Date: **August 04, 2020**

Chanhdara Ratsavong
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Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
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Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL02122
	Carrier Site Name:	NORWALK - ROCKLAND ROAD
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	615244
	Crown Castle Work Order Number:	1865544
	Crown Castle Order Number:	525047 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1865544
Site Data:	**50 ROCKLAND ROADNORWALK OFC - MTSO, SO NORWALK, Fairfield County, CT**	
	Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*	
	180 Foot - Self Support Tower	

Dear Chanhdara Ratsavong,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

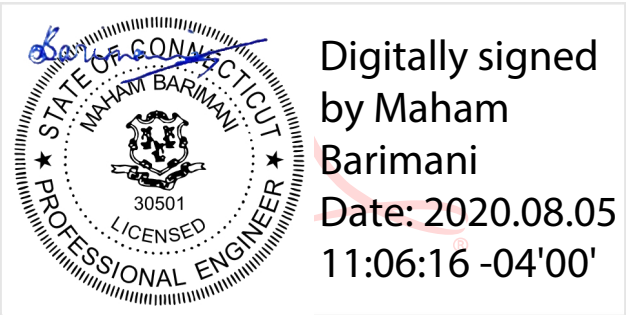
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Travis Bussard

Respectfully submitted by:



Maham Barimani, P.E.
Senior Project Engineer

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1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN. The tower was originally designed for a height of 220 ft but only constructed to a height of 180 ft.

This tower has been modified per reinforcement drawings prepared by Vertical Structures, Inc. in November of 2004. The modifications consist of installation of additional diagonal reinforcement to existing diagonal member from 0' to 20' and 60' to 70' and installation of end bolts for diagonal 20' to 40'.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
161.0	161.0	1	andrew	SBNHH-1D65A	8 6 2	5/8 1-5/8 3/8
		2	cci antennas	HPA-65R-BUU-H6		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		2	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 4426 B66		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 4478 B5		
		1	quintel technology	QS46512-2		
		2	quintel technology	QS66512-2		
		4	raycap	DC6-48-60-18-8F		
		1	tower mounts	Sector Mount [SM 201-3]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	178.0	2	tower mounts	Side Arm Mount [SO 305-1]	-	-
170.0	170.0	1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	6	1-3/8
		1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	AIR 3246 B66_T-MOBILE w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	AIR6449 B41 w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25_CCIV2		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 702-3]		
157.0	157.0	2	andrew	VHLP2-18	2	7983A
		2	tower mounts	Side Arm Mount [SO 203-1]		
148.0	148.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	4	1-1/4
		3	alcatel lucent	800MHZ 2X50W RRH		
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		9	rfs celwave	ACU-A20-N		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 502-3]		
136.0	138.0	1	andrew	VHLP2-23	6 1 2	5-16 1/2 conduit
	136.0	3	argus technologies	LLPX310R w/ Mount Pipe		
		3	samsung telecommunications	RRH-2WB		
		1	tower mounts	Sector Mount [SM 504-3]		
126.0	130.0	1	gps	GPS_A	19 1	1-5/8 1/2
	128.0	3	alcatel lucent	B13 RRH 4X30		
		3	alcatel lucent	B25 RRH2x60 PCS		
		3	alcatel lucent	B66A RRH4X45		
		6	commscope	SBNHH-1D65C w/ Mount Pipe		
		4	decibel	DB844G65ZAXY w/ Mount Pipe		
		2	decibel	DB844H80-XY w/ Mount Pipe		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		3	rymsa wireless	MG D3-800TV w/ Mount Pipe		
	126.0	1	tower mounts	Sector Mount [SM 411-3]		
112.0	112.0	3	kathrein	800 10504 w/ Mount Pipe	-	-
		1	tower mounts	Sector Mount [SM 104-3]		
5.0	6.0	1	decibel	ASPP2933	2	1/4
	5.0	1	gps	GPS_A		
		1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2311843	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Paul J. Ford	821566	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn	392878	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, Inc.	1257479	CCISITES
4-POST-MODIFICATION INSPECTION	All Points Technology Corp.	4065020	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.4), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.851	116.138	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.267	167.901	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.492	167.900	16.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-37.347	167.901	22.2	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-73.804	251.347	29.4	Pass
T6	120 - 100	Leg	ROHN 6 EHS	90	-114.785	288.515	39.8	Pass
T7	100 - 80	Leg	ROHN 6 EH	111	-151.860	318.903	47.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	126	-171.561	405.715	42.3	Pass
T9	70 - 60	Leg	ROHN 8 EHS	135	-191.739	405.715	47.3	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-231.942	405.717	57.2	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-272.078	530.833	51.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-312.291	530.833	58.8	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.439	10.104	24.1 29.2 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.393	19.793	22.2 35.4 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.684	17.900	26.2 37.1 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.411	16.240	33.3 44.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.376	12.489	59.1 61.9 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	94	-8.746	17.566	49.8 65.9 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	115	-9.853	18.890	52.2 66.8 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	130	-10.448	17.632	59.3 69.6 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	139	-11.254	27.539	40.9 52.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	148	-11.850	20.589	57.6 77.9 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	163	-12.580	21.559	58.4 66.0 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	178	-13.964	31.656	44.1 63.0 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.088	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.411	4.069	10.1 12.0 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.391	17.663	2.2 6.6 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.545	3.097	17.6	Pass
							Summary	
						Leg (T12)	58.8	Pass
						Diagonal (T10)	77.9	Pass
						Top Girt (T3)	12.0	Pass
						Mid Girt (T1)	17.6	Pass
						Bolt Checks	77.9	Pass
						Rating =	77.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	23.9	Pass
1	Base Foundation	0	83.9	Pass

Structure Rating (max from all components) =	83.9%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

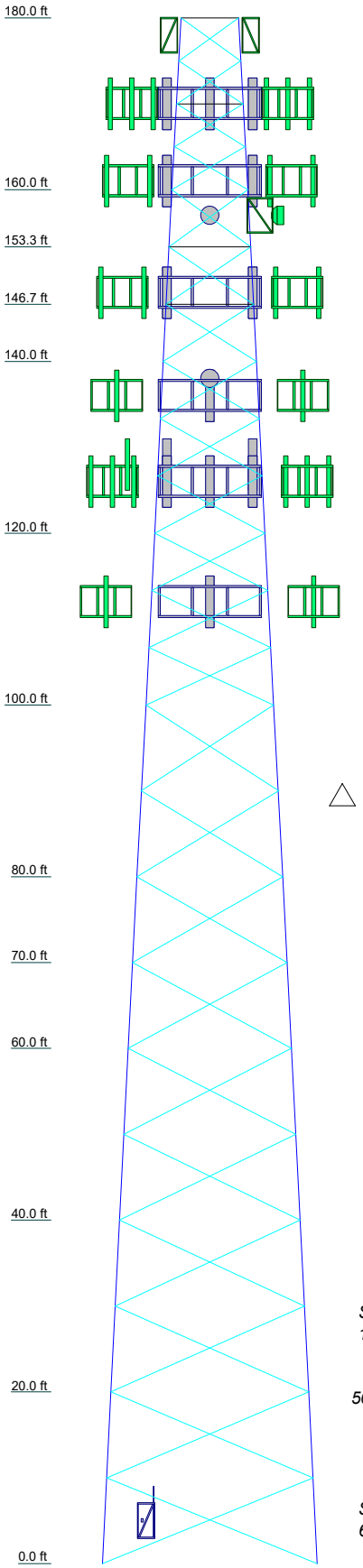
The tower and its foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Legs	ROHN 3 EH	ROHN 4 EH			ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS			ROHN 8 EH	
Leg Grade	A572-50											
Diagonals	L2x2x3/16	L2 1/2x2 1/2x1/4				L3x3x1/4	L3 1/2x3 1/2x1/4		A	L4x4x1/4	L4x4x5/16	2L4x4x5/16x3/8
Diagonal Grade	A36	A572-50						A36		A572-50		A36
Top Girts	L2x2x1/8	N.A.	L2 1/2x2 1/2x1/8			N.A.						
Mid Girts	L2x2x1/8	N.A.										
Face Width (ft)	6.6875	8.76042	9.45052	10.1432	10.8333	12.9167	14.8542	16.9896	17.9948	19	21	23
# Panels @ (ft)	4 @ 5	9 @ 6.66667							10 @ 10			
Weight (K)	1.3	0.6	0.7	0.7	2.4	2.9	3.2	1.8	2.6	3.9	5.2	8.1

33.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

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 C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 77.9%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 322 K
SHEAR: 40 K

UPLIFT: -268 K
SHEAR: 34 K

AXIAL 177 K
SHEAR 19 K
MOMENT 2022 kip-ft

TORQUE 21 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 77 K
SHEAR 65 K
MOMENT 6437 kip-ft

TORQUE 64 kip-ft
REACTIONS - 120 mph WIND

CROWN CASTLE
The pathway to possible

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Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: **BU# 807133**		
Project:		
Client: Crown Castle	Drawn by: Travis Bussard	App'd:
Code: TIA-222-H	Date: 08/04/20	Scale: NTS
Path: R:\SA Models - Letters\Work Area\TBussard\WIP\807133 WO 1865544\Production\Wind\807133.eri		Dwg No. E-1

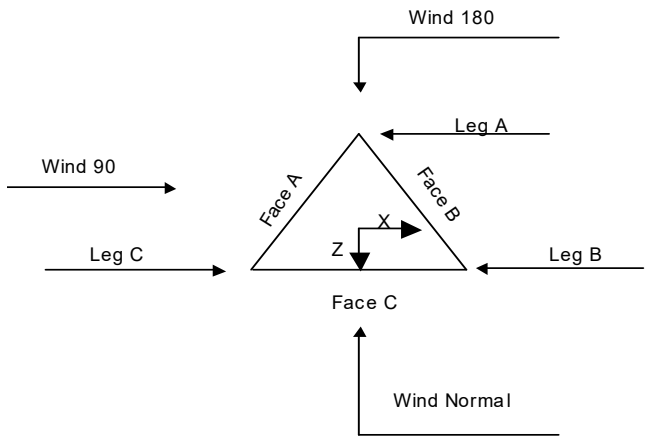
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'8-1/4" at the top and 25' at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Tower base elevation above sea level: 61'.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0'.
9) Nominal ice thickness of 1.500 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.000 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50.000 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) Pressures are calculated at each section.
16) Tower analysis based on target reliabilities in accordance with Annex S.
17) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
18) Stress ratio used in tower member design is 1.05.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	**Poles**
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180'-160'			6'8-1/4"	1	20'
T2	160'-153'4"			8'9-1/8"	1	6'8"
T3	153'4"-146'8"			9'5-13/32"	1	6'8"
T4	146'8"-140'			10'1-23/32"	1	6'8"
T5	140'-120'			10'10"	1	20'
T6	120'-100'			12'11"	1	20'
T7	100'-80'			14'10-1/4"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-15/16"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

