



STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

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VIA ELECTRONIC MAIL

April 22, 2024

Jeffrey Barbadora  
Site Acquisition Specialist  
Crown Castle  
1800 West Park Drive  
Westborough, MA 01581  
[Jeff.Barbadora@crowncastle.com](mailto:Jeff.Barbadora@crowncastle.com)

RE: **EM-VER-007-230823** – Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Highway, Berlin, Connecticut. **Request for Project Change.**

Dear Jeffrey Barbadora:

The Connecticut Siting Council (Council) is in receipt of the correspondence dated April 19, 2024 regarding a project change for the above-referenced exempt modification request approved by the Council on September 18, 2023.

Pursuant to Condition No. 1 of the Council's September 18, 2023 exempt modification approval, the request to increase the number of Kaelus interference mitigation filters from two to four is hereby approved with the following conditions:

1. The filters are installed in accordance with the recommendations in the Structural Analysis performed by Crown Castle dated April 4, 2024 and stamped and signed by Rohit Soni;
2. Within 45 days following completion of equipment installation, Verizon shall provide documentation certified by a Professional Engineer that its installation complied with the recommendations of the Structural Analysis.

This approval applies only to the project change in the correspondence dated April 19, 2024.

Please be advised that deviations from the standards established by the Council in the exempt modification approval are enforceable under the provisions of Connecticut General Statutes §16-50u.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman  
Executive Director

MAB/ANM/laf

c: Domenica Tatasciore, Site Acquisition Specialist, Crown Castle ([Domenica.tatasciore@crowncastle.com](mailto:Domenica.tatasciore@crowncastle.com))

**From:** Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>  
**Sent:** Friday, April 19, 2024 8:04 AM  
**To:** CSC-DL Siting Council <Siting.Council@ct.gov>  
**Subject:** EM-VER-007-230823 - 1684 Chamberlain Highway, Berlin CT - 876382  
Good morning,

Would the CSC please update the approval for EM-VER-007-230823 to include 4 filters?

The original SA submitted for approval issued on 9/18/2023 stated only 2 filters and should have stated 4 filters.

Please see updated SA stating 4 filters and let me know if you have any questions.

Thanks,

**Jeffrey Barbadora**  
Permitting Specialist  
781-970-0053

**Crown Castle**  
1800 W. Park Drive, Suite 250  
Westborough, MA 01581

Date: **April 04, 2024**



Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **Verizon Wireless Co-Locate**  
**Site Number:** 5000383751  
**Site Name:** BERLIN 3 CT

**Crown Castle Designation:** **BU Number:** 876382  
**Site Name:** BERLIN / LAVIANA ORCHARD  
**JDE Job Number:** 2103469  
**Work Order Number:** 2264931  
**Order Number:** 658776 Rev. 2

**Engineering Firm Designation:** **Crown Castle Project Number** 2264931

**Site Data:** **1684 Chamberlain Highway, Berlin, Hartford County, CT**  
**Latitude: 41° 35' 23.07" Longitude: -72° 48' 19.2"**  
**133 ft - Monopole Tower**

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

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

LC5: Proposed Equipment Configuration

**Sufficient - 99.9% Capacity**

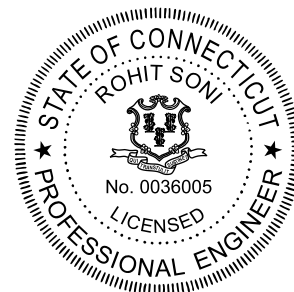
**\*The structure has sufficient capacity once the loading changes, described in the Recommendations section of this report, are completed.**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 118 mph. Applicable Standard references and design criteria are listed in Section 2 – Analysis Criteria.

Structural analysis prepared by: Emma McCarty

Respectfully submitted by:

Rohit Soni, P.E.  
Senior Project Engineer



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**1) INTRODUCTION**

This tower is a 133 ft Monopole Tower designed by Summit.

**2) ANALYSIS CRITERIA**

**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Wind Speed:** 118 mph  
**Exposure Category:** C  
**Topographic Factor:** 1  
**Ice Thickness:** 1.00 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)
89	94	3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe	8	1-5/8
		3	commscope	NHH-65B-R2B w/ Mount Pipe		
		3	commscope	NHHSS-65B-R2BT4 w/ Mount Pipe		
		4	kaelus	BSF0020F3V1		
		1	raycap	RVZDC-6627-PF-48		
		3	samsung telecommunications	CBRS RT4401-48A		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RF4439D-25A		
	3	samsung telecommunications	RF4440D-13A			
89	1	tower mounts	Platform Mount [LP 1201-1_KCKR-HR-1]			

**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)
128	132	3	cci antennas	TPA65R-BU8D_CCIV2 w/ Mount Pipe	2 6 4	3/8 1-1/4 3/4
	128	3	kaelus	DBC0111F2V62-1		
		1	tower mounts	Side Arm Mount [SO 102-3]		
	126	1	ericsson	RRUS 4415 B25		
		1	ericsson	RRUS 4449 B5/B12		
	125	2	ericsson	RRUS 4415 B25		
		2	ericsson	RRUS 4449 B5/B12		
		1	raycap	DC6-48-60-18-8C-EV		
	1	raycap	DC6-48-60-18-8F			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
124	125	3	ericsson	RADIO 4460 B2/B25 B66_TMO	3	1-5/8
		3	ericsson	Radio 4480_TMOV2		
	124	3	commscope	VV-65B-R1_TMO w/ Mount Pipe		
		3	ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	rfs celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 1201-1_HR-1]		
110	113	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
	111	3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
	110	1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		
99	100	3	andrew	ETT19V2S12UB	-	-
		3	ericsson	KRY 112 144/1		
		3	rfs celwave	APX16DWV-16DWVS-C w/ Mount Pipe		
	99	1	tower mounts	T-Arm Mount [TA 602-3]		
75	76	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	-	-

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1629384	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	8173364	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2611098	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2339268	CCISITES
4-POST-MODIFICATION INSPECTION	8482047	CCISITES
4-POST-MODIFICATION INSPECTION	5287888	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.2.4.3), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

