

October 2, 2018

Melanie A. Bachman, Esq.  
Executive Director/Staff Attorney  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

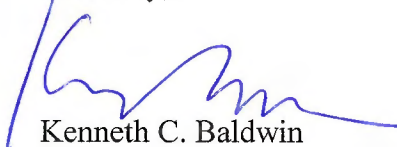
Re: **EM-VER-084-180305 – 311 Old Gate Lane, Milford, Connecticut**

Dear Ms. Bachman:

In preparation for installation of the facility modifications approved in EM-VER-084-180305, the Cellco Partnership construction team discovered that the platform mounting system at this facility needed to be reinforced. Attached is an updated Structural Analysis Report, including the Platform Reinforcement Plans, confirming that the tower can support the previously approved equipment modifications and the newly designed platform reinforcement system.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,



Kenneth C. Baldwin

Attachment

Copy to:

Tim Parks, Verizon Wireless  
Magali Black, SAI Communications LLC

Date: September 24, 2018

Holly Haas  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277

Paul J. Ford and Company  
250 East Broad St., Suite 600  
Columbus, OH 43215  
(614) 221-6679  
gaustin@pauljford.com

**Subject:** Structural Analysis Report

**Carrier Designation:** Verizon Wireless Co-Locate  
**Carrier Site Number:** 178084  
**Carrier Site Name:** Old Gate, CT

**Crown Castle Designation:**  
**Crown Castle BU Number:** 876309  
**Crown Castle Site Name:** MILFORD JAI-ALAI  
**Crown Castle JDE Job Number:** 424261  
**Crown Castle Work Order Number:** 1635196  
**Crown Castle Order Number:** 378471 Rev. 5

**Engineering Firm Designation:** Paul J. Ford and Company Project Number: 37518-3174.001.7805

**Site Data:** 311 Old Gate Lane, Milford, New Haven County, CT  
Latitude 41° 14' 2.59", Longitude -73° 1' 22.4"  
120 Foot - Monopole Tower

Dear Holly Haas,

Paul J. Ford and Company 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 has been performed in accordance with the ANSI/TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from the 2016 Connecticut State Building Code per section 1609.3 and Appendix N. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Respectfully submitted by:

  
Grant J. Austin  
Structural Designer *ST*



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**1) INTRODUCTION**

This tower is a 120 ft Monopole tower designed by ROHN.

**2) ANALYSIS CRITERIA**

**Building Code:** 2016 Connecticut State Building Code  
**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Wind Speed:** 125 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)	
100.0	102.0	3	alcatel lucent	B25 RRH4X30	13	1-5/8	
		3	alcatel lucent	B66A RRH4X45			
		3	antel	BXA-70063-6BF-EDIN-0 w/ MP			
		8	rfs celwave	FD9R6004/2C-3L			
		9	commscope	SBNHH-1D45A w/ MP			
		1	raycap	RXXDC-3315-PF-48			
	100.0	100.0	4	rfs celwave			FD9R6004/2C-3L
			1	tower mounts			Platform Mount [LP 303-1]
			1	site pro 1			HRK 12 [NA 507-1]
			1	site pro 1			PRK-1245 [NA 509-3]

**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)
117.0	124.0	1	andrew	VHLP1-18	3	1/4 5/16 7983A 1/2 1-1/4 1-1/2 Conduit
		1	dragonwave	HORIZON COMPACT		
	123.0	1	lucent	KS24019-L112A		
		1	andrew	VHLP1-18		
	121.0	1	dragonwave	HORIZON COMPACT		
		6	alcatel lucent	1900MHZ RRH (65MHZ)		
	120.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER		
		3	alcatel lucent	800MHZ RRH		
		3	nokia	AAHC w/ MP		
		1	rfs celwave	APXV9ERR18-C-A20 w/ MP		
		3	samsung telecom.	FDD_R6_RRH		
		2	rfs celwave	APXVSP18-C-A20 w/ MP		
		3	rfs celwave	IBC1900HB-2		
		117.0	3	argus tech.		
	1		tower mounts	Platform Mount [LP 502-1]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 146G3C1600, 12/12/2014	2221322	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Solutions, 07574.04, 11/12/2007	2217525	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2010111.29, 04/26/2010	2638363	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41712-0006 MO R2, 04/20/2012	3158394	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 37512-0675 MO, 09/24/2012	3334396	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 151931, 01/28/2016	6078054	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 12/16/1996	2068407	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 12/16/1996	2068406	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 07574.03, 11/12/2007	2217524	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD, 2010111.29, 04/23/2010	2638364	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37511-0052 BP, 12/28/2011	3088811	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37512-0676 BP, 03/19/2012	3139251	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37512-0676, 07/09/2012	3265183	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-2057.007.7700, 12/15/2014	5461972	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.0.4.0), 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.

#### 3.2) Assumptions

- 1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 3) Monopole was modified in conformance with the referenced modification drawings.
- 4) There is no PMI for reinforcement document #3088811. It is assumed that this modification was installed as designed.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company 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	% Capacity	Pass / Fail
L1	120 - 115	Pole	TP24x24x0.25	Pole	6.0%	Pass
L2	115 - 110	Pole	TP24x24x0.25	Pole	13.8%	Pass
L3	110 - 105	Pole	TP24x24x0.25	Pole	22.0%	Pass
L4	105 - 100	Pole	TP24x24x0.25	Pole	33.2%	Pass
L5	100 - 98.5	Pole	TP24x24x0.25	Pole	37.9%	Pass
L6	98.5 - 98.25	Pole + Reinf.	TP24x24x0.3875	Reinf. 13 Tension Rupture	27.4%	Pass
L7	98.25 - 93.25	Pole + Reinf.	TP24x24x0.3875	Reinf. 13 Tension Rupture	39.0%	Pass
L8	93.25 - 90	Pole + Reinf.	TP24x24x0.3875	Reinf. 13 Tension Rupture	46.7%	Pass
L9	90 - 89.75	Pole	TP24x24x0.375	Pole	42.5%	Pass
L10	89.75 - 84.75	Pole	TP24x24x0.375	Pole	53.5%	Pass
L11	84.75 - 79.75	Pole	TP24x24x0.375	Pole	64.8%	Pass
L12	79.75 - 79	Pole	TP24x24x0.375	Pole	66.5%	Pass
L13	79 - 78.75	Pole + Reinf.	TP24x24x0.5188	Reinf. 12 Tension Rupture	57.0%	Pass
L14	78.75 - 75.17	Pole + Reinf.	TP24x24x0.5188	Reinf. 12 Tension Rupture	64.1%	Pass
L15	75.17 - 74.92	Pole + Reinf.	TP24x24x0.675	Reinf. 12 Tension Rupture	51.0%	Pass
L16	74.92 - 69.92	Pole + Reinf.	TP24x24x0.675	Reinf. 12 Tension Rupture	59.1%	Pass
L17	69.92 - 64.92	Pole + Reinf.	TP24x24x0.675	Reinf. 12 Tension Rupture	67.4%	Pass
L18	64.92 - 60	Pole + Reinf.	TP24x24x0.675	Reinf. 12 Tension Rupture	75.7%	Pass
L19	60 - 59.75	Pole + Reinf.	TP30x30x0.5313	Pole	53.7%	Pass
L20	59.75 - 54.75	Pole + Reinf.	TP30x30x0.5313	Pole	60.1%	Pass
L21	54.75 - 49.75	Pole + Reinf.	TP30x30x0.5313	Pole	66.6%	Pass
L22	49.75 - 47.83	Pole + Reinf.	TP30x30x0.5313	Pole	69.1%	Pass
L23	47.83 - 47.58	Pole + Reinf.	TP30x30x0.65	Reinf. 11 Tension Rupture	64.0%	Pass
L24	47.58 - 43	Pole + Reinf.	TP30x30x0.65	Reinf. 11 Tension Rupture	69.7%	Pass
L25	43 - 42.75	Pole + Reinf.	TP30x30x0.8125	Reinf. 2 Tension Rupture	64.3%	Pass
L26	42.75 - 37.75	Pole + Reinf.	TP30x30x0.8125	Reinf. 2 Tension Rupture	70.1%	Pass
L27	37.75 - 34.5	Pole + Reinf.	TP30x30x0.8125	Reinf. 2 Tension Rupture	74.0%	Pass
L28	34.5 - 34.25	Pole + Reinf.	TP30x30x0.65	Reinf. 11 Tension Rupture	80.9%	Pass
L29	34.25 - 30	Pole + Reinf.	TP30x30x0.65	Reinf. 11 Tension Rupture	86.5%	Pass
L30	30 - 29.75	Pole + Reinf.	TP36x36x0.55	Pole	64.6%	Pass
L31	29.75 - 25.58	Pole + Reinf.	TP36x36x0.55	Pole	69.0%	Pass
L32	25.58 - 25.33	Pole + Reinf.	TP36x36x0.65	Reinf. 10 Tension Rupture	64.1%	Pass
L33	25.33 - 20.75	Pole + Reinf.	TP36x36x0.65	Reinf. 10 Tension Rupture	68.6%	Pass
L34	20.75 - 20.5	Pole + Reinf.	TP36x36x0.7875	Reinf. 1 Tension Rupture	61.9%	Pass
L35	20.5 - 17.58	Pole + Reinf.	TP36x36x0.7875	Reinf. 1 Tension Rupture	64.5%	Pass
L36	17.58 - 17.33	Pole + Reinf.	TP36x36x0.6875	Reinf. 1 Tension Rupture	73.0%	Pass
L37	17.33 - 13.5	Pole + Reinf.	TP36x36x0.6875	Reinf. 1 Tension Rupture	76.9%	Pass
L38	13.5 - 13.25	Pole + Reinf.	TP36x36x0.7	Reinf. 1 Tension Rupture	77.6%	Pass
L39	13.25 - 8.25	Pole + Reinf.	TP36x36x0.7	Reinf. 1 Tension Rupture	82.9%	Pass
L40	8.25 - 6.25	Pole + Reinf.	TP36x36x0.7	Reinf. 1 Tension Rupture	85.0%	Pass
L41	6.25 - 6	Pole + Reinf.	TP36x36x0.8875	Reinf. 1 Tension Rupture	68.2%	Pass
L42	6 - 1	Pole + Reinf.	TP36x36x0.8875	Reinf. 1 Tension Rupture	72.5%	Pass
L43	1 - 0	Pole + Reinf.	TP36x36x0.8875	Reinf. 1 Tension Rupture	73.3%	Pass
					Summary	

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
				Pole	78.2%	Pass
				Reinforcement	86.5%	Pass
				Overall	86.5%	Pass

**Table 5 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	45.5	Pass
1	Base Plate	0	40.1	Pass
1	Base Foundation Structural Steel	0	45.5	Pass
1	Base Foundation Soil Interaction	0	30.8	Pass
1	Flange Connection	30	43.4	Pass
1	Flange Connection	60	84.6	Pass
1	Flange Connection	90	44.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>86.5%</b>
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Notes:

- All Structural rating are per TIA-222-H Section 15.5
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

**4.1) Recommendations**

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.



**APPENDIX A**  
**TNXTOWER OUTPUT**

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

- 1) Tower base elevation above sea level: 30.0000 ft.
- 2) Basic wind speed of 125.00 mph.
- 3) Risk Category II.
- 4) Exposure Category C.
- 5) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 6) Topographic Category: 1.
- 7) Crest Height 0.0000 ft.
- 8) Nominal ice thickness of 1.2750 in.
- 9) Ice thickness is considered to increase with height.
- 10) Ice density of 56.00 pcf.
- 11) A wind speed of 50.00 mph is used in combination with ice.
- 12) Temperature drop of 50.00 °F.
- 13) Deflections calculated using a wind speed of 60.00 mph.
- 14) TIA-222-H Annex S.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="background-color: #e0e0e0; text-align: center; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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## Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	120.0000- 115.0000	5.0000	P24x0.25	A53-B-42 (42 ksi)	
L2	115.0000- 110.0000	5.0000	P24x0.25	A53-B-42 (42 ksi)	
L3	110.0000- 105.0000	5.0000	P24x0.25	A53-B-42 (42 ksi)	
L4	105.0000- 100.0000	5.0000	P24x0.25	A53-B-42 (42 ksi)	
L5	100.0000-	1.5000	P24x0.25	A53-B-42	

120 Ft Monopole Tower Structural Analysis  
 Project Number 37518-3174.001.7805, Order 378471, Revision 5

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
	98.5000			(42 ksi)	
L6	98.5000-98.2500	0.2500	P24x0.3875	A53-B-42	
				(42 ksi)	
L7	98.2500-93.2500	5.0000	P24x0.3875	A53-B-42	
				(42 ksi)	
L8	93.2500-90.0000	3.2500	P24x0.3875	A53-B-42	
				(42 ksi)	
L9	90.0000-89.7500	0.2500	P24x0.375	A53-B-42	
				(42 ksi)	
L10	89.7500-84.7500	5.0000	P24x0.375	A53-B-42	
				(42 ksi)	
L11	84.7500-79.7500	5.0000	P24x0.375	A53-B-42	
				(42 ksi)	
L12	79.7500-79.0000	0.7500	P24x0.375	A53-B-42	
				(42 ksi)	
L13	79.0000-78.7500	0.2500	P24x0.51875	A53-B-42	
				(42 ksi)	
L14	78.7500-75.1700	3.5800	P24x0.51875	A53-B-42	
				(42 ksi)	
L15	75.1700-74.9200	0.2500	P24x0.675	A53-B-42	
				(42 ksi)	
L16	74.9200-69.9200	5.0000	P24x0.675	A53-B-42	
				(42 ksi)	
L17	69.9200-64.9200	5.0000	P24x0.675	A53-B-42	
				(42 ksi)	
L18	64.9200-60.0000	4.9200	P24x0.675	A53-B-42	
				(42 ksi)	
L19	60.0000-59.7500	0.2500	P30x0.53125	A53-B-42	
				(42 ksi)	
L20	59.7500-54.7500	5.0000	P30x0.53125	A53-B-42	
				(42 ksi)	
L21	54.7500-49.7500	5.0000	P30x0.53125	A53-B-42	
				(42 ksi)	
L22	49.7500-47.8300	1.9200	P30x0.53125	A53-B-42	
				(42 ksi)	
L23	47.8300-47.5800	0.2500	P30x0.65	A53-B-42	
				(42 ksi)	
L24	47.5800-43.0000	4.5800	P30x0.65	A53-B-42	
				(42 ksi)	
L25	43.0000-42.7500	0.2500	P30x0.8125	A53-B-42	
				(42 ksi)	
L26	42.7500-37.7500	5.0000	P30x0.8125	A53-B-42	
				(42 ksi)	
L27	37.7500-34.5000	3.2500	P30x0.8125	A53-B-42	
				(42 ksi)	
L28	34.5000-34.2500	0.2500	P30x0.65	A53-B-42	
				(42 ksi)	
L29	34.2500-30.0000	4.2500	P30x0.65	A53-B-42	
				(42 ksi)	
L30	30.0000-29.7500	0.2500	P36x0.55	A53-B-42	
				(42 ksi)	
L31	29.7500-25.5800	4.1700	P36x0.55	A53-B-42	
				(42 ksi)	
L32	25.5800-25.3300	0.2500	P36x0.65	A53-B-42	
				(42 ksi)	
L33	25.3300-20.7500	4.5800	P36x0.65	A53-B-42	
				(42 ksi)	
L34	20.7500-20.5000	0.2500	P36x0.7875	A53-B-42	
				(42 ksi)	
L35	20.5000-17.5800	2.9200	P36x0.7875	A53-B-42	
				(42 ksi)	
L36	17.5800-17.3300	0.2500	P36x0.6875	A53-B-42	
				(42 ksi)	
L37	17.3300-13.5000	3.8300	P36x0.6875	A53-B-42	
				(42 ksi)	
L38	13.5000-13.2500	0.2500	P36x0.7	A53-B-42	
				(42 ksi)	
L39	13.2500-8.2500	5.0000	P36x0.7	A53-B-42	
				(42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L40	8.2500-6.2500	2.0000	P36x0.7	A53-B-42 (42 ksi)	
L41	6.2500-6.0000	0.2500	P36x0.8875	A53-B-42 (42 ksi)	
L42	6.0000-1.0000	5.0000	P36x0.8875	A53-B-42 (42 ksi)	
L43	1.0000-0.0000	1.0000	P36x0.8875	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 120.0000-115.0000				1	1	1			
L2 115.0000-110.0000				1	1	1			
L3 110.0000-105.0000				1	1	1			
L4 105.0000-100.0000				1	1	1			
L5 100.0000-98.5000				1	1	1			
L6 98.5000-98.2500				1	1	0.962015			
L7 98.2500-93.2500				1	1	0.962015			
L8 93.2500-90.0000				1	1	0.962015			
L9 90.0000-89.7500				1	1	1			
L10 89.7500-84.7500				1	1	1			
L11 84.7500-79.7500				1	1	1			
L12 79.7500-79.0000				1	1	1			
L13 79.0000-78.7500				1	1	0.962504			
L14 78.7500-75.1700				1	1	0.962504			
L15 75.1700-74.9200				1	1	0.921761			
L16 74.9200-69.9200				1	1	0.921761			
L17 69.9200-64.9200				1	1	0.921761			
L18 64.9200-60.0000				1	1	0.921761			
L19 60.0000-59.7500				1	1	0.961544			
L20 59.7500-54.7500				1	1	0.961544			
L21 54.7500-49.7500				1	1	0.961544			
L22 49.7500-47.8300				1	1	0.961544			
L23 47.8300-47.5800				1	1	0.939223			
L24 47.5800-43.0000				1	1	0.939223			
L25 43.0000-42.7500				1	1	0.919147			
L26 42.7500-37.7500				1	1	0.919147			
L27 37.7500-34.5000				1	1	0.919147			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
ft	ft <sup>2</sup>	in							
L28 34.5000-34.2500				1	1	0.939223			
L29 34.2500-30.0000				1	1	0.939223			
L30 30.0000-29.7500				1	1	0.961904			
L31 29.7500-25.5800				1	1	0.961904			
L32 25.5800-25.3300				1	1	0.940899			
L33 25.3300-20.7500				1	1	0.940899			
L34 20.7500-20.5000				1	1	0.930309			
L35 20.5000-17.5800				1	1	0.930309			
L36 17.5800-17.3300				1	1	0.944607			
L37 17.3300-13.5000				1	1	0.944607			
L38 13.5000-13.2500				1	1	0.961689			
L39 13.2500-8.2500				1	1	0.961689			
L40 8.2500-6.2500				1	1	0.961689			
L41 6.2500-6.0000				1	1	0.8987			
L42 6.0000-1.0000				1	1	0.8987			
L43 1.0000-0.0000				1	1	0.8987			

**Feed Line/Linear Appurtenances - Entered As Area**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
LDF4-50A(1/2)	C	No	No	Inside Pole	0.0000 - 117.0000	1	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.15
							1" Ice	0.0000	0.15
							2" Ice	0.0000	0.15
							No Ice	0.0000	0.08
7983A(ELLIPTICAL)	C	No	No	Inside Pole	0.0000 - 117.0000	2	1/2" Ice	0.0000	0.08
							1" Ice	0.0000	0.08
							2" Ice	0.0000	0.08
9207(5/16)	C	No	No	Inside Pole	0.0000 - 117.0000	3	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.06
							1" Ice	0.0000	0.06
9248(1/4)	C	No	No	Inside Pole	0.0000 - 117.0000	3	2" Ice	0.0000	0.06
							No Ice	0.0000	0.03
							1/2" Ice	0.0000	0.03
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Inside Pole	0.0000 - 117.0000	3	1" Ice	0.0000	0.03
							2" Ice	0.0000	0.03
							No Ice	0.0000	1.20
							1/2" Ice	0.0000	1.20
MLC6C-06C-008R-008R(1-1/2)	C	No	No	Inside Pole	0.0000 - 117.0000	1	1" Ice	0.0000	1.20
							2" Ice	0.0000	1.20
							No Ice	0.0000	1.52
							1/2" Ice	0.0000	1.52
2" (Nominal) Conduit	C	No	No	CaAa (Out Of Face)	0.0000 - 117.0000	1	No Ice	0.2375	0.72
							2" Ice	0.0000	1.52
							1/2" Ice	0.3375	2.48