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	180'-160'	5'	X Brace	No	No	0.000	0.000
T2	160'-153'4"	6'8"	X Brace	No	No	0.000	0.000
T3	153'4"-146'8"	6'8"	X Brace	No	No	0.000	0.000
T4	146'8"-140'	6'8"	X Brace	No	No	0.000	0.000
T5	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T6	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T7	100'-80'	10'	X Brace	No	No	0.000	0.000
T8	80'-70'	10'	X Brace	No	No	0.000	0.000
T9	70'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000
T12	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'4"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'4"-146'8"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	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 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'4"-146'8"	Equal Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146'8"-140'	Single Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single 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*
T1 180'-160'	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180'-160'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 160'-153'4"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 153'4"-146'8"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 146'8"-140'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 140'-120'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 120'-100'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 100'-80'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 80'-70'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 70'-60'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	120.000	Mid-Pt	Mid-Pt
T10 60'-40'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 40'-20'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 20'-0'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	152.750	Mid-Pt	Mid-Pt

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 180'-160'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 160'-153'4"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 153'4"-146'8"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 146'8"-140'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325N	1	0.625 A325X	0	0.625 A325N	0
T2 160'-153'4"	Flange	0.000 A325N	0	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T3 153'4"-146'8"	Flange	0.000 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T4 146'8"-140'	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T5 140'-120'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T6 120'-100'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T7 100'-80'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T8 80'-70'	Flange	0.000 A325N	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T9 70'-60'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T10 60'-40'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T11 40'-20'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T12 20'-0'	Flange	1.000 A449	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 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 klf
***													
Feedline Ladder (Af)	B	No	No	Af (CaAa)	180' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
***													
HCS 6X12 6AWG(1-3/8)	A	No	No	Ar (CaAa)	170' - 0'	0.000	0.08	6	6	1.380	1.380		0.002
LDF1-50A(1/4)	A	No	No	Ar (CaAa)	5' - 0'	0.000	0.15	2	2	0.345	0.345		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	170' - 0'	0.000	0	1	1	3.000	3.000		0.008
***													
MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	A	No	No	Ar (CaAa)	148' - 0'	0.000	-0.35	4	4	1.250	1.250		0.000
***													
2-1/4" Rigid Conduit	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	2	2	0.850 0.750	2.250		0.003
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.395	1	1	0.630	0.630		0.000
9207(5/16)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	6	6	0.200	0.330		0.001
7983A(ELLIPTICAL)	A	No	No	Ar (CaAa)	157' - 0'	0.000	-0.405	2	1	0.500	0.573		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	160' - 0'	0.000	-0.36	1	1	3.000	3.000		0.008
***													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	180' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
***													
LDF7-50A(1 5/8)	C	No	No	Ar (CaAa)	126' - 0'	-3.000	-0.4	19	12	1.980	1.980		0.001
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	126' - 0'	-1.000	-0.455	1	1	0.500	0.630		0.000
Feedline Ladder (Af)	C	No	No	Af (CaAa)	126' - 0'	-1.000	-0.4	1	1	3.000	3.000		0.008
***													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	161' - 0'	0.000	0.4	1	1	3.000	3.000		0.008
***													
CR 50 1873(1-5/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.34	6	3	0.850 0.750	1.980		0.001
FB-L98-002-XXX(3/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.36	2	1	0.500	0.394		0.000
WR-VG82ST-BRDA(5/8)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	6	6	0.500	0.645		0.000
WR-VG82ST-BRDA(5/8)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	2	2	0.500	0.645		0.000
***													
Safety Line 3/8	B	No	No	Ar (CaAa)	180' - 0'	0.000	0.5	1	1	0.375	0.375		0.000
***													

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 klf
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	0.000	0.000	13.280	0.000	0.186
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	12.283	0.000	0.184
T2	160'-153'4"	A	0.000	0.000	12.607	0.000	0.181
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T3	153'4"-146'8"	A	0.000	0.000	13.617	0.000	0.184
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T4	146'8"-140'	A	0.000	0.000	16.284	0.000	0.193
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T5	140'-120'	A	0.000	0.000	60.228	0.000	0.736
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	81.605	0.000	0.632
T6	120'-100'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T7	100'-80'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T8	80'-70'	A	0.000	0.000	31.536	0.000	0.388
		B	0.000	0.000	5.375	0.000	0.086
		C	0.000	0.000	71.077	0.000	0.485
T9	70'-60'	A	0.000	0.000	31.536	0.000	0.388
		B	0.000	0.000	5.375	0.000	0.086
		C	0.000	0.000	71.077	0.000	0.485
T10	60'-40'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T11	40'-20'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T12	20'-0'	A	0.000	0.000	63.417	0.000	0.776
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	1.502	0.000	0.000	31.386	0.000	0.548
		B		0.000	0.000	22.767	0.000	0.448
		C		0.000	0.000	21.147	0.000	0.447
T2	160'-153'4"	A	1.490	0.000	0.000	28.876	0.000	0.516
		B		0.000	0.000	7.556	0.000	0.148
		C		0.000	0.000	39.448	0.000	0.606
T3	153'4"-146'8"	A	1.483	0.000	0.000	33.094	0.000	0.561
		B		0.000	0.000	7.539	0.000	0.148
		C		0.000	0.000	39.371	0.000	0.604
T4	146'8"-140'	A	1.477	0.000	0.000	41.334	0.000	0.652

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		B		0.000	0.000	7.521	0.000	0.147
		C		0.000	0.000	39.292	0.000	0.601
T5	140'-120'	A	1.462	0.000	0.000	162.299	0.000	2.441
		B		0.000	0.000	22.449	0.000	0.438
		C		0.000	0.000	161.206	0.000	2.683
T6	120'-100'	A	1.438	0.000	0.000	170.879	0.000	2.531
		B		0.000	0.000	22.255	0.000	0.431
		C		0.000	0.000	262.304	0.000	4.719
T7	100'-80'	A	1.410	0.000	0.000	169.592	0.000	2.490
		B		0.000	0.000	22.026	0.000	0.424
		C		0.000	0.000	260.896	0.000	4.658
T8	80'-70'	A	1.384	0.000	0.000	84.222	0.000	1.227
		B		0.000	0.000	10.911	0.000	0.209
		C		0.000	0.000	129.821	0.000	2.302
T9	70'-60'	A	1.364	0.000	0.000	83.780	0.000	1.213
		B		0.000	0.000	10.833	0.000	0.206
		C		0.000	0.000	129.337	0.000	2.281
T10	60'-40'	A	1.329	0.000	0.000	165.970	0.000	2.377
		B		0.000	0.000	21.383	0.000	0.404
		C		0.000	0.000	256.935	0.000	4.487
T11	40'-20'	A	1.263	0.000	0.000	162.996	0.000	2.286
		B		0.000	0.000	20.853	0.000	0.388
		C		0.000	0.000	253.680	0.000	4.349
T12	20'-0'	A	1.132	0.000	0.000	159.736	0.000	2.125
		B		0.000	0.000	19.802	0.000	0.357
		C		0.000	0.000	247.229	0.000	4.082

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180'-160'	2.699	1.392	4.544	2.157
T2	160'-153'4"	-9.056	5.371	-10.517	7.687
T3	153'4"-146'8"	-9.012	5.286	-11.103	7.805
T4	146'8"-140'	-10.599	6.043	-12.907	8.719
T5	140'-120'	-6.663	9.160	-9.623	11.986
T6	120'-100'	5.477	11.992	2.393	15.091
T7	100'-80'	6.309	13.793	2.887	17.353
T8	80'-70'	6.615	14.273	3.160	18.081
T9	70'-60'	6.887	14.824	3.387	18.767
T10	60'-40'	6.972	14.888	3.679	19.282
T11	40'-20'	7.419	15.776	4.270	20.312
T12	20'-0'	7.787	16.487	5.096	20.545

