' Dipole				
138	(1) 3' Dish w/Radome	(1) 2' Standoff	(1) 1/2	Municipal	Existing

TOWER RESULTS

The maximum tower member stress capacities under the loading conditions previously described are as follows:

Component Type	Percent Capacity	Pass/Fail
Leg	88.4	Pass
Diagonal	96.4	Pass
Horizontal	23.0	Pass
Secondary Horizontal	45.3	Pass
Redundant Bracing	15.3	Pass
Bolt	82.5	Pass
Anchor Rod	79.1	Pass
RATING	**96.4**	**PASS**

Results of the analysis show that the modified tower will be stressed to a maximum of 96.4 percent of capacity. Therefore, the modified tower will pass the TIA-222-G analysis requirements under proposed loading conditions. The required tower modifications are included in the attachments.

DISH TWIST/SWAY RESULTS

The twist/sway results for a 60 mph service wind speed are as follows:

Elevation	Dish	Deflection (in)	Tilt (deg)	Twist (deg)
138	Andrew 3' Dish	3.733	0.2799	0.0177

FOUNDATION RESULTS

The maximum foundation stress capacities are as follows:

Component Type	Percent Capacity	Pass/Fail
Soil Interaction	64.5	Pass
Structural	95.8	Pass
RATING	**95.8**	**PASS**

Results of the analysis show that the existing foundation will be stressed to a maximum of 95.8 percent of capacity. Therefore, the existing foundation will pass the TIA-222-G analysis requirements under proposed loading conditions.

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance

RAMAKER assumes no responsibility for modifications completed prior to or hereafter in which RAMAKER was not directly involved. These modifications include but are not limited to the following:

- Replacing or strengthening bracing members
- Reinforcing or extending vertical members
- Installing or removing antenna mounting gates or side arms
- Changing loading configurations

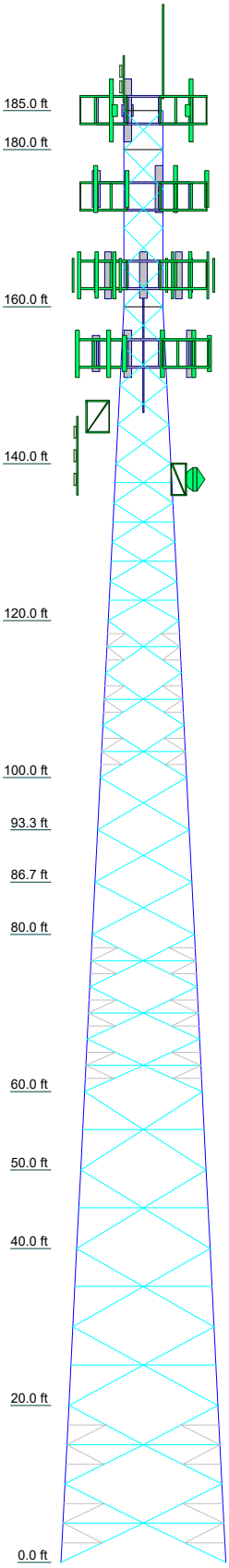
The cell carrier is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the tower structure, and no analyses or conclusions were made regarding the antenna and equipment mounting structure(s). Analysis and certification of the antenna and equipment mounting structure(s) is performed and submitted separately.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P8x.322		P5x.5		P5x.375				P5x.258	P3.5x.318	P2.5x.375	P2.5x.203	A
Leg Grade							A572-50						
Diagonals	L3 1/2x3 1/2x1/4		C	L3x3x1/4	L3x3x3/16	B			L2 1/2x2 1/2x3/16	L2x2x3/16	L2x2x1/8		
Diagonal Grade							A36						
Top Girts					N.A.					L2x2x1/8			
Horizontals	L3 1/2x3 1/2x1/2		N.A.		L3x3x3/8		N.A.		L2 1/2x2 1/2x3/8		N.A.		
Sec. Horizontals	N.A.	L3x3x1/2		L3x3x7/16			N.A.			L2x2x1/4	N.A.		
Red. Horizontals	L3x3x1/2		N.A.		L3x3x1/2		N.A.		L3x3x1/2		N.A.		
Red. Diagonals	L3x3x1/2		N.A.		L3x3x1/2		N.A.		L3x3x1/2		N.A.		
Face Width (ft) 21	19		17	16	15	13	12.3333	11	9	7			5
# Panels @ (ft)	4 @ 5		4 @ 10		6 @ 3.33333		3 @ 6.66667		6 @ 3.33333		13 @ 5		
Weight (lb) 30434.6	6966.8	4148.8	2356.7	1739.7	5675.4	942.7	669.5	658.8	3928.5	1609.6	936.4	652.3	149.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6' Dipole (Muncipal)	185	DB846H80E-SX w/Mount Pipe (Verizon)	164
12' Omni (Muncipal)	185	DB846H80E-SX w/Mount Pipe (Verizon)	164
6' Dipole (Muncipal)	185	DB846F65ZAXY w/Mount Pipe (Verizon)	164
(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	185	DB846F65ZAXY w/Mount Pipe (Verizon)	164
(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
(2) AIR 21 B2A B2P w/Mount Pipe (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
KRY 112 71 (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
KRY 112 71 (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
KRY 112 71 (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	185	742 213 w/Mount Pipe (Verizon)	164
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	185	RRH 2x40 AWS (Verizon)	164
LNX-6515DS-A1M w/Mount Pipe (T-Mobile)	185	RRH 2x40 AWS (Verizon)	164
RRUS-11 (T-Mobile)	185	RRH 2x40 AWS (Verizon)	164
RRUS-11 (T-Mobile)	185	DB-T1-6Z-8AB-0Z (Verizon)	164
RRUS-11 (T-Mobile)	185	Sector Mount [SM 104-1] (Verizon)	164
Sector Mount [SM 403-1] (T-Mobile)	185	Sector Mount [SM 104-1] (Verizon)	164
Sector Mount [SM 403-1] (T-Mobile)	185	Sector Mount [SM 104-1] (Verizon)	164
Sector Mount [SM 403-1] (T-Mobile)	185	7770.00 w/Mount Pipe (ATT)	154
APXVSPP18-C w/Mount Pipe (Sprint)	174	7770.00 w/Mount Pipe (ATT)	154
APXVSPP18-C w/Mount Pipe (Sprint)	174	7770.00 w/Mount Pipe (ATT)	154
APXVSPP18-C w/Mount Pipe (Sprint)	174	HPA65R-BU6A w/Mount Pipe (ATT)	154
1900MHz 4x40W RRH (Sprint)	174	HPA65R-BU6A w/Mount Pipe (ATT)	154
1900MHz 4x40W RRH (Sprint)	174	HPA65R-BU6A w/Mount Pipe (ATT)	154
1900MHz 4x40W RRH (Sprint)	174	P65-16-XLH-RR w/Mount Pipe (ATT)	154
800MHz 2x50W RRH (Sprint)	174	P65-16-XLH-RR w/Mount Pipe (ATT)	154
800MHz 2x50W RRH (Sprint)	174	P65-16-XLH-RR w/Mount Pipe (ATT)	154
800MHz 2x50W RRH (Sprint)	174	(2) LGP214nn (ATT)	154
APXV9TM14-ALU-120 w/Mount Pipe (Sprint)	174	(2) LGP214nn (ATT)	154
APXV9TM14-ALU-120 w/Mount Pipe (Sprint)	174	(2) LGP214nn (ATT)	154
APXV9TM14-ALU-120 w/Mount Pipe (Sprint)	174	RRUS 4415 B25 (ATT)	154
TD-RRH8x20-25 (Sprint)	174	RRUS 4415 B25 (ATT)	154
TD-RRH8x20-25 (Sprint)	174	RRUS 4415 B25 (ATT)	154
TD-RRH8x20-25 (Sprint)	174	RRUS-11 (ATT)	154
Sector Mount [SM 403-1] (Sprint)	174	RRUS-11 (ATT)	154
Sector Mount [SM 403-1] (Sprint)	174	RRUS-11 (ATT)	154
Sector Mount [SM 403-1] (Sprint)	174	DC6-48-60-18-8F (ATT)	154
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	164	10'x2" Pipe Mount (ATT)	154
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	164	10'x2" Pipe Mount (ATT)	154
BXA-70063-6CF-EDIN-X w/Mount Pipe (Verizon)	164	10'x2" Pipe Mount (ATT)	154
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DB846F65ZAXY w/Mount Pipe (Verizon)	164	Sector Mount [SM 104-1] (ATT)	154
		Sector Mount [SM 104-1] (ATT)	154
		15' Omni (Municipal)	146
		8' Dipole (Municipal)	146
		8' Dipole (Municipal)	146
		Side Arm Mount [SO 308-1] (Municipal)	146
		Side Arm Mount [SO 308-1] (Municipal)	146
		2' Standoff (Dish)	138
		Andrew 3' w/Radome (Sprint)	138

ALL REAC
ARE FACT

MAX. COR
DOWN:
SHEAR

UPLIFT
SHEAR

AXIA
18882

SHEAR
16382 lb

TORQUE 6
50 mph WIND -

AXIA
69643

SHEAR
56392 lb

TORQUE 2
REACTIONS - 9

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154	C	2L3x3x1/4x3/8
B	2L2 1/2x2 1/2x3/16x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

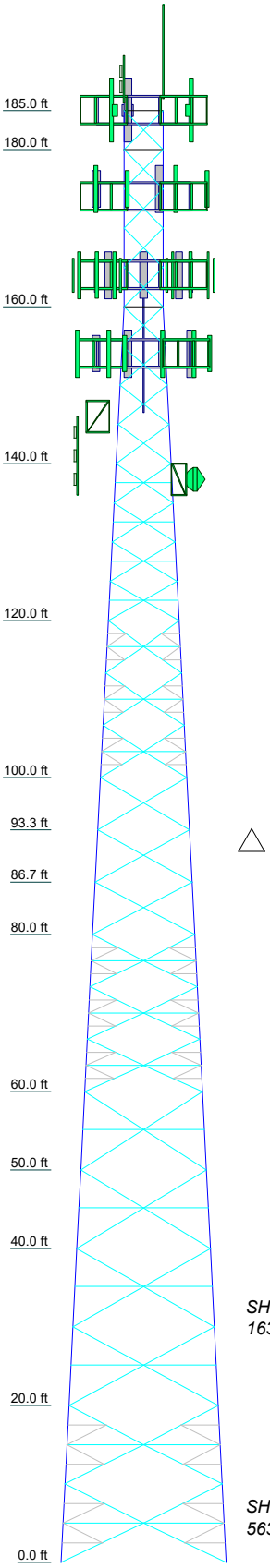
TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 96.4%

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643 7999

Job:	***Weston Godfrey Road (CT2380)***		
Project:	***28737***		
Client: Centerline/ AT&T	Drawn by: JMA	App'd:	
Code: TIA-222-G	Date: 12/04/18	Scale: NTS	
Path: I:\28700\28737\Structural\tnx\28737 rev4.eri		Dwg No. E-1	

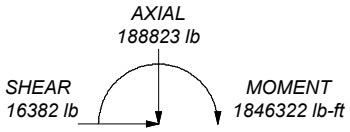
Section	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	P8x.322		P5x.5		P5x.375				P5x.258	P3.5x.318	P2.5x.375	P2.5x.203	A
Leg Grade							A572-50						
Diagonals	L3 1/2x3 1/2x1/4		C	L3x3x1/4	L3x3x3/16	B			L2 1/2x2 1/2x3/16	L2x2x3/16	L2x2x1/8		
Diagonal Grade							A36						
Top Girts					N.A.				L2x2x1/8				
Horizontals	L3 1/2x3 1/2x1/2		N.A.		L3x3x3/8		N.A.		L2 1/2x2 1/2x3/8		N.A.		
Sec. Horizontals	N.A.	L3x3x1/2		L3x3x7/16			N.A.			L2x2x1/4	N.A.		
Red. Horizontals	L3x3x1/2		N.A.		L3x3x1/2		N.A.		L3x3x1/2		N.A.		
Red. Diagonals	L3x3x1/2		N.A.		L3x3x1/2		N.A.		L3x3x1/2		N.A.		
Face Width (ft) 21	19		17	16	15	13	12.3333	11	9	7	5		
# Panels @ (ft)	4 @ 5		4 @ 10		6 @ 3.33333		3 @ 6.66667		6 @ 3.33333		13 @ 5		
Weight (lb) 30434.6	6966.8	4148.8	2356.7	1739.7	5675.4	942.7	669.5	658.8	3928.5	1609.6	936.4	652.3	149.5



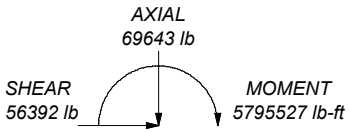
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 341885 lb
SHEAR: 37029 lb

UPLIFT: -290574 lb
SHEAR: 31635 lb



TORQUE 6127 lb-ft
50 mph WIND - 0.7500 in ICE



TORQUE 26112 lb-ft
REACTIONS - 93 mph WIND

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P2x.154	C	2L3x3x1/4x3/8
B	2L2 1/2x2 1/2x3/16x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 96.4%

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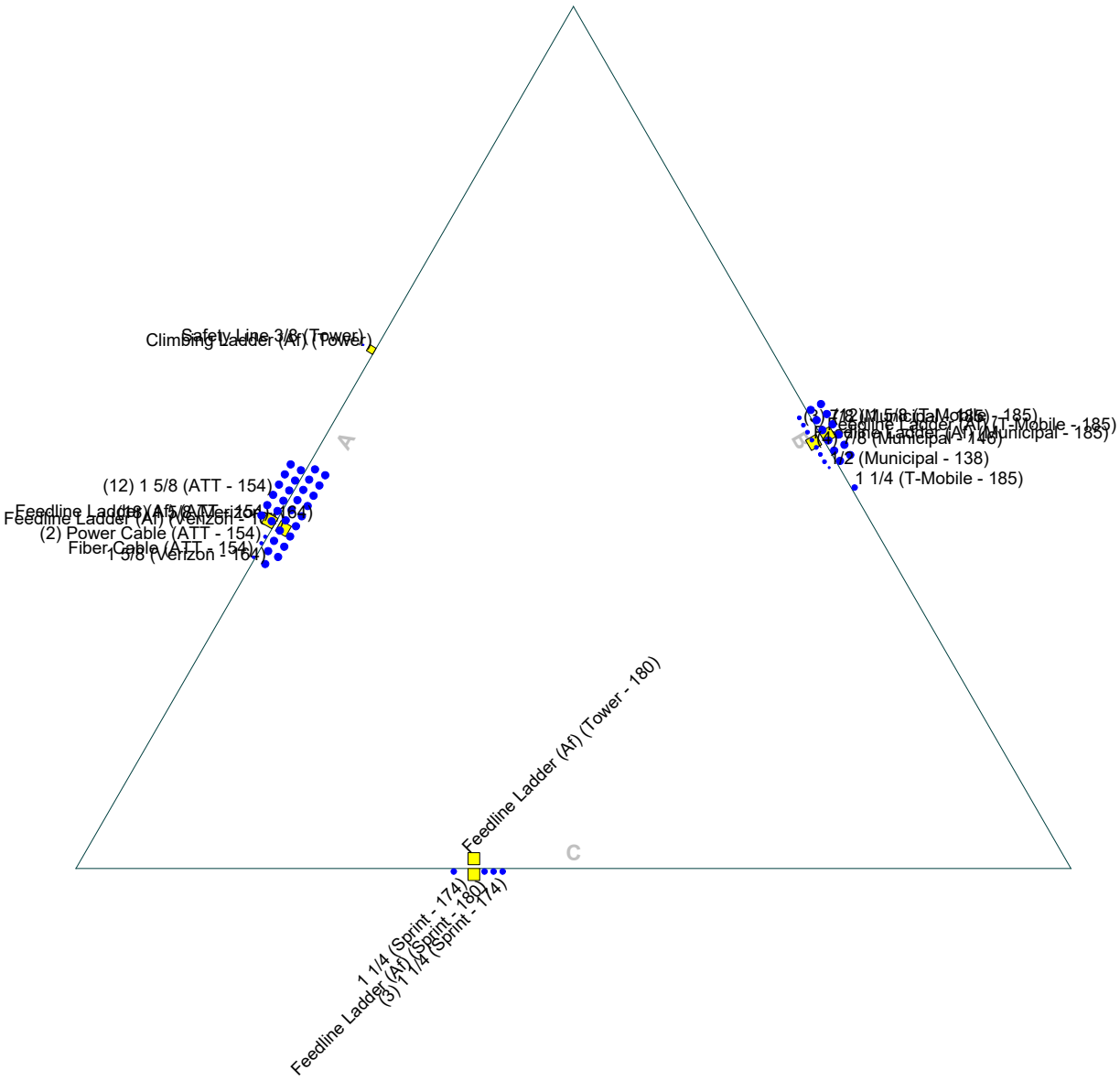
Project:	***28737***		
Client:	Centerline/ AT&T	Drawn by: JMA	App'd:
Code:	TIA-222-G	Date: 12/04/18	Scale: NTS
Path:	I:\28700\28737\Structural\tnx\28737 rev4.eri		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