#### 3.2) Assumptions

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

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

#### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary)**

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14x14x0.375	Pole	0.3	Pass
128 - 123	Pole	TP14x14x0.375	Pole	11.7	Pass
123 - 118	Pole	TP22.75x22x0.1875	Pole	15.5	Pass
118 - 113	Pole	TP23.5x22.75x0.1875	Pole	23.5	Pass
113 - 108	Pole	TP24.251x23.5x0.1875	Pole	32.9	Pass
108 - 103	Pole	TP25.001x24.251x0.1875	Pole	42.8	Pass
103 - 98	Pole	TP25.751x25.001x0.1875	Pole	52.6	Pass
98 - 93	Pole	TP26.501x25.751x0.1875	Pole	62.5	Pass
93 - 88	Pole	TP27.251x26.501x0.1875	Pole	75.2	Pass
88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	80.9	Pass
85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	60.8	Pass
80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	67.9	Pass
75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	74.8	Pass
70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	81.1	Pass
65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	87.0	Pass
60.75 - 57.75	Pole	TP31.415x30.965x0.25	Pole	90.3	Pass
57.75 - 57.5	Pole + Reinf.	TP31.453x31.415x0.4625	Reinf. 2 Tension Rupture	78.5	Pass
57.5 - 52.5	Pole + Reinf.	TP32.203x31.453x0.4563	Reinf. 2 Tension Rupture	83.3	Pass
52.5 - 47.5	Pole + Reinf.	TP32.953x32.203x0.45	Reinf. 2 Tension Rupture	87.9	Pass
47.5 - 45	Pole + Reinf.	TP33.966x32.953x0.45	Reinf. 2 Tension Rupture	90.1	Pass
45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	90.3	Pass
40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	93.9	Pass
35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	97.4	Pass
30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	99.9	Pass
26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Tension Rupture	85.0	Pass
26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Tension Rupture	87.7	Pass
21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Tension Rupture	90.3	Pass
16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Tension Rupture	92.8	Pass
11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Tension Rupture	95.0	Pass
6 - 1	Pole + Reinf.	TP39.43x38.68x0.4875	Reinf. 1 Tension Rupture	97.2	Pass
1 - 0	Pole + Reinf.	TP39.58x39.43x0.4875	Reinf. 1 Tension Rupture	97.6	Pass
				Summary	
			Pole	90.3	Pass
			Reinforcement	99.9	Pass
			Overall	99.9	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	123	29.5	Pass
1	Flange Plate	123	51.7	Pass
1	Anchor Rods	0	79.3	Pass
1	Base Plate	0	53.4	Pass
1	Base Foundation (Structural)	0	79.8	Pass
1	Base Foundation (Soil)	0	48.6	Pass

<b>Structure Rating (max from all components) =</b>	<b>99.9%</b>
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Notes:

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

**4.1) Recommendations**

The tower and its foundation have sufficient capacity to carry the considered equipment configuration. No modifications are required at this time. In order for the results of this analysis to be considered valid, the loading modification, as follows, must be completed.

Loading Changes:

- VZW must shield their (4) Kaelus BSF0020F3V1 filters behind the antennas.

No structural modifications are required at this time provided that the above-listed changes are completed.



**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:

Tower is located in Hartford County, Connecticut.

Tower base elevation above sea level: 352.00 ft.

Basic wind speed of 118 mph.

Risk Category II.

Exposure Category C.

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

Topographic Category: 1.

Crest Height: 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

TOWER RATING: 99.9%.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .

Maximum demand-capacity ratio is: 1.05.

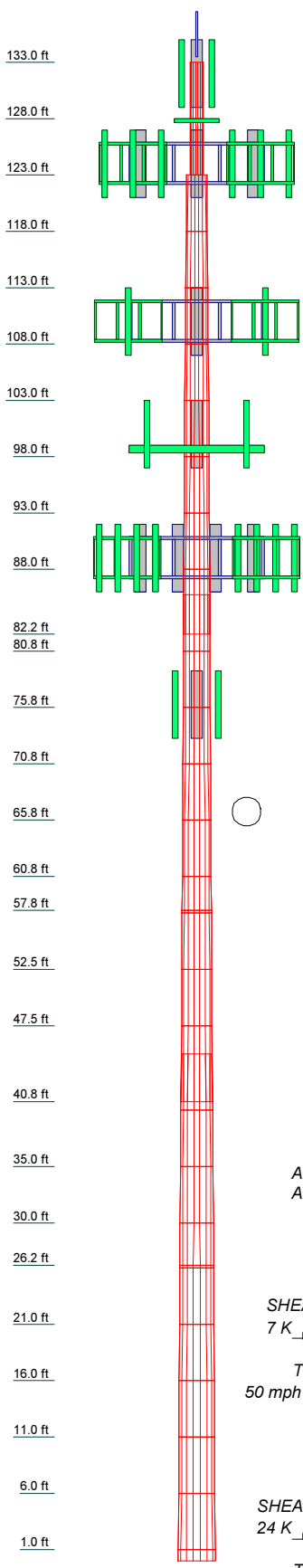
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## 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 Appurtenances Alternative Appurt. EPA Calculation 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;">Poles</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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## Tapered Pole Section Geometry

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	0	0.3750				A500-42	0.3
2	5.00	0	0.3750				A500-42	0.3
3	5.00	18	0.1875				A500-42	0.2
4	5.00	18	0.1875				A500-42	0.2
5	5.00	18	0.1875				A500-42	0.2
6	5.00	18	0.1875				A500-42	0.2
7	5.00	18	0.1875				A500-42	0.2
8	5.00	18	0.1875				A500-42	0.3
9	5.00	18	0.1875				A500-42	0.3
10	5.00	18	0.1875				A500-42	0.3
11	5.0675	18	0.2500	3.50	27.96427	27.96427	A607-60	0.4
12	5.00	18	0.2500		28.7143	28.7143	A607-60	0.4
13	5.00	18	0.2500		29.4646	29.4646	A607-60	0.4
14	5.00	18	0.2500		30.2148	30.2148	A607-60	0.4
15	5.00	18	0.2500		30.9651	30.9651	A607-60	0.4
16	5.00	18	0.2500		31.7154	31.7154	A607-60	0.4
17	5.00	18	0.2500		32.4657	32.4657	A607-60	0.4
18	5.00	18	0.2500		33.2160	33.2160	A607-60	0.4
19	5.00	18	0.4500	4.25	34.3287	34.3287	A607-65	0.7
20	5.0675	18	0.4500		35.0790	35.0790	A607-65	0.7
21	5.00	18	0.4688		35.8293	35.8293	A607-65	0.8
22	5.00	18	0.4688		36.5796	36.5796	A607-65	0.8
23	5.00	18	0.4688		37.3299	37.3299	A607-65	0.8
24	5.00	18	0.5062		38.0802	38.0802	A607-65	0.9
25	5.00	18	0.5062		38.8305	38.8305	A607-65	0.9
26	5.00	18	0.5062		39.5808	39.5808	A607-65	0.9
27	5.00	18	0.4938		40.3311	40.3311	A607-65	1.0
28	5.00	18	0.4938		41.0814	41.0814	A607-65	1.0
29	5.00	18	0.4938		41.8317	41.8317	A607-65	1.0
30	5.00	18	0.4938		42.5820	42.5820	A607-65	1.0
31	1.00	18	0.4875		43.3323	43.3323	A607-65	1.0

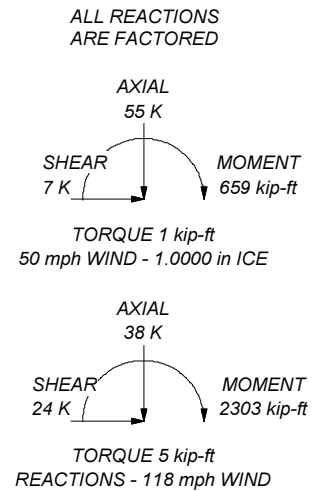


**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A607-65	65 ksi	80 ksi
A607-60	60 ksi	75 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.9%



**Crown Castle**  
 2000 Corporate Drive  
 Canonsburg, PA 15317  
 Phone: (724) 416-2000  
 FAX:

Job:	<b>876382</b>		
Project:			
Client:	Crown Castle	Drawn by:	EMcCarty
Code:	TIA-222-H	Date:	04/03/24
Path:	C:\WORK\AREA\876382\WO 2264931 - SA\Prod\876382.dwg	App'd:	
		Scale:	NTS
		Dwg No.:	E-1