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	4	HCS 6X12 6AWG(1-3/8)	160.00 - 170.00	0.6000	0.6000
T1	9	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	20	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	33	Feedline Ladder (Af)	160.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	35	CR 50 1873(1-5/8)	161.00 160.00 - 161.00	0.6000	0.6000
T1	36	FB-L98-002-XXX(3/8)	160.00 - 161.00	0.6000	0.6000
T1	37	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	38	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	40	Safety Line 3/8	160.00 - 161.00	0.6000	0.6000
T2	2	Feedline Ladder (Af)	153.33 - 180.00	0.6000	0.6000
T2	4	HCS 6X12 6AWG(1-3/8)	153.33 - 160.00	0.6000	0.6000
T2	9	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	17	7983A(ELLIPTICAL)	153.33 - 160.00	0.6000	0.6000
T2	18	Feedline Ladder (Af)	153.33 - 157.00	0.6000	0.6000
T2	20	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	33	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	35	CR 50 1873(1-5/8)	153.33 - 160.00	0.6000	0.6000
T2	36	FB-L98-002-XXX(3/8)	153.33 - 160.00	0.6000	0.6000
T2	37	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	38	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	40	Safety Line 3/8	153.33 - 160.00	0.6000	0.6000
T3	2	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	4	HCS 6X12 6AWG(1-3/8)	146.67 - 153.33	0.6000	0.6000
T3	9	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	146.67 - 148.00	0.6000	0.6000
T3	17	7983A(ELLIPTICAL)	146.67 - 153.33	0.6000	0.6000
T3	18	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	20	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	33	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	35	CR 50 1873(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	36	FB-L98-002-XXX(3/8)	146.67 - 153.33	0.6000	0.6000
T3	37	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	38	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	40	Safety Line 3/8	146.67 - 153.33	0.6000	0.6000
T4	2	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	4	HCS 6X12 6AWG(1-3/8)	140.00 - 146.67	0.6000	0.6000
T4	9	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	140.00 - 146.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	17	7983A(ELLIPTICAL)	140.00 - 146.67	0.6000	0.6000
T4	18	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	20	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	33	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	35	CR 50 1873(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	36	FB-L98-002-XXX(3/8)	140.00 - 146.67	0.6000	0.6000
T4	37	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	38	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	40	Safety Line 3/8	140.00 - 146.67	0.6000	0.6000
T5	2	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	4	HCS 6X12 6AWG(1-3/8)	120.00 - 140.00	0.6000	0.6000
T5	9	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	120.00 - 140.00	0.6000	0.6000
T5	14	2-1/4" Rigid Conduit	120.00 - 136.00	0.6000	0.6000
T5	15	LDF4-50A(1/2)	120.00 - 136.00	0.6000	0.6000
T5	16	9207(5/16)	120.00 - 136.00	0.0000	0.0000
T5	17	7983A(ELLIPTICAL)	120.00 - 140.00	0.6000	0.6000
T5	18	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	20	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	22	LDF7-50A(1 5/8)	120.00 - 126.00	0.6000	0.6000
T5	24	LDF4-50A(1/2)	120.00 - 126.00	0.6000	0.6000
T5	25	Feedline Ladder (Af)	120.00 - 126.00	0.6000	0.6000
T5	33	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	35	CR 50 1873(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	36	FB-L98-002-XXX(3/8)	120.00 - 140.00	0.6000	0.6000
T5	37	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	38	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	40	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	4	HCS 6X12 6AWG(1-3/8)	100.00 - 120.00	0.6000	0.6000
T6	9	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	100.00 - 120.00	0.6000	0.6000
T6	14	2-1/4" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T6	15	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	16	9207(5/16)	100.00 -	0.0000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	17	7983A(ELLIPTICAL)	120.00 100.00 -	0.6000	0.6000
T6	18	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	20	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	22	LDF7-50A(1 5/8)	120.00 100.00 -	0.6000	0.6000
T6	24	LDF4-50A(1/2)	120.00 100.00 -	0.6000	0.6000
T6	25	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	33	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	35	CR 50 1873(1-5/8)	120.00 100.00 -	0.6000	0.6000
T6	36	FB-L98-002-XXX(3/8)	120.00 100.00 -	0.6000	0.6000
T6	37	WR-VG82ST-BRDA(5/8)	120.00 100.00 -	0.6000	0.6000
T6	38	WR-VG82ST-BRDA(5/8)	120.00 100.00 -	0.6000	0.6000
T6	40	Safety Line 3/8	120.00 100.00 -	0.6000	0.6000
T7	2	Feedline Ladder (Af)	120.00 80.00 -	0.6000	0.6000
T7	4	HCS 6X12 6AWG(1-3/8)	100.00 80.00 -	0.6000	0.6000
T7	9	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	12	MLE Hybrid 3Power/6Fiber	100.00 80.00 -	0.6000	0.6000
T7	14	RL 2 10AWG(1-1/4) 2-1/4" Rigid Conduit	100.00 80.00 -	0.6000	0.6000
T7	15	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T7	16	9207(5/16)	100.00 80.00 -	0.0000	0.0000
T7	17	7983A(ELLIPTICAL)	100.00 80.00 -	0.6000	0.6000
T7	18	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	20	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	22	LDF7-50A(1 5/8)	100.00 80.00 -	0.6000	0.6000
T7	24	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T7	25	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	33	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	35	CR 50 1873(1-5/8)	100.00 80.00 -	0.6000	0.6000
T7	36	FB-L98-002-XXX(3/8)	100.00 80.00 -	0.6000	0.6000
T7	37	WR-VG82ST-BRDA(5/8)	100.00 80.00 -	0.6000	0.6000
T7	38	WR-VG82ST-BRDA(5/8)	100.00 80.00 -	0.6000	0.6000
T7	40	Safety Line 3/8	100.00 80.00 -	0.6000	0.6000
T8	2	Feedline Ladder (Af)	100.00 70.00 -	0.6000	0.6000
T8	4	HCS 6X12 6AWG(1-3/8)	80.00 70.00 -	0.6000	0.6000
T8	9	Feedline Ladder (Af)	80.00 70.00 -	0.6000	0.6000
			80.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	70.00 - 80.00	0.6000	0.6000
T8	14	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	15	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	16	9207(5/16)	70.00 - 80.00	0.0000	0.0000
T8	17	7983A(ELLIPTICAL)	70.00 - 80.00	0.6000	0.6000
T8	18	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	20	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	22	LDF7-50A(1 5/8)	70.00 - 80.00	0.6000	0.6000
T8	24	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	25	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	33	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	35	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	36	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.6000	0.6000
T8	37	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	38	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	40	Safety Line 3/8	70.00 - 80.00	0.6000	0.6000
T9	2	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	4	HCS 6X12 6AWG(1-3/8)	60.00 - 70.00	0.6000	0.6000
T9	9	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	60.00 - 70.00	0.6000	0.6000
T9	14	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	15	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	16	9207(5/16)	60.00 - 70.00	0.0000	0.0000
T9	17	7983A(ELLIPTICAL)	60.00 - 70.00	0.6000	0.6000
T9	18	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	20	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	22	LDF7-50A(1 5/8)	60.00 - 70.00	0.6000	0.6000
T9	24	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	25	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	33	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	35	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	36	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.6000	0.6000
T9	37	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	38	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	40	Safety Line 3/8	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			70.00		
T10	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	4	HCS 6X12 6AWG(1-3/8)	40.00 - 60.00	0.6000	0.6000
T10	9	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	40.00 - 60.00	0.6000	0.6000
T10	14	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	15	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	16	9207(5/16)	40.00 - 60.00	0.0000	0.0000
T10	17	7983A(ELLIPTICAL)	40.00 - 60.00	0.6000	0.6000
T10	18	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	20	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	22	LDF7-50A(1 5/8)	40.00 - 60.00	0.6000	0.6000
T10	24	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	25	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	33	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	35	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	36	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T10	37	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	38	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	40	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	4	HCS 6X12 6AWG(1-3/8)	20.00 - 40.00	0.6000	0.6000
T11	9	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	20.00 - 40.00	0.6000	0.6000
T11	14	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	15	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	16	9207(5/16)	20.00 - 40.00	0.0000	0.0000
T11	17	7983A(ELLIPTICAL)	20.00 - 40.00	0.6000	0.6000
T11	18	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	20	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	22	LDF7-50A(1 5/8)	20.00 - 40.00	0.6000	0.6000
T11	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	25	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	33	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	35	CR 50 1873(1-5/8)	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
T11	36	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T11	37	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	38	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	40	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	4	HCS 6X12 6AWG(1-3/8)	0.00 - 20.00	0.6000	0.6000
T12	8	LDF1-50A(1/4)	0.00 - 5.00	0.6000	0.6000
T12	9	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	0.00 - 20.00	0.6000	0.6000
T12	14	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	15	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	16	9207(5/16)	0.00 - 20.00	0.0000	0.0000
T12	17	7983A(ELLIPTICAL)	0.00 - 20.00	0.6000	0.6000
T12	18	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	20	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	22	LDF7-50A(1 5/8)	0.00 - 20.00	0.6000	0.6000
T12	24	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	25	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	33	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	35	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	36	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T12	37	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	38	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	40	Safety Line 3/8	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 K
Side Arm Mount [SO 305-1]	B	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.530 0.780 1.060 1.730	1.520 2.070 2.660 3.910	0.030 0.044 0.064 0.125
Side Arm Mount [SO 305-1]	C	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.530 0.780 1.060 1.730	1.520 2.070 2.660 3.910	0.030 0.044 0.064 0.125
170 AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2"	6.747 7.202	6.070 6.867	0.153 0.214

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	7.648	7.583	0.282
						1" Ice	8.565	9.063	0.441
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR6449 B41 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
AIR6449 B41 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
AIR6449 B41 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RRUS 4415 B25_CCIV2	A	From Leg	4.000 0'	0.000	170'	No Ice	1.843	0.820	0.046
						1/2"	2.012	0.943	0.060

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
RRUS 4415 B25_CCIV2	B	From Leg	4.000	0.000	170'	No Ice	1.843	0.820	0.046
			0'			1/2"	2.012	0.943	0.060
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
RRUS 4415 B25_CCIV2	C	From Leg	4.000	0.000	170'	No Ice	1.843	0.820	0.046
			0'			1/2"	2.012	0.943	0.060
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
Sector Mount [SM 702-3]	C	None		0.000	170'	No Ice	38.890	38.890	1.551
						1/2"	50.400	50.400	2.279
						Ice	61.770	61.770	3.217
						1" Ice	84.350	84.350	5.705
						2" Ice			
161									
HPA-65R-BUU-H6	A	From Leg	4.000	0.000	161'	No Ice	9.220	4.650	0.048
			0'			1/2"	10.000	5.360	0.105
			0'			Ice	10.790	6.090	0.169
						1" Ice	12.430	7.600	0.316
						2" Ice			
HPA-65R-BUU-H6	B	From Leg	4.000	0.000	161'	No Ice	9.220	4.650	0.048
			0'			1/2"	10.000	5.360	0.105
			0'			Ice	10.790	6.090	0.169
						1" Ice	12.430	7.600	0.316
						2" Ice			
SBNHH-1D65A	C	From Leg	4.000	0.000	161'	No Ice	3.080	1.850	0.034
			0'			1/2"	3.400	2.140	0.073
			0'			Ice	3.730	2.450	0.117
						1" Ice	4.410	3.090	0.222
						2" Ice			
QS66512-2	A	From Leg	4.000	0.000	161'	No Ice	4.010	3.370	0.111
			0'			1/2"	4.410	3.760	0.168
			0'			Ice	4.810	4.150	0.232
						1" Ice	5.650	4.970	0.378
						2" Ice			
QS66512-2	B	From Leg	4.000	0.000	161'	No Ice	4.010	3.370	0.111
			0'			1/2"	4.410	3.760	0.168
			0'			Ice	4.810	4.150	0.232
						1" Ice	5.650	4.970	0.378
						2" Ice			
QS46512-2	C	From Leg	4.000	0.000	161'	No Ice	2.910	2.720	0.075
			0'			1/2"	3.210	3.020	0.120
			0'			Ice	3.520	3.330	0.170
						1" Ice	4.170	3.970	0.286
						2" Ice			
RRUS 4426 B66	A	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 4426 B66	B	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 4426 B66	C	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 32 B2	B	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
RRUS 32 B2	A	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
RRUS 32 B2	C	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
DC6-48-60-18-8F	B	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
DC6-48-60-18-8F	C	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
RRUS 11	A	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 11	B	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 11	C	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 32	A	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
RRUS 32	B	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
RRUS 32	C	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
Sector Mount [SM 201-3]	C	None		0.000	161'	No Ice	24.760	24.760	1.083
						1/2"	33.890	33.890	1.524
						Ice	43.000	43.000	2.098
						1" Ice	61.440	61.440	3.639
						2" Ice			
OPA65R-BU6D w/ Mount	A	From Leg	4.000	0.000	161'	No Ice	12.250	6.050	0.089

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0' 0'			1/2" Ice 1" Ice 2" Ice	13.000 13.760 15.340	6.710 7.390 8.790	0.176 0.275 0.508
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.000 13.760 15.340	6.050 6.710 7.390 8.790	0.089 0.176 0.275 0.508
OPA65R-BU4D w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	8.100 8.650 9.210 10.390	4.030 4.500 4.980 5.980	0.081 0.142 0.212 0.380
RRUS 4478 B5	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B5	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B5	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
DC6-48-60-18-8F	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.020 0.042 0.067 0.126
157									
Side Arm Mount [SO 203-1]	A	From Leg	1.500 0' 0'	0.000	157'	No Ice 1/2" Ice 1" Ice 2" Ice	1.780 2.240 2.750 3.890	3.790 4.470 5.210 6.780	0.125 0.153 0.189 0.291
Side Arm Mount [SO 203-1]	B	From Leg	1.500 0' 0'	0.000	157'	No Ice 1/2" Ice 1" Ice 2" Ice	1.780 2.240 2.750 3.890	3.790 4.470 5.210 6.780	0.125 0.153 0.189 0.291
148									
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.077 0.127 0.185 0.331