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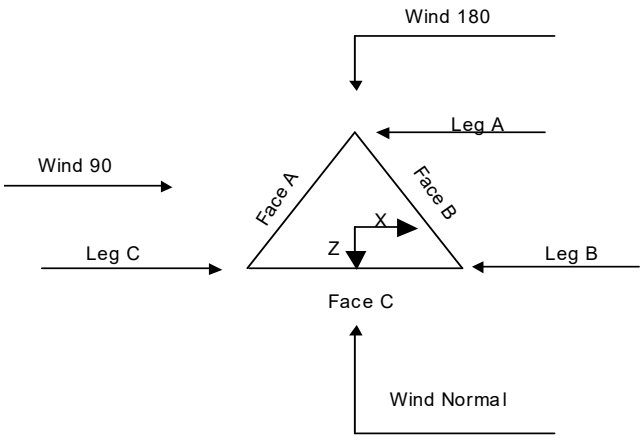
Code:	TIA-222-G	Date: 12/04/18	Scale: NTS
Path:	I:\28700\28737\Structural\tnx\28737 rev4.eri		Dwg No. E-7

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 185.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 21.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 93 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	185.00-180.00			5.00	1	5.00
T2	180.00-160.00			5.00	1	20.00
T3	160.00-140.00			5.00	1	20.00
T4	140.00-120.00			7.00	1	20.00
T5	120.00-100.00			9.00	1	20.00
T6	100.00-93.33			11.00	1	6.67
T7	93.33-86.67			11.67	1	6.67
T8	86.67-80.00			12.33	1	6.67
T9	80.00-60.00			13.00	1	20.00
T10	60.00-50.00			15.00	1	10.00
T11	50.00-40.00			16.00	1	10.00
T12	40.00-20.00			17.00	1	20.00
T13	20.00-0.00			19.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	185.00-180.00	5.00	X Brace	No	Yes	0.0000	0.0000
T2	180.00-160.00	5.00	X Brace	No	Yes	0.0000	0.0000
T3	160.00-140.00	5.00	X Brace	No	Yes	0.0000	0.0000
T4	140.00-120.00	5.00	X Brace	No	Yes	0.0000	0.0000
T5	120.00-100.00	3.33	Double K1	No	Yes	0.0000	0.0000
T6	100.00-93.33	6.67	X Brace	No	Yes	0.0000	0.0000
T7	93.33-86.67	6.67	X Brace	No	Yes	0.0000	0.0000
T8	86.67-80.00	6.67	X Brace	No	Yes	0.0000	0.0000
T9	80.00-60.00	3.33	Double K1	No	Yes	0.0000	0.0000
T10	60.00-50.00	10.00	X Brace	No	Yes	0.0000	0.0000
T11	50.00-40.00	10.00	X Brace	No	Yes	0.0000	0.0000
T12	40.00-20.00	10.00	X Brace	No	Yes	0.0000	0.0000
T13	20.00-0.00	5.00	Double K1	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 185.00-180.00	Pipe	P2x.154	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T2 180.00-160.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 160.00-140.00	Pipe	P2.5x.375	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T4 140.00-120.00	Pipe	P3.5x.318	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T5 120.00-100.00	Pipe	P5x.258	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 100.00-93.33	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 93.33-86.67	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 86.67-80.00	Pipe	P5x.375	A572-50 (50 ksi)	Double Equal Angle	2L2 1/2x2 1/2x3/16x3/8	A36 (36 ksi)
T9 80.00-60.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T10 60.00-50.00	Pipe	P5x.5	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 50.00-40.00	Pipe	P5x.5	A572-50 (50 ksi)	Double Equal Angle	2L3x3x1/4x3/8	A36 (36 ksi)
T12 40.00-20.00	Pipe	P8x.322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T13 20.00-0.00	Pipe	P8x.322	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 185.00-180.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 180.00-160.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 160.00-140.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T5 120.00-100.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/8	A36 (36 ksi)
T9 80.00-60.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L3x3x3/8	A36 (36 ksi)
T13 20.00-0.00	None	Solid Round		A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 140.00-120.00	Equal Angle	L2x2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T10 60.00-50.00	Equal Angle	L3x3x7/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T11 50.00-40.00	Equal Angle	L3x3x7/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T12 40.00-20.00	Equal Angle	L3x3x1/2	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T5 120.00-100.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/2	1
		Diagonal (1)	Equal Angle	L3x3x1/2	1
T9 80.00-60.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/2	1
		Diagonal (1)	Equal Angle	L3x3x1/2	1
T13 20.00-0.00	A36 (36 ksi)	Horizontal (1)	Equal Angle	L3x3x1/2	1
		Diagonal (1)	Equal Angle	L3x3x1/2	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 185.00-180.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 180.00-160.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 160.00-140.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 140.00-120.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 120.00-100.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 100.00-93.33	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 93.33-86.67	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T8 86.67-80.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T9 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T10 60.00-50.00	0.00	0.3750	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T11 50.00-40.00	0.00	0.3750	A36 (36 ksi)	1	1	1	Third-Pt	36.0000	36.0000
T12	0.00	0.3750	A36	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
40.00-20.00 T13 20.00-0.00	0.00	0.3750	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 185.00-180.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 180.00-160.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-93.33	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 93.33-86.67	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 86.67-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 60.00-50.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 50.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T12 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T13 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	U	Diagonal Net Width Deduct in	U	Top Girt Net Width Deduct in	U	Bottom Girt Net Width Deduct in	U	Mid Girt Net Width Deduct in	U	Long Horizontal Net Width Deduct in	U	Short Horizontal Net Width Deduct in	U
T1 185.00-180.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T2 180.00-160.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T3 160.00-140.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T4 140.00-120.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T5 120.00-100.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T6 100.00-93.33	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T7 93.33-86.67	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T8 86.67-80.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T9 80.00-60.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T10 60.00-50.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T11 50.00-40.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T12 40.00-20.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1
T13 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 185.00-180.00	Flange	0.7500 A325X	6	0.6250 A325X	1	0.6250 A325X	1	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.7500 A325X	6	0.6250 A325X	1	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.7500 A325N	1
T5 120.00-100.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	1	0.6250 A325N	0
T6 100.00-93.33	Flange	1.0000 A325X	0	0.6250 A325X	1	0.6250 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T7 93.33-86.67	Flange	1.0000 A325X	0	0.6250 A325X	1	0.6250 A325N	0	0.0000 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T8 86.67-80.00	Flange	1.0000 A325X	6	0.6250 A325X	1	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325N	0
T9 80.00-60.00	Flange	1.0000 A325X	6	0.7500 A325X	1	0.7500 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	1	0.7500 A325N	0
T10 60.00-50.00	Flange	1.2500 A325X	0	0.7500 A325X	1	0.7500 A325X	0	0.0000 A325X	0	0.6250 A325X	0	0.7500 A325N	0	0.7500 A325N	1
T11 50.00-40.00	Flange	1.2500 A325X	6	0.7500 A325X	1	0.7500 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	0	0.7500 A325N	1
T12 40.00-20.00	Flange	1.2500 A325X	6	0.7500 A325X	1	0.7500 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	0	0.7500 A325N	1

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T13 20.00-0.00	Flange	1.5000 A572-50	0	0.7500 A325X	1	0.7500 A325X	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	1	0.7500 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**********													
Climbing Ladder (Af) (Tower)	A	No	No	Af (CaAa)	185.00 - 0.00	0.0000	0.1	1	1	1.8000	1.8000		7.90
Safety Line 3/8 (Tower)	A	No	No	Ar (CaAa)	185.00 - 0.00	3.0000	0.1	1	1	0.3750	0.3750		0.22
**********													
Feedline Ladder (Af) (Municipal - 185)	B	No	No	Af (CaAa)	185.00 - 0.00	-1.0000	0	1	1	3.0000	3.0000		8.40
7/8 (Municipal - 185)	B	No	No	Ar (CaAa)	185.00 - 0.00	-2.0000	-0.02	3	3	1.0000	1.1100		0.54
**********													
Feedline Ladder (Af) (T-Mobile - 185)	B	No	No	Af (CaAa)	185.00 - 0.00	0.0000	0	1	1	3.0000	3.0000		8.40
1 5/8 (T-Mobile - 185)	B	No	No	Ar (CaAa)	185.00 - 0.00	0.0000	0	12	6	1.0000	1.9800		1.04
1 1/4 (T-Mobile - 185)	B	No	No	Ar (CaAa)	185.00 - 0.00	0.0000	0.06	1	1	1.5500	1.5500		0.66
**********													
Feedline Ladder (Af) (Tower - 180)	C	No	No	Af (CaAa)	180.00 - 0.00	-1.0000	0.1	1	1	3.0000	3.0000		8.40
**********													
Feedline Ladder (Af) (Sprint - 180)	C	No	No	Af (CaAa)	180.00 - 0.00	0.0000	0.1	1	1	3.0000	3.0000		8.40
1 1/4 (Sprint - 174)	C	No	No	Ar (CaAa)	174.00 - 0.00	0.0000	0.08	3	3	0.7500	1.5500		0.66
1 1/4 (Sprint - 174)	C	No	No	Ar (CaAa)	174.00 - 0.00	0.0000	0.12	1	1	1.5500	1.5500		0.66
**********													
Feedline Ladder (Af) (Verizon - 164)	A	No	No	Af (CaAa)	164.00 - 0.00	-1.0000	-0.1	1	1	3.0000	3.0000		8.40
1 5/8 (Verizon - 164)	A	No	No	Ar (CaAa)	164.00 - 0.00	-4.0000	-0.08	18	9	1.0000	1.9800		1.04
1 5/8 (Verizon - 164)	A	No	No	Ar (CaAa)	164.00 - 0.00	-2.0000	-0.14	1	1	1.9800	1.9800		1.04
**********													

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Feedline Ladder (Af) (ATT - 154)	A	No	No	Af (CaAa)	154.00 - 0.00	0.0000	-0.1	1	1	3.0000	3.0000		8.40
1 5/8 (ATT - 154)	A	No	No	Ar (CaAa)	154.00 - 0.00	0.0000	-0.07	12	6	1.0000	1.9800		1.04
Power Cable (ATT - 154)	A	No	No	Ar (CaAa)	154.00 - 0.00	0.0000	-0.12	2	2	1.0000	0.8750		0.60
Fiber Cable (ATT - 154)	A	No	No	Ar (CaAa)	154.00 - 0.00	0.0000	-0.14	1	1	0.7875	0.7875		0.17
**********													
7/8 (Municipal - 146)	B	No	No	Ar (CaAa)	146.00 - 0.00	-2.0000	0.01	4	4	1.0000	1.1100		0.54
**********													
1/2 (Municipal - 138)	B	No	No	Ar (CaAa)	138.00 - 0.00	-2.0000	0.03	1	1	0.5800	0.5800		0.25
**********													

Feed Line/Linear Appurtenances - Entered As Area

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	185.00-180.00	A	0.000	0.000	1.688	0.000	40.60
		B	0.000	0.000	19.320	0.000	157.80
		C	0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	0.000	0.000	23.798	0.000	275.04
		B	0.000	0.000	77.280	0.000	631.20
		C	0.000	0.000	28.680	0.000	372.96
T3	160.00-140.00	A	0.000	0.000	135.807	0.000	1037.10
		B	0.000	0.000	79.944	0.000	644.16
		C	0.000	0.000	32.400	0.000	388.80
T4	140.00-120.00	A	0.000	0.000	154.585	0.000	1170.60
		B	0.000	0.000	87.204	0.000	678.90
		C	0.000	0.000	32.400	0.000	388.80
T5	120.00-100.00	A	0.000	0.000	154.585	0.000	1170.60
		B	0.000	0.000	87.320	0.000	679.40
		C	0.000	0.000	32.400	0.000	388.80
T6	100.00-93.33	A	0.000	0.000	51.528	0.000	390.20
		B	0.000	0.000	29.107	0.000	226.47
		C	0.000	0.000	10.800	0.000	129.60
T7	93.33-86.67	A	0.000	0.000	51.528	0.000	390.20
		B	0.000	0.000	29.107	0.000	226.47

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C	0.000	0.000	10.800	0.000	129.60
T8	86.67-80.00	A	0.000	0.000	51.528	0.000	390.20
		B	0.000	0.000	29.107	0.000	226.47
		C	0.000	0.000	10.800	0.000	129.60
T9	80.00-60.00	A	0.000	0.000	154.585	0.000	1170.60
		B	0.000	0.000	87.320	0.000	679.40
		C	0.000	0.000	32.400	0.000	388.80
T10	60.00-50.00	A	0.000	0.000	77.293	0.000	585.30
		B	0.000	0.000	43.660	0.000	339.70
		C	0.000	0.000	16.200	0.000	194.40
T11	50.00-40.00	A	0.000	0.000	77.293	0.000	585.30
		B	0.000	0.000	43.660	0.000	339.70
		C	0.000	0.000	16.200	0.000	194.40
T12	40.00-20.00	A	0.000	0.000	154.585	0.000	1170.60
		B	0.000	0.000	87.320	0.000	679.40
		C	0.000	0.000	32.400	0.000	388.80
T13	20.00-0.00	A	0.000	0.000	154.585	0.000	1170.60
		B	0.000	0.000	87.320	0.000	679.40
		C	0.000	0.000	32.400	0.000	388.80