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
2" (Nominal) Conduit	C	No	No	CaAa (Out Of Face)	0.0000 - 117.0000	1	1" Ice	0.4375	4.84
							2" Ice	0.6375	11.41
							No Ice	0.0000	0.00
							1/2" Ice	0.0000	0.00
							1" Ice	0.0000	0.00
2" Ice	0.0000	0.01							
***									
561(1-5/8)	C	No	No	Inside Pole	0.0000 - 100.0000	12	No Ice	0.0000	1.35
							1/2" Ice	0.0000	1.35
							1" Ice	0.0000	1.35
							2" Ice	0.0000	1.35
HB158-1-08U8-S8J18(1-5/8)	C	No	No	CaAa (Out Of Face)	0.0000 - 100.0000	1	No Ice	0.1980	1.30
							1/2" Ice	0.2980	2.81
							1" Ice	0.3980	4.94
							2" Ice	0.5980	11.02
*****									
1 1/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	0.0000 - 22.0000	1	No Ice	0.2083	0.00
							1/2" Ice	0.3194	0.00
							1" Ice	0.4306	0.00
							2" Ice	0.6528	0.00
1 1/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	30.0000 - 44.0000	1	No Ice	0.2083	0.00
							1/2" Ice	0.3194	0.00
							1" Ice	0.4306	0.00
							2" Ice	0.6528	0.00
**									
Aero MP3-05	C	No	No	CaAa (Out Of Face)	0.0000 - 30.0000	1	No Ice	0.3478	0.00
							1/2" Ice	0.4001	0.00
							1" Ice	0.6566	0.00
							2" Ice	0.8788	0.00
Aero MP3-04	C	No	No	CaAa (Out Of Face)	30.0000 - 60.0000	1	No Ice	0.2690	0.00
							1/2" Ice	0.3801	0.00
							1" Ice	0.4913	0.00
							2" Ice	0.7135	0.00
Aero MP3-03	C	No	No	CaAa (Out Of Face)	60.0000 - 75.1700	1	No Ice	0.2625	0.00
							1/2" Ice	0.3736	0.00
							1" Ice	0.4847	0.00
							2" Ice	0.7069	0.00
**									
3/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	90.2500 - 100.2500	1	No Ice	0.1250	0.00
							1/2" Ice	0.2361	0.00
							1" Ice	0.3472	0.00
							2" Ice	0.5694	0.00

### Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	120.0000-115.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.475	0.01
L2	115.0000-110.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.188	0.03
L3	110.0000-105.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.188	0.03
L4	105.0000-100.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.219	0.03
L5	100.0000-98.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.841	0.04
L6	98.5000-98.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.140	0.01

Tower Sectio n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L7	98.2500-93.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.803	0.12
L8	93.2500-90.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.790	0.08
L9	90.0000-89.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.109	0.01
L10	89.7500-84.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.178	0.12
L11	84.7500-79.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.178	0.12
L12	79.7500-79.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.327	0.02
L13	79.0000-78.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.109	0.01
L14	78.7500-75.1700	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.559	0.09
L15	75.1700-74.9200	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.174	0.01
L16	74.9200-69.9200	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.490	0.12
L17	69.9200-64.9200	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.490	0.12
L18	64.9200-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.434	0.12
L19	60.0000-59.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.176	0.01
L20	59.7500-54.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.523	0.12
L21	54.7500-49.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.523	0.12
L22	49.7500-47.8300	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.353	0.05
L23	47.8300-47.5800	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.176	0.01
L24	47.5800-43.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.435	0.11
L25	43.0000-42.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.228	0.01
L26	42.7500-37.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.564	0.12
L27	37.7500-34.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.967	0.08
L28	34.5000-34.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.228	0.01
L29	34.2500-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.880	0.10

Tower Sectio n	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L30	30.0000-29.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.196	0.01
L31	29.7500-25.5800	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.266	0.10
L32	25.5800-25.3300	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.196	0.01
L33	25.3300-20.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.848	0.11
L34	20.7500-20.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.248	0.01
L35	20.5000-17.5800	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.896	0.07
L36	17.5800-17.3300	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.248	0.01
L37	17.3300-13.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.798	0.09
L38	13.5000-13.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.248	0.01
L39	13.2500-8.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.958	0.12
L40	8.2500-6.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.983	0.05
L41	6.2500-6.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.248	0.01
L42	6.0000-1.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.958	0.12
L43	1.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.992	0.02

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	120.0000- 115.0000	A	1.448	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.054	0.03
L2	115.0000- 110.0000	A	1.441	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.629	0.07
L3	110.0000- 105.0000	A	1.435	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.622	0.07
L4	105.0000- 100.0000	A	1.428	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.726	0.07
L5	100.0000- 98.5000	A	1.423	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.169	0.06
L6	98.5000-98.2500	A	1.422	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.361	0.01
L7	98.2500-93.2500	A	1.418	0.000	0.000	0.000	0.000	0.00



120 Ft Monopole Tower Structural Analysis  
Project Number 37518-3174.001.7805, Order 378471, Revision 5

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.215	0.19
L8	93.2500-90.0000	A	1.412	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.567	0.12
L9	90.0000-89.7500	A	1.409	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.250	0.01
L10	89.7500-84.7500	A	1.405	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.988	0.18
L11	84.7500-79.7500	A	1.397	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.971	0.18
L12	79.7500-79.0000	A	1.392	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.744	0.03
L13	79.0000-78.7500	A	1.391	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.248	0.01
L14	78.7500-75.1700	A	1.388	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.546	0.13
L15	75.1700-74.9200	A	1.384	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.390	0.01
L16	74.9200-69.9200	A	1.379	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.781	0.18
L17	69.9200-64.9200	A	1.369	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.750	0.18
L18	64.9200-60.0000	A	1.359	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.594	0.18
L19	60.0000-59.7500	A	1.353	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.387	0.01
L20	59.7500-54.7500	A	1.347	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.714	0.18
L21	54.7500-49.7500	A	1.335	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.676	0.18
L22	49.7500-47.8300	A	1.326	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.937	0.07
L23	47.8300-47.5800	A	1.323	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.382	0.01
L24	47.5800-43.0000	A	1.316	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.478	0.16
L25	43.0000-42.7500	A	1.309	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.505	0.01
L26	42.7500-37.7500	A	1.301	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.056	0.18
L27	37.7500-34.5000	A	1.287	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.498	0.11
L28	34.5000-34.2500	A	1.280	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.498	0.01
L29	34.2500-30.0000	A	1.272	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.443	0.15
L30	30.0000-29.7500	A	1.262	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> <sub>In Face</sub>	C <sub>AA</sub> <sub>Out Face</sub>	Weight
n	ft		in	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.414	0.01
L31	29.7500-25.5800	A	1.253	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.878	0.15
L32	25.5800-25.3300	A	1.242	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.411	0.01
L33	25.3300-20.7500	A	1.230	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.091	0.16
L34	20.7500-20.5000	A	1.216	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.526	0.01
L35	20.5000-17.5800	A	1.207	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.124	0.10
L36	17.5800-17.3300	A	1.196	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.522	0.01
L37	17.3300-13.5000	A	1.182	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.951	0.13
L38	13.5000-13.2500	A	1.165	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.515	0.01
L39	13.2500-8.2500	A	1.140	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.203	0.17
L40	8.2500-6.2500	A	1.096	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.007	0.07
L41	6.2500-6.0000	A	1.077	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.497	0.01
L42	6.0000-1.0000	A	1.019	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.692	0.16
L43	1.0000-0.0000	A	0.839	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.739	0.03

### Feed Line Center of Pressure

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub>	CP <sub>z</sub>
	ft	in	in	Ice in	Ice in
L1	120.0000-115.0000	-0.7624	0.4402	-0.7554	0.4361
L2	115.0000-110.0000	-1.7170	0.9913	-1.7000	0.9815
L3	110.0000-105.0000	-1.7170	0.9913	-1.6972	0.9799
L4	105.0000-100.0000	-1.7546	1.0130	-1.7538	1.0125
L5	100.0000-98.5000	-3.3087	1.9103	-3.6383	2.1005
L6	98.5000-98.2500	-3.3087	1.9103	-3.6372	2.0999
L7	98.2500-93.2500	-3.3087	1.9103	-3.6340	2.0981
L8	93.2500-90.0000	-3.2698	1.8878	-3.5729	2.0628
L9	90.0000-89.7500	-2.7673	1.5977	-2.8210	1.6287
L10	89.7500-84.7500	-2.7673	1.5977	-2.8182	1.6271
L11	84.7500-79.7500	-2.7673	1.5977	-2.8127	1.6239
L12	79.7500-79.0000	-2.7673	1.5977	-2.8093	1.6220
L13	79.0000-78.7500	-2.7673	1.5977	-2.8087	1.6216
L14	78.7500-75.1700	-2.7673	1.5977	-2.8064	1.6203
L15	75.1700-74.9200	-3.8217	2.2065	-3.8252	2.2085
L16	74.9200-69.9200	-3.8217	2.2065	-3.8214	2.2063

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L17	69.9200-64.9200	-3.8217	2.2065	-3.8136	2.2018
L18	64.9200-60.0000	-3.8217	2.2065	-3.8054	2.1971
L19	60.0000-59.7500	-4.1515	2.3969	-4.1705	2.4079
L20	59.7500-54.7500	-4.1515	2.3969	-4.1647	2.4045
L21	54.7500-49.7500	-4.1515	2.3969	-4.1528	2.3976
L22	49.7500-47.8300	-4.1515	2.3969	-4.1439	2.3925
L23	47.8300-47.5800	-4.1515	2.3969	-4.1410	2.3908
L24	47.5800-43.0000	-4.3302	2.5000	-4.3321	2.5011
L25	43.0000-42.7500	-4.9147	2.8375	-4.9652	2.8667
L26	42.7500-37.7500	-4.9147	2.8375	-4.9562	2.8615
L27	37.7500-34.5000	-4.9147	2.8375	-4.9408	2.8526
L28	34.5000-34.2500	-4.9147	2.8375	-4.9337	2.8485
L29	34.2500-30.0000	-4.9147	2.8375	-4.9241	2.8430
L30	30.0000-29.7500	-4.7267	2.7290	-4.6850	2.7049
L31	29.7500-25.5800	-4.7267	2.7290	-4.6747	2.6989
L32	25.5800-25.3300	-4.7267	2.7290	-4.6636	2.6925
L33	25.3300-20.7500	-4.9606	2.8640	-4.9066	2.8328
L34	20.7500-20.5000	-5.5373	3.1969	-5.5172	3.1853
L35	20.5000-17.5800	-5.5373	3.1969	-5.5051	3.1784
L36	17.5800-17.3300	-5.5373	3.1969	-5.4920	3.1708
L37	17.3300-13.5000	-5.5373	3.1969	-5.4735	3.1601
L38	13.5000-13.2500	-5.5373	3.1969	-5.4524	3.1480
L39	13.2500-8.2500	-5.5373	3.1969	-5.4204	3.1295
L40	8.2500-6.2500	-5.5373	3.1969	-5.3637	3.0967
L41	6.2500-6.0000	-5.5373	3.1969	-5.3398	3.0829
L42	6.0000-1.0000	-5.5373	3.1969	-5.2623	3.0382
L43	1.0000-0.0000	-5.5373	3.1969	-4.9235	2.8426

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t	Placement ft	C <sub>a</sub> A <sub>a</sub> Front ft <sup>2</sup>	C <sub>a</sub> A <sub>a</sub> Side ft <sup>2</sup>	Weight K	
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice	8.2619	7.4708	0.09
						1/2" Ice	8.8215	8.6564	0.16
						Ice	9.3462	9.5559	0.24
						1" Ice	10.4181	11.3884	0.42
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice	8.2619	6.9458	0.08
						1/2" Ice	8.8215	8.1266	0.15
						Ice	9.3462	9.0212	0.23
						1" Ice	10.4181	10.8440	0.41
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice	8.2619	6.9458	0.08
						1/2" Ice	8.8215	8.1266	0.15
						Ice	9.3462	9.0212	0.23
						1" Ice	10.4181	10.8440	0.41
LLPX310R w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice	4.4582	2.8533	0.04
						1/2" Ice	4.7860	3.3731	0.08
						Ice	5.1221	3.9095	0.12
						1" Ice	5.8189	5.0147	0.22
LLPX310R w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice	4.4582	2.8533	0.04
						1/2" Ice	4.7860	3.3731	0.08
						Ice	5.1221	3.9095	0.12

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
LLPX310R w/ Mount Pipe	C	From Leg	4.0000	0.0000	117.0000	1" Ice	5.8189	5.0147	0.22
						2" Ice			
						No Ice	4.4582	2.8533	0.04
						1/2" Ice	4.7860	3.3731	0.08
						Ice	5.1221	3.9095	0.12
800MHZ RRH	A	From Leg	4.0000	0.0000	117.0000	1" Ice	5.8189	5.0147	0.22
						2" Ice			
						No Ice	2.1342	1.7730	0.05
						1/2" Ice	2.3195	1.9461	0.07
						Ice	2.5123	2.1267	0.10
800MHZ RRH	B	From Leg	4.0000	0.0000	117.0000	1" Ice	2.9201	2.5100	0.16
						2" Ice			
						No Ice	2.1342	1.7730	0.05
						1/2" Ice	2.3195	1.9461	0.07
						Ice	2.5123	2.1267	0.10
800MHZ RRH	C	From Leg	4.0000	0.0000	117.0000	1" Ice	2.9201	2.5100	0.16
						2" Ice			
						No Ice	2.1342	1.7730	0.05
						1/2" Ice	2.3195	1.9461	0.07
						Ice	2.5123	2.1267	0.10
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000	0.0000	117.0000	1" Ice	2.9201	2.5100	0.16
						2" Ice			
						No Ice	0.6601	0.3211	0.01
						1/2" Ice	0.7627	0.3983	0.02
						Ice	0.8727	0.4830	0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000	0.0000	117.0000	1" Ice	1.1149	0.6744	0.04
						2" Ice			
						No Ice	0.6601	0.3211	0.01
						1/2" Ice	0.7627	0.3983	0.02
						Ice	0.8727	0.4830	0.02
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000	0.0000	117.0000	1" Ice	1.1149	0.6744	0.04
						2" Ice			
						No Ice	0.6601	0.3211	0.01
						1/2" Ice	0.7627	0.3983	0.02
						Ice	0.8727	0.4830	0.02
(2) 1900MHZ RRH (65MHZ)	A	From Leg	4.0000	0.0000	117.0000	1" Ice	3.1855	3.0906	0.17
						2" Ice			
						No Ice	2.3218	2.2360	0.06
						1/2" Ice	2.5266	2.4385	0.08
						Ice	2.7388	2.6485	0.11
(2) 1900MHZ RRH (65MHZ)	B	From Leg	4.0000	0.0000	117.0000	1" Ice	3.1855	3.0906	0.17
						2" Ice			
						No Ice	2.3218	2.2360	0.06
						1/2" Ice	2.5266	2.4385	0.08
						Ice	2.7388	2.6485	0.11
(2) 1900MHZ RRH (65MHZ)	C	From Leg	4.0000	0.0000	117.0000	1" Ice	3.1855	3.0906	0.17
						2" Ice			
						No Ice	2.3218	2.2360	0.06
						1/2" Ice	2.5266	2.4385	0.08
						Ice	2.7388	2.6485	0.11
FDD_R6_RRH	A	From Leg	4.0000	0.0000	117.0000	1" Ice	2.2037	1.1926	0.09
						2" Ice			
						No Ice	1.5333	0.6840	0.03
						1/2" Ice	1.6898	0.7999	0.04
						Ice	1.8537	0.9228	0.06
FDD_R6_RRH	B	From Leg	4.0000	0.0000	117.0000	1" Ice	2.2037	1.1926	0.09
						2" Ice			
						No Ice	1.5333	0.6840	0.03
						1/2" Ice	1.6898	0.7999	0.04
						Ice	1.8537	0.9228	0.06
FDD_R6_RRH	C	From Leg	4.0000	0.0000	117.0000	1" Ice	2.2037	1.1926	0.09
						2" Ice			
						No Ice	1.5333	0.6840	0.03
						1/2" Ice	1.6898	0.7999	0.04
						Ice	1.8537	0.9228	0.06

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz Lateral	Vert					
IBC1900HB-2	A	From Leg	4.0000	0.0000	117.0000	1" Ice	2.2037	1.1926	0.09
						2" Ice	1.1250	0.7125	0.04
						No Ice	1.1250	0.7125	0.04
						1/2" Ice	1.2704	0.8368	0.05
						Ice	1.4231	0.9682	0.06
IBC1900HB-2	B	From Leg	4.0000	0.0000	117.0000	1" Ice	1.7509	1.2518	0.09
						2" Ice	1.1250	0.7125	0.04
						No Ice	1.1250	0.7125	0.04
						1/2" Ice	1.2704	0.8368	0.05
						Ice	1.4231	0.9682	0.06
IBC1900HB-2	C	From Leg	4.0000	0.0000	117.0000	1" Ice	1.7509	1.2518	0.09
						2" Ice	1.1250	0.7125	0.04
						No Ice	1.1250	0.7125	0.04
						1/2" Ice	1.2704	0.8368	0.05
						Ice	1.4231	0.9682	0.06
HORIZON COMPACT	A	From Leg	4.0000	0.0000	117.0000	1" Ice	1.7509	1.2518	0.09
						2" Ice	1.1250	0.7125	0.04
						No Ice	0.7208	0.3681	0.01
						1/2" Ice	0.8278	0.4499	0.02
						Ice	0.9422	0.5391	0.03
HORIZON COMPACT	B	From Leg	4.0000	0.0000	117.0000	1" Ice	1.1933	0.7396	0.05
						2" Ice	0.7208	0.3681	0.01
						No Ice	0.7208	0.3681	0.01
						1/2" Ice	0.8278	0.4499	0.02
						Ice	0.9422	0.5391	0.03
KS24019-L112A	A	From Leg	4.0000	0.0000	117.0000	1" Ice	1.1933	0.7396	0.05
						2" Ice	0.1407	0.1407	0.01
						No Ice	0.1407	0.1407	0.01
						1/2" Ice	0.1979	0.1979	0.01
						Ice	0.2621	0.2621	0.01
AAHC w/ Mount Pipe	A	From Leg	4.0000	0.0000	117.0000	1" Ice	0.4148	0.4148	0.02
						2" Ice	4.4091	2.6915	0.12
						No Ice	4.4091	2.6915	0.12
						1/2" Ice	4.7270	3.0786	0.16
						Ice	5.0553	3.4862	0.20
AAHC w/ Mount Pipe	B	From Leg	4.0000	0.0000	117.0000	1" Ice	5.7429	4.3595	0.31
						2" Ice	4.4091	2.6915	0.12
						No Ice	4.4091	2.6915	0.12
						1/2" Ice	4.7270	3.0786	0.16
						Ice	5.0553	3.4862	0.20
AAHC w/ Mount Pipe	C	From Leg	4.0000	0.0000	117.0000	1" Ice	5.7429	4.3595	0.31
						2" Ice	4.4091	2.6915	0.12
						No Ice	4.4091	2.6915	0.12
						1/2" Ice	4.7270	3.0786	0.16
						Ice	5.0553	3.4862	0.20
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.0000	0.0000	117.0000	1" Ice	5.7429	4.3595	0.31
						2" Ice	1.4250	1.4250	0.03
						No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.0000	0.0000	117.0000	1" Ice	3.0596	3.0596	0.09
						2" Ice	1.4250	1.4250	0.03
						No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.0000	0.0000	117.0000	1" Ice	3.0596	3.0596	0.09
						2" Ice	1.4250	1.4250	0.03
						No Ice	1.4250	1.4250	0.03
						1/2" Ice	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
Platform Mount [LP 502-1]	C	None		0.0000	117.0000	1" Ice	32.3472	32.3472	0.93
						2" Ice	45.6677	45.6677	1.19
						No Ice	58.9882	58.9882	1.46