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.090	2.860	0.077
						1/2" Ice	4.480	3.230	0.127
						1" Ice	4.880	3.610	0.185
						2" Ice	5.710	4.400	0.331
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.090	2.860	0.077
						1/2" Ice	4.480	3.230	0.127
						1" Ice	4.880	3.610	0.185
						2" Ice	5.710	4.400	0.331
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
800MHZ 2X50W RRH	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800MHZ 2X50W RRH	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800MHZ 2X50W RRH	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
						2" Ice	1.115	0.674	0.045
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
						1" Ice	1.115	0.674	0.045

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000	0.000	148'	No Ice	0.660	0.321	0.011
			0'			1/2"	0.763	0.398	0.017
			0'			Ice	0.873	0.483	0.024
						1" Ice	1.115	0.674	0.045
						2" Ice			
(3) ACU-A20-N	A	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
(3) ACU-A20-N	B	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
(3) ACU-A20-N	C	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
Sector Mount [SM 502-3]	C	None		0.000	148'	No Ice	29.820	29.820	1.673
						1/2"	42.210	42.210	2.266
						Ice	54.430	54.430	3.052
						1" Ice	78.490	78.490	5.180
						2" Ice			
136									
LLPX310R w/ Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
LLPX310R w/ Mount Pipe	B	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
LLPX310R w/ Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
RRH-2WB	A	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
RRH-2WB	B	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
RRH-2WB	C	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
J - Box	C	From Leg	0.500	0.000	136'	No Ice	0.667	0.500	0.020
			0'			1/2"	0.770	0.593	0.027
			0'			Ice	0.881	0.693	0.036
						1" Ice	1.126	0.915	0.059
						2" Ice			
(3) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	3.060	3.060	0.090
						2" Ice			
(3) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
(3) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 3" Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	1.767	1.767	0.030
			0'			1/2"	2.129	2.129	0.044
			0'			Ice	2.501	2.501	0.061
						1" Ice	3.272	3.272	0.109
						2" Ice			
6' x 3" Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	1.767	1.767	0.030
			0'			1/2"	2.129	2.129	0.044
			0'			Ice	2.501	2.501	0.061
						1" Ice	3.272	3.272	0.109
						2" Ice			
Sector Mount [SM 504-3]	C	None		0.000	136'	No Ice	31.050	31.050	1.708
						1/2"	43.830	43.830	2.326
						Ice	56.440	56.440	3.143
						1" Ice	81.280	81.280	5.358
						2" Ice			
126									
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
			0'			1/2"	4.955	5.416	0.080
			2'			Ice	5.340	6.040	0.132
						1" Ice	6.137	7.337	0.257
						2" Ice			
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
			0'			1/2"	4.955	5.416	0.080
			2'			Ice	5.340	6.040	0.132
						1" Ice	6.137	7.337	0.257
						2" Ice			
MG D3-800TV w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
MG D3-800TV w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
MG D3-800TV w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	2.240	3.340	0.039
			0'			1/2"	2.610	3.730	0.075
			2'			Ice	2.990	4.130	0.117
						1" Ice	3.780	4.970	0.228
						2" Ice			
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	2.240	3.340	0.039
			0'			1/2"	2.610	3.730	0.075
			2'			Ice	2.990	4.130	0.117
						1" Ice	3.780	4.970	0.228
						2" Ice			
GPS_A	B	From Leg	4.000	0.000	126'	No Ice	0.255	0.255	0.001
			0'			1/2"	0.320	0.320	0.005
			4'			Ice	0.393	0.393	0.010
						1" Ice	0.561	0.561	0.025
						2" Ice			
B25 RRH2x60 PCS	A	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
B25 RRH2x60 PCS	B	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
B25 RRH2x60 PCS	C	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044
			0'			1/2"	5.070	2.193	0.080
			2'			Ice	5.348	2.393	0.120
						1" Ice	5.926	2.815	0.213
						2" Ice			
B66A RRH4X45	A	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B66A RRH4X45	B	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B66A RRH4X45	C	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B13 RRH 4X30	A	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
B13 RRH 4X30	B	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
B13 RRH 4X30	C	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
5' x 2" Pipe Mount	B	From Leg	1.000	0.000	126'	No Ice	1.188	1.188	0.018
			0'			1/2"	1.496	1.496	0.027
			0'			Ice	1.807	1.807	0.040
						1" Ice	2.458	2.458	0.076
						2" Ice			
Sector Mount [SM 411-3]	C	None		0.000	126'	No Ice	20.530	20.530	1.069
						1/2"	28.620	28.620	1.457
						Ice	36.630	36.630	1.972
						1" Ice	52.730	52.730	3.369
						2" Ice			
112									
800 10504 w/ Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
800 10504 w/ Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
800 10504 w/ Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
Sector Mount [SM 104-3]	C	None		0.000	112'	No Ice	30.210	30.210	0.953
						1/2"	38.120	38.120	1.432
						Ice	46.010	46.010	2.031
						1" Ice	62.030	62.030	3.577
						2" Ice			
102									
5									
GPS_A	A	From Face	2.000	0.000	5'	No Ice	0.255	0.255	0.001
			0'			1/2"	0.320	0.320	0.005
			0'			Ice	0.393	0.393	0.010
						1" Ice	0.561	0.561	0.025

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
ASPP2933	A	From Face	0.500	0.000	5'	No Ice	0.196	0.196	0.004
			0'			1/2"	0.320	0.320	0.006
			1'			Ice	0.453	0.453	0.009
						1" Ice	0.748	0.748	0.021
						2" Ice			
3' x 2" Pipe Mount	A	From Face	2.000	0.000	5'	No Ice	0.583	0.583	0.011
			0'			1/2"	0.770	0.770	0.017
			0'			Ice	0.967	0.967	0.024
						1" Ice	1.388	1.388	0.047
						2" Ice			
Side Arm Mount [SO 701-1]	A	From Face	1.500	0.000	5'	No Ice	0.850	1.670	0.065
			0'			1/2"	1.140	2.340	0.079
			0'			Ice	1.430	3.010	0.093
						1" Ice	2.010	4.350	0.121
						2" Ice			
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	3.000	-10.000		157'	2.175	No Ice	3.720	0.031
				0'					1/2" Ice	4.010	0.050
				0'					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
VHLP2-18	B	Paraboloid w/Shroud (HP)	From Leg	3.000	-40.000		157'	2.175	No Ice	3.720	0.031
				0'					1/2" Ice	4.010	0.050
				0'					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
**											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	4.000	50.000		136'	2.175	No Ice	3.720	0.030
				0'					1/2" Ice	4.000	0.030
				2'					1" Ice	4.310	0.040
									2" Ice	4.940	0.070
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice

Comb. No.	Description
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 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 K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	15	5.181	-0.163	0.014
			Max. Compression	31	-10.851	0.080	0.012
			Max. Mx	14	3.457	-0.651	0.067
			Max. My	17	-2.765	-0.020	0.530
			Max. Vy	22	-1.476	0.040	0.002
			Max. Vx	17	1.352	0.002	-0.121
		Diagonal	Max Tension	24	2.498	0.000	0.000
			Max. Compression	25	-2.439	0.000	0.000
			Max. Mx	38	0.293	0.029	-0.004
			Max. My	34	0.640	0.029	0.004
			Max. Vy	38	0.030	0.029	-0.004
			Max. Vx	34	-0.002	0.000	0.000
		Top Girt	Max Tension	3	0.064	0.000	0.000
			Max. Compression	14	-0.088	0.000	0.000
			Max. Mx	26	-0.043	-0.056	0.000
			Max. My	26	-0.044	0.000	0.002
			Max. Vy	26	0.034	0.000	0.000
			Max. Vx	26	0.001	0.000	0.000
		Mid Girt	Max Tension	19	0.533	0.000	0.000
			Max. Compression	22	-0.545	0.000	0.000
			Max. Mx	26	-0.011	-0.075	0.000
			Max. My	26	-0.010	0.000	0.002
			Max. Vy	26	0.039	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	160 - 153.333	Leg	Max Tension	15	10.154	-0.642	0.067
			Max. Compression	10	-17.267	0.181	-0.020
			Max. Mx	14	9.278	-0.651	0.067
			Max. My	17	-2.833	-0.020	0.530
			Max. Vy	22	-0.205	-0.650	-0.049
			Max. Vx	16	0.209	-0.029	0.530
		Diagonal	Max Tension	13	4.209	0.000	0.000
			Max. Compression	12	-4.393	0.000	0.000
			Max. Mx	28	0.461	0.048	0.006
			Max. My	27	-1.301	0.045	-0.008
			Max. Vy	28	0.042	0.048	0.006
			Max. Vx	27	0.003	0.000	0.000
T3	153.333 - 146.667	Leg	Max Tension	15	18.281	-0.208	-0.002
			Max. Compression	10	-27.492	0.434	-0.041
			Max. Mx	6	15.928	0.541	-0.008
			Max. My	20	-4.103	-0.026	0.551
			Max. Vy	6	0.756	-0.454	-0.008
			Max. Vx	13	0.717	-0.016	-0.387
		Diagonal	Max Tension	13	4.401	0.000	0.000
			Max. Compression	12	-4.684	0.000	0.000
			Max. Mx	31	0.692	0.054	-0.008
			Max. My	28	0.707	0.054	-0.008
			Max. Vy	33	0.045	0.054	-0.007
			Max. Vx	28	0.003	0.000	0.000
		Top Girt	Max Tension	14	0.710	0.000	0.000
			Max. Compression	11	-0.411	0.000	0.000
			Max. Mx	26	0.441	-0.131	0.000
			Max. My	26	0.428	0.000	0.004
			Max. Vy	26	0.055	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T4	146.667 - 140	Leg	Max Tension	15	26.214	-0.447	-0.039
			Max. Compression	10	-37.347	0.163	-0.028
			Max. Mx	6	24.417	-0.454	-0.008
			Max. My	12	-5.583	-0.022	-0.387
			Max. Vy	2	0.101	0.435	0.041
			Max. Vx	13	-0.109	-0.016	-0.387
		Diagonal	Max Tension	13	5.273	0.000	0.000
			Max. Compression	12	-5.411	0.000	0.000
			Max. Mx	31	1.119	0.059	-0.008
			Max. My	35	-1.683	0.052	0.009
			Max. Vy	33	0.047	0.058	-0.008
			Max. Vx	35	-0.003	0.000	0.000
		Top Girt	Max Tension	29	0.391	0.000	0.000
			Max. Compression	11	-0.065	0.000	0.000
			Max. Mx	26	0.354	-0.150	0.000
			Max. My	26	0.352	0.000	0.004
			Max. Vy	26	-0.059	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T5	140 - 120	Leg	Max Tension	15	56.111	-0.355	-0.014
			Max. Compression	10	-73.804	0.494	-0.036
			Max. Mx	6	32.463	0.811	0.017
			Max. My	24	-7.420	-0.010	-0.744
			Max. Vy	14	-1.028	-0.363	-0.014
			Max. Vx	24	0.977	-0.041	0.261
		Diagonal	Max Tension	20	7.354	0.000	0.000
			Max. Compression	20	-7.376	0.000	0.000
			Max. Mx	33	1.697	0.082	-0.011
			Max. My	37	-1.898	0.075	0.011
			Max. Vy	33	0.057	0.082	-0.011
			Max. Vx	37	-0.003	0.000	0.000
T6	120 - 100	Leg	Max Tension	15	92.128	-0.427	0.013
			Max. Compression	2	-114.785	0.787	-0.030
			Max. Mx	3	-112.045	0.789	-0.030
			Max. My	12	-10.143	-0.003	-0.729
			Max. Vy	6	-0.462	-0.568	-0.045
			Max. Vx	17	0.462	-0.019	0.425