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T1	185.00-180.00	A	1.780	0.000	0.000	5.247	0.000	112.26
		B		0.000	0.000	31.230	0.000	643.61
		C		0.000	0.000	0.000	0.000	0.00
T2	180.00-160.00	A	1.767	0.000	0.000	41.786	0.000	933.70
		B		0.000	0.000	124.603	0.000	2560.43
		C		0.000	0.000	60.397	0.000	1194.05
T3	160.00-140.00	A	1.745	0.000	0.000	194.691	0.000	4244.73
		B		0.000	0.000	132.941	0.000	2646.73
		C		0.000	0.000	71.239	0.000	1325.94
T4	140.00-120.00	A	1.720	0.000	0.000	223.521	0.000	4789.07
		B		0.000	0.000	160.143	0.000	2963.94
		C		0.000	0.000	70.774	0.000	1308.40
T5	120.00-100.00	A	1.692	0.000	0.000	222.277	0.000	4733.10
		B		0.000	0.000	159.927	0.000	2934.17
		C		0.000	0.000	70.240	0.000	1288.40
T6	100.00-93.33	A	1.670	0.000	0.000	73.776	0.000	1563.57
		B		0.000	0.000	53.050	0.000	967.97
		C		0.000	0.000	23.278	0.000	424.43
T7	93.33-86.67	A	1.658	0.000	0.000	73.603	0.000	1555.86
		B		0.000	0.000	52.908	0.000	962.48
		C		0.000	0.000	23.203	0.000	421.68
T8	86.67-80.00	A	1.646	0.000	0.000	73.418	0.000	1547.65
		B		0.000	0.000	52.756	0.000	956.62
		C		0.000	0.000	23.124	0.000	418.76
T9	80.00-60.00	A	1.617	0.000	0.000	219.013	0.000	4588.08
		B		0.000	0.000	157.252	0.000	2830.78
		C		0.000	0.000	68.840	0.000	1236.77
T10	60.00-50.00	A	1.579	0.000	0.000	108.666	0.000	2257.19
		B		0.000	0.000	77.937	0.000	1389.15
		C		0.000	0.000	34.059	0.000	605.32
T11	50.00-40.00	A	1.547	0.000	0.000	107.982	0.000	2227.45
		B		0.000	0.000	77.377	0.000	1367.98
		C		0.000	0.000	33.766	0.000	594.80

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
T12	40.00-20.00	A	1.486	0.000	0.000	213.283	0.000	4339.64
		B		0.000	0.000	152.560	0.000	2654.03
		C		0.000	0.000	66.381	0.000	1148.97
T13	20.00-0.00	A	1.331	0.000	0.000	206.551	0.000	4057.70
		B		0.000	0.000	147.054	0.000	2454.06
		C		0.000	0.000	63.493	0.000	1050.43

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	185.00-180.00	5.0100	-4.7749	4.0132	-4.5624
T2	180.00-160.00	2.4725	-1.9704	1.7373	-1.4084
T3	160.00-140.00	-3.0378	-2.9392	-3.3643	-2.1874
T4	140.00-120.00	-3.8672	-3.8776	-3.9405	-3.1717
T5	120.00-100.00	-3.8071	-4.0356	-3.7381	-3.1940
T6	100.00-93.33	-5.3809	-5.3877	-5.5346	-4.5760
T7	93.33-86.67	-5.6202	-5.6442	-5.7869	-4.8058
T8	86.67-80.00	-5.8516	-5.8942	-6.0323	-5.0314
T9	80.00-60.00	-4.4017	-4.8376	-4.6375	-4.0958
T10	60.00-50.00	-6.3180	-6.5528	-6.7674	-5.7934
T11	50.00-40.00	-6.5766	-6.8522	-7.0659	-6.0928
T12	40.00-20.00	-6.5549	-6.9296	-7.1382	-6.2622
T13	20.00-0.00	-5.7606	-6.3813	-6.5480	-6.0183

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Climbing Ladder (Af)	180.00 - 185.00	0.6000	0.5100
T1	3	Safety Line 3/8	180.00 - 185.00	0.6000	0.5100
T1	8	Feedline Ladder (Af)	180.00 - 185.00	0.6000	0.5100
T1	9	7/8	180.00 - 185.00	0.6000	0.5100
T1	11	Feedline Ladder (Af)	180.00 - 185.00	0.6000	0.5100
T1	12	1 5/8	180.00 - 185.00	0.6000	0.5100
T1	13	1 1/4	180.00 - 185.00	0.6000	0.5100
T2	2	Climbing Ladder (Af)	160.00 - 180.00	0.6000	0.5623
T2	3	Safety Line 3/8	160.00 - 180.00	0.6000	0.5623
T2	8	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5623
T2	9	7/8	160.00 - 180.00	0.6000	0.5623
T2	11	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5623
T2	12	1 5/8	160.00 - 180.00	0.6000	0.5623
T2	13	1 1/4	160.00 - 180.00	0.6000	0.5623
T2	15	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5623
T2	17	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5623
T2	18	1 1/4	160.00 - 174.00	0.6000	0.5623
T2	19	1 1/4	160.00 - 174.00	0.6000	0.5623
T2	21	Feedline Ladder (Af)	160.00 - 164.00	0.6000	0.5623
T2	22	1 5/8	160.00 - 164.00	0.6000	0.5623
T2	23	1 5/8	160.00 - 164.00	0.6000	0.5623

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	2	Climbing Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	3	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T3	8	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	9	7/8	140.00 - 160.00	0.6000	0.6000
T3	11	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	12	1 5/8	140.00 - 160.00	0.6000	0.6000
T3	13	1 1/4	140.00 - 160.00	0.6000	0.6000
T3	15	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	17	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	18	1 1/4	140.00 - 160.00	0.6000	0.6000
T3	19	1 1/4	140.00 - 160.00	0.6000	0.6000
T3	21	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	22	1 5/8	140.00 - 160.00	0.6000	0.6000
T3	23	1 5/8	140.00 - 160.00	0.6000	0.6000
T3	25	Feedline Ladder (Af)	140.00 - 154.00	0.6000	0.6000
T3	26	1 5/8	140.00 - 154.00	0.6000	0.6000
T3	27	Power Cable	140.00 - 154.00	0.6000	0.6000
T3	28	Fiber Cable	140.00 - 154.00	0.6000	0.6000
T3	30	7/8	140.00 - 146.00	0.6000	0.6000
T4	2	Climbing Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	3	Safety Line 3/8	120.00 - 140.00	0.6000	0.5847
T4	8	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	9	7/8	120.00 - 140.00	0.6000	0.5847
T4	11	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	12	1 5/8	120.00 - 140.00	0.6000	0.5847
T4	13	1 1/4	120.00 - 140.00	0.6000	0.5847
T4	15	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	17	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	18	1 1/4	120.00 - 140.00	0.6000	0.5847
T4	19	1 1/4	120.00 - 140.00	0.6000	0.5847
T4	21	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	22	1 5/8	120.00 - 140.00	0.6000	0.5847
T4	23	1 5/8	120.00 - 140.00	0.6000	0.5847
T4	25	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5847
T4	26	1 5/8	120.00 - 140.00	0.6000	0.5847
T4	27	Power Cable	120.00 - 140.00	0.6000	0.5847
T4	28	Fiber Cable	120.00 - 140.00	0.6000	0.5847
T4	30	7/8	120.00 - 140.00	0.6000	0.5847
T4	32	1/2	120.00 - 138.00	0.6000	0.5847
T5	2	Climbing Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	3	Safety Line 3/8	100.00 - 120.00	0.6000	0.4900
T5	8	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	9	7/8	100.00 - 120.00	0.6000	0.4900
T5	11	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	12	1 5/8	100.00 - 120.00	0.6000	0.4900
T5	13	1 1/4	100.00 - 120.00	0.6000	0.4900
T5	15	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	17	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	18	1 1/4	100.00 - 120.00	0.6000	0.4900
T5	19	1 1/4	100.00 - 120.00	0.6000	0.4900
T5	21	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	22	1 5/8	100.00 - 120.00	0.6000	0.4900
T5	23	1 5/8	100.00 - 120.00	0.6000	0.4900
T5	25	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.4900
T5	26	1 5/8	100.00 - 120.00	0.6000	0.4900
T5	27	Power Cable	100.00 - 120.00	0.6000	0.4900
T5	28	Fiber Cable	100.00 - 120.00	0.6000	0.4900
T5	30	7/8	100.00 - 120.00	0.6000	0.4900
T5	32	1/2	100.00 - 120.00	0.6000	0.4900
T6	2	Climbing Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	3	Safety Line 3/8	93.33 - 100.00	0.6000	0.6000
T6	8	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	9	7/8	93.33 - 100.00	0.6000	0.6000
T6	11	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	12	1 5/8	93.33 - 100.00	0.6000	0.6000
T6	13	1 1/4	93.33 - 100.00	0.6000	0.6000
T6	15	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	17	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	18	1 1/4	93.33 - 100.00	0.6000	0.6000
T6	19	1 1/4	93.33 - 100.00	0.6000	0.6000
T6	21	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	22	1 5/8	93.33 - 100.00	0.6000	0.6000
T6	23	1 5/8	93.33 - 100.00	0.6000	0.6000
T6	25	Feedline Ladder (Af)	93.33 - 100.00	0.6000	0.6000
T6	26	1 5/8	93.33 - 100.00	0.6000	0.6000
T6	27	Power Cable	93.33 - 100.00	0.6000	0.6000
T6	28	Fiber Cable	93.33 - 100.00	0.6000	0.6000
T6	30	7/8	93.33 - 100.00	0.6000	0.6000
T6	32	1/2	93.33 - 100.00	0.6000	0.6000
T7	2	Climbing Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	3	Safety Line 3/8	86.67 - 93.33	0.6000	0.6000
T7	8	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	9	7/8	86.67 - 93.33	0.6000	0.6000
T7	11	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	12	1 5/8	86.67 - 93.33	0.6000	0.6000
T7	13	1 1/4	86.67 - 93.33	0.6000	0.6000
T7	15	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	17	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	18	1 1/4	86.67 - 93.33	0.6000	0.6000
T7	19	1 1/4	86.67 - 93.33	0.6000	0.6000
T7	21	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	22	1 5/8	86.67 - 93.33	0.6000	0.6000
T7	23	1 5/8	86.67 - 93.33	0.6000	0.6000
T7	25	Feedline Ladder (Af)	86.67 - 93.33	0.6000	0.6000
T7	26	1 5/8	86.67 - 93.33	0.6000	0.6000
T7	27	Power Cable	86.67 - 93.33	0.6000	0.6000
T7	28	Fiber Cable	86.67 - 93.33	0.6000	0.6000
T7	30	7/8	86.67 - 93.33	0.6000	0.6000
T7	32	1/2	86.67 - 93.33	0.6000	0.6000
T8	2	Climbing Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	3	Safety Line 3/8	80.00 - 86.67	0.6000	0.6000
T8	8	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	9	7/8	80.00 - 86.67	0.6000	0.6000
T8	11	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	12	1 5/8	80.00 - 86.67	0.6000	0.6000
T8	13	1 1/4	80.00 - 86.67	0.6000	0.6000
T8	15	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	17	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	18	1 1/4	80.00 - 86.67	0.6000	0.6000
T8	19	1 1/4	80.00 - 86.67	0.6000	0.6000
T8	21	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	22	1 5/8	80.00 - 86.67	0.6000	0.6000
T8	23	1 5/8	80.00 - 86.67	0.6000	0.6000
T8	25	Feedline Ladder (Af)	80.00 - 86.67	0.6000	0.6000
T8	26	1 5/8	80.00 - 86.67	0.6000	0.6000
T8	27	Power Cable	80.00 - 86.67	0.6000	0.6000
T8	28	Fiber Cable	80.00 - 86.67	0.6000	0.6000
T8	30	7/8	80.00 - 86.67	0.6000	0.6000
T8	32	1/2	80.00 - 86.67	0.6000	0.6000
T9	2	Climbing Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	3	Safety Line 3/8	60.00 - 80.00	0.6000	0.5244
T9	8	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	9	7/8	60.00 - 80.00	0.6000	0.5244
T9	11	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	12	1 5/8	60.00 - 80.00	0.6000	0.5244
T9	13	1 1/4	60.00 - 80.00	0.6000	0.5244
T9	15	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	17	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	18	1 1/4	60.00 - 80.00	0.6000	0.5244
T9	19	1 1/4	60.00 - 80.00	0.6000	0.5244
T9	21	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	22	1 5/8	60.00 - 80.00	0.6000	0.5244
T9	23	1 5/8	60.00 - 80.00	0.6000	0.5244
T9	25	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.5244
T9	26	1 5/8	60.00 - 80.00	0.6000	0.5244
T9	27	Power Cable	60.00 - 80.00	0.6000	0.5244
T9	28	Fiber Cable	60.00 - 80.00	0.6000	0.5244
T9	30	7/8	60.00 - 80.00	0.6000	0.5244
T9	32	1/2	60.00 - 80.00	0.6000	0.5244
T10	2	Climbing Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	3	Safety Line 3/8	50.00 - 60.00	0.6000	0.6000
T10	8	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	9	7/8	50.00 - 60.00	0.6000	0.6000
T10	11	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	12	1 5/8	50.00 - 60.00	0.6000	0.6000
T10	13	1 1/4	50.00 - 60.00	0.6000	0.6000
T10	15	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	17	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	18	1 1/4	50.00 - 60.00	0.6000	0.6000
T10	19	1 1/4	50.00 - 60.00	0.6000	0.6000
T10	21	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	22	1 5/8	50.00 - 60.00	0.6000	0.6000
T10	23	1 5/8	50.00 - 60.00	0.6000	0.6000
T10	25	Feedline Ladder (Af)	50.00 - 60.00	0.6000	0.6000
T10	26	1 5/8	50.00 - 60.00	0.6000	0.6000
T10	27	Power Cable	50.00 - 60.00	0.6000	0.6000
T10	28	Fiber Cable	50.00 - 60.00	0.6000	0.6000
T10	30	7/8	50.00 - 60.00	0.6000	0.6000
T10	32	1/2	50.00 - 60.00	0.6000	0.6000
T11	2	Climbing Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	3	Safety Line 3/8	40.00 - 50.00	0.6000	0.6000
T11	8	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	9	7/8	40.00 - 50.00	0.6000	0.6000
T11	11	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	12	1 5/8	40.00 - 50.00	0.6000	0.6000
T11	13	1 1/4	40.00 - 50.00	0.6000	0.6000
T11	15	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	17	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	18	1 1/4	40.00 - 50.00	0.6000	0.6000
T11	19	1 1/4	40.00 - 50.00	0.6000	0.6000
T11	21	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	22	1 5/8	40.00 - 50.00	0.6000	0.6000
T11	23	1 5/8	40.00 - 50.00	0.6000	0.6000
T11	25	Feedline Ladder (Af)	40.00 - 50.00	0.6000	0.6000
T11	26	1 5/8	40.00 - 50.00	0.6000	0.6000
T11	27	Power Cable	40.00 - 50.00	0.6000	0.6000
T11	28	Fiber Cable	40.00 - 50.00	0.6000	0.6000
T11	30	7/8	40.00 - 50.00	0.6000	0.6000
T11	32	1/2	40.00 - 50.00	0.6000	0.6000
T12	2	Climbing Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	3	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	8	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	9	7/8	20.00 - 40.00	0.6000	0.6000
T12	11	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	12	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	13	1 1/4	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T12	15	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	17	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	18	1 1/4	20.00 - 40.00	0.6000	0.6000
T12	19	1 1/4	20.00 - 40.00	0.6000	0.6000
T12	21	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	22	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	23	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	25	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T12	26	1 5/8	20.00 - 40.00	0.6000	0.6000
T12	27	Power Cable	20.00 - 40.00	0.6000	0.6000
T12	28	Fiber Cable	20.00 - 40.00	0.6000	0.6000
T12	30	7/8	20.00 - 40.00	0.6000	0.6000
T12	32	1/2	20.00 - 40.00	0.6000	0.6000
T13	2	Climbing Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	3	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T13	8	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	9	7/8	0.00 - 20.00	0.6000	0.6000
T13	11	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	12	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	13	1 1/4	0.00 - 20.00	0.6000	0.6000
T13	15	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	17	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	18	1 1/4	0.00 - 20.00	0.6000	0.6000
T13	19	1 1/4	0.00 - 20.00	0.6000	0.6000
T13	21	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	22	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	23	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	25	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T13	26	1 5/8	0.00 - 20.00	0.6000	0.6000
T13	27	Power Cable	0.00 - 20.00	0.6000	0.6000
T13	28	Fiber Cable	0.00 - 20.00	0.6000	0.6000
T13	30	7/8	0.00 - 20.00	0.6000	0.6000
T13	32	1/2	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
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6' Dipole	A	From Leg	0.00	0.0000	185.00	No Ice	2.25	2.25	30.00
(Muncipal)			0.00			1/2" Ice	3.00	3.00	40.00
			4.00			1" Ice	3.75	3.75	50.00
12' Omni	B	From Leg	0.00	0.0000	185.00	No Ice	3.00	3.00	35.00
(Muncipal)			0.00			1/2" Ice	4.23	4.23	57.30
			7.50			1" Ice	5.47	5.47	87.34
6' Dipole	C	From Leg	0.00	0.0000	185.00	No Ice	2.25	2.25	30.00
(Muncipal)			0.00			1/2" Ice	3.00	3.00	40.00
			4.00			1" Ice	3.75	3.75	50.00
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) AIR 21 B2A B4P w/Mount Pipe	A	From Leg	3.00	0.0000	185.00	No Ice	6.37	5.74	104.90
			0.00			1/2" Ice	6.85	6.59	162.47
(T-Mobile)			0.00			1" Ice	7.30	7.31	226.82
(2) AIR 21 B2A B4P w/Mount Pipe	B	From Leg	3.00	0.0000	185.00	No Ice	6.37	5.74	104.90
			0.00			1/2" Ice	6.85	6.59	162.47
(T-Mobile)			0.00			1" Ice	7.30	7.31	226.82
(2) AIR 21 B2A B2P w/Mount Pipe	C	From Leg	3.00	0.0000	185.00	No Ice	6.69	5.64	119.15
			0.00			1/2" Ice	7.15	6.35	176.73
(T-Mobile)			0.00			1" Ice	7.63	7.09	241.60
KRY 112 71	A	From Leg	2.00	0.0000	185.00	No Ice	0.58	0.40	13.20
(T-Mobile)			0.00			1/2" Ice	0.69	0.49	18.38
			0.00			1" Ice	0.80	0.59	25.16
KRY 112 71	B	From Leg	2.00	0.0000	185.00	No Ice	0.58	0.40	13.20
(T-Mobile)			0.00			1/2" Ice	0.69	0.49	18.38
			0.00			1" Ice	0.80	0.59	25.16
KRY 112 71	C	From Leg	2.00	0.0000	185.00	No Ice	0.58	0.40	13.20
(T-Mobile)			0.00			1/2" Ice	0.69	0.49	18.38
			0.00			1" Ice	0.80	0.59	25.16
LNX-6515DS-A1M w/Mount Pipe	A	From Leg	3.00	0.0000	185.00	No Ice	11.43	9.59	92.20
			-2.00			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
LNX-6515DS-A1M w/Mount Pipe	B	From Leg	3.00	0.0000	185.00	No Ice	11.43	9.59	92.20
			-2.00			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
LNX-6515DS-A1M w/Mount Pipe	C	From Leg	3.00	0.0000	185.00	No Ice	11.43	9.59	92.20
			-2.00			1/2" Ice	12.05	11.01	179.10
(T-Mobile)			0.00			1" Ice	12.67	12.28	275.75
RRUS-11	A	From Leg	2.50	0.0000	185.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-2.00			1/2" Ice	2.72	1.21	74.32
			0.00			1" Ice	2.92	1.36	96.56
RRUS-11	B	From Leg	2.50	0.0000	185.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-2.00			1/2" Ice	2.72	1.21	74.32
			0.00			1" Ice	2.92	1.36	96.56
RRUS-11	C	From Leg	2.50	0.0000	185.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-2.00			1/2" Ice	2.72	1.21	74.32
			0.00			1" Ice	2.92	1.36	96.56
Sector Mount [SM 403-1]	A	From Leg	3.00	0.0000	185.00	No Ice	10.22	7.05	291.16
(T-Mobile)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
Sector Mount [SM 403-1]	B	From Leg	3.00	0.0000	185.00	No Ice	10.22	7.05	291.16
(T-Mobile)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
Sector Mount [SM 403-1]	C	From Leg	3.00	0.0000	185.00	No Ice	10.22	7.05	291.16
(T-Mobile)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
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APXVSPP18-C w/Mount Pipe	A	From Leg	3.00	0.0000	174.00	No Ice	8.02	6.71	78.90
(Sprint)			2.00			1/2" Ice	8.48	7.66	144.31
			1.00			1" Ice	8.94	8.49	217.47
APXVSPP18-C w/Mount Pipe	B	From Leg	3.00	0.0000	174.00	No Ice	8.02	6.71	78.90
(Sprint)			2.00			1/2" Ice	8.48	7.66	144.31
			1.00			1" Ice	8.94	8.49	217.47
APXVSPP18-C w/Mount Pipe	C	From Leg	3.00	0.0000	174.00	No Ice	8.02	6.71	78.90
(Sprint)			2.00			1/2" Ice	8.48	7.66	144.31
			1.00			1" Ice	8.94	8.49	217.47
1900MHz 4x40W RRH	A	From Leg	2.00	0.0000	174.00	No Ice	2.32	2.24	60.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Sprint)			-2.00			1/2" Ice	2.53	2.44	83.12
			1.00			1" Ice	2.74	2.65	109.48
1900MHz 4x40W RRH	B	From Leg	2.00	0.0000	174.00	No Ice	2.32	2.24	60.00
(Sprint)			-2.00			1/2" Ice	2.53	2.44	83.12
			1.00			1" Ice	2.74	2.65	109.48
1900MHz 4x40W RRH	C	From Leg	2.00	0.0000	174.00	No Ice	2.32	2.24	60.00
(Sprint)			-2.00			1/2" Ice	2.53	2.44	83.12
			1.00			1" Ice	2.74	2.65	109.48
800MHz 2x50W RRH	A	From Leg	2.50	0.0000	174.00	No Ice	2.06	1.93	64.00
(Sprint)			-2.00			1/2" Ice	2.24	2.11	86.12
			1.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Leg	2.50	0.0000	174.00	No Ice	2.06	1.93	64.00
(Sprint)			-2.00			1/2" Ice	2.24	2.11	86.12
			1.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Leg	2.50	0.0000	174.00	No Ice	2.06	1.93	64.00
(Sprint)			-2.00			1/2" Ice	2.24	2.11	86.12
			1.00			1" Ice	2.43	2.29	111.30
APXV9TM14-ALU-120	A	From Leg	3.00	0.0000	174.00	No Ice	7.29	5.91	101.44
w/Mount Pipe			-6.00			1/2" Ice	8.01	7.10	165.83
(Sprint)			1.00			1" Ice	8.59	7.95	238.41
APXV9TM14-ALU-120	B	From Leg	3.00	0.0000	174.00	No Ice	7.29	5.91	101.44
w/Mount Pipe			-6.00			1/2" Ice	8.01	7.10	165.83
(Sprint)			1.00			1" Ice	8.59	7.95	238.41
APXV9TM14-ALU-120	C	From Leg	3.00	0.0000	174.00	No Ice	7.29	5.91	101.44
w/Mount Pipe			-6.00			1/2" Ice	8.01	7.10	165.83
(Sprint)			1.00			1" Ice	8.59	7.95	238.41
TD-RRH8x20-25	A	From Leg	2.00	0.0000	174.00	No Ice	4.05	1.53	76.20
(Sprint)			-6.00			1/2" Ice	4.30	1.71	103.34
			1.00			1" Ice	4.56	1.90	134.00
TD-RRH8x20-25	B	From Leg	2.00	0.0000	174.00	No Ice	4.05	1.53	76.20
(Sprint)			-6.00			1/2" Ice	4.30	1.71	103.34
			1.00			1" Ice	4.56	1.90	134.00
TD-RRH8x20-25	C	From Leg	2.00	0.0000	174.00	No Ice	4.05	1.53	76.20
(Sprint)			-6.00			1/2" Ice	4.30	1.71	103.34
			1.00			1" Ice	4.56	1.90	134.00
Sector Mount [SM 403-1]	A	From Leg	3.00	0.0000	174.00	No Ice	10.22	7.05	291.16
(Sprint)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
Sector Mount [SM 403-1]	B	From Leg	3.00	0.0000	174.00	No Ice	10.22	7.05	291.16
(Sprint)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
Sector Mount [SM 403-1]	C	From Leg	3.00	0.0000	174.00	No Ice	10.22	7.05	291.16
(Sprint)			0.00			1/2" Ice	14.32	10.13	422.38
			0.00			1" Ice	18.42	13.21	553.60
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BXA-70063-6CF-EDIN-X	A	From Leg	4.00	0.0000	164.00	No Ice	7.83	5.82	42.55
w/Mount Pipe			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
BXA-70063-6CF-EDIN-X	B	From Leg	4.00	0.0000	164.00	No Ice	7.83	5.82	42.55
w/Mount Pipe			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
BXA-70063-6CF-EDIN-X	C	From Leg	4.00	0.0000	164.00	No Ice	7.83	5.82	42.55
w/Mount Pipe			0.00			1/2" Ice	8.39	6.99	103.53
(Verizon)			0.00			1" Ice	8.91	7.87	172.25
DB846F65ZAXY w/Mount Pipe	A	From Leg	4.00	0.0000	164.00	No Ice	7.27	7.82	46.55
(Verizon)			-4.50			1/2" Ice	7.83	9.01	113.93