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
						1" Ice 2" Ice	85.6292 85.6292	2.00	
***									
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.3296 7.7872 8.2456 9.1848 8.8352	5.4600 6.3840 7.1844 8.8352	0.04 0.10 0.16 0.32
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.3296 7.7872 8.2456 9.1848 8.8352	5.4600 6.3840 7.1844 8.8352	0.04 0.10 0.16 0.32
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.3296 7.7872 8.2456 9.1848 8.8352	5.4600 6.3840 7.1844 8.8352	0.04 0.10 0.16 0.32
(4) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3142 0.3862 0.4656 0.6468	0.0762 0.1189 0.1685 0.2940	0.00 0.01 0.01 0.02
(4) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3142 0.3862 0.4656 0.6468	0.0762 0.1189 0.1685 0.2940	0.00 0.01 0.01 0.02
(4) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3142 0.3862 0.4656 0.6468	0.0762 0.1189 0.1685 0.2940	0.00 0.01 0.01 0.02
(3) SBNHH-1D45A w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.6573 9.1256 9.5886 10.5404	5.1455 5.9157 6.6150 8.0452	0.07 0.14 0.21 0.38
(3) SBNHH-1D45A w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.6573 9.1256 9.5886 10.5404	5.1455 5.9157 6.6150 8.0452	0.07 0.14 0.21 0.38
(3) SBNHH-1D45A w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.6573 9.1256 9.5886 10.5404	5.1455 5.9157 6.6150 8.0452	0.07 0.14 0.21 0.38
B25 RRH4X30	A	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7417 1.9204 2.1065 2.5009	0.06 0.08 0.10 0.16
B25 RRH4X30	B	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7417 1.9204 2.1065 2.5009	0.06 0.08 0.10 0.16
B25 RRH4X30	C	From Leg	4.0000 0.00 2.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.2000 2.3926 2.5926 3.0148	1.7417 1.9204 2.1065 2.5009	0.06 0.08 0.10 0.16
B66A RRH4X45	A	From Leg	4.0000 0.00	0.0000	100.0000	No Ice 1/2"	2.5800 2.7937	1.6296 1.8106	0.07 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>Front</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>Side</sub> ft <sup>2</sup>	Weight K	
			2.00			Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						2" Ice			
B66A RRH4X45	B	From Leg	4.0000	0.0000	100.0000	No Ice	2.5800	1.6296	0.07
			0.00			1/2"	2.7937	1.8106	0.09
			2.00			Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						2" Ice			
B66A RRH4X45	C	From Leg	4.0000	0.0000	100.0000	No Ice	2.5800	1.6296	0.07
			0.00			1/2"	2.7937	1.8106	0.09
			2.00			Ice	3.0148	1.9986	0.11
						1" Ice	3.4793	2.3955	0.17
						2" Ice			
RXXDC-3315-PF-48	A	From Leg	4.0000	0.0000	100.0000	No Ice	3.0123	1.9629	0.02
			0.00			1/2"	3.2311	2.1512	0.05
			2.00			Ice	3.4572	2.3469	0.08
						1" Ice	3.9318	2.7606	0.15
						2" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	100.0000	No Ice	14.6600	14.6600	1.25
						1/2"	18.8700	18.8700	1.48
						Ice	23.0800	23.0800	1.71
						1" Ice	31.5000	31.5000	2.18
						2" Ice			
Miscellaneous [NA 507-1]	C	None		0.0000	100.0000	No Ice	4.8000	4.8000	0.25
						1/2"	6.7000	6.7000	0.29
						Ice	8.6000	8.6000	0.34
						1" Ice	12.4000	12.4000	0.44
						2" Ice			
Miscellaneous [NA 509-3]	C	None		0.0000	100.0000	No Ice	11.8400	11.8400	0.28
						1/2"	16.9600	16.9600	0.30
						Ice	22.0800	22.0800	0.32
						1" Ice	32.3200	32.3200	0.36
						2" Ice			
*****									
Bridge Stiffener (35" x 10.5" x 1.25")	A	None		0.0000	60.0000	No Ice	0.6076	3.1570	0.82
						1/2"	0.8483	3.4043	0.84
						Ice	1.0660	3.6586	0.86
						1" Ice	1.5237	4.1881	0.90
						2" Ice			
Bridge Stiffener (35" x 10.5" x 1.25")	B	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.82
						1/2"	0.0000	0.0000	0.84
						Ice	0.0000	0.0000	0.86
						1" Ice	0.0000	0.0000	0.90
						2" Ice			
Bridge Stiffener (35" x 10.5" x 1.25")	C	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.82
						1/2"	0.0000	0.0000	0.84
						Ice	0.0000	0.0000	0.86
						1" Ice	0.0000	0.0000	0.90
						2" Ice			
Bridge Stiffener (35" x 10.5" x 1.25")	A	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2"	0.0000	0.0000	0.84
						Ice	0.0000	0.0000	0.86
						1" Ice	0.0000	0.0000	0.90
						2" Ice			
Bridge Stiffener (35" x 10.5" x 1.25")	B	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2"	0.0000	0.0000	0.84
						Ice	0.0000	0.0000	0.86
						1" Ice	0.0000	0.0000	0.90
						2" Ice			
Bridge Stiffener (35" x 10.5" x 1.25")	C	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2"	0.0000	0.0000	0.84
						Ice	0.0000	0.0000	0.86
						1" Ice	0.0000	0.0000	0.90
						2" Ice			

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight	
			Horz Lateral	Vert						ft
Bridge Stiffener (58" x 14" x 1.25")	A	None			0.0000	60.0000	No Ice	1.0069	7.1784	0.35
							1/2" Ice	1.5617	7.5687	0.38
							Ice	2.0568	7.9660	0.42
							1" Ice	2.7770	8.7817	0.51
							2" Ice			
Bridge Stiffener (58" x 14" x 1.25")	B	None			0.0000	60.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.38
							Ice	0.0000	0.0000	0.42
							1" Ice	0.0000	0.0000	0.51
							2" Ice			
Bridge Stiffener (58" x 14" x 1.25")	C	None			0.0000	60.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.38
							Ice	0.0000	0.0000	0.42
							1" Ice	0.0000	0.0000	0.51
							2" Ice			
Bridge Stiffener (58" x 14" x 1.25")	A	None			0.0000	30.0000	No Ice	1.0069	7.1784	0.35
							1/2" Ice	1.5617	7.5687	0.38
							Ice	2.0568	7.9660	0.42
							1" Ice	2.7770	8.7817	0.51
							2" Ice			
Bridge Stiffener (58" x 14" x 1.25")	B	None			0.0000	30.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.38
							Ice	0.0000	0.0000	0.42
							1" Ice	0.0000	0.0000	0.51
							2" Ice			
Bridge Stiffener (58" x 14" x 1.25")	C	None			0.0000	30.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.38
							Ice	0.0000	0.0000	0.42
							1" Ice	0.0000	0.0000	0.51
							2" Ice			
***										
Bridge Stiffener (93" x 16" x 1.25")	A	None			0.0000	30.0000	No Ice	1.6146	13.9213	0.35
							1/2" Ice	2.4934	14.5126	0.41
							Ice	3.3846	15.1108	0.47
							1" Ice	5.1543	16.3283	0.62
							2" Ice			
Bridge Stiffener (93" x 16" x 1.25")	B	None			0.0000	30.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.41
							Ice	0.0000	0.0000	0.47
							1" Ice	0.0000	0.0000	0.62
							2" Ice			
Bridge Stiffener (93" x 16" x 1.25")	C	None			0.0000	30.0000	No Ice	0.0000	0.0000	0.35
							1/2" Ice	0.0000	0.0000	0.41
							Ice	0.0000	0.0000	0.47
							1" Ice	0.0000	0.0000	0.62
							2" Ice			

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz Lateral	Vert							ft
VHLP1-18	A	Paraboloid w/o Radome	From Leg	1.0000	0.0000			117.0000	1.2750	No Ice	1.2800	0.01
										1/2" Ice	1.4500	0.02
										1" Ice	1.6200	0.03
										2" Ice	1.9700	0.04
VHLP1-18	B	Paraboloid w/o Radome	From Leg	1.0000	0.0000			117.0000	1.2750	No Ice	1.2800	0.01
										1/2" Ice	1.4500	0.02
										1" Ice	1.6200	0.03
										2" Ice	1.9700	0.04



### Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation	z	$K_z$	$q_z$	$A_G$	F a c e	$A_F$	$A_R$	$A_{leg}$	Leg %	$C_A A_A$ In Face	$C_A A_A$ Out Face
ft	ft		psf	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L1 120.0000- 115.0000	117.5000	1.309	47.22	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	0.475
L2 115.0000- 110.0000	112.5000	1.297	46.79	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.188
L3 110.0000- 105.0000	107.5000	1.285	46.34	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.188
L4 105.0000- 100.0000	102.5000	1.272	45.88	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.219
L5 100.0000- 98.5000	99.2500	1.264	45.57	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000	3.000	100.00	0.000	0.000
					C	0.000	3.000	3.000	100.00	0.000	0.841
L6 98.5000- 98.2500	98.3750	1.261	45.48	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.140
L7 98.2500- 93.2500	95.7500	1.254	45.22	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.803
L8 93.2500- 90.0000	91.6250	1.243	44.81	6.500	A	0.000	6.500	6.500	100.00	0.000	0.000
					B	0.000	6.500	6.500	100.00	0.000	0.000
					C	0.000	6.500	6.500	100.00	0.000	1.790
L9 90.0000- 89.7500	89.8750	1.237	44.63	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.109
L10 89.7500- 84.7500	87.2500	1.23	44.35	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.178
L11 84.7500- 79.7500	82.2500	1.215	43.80	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.178
L12 79.7500- 79.0000	79.3750	1.206	43.47	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500	1.500	100.00	0.000	0.000
					C	0.000	1.500	1.500	100.00	0.000	0.327
L13 79.0000- 78.7500	78.8750	1.204	43.42	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.109
L14 78.7500- 75.1700	76.9600	1.198	43.19	7.160	A	0.000	7.160	7.160	100.00	0.000	0.000
					B	0.000	7.160	7.160	100.00	0.000	0.000
					C	0.000	7.160	7.160	100.00	0.000	1.559
L15 75.1700- 74.9200	75.0450	1.191	42.96	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.174
L16 74.9200- 69.9200	72.4200	1.182	42.64	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	3.490
L17 69.9200- 64.9200	67.4200	1.165	42.00	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	3.490
L18 64.9200- 60.0000	62.4600	1.146	41.33	9.840	A	0.000	9.840	9.840	100.00	0.000	0.000
					B	0.000	9.840	9.840	100.00	0.000	0.000
					C	0.000	9.840	9.840	100.00	0.000	3.434
L19 60.0000- 59.7500	59.8750	1.136	40.97	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625	0.625	100.00	0.000	0.000
					C	0.000	0.625	0.625	100.00	0.000	0.176
L20 59.7500- 54.7500	57.2500	1.125	40.58	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500	12.500	100.00	0.000	0.000
					C	0.000	12.500	12.500	100.00	0.000	3.523
L21 54.7500- 49.7500	52.2500	1.104	39.81	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500	12.500	100.00	0.000	0.000
					C	0.000	12.500	12.500	100.00	0.000	3.523

Section Elevation	z	K <sub>z</sub>	q <sub>z</sub>	A <sub>G</sub>	F a c e	A <sub>F</sub>	A <sub>R</sub>	A <sub>leg</sub>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face	C <sub>A</sub> A <sub>A</sub> Out Face
ft	ft		psf	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>		ft <sup>2</sup>	ft <sup>2</sup>
L22 49.7500- 47.8300	48.7900	1.088	39.24	4.800	A	0.000	4.800	4.800	100.00	0.000	0.000
					B	0.000	4.800		100.00	0.000	0.000
					C	0.000	4.800		100.00	0.000	1.353
L23 47.8300- 47.5800	47.7050	1.083	39.05	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.176
L24 47.5800- 43.0000	45.2900	1.071	38.63	11.450	A	0.000	11.450	11.450	100.00	0.000	0.000
					B	0.000	11.450		100.00	0.000	0.000
					C	0.000	11.450		100.00	0.000	3.435
L25 43.0000- 42.7500	42.8750	1.059	38.19	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.228
L26 42.7500- 37.7500	40.2500	1.045	37.68	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	4.564
L27 37.7500- 34.5000	36.1250	1.021	36.83	8.125	A	0.000	8.125	8.125	100.00	0.000	0.000
					B	0.000	8.125		100.00	0.000	0.000
					C	0.000	8.125		100.00	0.000	2.967
L28 34.5000- 34.2500	34.3750	1.011	36.45	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.228
L29 34.2500- 30.0000	32.1250	0.997	35.93	10.625	A	0.000	10.625	10.625	100.00	0.000	0.000
					B	0.000	10.625		100.00	0.000	0.000
					C	0.000	10.625		100.00	0.000	3.880
L30 30.0000- 29.7500	29.8750	0.981	35.39	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.196
L31 29.7500- 25.5800	27.6650	0.966	34.82	12.510	A	0.000	12.510	12.510	100.00	0.000	0.000
					B	0.000	12.510		100.00	0.000	0.000
					C	0.000	12.510		100.00	0.000	3.266
L32 25.5800- 25.3300	25.4550	0.949	34.22	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.196
L33 25.3300- 20.7500	23.0400	0.929	33.51	13.740	A	0.000	13.740	13.740	100.00	0.000	0.000
					B	0.000	13.740		100.00	0.000	0.000
					C	0.000	13.740		100.00	0.000	3.848
L34 20.7500- 20.5000	20.6250	0.908	32.73	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L35 20.5000- 17.5800	19.0400	0.893	32.19	8.760	A	0.000	8.760	8.760	100.00	0.000	0.000
					B	0.000	8.760		100.00	0.000	0.000
					C	0.000	8.760		100.00	0.000	2.896
L36 17.5800- 17.3300	17.4550	0.876	31.60	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L37 17.3300- 13.5000	15.4150	0.854	30.79	11.490	A	0.000	11.490	11.490	100.00	0.000	0.000
					B	0.000	11.490		100.00	0.000	0.000
					C	0.000	11.490		100.00	0.000	3.798
L38 13.5000- 13.2500	13.3750	0.85	30.65	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L39 13.2500- 8.2500	10.7500	0.85	30.65	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.958
L40 8.2500- 6.2500	7.2500	0.85	30.65	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.983
L41 6.2500- 6.0000	6.1250	0.85	30.65	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L42 6.0000- 1.0000	3.5000	0.85	30.65	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.958
L43 1.0000- 0.0000	0.5000	0.85	30.65	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.992

**Tower Pressure - With Ice**

$G_H = 1.100$

Section Elevation ft	z ft	$K_z$	$q_z$ psf	$t_z$ in	$A_G$ ft <sup>2</sup>	Face	$A_F$ ft <sup>2</sup>	$A_R$ ft <sup>2</sup>	$A_{leg}$ ft <sup>2</sup>	Leg %	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>
L1 120.0000-115.0000	117.5000	1.309	7.55	1.4476	11.206	A	0.000	11.206	11.206	100.00	0.000	0.000
						B	0.000	11.206	11.206	100.00	0.000	0.000
						C	0.000	11.206	11.206	100.00	0.000	1.054
L2 115.0000-110.0000	112.5000	1.297	7.49	1.4414	11.201	A	0.000	11.201	11.201	100.00	0.000	0.000
						B	0.000	11.201	11.201	100.00	0.000	0.000
						C	0.000	11.201	11.201	100.00	0.000	2.629
L3 110.0000-105.0000	107.5000	1.285	7.41	1.4348	11.196	A	0.000	11.196	11.196	100.00	0.000	0.000
						B	0.000	11.196	11.196	100.00	0.000	0.000
						C	0.000	11.196	11.196	100.00	0.000	2.622
L4 105.0000-100.0000	102.5000	1.272	7.34	1.4280	11.190	A	0.000	11.190	11.190	100.00	0.000	0.000
						B	0.000	11.190	11.190	100.00	0.000	0.000
						C	0.000	11.190	11.190	100.00	0.000	2.726
L5 100.0000-98.5000	99.2500	1.264	7.29	1.4234	3.356	A	0.000	3.356	3.356	100.00	0.000	0.000
						B	0.000	3.356	3.356	100.00	0.000	0.000
						C	0.000	3.356	3.356	100.00	0.000	2.169
L6 98.5000-98.2500	98.3750	1.261	7.28	1.4222	0.559	A	0.000	0.559	0.559	100.00	0.000	0.000
						B	0.000	0.559	0.559	100.00	0.000	0.000
						C	0.000	0.559	0.559	100.00	0.000	0.361
L7 98.2500-93.2500	95.7500	1.254	7.24	1.4183	11.182	A	0.000	11.182	11.182	100.00	0.000	0.000
						B	0.000	11.182	11.182	100.00	0.000	0.000
						C	0.000	11.182	11.182	100.00	0.000	7.215
L8 93.2500-90.0000	91.6250	1.243	7.17	1.4121	7.265	A	0.000	7.265	7.265	100.00	0.000	0.000
						B	0.000	7.265	7.265	100.00	0.000	0.000
						C	0.000	7.265	7.265	100.00	0.000	4.567
L9 90.0000-89.7500	89.8750	1.237	7.14	1.4094	0.559	A	0.000	0.559	0.559	100.00	0.000	0.000
						B	0.000	0.559	0.559	100.00	0.000	0.000
						C	0.000	0.559	0.559	100.00	0.000	0.250
L10 89.7500-84.7500	87.2500	1.23	7.10	1.4052	11.171	A	0.000	11.171	11.171	100.00	0.000	0.000
						B	0.000	11.171	11.171	100.00	0.000	0.000
						C	0.000	11.171	11.171	100.00	0.000	4.988
L11 84.7500-79.7500	82.2500	1.215	7.01	1.3969	11.164	A	0.000	11.164	11.164	100.00	0.000	0.000
						B	0.000	11.164	11.164	100.00	0.000	0.000
						C	0.000	11.164	11.164	100.00	0.000	4.971
L12 79.7500-79.0000	79.3750	1.206	6.96	1.3920	1.674	A	0.000	1.674	1.674	100.00	0.000	0.000
						B	0.000	1.674	1.674	100.00	0.000	0.000
						C	0.000	1.674	1.674	100.00	0.000	0.744
L13 79.0000-78.7500	78.8750	1.204	6.95	1.3911	0.558	A	0.000	0.558	0.558	100.00	0.000	0.000
						B	0.000	0.558	0.558	100.00	0.000	0.000
						C	0.000	0.558	0.558	100.00	0.000	0.248
L14 78.7500-75.1700	76.9600	1.198	6.91	1.3877	7.988	A	0.000	7.988	7.988	100.00	0.000	0.000
						B	0.000	7.988	7.988	100.00	0.000	0.000
						C	0.000	7.988	7.988	100.00	0.000	3.546
L15 75.1700-74.9200	75.0450	1.191	6.87	1.3842	0.558	A	0.000	0.558	0.558	100.00	0.000	0.000
						B	0.000	0.558	0.558	100.00	0.000	0.000
						C	0.000	0.558	0.558	100.00	0.000	0.390
L16 74.9200-69.9200	72.4200	1.182	6.82	1.3793	11.149	A	0.000	11.149	11.149	100.00	0.000	0.000
						B	0.000	11.149	11.149	100.00	0.000	0.000
						C	0.000	11.149	11.149	100.00	0.000	7.781
L17 69.9200-64.9200	67.4200	1.165	6.72	1.3694	11.141	A	0.000	11.141	11.141	100.00	0.000	0.000
						B	0.000	11.141	11.141	100.00	0.000	0.000
						C	0.000	11.141	11.141	100.00	0.000	7.750
L18 64.9200-60.0000	62.4600	1.146	6.61	1.3590	10.954	A	0.000	10.954	10.954	100.00	0.000	0.000
						B	0.000	10.954	10.954	100.00	0.000	0.000
						C	0.000	10.954	10.954	100.00	0.000	7.594
L19 60.0000-59.7500	59.8750	1.136	6.55	1.3533	0.681	A	0.000	0.681	0.681	100.00	0.000	0.000
						B	0.000	0.681	0.681	100.00	0.000	0.000
						C	0.000	0.681	0.681	100.00	0.000	0.387
L20 59.7500-54.7500	57.2500	1.125	6.49	1.3472	13.623	A	0.000	13.623	13.623	100.00	0.000	0.000
						B	0.000	13.623	13.623	100.00	0.000	0.000
						C	0.000	13.623	13.623	100.00	0.000	7.714
L21 54.7500-49.7500	52.2500	1.104	6.37	1.3350	13.612	A	0.000	13.612	13.612	100.00	0.000	0.000
						B	0.000	13.612	13.612	100.00	0.000	0.000
						C	0.000	13.612	13.612	100.00	0.000	7.676