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	133.00-128.00	5.00	0.00	Round	14.0000	14.0000	0.3750		A500-42 (42 ksi)
L2	128.00-123.00	5.00	0.00	Round	14.0000	14.0000	0.3750		A500-42 (42 ksi)
L3	123.00-118.00	5.00	0.00	18	22.0000	22.7502	0.1875	0.7500	A607-60 (60 ksi)
L4	118.00-113.00	5.00	0.00	18	22.7502	23.5004	0.1875	0.7500	A607-60 (60 ksi)
L5	113.00-108.00	5.00	0.00	18	23.5004	24.2506	0.1875	0.7500	A607-60 (60 ksi)
L6	108.00-103.00	5.00	0.00	18	24.2506	25.0007	0.1875	0.7500	A607-60 (60 ksi)
L7	103.00-98.00	5.00	0.00	18	25.0007	25.7509	0.1875	0.7500	A607-60 (60 ksi)
L8	98.00-93.00	5.00	0.00	18	25.7509	26.5011	0.1875	0.7500	A607-60 (60 ksi)
L9	93.00-88.00	5.00	0.00	18	26.5011	27.2513	0.1875	0.7500	A607-60 (60 ksi)
L10	88.00-82.25	5.75	3.50	18	27.2513	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L11	82.25-80.75	5.00	0.00	18	27.2139	27.9641	0.2500	1.0000	A607-65 (65 ksi)
L12	80.75-75.75	5.00	0.00	18	27.9641	28.7143	0.2500	1.0000	A607-65 (65 ksi)
L13	75.75-70.75	5.00	0.00	18	28.7143	29.4646	0.2500	1.0000	A607-65 (65 ksi)
L14	70.75-65.75	5.00	0.00	18	29.4646	30.2148	0.2500	1.0000	A607-65 (65 ksi)
L15	65.75-60.75	5.00	0.00	18	30.2148	30.9651	0.2500	1.0000	A607-65 (65 ksi)
L16	60.75-57.75	3.00	0.00	18	30.9651	31.4152	0.2500	1.0000	A607-65 (65 ksi)
L17	57.75-57.50	0.25	0.00	18	31.4152	31.4527	0.4625	1.8500	A607-65 (65 ksi)
L18	57.50-52.50	5.00	0.00	18	31.4527	32.2029	0.4562	1.8250	A607-65 (65 ksi)
L19	52.50-47.50	5.00	0.00	18	32.2029	32.9532	0.4500	1.8000	A607-65 (65 ksi)
L20	47.50-40.75	6.75	4.25	18	32.9532	33.9660	0.4500	1.8000	A607-65 (65 ksi)
L21	40.75-40.00	5.00	0.00	18	32.8283	33.5785	0.4813	1.9250	A607-65 (65 ksi)
L22	40.00-35.00	5.00	0.00	18	33.5785	34.3287	0.4688	1.8750	A607-65 (65 ksi)
L23	35.00-30.00	5.00	0.00	18	34.3287	35.0789	0.4688	1.8750	A607-65 (65 ksi)
L24	30.00-26.25	3.75	0.00	18	35.0789	35.6415	0.4688	1.8750	A607-65 (65 ksi)
L25	26.25-26.00	0.25	0.00	18	35.6415	35.6790	0.5188	2.0750	A607-65 (65 ksi)
L26	26.00-21.00	5.00	0.00	18	35.6790	36.4292	0.5062	2.0250	A607-65 (65 ksi)
L27	21.00-16.00	5.00	0.00	18	36.4292	37.1794	0.5062	2.0250	A607-65 (65 ksi)
L28	16.00-11.00	5.00	0.00	18	37.1794	37.9296	0.4938	1.9750	A607-65 (65 ksi)
L29	11.00-6.00	5.00	0.00	18	37.9296	38.6798	0.4938	1.9750	A607-65 (65 ksi)
L30	6.00-1.00	5.00	0.00	18	38.6798	39.4300	0.4875	1.9500	A607-65 (65 ksi)
L31	1.00-0.00	1.00		18	39.4300	39.5800	0.4875	1.9500	A607-65

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	(65 ksi)

### Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in <sup>2</sup>	in <sup>4</sup>	in	in	in <sup>3</sup>	in <sup>4</sup>	in <sup>2</sup>	in	
L1	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
L2	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
L3	22.3105	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	23.0722	13.4276	863.6105	8.0098	11.5571	74.7256	1728.3574	6.7151	3.6740	19.595
L4	23.0722	13.4276	863.6105	8.0098	11.5571	74.7256	1728.3574	6.7151	3.6740	19.595
	23.8340	13.8741	952.6487	8.2761	11.9382	79.7984	1906.5509	6.9384	3.8061	20.299
L5	23.8340	13.8741	952.6487	8.2761	11.9382	79.7984	1906.5509	6.9384	3.8061	20.299
	24.5957	14.3205	1047.6055	8.5424	12.3193	85.0379	2096.5895	7.1616	3.9381	21.003
L6	24.5957	14.3205	1047.6055	8.5424	12.3193	85.0379	2096.5895	7.1616	3.9381	21.003
	25.3575	14.7670	1148.6716	8.8087	12.7004	90.4439	2298.8546	7.3849	4.0701	21.707
L7	25.3575	14.7670	1148.6716	8.8087	12.7004	90.4439	2298.8546	7.3849	4.0701	21.707
	26.1192	15.2134	1256.0373	9.0750	13.0815	96.0165	2513.7272	7.6082	4.2022	22.412
L8	26.1192	15.2134	1256.0373	9.0750	13.0815	96.0165	2513.7272	7.6082	4.2022	22.412
	26.8810	15.6599	1369.8931	9.3413	13.4626	101.7558	2741.5886	7.8314	4.3342	23.116
L9	26.8810	15.6599	1369.8931	9.3413	13.4626	101.7558	2741.5886	7.8314	4.3342	23.116
	27.6428	16.1063	1490.4294	9.6076	13.8437	107.6616	2982.8200	8.0547	4.4662	23.82
L10	27.6428	16.1063	1490.4294	9.6076	13.8437	107.6616	2982.8200	8.0547	4.4662	23.82
	28.5188	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
L11	28.5188	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
	28.3569	21.9911	2133.9640	9.8385	14.2058	150.2181	4270.7359	10.9977	4.4817	17.927
L12	28.3569	21.9911	2133.9640	9.8385	14.2058	150.2181	4270.7359	10.9977	4.4817	17.927
	29.1187	22.5865	2312.0005	10.1048	14.5869	158.4986	4627.0433	11.2954	4.6137	18.455
L13	29.1187	22.5865	2312.0005	10.1048	14.5869	158.4986	4627.0433	11.2954	4.6137	18.455
	29.8806	23.1818	2499.6739	10.3712	14.9680	167.0011	5002.6370	11.5931	4.7458	18.983
L14	29.8806	23.1818	2499.6739	10.3712	14.9680	167.0011	5002.6370	11.5931	4.7458	18.983
	30.6424	23.7771	2697.2381	10.6375	15.3491	175.7258	5398.0253	11.8908	4.8778	19.511
L15	30.6424	23.7771	2697.2381	10.6375	15.3491	175.7258	5398.0253	11.8908	4.8778	19.511
	31.4042	24.3724	2904.9471	10.9038	15.7302	184.6727	5813.7166	12.1885	5.0098	20.039
L16	31.4042	24.3724	2904.9471	10.9038	15.7302	184.6727	5813.7166	12.1885	5.0098	20.039
	31.8613	24.7296	3034.5476	11.0636	15.9589	190.1474	6073.0882	12.3671	5.0891	20.356
L17	31.8613	24.7296	3034.5476	11.0636	15.9589	190.1474	6073.0882	12.3671	5.0891	20.356
	31.8285	45.4378	5499.8589	10.9882	15.9589	344.6260	11006.9546	22.7232	4.7151	10.195
L17	31.8285	45.4378	5499.8589	10.9882	15.9589	344.6260	11006.9546	22.7232	4.7151	10.195
	31.8666	45.4928	5519.8791	11.0015	15.9780	345.4680	11047.0214	22.7507	4.7217	10.209
L18	31.8666	45.4928	5519.8791	11.0015	15.9780	345.4680	11047.0214	22.7507	4.7217	10.209
	31.8675	44.8871	5448.5814	11.0037	15.9780	341.0057	10904.3321	22.4478	4.7327	10.373
L18	31.8675	44.8871	5448.5814	11.0037	15.9780	341.0057	10904.3321	22.4478	4.7327	10.373
	32.6293	45.9736	5853.8660	11.2701	16.3591	357.8355	11715.4346	22.9912	4.8647	10.662
L19	32.6293	45.9736	5853.8660	11.2701	16.3591	357.8355	11715.4346	22.9912	4.8647	10.662
	32.6303	45.3527	5777.0867	11.2723	16.3591	353.1422	11561.7750	22.6807	4.8757	10.835
L19	32.6303	45.3527	5777.0867	11.2723	16.3591	353.1422	11561.7750	22.6807	4.8757	10.835
	33.3921	46.4243	6196.3290	11.5386	16.7402	370.1463	12400.8114	23.2166	5.0078	11.128
L20	33.3921	46.4243	6196.3290	11.5386	16.7402	370.1463	12400.8114	23.2166	5.0078	11.128
	34.4206	47.8709	6793.8105	11.8982	17.2547	393.7362	13596.5606	23.9400	5.1860	11.524
L21	34.4206	47.8709	6793.8105	11.8982	17.2547	393.7362	13596.5606	23.9400	5.1860	11.524
	33.9080	49.4097	6531.5930	11.4832	16.6768	391.6580	13071.7804	24.7096	4.9308	10.246
L21	33.9080	49.4097	6531.5930	11.4832	16.6768	391.6580	13071.7804	24.7096	4.9308	10.246
	34.0222	50.5556	6996.6536	11.7495	17.0579	410.1715	14002.5136	25.2826	5.0628	10.52
L22	34.0222	50.5556	6996.6536	11.7495	17.0579	410.1715	14002.5136	25.2826	5.0628	10.52
	34.0242	49.2611	6822.6467	11.7540	17.0579	399.9706	13654.2709	24.6352	5.0848	10.848
L22	34.0242	49.2611	6822.6467	11.7540	17.0579	399.9706	13654.2709	24.6352	5.0848	10.848
	34.7859	50.3772	7296.9892	12.0203	17.4390	418.4301	14603.5800	25.1934	5.2168	11.129
L23	34.7859	50.3772	7296.9892	12.0203	17.4390	418.4301	14603.5800	25.1934	5.2168	11.129
	35.5477	51.4934	7792.8231	12.2866	17.8201	437.3061	15595.9002	25.7516	5.3489	11.411
L24	35.5477	51.4934	7792.8231	12.2866	17.8201	437.3061	15595.9002	25.7516	5.3489	11.411
	36.1190	52.3305	8179.0886	12.4863	18.1059	451.7365	16368.9395	26.1702	5.4479	11.622
L24	36.1190	52.3305	8179.0886	12.4863	18.1059	451.7365	16368.9395	26.1702	5.4479	11.622
	36.1113	57.8301	9012.9779	12.4686	18.1059	497.7927	18037.8153	28.9205	5.3599	10.332
L25	36.1113	57.8301	9012.9779	12.4686	18.1059	497.7927	18037.8153	28.9205	5.3599	10.332
	36.1494	57.8918	9041.8851	12.4819	18.1249	498.8643	18095.6676	28.9514	5.3665	10.345
L25	36.1494	57.8918	9041.8851	12.4819	18.1249	498.8643	18095.6676	28.9514	5.3665	10.345
	36.1513	56.5169	8833.4229	12.4863	18.1249	487.3629	17678.4689	28.2638	5.3885	10.644
L26	36.1513	56.5169	8833.4229	12.4863	18.1249	487.3629	17678.4689	28.2638	5.3885	10.644
	36.9131	57.7224	9410.7799	12.7526	18.5060	508.5249	18833.9427	28.8667	5.5205	10.905

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L27	36.9131	57.7224	9410.7799	12.7526	18.5060	508.5249	18833.9427	28.8667	5.5205	10.905
	37.6749	58.9278	10012.7617	13.0190	18.8871	530.1367	20038.6985	29.4695	5.6526	11.166
L28	37.6768	57.4924	9775.5222	13.0234	18.8871	517.5758	19563.9072	28.7516	5.6746	11.493
	38.4385	58.6680	10387.5715	13.2897	19.2682	539.1036	20788.8112	29.3396	5.8066	11.76
L29	38.4385	58.6680	10387.5715	13.2897	19.2682	539.1036	20788.8112	29.3396	5.8066	11.76
	39.2003	59.8437	11024.6491	13.5560	19.6493	561.0701	22063.8048	29.9275	5.9386	12.028
L30	39.2013	59.0959	10890.4423	13.5583	19.6493	554.2400	21795.2145	29.5535	5.9496	12.204
	39.9630	60.2566	11544.8744	13.8246	20.0304	576.3670	23104.9399	30.1340	6.0817	12.475
L31	39.9630	60.2566	11544.8744	13.8246	20.0304	576.3670	23104.9399	30.1340	6.0817	12.475
	40.1154	60.4888	11678.8297	13.8778	20.1066	580.8444	23373.0268	30.2501	6.1081	12.529

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 133.00-128.00				1	1	1			
L2 128.00-123.00				1	1	1			
L3 123.00-118.00				1	1	1			
L4 118.00-113.00				1	1	1			
L5 113.00-108.00				1	1	1			
L6 108.00-103.00				1	1	1			
L7 103.00-98.00				1	1	1			
L8 98.00-93.00				1	1	1			
L9 93.00-88.00				1	1	1			
L10 88.00-82.25				1	1	1			
L11 82.25-80.75				1	1	1			
L12 80.75-75.75				1	1	1			
L13 75.75-70.75				1	1	1			
L14 70.75-65.75				1	1	1			
L15 65.75-60.75				1	1	1			
L16 60.75-57.75				1	1	1			
L17 57.75-57.50				1	1	0.94611			
L18 57.50-52.50				1	1	0.949166			
L19 52.50-47.50				1	1	0.952774			
L20 47.50-40.75				1	1	0.948243			
L21 40.75-40.00				1	1	0.949567			
L22 40.00-35.00				1	1	0.966223			
L23 35.00-30.00				1	1	0.958285			
L24 30.00-26.25				1	1	0.952553			
L25 26.25-				1	1	0.942598			