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	8.35	9.91	189.25
DB846F65ZAXY w/Mount Pipe (Verizon)	A	From Leg	4.00 4.50 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	7.27 7.83 8.35	7.82 9.01 9.91	46.55 113.93 189.25
DB846H80E-SX w/Mount Pipe (Verizon)	B	From Leg	4.00 -4.50 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	5.32 5.87 6.39	7.73 8.92 9.82	40.55 98.56 164.31
DB846H80E-SX w/Mount Pipe (Verizon)	B	From Leg	4.00 4.50 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	5.32 5.87 6.39	7.73 8.92 9.82	40.55 98.56 164.31
DB846F65ZAXY w/Mount Pipe (Verizon)	C	From Leg	4.00 -4.50 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	7.27 7.83 8.35	7.82 9.01 9.91	46.55 113.93 189.25
DB846F65ZAXY w/Mount Pipe (Verizon)	C	From Leg	4.00 4.50 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	7.27 7.83 8.35	7.82 9.01 9.91	46.55 113.93 189.25
742 213 w/Mount Pipe (Verizon)	A	From Leg	4.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
742 213 w/Mount Pipe (Verizon)	A	From Leg	4.00 6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
742 213 w/Mount Pipe (Verizon)	B	From Leg	4.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
742 213 w/Mount Pipe (Verizon)	B	From Leg	4.00 6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
742 213 w/Mount Pipe (Verizon)	C	From Leg	4.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
742 213 w/Mount Pipe (Verizon)	C	From Leg	4.00 6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	3.59 4.09 4.54	3.20 4.04 4.74	42.31 75.77 115.04
RRH 2x40 AWS (Verizon)	A	From Leg	3.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
RRH 2x40 AWS (Verizon)	B	From Leg	3.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
RRH 2x40 AWS (Verizon)	C	From Leg	3.00 -6.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
DB-T1-6Z-8AB-0Z (Verizon)	C	From Leg	1.50 0.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	44.00 80.13 120.22
Sector Mount [SM 104-1] (Verizon)	A	From Leg	3.00 0.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90
Sector Mount [SM 104-1] (Verizon)	B	From Leg	3.00 0.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90
Sector Mount [SM 104-1] (Verizon)	C	From Leg	3.00 0.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
7770.00 w/Mount Pipe	A	From Leg	3.00	0.0000	154.00	No Ice	5.84	4.35	56.90
(ATT)			-6.00			1/2" Ice	6.32	5.20	105.42
			0.00			1" Ice	6.77	5.92	160.42
7770.00 w/Mount Pipe	B	From Leg	3.00	0.0000	154.00	No Ice	5.84	4.35	56.90
(ATT)			-6.00			1/2" Ice	6.32	5.20	105.42
			0.00			1" Ice	6.77	5.92	160.42
7770.00 w/Mount Pipe	C	From Leg	3.00	0.0000	154.00	No Ice	5.84	4.35	56.90
(ATT)			-6.00			1/2" Ice	6.32	5.20	105.42
			0.00			1" Ice	6.77	5.92	160.42
HPA65R-BU6A w/Mount Pipe	A	From Leg	3.00	0.0000	154.00	No Ice	8.11	7.21	67.45
(ATT)			-2.00			1/2" Ice	8.67	8.39	136.26
			0.00			1" Ice	9.19	9.28	213.00
HPA65R-BU6A w/Mount Pipe	B	From Leg	3.00	0.0000	154.00	No Ice	8.11	7.21	67.45
(ATT)			-2.00			1/2" Ice	8.67	8.39	136.26
			0.00			1" Ice	9.19	9.28	213.00
HPA65R-BU6A w/Mount Pipe	C	From Leg	3.00	0.0000	154.00	No Ice	8.11	7.21	67.45
(ATT)			-2.00			1/2" Ice	8.67	8.39	136.26
			0.00			1" Ice	9.19	9.28	213.00
P65-16-XLH-RR w/Mount Pipe	A	From Leg	3.00	0.0000	154.00	No Ice	8.13	6.13	85.90
(ATT)			6.00			1/2" Ice	8.59	7.07	149.07
			0.00			1" Ice	9.05	7.90	219.94
P65-16-XLH-RR w/Mount Pipe	B	From Leg	3.00	0.0000	154.00	No Ice	8.13	6.13	85.90
(ATT)			6.00			1/2" Ice	8.59	7.07	149.07
			0.00			1" Ice	9.05	7.90	219.94
P65-16-XLH-RR w/Mount Pipe	C	From Leg	3.00	0.0000	154.00	No Ice	8.13	6.13	85.90
(ATT)			6.00			1/2" Ice	8.59	7.07	149.07
			0.00			1" Ice	9.05	7.90	219.94
(2) LGP214nn	A	From Leg	3.00	0.0000	154.00	No Ice	1.11	0.21	14.10
(ATT)			-6.00			1/2" Ice	1.25	0.28	21.30
			0.00			1" Ice	1.39	0.35	30.39
(2) LGP214nn	B	From Leg	3.00	0.0000	154.00	No Ice	1.11	0.21	14.10
(ATT)			-6.00			1/2" Ice	1.25	0.28	21.30
			0.00			1" Ice	1.39	0.35	30.39
(2) LGP214nn	C	From Leg	3.00	0.0000	154.00	No Ice	1.11	0.21	14.10
(ATT)			-6.00			1/2" Ice	1.25	0.28	21.30
			0.00			1" Ice	1.39	0.35	30.39
RRUS 4415 B25	A	From Leg	3.00	0.0000	154.00	No Ice	1.84	0.82	46.00
(ATT)			-2.00			1/2" Ice	2.01	0.94	60.07
			3.00			1" Ice	2.19	1.07	76.66
RRUS 4415 B25	B	From Leg	3.00	0.0000	154.00	No Ice	1.84	0.82	46.00
(ATT)			-2.00			1/2" Ice	2.01	0.94	60.07
			3.00			1" Ice	2.19	1.07	76.66
RRUS 4415 B25	C	From Leg	3.00	0.0000	154.00	No Ice	1.84	0.82	46.00
(ATT)			-2.00			1/2" Ice	2.01	0.94	60.07
			3.00			1" Ice	2.19	1.07	76.66
RRUS-11	A	From Leg	1.00	0.0000	154.00	No Ice	2.52	1.07	55.00
(ATT)			0.00			1/2" Ice	2.72	1.21	74.32
			3.00			1" Ice	2.92	1.36	96.56
RRUS-11	B	From Leg	1.00	0.0000	154.00	No Ice	2.52	1.07	55.00
(ATT)			0.00			1/2" Ice	2.72	1.21	74.32
			3.00			1" Ice	2.92	1.36	96.56
RRUS-11	C	From Leg	1.00	0.0000	154.00	No Ice	2.52	1.07	55.00
(ATT)			0.00			1/2" Ice	2.72	1.21	74.32
			3.00			1" Ice	2.92	1.36	96.56
DC6-48-60-18-8F	C	From Leg	1.00	0.0000	154.00	No Ice	0.92	0.92	33.00
(ATT)			0.00			1/2" Ice	1.46	1.46	50.72
			0.00			1" Ice	1.64	1.64	70.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
10'x2" Pipe Mount (ATT)	A	From Leg	2.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.38 3.41 4.47	2.38 3.41 4.47	36.50 62.84 91.81
10'x2" Pipe Mount (ATT)	B	From Leg	2.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.38 3.41 4.47	2.38 3.41 4.47	36.50 62.84 91.81
10'x2" Pipe Mount (ATT)	C	From Leg	2.00 -6.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	2.38 3.41 4.47	2.38 3.41 4.47	36.50 62.84 91.81
Sector Mount [SM 104-1] (ATT)	A	From Leg	3.00 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90
Sector Mount [SM 104-1] (ATT)	B	From Leg	3.00 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90
Sector Mount [SM 104-1] (ATT)	C	From Leg	3.00 0.00 0.00	0.0000	154.00	No Ice 1/2" Ice 1" Ice	16.40 21.70 27.00	10.28 14.27 18.26	317.50 468.20 618.90
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15' Omni (Municipal)	A	From Leg	6.00 0.00 8.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	3.75 5.28 6.83	3.75 5.28 6.83	40.00 67.80 105.17
8' Dipole (Municipal)	A	From Leg	6.00 0.00 -5.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	4.80 6.40 8.00	4.80 6.40 8.00	45.00 89.00 133.00
8' Dipole (Municipal)	C	From Leg	6.00 0.00 -5.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	4.80 6.40 8.00	4.80 6.40 8.00	45.00 89.00 133.00
Side Arm Mount [SO 308-1] (Municipal)	A	From Leg	3.00 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	3.03 5.22 7.41	53.00 78.75 104.50
Side Arm Mount [SO 308-1] (Municipal)	C	From Leg	3.00 0.00 0.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice	0.98 1.70 2.42	3.03 5.22 7.41	53.00 78.75 104.50
**********									
**********									
2' Standoff (Dish)	B	From Leg	1.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	1.80 3.30 4.80	1.80 3.30 4.80	33.00 59.00 85.00
**********									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
**********											
Andrew 3' w/Radome	B	Paraboloid	From	2.00	0.0000		138.00	3.00	No Ice	7.07	100.00