120 Ft Monopole Tower Structural Analysis  
 Project Number 37518-3174.001.7805, Order 378471, Revision 5

Section Elevation ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	t <sub>z</sub> in	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L22 49.7500- 47.8300	48.7900	1.088	6.28	1.3258	5.224	A	0.000	5.224	5.224	100.00	0.000	0.000
						B	0.000	5.224		100.00	0.000	0.000
						C	0.000	5.224		100.00	0.000	2.937
L23 47.8300- 47.5800	47.7050	1.083	6.25	1.3229	0.680	A	0.000	0.680	0.680	100.00	0.000	0.000
						B	0.000	0.680		100.00	0.000	0.000
						C	0.000	0.680		100.00	0.000	0.382
L24 47.5800- 43.0000	45.2900	1.071	6.18	1.3160	12.455	A	0.000	12.455	12.455	100.00	0.000	0.000
						B	0.000	12.455		100.00	0.000	0.000
						C	0.000	12.455		100.00	0.000	7.478
L25 43.0000- 42.7500	42.8750	1.059	6.11	1.3088	0.680	A	0.000	0.680	0.680	100.00	0.000	0.000
						B	0.000	0.680		100.00	0.000	0.000
						C	0.000	0.680		100.00	0.000	0.505
L26 42.7500- 37.7500	40.2500	1.045	6.03	1.3006	13.584	A	0.000	13.584	13.584	100.00	0.000	0.000
						B	0.000	13.584		100.00	0.000	0.000
						C	0.000	13.584		100.00	0.000	10.056
L27 37.7500- 34.5000	36.1250	1.021	5.89	1.2866	8.822	A	0.000	8.822	8.822	100.00	0.000	0.000
						B	0.000	8.822		100.00	0.000	0.000
						C	0.000	8.822		100.00	0.000	6.498
L28 34.5000- 34.2500	34.3750	1.011	5.83	1.2802	0.678	A	0.000	0.678	0.678	100.00	0.000	0.000
						B	0.000	0.678		100.00	0.000	0.000
						C	0.000	0.678		100.00	0.000	0.498
L29 34.2500- 30.0000	32.1250	0.997	5.75	1.2716	11.526	A	0.000	11.526	11.526	100.00	0.000	0.000
						B	0.000	11.526		100.00	0.000	0.000
						C	0.000	11.526		100.00	0.000	8.443
L30 30.0000- 29.7500	29.8750	0.981	5.66	1.2624	0.803	A	0.000	0.803	0.803	100.00	0.000	0.000
						B	0.000	0.803		100.00	0.000	0.000
						C	0.000	0.803		100.00	0.000	0.414
L31 29.7500- 25.5800	27.6650	0.966	5.57	1.2527	13.381	A	0.000	13.381	13.381	100.00	0.000	0.000
						B	0.000	13.381		100.00	0.000	0.000
						C	0.000	13.381		100.00	0.000	6.878
L32 25.5800- 25.3300	25.4550	0.949	5.47	1.2423	0.802	A	0.000	0.802	0.802	100.00	0.000	0.000
						B	0.000	0.802		100.00	0.000	0.000
						C	0.000	0.802		100.00	0.000	0.411
L33 25.3300- 20.7500	23.0400	0.929	5.36	1.2300	14.679	A	0.000	14.679	14.679	100.00	0.000	0.000
						B	0.000	14.679		100.00	0.000	0.000
						C	0.000	14.679		100.00	0.000	8.091
L34 20.7500- 20.5000	20.6250	0.908	5.24	1.2165	0.801	A	0.000	0.801	0.801	100.00	0.000	0.000
						B	0.000	0.801		100.00	0.000	0.000
						C	0.000	0.801		100.00	0.000	0.526
L35 20.5000- 17.5800	19.0400	0.893	5.15	1.2068	9.347	A	0.000	9.347	9.347	100.00	0.000	0.000
						B	0.000	9.347		100.00	0.000	0.000
						C	0.000	9.347		100.00	0.000	6.124
L36 17.5800- 17.3300	17.4550	0.876	5.06	1.1963	0.800	A	0.000	0.800	0.800	100.00	0.000	0.000
						B	0.000	0.800		100.00	0.000	0.000
						C	0.000	0.800		100.00	0.000	0.522
L37 17.3300- 13.5000	15.4150	0.854	4.93	1.1816	12.244	A	0.000	12.244	12.244	100.00	0.000	0.000
						B	0.000	12.244		100.00	0.000	0.000
						C	0.000	12.244		100.00	0.000	7.951
L38 13.5000- 13.2500	13.3750	0.85	4.90	1.1649	0.799	A	0.000	0.799	0.799	100.00	0.000	0.000
						B	0.000	0.799		100.00	0.000	0.000
						C	0.000	0.799		100.00	0.000	0.515
L39 13.2500- 8.2500	10.7500	0.85	4.90	1.1397	15.950	A	0.000	15.950	15.950	100.00	0.000	0.000
						B	0.000	15.950		100.00	0.000	0.000
						C	0.000	15.950		100.00	0.000	10.203
L40 8.2500- 6.2500	7.2500	0.85	4.90	1.0957	6.365	A	0.000	6.365	6.365	100.00	0.000	0.000
						B	0.000	6.365		100.00	0.000	0.000
						C	0.000	6.365		100.00	0.000	4.007
L41 6.2500- 6.0000	6.1250	0.85	4.90	1.0774	0.795	A	0.000	0.795	0.795	100.00	0.000	0.000
						B	0.000	0.795		100.00	0.000	0.000
						C	0.000	0.795		100.00	0.000	0.497
L42 6.0000- 1.0000	3.5000	0.85	4.90	1.0187	15.849	A	0.000	15.849	15.849	100.00	0.000	0.000
						B	0.000	15.849		100.00	0.000	0.000
						C	0.000	15.849		100.00	0.000	9.692
L43 1.0000- 0.0000	0.5000	0.85	4.90	0.8386	3.140	A	0.000	3.140	3.140	100.00	0.000	0.000
						B	0.000	3.140		100.00	0.000	0.000
						C	0.000	3.140		100.00	0.000	1.739

### Tower Pressure - Service

$G_H = 1.100$

Section Elevation  ft	z  ft	$K_z$	$q_z$  psf	$A_G$  ft <sup>2</sup>	F a c e	$A_F$  ft <sup>2</sup>	$A_R$  ft <sup>2</sup>	$A_{leg}$  ft <sup>2</sup>	Leg %	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>
L1 120.0000- 115.0000	117.5000	1.309	9.73	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	0.475
L2 115.0000- 110.0000	112.5000	1.297	9.64	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.188
L3 110.0000- 105.0000	107.5000	1.285	9.55	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.188
L4 105.0000- 100.0000	102.5000	1.272	9.46	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	1.219
L5 100.0000- 98.5000	99.2500	1.264	9.39	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000	3.000	100.00	0.000	0.000
					C	0.000	3.000	3.000	100.00	0.000	0.841
L6 98.5000- 98.2500	98.3750	1.261	9.38	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.140
L7 98.2500- 93.2500	95.7500	1.254	9.32	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.803
L8 93.2500- 90.0000	91.6250	1.243	9.24	6.500	A	0.000	6.500	6.500	100.00	0.000	0.000
					B	0.000	6.500	6.500	100.00	0.000	0.000
					C	0.000	6.500	6.500	100.00	0.000	1.790
L9 90.0000- 89.7500	89.8750	1.237	9.20	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.109
L10 89.7500- 84.7500	87.2500	1.23	9.14	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.178
L11 84.7500- 79.7500	82.2500	1.215	9.03	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	2.178
L12 79.7500- 79.0000	79.3750	1.206	8.96	1.500	A	0.000	1.500	1.500	100.00	0.000	0.000
					B	0.000	1.500	1.500	100.00	0.000	0.000
					C	0.000	1.500	1.500	100.00	0.000	0.327
L13 79.0000- 78.7500	78.8750	1.204	8.95	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.109
L14 78.7500- 75.1700	76.9600	1.198	8.90	7.160	A	0.000	7.160	7.160	100.00	0.000	0.000
					B	0.000	7.160	7.160	100.00	0.000	0.000
					C	0.000	7.160	7.160	100.00	0.000	1.559
L15 75.1700- 74.9200	75.0450	1.191	8.86	0.500	A	0.000	0.500	0.500	100.00	0.000	0.000
					B	0.000	0.500	0.500	100.00	0.000	0.000
					C	0.000	0.500	0.500	100.00	0.000	0.174
L16 74.9200- 69.9200	72.4200	1.182	8.79	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	3.490
L17 69.9200- 64.9200	67.4200	1.165	8.66	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000	10.000	100.00	0.000	0.000
					C	0.000	10.000	10.000	100.00	0.000	3.490
L18 64.9200- 60.0000	62.4600	1.146	8.52	9.840	A	0.000	9.840	9.840	100.00	0.000	0.000
					B	0.000	9.840	9.840	100.00	0.000	0.000
					C	0.000	9.840	9.840	100.00	0.000	3.434
L19 60.0000- 59.7500	59.8750	1.136	8.45	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625	0.625	100.00	0.000	0.000
					C	0.000	0.625	0.625	100.00	0.000	0.176
L20 59.7500- 54.7500	57.2500	1.125	8.37	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500	12.500	100.00	0.000	0.000
					C	0.000	12.500	12.500	100.00	0.000	3.523
L21 54.7500- 49.7500	52.2500	1.104	8.21	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500	12.500	100.00	0.000	0.000
					C	0.000	12.500	12.500	100.00	0.000	3.523

Section Elevation ft	z ft	K <sub>z</sub>	q <sub>z</sub> psf	A <sub>G</sub> ft <sup>2</sup>	F a c e	A <sub>F</sub> ft <sup>2</sup>	A <sub>R</sub> ft <sup>2</sup>	A <sub>leg</sub> ft <sup>2</sup>	Leg %	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>
L22 49.7500-47.8300	48.7900	1.088	8.09	4.800	A	0.000	4.800	4.800	100.00	0.000	0.000
					B	0.000	4.800		100.00	0.000	0.000
					C	0.000	4.800		100.00	0.000	1.353
L23 47.8300-47.5800	47.7050	1.083	8.05	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.176
L24 47.5800-43.0000	45.2900	1.071	7.96	11.450	A	0.000	11.450	11.450	100.00	0.000	0.000
					B	0.000	11.450		100.00	0.000	0.000
					C	0.000	11.450		100.00	0.000	3.435
L25 43.0000-42.7500	42.8750	1.059	7.87	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.228
L26 42.7500-37.7500	40.2500	1.045	7.77	12.500	A	0.000	12.500	12.500	100.00	0.000	0.000
					B	0.000	12.500		100.00	0.000	0.000
					C	0.000	12.500		100.00	0.000	4.564
L27 37.7500-34.5000	36.1250	1.021	7.59	8.125	A	0.000	8.125	8.125	100.00	0.000	0.000
					B	0.000	8.125		100.00	0.000	0.000
					C	0.000	8.125		100.00	0.000	2.967
L28 34.5000-34.2500	34.3750	1.011	7.51	0.625	A	0.000	0.625	0.625	100.00	0.000	0.000
					B	0.000	0.625		100.00	0.000	0.000
					C	0.000	0.625		100.00	0.000	0.228
L29 34.2500-30.0000	32.1250	0.997	7.41	10.625	A	0.000	10.625	10.625	100.00	0.000	0.000
					B	0.000	10.625		100.00	0.000	0.000
					C	0.000	10.625		100.00	0.000	3.880
L30 30.0000-29.7500	29.8750	0.981	7.30	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.196
L31 29.7500-25.5800	27.6650	0.966	7.18	12.510	A	0.000	12.510	12.510	100.00	0.000	0.000
					B	0.000	12.510		100.00	0.000	0.000
					C	0.000	12.510		100.00	0.000	3.266
L32 25.5800-25.3300	25.4550	0.949	7.05	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.196
L33 25.3300-20.7500	23.0400	0.929	6.91	13.740	A	0.000	13.740	13.740	100.00	0.000	0.000
					B	0.000	13.740		100.00	0.000	0.000
					C	0.000	13.740		100.00	0.000	3.848
L34 20.7500-20.5000	20.6250	0.908	6.75	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L35 20.5000-17.5800	19.0400	0.893	6.64	8.760	A	0.000	8.760	8.760	100.00	0.000	0.000
					B	0.000	8.760		100.00	0.000	0.000
					C	0.000	8.760		100.00	0.000	2.896
L36 17.5800-17.3300	17.4550	0.876	6.52	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L37 17.3300-13.5000	15.4150	0.854	6.35	11.490	A	0.000	11.490	11.490	100.00	0.000	0.000
					B	0.000	11.490		100.00	0.000	0.000
					C	0.000	11.490		100.00	0.000	3.798
L38 13.5000-13.2500	13.3750	0.85	6.32	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L39 13.2500-8.2500	10.7500	0.85	6.32	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.958
L40 8.2500-6.2500	7.2500	0.85	6.32	6.000	A	0.000	6.000	6.000	100.00	0.000	0.000
					B	0.000	6.000		100.00	0.000	0.000
					C	0.000	6.000		100.00	0.000	1.983
L41 6.2500-6.0000	6.1250	0.85	6.32	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.248
L42 6.0000-1.0000	3.5000	0.85	6.32	15.000	A	0.000	15.000	15.000	100.00	0.000	0.000
					B	0.000	15.000		100.00	0.000	0.000
					C	0.000	15.000		100.00	0.000	4.958
L43 1.0000-0.0000	0.5000	0.85	6.32	3.000	A	0.000	3.000	3.000	100.00	0.000	0.000
					B	0.000	3.000		100.00	0.000	0.000
					C	0.000	3.000		100.00	0.000	0.992

## 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
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
L1	120 - 115	Pole	Max Tension	21	0.00	-0.00	-0.00
			Max. Compression	26	-7.37	-0.22	0.27
			Max. Mx	20	-3.08	22.84	0.68
			Max. My	2	-3.08	0.81	23.05
			Max. Vy	20	-6.15	22.84	0.68
			Max. Vx	14	6.17	-0.23	-22.74
			Max. Torque	20			-0.29
L2	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8.05	-0.18	0.25

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	110 - 105	Pole	Max. Mx	20	-3.47	54.61	1.00
			Max. My	2	-3.47	1.30	54.88
			Max. Vy	20	-6.55	54.61	1.00
			Max. Vx	14	6.57	-0.33	-54.60
			Max. Torque	20			-0.29
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8.72	-0.15	0.23
			Max. Mx	20	-3.87	88.36	1.33
			Max. My	2	-3.87	1.80	88.69
			Max. Vy	20	-6.95	88.36	1.33
L4	105 - 100	Pole	Max. Vx	14	6.96	-0.42	-88.44
			Max. Torque	20			-0.26
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.40	-0.11	0.21
			Max. Mx	20	-4.28	124.05	1.65
			Max. My	2	-4.27	2.30	124.45
			Max. Vy	20	-7.33	124.05	1.65
			Max. Vx	14	7.35	-0.52	-124.23
			Max. Torque	20			-0.23
			Max Tension	1	0.00	0.00	0.00
L5	100 - 98.5	Pole	Max. Compression	26	-17.14	-0.09	0.75
			Max. Mx	20	-7.57	151.68	1.84
			Max. My	2	-7.56	2.45	152.28
			Max. Vy	20	-13.24	151.68	1.84
			Max. Vx	14	13.30	-0.54	-151.83
			Max. Torque	20			-0.59
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.19	-0.09	0.75
			Max. Mx	20	-7.61	154.99	1.86
			Max. My	2	-7.60	2.48	155.60
L6	98.5 - 98.25	Pole	Max. Vy	20	-13.26	154.99	1.86
			Max. Vx	14	13.32	-0.55	-155.16
			Max. Torque	20			-0.57
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.19	-0.02	0.71
			Max. Mx	20	-8.31	222.47	2.19
			Max. My	2	-8.31	3.00	223.35
			Max. Vy	20	-13.73	222.47	2.19
			Max. Vx	14	13.79	-0.64	-222.95
			Max. Torque	20			-0.57
L7	98.25 - 93.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.83	0.02	0.68
			Max. Mx	20	-8.78	267.58	2.41
			Max. My	2	-8.77	3.33	268.64
			Max. Vy	20	-14.03	267.58	2.41
			Max. Vx	14	14.09	-0.70	-268.26
			Max. Torque	18			-0.52
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.88	0.02	0.68
			Max. Mx	20	-8.82	271.09	2.42
L8	93.25 - 90	Pole	Max. My	2	-8.81	3.36	272.16
			Max. Vy	20	-14.05	271.09	2.42
			Max. Vx	14	14.11	-0.70	-271.78
			Max. Torque	18			-0.52
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.88	0.09	0.64
			Max. Mx	20	-9.55	342.36	2.75
			Max. My	2	-9.55	3.88	343.69
			Max. Vy	20	-14.46	342.36	2.75
			Max. Vx	14	14.52	-0.79	-343.35
L9	90 - 89.75	Pole	Max. Torque	4			0.53
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.87	0.16	0.61
			Max. Mx	20	-10.31	415.62	3.08
			Max. My	2	-10.30	4.40	417.22
			Max. Vy	20	-14.85	415.62	3.08
			Max. Torque	18			-0.52
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.88	0.02	0.68
			Max. Mx	20	-8.82	271.09	2.42
L10	89.75 - 84.75	Pole	Max. My	2	-8.81	3.36	272.16
			Max. Vy	20	-14.05	271.09	2.42
			Max. Vx	14	14.11	-0.70	-271.78
			Max. Torque	18			-0.52
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.88	0.09	0.64
			Max. Mx	20	-9.55	342.36	2.75
			Max. My	2	-9.55	3.88	343.69
			Max. Vy	20	-14.46	342.36	2.75
			Max. Vx	14	14.52	-0.79	-343.35
L11	84.75 - 79.75	Pole	Max. Torque	4			0.53
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-20.87	0.16	0.61
			Max. Mx	20	-10.31	415.62	3.08
			Max. My	2	-10.30	4.40	417.22
			Max. Vy	20	-14.85	415.62	3.08
			Max. Torque	18			-0.52
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.88	0.02	0.68
			Max. Mx	20	-8.82	271.09	2.42



120 Ft Monopole Tower Structural Analysis  
Project Number 37518-3174.001.7805, Order 378471, Revision 5

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L12	79.75 - 79	Pole	Max. Vx	14	14.91	-0.88	-416.93
			Max. Torque	4			0.58
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.02	0.17	0.60
			Max. Mx	20	-10.43	426.78	3.13
			Max. My	2	-10.42	4.47	428.42
			Max. Vy	20	-14.91	426.78	3.13
L13	79 - 78.75	Pole	Max. Vx	14	14.97	-0.90	-428.13
			Max. Torque	4			0.59
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.08	0.17	0.60
			Max. Mx	20	-10.48	430.51	3.15
			Max. My	2	-10.47	4.50	432.16
			Max. Vy	20	-14.92	430.51	3.15
L14	78.75 - 75.17	Pole	Max. Vx	14	14.99	-0.90	-431.87
			Max. Torque	4			0.60
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.92	0.22	0.57
			Max. Mx	20	-11.14	484.44	3.38
			Max. My	2	-11.13	4.87	486.28
			Max. Vy	20	-15.21	484.44	3.38
L15	75.17 - 74.92	Pole	Max. Vx	14	15.27	-0.97	-486.02
			Max. Torque	4			0.63
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.98	0.22	0.57
			Max. Mx	20	-11.20	488.24	3.40
			Max. My	2	-11.20	4.90	490.10
			Max. Vy	20	-15.23	488.24	3.40
L16	74.92 - 69.92	Pole	Max. Vx	14	15.29	-0.97	-489.84
			Max. Torque	4			0.64
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.33	0.28	0.53
			Max. Mx	20	-12.31	565.53	3.73
			Max. My	2	-12.30	5.41	567.66
			Max. Vy	20	-15.69	565.53	3.73
L17	69.92 - 64.92	Pole	Max. Vx	14	15.75	-1.06	-567.44
			Max. Torque	3			0.74
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24.68	0.35	0.50
			Max. Mx	20	-13.43	645.05	4.06
			Max. My	2	-13.42	5.93	647.44
			Max. Vy	20	-16.12	645.05	4.06
L18	64.92 - 60	Pole	Max. Vx	14	16.19	-1.15	-647.26
			Max. Torque	3			0.88
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.01	0.41	0.46
			Max. Mx	20	-14.54	725.35	4.38
			Max. My	2	-14.54	6.43	728.01
			Max. Vy	20	-16.53	725.35	4.38
L19	60 - 59.75	Pole	Max. Vx	14	16.59	-1.24	-727.87
			Max. Torque	3			1.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.75	0.42	0.46
			Max. Mx	20	-18.80	729.65	4.39
			Max. My	2	-18.79	6.46	732.32
			Max. Vy	20	-17.20	729.65	4.39
L20	59.75 - 54.75	Pole	Max. Vx	14	17.26	-1.25	-732.18
			Max. Torque	3			1.02
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.18	0.49	0.41
			Max. Mx	20	-19.94	816.78	4.72
			Max. My	2	-19.94	6.98	819.72
			Max. Vy	20	-17.66	816.78	4.72
			Max. Vx	14	17.73	-1.34	-819.62