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	24	8.772	0.000	0.000
			Max. Compression	24	-8.746	0.000	0.000
			Max. Mx	35	2.238	0.123	0.015
			Max. My	37	-2.264	0.110	0.016
			Max. Vy	33	0.075	0.121	-0.014
			Max. Vx	37	-0.004	0.000	0.000
T7	100 - 80	Leg	Max Tension	15	125.000	-0.512	0.048
			Max. Compression	2	-151.860	0.558	-0.036
			Max. Mx	3	-128.449	0.789	-0.030
			Max. My	16	-12.965	-0.023	0.842
			Max. Vy	6	-0.138	-0.754	-0.085
			Max. Vx	16	0.213	-0.023	0.842
		Diagonal	Max Tension	24	9.919	0.000	0.000
			Max. Compression	24	-9.853	0.000	0.000
			Max. Mx	33	2.536	0.193	0.026
			Max. My	37	-0.198	0.186	0.028
			Max. Vy	33	0.097	0.193	0.026
			Max. Vx	31	0.006	0.000	0.000
T8	80 - 70	Leg	Max Tension	15	142.451	-0.597	0.035
			Max. Compression	2	-171.561	2.209	-0.061
			Max. Mx	2	-171.561	2.209	-0.061
			Max. My	16	-15.264	0.061	2.005
			Max. Vy	2	-0.295	2.209	-0.061
			Max. Vx	16	-0.345	0.061	2.005
		Diagonal	Max Tension	24	10.327	0.000	0.000
			Max. Compression	24	-10.448	0.000	0.000
			Max. Mx	33	2.325	0.216	0.026
			Max. My	37	2.098	0.214	0.028
			Max. Vy	33	0.102	0.216	0.026
			Max. Vx	37	-0.005	0.000	0.000
T9	70 - 60	Leg	Max Tension	15	159.870	-1.984	0.057
			Max. Compression	2	-191.739	0.231	-0.016
			Max. Mx	2	-191.523	2.209	-0.061
			Max. My	16	-16.069	0.061	2.005
			Max. Vy	2	0.326	2.209	-0.061
			Max. Vx	4	-0.356	0.056	-1.992
		Diagonal	Max Tension	24	11.087	0.000	0.000
			Max. Compression	24	-11.254	0.000	0.000
			Max. Mx	33	2.615	-0.368	-0.044
			Max. My	31	-3.042	-0.329	0.053
			Max. Vy	33	-0.172	-0.368	-0.044
			Max. Vx	31	-0.009	0.000	0.000
T10	60 - 40	Leg	Max Tension	15	194.498	-1.226	0.033
			Max. Compression	2	-231.942	1.640	-0.048
			Max. Mx	37	11.907	-2.491	0.071
			Max. My	16	-19.125	0.058	1.380
			Max. Vy	37	0.382	-2.491	0.071
			Max. Vx	17	-0.284	-0.019	1.358
		Diagonal	Max Tension	24	11.568	0.000	0.000
			Max. Compression	24	-11.850	0.000	0.000
			Max. Mx	33	2.362	0.291	0.034
			Max. My	31	-3.410	0.255	-0.039
			Max. Vy	33	0.128	0.290	0.037
			Max. Vx	31	0.007	0.000	0.000
T11	40 - 20	Leg	Max Tension	15	228.355	-0.826	0.013
			Max. Compression	2	-272.078	2.755	-0.078
			Max. Mx	37	14.462	-5.832	0.083
			Max. My	12	-22.083	-0.200	-1.444
			Max. Vy	37	0.977	-5.832	0.083
			Max. Vx	16	0.207	-0.201	1.426
		Diagonal	Max Tension	24	12.245	0.000	0.000
			Max. Compression	24	-12.580	0.000	0.000
			Max. Mx	33	1.563	0.389	0.042
			Max. My	31	4.526	0.318	-0.049
			Max. Vy	33	0.147	0.389	0.042
			Max. Vx	31	0.008	0.000	0.000
T12	20 - 0	Leg	Max Tension	15	260.295	-1.078	0.008
			Max. Compression	2	-312.291	0.000	0.000
			Max. Mx	37	21.126	-5.832	0.083

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	12	-26.062	-0.276	-2.817
			Max. Vy	37	-1.145	-5.832	0.083
			Max. Vx	16	0.436	-0.275	2.748
		Diagonal	Max Tension	24	13.387	0.000	0.000
			Max. Compression	2	-13.964	0.000	0.000
			Max. Mx	33	-0.987	-0.838	-0.072
			Max. My	32	8.036	-0.482	0.098
			Max. Vy	33	-0.266	-0.838	-0.072
			Max. Vx	32	-0.014	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	309.069	33.019	-17.843
	Max. H_x	18	309.069	33.019	-17.843
	Max. H_z	5	-221.283	-24.295	15.149
	Min. Vert	7	-247.892	-27.673	14.821
	Min. H_x	7	-247.892	-27.673	14.821
	Min. H_z	18	309.069	33.019	-17.843
Leg B	Max. Vert	10	312.216	-33.559	-17.966
	Max. H_x	23	-252.699	28.269	14.986
	Max. H_z	25	-233.140	25.203	16.799
	Min. Vert	23	-252.699	28.269	14.986
	Min. H_x	10	312.216	-33.559	-17.966
	Min. H_z	12	279.437	-28.788	-18.798
Leg A	Max. Vert	2	322.418	0.357	40.226
	Max. H_x	21	17.501	3.459	1.690
	Max. H_z	2	322.418	0.357	40.226
	Min. Vert	15	-268.182	-0.363	-34.276
	Min. H_x	8	23.596	-3.468	2.300
	Min. H_z	15	-268.182	-0.363	-34.276

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	64.113	0.000	0.000	38.320	6.802	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	76.936	0.067	-64.920	-6425.326	0.846	15.980
0.9 Dead+1.0 Wind 0 deg - No Ice	57.702	0.067	-64.920	-6436.822	-1.195	15.980
1.2 Dead+1.0 Wind 30 deg - No Ice	76.936	29.923	-51.947	-5193.346	-3005.867	64.386
0.9 Dead+1.0 Wind 30 deg - No Ice	57.702	29.923	-51.947	-5204.842	-3007.908	64.386
1.2 Dead+1.0 Wind 60 deg - No Ice	76.936	48.810	-28.300	-2868.824	-5013.164	44.598
0.9 Dead+1.0 Wind 60 deg - No Ice	57.702	48.810	-28.300	-2880.319	-5015.204	44.598
1.2 Dead+1.0 Wind 90 deg - No Ice	76.936	54.830	-0.030	44.366	-5703.687	35.646
0.9 Dead+1.0 Wind 90 deg - No Ice	57.702	54.830	-0.030	32.870	-5705.727	35.646
1.2 Dead+1.0 Wind 120 deg - No Ice	76.936	52.715	30.521	3150.788	-5345.151	51.244
0.9 Dead+1.0 Wind 120 deg - No Ice	57.702	52.715	30.521	3139.292	-5347.192	51.244
1.2 Dead+1.0 Wind 150 deg	76.936	31.529	54.788	5536.059	-3148.539	28.760

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
- No Ice						
0.9 Dead+1.0 Wind 150 deg - No Ice	57.702	31.529	54.788	5524.563	-3150.580	28.760
1.2 Dead+1.0 Wind 180 deg - No Ice	76.936	-0.075	61.489	6234.232	16.315	-15.697
0.9 Dead+1.0 Wind 180 deg - No Ice	57.702	-0.075	61.489	6222.737	14.275	-15.697
1.2 Dead+1.0 Wind 210 deg - No Ice	76.936	-29.979	52.006	5294.140	3030.452	-64.243
0.9 Dead+1.0 Wind 210 deg - No Ice	57.702	-29.979	52.006	5282.644	3028.412	-64.243
1.2 Dead+1.0 Wind 240 deg - No Ice	76.936	-51.874	30.086	3112.935	5288.340	-44.642
0.9 Dead+1.0 Wind 240 deg - No Ice	57.702	-51.874	30.086	3101.440	5286.299	-44.642
1.2 Dead+1.0 Wind 270 deg - No Ice	76.936	-54.894	0.041	49.026	5729.592	-35.566
0.9 Dead+1.0 Wind 270 deg - No Ice	57.702	-54.894	0.041	37.530	5727.551	-35.566
1.2 Dead+1.0 Wind 300 deg - No Ice	76.936	-49.736	-28.738	-2907.095	5115.325	-51.329
0.9 Dead+1.0 Wind 300 deg - No Ice	57.702	-49.736	-28.738	-2918.591	5113.284	-51.329
1.2 Dead+1.0 Wind 330 deg - No Ice	76.936	-31.529	-54.751	-5438.062	3165.087	-29.021
0.9 Dead+1.0 Wind 330 deg - No Ice	57.702	-31.529	-54.751	-5449.558	3163.046	-29.021
1.2 Dead+1.0 Ice+1.0 Temp	177.116	0.000	-0.000	178.940	-7.139	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	177.116	0.015	-18.727	-1697.103	-8.773	1.136
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	177.116	8.674	-15.045	-1352.783	-889.473	12.852
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	177.116	14.175	-8.208	-672.745	-1476.897	12.874
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	177.116	16.620	-0.007	178.525	-1734.219	14.756
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	177.116	15.569	9.005	1099.058	-1596.186	20.902
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	177.116	9.203	15.975	1792.484	-936.186	16.134
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	177.116	-0.017	18.200	2012.810	-5.322	-1.076
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	177.116	-8.686	15.058	1712.555	876.967	-12.821
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	177.116	-14.652	8.487	1053.985	1502.082	-12.883
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	177.116	-16.633	0.009	179.661	1721.995	-14.739
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	177.116	-15.111	-8.726	-717.908	1545.169	-20.919
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	177.116	-9.203	-15.967	-1433.316	921.956	-16.190
Dead+Wind 0 deg - Service	64.113	0.018	-17.084	-1664.657	4.876	4.205
Dead+Wind 30 deg - Service	64.113	7.875	-13.670	-1340.451	-786.364	16.944
Dead+Wind 60 deg - Service	64.113	12.845	-7.447	-728.735	-1314.600	11.736
Dead+Wind 90 deg - Service	64.113	14.429	-0.008	37.894	-1496.316	9.381
Dead+Wind 120 deg - Service	64.113	13.872	8.032	855.373	-1401.965	13.485
Dead+Wind 150 deg - Service	64.113	8.297	14.418	1483.076	-823.909	7.568
Dead+Wind 180 deg - Service	64.113	-0.020	16.181	1666.806	8.947	-4.131
Dead+Wind 210 deg - Service	64.113	-7.889	13.686	1419.413	802.141	-16.906
Dead+Wind 240 deg - Service	64.113	-13.651	7.917	845.412	1396.322	-11.748
Dead+Wind 270 deg - Service	64.113	-14.446	0.011	39.120	1512.441	-9.359
Dead+Wind 300 deg -	64.113	-13.089	-7.563	-738.806	1350.792	-13.508