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
(Sprint)		w/Radome	Leg	0.00 0.00					1/2" Ice 1" Ice	7.47 7.87	138.35 176.70
**********											

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	10198.44					
Bracing Weight	20236.20					
Total Member Self-Weight	30434.64			-9969.04	19671.68	
Total Weight	58035.74			-9969.04	19671.68	
Wind 0 deg - No Ice		21.55	-31146.92	-3261715.37	15384.33	-9261.92
Wind 30 deg - No Ice		14866.14	-25726.42	-2745328.91	-1562339.24	-3053.88
Wind 60 deg - No Ice		26999.89	-15601.84	-1662672.20	-2838714.05	-9728.27
Wind 90 deg - No Ice		33682.14	-32.46	-15761.62	-3485835.24	-11743.29
Wind 120 deg - No Ice		30536.57	17598.52	1790945.77	-3108859.63	3440.11
Wind 150 deg - No Ice		15738.24	27269.31	2835441.77	-1621781.90	16254.84
Wind 180 deg - No Ice		-39.17	29230.07	3091971.84	26389.42	9318.56
Wind 210 deg - No Ice		-14894.33	25710.15	2723144.86	1605572.74	3053.88
Wind 240 deg - No Ice		-28668.73	16545.01	1715532.07	3009007.92	9671.63
Wind 270 deg - No Ice		-33716.22	32.13	-4221.98	3529881.51	11698.87
Wind 300 deg - No Ice		-28922.25	-16666.49	-1739623.40	3024776.28	-3440.11
Wind 330 deg - No Ice		-15755.56	-27298.65	-2859429.93	1663516.14	-16210.43
Member Ice	45792.11					
Total Weight Ice	177215.77			-45441.39	69637.74	
Wind 0 deg - Ice		-4.70	-15303.91	-1686015.23	69957.26	-4973.61
Wind 30 deg - Ice		7545.48	-13062.32	-1456972.21	-746176.08	-3200.18
Wind 60 deg - Ice		13492.35	-7780.97	-882916.07	-1382922.69	-5128.59
Wind 90 deg - Ice		16172.58	0.93	-45642.16	-1655286.18	-5063.72
Wind 120 deg - Ice		14191.49	8183.01	820123.29	-1432617.11	916.54
Wind 150 deg - Ice		7731.27	13371.01	1386302.15	-758510.50	6044.56
Wind 180 deg - Ice		-1.39	14847.90	1560326.67	70158.30	4993.19
Wind 210 deg - Ice		-7555.23	13056.69	1365313.10	886796.23	3200.18
Wind 240 deg - Ice		-13890.31	8003.71	808708.66	1552760.92	5109.01
Wind 270 deg - Ice		-16184.36	-1.04	-45256.35	1796187.27	5048.37
Wind 300 deg - Ice		-13816.01	-7966.23	-895177.37	1544476.49	-917.13
Wind 330 deg - Ice		-7737.26	-13381.16	-1478584.86	898612.42	-6029.21
Total Weight	58035.74			-9969.04	19671.68	
Wind 0 deg - Service		8.97	-12964.38	-1353658.71	-1287.50	-3855.12
Wind 30 deg - Service		6187.78	-10708.19	-1138721.58	-657988.25	-1271.13
Wind 60 deg - Service		11238.25	-6494.00	-688084.03	-1189257.68	-4049.23
Wind 90 deg - Service		14019.62	-13.51	-2585.35	-1458610.93	-4887.94
Wind 120 deg - Service		12710.33	7325.09	749426.05	-1301701.21	1431.89
Wind 150 deg - Service		6550.77	11350.39	1184179.85	-682730.26	6765.80
Wind 180 deg - Service		-16.30	12166.52	1290956.15	3293.19	3878.69
Wind 210 deg - Service		-6199.51	10701.42	1137438.16	660601.54	1271.13
Wind 240 deg - Service		-11932.87	6886.58	718036.37	1244757.71	4025.65
Wind 270 deg - Service		-14033.81	13.37	2217.83	1461562.53	4869.46
Wind 300 deg - Service		-12038.40	-6937.14	-720113.67	1251321.02	-1431.89
Wind 330 deg - Service		-6557.99	-11362.60	-1186214.20	684719.50	-6747.32

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	185 - 180	Leg	Max Tension	6	1687.51	0.00	-0.00
			Max. Compression	31	-2865.49	-3.42	-7.22
			Max. Mx	8	-756.73	35.86	2.77
			Max. My	2	187.33	-14.06	-37.33
			Max. Vy	20	924.32	0.00	-0.00
			Max. Vx	14	-930.72	-0.00	0.00
		Diagonal	Max Tension	25	1303.57	0.00	0.00
			Max. Compression	20	-1531.33	0.00	0.00
			Max. Mx	30	98.11	15.21	-0.14
			Max. My	14	-1239.98	2.10	0.96
			Max. Vy	30	-19.42	15.21	-0.14
			Max. Vx	27	0.31	0.00	0.00
		Top Girt	Max Tension	18	499.27	0.00	0.00
			Max. Compression	7	-352.71	0.00	0.00
			Max. Mx	37	100.89	-37.49	0.00
			Max. My	8	91.15	0.00	0.00
			Max. Vy	37	29.99	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	7	27012.42	-320.55	184.66
			Max. Compression	18	-32249.58	273.38	-175.52
			Max. Mx	20	-26984.97	-514.95	26.95
			Max. My	2	-30352.81	-6.45	-518.55
			Max. Vy	20	881.87	398.80	-26.19
			Max. Vx	2	900.69	-2.93	397.80
		Diagonal	Max Tension	6	4802.28	0.00	0.00
			Max. Compression	18	-5044.28	0.00	0.00
			Max. Mx	27	1035.42	29.91	0.11
			Max. My	4	-4882.73	-14.17	-4.77
			Max. Vy	27	-23.44	29.91	0.11
			Max. Vx	4	-1.35	0.00	0.00
		Top Girt	Max Tension	14	415.25	0.00	0.00
			Max. Compression	3	-292.19	0.00	0.00
			Max. Mx	37	288.38	-37.19	0.00
			Max. My	8	57.85	0.00	0.00
			Max. Vy	37	29.75	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
T3	160 - 140	Leg	Max Tension	7	67388.63	-132.03	74.50
			Max. Compression	18	-78176.17	44.42	14.68
			Max. Mx	6	46648.62	475.49	-1.37
			Max. My	12	-3772.45	-32.82	436.31
			Max. Vy	6	-793.57	-314.50	-1.37
			Max. Vx	24	802.56	-32.38	359.22
		Diagonal	Max Tension	16	4957.43	0.00	0.00
			Max. Compression	16	-5051.30	0.00	0.00
			Max. Mx	27	1263.59	29.99	2.97
			Max. My	35	-36.54	20.65	-4.51
			Max. Vy	27	-26.55	29.99	2.97
			Max. Vx	35	1.85	0.00	0.00
		Top Girt	Max Tension	7	430.71	0.00	0.00
			Max. Compression	18	-450.93	0.00	0.00
			Max. Mx	26	-19.47	-36.64	0.00
			Max. My	36	-21.39	0.00	1.06
			Max. Vy	26	29.31	0.00	0.00
			Max. Vx	36	-0.85	0.00	0.00
T4	140 - 120	Leg	Max Tension	7	103103.69	531.03	8.46
			Max. Compression	18	-117756.21	1495.42	2.30
			Max. Mx	18	-117707.39	-1978.83	0.15
			Max. My	20	-6668.26	-162.48	-877.01
			Max. Vy	18	1364.42	1495.46	2.36
			Max. Vx	20	419.19	-162.48	-877.01
		Diagonal	Max Tension	21	5424.08	19.51	0.47

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	20	-5633.00	0.00	0.00
			Max. Mx	35	1088.47	41.88	-3.78
			Max. My	18	-5298.43	-10.70	-5.49
			Max. Vy	37	35.50	38.13	-2.90
			Max. Vx	29	1.85	0.00	0.00
		Secondary Horizontal	Max Tension	18	2042.14	0.00	0.00
			Max. Compression	18	-2042.14	4.46	-1.17
			Max. Mx	29	-45.84	32.53	7.39
			Max. My	36	-119.64	32.29	8.15
			Max. Vy	29	-36.70	32.53	7.39
			Max. Vx	38	-2.79	0.00	0.00
T5	120 - 100	Leg	Max Tension	23	134603.35	1388.23	-0.75
			Max. Compression	10	-152902.32	2838.13	10.77
			Max. Mx	10	-150720.09	5716.50	-9.20
			Max. My	20	-7116.13	-427.52	-1479.32
			Max. Vy	10	-6376.79	5716.50	-9.20
			Max. Vx	20	1304.79	-427.52	-1479.32
		Diagonal	Max Tension	23	8259.29	35.43	-2.11
			Max. Compression	10	-9186.68	0.00	0.00
			Max. Mx	18	2077.68	98.77	1.80
			Max. My	36	-1038.47	6.06	-6.23
			Max. Vy	18	-39.45	98.77	1.80
			Max. Vx	36	-2.69	0.00	0.00
		Horizontal	Max Tension	10	2651.65	20.91	12.98
			Max. Compression	10	-2651.65	0.00	0.00
			Max. Mx	35	-102.52	60.53	36.26
			Max. My	35	34.12	60.38	36.51
			Max. Vy	35	-58.98	60.53	36.26
			Max. Vx	35	-8.37	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	18	6152.97	0.00	0.00
			Max. Compression	23	-5508.49	0.00	0.00
			Max. Mx	29	1949.46	-20.88	0.00
			Max. My	36	2738.78	0.00	0.60
			Max. Vy	29	-31.32	0.00	0.00
			Max. Vx	36	-0.90	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	7	3368.11	0.00	0.00
			Max. Compression	18	-3897.53	0.00	0.00
			Max. Mx	36	269.57	-26.03	0.00
			Max. My	35	20.57	0.00	0.92
			Max. Vy	36	32.38	0.00	0.00
			Max. Vx	35	-1.14	0.00	0.00
T6	100 - 93.3333	Leg	Max Tension	23	147142.69	491.83	9.79
			Max. Compression	10	-167220.06	751.86	-4.18
			Max. Mx	18	-166199.78	-871.36	-30.47
			Max. My	20	-9614.51	-185.70	-1280.72
			Max. Vy	18	-293.62	768.25	4.93
			Max. Vx	24	209.88	-188.47	1221.76
		Diagonal	Max Tension	8	6190.20	0.00	0.00
			Max. Compression	8	-6237.77	0.00	0.00
			Max. Mx	35	1688.81	77.81	-8.53
			Max. My	35	73.44	64.13	-10.74
			Max. Vy	37	52.92	75.37	9.45
			Max. Vx	35	3.04	0.00	0.00
T7	93.3333 - 86.6667	Leg	Max Tension	23	158091.14	-632.56	4.65
			Max. Compression	10	-179422.03	1443.38	-17.13
			Max. Mx	11	-176385.26	1443.56	-17.14
			Max. My	20	-10334.85	-12.17	-1020.56
			Max. Vy	22	162.32	-1381.15	16.17
			Max. Vx	12	173.34	-10.74	-980.24
		Diagonal	Max Tension	8	6167.36	0.00	0.00
			Max. Compression	8	-6392.93	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	35	1628.33	80.88	-9.36
			Max. My	35	45.15	67.64	-11.53
			Max. Vy	37	55.12	79.46	10.31
			Max. Vx	35	-3.13	0.00	0.00
T8	86.6667 - 80	Leg	Max Tension	23	168879.99	-1373.59	16.16
			Max. Compression	10	-191699.74	-1772.82	6.76
			Max. Mx	10	-191699.74	-1772.82	6.76
			Max. My	20	-10753.67	-12.18	-1020.56
			Max. Vy	10	532.40	1443.38	-17.14
			Max. Vx	12	-167.70	-10.75	-980.24
		Diagonal	Max Tension	8	6675.89	0.00	0.00
			Max. Compression	8	-6954.55	0.00	0.00
			Max. Mx	35	2032.26	-142.93	-13.20
			Max. My	36	-1086.06	-112.04	19.15
			Max. Vy	37	-88.56	-137.63	-16.48
			Max. Vx	36	-4.94	0.00	0.00
T9	80 - 60	Leg	Max Tension	23	199003.41	905.67	-1.26
			Max. Compression	10	-228724.60	1905.77	29.57
			Max. Mx	10	-227000.68	5777.14	-30.40
			Max. My	20	-14023.87	-350.36	-2133.78
			Max. Vy	10	-5977.73	5777.14	-30.40
			Max. Vx	8	-1816.13	-360.99	2124.14
		Diagonal	Max Tension	23	8509.52	26.12	-2.56
			Max. Compression	10	-9696.07	0.00	0.00
			Max. Mx	10	3804.84	121.50	2.70
			Max. My	36	-1068.96	21.85	-10.10
			Max. Vy	35	-47.77	75.25	7.93
			Max. Vx	36	-3.47	0.00	0.00
		Horizontal	Max Tension	10	3966.57	49.76	23.42
			Max. Compression	10	-3966.57	0.00	0.00
			Max. Mx	31	-154.49	129.26	61.88
			Max. My	35	70.40	120.97	65.34
			Max. Vy	35	-90.52	121.12	65.06
			Max. Vx	35	-11.18	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	10	5702.46	0.00	0.00
			Max. Compression	23	-5145.46	0.00	0.00
			Max. Mx	37	1513.58	-38.31	0.00
			Max. My	36	2368.17	0.00	1.11
			Max. Vy	37	41.79	0.00	0.00
			Max. Vx	36	1.21	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	2882.95	0.00	0.00
			Max. Compression	10	-3366.51	0.00	0.00
			Max. Mx	36	241.19	-43.90	0.00
			Max. My	35	39.40	0.00	1.42
			Max. Vy	36	-42.79	0.00	0.00
			Max. Vx	35	1.38	0.00	0.00
T10	60 - 50	Leg	Max Tension	23	211929.64	1129.87	23.89
			Max. Compression	10	-243825.13	-1903.41	-20.42
			Max. Mx	10	-243729.14	3105.60	6.07
			Max. My	20	-15134.38	-279.48	-2531.97
			Max. Vy	10	-1049.87	3105.51	5.91
			Max. Vx	20	661.22	-279.48	-2531.97
		Diagonal	Max Tension	23	8305.06	87.07	6.31
			Max. Compression	10	-9255.88	0.00	0.00
			Max. Mx	37	1544.26	172.96	9.77
			Max. My	18	-8884.94	5.22	-21.11
			Max. Vy	37	86.63	172.96	9.77
			Max. Vx	35	-4.18	0.00	0.00
		Secondary Horizontal	Max Tension	10	4228.45	56.98	1.12
			Max. Compression	10	-4228.45	0.00	0.00
			Max. Mx	36	-104.93	168.85	39.77