Sectio n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L21	54.75 - 49.75	Pole	Max. Torque	3			1.19
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.60	0.57	0.37
			Max. Mx	20	-21.10	906.18	5.05
			Max. My	2	-21.10	7.50	909.38
			Max. Vy	20	-18.11	906.18	5.05
			Max. Vx	14	18.17	-1.43	-909.33
L22	49.75 - 47.83	Pole	Max. Torque	3			1.36
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.15	0.60	0.35
			Max. Mx	20	-21.55	941.09	5.18
			Max. My	2	-21.54	7.70	944.39
			Max. Vy	20	-18.28	941.09	5.18
			Max. Vx	14	18.34	-1.46	-944.36
L23	47.83 - 47.58	Pole	Max. Torque	3			1.42
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.23	0.61	0.35
			Max. Mx	20	-21.63	945.66	5.19
			Max. My	2	-21.62	7.72	948.97
			Max. Vy	20	-18.29	945.66	5.19
			Max. Vx	14	18.35	-1.46	-948.94
L24	47.58 - 43	Pole	Max. Torque	3			1.43
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.70	0.68	0.31
			Max. Mx	20	-22.85	1030.31	5.49
			Max. My	14	-22.85	-1.55	-1033.87
			Max. Vy	20	-18.69	1030.31	5.49
			Max. Vx	14	18.75	-1.55	-1033.87
L25	43 - 42.75	Pole	Max. Torque	3			1.59
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.79	0.68	0.30
			Max. Mx	20	-22.94	1034.98	5.51
			Max. My	14	-22.94	-1.55	-1038.56
			Max. Vy	20	-18.71	1034.98	5.51
			Max. Vx	14	18.77	-1.55	-1038.56
L26	42.75 - 37.75	Pole	Max. Torque	3			1.60
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.64	0.76	0.26
			Max. Mx	20	-24.53	1129.67	5.83
			Max. My	14	-24.52	-1.64	-1133.56
			Max. Vy	20	-19.17	1129.67	5.83
			Max. Vx	14	19.24	-1.64	-1133.56
L27	37.75 - 34.5	Pole	Max. Torque	3			1.80
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.84	0.81	0.23
			Max. Mx	20	-25.56	1192.43	6.04
			Max. My	14	-25.56	-1.70	-1196.51
			Max. Vy	20	-19.46	1192.43	6.04
			Max. Vx	14	19.52	-1.70	-1196.51
L28	34.5 - 34.25	Pole	Max. Torque	3			1.93
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.92	0.81	0.23
			Max. Mx	20	-25.64	1197.29	6.06
			Max. My	14	-25.64	-1.70	-1201.39
			Max. Vy	20	-19.47	1197.29	6.06
			Max. Vx	14	19.53	-1.70	-1201.39
L29	34.25 - 30	Pole	Max. Torque	3			1.94
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.27	0.87	0.19
			Max. Mx	20	-26.80	1280.73	6.33
			Max. My	14	-26.80	-1.78	-1285.09
			Max. Vy	20	-19.80	1280.73	6.33
			Max. Vx	14	19.87	-1.78	-1285.09
L30	30 - 29.75	Pole	Max. Torque	25			2.12
			Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	29.75 - 25.58	Pole	Max. Compression	26	-46.72	0.88	0.19
			Max. Mx	20	-32.33	1285.92	6.35
			Max. My	14	-32.33	-1.78	-1290.29
			Max. Vy	20	-20.75	1285.92	6.35
			Max. Vx	14	20.81	-1.78	-1290.29
			Max. Torque	25			2.13
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.13	0.95	0.15
L32	25.58 - 25.33	Pole	Max. Mx	20	-33.50	1373.13	6.61
			Max. My	14	-33.50	-1.86	-1377.75
			Max. Vy	20	-21.09	1373.13	6.61
			Max. Vx	14	21.15	-1.86	-1377.75
			Max. Torque	25			2.32
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.22	0.95	0.15
			L33	25.33 - 20.75	Pole	Max. Mx	20
Max. My	14	-33.59				-1.86	-1383.04
Max. Vy	20	-21.11				1378.40	6.63
Max. Vx	14	21.17				-1.86	-1383.04
Max. Torque	25						2.33
Max Tension	1	0.00				0.00	0.00
Max. Compression	26	-49.93				1.03	0.10
L34	20.75 - 20.5	Pole				Max. Mx	20
			Max. My	14	-35.04	-1.94	-1480.82
			Max. Vy	20	-21.48	1475.89	6.92
			Max. Vx	14	21.54	-1.94	-1480.82
			Max. Torque	25			2.54
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.04	1.03	0.10
			L35	20.5 - 17.58	Pole	Max. Mx	20
Max. My	14	-35.14				-1.94	-1486.20
Max. Vy	20	-21.49				1481.26	6.94
Max. Vx	14	21.55				-1.94	-1486.20
Max. Torque	25						2.56
Max Tension	1	0.00				0.00	0.00
Max. Compression	26	-51.28				1.08	0.07
L36	17.58 - 17.33	Pole				Max. Mx	20
			Max. My	14	-36.21	-1.99	-1549.49
			Max. Vy	20	-21.75	1544.38	7.12
			Max. Vx	14	21.81	-1.99	-1549.49
			Max. Torque	25			2.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.37	1.09	0.07
			L37	17.33 - 13.5	Pole	Max. Mx	20
Max. My	14	-36.30				-2.00	-1554.94
Max. Vy	20	-21.76				1549.81	7.14
Max. Vx	14	21.82				-2.00	-1554.94
Max. Torque	25						2.72
Max Tension	1	0.00				0.00	0.00
Max. Compression	26	-52.85				1.15	0.03
L38	13.5 - 13.25	Pole				Max. Mx	20
			Max. My	14	-37.58	-2.06	-1639.03
			Max. Vy	20	-22.05	1633.67	7.38
			Max. Vx	14	22.11	-2.06	-1639.03
			Max. Torque	25			2.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.95	1.15	0.03
			L39	13.25 - 8.25	Pole	Max. Mx	20
Max. My	14	-37.68				-2.07	-1644.56
Max. Vy	20	-22.06				1639.18	7.39
Max. Vx	14	22.12				-2.07	-1644.56
Max. Torque	25						2.93
Max Tension	1	0.00				0.00	0.00
Max. Compression	26	-54.93				1.23	-0.01
Max. Mx	20	-39.41				1750.33	7.71

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L40	8.25 - 6.25	Pole	Max. My	14	-39.41	-2.15	-1756.00
			Max. Vy	20	-22.41	1750.33	7.71
			Max. Vx	14	22.47	-2.15	-1756.00
			Max. Torque	25			3.18
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.71	1.26	-0.03
			Max. Mx	20	-40.11	1795.27	7.83
			Max. My	14	-40.11	-2.19	-1801.06
			Max. Vy	20	-22.55	1795.27	7.83
			Max. Vx	14	22.61	-2.19	-1801.06
L41	6.25 - 6	Pole	Max. Torque	25			3.28
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.82	1.26	-0.03
			Max. Mx	20	-40.22	1800.90	7.85
			Max. My	14	-40.22	-2.19	-1806.71
			Max. Vy	20	-22.55	1800.90	7.85
			Max. Vx	14	22.61	-2.19	-1806.71
			Max. Torque	25			3.29
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.03	1.33	-0.07
L42	6 - 1	Pole	Max. Mx	20	-42.22	1914.54	8.15
			Max. My	14	-42.22	-2.27	-1920.65
			Max. Vy	20	-22.91	1914.54	8.15
			Max. Vx	14	22.97	-2.27	-1920.65
			Max. Torque	25			3.54
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.47	1.34	-0.08
			Max. Mx	20	-42.62	1937.48	8.22
			Max. My	14	-42.62	-2.29	-1943.64
			Max. Vy	20	-22.98	1937.48	8.22
L43	1 - 0	Pole	Max. Vx	14	23.04	-2.29	-1943.64
			Max. Torque	25			3.59

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	58.47	0.00	0.00
	Max. H <sub>x</sub>	20	42.63	22.97	0.06
	Max. H <sub>z</sub>	2	42.63	0.10	23.02
	Max. M <sub>x</sub>	2	1943.25	0.10	23.02
	Max. M <sub>z</sub>	8	1933.05	-22.93	-0.01
	Max. Torsion	25	3.59	11.55	19.92
	Min. Vert	21	31.97	22.97	0.06
	Min. H <sub>x</sub>	9	31.97	-22.93	-0.01
	Min. H <sub>z</sub>	15	31.97	-0.02	-23.03
	Min. M <sub>x</sub>	14	-1943.64	-0.02	-23.03
	Min. M <sub>z</sub>	20	-1937.48	22.97	0.06
	Min. Torsion	13	-3.57	-11.46	-19.97

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	35.53	0.00	-0.00	-0.08	0.16	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	42.63	-0.10	-23.02	-1943.25	12.56	-3.38
0.9 Dead+1.0 Wind 0 deg - No Ice	31.97	-0.10	-23.02	-1926.72	12.38	-3.38
1.2 Dead+1.0 Wind 30 deg - No Ice	42.63	11.46	-19.88	-1676.01	-965.23	-2.24
0.9 Dead+1.0 Wind 30 deg - No Ice	31.97	11.46	-19.88	-1661.77	-957.09	-2.24

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Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.0 Wind 60 deg - No Ice	42.63	19.86	-11.48	-967.17	-1673.84	-0.48
0.9 Dead+1.0 Wind 60 deg - No Ice	31.97	19.86	-11.48	-958.94	-1659.69	-0.48
1.2 Dead+1.0 Wind 90 deg - No Ice	42.63	22.93	0.01	1.25	-1933.05	1.40
0.9 Dead+1.0 Wind 90 deg - No Ice	31.97	22.93	0.01	1.26	-1916.72	1.40
1.2 Dead+1.0 Wind 120 deg - No Ice	42.63	19.87	11.59	981.88	-1675.56	2.87
0.9 Dead+1.0 Wind 120 deg - No Ice	31.97	19.87	11.59	973.56	-1661.39	2.87
1.2 Dead+1.0 Wind 150 deg - No Ice	42.63	11.46	19.97	1687.14	-966.00	3.57
0.9 Dead+1.0 Wind 150 deg - No Ice	31.97	11.46	19.97	1672.84	-957.85	3.57
1.2 Dead+1.0 Wind 180 deg - No Ice	42.63	0.02	23.03	1943.64	-2.29	3.31
0.9 Dead+1.0 Wind 180 deg - No Ice	31.97	0.02	23.03	1927.18	-2.32	3.31
1.2 Dead+1.0 Wind 210 deg - No Ice	42.63	-11.43	19.94	1682.47	961.89	2.18
0.9 Dead+1.0 Wind 210 deg - No Ice	31.97	-11.43	19.94	1668.22	953.69	2.18
1.2 Dead+1.0 Wind 240 deg - No Ice	42.63	-19.91	11.50	970.20	1680.43	0.51
0.9 Dead+1.0 Wind 240 deg - No Ice	31.97	-19.91	11.50	962.00	1666.12	0.51
1.2 Dead+1.0 Wind 270 deg - No Ice	42.63	-22.97	-0.06	-8.22	1937.48	-1.31
0.9 Dead+1.0 Wind 270 deg - No Ice	31.97	-22.97	-0.06	-8.10	1920.95	-1.32
1.2 Dead+1.0 Wind 300 deg - No Ice	42.63	-19.92	-11.53	-974.23	1681.48	-2.82
0.9 Dead+1.0 Wind 300 deg - No Ice	31.97	-19.92	-11.53	-965.93	1667.16	-2.83
1.2 Dead+1.0 Wind 330 deg - No Ice	42.63	-11.55	-19.92	-1681.01	977.63	-3.59
0.9 Dead+1.0 Wind 330 deg - No Ice	31.97	-11.55	-19.92	-1666.72	969.27	-3.59
1.2 Dead+1.0 Ice+1.0 Temp	58.47	-0.00	-0.00	0.08	1.34	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	58.47	-0.02	-7.03	-596.54	4.22	-1.18
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	58.47	3.51	-6.08	-515.04	-295.46	-0.76
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	58.47	6.07	-3.51	-297.24	-513.18	-0.13
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	58.47	7.01	0.00	0.32	-592.84	0.53
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	58.47	6.08	3.53	300.69	-513.55	1.05
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	58.47	3.51	6.10	517.69	-295.58	1.28
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	58.47	0.00	7.03	596.75	0.88	1.17
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	58.47	-3.50	6.09	516.64	297.43	0.75
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	58.47	-6.08	3.52	298.06	517.44	0.13
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	58.47	-7.02	-0.01	-1.79	596.60	-0.52
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	58.47	-6.09	-3.52	-298.81	517.65	-1.04
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	58.47	-3.53	-6.09	-516.16	300.99	-1.28
Dead+Wind 0 deg - Service	35.53	-0.02	-4.75	-398.68	2.70	-0.70
Dead+Wind 30 deg - Service	35.53	2.36	-4.10	-343.88	-197.88	-0.46
Dead+Wind 60 deg - Service	35.53	4.09	-2.37	-198.47	-343.24	-0.10

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 90 deg - Service	35.53	4.73	0.00	0.19	-396.40	0.29
Dead+Wind 120 deg - Service	35.53	4.10	2.39	201.36	-343.60	0.59
Dead+Wind 150 deg - Service	35.53	2.36	4.12	346.04	-198.04	0.74
Dead+Wind 180 deg - Service	35.53	0.00	4.75	398.63	-0.34	0.68
Dead+Wind 210 deg - Service	35.53	-2.36	4.11	345.08	197.45	0.45
Dead+Wind 240 deg - Service	35.53	-4.10	2.37	198.96	344.85	0.10
Dead+Wind 270 deg - Service	35.53	-4.73	-0.01	-1.75	397.56	-0.27
Dead+Wind 300 deg - Service	35.53	-4.11	-2.38	-199.92	345.07	-0.58
Dead+Wind 330 deg - Service	35.53	-2.38	-4.11	-344.91	200.68	-0.74

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-35.53	0.00	0.00	35.53	0.00	0.000%
2	-0.10	-42.63	-23.02	0.10	42.63	23.02	0.000%
3	-0.10	-31.97	-23.02	0.10	31.97	23.02	0.000%
4	11.46	-42.63	-19.88	-11.46	42.63	19.88	0.000%
5	11.46	-31.97	-19.88	-11.46	31.97	19.88	0.000%
6	19.86	-42.63	-11.48	-19.86	42.63	11.48	0.000%
7	19.86	-31.97	-11.48	-19.86	31.97	11.48	0.000%
8	22.94	-42.63	0.01	-22.93	42.63	-0.01	0.001%
9	22.94	-31.97	0.01	-22.93	31.97	-0.01	0.001%
10	19.87	-42.63	11.59	-19.87	42.63	-11.59	0.000%
11	19.87	-31.97	11.59	-19.87	31.97	-11.59	0.000%
12	11.46	-42.63	19.97	-11.46	42.63	-19.97	0.000%
13	11.46	-31.97	19.97	-11.46	31.97	-19.97	0.000%
14	0.02	-42.63	23.03	-0.02	42.63	-23.03	0.001%
15	0.02	-31.97	23.03	-0.02	31.97	-23.03	0.000%
16	-11.43	-42.63	19.94	11.43	42.63	-19.94	0.000%
17	-11.43	-31.97	19.94	11.43	31.97	-19.94	0.000%
18	-19.91	-42.63	11.50	19.91	42.63	-11.50	0.000%
19	-19.91	-31.97	11.50	19.91	31.97	-11.50	0.000%
20	-22.97	-42.63	-0.06	22.97	42.63	0.06	0.001%
21	-22.97	-31.97	-0.06	22.97	31.97	0.06	0.003%
22	-19.92	-42.63	-11.53	19.92	42.63	11.53	0.000%
23	-19.92	-31.97	-11.53	19.92	31.97	11.53	0.000%
24	-11.55	-42.63	-19.92	11.55	42.63	19.92	0.000%
25	-11.55	-31.97	-19.92	11.55	31.97	19.92	0.000%
26	0.00	-58.47	0.00	0.00	58.47	0.00	0.000%
27	-0.02	-58.47	-7.03	0.02	58.47	7.03	0.000%
28	3.51	-58.47	-6.08	-3.51	58.47	6.08	0.000%
29	6.07	-58.47	-3.51	-6.07	58.47	3.51	0.000%
30	7.01	-58.47	0.00	-7.01	58.47	-0.00	0.000%
31	6.08	-58.47	3.53	-6.08	58.47	-3.53	0.000%
32	3.51	-58.47	6.10	-3.51	58.47	-6.10	0.000%
33	0.00	-58.47	7.03	-0.00	58.47	-7.03	0.000%
34	-3.50	-58.47	6.09	3.50	58.47	-6.09	0.000%
35	-6.08	-58.47	3.52	6.08	58.47	-3.52	0.000%
36	-7.02	-58.47	-0.01	7.02	58.47	0.01	0.000%
37	-6.09	-58.47	-3.52	6.09	58.47	3.52	0.000%
38	-3.53	-58.47	-6.09	3.53	58.47	6.09	0.000%
39	-0.02	-35.53	-4.75	0.02	35.53	4.75	0.002%
40	2.36	-35.53	-4.10	-2.36	35.53	4.10	0.001%
41	4.09	-35.53	-2.37	-4.09	35.53	2.37	0.001%
42	4.73	-35.53	0.00	-4.73	35.53	-0.00	0.002%
43	4.10	-35.53	2.39	-4.10	35.53	-2.39	0.001%
44	2.36	-35.53	4.12	-2.36	35.53	-4.12	0.001%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
45	0.00	-35.53	4.75	-0.00	35.53	-4.75	0.002%
46	-2.36	-35.53	4.11	2.36	35.53	-4.11	0.001%
47	-4.10	-35.53	2.37	4.10	35.53	-2.37	0.001%
48	-4.73	-35.53	-0.01	4.73	35.53	0.01	0.002%
49	-4.11	-35.53	-2.38	4.11	35.53	2.38	0.001%
50	-2.38	-35.53	-4.11	2.38	35.53	4.11	0.001%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	18	0.00000001	0.00008079
3	Yes	17	0.00000001	0.00014810
4	Yes	20	0.00000001	0.00013877
5	Yes	20	0.00000001	0.00010533
6	Yes	20	0.00000001	0.00014551
7	Yes	20	0.00000001	0.00011059
8	Yes	16	0.00000001	0.00009760
9	Yes	16	0.00000001	0.00007677
10	Yes	21	0.00000001	0.00006310
11	Yes	20	0.00000001	0.00011415
12	Yes	20	0.00000001	0.00014011
13	Yes	20	0.00000001	0.00010627
14	Yes	17	0.00000001	0.00014093
15	Yes	17	0.00000001	0.00011436
16	Yes	20	0.00000001	0.00014809
17	Yes	20	0.00000001	0.00011261
18	Yes	20	0.00000001	0.00014260
19	Yes	20	0.00000001	0.00010827
20	Yes	16	0.00000001	0.00008438
21	Yes	15	0.00000001	0.00013821
22	Yes	20	0.00000001	0.00014282
23	Yes	20	0.00000001	0.00010833
24	Yes	21	0.00000001	0.00006396
25	Yes	20	0.00000001	0.00011571
26	Yes	6	0.00000001	0.00000001
27	Yes	19	0.00000001	0.00008040
28	Yes	19	0.00000001	0.00009314
29	Yes	19	0.00000001	0.00009370
30	Yes	19	0.00000001	0.00007945
31	Yes	19	0.00000001	0.00009454
32	Yes	19	0.00000001	0.00009330
33	Yes	19	0.00000001	0.00008011
34	Yes	19	0.00000001	0.00009434
35	Yes	19	0.00000001	0.00009384
36	Yes	19	0.00000001	0.00007993
37	Yes	19	0.00000001	0.00009415
38	Yes	19	0.00000001	0.00009554
39	Yes	14	0.00000001	0.00009100
40	Yes	15	0.00000001	0.00009035
41	Yes	15	0.00000001	0.00010510
42	Yes	14	0.00000001	0.00004987
43	Yes	15	0.00000001	0.00011233
44	Yes	15	0.00000001	0.00009151
45	Yes	14	0.00000001	0.00008560
46	Yes	15	0.00000001	0.00011292
47	Yes	15	0.00000001	0.00009472
48	Yes	14	0.00000001	0.00004903
49	Yes	15	0.00000001	0.00009467
50	Yes	15	0.00000001	0.00011927