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor $A_r$	Adjust. Factor $A_r$	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
26.00									
L26 26.00-21.00				1	1	0.956967			
L27 21.00-16.00				1	1	0.948756			
L28 16.00-11.00				1	1	0.964371			
L29 11.00-6.00				1	1	0.956616			
L30 6.00-1.00				1	1	0.961174			
L31 1.00-0.00				1	1	0.9597			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
				ft				in	in	plf
*****										
FP 6.125"x1.25"	A	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125	6.1250	14.7500	0.00
FP 6.125"x1.25"	B	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125	6.1250	14.7500	0.00
FP 6.125"x1.25"	C	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125	6.1250	14.7500	0.00
*****										
FP 4.875"x1.25"	A	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125	4.8750	12.2500	0.00
FP 4.875"x1.25"	B	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125	4.8750	12.2500	0.00
FP 4.875"x1.25"	C	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125	4.8750	12.2500	0.00
***										

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement	Total Number		C <sub>A</sub> A <sub>A</sub>	Weight
					ft			ft <sup>2</sup> /ft	plf
*****									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	128.00 - 0.00	6	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	128.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	128.00 - 0.00	4	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
2" Rigid Conduit	B	No	No	Inside Pole	128.00 - 0.00	2	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
***									
HB158-21U6S24-	B	No	No	Inside Pole	124.00 - 0.00	3	No Ice	0.00	2.50

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
xxM_TMO(1-5/8)							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
***									
CU12PSM9P6XXX(1-1/2)	A	No	No	Inside Pole	110.00 - 0.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35
***									
HB158-21U6S12-XXXM-01(1-5/8)	A	No	No	Inside Pole	89.00 - 0.00	2	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
LDF7-50A(1-5/8)	A	No	No	Inside Pole	89.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
***									

### Feed Line/Linear Appurtenances Section Areas

Tower Section	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
L1	133.00-128.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L6	108.00-103.00	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L7	103.00-98.00	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L8	98.00-93.00	A	0.000	0.000	0.000	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L9	93.00-88.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L10	88.00-82.25	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.11
		C	0.000	0.000	0.000	0.000	0.00
L11	82.25-80.75	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L12	80.75-75.75	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00



Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L13	75.75-70.75	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L14	70.75-65.75	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L15	65.75-60.75	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L16	60.75-57.75	A	0.000	0.000	1.422	0.000	0.03
		B	0.000	0.000	1.422	0.000	0.06
		C	0.000	0.000	1.422	0.000	0.00
L17	57.75-57.50	A	0.000	0.000	0.203	0.000	0.00
		B	0.000	0.000	0.203	0.000	0.00
		C	0.000	0.000	0.203	0.000	0.00
L18	57.50-52.50	A	0.000	0.000	4.062	0.000	0.06
		B	0.000	0.000	4.062	0.000	0.10
		C	0.000	0.000	4.062	0.000	0.00
L19	52.50-47.50	A	0.000	0.000	4.062	0.000	0.06
		B	0.000	0.000	4.062	0.000	0.10
		C	0.000	0.000	4.062	0.000	0.00
L20	47.50-40.75	A	0.000	0.000	5.484	0.000	0.07
		B	0.000	0.000	5.484	0.000	0.13
		C	0.000	0.000	5.484	0.000	0.00
L21	40.75-40.00	A	0.000	0.000	0.609	0.000	0.01
		B	0.000	0.000	0.609	0.000	0.01
		C	0.000	0.000	0.609	0.000	0.00
L22	40.00-35.00	A	0.000	0.000	4.062	0.000	0.06
		B	0.000	0.000	4.062	0.000	0.10
		C	0.000	0.000	4.062	0.000	0.00
L23	35.00-30.00	A	0.000	0.000	4.062	0.000	0.06
		B	0.000	0.000	4.062	0.000	0.10
		C	0.000	0.000	4.062	0.000	0.00
L24	30.00-26.25	A	0.000	0.000	3.776	0.000	0.04
		B	0.000	0.000	3.776	0.000	0.07
		C	0.000	0.000	3.776	0.000	0.00
L25	26.25-26.00	A	0.000	0.000	0.255	0.000	0.00
		B	0.000	0.000	0.255	0.000	0.00
		C	0.000	0.000	0.255	0.000	0.00
L26	26.00-21.00	A	0.000	0.000	5.104	0.000	0.06
		B	0.000	0.000	5.104	0.000	0.10
		C	0.000	0.000	5.104	0.000	0.00
L27	21.00-16.00	A	0.000	0.000	5.104	0.000	0.06
		B	0.000	0.000	5.104	0.000	0.10
		C	0.000	0.000	5.104	0.000	0.00
L28	16.00-11.00	A	0.000	0.000	5.104	0.000	0.06
		B	0.000	0.000	5.104	0.000	0.10
		C	0.000	0.000	5.104	0.000	0.00
L29	11.00-6.00	A	0.000	0.000	5.104	0.000	0.06
		B	0.000	0.000	5.104	0.000	0.10
		C	0.000	0.000	5.104	0.000	0.00
L30	6.00-1.00	A	0.000	0.000	5.104	0.000	0.06
		B	0.000	0.000	5.104	0.000	0.10
		C	0.000	0.000	5.104	0.000	0.00
L31	1.00-0.00	A	0.000	0.000	1.021	0.000	0.01
		B	0.000	0.000	1.021	0.000	0.02
		C	0.000	0.000	1.021	0.000	0.00

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <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
L1	133.00-128.00	A	0.975	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	0.971	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	0.968	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	0.963	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	0.959	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L6	108.00-103.00	A	0.955	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L7	103.00-98.00	A	0.950	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L8	98.00-93.00	A	0.945	0.000	0.000	0.000	0.000	0.01
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L9	93.00-88.00	A	0.940	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L10	88.00-82.25	A	0.934	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.11
		C		0.000	0.000	0.000	0.000	0.00
L11	82.25-80.75	A	0.930	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.00
L12	80.75-75.75	A	0.927	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L13	75.75-70.75	A	0.921	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L14	70.75-65.75	A	0.914	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L15	65.75-60.75	A	0.907	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.00
L16	60.75-57.75	A	0.901	0.000	0.000	1.737	0.000	0.04
		B		0.000	0.000	1.737	0.000	0.07
		C		0.000	0.000	1.737	0.000	0.01
L17	57.75-57.50	A	0.899	0.000	0.000	0.248	0.000	0.00
		B		0.000	0.000	0.248	0.000	0.01
		C		0.000	0.000	0.248	0.000	0.00
L18	57.50-52.50	A	0.895	0.000	0.000	4.957	0.000	0.08
		B		0.000	0.000	4.957	0.000	0.12
		C		0.000	0.000	4.957	0.000	0.03
L19	52.50-47.50	A	0.886	0.000	0.000	4.949	0.000	0.08
		B		0.000	0.000	4.949	0.000	0.12
		C		0.000	0.000	4.949	0.000	0.03
L20	47.50-40.75	A	0.875	0.000	0.000	6.666	0.000	0.11
		B		0.000	0.000	6.666	0.000	0.17
		C		0.000	0.000	6.666	0.000	0.04
L21	40.75-40.00	A	0.867	0.000	0.000	0.741	0.000	0.01
		B		0.000	0.000	0.741	0.000	0.02