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	36	-104.93	168.85	39.77
			Max. Vy	36	103.65	168.85	39.77
			Max. Vx	38	-7.57	0.00	0.00
T11	50 - 40	Leg	Max Tension	23	227362.41	1376.92	19.26
			Max. Compression	10	-262310.82	-3167.91	4.17
			Max. Mx	10	-262215.18	3583.16	0.48
			Max. My	20	-16004.08	-279.50	-2531.96
			Max. Vy	10	1342.65	3583.16	0.48
			Max. Vx	20	-716.94	-279.50	-2531.96
		Diagonal	Max Tension	9	8498.16	-168.66	-13.38
			Max. Compression	10	-9523.27	0.00	0.00
			Max. Mx	35	2524.79	-291.00	-43.84
			Max. My	36	2638.43	-284.91	47.01
			Max. Vy	37	-141.89	-280.47	-38.83
			Max. Vx	36	-8.62	0.00	0.00
		Secondary Horizontal	Max Tension	10	4549.03	82.80	-18.39
			Max. Compression	10	-4549.03	0.00	0.00
			Max. Mx	36	863.56	169.24	10.47
			Max. My	20	-1610.29	78.56	30.80
			Max. Vy	36	106.50	169.24	10.47
			Max. Vx	38	-5.17	0.00	0.00
T12	40 - 20	Leg	Max Tension	23	255807.69	3209.31	11.73
			Max. Compression	10	-296701.77	7815.41	4.66
			Max. Mx	10	-296478.10	7815.47	4.75
			Max. My	20	-17859.15	-610.37	-3688.07
			Max. Vy	10	3047.88	7815.47	4.75
			Max. Vx	20	836.59	-610.37	-3688.07
		Diagonal	Max Tension	23	9809.34	122.11	-2.98
			Max. Compression	10	-11269.17	0.00	0.00
			Max. Mx	35	1613.60	245.27	23.81
			Max. My	38	-2472.34	188.72	27.08
			Max. Vy	37	109.04	224.29	22.53
			Max. Vx	38	5.39	0.00	0.00
		Secondary Horizontal	Max Tension	10	5145.44	114.84	3.22
			Max. Compression	10	-5145.44	0.00	0.00
			Max. Mx	31	394.51	227.21	33.78
			Max. My	36	-378.72	225.12	39.62
			Max. Vy	35	122.42	208.02	33.67
			Max. Vx	38	-7.30	0.00	0.00
T13	20 - 0	Leg	Max Tension	23	282372.01	1445.39	-3.26
			Max. Compression	10	-331453.39	5244.88	71.84
			Max. Mx	10	-312028.56	12297.52	-54.34
			Max. My	20	-20677.97	-1341.83	-5067.75
			Max. Vy	10	-9399.16	11949.16	-63.11
			Max. Vx	20	2460.50	-1341.83	-5067.75
		Diagonal	Max Tension	23	11342.53	71.71	-5.11
			Max. Compression	10	-13143.36	0.00	0.00
			Max. Mx	10	4117.65	185.89	8.17
			Max. My	35	-1250.05	9.51	-18.68
			Max. Vy	35	-68.21	142.17	15.42
			Max. Vx	30	-4.72	0.00	0.00
		Horizontal	Max Tension	10	5748.11	190.74	66.79
			Max. Compression	10	-5748.11	0.00	0.00
			Max. Mx	35	-570.17	342.67	133.92
			Max. My	35	192.18	342.61	134.07
			Max. Vy	35	-149.59	342.67	133.92
			Max. Vx	35	-17.09	0.00	0.00
		Redund Horz 1 Bracing	Max Tension	10	8493.05	0.00	0.00
			Max. Compression	23	-7276.22	0.00	0.00
			Max. Mx	32	2420.11	-66.60	0.00
			Max. My	36	2589.33	0.00	1.92

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	32	51.98	0.00	0.00
			Max. Vx	36	-1.50	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	23	4097.77	0.00	0.00
			Max. Compression	10	-5039.48	0.00	0.00
			Max. Mx	36	661.14	-77.44	0.00
			Max. My	36	642.49	0.00	2.50
			Max. Vy	36	53.27	0.00	0.00
			Max. Vx	36	1.72	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	330156.27	30161.45	-17926.67
	Max. H_x	18	330156.27	30161.45	-17926.67
	Max. H_z	7	-274259.07	-25357.90	15125.65
	Min. Vert	7	-274259.07	-25357.90	15125.65
	Min. H_x	7	-274259.07	-25357.90	15125.65
	Min. H_z	18	330156.27	30161.45	-17926.67
Leg B	Max. Vert	10	341885.48	-32141.57	-18386.42
	Max. H_x	23	-290574.03	27472.19	15685.28
	Max. H_z	23	-290574.03	27472.19	15685.28
	Min. Vert	23	-290574.03	27472.19	15685.28
	Min. H_x	10	341885.48	-32141.57	-18386.42
	Min. H_z	10	341885.48	-32141.57	-18386.42
Leg A	Max. Vert	2	312300.56	-427.36	33154.24
	Max. H_x	21	17402.34	2930.54	1582.28
	Max. H_z	2	312300.56	-427.36	33154.24
	Min. Vert	15	-256678.96	398.50	-27580.50
	Min. H_x	9	18426.67	-2973.73	1656.56
	Min. H_z	15	-256678.96	398.50	-27580.50

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	58035.74	0.00	-0.00	-9973.85	19679.52	0.08
1.2 Dead+1.6 Wind 0 deg - No Ice	69642.89	34.48	-49835.08	-5257476.93	16880.77	-14984.15
0.9 Dead+1.6 Wind 0 deg - No Ice	52232.17	34.48	-49835.08	-5243627.45	10928.63	-14943.73
1.2 Dead+1.6 Wind 30 deg - No Ice	69642.89	23785.83	-41162.29	-4424934.23	-2528440.95	-5060.55
0.9 Dead+1.6 Wind 30 deg - No Ice	52232.17	23785.83	-41162.29	-4412693.00	-2529083.29	-5014.23
1.2 Dead+1.6 Wind 60 deg - No Ice	69642.89	43199.83	-24962.95	-2678263.15	-4587313.58	-15726.51
0.9 Dead+1.6 Wind 60 deg - No Ice	52232.17	43199.83	-24962.95	-2669691.59	-4583718.51	-15685.13
1.2 Dead+1.6 Wind 90 deg - No Ice	69642.89	53891.45	-51.94	-21539.46	-5630595.98	-18896.38
0.9 Dead+1.6 Wind 90 deg - No Ice	52232.17	53891.45	-51.94	-18476.47	-5625001.79	-18871.53
1.2 Dead+1.6 Wind 120 deg - No Ice	69642.89	48858.53	28157.64	2892547.39	-5022081.75	5504.55
0.9 Dead+1.6 Wind 120 deg - No Ice	52232.17	48858.52	28157.64	2889704.98	-5017844.18	5503.94
1.2 Dead+1.6 Wind 150 deg - No Ice	69642.89	25181.18	43630.91	4577794.86	-2623860.45	26111.87

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
0.9 Dead+1.6 Wind 150 deg - No Ice	52232.17	25181.18	43630.90	4571400.71	-2624406.97	26087.51
1.2 Dead+1.6 Wind 180 deg - No Ice	69642.89	-62.67	46768.13	4992130.41	34701.34	15066.61
0.9 Dead+1.6 Wind 180 deg - No Ice	52232.17	-62.67	46768.12	4984741.11	28695.88	15027.88
1.2 Dead+1.6 Wind 210 deg - No Ice	69642.89	-23830.91	41136.24	4397183.68	2582293.52	5057.04
0.9 Dead+1.6 Wind 210 deg - No Ice	52232.17	-23830.94	41136.25	4391009.73	2570975.04	5013.54
1.2 Dead+1.6 Wind 240 deg - No Ice	69642.89	-45869.99	26472.02	2771239.54	4845805.56	15642.04
0.9 Dead+1.6 Wind 240 deg - No Ice	52232.17	-45869.99	26472.02	2768541.65	4829912.35	15599.28
1.2 Dead+1.6 Wind 270 deg - No Ice	69642.89	-53945.98	51.41	-2853.39	5685724.84	18827.43
0.9 Dead+1.6 Wind 270 deg - No Ice	52232.17	-53945.97	51.41	152.45	5668165.49	18802.60
1.2 Dead+1.6 Wind 300 deg - No Ice	69642.89	-46275.61	-26666.39	-2801900.86	4870900.46	-5504.09
0.9 Dead+1.6 Wind 300 deg - No Ice	52232.17	-46275.61	-26666.39	-2793181.57	4855035.70	-5504.38
1.2 Dead+1.6 Wind 330 deg - No Ice	69642.89	-25208.91	-43677.86	-4608333.84	2675441.52	-26041.96
0.9 Dead+1.6 Wind 330 deg - No Ice	52232.17	-25208.91	-43677.86	-4595865.32	2664026.34	-26017.59
1.2 Dead+1.0 Ice+1.0 Temp	188822.91	0.00	0.00	-48561.67	75112.52	0.96
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	188822.91	-4.70	-15303.88	-1731210.68	75539.57	-5141.69
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	188822.91	7545.48	-13062.30	-1496486.45	-761585.38	-3407.57
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	188822.91	13492.34	-7780.97	-907595.91	-1414553.94	-5323.58
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	188822.91	16172.57	0.92	-48880.56	-1693568.96	-5190.56
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	188822.91	14191.47	8183.00	838817.83	-1465049.42	892.40
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	188822.91	7731.26	13371.00	1419647.75	-774034.95	6126.80
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	188822.91	-1.39	14847.88	1598439.35	75790.61	5157.97
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	188822.91	-7555.22	13056.68	1398404.06	913422.85	3407.46
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	188822.91	-13890.29	8003.69	827298.84	1596184.20	5307.08
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	188822.91	-16184.34	-1.04	-48437.08	1845686.94	5174.97
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	188822.91	-13816.00	-7966.23	-919968.13	1587560.53	-892.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	188822.91	-7737.26	-13381.14	-1518356.84	925348.50	-6111.18
Dead+Wind 0 deg - Service	58035.74	8.97	-12964.38	-1372788.05	17992.17	-3891.70
Dead+Wind 30 deg - Service	58035.74	6187.78	-10708.19	-1156484.48	-643255.84	-1311.11
Dead+Wind 60 deg - Service	58035.74	11238.25	-6494.00	-702692.76	-1178169.13	-4082.82
Dead+Wind 90 deg - Service	58035.74	14019.62	-13.51	-12468.19	-1449239.28	-4909.74
Dead+Wind 120 deg - Service	58035.74	12710.33	7325.09	744599.23	-1291155.76	1432.61
Dead+Wind 150 deg - Service	58035.74	6550.77	11350.39	1182402.20	-668091.47	6786.57
Dead+Wind 180 deg - Service	58035.74	-16.30	12166.52	1290028.92	22610.84	3912.09
Dead+Wind 210 deg - Service	58035.74	-6199.51	10701.42	1135461.30	684486.94	1311.05
Dead+Wind 240 deg - Service	58035.74	-11932.87	6886.58	713078.21	1272551.47	4063.16
Dead+Wind 270 deg - Service	58035.74	-14033.81	13.37	-7616.17	1490787.32	4890.71