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 115	12.838	50	0.9293	0.0015
L2	115 - 110	11.865	50	0.9277	0.0015
L3	110 - 105	10.898	50	0.9190	0.0015
L4	105 - 100	9.943	50	0.9030	0.0015
L5	100 - 98.5	9.010	50	0.8792	0.0015
L6	98.5 - 98.25	8.735	50	0.8697	0.0015
L7	98.25 - 93.25	8.689	50	0.8686	0.0015
L8	93.25 - 90	7.794	50	0.8409	0.0015
L9	90 - 89.75	7.229	50	0.8175	0.0015
L10	89.75 - 84.75	7.186	50	0.8154	0.0015
L11	84.75 - 79.75	6.356	50	0.7691	0.0014
L12	79.75 - 79	5.579	50	0.7118	0.0013
L13	79 - 78.75	5.468	50	0.7022	0.0013
L14	78.75 - 75.17	5.432	50	0.6999	0.0013
L15	75.17 - 74.92	4.920	50	0.6634	0.0013
L16	74.92 - 69.92	4.886	50	0.6613	0.0013
L17	69.92 - 64.92	4.217	50	0.6154	0.0012
L18	64.92 - 60	3.599	50	0.5627	0.0011
L19	60 - 59.75	3.049	50	0.5040	0.0010
L20	59.75 - 54.75	3.023	50	0.5020	0.0010
L21	54.75 - 49.75	2.519	50	0.4596	0.0010
L22	49.75 - 47.83	2.062	50	0.4123	0.0009
L23	47.83 - 47.58	1.900	50	0.3929	0.0008
L24	47.58 - 43	1.879	50	0.3907	0.0008
L25	43 - 42.75	1.524	50	0.3497	0.0008
L26	42.75 - 37.75	1.506	50	0.3478	0.0008
L27	37.75 - 34.5	1.162	50	0.3079	0.0007
L28	34.5 - 34.25	0.962	50	0.2800	0.0006
L29	34.25 - 30	0.947	50	0.2773	0.0006
L30	30 - 29.75	0.722	50	0.2295	0.0005
L31	29.75 - 25.58	0.710	50	0.2276	0.0005
L32	25.58 - 25.33	0.525	50	0.1939	0.0004
L33	25.33 - 20.75	0.515	50	0.1921	0.0004
L34	20.75 - 20.5	0.347	50	0.1581	0.0004
L35	20.5 - 17.58	0.339	50	0.1565	0.0004
L36	17.58 - 17.33	0.249	50	0.1374	0.0003
L37	17.33 - 13.5	0.242	50	0.1355	0.0003
L38	13.5 - 13.25	0.145	50	0.1055	0.0002
L39	13.25 - 8.25	0.140	50	0.1035	0.0002
L40	8.25 - 6.25	0.053	50	0.0624	0.0001
L41	6.25 - 6	0.030	50	0.0453	0.0001
L42	6 - 1	0.028	50	0.0435	0.0001
L43	1 - 0	0.001	50	0.0075	0.0000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	50	12.838	0.9293	0.0016	56498
121.0000	VHLP1-18	50	12.838	0.9293	0.0016	56498
117.0000	APXV9ERR18-C-A20 w/ Mount Pipe	50	12.254	0.9289	0.0016	56498
100.0000	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	50	9.010	0.8792	0.0016	10756
60.0000	Bridge Stiffener (35" x 10.5" x 1.25")	50	3.049	0.5040	0.0010	5608
30.0000	Bridge Stiffener (35" x 10.5" x 1.25")	50	0.722	0.2295	0.0005	5942



### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 115	62.520	24	4.5287	0.0071
L2	115 - 110	57.788	24	4.5208	0.0072
L3	110 - 105	53.081	24	4.4786	0.0074
L4	105 - 100	48.437	24	4.4009	0.0074
L5	100 - 98.5	43.893	24	4.2854	0.0074
L6	98.5 - 98.25	42.556	24	4.2391	0.0074
L7	98.25 - 93.25	42.334	24	4.2336	0.0074
L8	93.25 - 90	37.974	24	4.0989	0.0073
L9	90 - 89.75	35.226	24	3.9852	0.0072
L10	89.75 - 84.75	35.018	24	3.9753	0.0071
L11	84.75 - 79.75	30.974	24	3.7495	0.0069
L12	79.75 - 79	27.193	24	3.4706	0.0065
L13	79 - 78.75	26.652	24	3.4241	0.0064
L14	78.75 - 75.17	26.473	24	3.4124	0.0064
L15	75.17 - 74.92	23.982	24	3.2350	0.0061
L16	74.92 - 69.92	23.813	24	3.2246	0.0061
L17	69.92 - 64.92	20.554	24	3.0010	0.0058
L18	64.92 - 60	17.545	24	2.7440	0.0054
L19	60 - 59.75	14.864	24	2.4578	0.0050
L20	59.75 - 54.75	14.735	24	2.4481	0.0050
L21	54.75 - 49.75	12.279	24	2.2412	0.0046
L22	49.75 - 47.83	10.052	24	2.0108	0.0043
L23	47.83 - 47.58	9.262	24	1.9159	0.0041
L24	47.58 - 43	9.162	24	1.9054	0.0041
L25	43 - 42.75	7.430	24	1.7052	0.0037
L26	42.75 - 37.75	7.341	24	1.6959	0.0037
L27	37.75 - 34.5	5.666	24	1.5012	0.0033
L28	34.5 - 34.25	4.690	24	1.3654	0.0030
L29	34.25 - 30	4.619	24	1.3522	0.0030
L30	30 - 29.75	3.518	24	1.1192	0.0025
L31	29.75 - 25.58	3.459	24	1.1097	0.0025
L32	25.58 - 25.33	2.561	24	0.9452	0.0022
L33	25.33 - 20.75	2.512	24	0.9365	0.0021
L34	20.75 - 20.5	1.692	24	0.7709	0.0018
L35	20.5 - 17.58	1.652	24	0.7631	0.0018
L36	17.58 - 17.33	1.214	24	0.6697	0.0016
L37	17.33 - 13.5	1.179	24	0.6604	0.0015
L38	13.5 - 13.25	0.707	24	0.5140	0.0012
L39	13.25 - 8.25	0.681	24	0.5044	0.0012
L40	8.25 - 6.25	0.256	24	0.3043	0.0007
L41	6.25 - 6	0.146	24	0.2206	0.0005
L42	6 - 1	0.135	24	0.2121	0.0005
L43	1 - 0	0.004	24	0.0364	0.0001

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	24	62.520	4.5287	0.0076	11873
121.0000	VHLP1-18	24	62.520	4.5287	0.0076	11873
117.0000	APXV9ERR18-C-A20 w/ Mount Pipe	24	59.679	4.5266	0.0076	11873
100.0000	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	24	43.893	4.2854	0.0077	2240
60.0000	Bridge Stiffener (35" x 10.5" x 1.25")	24	14.864	2.4578	0.0051	1155
30.0000	Bridge Stiffener (35" x 10.5" x 1.25")	24	3.518	1.1192	0.0025	1219

## Compression Checks

## Pole Design Data

Section No.	Elevation ft	Size	L ft	$L_u$ ft	Kl/r	A in <sup>2</sup>	$P_u$ K
L1	120 - 115 (1)	P24x0.25	5.0000	0.0000	0.0	18.653 2	-3.07
L2	115 - 110 (2)	P24x0.25	5.0000	0.0000	0.0	18.653 2	-3.47
L3	110 - 105 (3)	P24x0.25	5.0000	0.0000	0.0	18.653 2	-3.87
L4	105 - 100 (4)	P24x0.25	5.0000	0.0000	0.0	18.653 2	-4.27
L5	100 - 98.5 (5)	P24x0.25	1.5000	0.0000	0.0	18.653 2	-7.56
L6	98.5 - 98.25 (6)	P24x0.3875	0.2500	0.0000	0.0	28.745 1	-7.60
L7	98.25 - 93.25 (7)	P24x0.3875	5.0000	0.0000	0.0	28.745 1	-8.30
L8	93.25 - 90 (8)	P24x0.3875	3.2500	0.0000	0.0	28.745 1	-8.77
L9	90 - 89.75 (9)	P24x0.375	0.2500	0.0000	0.0	27.832 5	-8.81
L10	89.75 - 84.75 (10)	P24x0.375	5.0000	0.0000	0.0	27.832 5	-9.54
L11	84.75 - 79.75 (11)	P24x0.375	5.0000	0.0000	0.0	27.832 5	-10.30
L12	79.75 - 79 (12)	P24x0.375	0.7500	0.0000	0.0	27.832 5	-10.42
L13	79 - 78.75 (13)	P24x0.51875	0.2500	0.0000	0.0	38.267 4	-10.47
L14	78.75 - 75.17 (14)	P24x0.51875	3.5800	0.0000	0.0	38.267 4	-11.13
L15	75.17 - 74.92 (15)	P24x0.675	0.2500	0.0000	0.0	49.462 4	-11.19
L16	74.92 - 69.92 (16)	P24x0.675	5.0000	0.0000	0.0	49.462 4	-12.30
L17	69.92 - 64.92 (17)	P24x0.675	5.0000	0.0000	0.0	49.462 4	-13.42
L18	64.92 - 60 (18)	P24x0.675	4.9200	0.0000	0.0	49.462 4	-14.54
L19	60 - 59.75 (19)	P30x0.53125	0.2500	0.0000	0.0	49.182 5	-18.79
L20	59.75 - 54.75 (20)	P30x0.53125	5.0000	0.0000	0.0	49.182 5	-19.94
L21	54.75 - 49.75 (21)	P30x0.53125	5.0000	0.0000	0.0	49.182 5	-21.10
L22	49.75 - 47.83 (22)	P30x0.53125	1.9200	0.0000	0.0	49.182 5	-21.54
L23	47.83 - 47.58 (23)	P30x0.65	0.2500	0.0000	0.0	59.933 7	-21.62
L24	47.58 - 43 (24)	P30x0.65	4.5800	0.0000	0.0	59.933 7	-22.85
L25	43 - 42.75 (25)	P30x0.8125	0.2500	0.0000	0.0	74.502 4	-22.94
L26	42.75 - 37.75 (26)	P30x0.8125	5.0000	0.0000	0.0	74.502 4	-24.52
L27	37.75 - 34.5 (27)	P30x0.8125	3.2500	0.0000	0.0	74.502 4	-25.56
L28	34.5 - 34.25 (28)	P30x0.65	0.2500	0.0000	0.0	59.933 7	-25.64
L29	34.25 - 30 (29)	P30x0.65	4.2500	0.0000	0.0	59.933 7	-26.80
L30	30 - 29.75 (30)	P36x0.55	0.2500	0.0000	0.0	61.253 2	-32.33
L31	29.75 - 25.58 (31)	P36x0.55	4.1700	0.0000	0.0	61.253 2	-33.50

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K
L32	25.58 - 25.33 (32)	P36x0.65	0.2500	0.0000	0.0	72.185 9	-33.59
L33	25.33 - 20.75 (33)	P36x0.65	4.5800	0.0000	0.0	72.185 9	-35.04
L34	20.75 - 20.5 (34)	P36x0.7875	0.2500	0.0000	0.0	87.115 9	-35.14
L35	20.5 - 17.58 (35)	P36x0.7875	2.9200	0.0000	0.0	87.115 9	-36.21
L36	17.58 - 17.33 (36)	P36x0.6875	0.2500	0.0000	0.0	76.269 5	-36.30
L37	17.33 - 13.5 (37)	P36x0.6875	3.8300	0.0000	0.0	76.269 5	-37.58
L38	13.5 - 13.25 (38)	P36x0.7	0.2500	0.0000	0.0	77.628 8	-37.68
L39	13.25 - 8.25 (39)	P36x0.7	5.0000	0.0000	0.0	77.628 8	-39.41
L40	8.25 - 6.25 (40)	P36x0.7	2.0000	0.0000	0.0	77.628 8	-40.11
L41	6.25 - 6 (41)	P36x0.8875	0.2500	0.0000	0.0	97.899 4	-40.22
L42	6 - 1 (42)	P36x0.8875	5.0000	0.0000	0.0	97.899 4	-42.22
L43	1 - 0 (43)	P36x0.8875	1.0000	0.0000	0.0	97.899 4	-42.62

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	M <sub>uy</sub> kip-ft
L1	120 - 115 (1)	P24x0.25	23.20	0.00
L2	115 - 110 (2)	P24x0.25	55.16	0.00
L3	110 - 105 (3)	P24x0.25	89.09	0.00
L4	105 - 100 (4)	P24x0.25	124.98	0.00
L5	100 - 98.5 (5)	P24x0.25	152.74	0.00
L6	98.5 - 98.25 (6)	P24x0.3875	156.06	0.00
L7	98.25 - 93.25 (7)	P24x0.3875	223.83	0.00
L8	93.25 - 90 (8)	P24x0.3875	269.14	0.00
L9	90 - 89.75 (9)	P24x0.375	272.66	0.00
L10	89.75 - 84.75 (10)	P24x0.375	344.24	0.00
L11	84.75 - 79.75 (11)	P24x0.375	417.82	0.00
L12	79.75 - 79 (12)	P24x0.375	429.03	0.00
L13	79 - 78.75 (13)	P24x0.51875	432.77	0.00
L14	78.75 - 75.17 (14)	P24x0.51875	486.93	0.00
L15	75.17 - 74.92 (15)	P24x0.675	490.75	0.00
L16	74.92 - 69.92 (16)	P24x0.675	568.35	0.00
L17	69.92 - 64.92 (17)	P24x0.675	648.18	0.00
L18	64.92 - 60 (18)	P24x0.675	728.80	0.00
L19	60 - 59.75 (19)	P30x0.53125	733.11	0.00
L20	59.75 - 54.75 (20)	P30x0.53125	820.55	0.00
L21	54.75 - 49.75 (21)	P30x0.53125	910.27	0.00
L22	49.75 - 47.83	P30x0.53125	945.30	0.00

120 Ft Monopole Tower Structural Analysis  
 Project Number 37518-3174.001.7805, Order 378471, Revision 5

Section No.	Elevation	Size	$M_{ux}$	$M_{uy}$
	ft		kip-ft	kip-ft
L23	(22) 47.83 - 47.58	P30x0.65	949.88	0.00
L24	(23) 47.58 - 43	P30x0.65	1034.83	0.00
L25	(24) 43 - 42.75	P30x0.8125	1039.52	0.00
L26	(25) 42.75 - 37.75	P30x0.8125	1134.52	0.00
L27	(26) 37.75 - 34.5	P30x0.8125	1197.47	0.00
L28	(27) 34.5 - 34.25	P30x0.65	1202.35	0.00
L29	(28) 34.25 - 30	P30x0.65	1286.06	0.00
L30	(29) 30 - 29.75	P36x0.55	1291.26	0.00
L31	(30) 29.75 - 25.58	P36x0.55	1378.72	0.00
L32	(31) 25.58 - 25.33	P36x0.65	1384.01	0.00
L33	(32) 25.33 - 20.75	P36x0.65	1481.78	0.00
L34	(33) 20.75 - 20.5	P36x0.7875	1487.18	0.00
L35	(34) 20.5 - 17.58	P36x0.7875	1550.46	0.00
L36	(35) 17.58 - 17.33	P36x0.6875	1555.92	0.00
L37	(36) 17.33 - 13.5	P36x0.6875	1640.01	0.00
L38	(37) 13.5 - 13.25	P36x0.7	1645.53	0.00
L39	(38) 13.25 - 8.25	P36x0.7	1756.98	0.00
L40	(39) 8.25 - 6.25	P36x0.7	1802.03	0.00
L41	(40) 6.25 - 6 (41)	P36x0.8875	1807.69	0.00
L42	(42) 6 - 1 (42)	P36x0.8875	1921.63	0.00
L43	(43) 1 - 0 (43)	P36x0.8875	1944.63	0.00

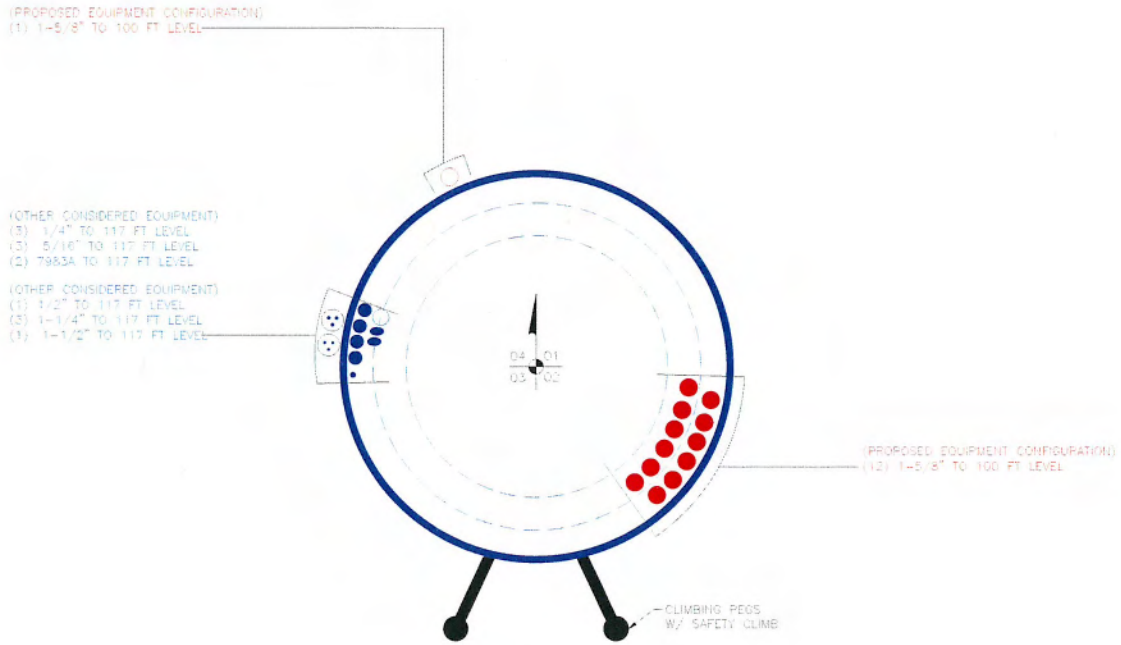
**Pole Shear Design Data**

Section No.	Elevation	Size	Actual	Actual
	ft		$V_u$ K	$T_u$ kip-ft
L1	120 - 115 (1)	P24x0.25	6.19	0.29
L2	115 - 110 (2)	P24x0.25	6.59	0.24
L3	110 - 105 (3)	P24x0.25	6.98	0.19
L4	105 - 100 (4)	P24x0.25	7.37	0.14
L5	100 - 98.5 (5)	P24x0.25	13.29	0.47
L6	98.5 - 98.25 (6)	P24x0.3875	13.33	0.44
L7	98.25 - 93.25 (7)	P24x0.3875	13.80	0.06
L8	93.25 - 90 (8)	P24x0.3875	14.09	0.06
L9	90 - 89.75 (9)	P24x0.375	14.12	0.06
L10	89.75 - 84.75 (10)	P24x0.375	14.52	0.17
L11	84.75 - 79.75 (11)	P24x0.375	14.92	0.27
L12	79.75 - 79 (12)	P24x0.375	14.97	0.29
L13	79 - 78.75 (13)	P24x0.51875	14.99	0.29
L14	78.75 - 75.17	P24x0.51875	15.27	0.37