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L22	40.00-35.00	C	0.861	0.000	0.000	0.741	0.000	0.00
		A		0.000	0.000	4.923	0.000	0.08
		B		0.000	0.000	4.923	0.000	0.12
L23	35.00-30.00	C	0.849	0.000	0.000	4.923	0.000	0.03
		A		0.000	0.000	4.911	0.000	0.08
		B		0.000	0.000	4.911	0.000	0.12
L24	30.00-26.25	C	0.837	0.000	0.000	4.911	0.000	0.03
		A		0.000	0.000	4.403	0.000	0.06
		B		0.000	0.000	4.403	0.000	0.09
L25	26.25-26.00	C	0.830	0.000	0.000	4.403	0.000	0.02
		A		0.000	0.000	0.297	0.000	0.00
		B		0.000	0.000	0.297	0.000	0.01
L26	26.00-21.00	C	0.822	0.000	0.000	0.297	0.000	0.00
		A		0.000	0.000	5.926	0.000	0.08
		B		0.000	0.000	5.926	0.000	0.12
L27	21.00-16.00	C	0.802	0.000	0.000	5.926	0.000	0.03
		A		0.000	0.000	5.906	0.000	0.08
		B		0.000	0.000	5.906	0.000	0.12
L28	16.00-11.00	C	0.777	0.000	0.000	5.906	0.000	0.03
		A		0.000	0.000	5.881	0.000	0.08
		B		0.000	0.000	5.881	0.000	0.12
L29	11.00-6.00	C	0.742	0.000	0.000	5.881	0.000	0.03
		A		0.000	0.000	5.846	0.000	0.08
		B		0.000	0.000	5.846	0.000	0.12
L30	6.00-1.00	C	0.679	0.000	0.000	5.846	0.000	0.03
		A		0.000	0.000	5.783	0.000	0.08
		B		0.000	0.000	5.783	0.000	0.12
L31	1.00-0.00	C	0.559	0.000	0.000	5.783	0.000	0.02
		A		0.000	0.000	1.133	0.000	0.01
		B		0.000	0.000	1.133	0.000	0.02
		C		0.000	0.000	1.133	0.000	0.00

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	133.00-128.00	0.0000	0.0000	0.0000	0.0000
L2	128.00-123.00	0.0000	0.0000	0.0000	0.0000
L3	123.00-118.00	0.0000	0.0000	0.0000	0.0000
L4	118.00-113.00	0.0000	0.0000	0.0000	0.0000
L5	113.00-108.00	0.0000	0.0000	0.0000	0.0000
L6	108.00-103.00	0.0000	0.0000	0.0000	0.0000
L7	103.00-98.00	0.0000	0.0000	0.0000	0.0000
L8	98.00-93.00	0.0000	0.0000	0.0000	0.0000
L9	93.00-88.00	0.0000	0.0000	0.0000	0.0000
L10	88.00-82.25	0.0000	0.0000	0.0000	0.0000
L11	82.25-80.75	0.0000	0.0000	0.0000	0.0000
L12	80.75-75.75	0.0000	0.0000	0.0000	0.0000
L13	75.75-70.75	0.0000	0.0000	0.0000	0.0000
L14	70.75-65.75	0.0000	0.0000	0.0000	0.0000
L15	65.75-60.75	0.0000	0.0000	0.0000	0.0000
L16	60.75-57.75	0.0000	0.0000	0.0000	0.0000
L17	57.75-57.50	0.0000	0.0000	0.0000	0.0000
L18	57.50-52.50	0.0000	0.0000	0.0000	0.0000
L19	52.50-47.50	0.0000	0.0000	0.0000	0.0000
L20	47.50-40.75	0.0000	0.0000	0.0000	0.0000
L21	40.75-40.00	0.0000	0.0000	0.0000	0.0000

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
L22	40.00-35.00	0.0000	0.0000	0.0000	0.0000
L23	35.00-30.00	0.0000	0.0000	0.0000	0.0000
L24	30.00-26.25	0.0000	0.0000	0.0000	0.0000
L25	26.25-26.00	0.0000	0.0000	0.0000	0.0000
L26	26.00-21.00	0.0000	0.0000	0.0000	0.0000
L27	21.00-16.00	0.0000	0.0000	0.0000	0.0000
L28	16.00-11.00	0.0000	0.0000	0.0000	0.0000
L29	11.00-6.00	0.0000	0.0000	0.0000	0.0000
L30	6.00-1.00	0.0000	0.0000	0.0000	0.0000
L31	1.00-0.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### 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
L16	6	FP 4.875"x1.25"	57.75 - 59.50	1.0000	1.0000
L16	7	FP 4.875"x1.25"	57.75 - 59.50	1.0000	1.0000
L16	8	FP 4.875"x1.25"	57.75 - 59.50	1.0000	1.0000
L17	6	FP 4.875"x1.25"	57.50 - 57.75	1.0000	1.0000
L17	7	FP 4.875"x1.25"	57.50 - 57.75	1.0000	1.0000
L17	8	FP 4.875"x1.25"	57.50 - 57.75	1.0000	1.0000
L18	6	FP 4.875"x1.25"	52.50 - 57.50	1.0000	1.0000
L18	7	FP 4.875"x1.25"	52.50 - 57.50	1.0000	1.0000
L18	8	FP 4.875"x1.25"	52.50 - 57.50	1.0000	1.0000
L19	6	FP 4.875"x1.25"	47.50 - 52.50	1.0000	1.0000
L19	7	FP 4.875"x1.25"	47.50 - 52.50	1.0000	1.0000
L19	8	FP 4.875"x1.25"	47.50 - 52.50	1.0000	1.0000
L20	6	FP 4.875"x1.25"	40.75 - 47.50	1.0000	1.0000
L20	7	FP 4.875"x1.25"	40.75 - 47.50	1.0000	1.0000
L20	8	FP 4.875"x1.25"	40.75 - 47.50	1.0000	1.0000
L21	6	FP 4.875"x1.25"	40.00 - 40.75	1.0000	1.0000
L21	7	FP 4.875"x1.25"	40.00 - 40.75	1.0000	1.0000
L21	8	FP 4.875"x1.25"	40.00 - 40.75	1.0000	1.0000
L22	6	FP 4.875"x1.25"	35.00 - 40.00	1.0000	1.0000
L22	7	FP 4.875"x1.25"	35.00 - 40.00	1.0000	1.0000
L22	8	FP 4.875"x1.25"	35.00 - 40.00	1.0000	1.0000
L23	6	FP 4.875"x1.25"	30.00 - 35.00	1.0000	1.0000
L23	7	FP 4.875"x1.25"	30.00 - 35.00	1.0000	1.0000
L23	8	FP 4.875"x1.25"	30.00 - 35.00	1.0000	1.0000
L24	2	FP 6.125"x1.25"	26.25 - 29.75	1.0000	1.0000
L24	3	FP 6.125"x1.25"	26.25 - 29.75	1.0000	1.0000
L24	4	FP 6.125"x1.25"	26.25 - 29.75	1.0000	1.0000
L24	6	FP 4.875"x1.25"	29.75 - 30.00	1.0000	1.0000
L24	7	FP 4.875"x1.25"	29.75 - 30.00	1.0000	1.0000
L24	8	FP 4.875"x1.25"	29.75 - 30.00	1.0000	1.0000
L25	2	FP 6.125"x1.25"	26.00 - 26.25	1.0000	1.0000
L25	3	FP 6.125"x1.25"	26.00 - 26.25	1.0000	1.0000
L25	4	FP 6.125"x1.25"	26.00 - 26.25	1.0000	1.0000
L26	2	FP 6.125"x1.25"	21.00 - 26.00	1.0000	1.0000
L26	3	FP 6.125"x1.25"	21.00 - 26.00	1.0000	1.0000
L26	4	FP 6.125"x1.25"	21.00 - 26.00	1.0000	1.0000
L27	2	FP 6.125"x1.25"	16.00 - 21.00	1.0000	1.0000
L27	3	FP 6.125"x1.25"	16.00 - 21.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_g$ No Ice	$K_g$ Ice
L27	4	FP 6.125"x1.25"	16.00 - 21.00	1.0000	1.0000
L28	2	FP 6.125"x1.25"	11.00 - 16.00	1.0000	1.0000
L28	3	FP 6.125"x1.25"	11.00 - 16.00	1.0000	1.0000
L28	4	FP 6.125"x1.25"	11.00 - 16.00	1.0000	1.0000
L29	2	FP 6.125"x1.25"	6.00 - 11.00	1.0000	1.0000
L29	3	FP 6.125"x1.25"	6.00 - 11.00	1.0000	1.0000
L29	4	FP 6.125"x1.25"	6.00 - 11.00	1.0000	1.0000
L30	2	FP 6.125"x1.25"	1.00 - 6.00	1.0000	1.0000
L30	3	FP 6.125"x1.25"	1.00 - 6.00	1.0000	1.0000
L30	4	FP 6.125"x1.25"	1.00 - 6.00	1.0000	1.0000
L31	2	FP 6.125"x1.25"	0.00 - 1.00	1.0000	1.0000
L31	3	FP 6.125"x1.25"	0.00 - 1.00	1.0000	1.0000
L31	4	FP 6.125"x1.25"	0.00 - 1.00	1.0000	1.0000