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 300 deg - Service	58035.74	-12038.40	-6937.14	-734854.91	1279102.91	-1430.75
Dead+Wind 330 deg - Service	58035.74	-6557.99	-11362.60	-1204167.30	708676.10	-6769.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-58035.74	-0.00	-0.00	58035.74	0.00	0.000%
2	34.49	-69642.89	-49835.07	-34.48	69642.89	49835.08	0.000%
3	34.49	-52232.17	-49835.07	-34.48	52232.17	49835.08	0.000%
4	23785.83	-69642.89	-41162.28	-23785.83	69642.89	41162.29	0.000%
5	23785.83	-52232.17	-41162.28	-23785.83	52232.17	41162.29	0.000%
6	43199.82	-69642.89	-24962.94	-43199.83	69642.89	24962.95	0.000%
7	43199.82	-52232.17	-24962.94	-43199.83	52232.17	24962.95	0.000%
8	53891.43	-69642.89	-51.94	-53891.45	69642.89	51.94	0.000%
9	53891.43	-52232.17	-51.94	-53891.45	52232.17	51.94	0.000%
10	48858.51	-69642.89	28157.63	-48858.53	69642.89	-28157.64	0.000%
11	48858.51	-52232.17	28157.63	-48858.52	52232.17	-28157.64	0.000%
12	25181.18	-69642.89	43630.89	-25181.18	69642.89	-43630.91	0.000%
13	25181.18	-52232.17	43630.89	-25181.18	52232.17	-43630.90	0.000%
14	-62.66	-69642.89	46768.11	62.67	69642.89	-46768.13	0.000%
15	-62.66	-52232.17	46768.11	62.67	52232.17	-46768.12	0.000%
16	-23830.93	-69642.89	41136.24	23830.91	69642.89	-41136.24	0.000%
17	-23830.93	-52232.17	41136.24	23830.94	52232.17	-41136.25	0.000%
18	-45869.97	-69642.89	26472.02	45869.99	69642.89	-26472.02	0.000%
19	-45869.97	-52232.17	26472.02	45869.99	52232.17	-26472.02	0.000%
20	-53945.96	-69642.89	51.41	53945.98	69642.89	-51.41	0.000%
21	-53945.96	-52232.17	51.41	53945.97	52232.17	-51.41	0.000%
22	-46275.59	-69642.89	-26666.38	46275.61	69642.89	26666.39	0.000%
23	-46275.59	-52232.17	-26666.38	46275.61	52232.17	26666.39	0.000%
24	-25208.90	-69642.89	-43677.85	25208.91	69642.89	43677.86	0.000%
25	-25208.90	-52232.17	-43677.85	25208.91	52232.17	43677.86	0.000%
26	0.00	-188822.91	0.00	-0.00	188822.91	-0.00	0.000%
27	-4.70	-188822.91	-15303.91	4.70	188822.91	15303.88	0.000%
28	7545.48	-188822.91	-13062.32	-7545.48	188822.91	13062.30	0.000%
29	13492.35	-188822.91	-7780.97	-13492.34	188822.91	7780.97	0.000%
30	16172.58	-188822.91	0.93	-16172.57	188822.91	-0.92	0.000%
31	14191.49	-188822.91	8183.01	-14191.47	188822.91	-8183.00	0.000%
32	7731.27	-188822.91	13371.01	-7731.26	188822.91	-13371.00	0.000%
33	-1.39	-188822.91	14847.90	1.39	188822.91	-14847.88	0.000%
34	-7555.23	-188822.91	13056.69	7555.22	188822.91	-13056.68	0.000%
35	-13890.31	-188822.91	8003.71	13890.29	188822.91	-8003.69	0.000%
36	-16184.36	-188822.91	-1.04	16184.34	188822.91	1.04	0.000%
37	-13816.01	-188822.91	-7966.23	13816.00	188822.91	7966.23	0.000%
38	-7737.26	-188822.91	-13381.16	7737.26	188822.91	13381.14	0.000%
39	8.97	-58035.74	-12964.38	-8.97	58035.74	12964.38	0.000%
40	6187.78	-58035.74	-10708.19	-6187.78	58035.74	10708.19	0.000%
41	11238.25	-58035.74	-6494.00	-11238.25	58035.74	6494.00	0.000%
42	14019.62	-58035.74	-13.51	-14019.62	58035.74	13.51	0.000%
43	12710.33	-58035.74	7325.09	-12710.33	58035.74	-7325.09	0.000%
44	6550.77	-58035.74	11350.39	-6550.77	58035.74	-11350.39	0.000%
45	-16.30	-58035.74	12166.52	16.30	58035.74	-12166.52	0.000%
46	-6199.51	-58035.74	10701.42	6199.51	58035.74	-10701.42	0.000%
47	-11932.87	-58035.74	6886.58	11932.87	58035.74	-6886.58	0.000%
48	-14033.81	-58035.74	13.37	14033.81	58035.74	-13.37	0.000%
49	-12038.40	-58035.74	-6937.14	12038.40	58035.74	6937.14	0.000%
50	-6557.99	-58035.74	-11362.60	6557.99	58035.74	11362.60	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000135
3	Yes	4	0.00000001	0.00000047
4	Yes	4	0.00000001	0.00000151
5	Yes	4	0.00000001	0.00000068
6	Yes	4	0.00000001	0.00000162
7	Yes	4	0.00000001	0.00000078
8	Yes	4	0.00000001	0.00000168
9	Yes	4	0.00000001	0.00000100
10	Yes	4	0.00000001	0.00000126
11	Yes	4	0.00000001	0.00000048
12	Yes	4	0.00000001	0.00000165
13	Yes	4	0.00000001	0.00000087
14	Yes	4	0.00000001	0.00000164
15	Yes	4	0.00000001	0.00000071
16	Yes	4	0.00000001	0.00000164
17	Yes	4	0.00000001	0.00000068
18	Yes	4	0.00000001	0.00000130
19	Yes	4	0.00000001	0.00000052
20	Yes	4	0.00000001	0.00000167
21	Yes	4	0.00000001	0.00000101
22	Yes	4	0.00000001	0.00000163
23	Yes	4	0.00000001	0.00000083
24	Yes	4	0.00000001	0.00000163
25	Yes	4	0.00000001	0.00000087
26	Yes	4	0.00000001	0.00000341
27	Yes	4	0.00000001	0.00004728
28	Yes	4	0.00000001	0.00004710
29	Yes	4	0.00000001	0.00004718
30	Yes	4	0.00000001	0.00004680
31	Yes	4	0.00000001	0.00004625
32	Yes	4	0.00000001	0.00004581
33	Yes	4	0.00000001	0.00004603
34	Yes	4	0.00000001	0.00004671
35	Yes	4	0.00000001	0.00004765
36	Yes	4	0.00000001	0.00004818
37	Yes	4	0.00000001	0.00004821
38	Yes	4	0.00000001	0.00004769
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	185 - 180	7.141	48	0.3731	0.0238
T2	180 - 160	6.748	48	0.3715	0.0237
T3	160 - 140	5.212	48	0.3381	0.0217
T4	140 - 120	3.855	48	0.2855	0.0180
T5	120 - 100	2.740	48	0.2289	0.0147
T6	100 - 93.3333	1.861	48	0.1757	0.0118
T7	93.3333 - 86.6667	1.613	48	0.1626	0.0106
T8	86.6667 - 80	1.384	43	0.1493	0.0093
T9	80 - 60	1.180	43	0.1355	0.0087
T10	60 - 50	0.665	43	0.0945	0.0057
T11	50 - 40	0.468	43	0.0783	0.0045
T12	40 - 20	0.315	43	0.0619	0.0039
T13	20 - 0	0.094	43	0.0309	0.0019

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	6' Dipole	48	7.141	0.3731	0.0238	282233
174.00	APXVSPP18-C w/Mount Pipe	48	6.277	0.3657	0.0234	69585
164.00	BXA-70063-6CF-EDIN-X w/Mount Pipe	48	5.509	0.3473	0.0223	28490
154.00	7770.00 w/Mount Pipe	48	4.782	0.3232	0.0205	21532
146.00	15' Omni	48	4.238	0.3020	0.0191	19869
138.00	Andrew 3' w/Radome	48	3.733	0.2799	0.0177	18939

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	185 - 180	27.402	10	1.4279	0.0916
T2	180 - 160	25.902	10	1.4220	0.0913
T3	160 - 140	20.047	10	1.2923	0.0835
T4	140 - 120	14.868	10	1.0912	0.0695
T5	120 - 100	10.597	10	0.8777	0.0567
T6	100 - 93.3333	7.216	10	0.6757	0.0454
T7	93.3333 - 86.6667	6.260	10	0.6257	0.0407
T8	86.6667 - 80	5.373	10	0.5749	0.0360
T9	80 - 60	4.580	10	0.5224	0.0334
T10	60 - 50	2.578	10	0.3651	0.0219
T11	50 - 40	1.815	10	0.3028	0.0173
T12	40 - 20	1.222	10	0.2394	0.0150
T13	20 - 0	0.362	10	0.1197	0.0072

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	6' Dipole	10	27.402	1.4279	0.0916	73892
174.00	APXVSPP18-C w/Mount Pipe	10	24.108	1.3992	0.0902	18238
164.00	BXA-70063-6CF-EDIN-X w/Mount Pipe	10	21.179	1.3280	0.0860	7359
154.00	7770.00 w/Mount Pipe	10	18.404	1.2349	0.0789	5584
146.00	15' Omni	10	16.330	1.1536	0.0734	5172
138.00	Andrew 3' w/Radome	10	14.399	1.0703	0.0682	4941

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	185	Leg	A325X	0.7500	6	281.25	29820.60	0.009 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	1303.57	6009.38	0.217 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	1	499.27	4553.91	0.110 ✔	1	Member Block Shear
T2	180	Leg	A325X	0.7500	6	4502.07	29820.60	0.151 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	4802.28	6009.38	0.799 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	1	415.25	4553.91	0.091 ✔	1	Member Block Shear
T3	160	Leg	A325X	1.0000	6	11231.40	53014.40	0.212 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	4957.43	6009.38	0.825 ✔	1	Member Block Shear
		Top Girt	A325X	0.6250	1	430.71	4553.91	0.095 ✔	1	Member Block Shear
T4	140	Leg	A325X	1.0000	6	17156.90	53014.40	0.324 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	5424.08	8634.38	0.628 ✔	1	Member Block Shear
		Secondary Horizontal	A325N	0.7500	1	2042.14	9243.75	0.221 ✔	1	Member Block Shear
T5	120	Leg	A325X	1.0000	6	22390.20	53014.40	0.422 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	8259.29	10673.40	0.774 ✔	1	Member Block Shear
		Horizontal	A325N	0.7500	1	2651.65	17892.40	0.148 ✔	1	Bolt Shear
T6	100	Diagonal	A325X	0.6250	1	6190.20	10673.40	0.580 ✔	1	Member Block Shear
T7	93.3333	Diagonal	A325X	0.6250	1	6167.36	10673.40	0.578 ✔	1	Member Block Shear
T8	86.6667	Leg	A325X	1.0000	6	28146.70	53014.40	0.531 ✔	1	Bolt Tension
		Diagonal	A325X	0.6250	1	6675.89	15660.00	0.426 ✔	1	Gusset Bearing
T9	80	Leg	A325X	1.0000	6	33130.00	53014.40	0.625 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	8509.52	11183.20	0.761 ✔	1	Member Block Shear
		Horizontal	A325N	0.7500	1	3966.57	17892.40	0.222 ✔	1	Bolt Shear
T10	60	Diagonal	A325X	0.7500	1	8305.06	14910.90	0.557 ✔	1	Member Block Shear
		Secondary	A325N	0.7500	1	4228.45	17892.40	0.236 ✔	1	Bolt Shear

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
T11	50	Horizontal Leg	A325X	1.2500	6	37854.10	82835.00	0.457 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	8498.16	18922.50	0.449 ✔	1	Gusset Bearing
		Secondary Horizontal	A325N	0.7500	1	4549.03	17892.40	0.254 ✔	1	Bolt Shear
T12	40	Leg	A325X	1.2500	6	42567.50	82835.00	0.514 ✔	1	Bolt Tension
		Diagonal	A325X	0.7500	1	9809.34	17629.70	0.556 ✔	1	Member Block Shear
		Secondary Horizontal	A325N	0.7500	1	5145.44	17892.40	0.288 ✔	1	Bolt Shear
T13	20	Diagonal	A325X	0.7500	1	11342.50	17629.70	0.643 ✔	1	Member Block Shear
		Horizontal	A325N	0.7500	1	5748.11	17892.40	0.321 ✔	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	P2x.154	5.00	5.00	76.2 K=1.00	1.0745	-2865.49	31617.20	0.091 [1] ✔
T2	180 - 160	P2.5x.203	20.00	5.00	63.3 K=1.00	1.7040	-32249.60	57192.30	0.564 [1] ✔
T3	160 - 140	P2.5x.375	20.03	5.01	67.2 K=1.00	2.9452	-78176.20	95225.20	0.821 [1] ✔
T4	140 - 120	P3.5x.318	20.03	2.59	23.8 K=1.00	3.6784	-117756.00	158818.00	0.741 [1] ✔
T5	120 - 100	P5x.258	20.03	1.67	10.7 K=1.00	4.2999	-152902.00	191890.00	0.797 [1] ✔
T6	100 - 93.3333	P5x.375	6.68	6.68	43.6 K=1.00	6.1120	-167220.00	239388.00	0.699 [1] ✔
T7	93.3333 - 86.6667	P5x.375	6.68	6.68	43.6 K=1.00	6.1120	-179422.00	239388.00	0.750 [1] ✔
T8	86.6667 - 80	P5x.375	6.68	6.68	43.6 K=1.00	6.1120	-191700.00	239388.00	0.801 [1] ✔
T9	80 - 60	P5x.375	20.03	1.67	10.9 K=1.00	6.1120	-228725.00	272663.00	0.839 [1] ✔
T10	60 - 50	P5x.5	10.02	5.17	34.5 K=1.00	7.9529	-243825.00	328070.00	0.743 [1] ✔
T11	50 - 40	P5x.5	10.02	5.16	34.4 K=1.00	7.9529	-262311.00	328178.00	0.799 [1] ✔
T12	40 - 20	P8x.322	20.03	5.15	21.0 K=1.00	8.3993	-296702.00	365926.00	0.811 [1] ✔
T13	20 - 0	P8x.322	20.03	2.50	10.2	8.3993	-331453.00	375086.00	0.884 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
					K=1.00				✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	7.07	3.22	102.9 K=1.06	0.4844	-1531.33	8852.07	0.173 [1] ✔
T2	180 - 160	L2x2x1/8	7.07	3.19	102.2 K=1.06	0.4844	-5044.28	8913.86	0.566 [1] ✔
T3	160 - 140	L2x2x1/8	8.40	4.03	121.7 K=1.00	0.4844	-5051.30	7142.85	0.707 [1] ✔
T4	140 - 120	L2x2x3/16	10.08	4.82	146.9 K=1.00	0.7150	-5633.00	7480.29	0.753 [1] ✔
T5	120 - 100	L2 1/2x2 1/2x3/16	6.15	5.55	102.8 K=1.20	0.9020	-9186.67	16761.30	0.548 [1] ✔
T6	100 - 93.3333	L2 1/2x2 1/2x3/16	13.15	6.33	153.5 K=1.00	0.9020	-6237.77	8645.55	0.721 [1] ✔
T7	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.73	6.62	160.6 K=1.00	0.9020	-6392.93	7904.00	0.809 [1] ✔
T8	86.6667 - 80	2L2 1/2x2 1/2x3/16x3/8	14.32	6.92	106.7 K=1.00	1.8000	-6954.55	32029.30	0.217 [1] ✔
T9	80 - 60	L3x3x3/16	7.90	7.32	106.8 K=1.14	1.0900	-9696.07	19110.00	0.507 [1] ✔
T10	60 - 50	L3x3x1/4	18.45	9.08	184.0 K=1.00	1.4400	-9255.88	9604.97	0.964 [1] ✔
T11	50 - 40	2L3x3x1/4x3/8	19.30	9.50	122.6 K=1.00	2.8800	-9523.27	42286.70	0.225 [1] ✔
T12	40 - 20	L3 1/2x3 1/2x1/4	21.03	10.22	176.8 K=1.00	1.6900	-11269.20	12214.20	0.923 [1] ✔
T13	20 - 0	L3 1/2x3 1/2x1/4	11.18	10.45	117.5 K=1.02	1.6900	-13143.40	26464.10	0.497 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	120 - 100	L2 1/2x2 1/2x3/8	10.67	4.97	122.4 K=1.00	1.7300	-2651.65	25482.20	0.104 [1] ✔
T9	80 - 60	L3x3x3/8	14.67	6.97	142.4 K=1.00	2.1100	-3966.57	23504.60	0.169 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T13	20 - 0	L3 1/2x3 1/2x1/2	20.50	9.76	171.4 K=1.00	3.2500	-5748.11	24993.60	0.230 [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 $\frac{P_u}{\phi P_n}$
T4	140 - 120	L2x2x1/4	8.74	8.14	160.4 K=1.00	0.9380	-2042.14	8239.59	0.248 [1]
T10	60 - 50	L3x3x7/16	15.48	14.75	195.6 K=1.00	2.4300	-4228.45	14352.50	0.295 [1]
T11	50 - 40	L3x3x7/16	16.48	15.75	208.8 K=1.00	2.4300	-4549.03	12586.20	0.361 [1]
T12	40 - 20	L3x3x1/2	18.49	17.50	233.8 K=1.00	2.7500	-5145.44	11364.20	0.453 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	5.00	4.56	137.7 K=1.00	0.4844	-352.71	5769.26	0.061 [1]
T2	180 - 160	L2x2x1/8	5.00	4.56	137.7 K=1.00	0.4844	-292.19	5769.26	0.051 [1]
T3	160 - 140	L2x2x1/8	5.00	4.52	136.5 K=1.00	0.4844	-450.93	5876.09	0.077 [1]