120 Ft Monopole Tower Structural Analysis  
 Project Number 37518-3174.001.7805, Order 378471, Revision 5

Section No.	Elevation ft	Size	Actual $V_u$ K	Actual $T_u$ kip-ft
L15	(14) 75.17 - 74.92	P24x0.675	15.30	0.37
L16	(15) 74.92 - 69.92	P24x0.675	15.75	0.54
L17	(16) 69.92 - 64.92	P24x0.675	16.19	0.70
L18	(17) 64.92 - 60	P24x0.675	16.59	0.85
L19	(18) 60 - 59.75	P30x0.53125	17.26	0.86
L20	(19) 59.75 - 54.75	P30x0.53125	17.73	1.06
L21	(20) 54.75 - 49.75	P30x0.53125	18.17	1.25
L22	(21) 49.75 - 47.83	P30x0.53125	18.34	1.32
L23	(22) 47.83 - 47.58	P30x0.65	18.35	1.33
L24	(23) 47.58 - 43	P30x0.65	18.75	1.52
L25	(24) 43 - 42.75	P30x0.8125	18.77	1.53
L26	(25) 42.75 - 37.75	P30x0.8125	19.24	1.76
L27	(26) 37.75 - 34.5	P30x0.8125	19.52	1.91
L28	(27) 34.5 - 34.25	P30x0.65	19.54	1.92
L29	(28) 34.25 - 30	P30x0.65	19.87	2.12
L30	(29) 30 - 29.75	P36x0.55	20.81	2.13
L31	(30) 29.75 - 25.58	P36x0.55	21.16	2.31
L32	(31) 25.58 - 25.33	P36x0.65	21.17	2.33
L33	(32) 25.33 - 20.75	P36x0.65	21.54	2.54
L34	(33) 20.75 - 20.5	P36x0.7875	21.56	2.55
L35	(34) 20.5 - 17.58	P36x0.7875	21.81	2.71
L36	(35) 17.58 - 17.33	P36x0.6875	21.82	2.72
L37	(36) 17.33 - 13.5	P36x0.6875	22.11	2.91
L38	(37) 13.5 - 13.25	P36x0.7	22.12	2.92
L39	(38) 13.25 - 8.25	P36x0.7	22.48	3.17
L40	(39) 8.25 - 6.25	P36x0.7	22.61	3.27
L41	(40) 6.25 - 6 (41)	P36x0.8875	22.62	3.29
L42	6 - 1 (42)	P36x0.8875	22.97	3.54
L43	1 - 0 (43)	P36x0.8875	23.04	3.59

**APPENDIX B**  
**BASE LEVEL DRAWING**

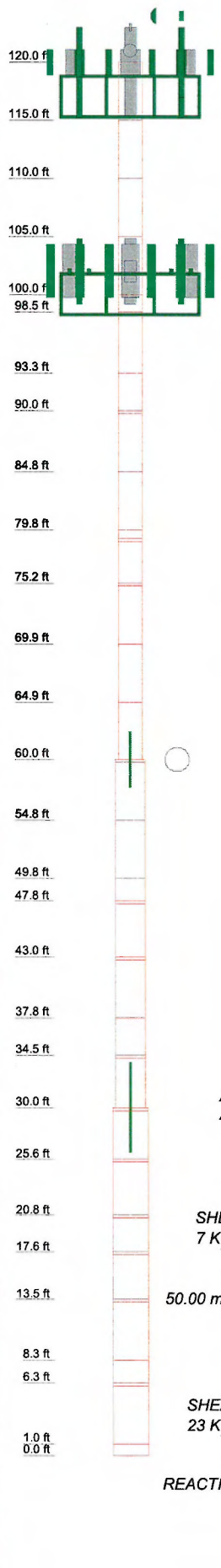


**APPENDIX C**  
**ADDITIONAL CALCULATIONS**



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43									
Size																																																				
Length (ft)																																																				
Grade																																																				
Weight (K)																																																				

A53-B-42



### DESIGNED APPURTENANCE LOADING

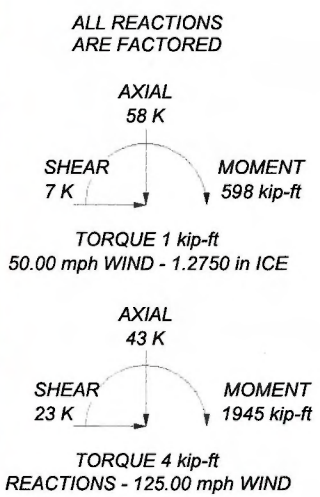
TYPE	ELEVATION	TYPE	ELEVATION
APXV9ERR18-C-A20 w/ Mount Pipe	117	(4) FD9R6004/2C-3L	100
APXVSP18-C-A20 w/ Mount Pipe	117	(4) FD9R6004/2C-3L	100
APXVSP18-C-A20 w/ Mount Pipe	117	(4) FD9R6004/2C-3L	100
LLPX310R w/ Mount Pipe	117	(3) SBNHH-1D45A w/ Mount Pipe	100
LLPX310R w/ Mount Pipe	117	(3) SBNHH-1D45A w/ Mount Pipe	100
LLPX310R w/ Mount Pipe	117	(3) SBNHH-1D45A w/ Mount Pipe	100
800MHZ RRH	117	B25 RRH4X30	100
800MHZ RRH	117	B25 RRH4X30	100
800MHZ RRH	117	B25 RRH4X30	100
800 EXTERNAL NOTCH FILTER	117	B66A RRH4X45	100
800 EXTERNAL NOTCH FILTER	117	B66A RRH4X45	100
800 EXTERNAL NOTCH FILTER	117	B66A RRH4X45	100
(2) 1900MHZ RRH (65MHZ)	117	RXXDC-3315-PF-48	100
(2) 1900MHZ RRH (65MHZ)	117	Platform Mount [LP 303-1]	100
(2) 1900MHZ RRH (65MHZ)	117	Miscellaneous [NA 507-1]	100
FDD_R6_RRH	117	Miscellaneous [NA 509-3]	100
FDD_R6_RRH	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
FDD_R6_RRH	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
IBC1900HB-2	117	IBC1900HB-2	60
IBC1900HB-2	117	IBC1900HB-2	60
IBC1900HB-2	117	IBC1900HB-2	60
HORIZON COMPACT	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
HORIZON COMPACT	117	Bridge Stiffener (58" x 14" x 1.25")	60
KS24019-L112A	117	Bridge Stiffener (58" x 14" x 1.25")	60
AAHC w/ Mount Pipe	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
AAHC w/ Mount Pipe	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
AAHC w/ Mount Pipe	117	Bridge Stiffener (35" x 10.5" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
Platform Mount [LP 502-1]	117	Bridge Stiffener (93" x 16" x 1.25")	30
VHLP1-18	117	Bridge Stiffener (93" x 16" x 1.25")	30
VHLP1-18	117	Bridge Stiffener (93" x 16" x 1.25")	30
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100	Bridge Stiffener (35" x 10.5" x 1.25")	30
		Bridge Stiffener (35" x 10.5" x 1.25")	30

### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

### TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-H Standard.
2. Tower designed for a 125.00 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50.00 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60.00 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.0000 ft
7. TIA-222-H Annex S



<p><b>Paul J. Ford and Company</b> 250 East Broad st., Suite 600 Columbus, OH 43215 Phone: (614) 221-6679 FAX:</p>	<p>Job: <b>120-Ft Monopole / Milford JAI-ALA</b></p> <p>Project: <b>PJF 37518-3174.001.7805 / BU# 876309</b></p> <p>Client: <b>Crown Castle</b>    Drawn by: <b>gaustin</b>    App'd:</p> <p>Code: <b>TIA-222-H</b>    Date: <b>09/24/18</b>    Scale: <b>N</b></p> <p>Path:</p>
	<p>Dwg No.</p>

v2.1, Effective Date: 05-03-17

**Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)**

**General Parameters and Loading:**

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Mu:	1286.1	k-ft
Axial, Pu:	26.8	kips
Shear, V:	19.9	kips

**Pole Parameters:**

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	47.00	47.00	in

**Bridge Stiffener Parameters:**

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	45.25	47.25	in
Lower Weld Length, L2:	42.25	44.13	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E80	
Effective Stiffener Width, Ws:	7.00	7.00	in
Stiffener Thickness, ts:	1.25	1.25	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	4.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	22.5	75	degrees
Stiffener Circle:	55.00	55.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.50	12.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.50	9.50	in = (Df - Dp) / 2 + n + Ws / 2

**Flange Bolt Parameters:**

Number of Bolt Circles:	(1) Bolt Circle		
	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	41.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

**Weld Analysis per AISC Tables 8-4 & 8-3:**

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2762	0.2646	= e1 / L1
k:	0	0	
C:	3.1945	3.2460	Tabulated Coefficient
C1:	1.0000	1.0300	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	191.6	191.6	kips
Axial Capacity, φPn:	650.5	710.9	kips = φ C C1 D L
Ratio:	29.5%	27.0%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2249	0.2153	= e2 / L2
k:	0	0	
C:	3.4106	3.4489	Tabulated Coefficient
C1:	1.0000	1.0300	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	191.6	191.6	kips
Axial Capacity, φPn:	648.4	705.4	kips = φ C C1 D L
Ratio:	29.6%	27.2%	

**Pole Analysis per AISC Table J2.5 & Sect. J4.2:**

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
Stiffener Axial, Pu:	191.6	191.6	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.1	2.0	kips/in = Pu / (2 L1)
Section Modulus, S:	682.5	744.2	in <sup>2</sup> = L <sup>2</sup> / 3
Bending Stress, fub:	3.5	3.2	kips/in = Pu e1 / S
Combined Stress, fu:	4.1	3.8	kips/in = (fuv <sup>2</sup> + fub <sup>2</sup> ) <sup>1/2</sup>
φ:	1.0000	1.0000	
Stress Capacity, φFn:	9.5	9.5	kips/in = φ 0.6 Ft p
Ratio:	43.4%	40.3%	
Lower Pole			
Stiffener Axial, Pu:	191.6	191.6	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.3	2.2	ksi = Pu / (2 L2)
Section Modulus, S:	595.0	649.2	in <sup>2</sup> = L <sup>2</sup> / 3
Bending Stress, fub:	3.1	2.8	ksi = Pu e2 / S
Combined Stress, fu:	3.8	3.5	kips/in = (fuv <sup>2</sup> + fub <sup>2</sup> ) <sup>1/2</sup>
φ:	1.0000	1.0000	
Stress Capacity, φFn:	9.5	9.5	kips/in = φ 0.6 Ft p
Ratio:	40.3%	37.5%	

**Stiffener 1 Analysis per AISC Sect. D2, E3 & E7**

	Stiffener Type 1	
Gross Area, Ag:	8.7500	in <sup>2</sup>
Effective Net Area, Aen:	8.7500	in <sup>2</sup> = Ag U, where U = 1.000
Stiffener Axial, Pu:	191.6	kips
Stiffener Stress, fu:	21.9	ksi = Pu / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8794	= Qa 1.34 - 0.76 (b / ts) (Fy / E) <sup>1/2</sup>
r:	0.3608	in <sup>3</sup>
K L / r:	12.4819	
φ:	0.9000	
Axial Capacity, φFcr:	50.78	ksi = φ Q [0.658 <sup>Q</sup> Fy / F <sub>cr</sub> ] Fy
φ:	0.9000	
Ten. Yielding Cap., φFnt:	58.50	ksi = φ Fy
φ:	0.7500	
Ten. Rupture Cap., φFnr:	60.00	ksi = φ Fu (Aen / Ag)
Ratio:	43.1%	

**Stiffener 2 Analysis per AISC Sect. D2, E3 & E7**

	Stiffener Type 2	
Gross Area, Ag:	8.7500	in <sup>2</sup>
Effective Net Area, Aen:	8.7500	in <sup>2</sup> = Ag U, where U = 1.000
Stiffener Axial, Pu:	191.6	kips
Stiffener Stress, fu:	21.9	ksi = Pu / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8794	= Qa 1.34 - 0.76 (b / ts) (Fy / E) <sup>1/2</sup>
r:	0.3608	in <sup>3</sup>
K L / r:	10.2648	
φ:	0.9000	
Axial Capacity, φFcr:	51.00	ksi = φ Q [0.658 <sup>Q</sup> Fy / F <sub>cr</sub> ] Fy
φ:	0.9000	
Ten. Yielding Cap., φFnt:	58.50	ksi = φ Fy
φ:	0.7500	
Ten. Rupture Cap., φFnr:	60.00	ksi = φ Fu (Aen / Ag)
Ratio:	42.9%	

**Analysis Summary:**

**Bridge Stiffener Type 1**  
 Weld Analysis Ratio: 29.6% PASS  
 Pole Analysis Ratio: 43.4% PASS  
 Stiffener Analysis Ratio: 43.1% PASS

**Bridge Stiffener Type 2**  
 Weld Analysis Ratio: 27.2% PASS  
 Pole Analysis Ratio: 40.3% PASS  
 Stiffener Analysis Ratio: 42.9% PASS

**Welded Bridge Stiffener Analysis per TIA-222-G & AISC 13th Ed. (Black)**

**General Parameters and Loading:**

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	N/A	
Moment, Muf:	728.8	k-ft
Axial, Puf:	14.5	kips
Shear, Vf:	16.6	kips

**Pole Parameters:**

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	30.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	41.00	41.00	in

**Bridge Stiffener Parameters:**

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	25.00	47.25	in
Lower Weld Length, L2:	22.00	44.13	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E80	
Effective Stiffener Width, Ws:	6.68	7.00	in
Stiffener Thickness, ts:	1.34	1.25	in
Notch, n:	1.00	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	11.75	4.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	75	degrees
Stiffener Circle:	49.68	49.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.84	12.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.84	9.50	in = (Df - Dp) / 2 + n + Ws / 2

**Flange Bolt Parameters:**

	(1) Bolt Circle		
	Bolt Circle 1	Bolt Circle 2	
Number of Bolt Circles:	(1) Bolt Circle		
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	35.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

**Weld Analysis per AISC Tables 8-4 & 8-3:**

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.5136	0.2646	= e1 / L1
k:	0	0	
C:	2.2506	3.2460	Tabulated Coefficient
C1:	1.0000	1.0300	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	122.9	118.5	kips
Axial Capacity, φPn:	253.2	710.9	kips = φ C C1 D L
Ratio:	48.5%	16.7%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.4473	0.2153	= e2 / L2
k:	0	0	
C:	2.4851	3.4489	Tabulated Coefficient
C1:	1.0000	1.0300	Coefficient for Electrode
φ:	0.7500	0.7500	
Stiffener Axial, Pu:	122.9	118.5	kips
Axial Capacity, φPn:	246.0	705.4	kips = φ C C1 D L
Ratio:	49.9%	16.8%	

**Pole Analysis per AISC Table J2.5 & Sect. J4.2:**

	Stiffener Type 1	Stiffener Type 2	
Upper Pole			
Stiffener Axial, Pu:	122.9	118.5	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.5	1.3	kips/in = Pu / (2 L1)
Section Modulus, S:	208.3	744.2	in <sup>2</sup> = L1 <sup>2</sup> / 3
Bending Stress, fub:	7.6	2.0	kips/in = Pu e1 / S
Combined Stress, fu:	8.0	2.4	kips/in = (fuv <sup>2</sup> + fub <sup>2</sup> ) <sup>1/2</sup>
φ:	1.0000	1.0000	
Stress Capacity, φFn:	9.5	9.5	kips/in = φ 0.6 Fy tp
Ratio:	84.2%	24.9%	
Lower Pole			
Stiffener Axial, Pu:	122.9	118.5	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fuv:	2.8	1.3	ksi = Pu / (2 L2)
Section Modulus, S:	161.3	649.2	in <sup>2</sup> = L2 <sup>2</sup> / 3
Bending Stress, fub:	7.5	1.7	ksi = Pu e2 / S
Combined Stress, fu:	8.0	2.2	kips/in = (fuv <sup>2</sup> + fub <sup>2</sup> ) <sup>1/2</sup>
φ:	1.0000	1.0000	
Stress Capacity, φFn:	9.5	9.5	kips/in = φ 0.6 Fy tp
Ratio:	84.6%	23.2%	

**Stiffener 1 Analysis per AISC Sect. D2, E3 & E7**

	Stiffener Type 1	
Gross Area, Ag:	8.9512	in <sup>2</sup>
Effective Net Area, Aen:	8.9512	in <sup>2</sup> = Ag U, where U = 1.000
Stiffener Axial, Pu:	122.9	kips
Stiffener Stress, fu:	13.7	ksi = Pu / Ag
b:	16.1800	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.0746	in
Q, Where Qa = 1.0:	0.9055	= Qa 1.34 - 0.76 (b / ts) (Fy / E) <sup>1/2</sup>
r:	0.3868	in <sup>3</sup>
K L / r:	24.3004	
φ:	0.9000	
Axial Capacity, φFcr:	50.35	ksi = φ Q [0.658 <sup>Q Fy / Fy</sup> Fy]
φ:	0.9000	
Ten. Yielding Cap., φFnt:	58.50	ksi = φ Fy
φ:	0.7500	
Ten. Rupture Cap., φFnr:	60.00	ksi = φ Fu (Aen / Ag)
Ratio:	27.3%	

**Stiffener 2 Analysis per AISC Sect. D2, E3 & E7**

	Stiffener Type 2	
Gross Area, Ag:	8.7500	in <sup>2</sup>
Effective Net Area, Aen:	8.7500	in <sup>2</sup> = Ag U, where U = 1.000
Stiffener Axial, Pu:	118.5	kips
Stiffener Stress, fu:	13.5	ksi = Pu / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8794	= Qa 1.34 - 0.76 (b / ts) (Fy / E) <sup>1/2</sup>
r:	0.3608	in <sup>3</sup>
K L / r:	10.2648	
φ:	0.9000	
Axial Capacity, φFcr:	51.00	ksi = φ Q [0.658 <sup>Q Fy / Fy</sup> Fy]
φ:	0.9000	
Ten. Yielding Cap., φFnt:	58.50	ksi = φ Fy
φ:	0.7500	
Ten. Rupture Cap., φFnr:	60.00	ksi = φ Fu (Aen / Ag)
Ratio:	26.6%	

**Analysis Summary:**

**Bridge Stiffener Type 1**  
 Weld Analysis Ratio: 49.9% PASS  
 Pole Analysis Ratio: 84.6% PASS  
 Stiffener Analysis Ratio: 27.3% PASS

**Bridge Stiffener Type 2**  
 Weld Analysis Ratio: 16.8% PASS  
 Pole Analysis Ratio: 24.9% PASS  
 Stiffener Analysis Ratio: 26.6% PASS

**BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)**

**General Parameters & Loading**

Flange Elevation:	90.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	269.14	k-ft
Axial, Puf:	8.77	kips
Shear, Vf:	14.09	kips

**Pole Parameters**

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	24.00	24.00	in
Pole Thickness, tp:	0.2500	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	32.00	32.00	in
Flange Thickness, tf:	1.50	1.50	in

**Flange Parameters**

Number of Bolt Circles:	(1) Bolt Circle		
	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	20		
Bolt Diameter:	1.00		in
Bolt Circle:	29.00		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00		degrees
Bolt Area, Ag:	0.7854	0.0000	in <sup>2</sup>
	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	12.87	0.00	kips
Max. Net Tension:	12.59	0.00	kips
Max. Net Compression:	13.15	0.00	kips
Moment to Bolt Circle:	155.51	0.00	k-ft
Axial to Bolt Circle:	5.58	0.00	kips
Shear to Bolt Circle:	14.09	0.00	kips
Equivalent Bolt Circle:	29.00	0.00	in

**Shaft Reinforcing Parameters**

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					in
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

**Bridge Stiffener Parameters**

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-040075				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	APPROVED BLIND BOLT				
Bolt Tension Method	Case 2				
Top Bolt Quantity	8				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	8				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override	16.00				in
K	0.80				
Stiffener Circle	32.75				in
Clearance Check	OK				
Qty. Jump Plates	3				in
Location 1	90				deg
Location 2	210				deg
Location 3	330				deg
Location 4					deg
Location 5					deg
Location 6					deg

**BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)**

**Jump Plate Analysis**

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	56.58				kips
Hole Diameter	1.19				in
Gross Area (Ag)	3.00				in <sup>2</sup>
Net Area (An)	2.11				in <sup>2</sup>
b/t Ratio	5.33				
Radius of Gyration (r)	0.22				in
K L / r	59.12				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	46.63				ksi
Nominal Compressive Capacity	125.89				kips
Nominal Tensile Capacity	126.56				kips
Controlling Stress Ratio	44.9%				

**Bolt Analysis**

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	7.072				kips
Top Bolt Tension Load (Tu)	5.157				kips
Top Eccentricity (e)	4.375				in
Top Bolt Bearing Capacity (Rn)	31.721				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	9.450				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	34.8%				
Bottom Bolt Shear Load (Vu)	7.072				kips
Bottom Bolt Tension Load (Tu)	5.157				kips
Bottom Eccentricity (e)	4.375				in
Bottom Bolt Bearing Capacity (Rn)	47.581				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	14.175				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	16.9%				

**Analysis Summary**

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	44.9%			
TOP BOLT COMBINED STRESS RATIO	34.8%			
BOTTOM BOLT COMBINED STRESS RATIO	16.9%			

# Monopole Flange Plate Connection

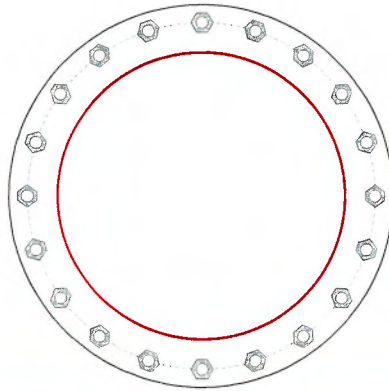
Elevation = 90 ft.