**Effective Width of Flat Linear Attachments / Feed Lines**

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L16	6	FP 4.875"x1.25"	57.75 - 59.50	Auto	0.0000
L16	7	FP 4.875"x1.25"	57.75 - 59.50	Auto	0.0000
L16	8	FP 4.875"x1.25"	57.75 - 59.50	Auto	0.0000
L17	6	FP 4.875"x1.25"	57.50 - 57.75	Auto	0.0321
L17	7	FP 4.875"x1.25"	57.50 - 57.75	Auto	0.0321
L17	8	FP 4.875"x1.25"	57.50 - 57.75	Auto	0.0321
L18	6	FP 4.875"x1.25"	52.50 - 57.50	Auto	0.0157
L18	7	FP 4.875"x1.25"	52.50 - 57.50	Auto	0.0157
L18	8	FP 4.875"x1.25"	52.50 - 57.50	Auto	0.0157
L19	6	FP 4.875"x1.25"	47.50 - 52.50	Auto	0.0000
L19	7	FP 4.875"x1.25"	47.50 - 52.50	Auto	0.0000
L19	8	FP 4.875"x1.25"	47.50 - 52.50	Auto	0.0000
L20	6	FP 4.875"x1.25"	40.75 - 47.50	Auto	0.0000
L20	7	FP 4.875"x1.25"	40.75 - 47.50	Auto	0.0000
L20	8	FP 4.875"x1.25"	40.75 - 47.50	Auto	0.0000
L21	6	FP 4.875"x1.25"	40.00 - 40.75	Auto	0.0000
L21	7	FP 4.875"x1.25"	40.00 - 40.75	Auto	0.0000
L21	8	FP 4.875"x1.25"	40.00 - 40.75	Auto	0.0000
L22	6	FP 4.875"x1.25"	35.00 - 40.00	Auto	0.0000
L22	7	FP 4.875"x1.25"	35.00 - 40.00	Auto	0.0000
L22	8	FP 4.875"x1.25"	35.00 - 40.00	Auto	0.0000
L23	6	FP 4.875"x1.25"	30.00 - 35.00	Auto	0.0000
L23	7	FP 4.875"x1.25"	30.00 - 35.00	Auto	0.0000
L23	8	FP 4.875"x1.25"	30.00 - 35.00	Auto	0.0000
L24	2	FP 6.125"x1.25"	26.25 - 29.75	Auto	0.1181
L24	3	FP 6.125"x1.25"	26.25 - 29.75	Auto	0.1181
L24	4	FP 6.125"x1.25"	26.25 - 29.75	Auto	0.1181
L24	6	FP 4.875"x1.25"	29.75 - 30.00	Auto	0.0000
L24	7	FP 4.875"x1.25"	29.75 - 30.00	Auto	0.0000
L24	8	FP 4.875"x1.25"	29.75 - 30.00	Auto	0.0000
L25	2	FP 6.125"x1.25"	26.00 - 26.25	Auto	0.1244
L25	3	FP 6.125"x1.25"	26.00 - 26.25	Auto	0.1244
L25	4	FP 6.125"x1.25"	26.00 - 26.25	Auto	0.1244
L26	2	FP 6.125"x1.25"	21.00 - 26.00	Auto	0.1095
L26	3	FP 6.125"x1.25"	21.00 - 26.00	Auto	0.1095
L26	4	FP 6.125"x1.25"	21.00 - 26.00	Auto	0.1095

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L27	2	FP 6.125"x1.25"	16.00 - 21.00	Auto	0.0879
L27	3	FP 6.125"x1.25"	16.00 - 21.00	Auto	0.0879
L27	4	FP 6.125"x1.25"	16.00 - 21.00	Auto	0.0879
L28	2	FP 6.125"x1.25"	11.00 - 16.00	Auto	0.0628
L28	3	FP 6.125"x1.25"	11.00 - 16.00	Auto	0.0628
L28	4	FP 6.125"x1.25"	11.00 - 16.00	Auto	0.0628
L29	2	FP 6.125"x1.25"	6.00 - 11.00	Auto	0.0412
L29	3	FP 6.125"x1.25"	6.00 - 11.00	Auto	0.0412
L29	4	FP 6.125"x1.25"	6.00 - 11.00	Auto	0.0412
L30	2	FP 6.125"x1.25"	1.00 - 6.00	Auto	0.0179
L30	3	FP 6.125"x1.25"	1.00 - 6.00	Auto	0.0179
L30	4	FP 6.125"x1.25"	1.00 - 6.00	Auto	0.0179
L31	2	FP 6.125"x1.25"	0.00 - 1.00	Auto	0.0049
L31	3	FP 6.125"x1.25"	0.00 - 1.00	Auto	0.0049
L31	4	FP 6.125"x1.25"	0.00 - 1.00	Auto	0.0049