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 330 deg - Service	64.113	-8.297	-14.408	-1404.850	837.571	-7.637

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-64.113	0.000	0.000	64.113	0.000	0.000%
2	0.067	-76.936	-64.920	-0.067	76.936	64.920	0.000%
3	0.067	-57.702	-64.920	-0.067	57.702	64.920	0.000%
4	29.923	-76.936	-51.947	-29.923	76.936	51.947	0.000%
5	29.923	-57.702	-51.947	-29.923	57.702	51.947	0.000%
6	48.810	-76.936	-28.300	-48.810	76.936	28.300	0.000%
7	48.810	-57.702	-28.300	-48.810	57.702	28.300	0.000%
8	54.830	-76.936	-0.030	-54.830	76.936	0.030	0.000%
9	54.830	-57.702	-0.030	-54.830	57.702	0.030	0.000%
10	52.715	-76.936	30.521	-52.715	76.936	-30.521	0.000%
11	52.715	-57.702	30.521	-52.715	57.702	-30.521	0.000%
12	31.529	-76.936	54.788	-31.529	76.936	-54.788	0.000%
13	31.529	-57.702	54.788	-31.529	57.702	-54.788	0.000%
14	-0.075	-76.936	61.489	0.075	76.936	-61.489	0.000%
15	-0.075	-57.702	61.489	0.075	57.702	-61.489	0.000%
16	-29.979	-76.936	52.006	29.979	76.936	-52.006	0.000%
17	-29.979	-57.702	52.006	29.979	57.702	-52.006	0.000%
18	-51.874	-76.936	30.086	51.874	76.936	-30.086	0.000%
19	-51.874	-57.702	30.086	51.874	57.702	-30.086	0.000%
20	-54.894	-76.936	0.041	54.894	76.936	-0.041	0.000%
21	-54.894	-57.702	0.041	54.894	57.702	-0.041	0.000%
22	-49.736	-76.936	-28.738	49.736	76.936	28.738	0.000%
23	-49.736	-57.702	-28.738	49.736	57.702	28.738	0.000%
24	-31.529	-76.936	-54.751	31.529	76.936	54.751	0.000%
25	-31.529	-57.702	-54.751	31.529	57.702	54.751	0.000%
26	0.000	-177.116	0.000	0.000	177.116	0.000	0.000%
27	0.015	-177.116	-18.727	-0.015	177.116	18.727	0.000%
28	8.674	-177.116	-15.045	-8.674	177.116	15.045	0.000%
29	14.175	-177.116	-8.208	-14.175	177.116	8.208	0.000%
30	16.620	-177.116	-0.007	-16.620	177.116	0.007	0.000%
31	15.569	-177.116	9.005	-15.569	177.116	-9.005	0.000%
32	9.203	-177.116	15.975	-9.203	177.116	-15.975	0.000%
33	-0.017	-177.116	18.200	0.017	177.116	-18.200	0.000%
34	-8.686	-177.116	15.058	8.686	177.116	-15.058	0.000%
35	-14.652	-177.116	8.487	14.652	177.116	-8.487	0.000%
36	-16.633	-177.116	0.009	16.633	177.116	-0.009	0.000%
37	-15.111	-177.116	-8.726	15.111	177.116	8.726	0.000%
38	-9.203	-177.116	-15.967	9.203	177.116	15.967	0.000%
39	0.018	-64.113	-17.084	-0.018	64.113	17.084	0.000%
40	7.875	-64.113	-13.670	-7.875	64.113	13.670	0.000%
41	12.845	-64.113	-7.447	-12.845	64.113	7.447	0.000%
42	14.429	-64.113	-0.008	-14.429	64.113	0.008	0.000%
43	13.872	-64.113	8.032	-13.872	64.113	-8.032	0.000%
44	8.297	-64.113	14.418	-8.297	64.113	-14.418	0.000%
45	-0.020	-64.113	16.181	0.020	64.113	-16.181	0.000%
46	-7.889	-64.113	13.686	7.889	64.113	-13.686	0.000%
47	-13.651	-64.113	7.917	13.651	64.113	-7.917	0.000%
48	-14.446	-64.113	0.011	14.446	64.113	-0.011	0.000%
49	-13.089	-64.113	-7.563	13.089	64.113	7.563	0.000%
50	-8.297	-64.113	-14.408	8.297	64.113	14.408	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.889	44	0.121	0.014
T2	160 - 153.333	2.377	44	0.119	0.014
T3	153.333 - 146.667	2.206	44	0.117	0.013
T4	146.667 - 140	2.039	44	0.115	0.013
T5	140 - 120	1.874	44	0.111	0.013
T6	120 - 100	1.405	44	0.099	0.012
T7	100 - 80	0.989	44	0.083	0.011
T8	80 - 70	0.648	44	0.066	0.009
T9	70 - 60	0.502	44	0.058	0.007
T10	60 - 40	0.380	44	0.049	0.007
T11	40 - 20	0.179	44	0.031	0.004
T12	20 - 0	0.050	39	0.016	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	44	2.838	0.121	0.014	Inf
170'	AIR 32 B2A/B66AA w/ Mount Pipe	44	2.634	0.120	0.014	Inf
161'	HPA-65R-BUU-H6	44	2.403	0.119	0.014	954224
157'	VHLP2-18	44	2.300	0.118	0.013	278575
148'	APXVTM14-ALU-I20 w/ Mount Pipe	44	2.072	0.115	0.013	201911
138'	VHLP2-23	44	1.825	0.110	0.012	126725
136'	LLPX310R w/ Mount Pipe	44	1.777	0.109	0.012	120741
126'	(2) DB844G65ZAXY w/ Mount Pipe	44	1.541	0.103	0.012	102051
112'	800 10504 w/ Mount Pipe	44	1.230	0.093	0.012	73532
5'	GPS_A	39	0.009	0.004	0.000	192531

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	10.963	3	0.456	0.055
T2	160 - 153.333	9.023	3	0.451	0.052
T3	153.333 - 146.667	8.376	3	0.444	0.050
T4	146.667 - 140	7.741	3	0.434	0.049
T5	140 - 120	7.116	3	0.420	0.048
T6	120 - 100	5.338	3	0.374	0.046
T7	100 - 80	3.763	3	0.313	0.041
T8	80 - 70	2.468	3	0.250	0.033
T9	70 - 60	1.915	3	0.220	0.028
T10	60 - 40	1.453	3	0.187	0.025
T11	40 - 20	0.685	3	0.118	0.015
T12	20 - 0	0.192	3	0.061	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	3	10.769	0.456	0.054	647233
170'	AIR 32 B2A/B66AA w/ Mount Pipe	3	9.994	0.455	0.054	323617
161'	HPA-65R-BUU-H6	3	9.121	0.452	0.052	312107
157'	VHLP2-18	3	8.731	0.448	0.051	77350
148'	APXVTM14-ALU-I20 w/ Mount Pipe	3	7.867	0.436	0.049	54648
138'	VHLP2-23	3	6.931	0.415	0.047	33563
136'	LLPX310R w/ Mount Pipe	3	6.748	0.411	0.047	31952
126'	(2) DB844G65ZAXY w/ Mount Pipe	3	5.854	0.389	0.046	26961
112'	800 10504 w/ Mount Pipe	3	4.677	0.351	0.044	19479
5'	GPS_A	3	0.033	0.016	0.001	50488

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.875	4	1.295	41.556	0.031	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	2.498	8.135	0.307	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.064	5.423	0.012	1.05	Member Block Shear
		Mid Girt	A325N	0.625	1	0.533	5.423	0.098	1.05	Member Block Shear
T2	160	Diagonal	A325N	0.625	1	4.209	11.310	0.372	1.05	Member Bearing
T3	153.333	Diagonal	A325N	0.625	1	4.401	11.310	0.389	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.710	5.655	0.126	1.05	Member Bearing
T4	146.667	Leg	A325N	1.000	4	6.554	54.517	0.120	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	5.273	11.310	0.466	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.391	5.655	0.069	1.05	Member Bearing
T5	140	Leg	A325N	1.000	6	9.352	54.517	0.172	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.354	11.310	0.650	1.05	Member Bearing
T6	120	Leg	A325N	1.000	6	15.355	54.517	0.282	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	8.772	12.675	0.692	1.05	Member Bearing
T7	100	Leg	A325N	1.000	8	15.625	54.517	0.287	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.919	14.137	0.702	1.05	Member Bearing
T8	80	Diagonal	A325N	0.750	1	10.327	14.137	0.730	1.05	Member Bearing
T9	70	Leg	A325N	1.000	8	19.984	54.517	0.367	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.087	20.227	0.548	1.05	Gusset Bearing
T10	60	Leg	A325N	1.000	8	24.312	54.517	0.446	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.568	14.137	0.818	1.05	Member Bearing
T11	40	Leg	A325N	1.000	8	28.544	54.517	0.524	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	12.245	17.672	0.693	1.05	Member Bearing
T12	20	Diagonal	A325N	0.750	1	13.387	20.227	0.662	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16''	5'3/32"	52.9 K=1.00	3.016	-10.851	110.608	0.098 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-17.267	159.906	0.108 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-27.492	159.905	0.172 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-37.347	159.906	0.234 [1]
T5	140 - 120	ROHN 5 EH	20'7/16''	6'8-5/32"	43.6 K=1.00	6.112	-73.804	239.378	0.308 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0 K=1.00	6.713	-114.785	274.776	0.418 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32''	54.8 K=1.00	8.405	-151.860	303.717	0.500 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32''	10'7/32''	41.2 K=1.00	9.719	-171.561	386.395	0.444 [1]
T9	70 - 60	ROHN 8 EHS	10'7/32''	10'7/32''	41.2 K=1.00	9.719	-191.739	386.395	0.496 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32''	41.2 K=1.00	9.719	-231.942	386.397	0.600 [1]
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32''	41.8 K=1.00	12.763	-272.078	505.555	0.538 [1]
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32''	41.8 K=1.00	12.763	-312.291	505.555	0.618 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8"	4'9-15/32"	145.8 K=1.00	0.715	-2.439	9.623	0.253 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	134.4 K=1.00	1.190	-4.393	18.851	0.233 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	141.4 K=1.00	1.190	-4.684	17.047	0.275 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	148.4 K=1.00	1.190	-5.411	15.466	0.350 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-3/32"	169.2 K=1.00	1.190	-7.376	11.895	0.620 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	157.0 K=1.00	1.440	-8.746	16.730	0.523 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	164.0 K=1.00	1.690	-9.853	17.990	0.548 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	169.7 K=1.00	1.690	-10.448	16.792	0.622 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32"	10'3-3/32"	189.4 K=1.00	3.380	-11.254	26.228	0.429 [1]
T10	60 - 40	2L 'a' > 58.773 in - 139 L4x4x1/4	22'9-23/32"	11'1-25/32"	168.3 K=1.00	1.940	-11.850	19.609	0.604 [1]
T11	40 - 20	L4x4x5/16	24'7-1/2"	12'11/16"	182.9 K=1.00	2.400	-12.580	20.532	0.613 [1]
T12	20 - 0	2L4x4x5/16x3/8	26'5-9/16"	12'11-3/4"	211.6 K=1.00	4.800	-13.964	30.149	0.463 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		2L 'a' > 74.511 in - 178							