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T5	120 - 100	L3x3x1/2	2.67	2.43	85.0 K=1.70	2.7500	-5508.49	60901.70	0.090 [1]

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	80 - 60	L3x3x1/2	3.67	3.43	95.3 K=1.35	2.7500	-5145.46	55242.90	0.093 [1] ✓
T13	20 - 0	L3x3x1/2	5.13	4.77	109.0 K=1.11	2.7500	-7276.22	47690.30	0.153 [1] ✓

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T5	120 - 100	L3x3x1/2	3.07	2.80	88.8 K=1.54	2.7500	-3897.53	58853.50	0.066 [1] ✓
T9	80 - 60	L3x3x1/2	4.10	3.85	99.5 K=1.26	2.7500	-3366.51	52887.70	0.064 [1] ✓
T13	20 - 0	L3x3x1/2	5.82	5.41	115.6 K=1.04	2.7500	-5039.48	44081.10	0.114 [1] ✓

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	P2x.154	5.00	5.00	76.2	1.0745	1687.51	48353.90	0.035 [1] ✓
T2	180 - 160	P2.5x.203	20.00	5.00	63.3	1.7040	27012.40	76682.30	0.352 [1] ✓
T3	160 - 140	P2.5x.375	20.03	5.01	67.2	2.9452	67388.60	132536.00	0.508 [1] ✓
T4	140 - 120	P3.5x.318	20.03	2.59	23.8	3.6784	103104.00	165529.00	0.623 [1] ✓
T5	120 - 100	P5x.258	20.03	1.67	10.7	4.2999	134603.00	193494.00	0.696 [1] ✓
T6	100 - 93.3333	P5x.375	6.68	6.68	43.6	6.1120	147143.00	275039.00	0.535 [1] ✓
T7	93.3333 - 86.6667	P5x.375	6.68	6.68	43.6	6.1120	158091.00	275039.00	0.575 [1] ✓
T8	86.6667 - 80	P5x.375	6.68	6.68	43.6	6.1120	168880.00	275039.00	0.614 [1] ✓
T9	80 - 60	P5x.375	20.03	1.67	10.9	6.1120	199003.00	275039.00	0.724 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T10	60 - 50	P5x.5	10.02	5.17	34.5	7.9529	211930.00	357882.00	0.592 [1]
T11	50 - 40	P5x.5	10.02	5.16	34.4	7.9529	227362.00	357882.00	0.635 [1]
T12	40 - 20	P8x.322	20.03	5.15	21.0	8.3993	255808.00	377967.00	0.677 [1]
T13	20 - 0	P8x.322	20.03	2.50	10.2	8.3993	282372.00	377967.00	0.747 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	7.07	3.22	65.1	0.4844	1303.57	15693.80	0.083 [1]
T2	180 - 160	L2x2x1/8	7.07	3.19	64.5	0.4844	4802.28	15693.80	0.306 [1]
T3	160 - 140	L2x2x1/8	8.40	4.03	80.6	0.4844	4957.43	15693.80	0.316 [1]
T4	140 - 120	L2x2x3/16	10.08	4.82	97.1	0.7150	5424.08	23166.00	0.234 [1]
T5	120 - 100	L2 1/2x2 1/2x3/16	6.15	5.55	90.7	0.9020	8259.29	29224.80	0.283 [1]
T6	100 - 93.3333	L2 1/2x2 1/2x3/16	13.15	6.33	100.3	0.9020	6190.20	29224.80	0.212 [1]
T7	93.3333 - 86.6667	L2 1/2x2 1/2x3/16	13.73	6.62	104.7	0.9020	6167.36	29224.80	0.211 [1]
T8	86.6667 - 80	2L2 1/2x2 1/2x3/16x3/8	14.32	6.92	109.3	1.8000	6675.89	58320.00	0.114 [1]
T9	80 - 60	L3x3x3/16	7.90	7.32	97.8	1.0900	8509.52	35316.00	0.241 [1]
T10	60 - 50	L3x3x1/4	18.45	9.08	119.3	1.4400	8305.06	46656.00	0.178 [1]
T11	50 - 40	2L3x3x1/4x3/8	19.30	9.50	124.8	2.8800	8498.16	93312.00	0.091 [1]
T12	40 - 20	L3 1/2x3 1/2x1/4	21.03	10.22	114.4	1.6900	9809.34	54756.00	0.179 [1]
T13	20 - 0	L3 1/2x3 1/2x1/4	11.18	10.45	118.7	1.6900	11342.50	54756.00	0.207 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T5	120 - 100	L2 1/2x2 1/2x3/8	10.67	4.97	121.9	1.7300	2651.65	56052.00	0.047 [1] ✓
T9	80 - 60	L3x3x3/8	14.67	6.97	140.0	2.1100	3966.57	68364.00	0.058 [1] ✓
T13	20 - 0	L3 1/2x3 1/2x1/2	20.50	9.76	168.0	3.2500	5748.11	105300.00	0.055 [1] ✓

[1] P_u / ϕP_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 $\frac{P_u}{\phi P_n}$
T4	140 - 120	L2x2x1/4	8.74	8.14	165.7	0.9380	2042.14	30391.20	0.067 [1] ✓
T10	60 - 50	L3x3x7/16	15.48	14.75	199.2	2.4300	4228.45	78732.00	0.054 [1] ✓
T11	50 - 40	L3x3x7/16	16.48	15.75	212.4	2.4300	4549.03	78732.00	0.058 [1] ✓
T12	40 - 20	L3x3x1/2	18.49	17.50	237.4	2.7500	5145.44	89100.00	0.058 [1] ✓

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	185 - 180	L2x2x1/8	5.00	4.56	92.0	0.4844	499.27	15693.80	0.032 [1] ✓
T2	180 - 160	L2x2x1/8	5.00	4.56	92.0	0.4844	415.25	15693.80	0.026 [1] ✓
T3	160 - 140	L2x2x1/8	5.00	4.52	91.2	0.4844	430.71	15693.80	0.027 [1] ✓

[1] P_u / ϕP_n controls

Redundant Horizontal (1) 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 $\frac{P_u}{\phi P_n}$
T5	120 - 100	L3x3x1/2	2.67	2.43	32.5	2.7500	6152.97	89100.00	0.069 [1] ✓
T9	80 - 60	L3x3x1/2	3.67	3.43	45.9	2.7500	5702.46	89100.00	0.064 [1] ✓
T13	20 - 0	L3x3x1/2	5.13	4.77	63.7	2.7500	8493.05	89100.00	0.095 [1] ✓

[1] P_u / ϕP_n controls

Redundant Diagonal (1) 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 $\frac{P_u}{\phi P_n}$
T5	120 - 100	L3x3x1/2	3.07	2.80	37.4	2.7500	3368.11	89100.00	0.038 [1] ✓
T9	80 - 60	L3x3x1/2	4.10	3.85	51.4	2.7500	2882.95	89100.00	0.032 [1] ✓
T13	20 - 0	L3x3x1/2	5.82	5.41	72.3	2.7500	4097.77	89100.00	0.046 [1] ✓

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	185 - 180	Leg	P2x.154	2	-2865.49	31617.20	9.1	Pass
		Diagonal	L2x2x1/8	7	-1531.33	8852.07	17.3	Pass
		Top Girt	L2x2x1/8	5	-352.71	5769.26	6.1	Pass
T2	180 - 160	Leg	P2.5x.203	13	-32249.60	57192.30	56.4	Pass
		Diagonal	L2x2x1/8	19	-5044.28	8913.86	56.6	Pass
		Top Girt	L2x2x1/8	16	-292.19	5769.26	5.1	Pass
T3	160 - 140	Leg	P2.5x.375	43	-78176.20	95225.20	82.1	Pass
		Diagonal	L2x2x1/8	54	-5051.30	7142.85	70.7	Pass
		Top Girt	L2x2x1/8	47	-450.93	5876.09	7.7	Pass
T4	140 - 120	Leg	P3.5x.318	73	-117756.00	158818.00	74.1	Pass
		Diagonal	L2x2x3/16	76	-5633.00	7480.29	75.3	Pass
		Secondary Horizontal	L2x2x1/4	82	-2042.14	8239.59	24.8	Pass
T5	120 - 100	Leg	P5x.258	113	-152902.00	191890.00	79.7	Pass
		Diagonal	L2 1/2x2 1/2x3/16	158	-9186.67	16761.30	54.8	Pass
		Horizontal	L2 1/2x2 1/2x3/8	115	-2651.65	25482.20	10.4	Pass
		Redund Horz 1 Bracing	L3x3x1/2	140	-5508.49	60901.70	9.0	Pass
		Redund Diag 1 Bracing	L3x3x1/2	192	-3897.53	58853.50	6.6	Pass
T6	100 - 93.3333	Leg	P5x.375	233	-167220.00	239388.00	69.9	Pass
		Diagonal	L2 1/2x2 1/2x3/16	236	-6237.77	8645.55	72.1	Pass
T7	93.3333 - 86.6667	Leg	P5x.375	242	-179422.00	239388.00	75.0	Pass
		Diagonal	L2 1/2x2 1/2x3/16	245	-6392.93	7904.00	80.9	Pass
T8	86.6667 - 80	Leg	P5x.375	251	-191700.00	239388.00	80.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Diagonal	2L2 1/2x2 1/2x3/16x3/8	254	-6954.55	32029.30	21.7	Pass
T9	80 - 60	Leg	P5x.375	260	-228725.00	272663.00	83.9	Pass
		Diagonal	L3x3x3/16	305	-9696.07	19110.00	50.7	Pass
		Horizontal	L3x3x3/8	262	-3966.57	23504.60	16.9	Pass
		Redund Horz 1 Bracing	L3x3x1/2	287	-5145.46	55242.90	9.3	Pass
		Redund Diag 1 Bracing	L3x3x1/2	288	-3366.51	52887.70	6.4	Pass
T10	60 - 50	Leg	P5x.5	380	-243825.00	328070.00	74.3	Pass
		Diagonal	L3x3x1/4	383	-9255.88	9604.97	96.4	Pass
		Secondary Horizontal	L3x3x7/16	388	-4228.45	14352.50	29.5	Pass
T11	50 - 40	Leg	P5x.5	392	-262311.00	328178.00	79.9	Pass
		Diagonal	2L3x3x1/4x3/8	395	-9523.27	42286.70	22.5	Pass
		Secondary Horizontal	L3x3x7/16	400	-4549.03	12586.20	36.1	Pass
T12	40 - 20	Leg	P8x.322	404	-296702.00	365926.00	81.1	Pass
		Diagonal	L3 1/2x3 1/2x1/4	407	-11269.20	12214.20	92.3	Pass
		Secondary Horizontal	L3x3x1/2	412	-5145.44	11364.20	45.3	Pass
T13	20 - 0	Leg	P8x.322	425	-331453.00	375086.00	88.4	Pass
		Diagonal	L3 1/2x3 1/2x1/4	470	-13143.40	26464.10	49.7	Pass
		Horizontal	L3 1/2x3 1/2x1/2	427	-5748.11	24993.60	23.0	Pass
		Redund Horz 1 Bracing	L3x3x1/2	452	-7276.22	47690.30	15.3	Pass
		Redund Diag 1 Bracing	L3x3x1/2	453	-5039.48	44081.10	11.4	Pass
							Summary	
						Leg (T13)	88.4	Pass
						Diagonal (T10)	96.4	Pass
						Horizontal (T13)	23.0	Pass
						Secondary Horizontal (T12)	45.3	Pass
						Top Girt (T3)	7.7	Pass
						Redund Horz 1 Bracing (T13)	15.3	Pass
						Redund Diag 1 Bracing (T13)	11.4	Pass
						Bolt Checks	82.5	Pass
						RATING =	**96.4**	**Pass**

Project Information

BU #	28737
Site Name	CT2380

Tower Information

Tower Type	Self Support
TIA-222 Rev	G

Applied Loads

	Comp.	Uplift
Axial (k)	341.89	290.57
Shear (k)	37.03	31.64

Anchor Rod Data

Quantity:	6	
Diameter (in):	1.5	
Material Grade:	A572-50	Fy=50 ksi Fu=65 ksi
Grout Considered:		Grout Considered
l_{ar} (in):		Bending Interaction Not Considered
Eta Factor, η:	0.55	
Thread Type:	N-Included	
Configuration:	Symmetrical	

Anchor Rod Results

Axial, Pu_t (kips)	48.43	
Shear, Vu (kips)	5.27	
Moment, Mu (kip-in)	-	
Axial Cap., φPn_t (kips)	73.32	
Shear Cap., ϕVn (kips)	-	
Moment Cap., ϕMn (kip-in)	-	
Stress Rating	79.1%	**Pass**

SST Unit Base Foundation

Project #:	28737
Site Name:	CT2380

TIA-222 Revision:	G

Tower Centroid Offset?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions		
Global Moment, **M**:	5795.53	ft-kips
Global Axial, **P**:	69.64	kips
Global Shear, **V**:	56.39	kips
Leg Compression, $\mathbf{P_{comp}}$:	341.89	kips
Leg Comp. Shear, $\mathbf{V_{u\_comp}}$:	37.03	kips
Leg Uplift, $\mathbf{P_{uplift}}$:	290.57	kips
Leg Uplift. Shear, $\mathbf{V_{u\_uplift}}$:	31.64	kips
Tower Height, **H**:	185	ft
Base Face Width, **BW**:	21	ft
BP Dist. Above Fdn, $\mathbf{bp_{dist}}$:	1	in

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating**	**Check**
Lateral (Sliding) (kips)	240.19	56.39	**23.5%**	**Pass**
Bearing Pressure (ksf)	9.47	2.04	**21.6%**	**Pass**
*Overturning (kip*ft)*	9467.66	6110.37	**64.5%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	884.58	148.12	**16.7%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	196.87	126.56	**64.3%**	**Pass**
Pier Compression (kip)	4101.51	348.82	**8.5%**	**Pass**
*Pad Flexure (kip*ft)*	3236.15	1305.25	**40.3%**	**Pass**
Pad Shear - 1-way (kips)	393.77	277.79	**70.5%**	**Pass**
Pad Shear - Comp 2-way (ksi)	0.164	0.157	**95.8%**	**Pass**

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	3.5	ft
Ext. Above Grade, **E**:	0.50	ft
Pier Rebar Size, **Sc**:	7	
Pier Rebar Quantity, **mc**:	12	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $\mathbf{cc_{pier}}$:	3	in

Soil Rating:	**64.5%**
Structural Rating:	**95.8%**

Pad Properties		
Depth, **D**:	5.00	ft
Pad Width, **W**:	30.50	ft
Pad Thickness, **T**:	1.50	ft
Pad Rebar Size (Bottom), **Sp**:	10	
Pad Rebar Quantity (Bottom), **mp**:	58	
Pad Clear Cover, $\mathbf{cc_{pad}}$:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	3000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Net Bearing, Qnet:	12.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	32	degrees
SPT Blow Count, $\mathbf{N_{blows}}$:		
Base Friction, μ:		
Neglected Depth, **N**:	3.3	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	11	ft

<-- Toggle between Gross and Net