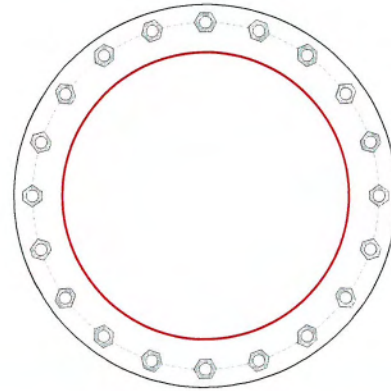
BU #	876309
Site Name	Milford JAI-ALAI
Order #	
TIA-222 Revision	H

Applied Loads	
Moment (kip-ft)	155.51
Axial Force (kips)	5.58
Shear Force (kips)	14.09

Top Plate - External



Bottom Plate - External



### Connection Properties

#### Bolt Data

(20) 1"  $\phi$  bolts (A325 X; Fy=92 ksi, Fu=120 ksi) on 29" BC

#### Top Plate Data

32" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

#### Bottom Plate Data

32" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

#### Top Stiffener Data

N/A

#### Bottom Stiffener Data

N/A

#### Top Pole Data

24" x 0.25" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

#### Bottom Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

### Analysis Results

#### Bolt Capacity

Max Load (kips)	12.58
Allowable (kips)	54.53
Stress Rating:	22.0% Pass

#### Top Plate Capacity

Max Stress (ksi):	8.94	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	26.3%	Pass
Tension Side Stress Rating:	12.6%	Pass

#### Bottom Plate Capacity

Max Stress (ksi):	8.94	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	26.3%	Pass
Tension Side Stress Rating:	12.6%	Pass



v4.4 - Effective 7-12-13

**Asymmetric Anchor Rod Analysis**

Moment =	1945	k-ft	TIA Ref.	G	Location =	Base Plate
Axial =	43.0	kips	ASIF =	1.0000	η =	0.50 for BP, Rev. G Sect. 4.9.9
Shear =	23.0	kips	Max Ratio =	100.0%	Threads =	N/A for FP, Rev. G
Anchor Qty =	23					

**\*\* For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. \*\***

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in <sup>2</sup>	Area, in <sup>2</sup>	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	41.00	0.00	1.77	37.17	34.08	38.82	0.00	141.00	27.5%
2	1.500	A354 Gr BC	109	125	22.5	41.00	0.00	1.77	36.65	33.56	38.30	0.00	141.00	27.2%
3	1.500	A354 Gr BC	109	125	45.0	41.00	0.00	1.77	37.65	34.56	39.30	0.00	141.00	27.9%
4	1.500	A354 Gr BC	109	125	67.5	41.00	0.00	1.77	39.97	36.88	41.62	0.00	141.00	29.5%
5	1.500	A354 Gr BC	109	125	90.0	41.00	0.00	1.77	42.53	39.45	44.18	0.00	141.00	31.3%
6	1.500	A354 Gr BC	109	125	112.5	41.00	0.00	1.77	44.17	41.09	45.82	0.00	141.00	32.5%
7	1.500	A354 Gr BC	109	125	135.0	41.00	0.00	1.77	44.17	41.09	45.82	0.00	141.00	32.5%
8	1.500	A354 Gr BC	109	125	157.5	41.00	0.00	1.77	42.48	39.39	44.13	0.00	141.00	31.3%
9	1.500	A354 Gr BC	109	125	180.0	41.00	0.00	1.77	39.74	36.65	41.39	0.00	141.00	29.4%
10	1.500	A354 Gr BC	109	125	202.5	41.00	0.00	1.77	37.12	34.04	38.77	0.00	141.00	27.5%
11	1.500	A354 Gr BC	109	125	225.0	41.00	0.00	1.77	35.84	32.75	37.48	0.00	141.00	26.6%
12	1.500	A354 Gr BC	109	125	247.5	41.00	0.00	1.77	36.29	33.20	37.94	0.00	141.00	26.9%
13	1.500	A354 Gr BC	109	125	270.0	41.00	0.00	1.77	37.74	34.65	39.39	0.00	141.00	27.9%
14	1.500	A354 Gr BC	109	125	292.5	41.00	0.00	1.77	39.00	35.91	40.65	0.00	141.00	28.8%
15	1.500	A354 Gr BC	109	125	315.0	41.00	0.00	1.77	39.25	36.16	40.90	0.00	141.00	29.0%
16	1.500	A354 Gr BC	109	125	337.5	41.00	0.00	1.77	38.41	35.32	40.06	0.00	141.00	28.4%
17	1.750	Dywidag (150 ksi)	127.7	150	101.3	47.00	0.00	2.71	75.66	70.93	78.19	241.00	241.00	32.4%
18	1.750	Dywidag (150 ksi)	127.7	150	221.3	47.00	0.00	2.71	62.98	58.25	65.51	241.00	241.00	27.2%
19	0.000	Dywidag (150 ksi)	0	0	341.3	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
20	2.000	A193 Gr B7	105	125	326.3	47.00	0.00	3.14	79.53	74.05	82.47	0.00	250.00	33.0%
21	2.250	Williams R71	127.7	150	56.3	96.00	0.00	4.14	202.89	195.65	206.76	0.00	489.60	42.2%
22	2.250	Williams R71	127.7	150	191.3	96.00	0.00	4.14	202.74	195.51	206.61	0.00	489.60	42.2%
23	2.250	Williams R71	127.7	150	303.8	96.00	0.00	4.14	218.84	211.60	222.71	0.00	489.60	45.5%

49.27

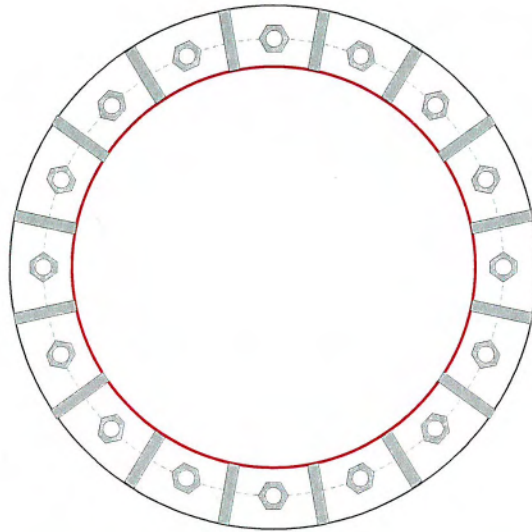
# Monopole Base Plate Connection



Site Info	
BU #	876309
Site Name	Milford JAI-ALAI
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	1

Applied Loads	
Moment (kip-ft)	726.10
Axial Force (kips)	29.40
Shear Force (kips)	15.70



Connection Properties	Analysis Results
-----------------------	------------------

**Anchor Rod Data**  
 (16) 1-1/2"  $\phi$  bolts (A354-BC N;  $F_y=109$  ksi,  $F_u=125$  ksi) on 41" BC

**Base Plate Data**  
 47" OD x 2" Plate (A36;  $F_y=36$  ksi,  $F_u=58$  ksi)

**Stiffener Data**  
 (16) 18"H x 5.5"W x 1"T, Notch: 0.75"  
 plate:  $F_y=50$  ksi ; weld:  $F_y=70$  ksi  
 horiz. weld: 0.4375" groove, 45° dbl bevel FALSE  
 vert. weld: 0.25" fillet

**Pole Data**  
 36" x 0.375" round pole (A53-B-42;  $F_y=42$  ksi,  $F_u=63$  ksi)

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

$P_u = 54.94$	$\phi P_n = 153.69$	<b>Stress Rating</b>
$V_u = 0.98$	$\phi V_n = 46.11$	<b>34.1%</b>
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>

**Base Plate Summary**

Max Stress (ksi):	11.62	(Roark's Flexural)
Allowable Stress (ksi):	32.4	
Stress Rating:	<b>34.2%</b>	<b>Pass</b>

**Stiffener Summary**

Horizontal Weld:	<b>40.1%</b>	<b>Pass</b>
Vertical Weld:	<b>21.1%</b>	<b>Pass</b>
Plate Flexure+Shear:	<b>2.8%</b>	<b>Pass</b>
Plate Tension+Shear:	<b>17.4%</b>	<b>Pass</b>
Plate Compression:	<b>25.6%</b>	<b>Pass</b>

**Pole Summary**

Punching Shear:	<b>5.6%</b>	<b>Pass</b>
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foundation loads

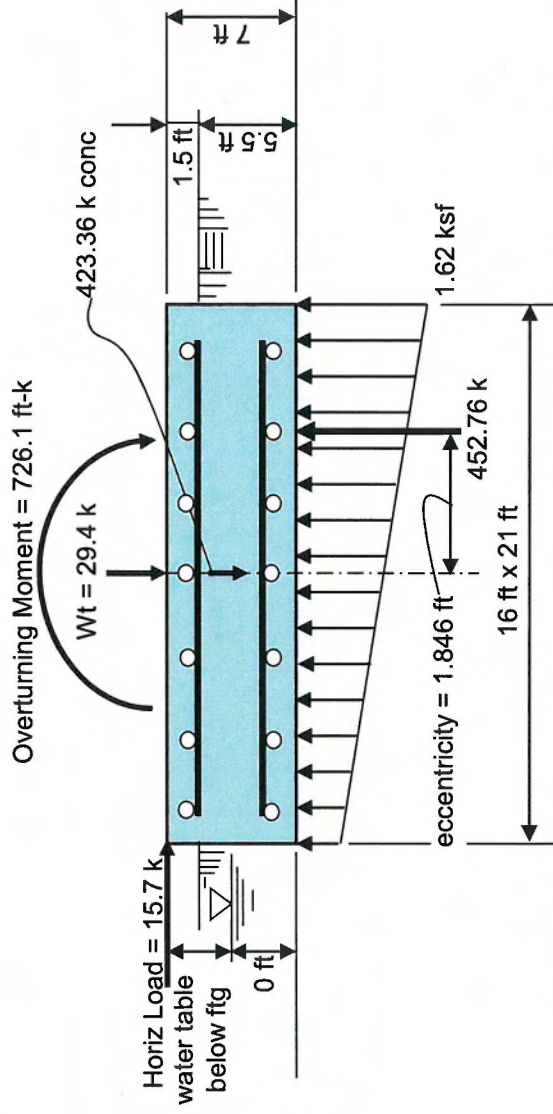
Limit states Tower or Pole Weight = 29.4 kips  
 limit states total horizontal force = 15.7 kips  
 limit states overturning moment = 726.1 ft-kips

soil properties

Safety factor against overturning = 1  
 Soil Density = 130 pcf  
 Ultimate soil bearing = 20 ksf  
 Depth to water table = 6.7 ft

mat dimensions

depth to bottom of footing = 5.5 ft  
 Footing thickness = 7 ft  
 Footing Width = 16 ft  
 Footing Length = 21 ft  
 Tower/Pole Center Offset = 0 ft



Volume of concrete =  $87.111 \text{ yd}^3$  Concrete strength =  $f_c = 3$  (ksi)  
 Rebar = ( 34 ) #8 x 15.5 ft long plus ( 34 ) #8 x 20.5 ft long  
 reinforcing steel = ( 17 ) #8 by 15.5 long @ 15.38 in o.c. top and bot short bars  
 reinforcing steel = ( 17 ) #8 by 20.5 long @ 11.63 in o.c. top and bot long bars

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.308 ) < **CONTROLLING CRITERIA**

Calculated Ultimate Overturning Moment = 836 ft-kips

Resisting Moment = 2716.6 ft-kips

Factor of Safety against overturning = 3.249 > 1 okay

Rebar strength =  $F_y = 60$  (ksi)  
 minimum cover over rebar = 3 inches

Soil Bearing

(Stress Ratio = 0.108 )

Limit States Maximum Net Soil Bearing = 15 ksf

Calculated limit states Soil Bearing Pressure = 1.62 ksf < 15 ksf okay

Bending Moment

(Stress Ratio = 0.088 )

Ultimate Bending Moment Resistance = 4755 ft-kips

Calculated Ultimate Bending Moment = 418 ft-kips < 4755 ft-kips okay

Bending Shear

(Stress Ratio = 0.042 )

Ultimate Bending Shear Resistance = 1421 kips

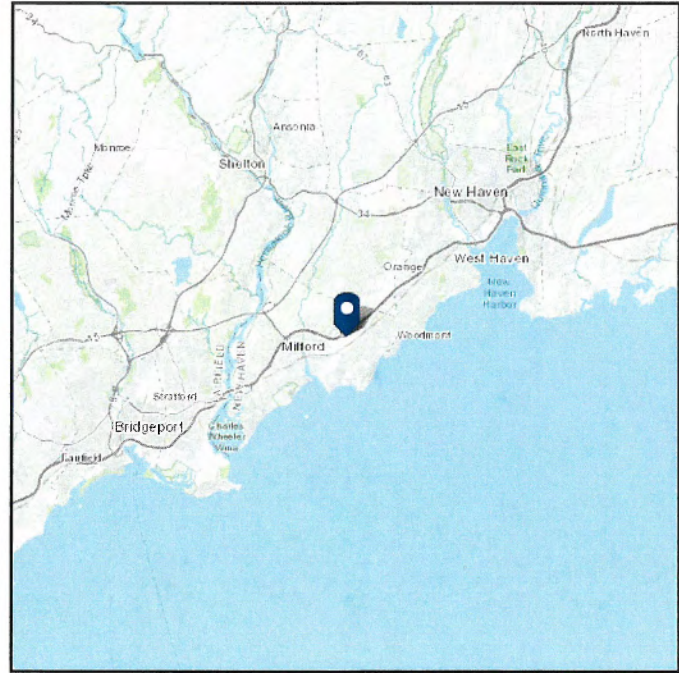
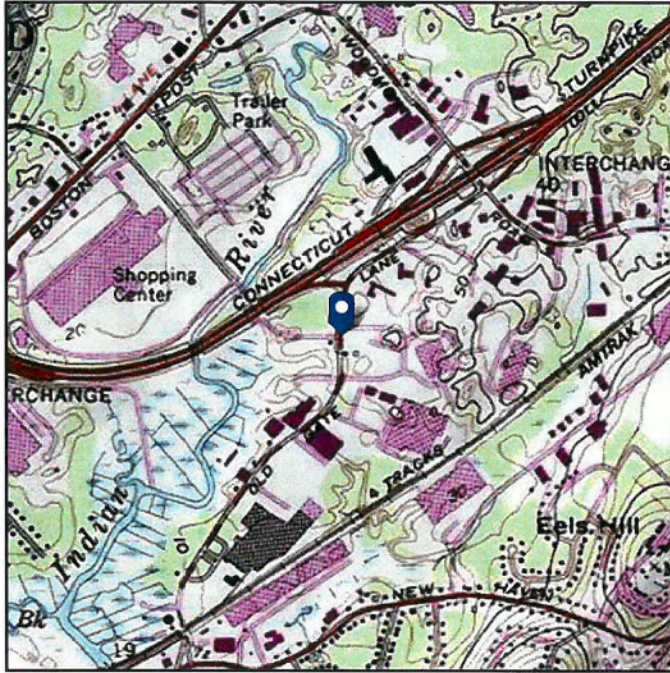
Calculated Ultimate Bending Shear = 60 kips < 1421 kips okay

# ASCE 7 Hazards Report

**Address:**  
311 Old Gate Ln  
Milford, Connecticut  
06460

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

**Elevation:** 30.75 ft (NAVD 88)  
**Latitude:** 41.23403  
**Longitude:** -73.027098



## Wind

### Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 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 Sep 24 2018

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).

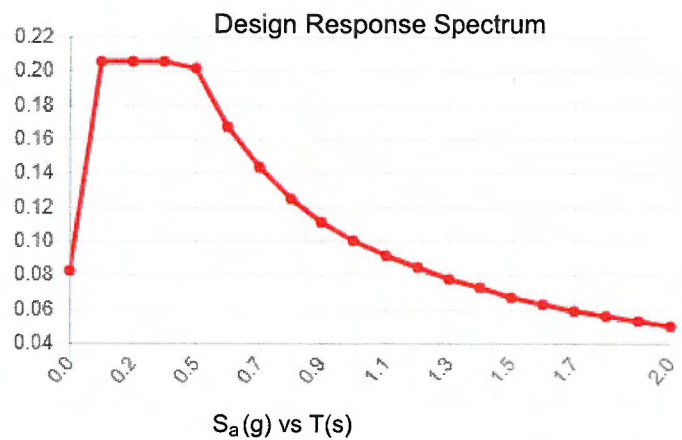
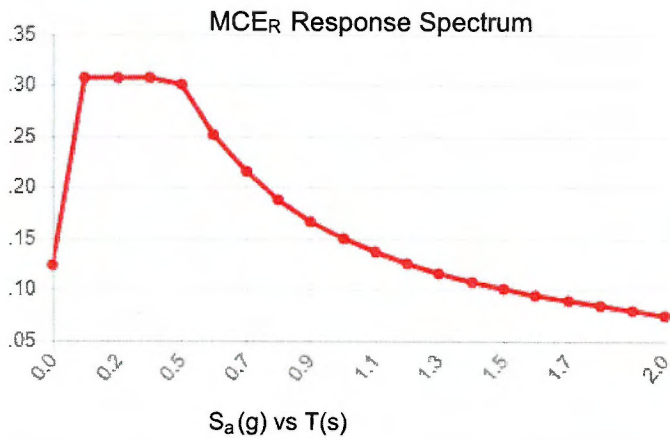
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.192	$S_{DS}$ :	0.205
$S_1$ :	0.063	$S_{D1}$ :	0.100
$F_a$ :	1.600	$T_L$ :	6.000
$F_v$ :	2.400	PGA :	0.102
$S_{MS}$ :	0.307	PGA <sub>M</sub> :	0.162
$S_{M1}$ :	0.150	F <sub>PGA</sub> :	1.597
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:** Mon Sep 24 2018  
**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

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**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 Sep 24 2018

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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