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	185.5 K=1.00	0.484	-0.088	4.028	0.022 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 48	9'5-13/32"	8'9-29/32"	212.2 K=1.00	0.609	-0.411	3.875	0.106 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 60	10'1-23/32"	9'6-7/32"	228.8 K=1.00	0.609	-0.065	3.331	0.020 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8 KL/R > 200 (C) - 9	7'8-11/16"	7'2-3/16"	216.8 K=1.00	0.484	-0.545	2.950	0.185 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16''	5'3/32"	52.9	3.016	5.181	135.717	0.038 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	10.154	198.335	0.051 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	18.281	198.335	0.092 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	26.214	198.335	0.132 [1]
T5	140 - 120	ROHN 5 EH	20'7/16''	6'8-5/32"	43.6	6.112	56.111	275.039	0.204 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0	6.713	92.128	302.097	0.305 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32''	54.8	8.405	125.000	378.222	0.330 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32''	10'7/32''	41.2	9.719	142.451	437.369	0.326 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	70 - 60	ROHN 8 EHS	10'7/32''	10'7/32''	41.2	9.719	159.870	437.369	0.366 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32''	10'7/32''	41.2	9.719	194.498	437.369	0.445 [1]
T11	40 - 20	ROHN 8 EH	20'13/32''	10'7/32''	41.8	12.763	228.355	574.322	0.398 [1]
T12	20 - 0	ROHN 8 EH	20'13/32''	10'7/32''	41.8	12.763	260.295	574.322	0.453 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8''	4'9-15/32''	95.6	0.431	2.498	18.739	0.133 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16''	5'6''	87.8	0.752	4.209	32.707	0.129 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32''	5'9-13/32''	92.2	0.752	4.401	32.707	0.135 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32''	6'7/8''	96.7	0.752	5.273	32.707	0.161 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4''	6'11-3/32''	110.0	0.752	7.354	32.707	0.225 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8''	7'8-29/32''	101.5	0.939	8.772	45.794	0.192 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32''	9'5-25/32''	105.9	1.103	9.919	53.793	0.184 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16''	9'9-25/32''	109.6	1.103	10.327	53.793	0.192 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32''	10'3-3/32''	114.4	2.207	11.087	95.999	0.115 [1]
T10	60 - 40	2L 'a' > 58.773 in - 138 L4x4x1/4	22'9-23/32''	11'1-25/32''	108.3	1.291	11.568	62.933	0.184 [1]
T11	40 - 20	L4x4x5/16	24'7-1/2''	12'11/16''	118.0	1.595	12.245	77.752	0.157 [1]
T12	20 - 0	2L4x4x5/16x3/8	26'5-9/16''	12'11-3/4''	126.9	3.190	13.387	138.758	0.096 [1]
		2L 'a' > 74.511 in - 177							

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4''	6'1-3/4''	122.6	0.293	0.064	12.744	0.005 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/32''	8'9-29/32''	138.3	0.387	0.710	16.822	0.042 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8	10'1-23/32''	9'6-7/32''	148.9	0.387	0.391	16.822	0.023 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16"	142.4	0.293	0.533	12.744	0.042 [1]

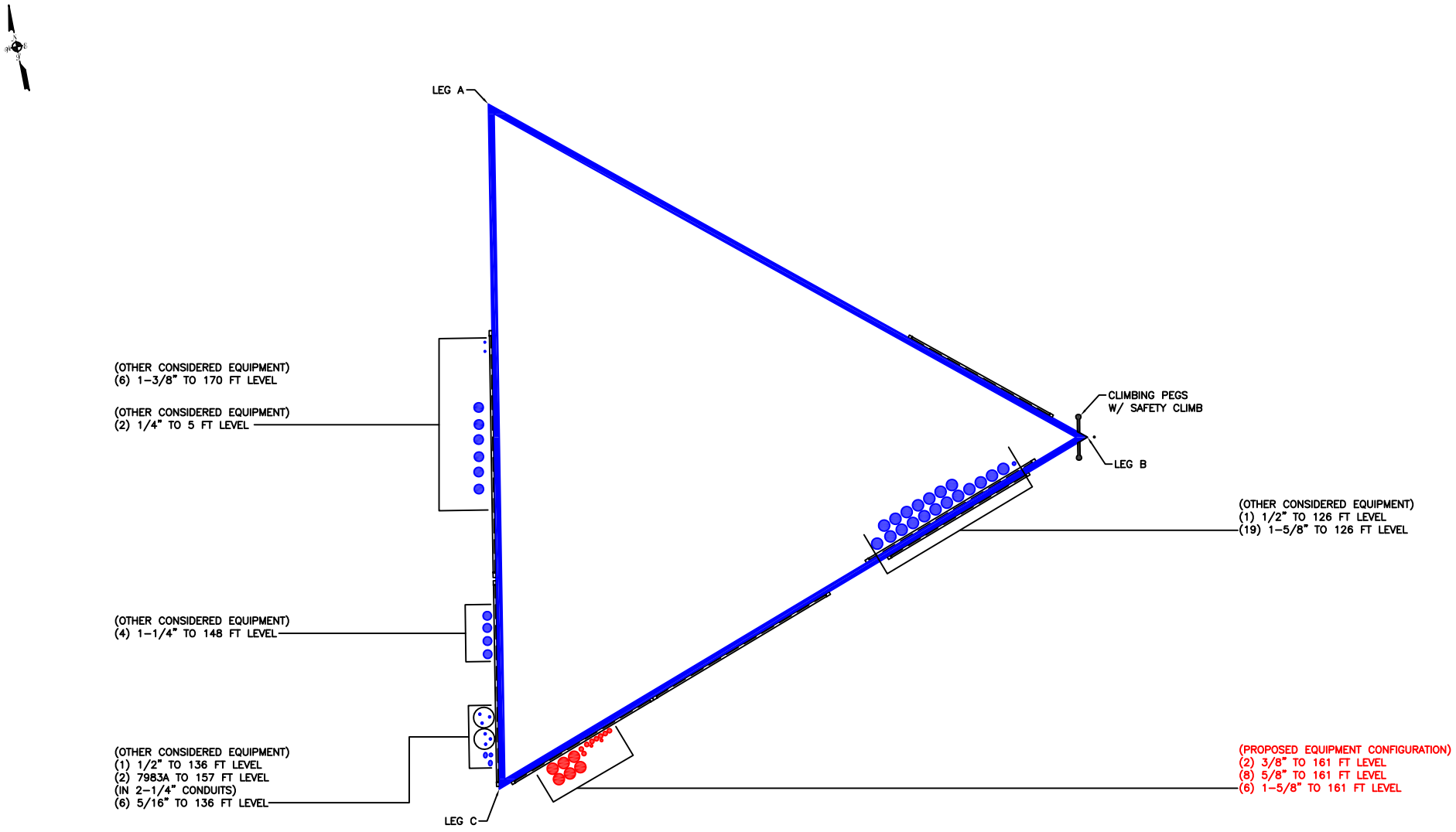
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.851	116.138	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.267	167.901	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.492	167.900	16.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-37.347	167.901	22.2	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-73.804	251.347	29.4	Pass
T6	120 - 100	Leg	ROHN 6 EHS	90	-114.785	288.515	39.8	Pass
T7	100 - 80	Leg	ROHN 6 EH	111	-151.860	318.903	47.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	126	-171.561	405.715	42.3	Pass
T9	70 - 60	Leg	ROHN 8 EHS	135	-191.739	405.715	47.3	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-231.942	405.717	57.2	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-272.078	530.833	51.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-312.291	530.833	58.8	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.439	10.104	24.1 29.2 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.393	19.793	22.2 35.4 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.684	17.900	26.2 37.1 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.411	16.240	33.3 44.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.376	12.489	59.1 61.9 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	94	-8.746	17.566	49.8 65.9 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	115	-9.853	18.890	52.2 66.8 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	130	-10.448	17.632	59.3 69.6 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	139	-11.254	27.539	40.9 52.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	148	-11.850	20.589	57.6 77.9 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	163	-12.580	21.559	58.4 66.0 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	178	-13.964	31.656	44.1 63.0 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.088	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.411	4.069	10.1 12.0 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.391	17.663	2.2 6.6 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.545	3.097	17.6	Pass
						Summary		
						Leg (T12)	58.8	Pass
						Diagonal (T10)	77.9	Pass
						Top Girt (T3)	12.0	Pass
						Mid Girt (T1)	17.6	Pass
						Bolt Checks	77.9	Pass
						RATING =	**77.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


LEG A
(OTHER CONSIDERED EQUIPMENT)
(6) 1-3/8" TO 170 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/4" TO 5 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
LEG B
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 126 FT LEVEL
(19) 1-5/8" TO 126 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 148 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 136 FT LEVEL
(2) 7983A TO 157 FT LEVEL
(IN 2-1/4" CONDUITS)
(6) 5/16" TO 136 FT LEVEL
LEG C
(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 161 FT LEVEL
(8) 5/8" TO 161 FT LEVEL
(6) 1-5/8" TO 161 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	807133
Site Name	BRG 134 943057
Order #	525047, Rev. 0

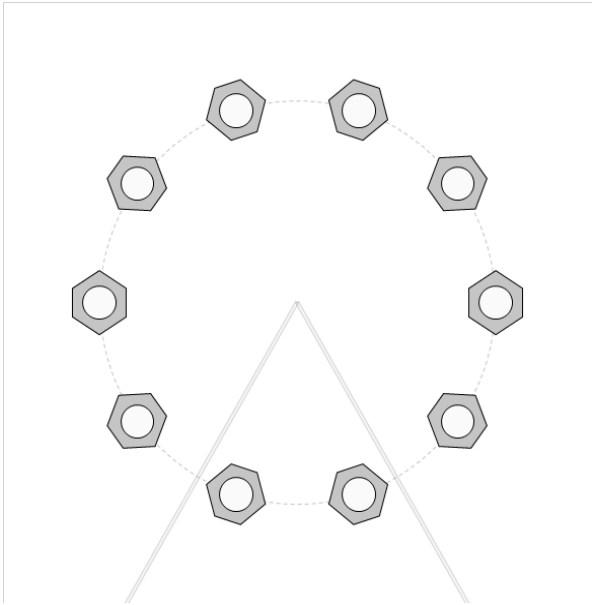
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	0.00	268.00
Shear Force (kips)	0.00	34.00

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(10) 1" ø bolts (A449 N; Fy=92 ksi, Fu=120 ksi)

l_{ar} *(in): 0*

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 26.8	ϕPn_t = 54.54	**Stress Rating**
Vu = 3.4	ϕVn = 35.34	**23.9%**
Mu = n/a	ϕMn = n/a	**Pass**

Foundation Analysis - Rock Anchors

Applied Loads:

$U := 268kip$ — Uplift Force per Leg

$C := 322kip$ — Compression Force per Leg

$d_{pier} := 9ft$ $b_{pier} := 6.25ft$ — Pier Dimensions

$L_{pier} := 9ft$ — Pier Length

$n := 4$ — Number of Anchors

$W_{conc} := \gamma_c \cdot L_{pier} \cdot d_{pier} \cdot b_{pier} = 75.94 \cdot kip$ — Pier Weight

$R_u := U - 0.9 \cdot W_{conc} = 199.66 \cdot kip$ — Applied Uplift Force

$R_c := C + 1.2 \cdot W_{conc} = 413.13 \cdot kip$ — Applied Compression Force

Compression Analysis:

$q_{ult} := 30ksf$ — Ultimate Bearing Capacity

$\phi := 0.75$ — Bearing Strength Reduction Factor

$A_{bearing} := d_{pier} \cdot b_{pier} = 56.25\ ft^2$ — Bearing Area

$R_{n_bearing} := q_{ult} \cdot A_{bearing} = 1687.5 \cdot kip$ — Nominal Bearing Capacity

$\phi R_{n_bearing} := \phi \cdot R_{n_bearing} = 1265.63 \cdot kip$ — Bearing Capacity

$R_c = 413.13 \cdot kip$ — Applied Compression Force

$$Compression := \frac{R_c}{\phi R_{n_bearing}} = 32.64 \cdot \%$$ — Bearing Stress Rating

Lateral Analysis:

$\mu := 0.3$ — Sliding Friction Factor

$\phi := 0.75$ — Sliding Strength Reduction Factor

$R_v := 44kip$ — Compression Shear per Leg

$R_c = 413.13 \cdot kip$ — Applied Compression Force per Leg

$R_s := R_c \cdot \mu = 123.94 \cdot kip$ — Nominal Lateral Resistance

$\phi R_s := \phi \cdot R_s = 92.95 \cdot kip$ — Lateral Resistance

$$Lateral := \frac{R_v}{\phi R_s} = 47.34 \cdot \%$$ — Lateral Stress Rating

Uplift Analysis:

8.1.a Steel Anchor Nominal Tensile Strength:

$F_u := 90ksi$ — A615 Gr. 60 Rebar

$A_{net} := 1.56in^2$ — #11 Rebar

$R_u = 199.66 \cdot kip$ — Uplift Force per Leg

$R_{n_steel} := F_u \cdot A_{net} = 140.4 \cdot kip$ — Nominal Steel Anchor Strength per Anchor

8.1.b Steel-to-Grout Nominal Bonding Strength:

$L := 8.5ft$ — Embedded Length

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$f_c := 4000psi$ — Grout Compressive Strength (Assumed)

$A_s := \pi \cdot d_{hole} \cdot \left(\frac{L}{\cos(\theta)}\right) = 721 \cdot in^2$ — Rebar Surface Area

$F_{s_g} := 6 \cdot \sqrt{f_c} \cdot \sqrt{psi} = 379.47 \cdot psi$ — Steel-to-Grout Bond Strength

$R_{n_steel_to_grout} := A_s \cdot F_{s_g} = 273.6 \cdot kip$ — Nominal Steel-to-Grout Bond Strength per Anchor

8.1.c Grout-Rock Nominal Bonding Strength:

$L_{rock} := 8.5ft$ — Length of Embedment Into Rock Layer

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$F_{r_g} := 110psi$ — Grout-Rock Bond Strength

$A_b := \pi \cdot d_{hole} \cdot \left(\frac{L_{rock}}{\cos(\theta)}\right) = 721 \cdot in^2$ — Grout Surface Area

$R_{n_rock_grout} := F_{r_g} \cdot A_b = 79.31 \cdot kip$ — Nominal Grout-Rock Bond Strength per Anchor

8.1.d Nominal Weight of Rock Prism

$L_{eff} := 11.25\,ft$ — Effective Embedment Length Into Rock

$d_{anchors} := 2.083\,ft$ — Diameter of Anchor Group @ Effective Embedment (Assumed)

$\phi_{rock} := 40°$ — Interal Friction Angle of Rock

$\gamma_{rock} := 140\,pcf$ — Unit Weight of Rock

$h_{soil} := 20\,ft$ — Soil Layer Height

$\phi_{soil} := 40°$ — Internal Friction Angle of Soil

$\gamma_{soil} := 135\,pcf$ — Unit Weight of Soil

$d_1 := d_{anchors} = 2.083\ ft$ — Diameter of Anchor Group @ Effective Embedment

$d_2 := 2 \cdot L_{eff} \cdot \tan(\phi_{rock}) + d_{anchors} = 20.96\ ft$ — Diameter @ Top of Rock Layer

$d_3 := d_2 + 2 \cdot h_{soil} \cdot \tan(\phi_{soil}) = 54.53\ ft$ — Diameter @ Top of Soil Layer

$$V_{rock} := \frac{\pi \cdot L_{eff}}{3} \cdot \left[\left(\frac{d_2}{2}\right)^2 + \left(\frac{d_2}{2}\right)\left(\frac{d_1}{2}\right) + \left(\frac{d_1}{2}\right)^2\right] = 1435.63 \cdot ft^3$$

$$V_{soil} := \frac{\pi \cdot h_{soil}}{3} \cdot \left[\left(\frac{d_3}{2}\right)^2 + \left(\frac{d_3}{2}\right)\left(\frac{d_2}{2}\right) + \left(\frac{d_2}{2}\right)^2\right] = 23853.22 \cdot ft^3$$

$W_{rock} := \gamma_{rock} \cdot V_{rock} = 200.99 \cdot kip$ — Weight of Rock Cone

$W_{soil} := \gamma_{soil} \cdot V_{soil} = 3220.19 \cdot kip$ — Weight of Soil Cone

$R_{n_rock} := W_{rock} + W_{soil} = 3421.17 \cdot kip$ — Total Rock & Soil Prism Weight

$R_n := \min(R_{n_steel}, R_{n_steel_to_grout}, R_{n_rock_grout}, R_{n_rock}) = 79.31 \cdot kip$

$\phi R_n := \phi \cdot R_n = 59.48 \cdot kip$

$P_u := \frac{R_u}{n} = 49.91 \cdot kip$

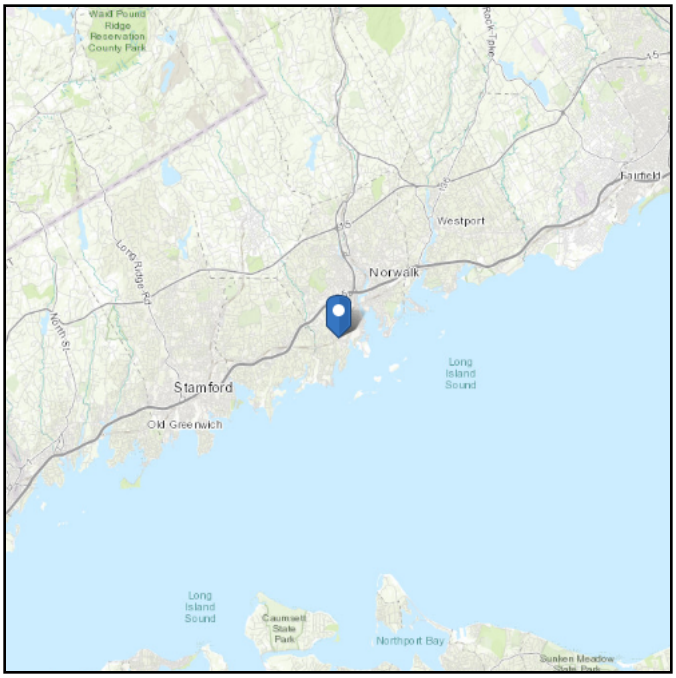
$Uplift := \frac{P_u}{\phi R_n} = 83.91 \cdot \%$

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 60.78 ft (NAVD 88)
Latitude: 41.081789
Longitude: -73.430422



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	98 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Mon Aug 03 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

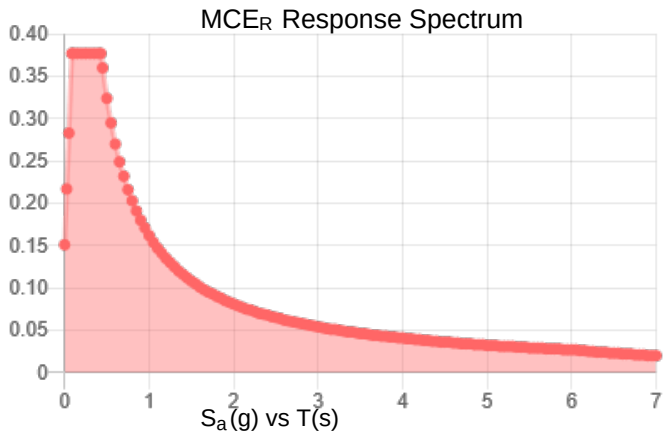
Seismic

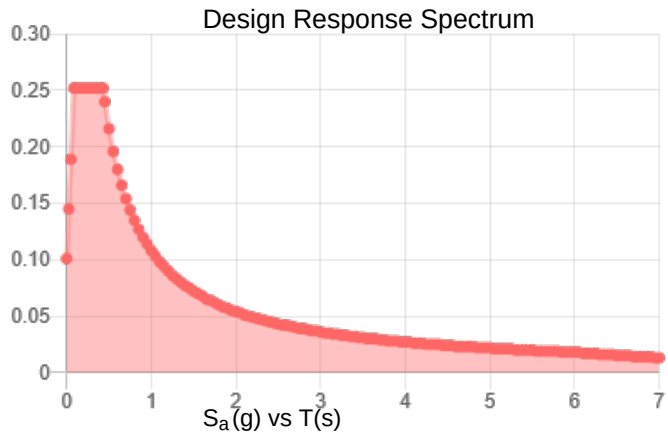
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.236	S_{DS} :	0.252
S_1 :	0.068	S_{D1} :	0.108
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.134
S_{MS} :	0.377	PGA_M :	0.206
S_{M1} :	0.162	F_{PGA} :	1.531
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Aug 03 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Aug 03 2020

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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