**Discrete Tower Loads**

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft
*****					
Lighting Rod 5/8" x 5'	A	From Leg	0.00 0.00 2.50	0.0000	133.00
***128***					
TPA65R-BU8D_CCIV2 w/ Mount Pipe	A	From Leg	1.00 0.00 4.00	0.0000	128.00
TPA65R-BU8D_CCIV2 w/ Mount Pipe	B	From Leg	1.00 0.00 4.00	0.0000	128.00
TPA65R-BU8D_CCIV2 w/ Mount Pipe	C	From Leg	1.00 0.00 4.00	0.0000	128.00
RRUS 4415 B25	A	From Leg	1.00 0.00 -3.00	0.0000	128.00
RRUS 4415 B25	B	From Leg	1.00 0.00 -3.00	0.0000	128.00
RRUS 4415 B25	C	From Leg	1.00 0.00 -2.00	0.0000	128.00
RRUS 4449 B5/B12	A	From Leg	1.00 0.00 -3.00	0.0000	128.00
RRUS 4449 B5/B12	B	From Leg	1.00 0.00 -3.00	0.0000	128.00
RRUS 4449 B5/B12	C	From Leg	1.00	0.0000	128.00

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement
			Horz Lateral	Vert			
			ft	ft	°	ft	
			0.00				
			-2.00				
DBC0111F2V62-1	A	From Leg	1.00		0.0000	128.00	
			0.00				
			0.00				
DBC0111F2V62-1	B	From Leg	1.00		0.0000	128.00	
			0.00				
			0.00				
DBC0111F2V62-1	C	From Leg	1.00		0.0000	128.00	
			0.00				
			0.00				
DC6-48-60-18-8C-EV	B	From Leg	1.00		0.0000	128.00	
			0.00				
			-3.00				
DC6-48-60-18-8F	A	From Leg	1.00		0.0000	128.00	
			0.00				
			-3.00				
Side Arm Mount [SO 102-3]	C	None			0.0000	128.00	
Pipe Mount [PM 601-3]	C	None			0.0000	128.00	
***124***							
VV-65B-R1_TMO w/ Mount Pipe	A	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
VV-65B-R1_TMO w/ Mount Pipe	B	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
VV-65B-R1_TMO w/ Mount Pipe	C	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
APXVAALL24_43-U- NA20_TMO w/ Mount Pipe	A	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
APXVAALL24_43-U- NA20_TMO w/ Mount Pipe	B	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
APXVAALL24_43-U- NA20_TMO w/ Mount Pipe	C	From Leg	4.00		0.0000	124.00	
			0.00				
			0.00				
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00		0.0000	124.00	
			0.00				
			1.00				
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00		0.0000	124.00	
			0.00				
			1.00				
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00		0.0000	124.00	
			0.00				
			1.00				
Radio 4480_TMOV2	A	From Leg	4.00		0.0000	124.00	
			0.00				

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement
			Horz Lateral	Vert			
			ft	ft	ft	°	ft
Radio 4480_TMOV2	B	From Leg	1.00	4.00	0.0000		124.00
			0.00				
Radio 4480_TMOV2	C	From Leg	1.00	4.00	0.0000		124.00
			0.00				
Platform Mount [LP 1201- 1_HR-1] ***110***	C	None			0.0000		124.00
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000		110.00
			1.00				
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000		110.00
			1.00				
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000		110.00
			1.00				
TA08025-B604	A	From Leg	4.00	0.00	0.0000		110.00
			3.00				
TA08025-B604	B	From Leg	4.00	0.00	0.0000		110.00
			3.00				
TA08025-B604	C	From Leg	4.00	0.00	0.0000		110.00
			3.00				
TA08025-B605	A	From Leg	4.00	0.00	0.0000		110.00
			3.00				
TA08025-B605	B	From Leg	4.00	0.00	0.0000		110.00
			3.00				
TA08025-B605	C	From Leg	4.00	0.00	0.0000		110.00
			3.00				
RDIDC-9181-PF-48	A	From Leg	4.00	0.00	0.0000		110.00
			0.00				
6' x 2" Mount Pipe	A	From Leg	2.00	0.00	0.0000		110.00
			0.00				
Commscope MC-PK8-DSH ***9g***	C	None			0.0000		110.00
APX16DWV-16DWVS-C w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000		99.00
			1.00				
APX16DWV-16DWVS-C w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000		99.00
			1.00				
APX16DWV-16DWVS-C w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000		99.00
			1.00				
ETT19V2S12UB	A	From Leg	4.00	0.00	0.0000		99.00
			1.00				
ETT19V2S12UB	B	From Leg	4.00	0.0000	0.0000		99.00



Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement
			Horz Lateral	Vert			
			ft	ft	ft	°	ft
			0.00				
			1.00				
ETT19V2S12UB	B	From Leg	4.00			0.0000	99.00
			0.00				
			1.00				
KRY 112 144/1	A	From Leg	4.00			0.0000	99.00
			0.00				
			1.00				
KRY 112 144/1	B	From Leg	4.00			0.0000	99.00
			0.00				
			1.00				
KRY 112 144/1	C	From Leg	4.00			0.0000	99.00
			0.00				
			1.00				
6' x 2" Mount Pipe	A	From Leg	4.00			0.0000	99.00
			0.00				
			0.00				
6' x 2" Mount Pipe	B	From Leg	4.00			0.0000	99.00
			0.00				
			0.00				
6' x 2" Mount Pipe	C	From Leg	4.00			0.0000	99.00
			0.00				
			0.00				
T-Arm Mount [TA 602-3] ***g***	C	None				0.0000	99.00
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHH-65B-R2B w/ Mount Pipe	A	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHH-65B-R2B w/ Mount Pipe	B	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHH-65B-R2B w/ Mount Pipe	C	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHHSS-65B-R2BT4 w/ Mount Pipe	A	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHHSS-65B-R2BT4 w/ Mount Pipe	B	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
NHHSS-65B-R2BT4 w/ Mount Pipe	C	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
MT6407-77A w/ Mount Pipe	A	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				
MT6407-77A w/ Mount Pipe	B	From Leg	4.00			0.0000	89.00
			0.00				
			5.00				

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement
			Horz Lateral	Vert ft	ft		
			ft	ft	°	ft	
MT6407-77A w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
BSF0020F3V1	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
(2) BSF0020F3V1	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
BSF0020F3V1	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RVZDC-6627-PF-48	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
CBRS RT4401-48A	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
CBRS RT4401-48A	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
CBRS RT4401-48A	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4439D-25A	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4439D-25A	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4439D-25A	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4440D-13A	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4440D-13A	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
RF4440D-13A	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	5.00			
6' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	0.00			
6' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	0.00			
6' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	89.00	
			0.00	0.00			
Dual Antenna Mounting Kit	A	From Leg	4.00	0.00	0.0000	89.00	
			0.00	0.00			
Dual Antenna Mounting Kit	B	From Leg	4.00	0.00	0.0000	89.00	
			0.00	0.00			
Dual Antenna Mounting Kit	C	From Leg	4.00	0.00	0.0000	89.00	

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement  ft
			Horz Lateral Vert ft ft ft				
				0.00			
				0.00			
Platform Mount [LP 1201- 1_KCKR-HR-1] ***75***	C	None			0.0000		89.00
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00		0.0000		75.00
			0.00				
			1.00				
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00		0.0000		75.00
			0.00				
			1.00				
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00		0.0000		75.00
			0.00				
			1.00				
*****							
***							
***							

## 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

Comb. No.	Description
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	133 - 128	Pole	Max Tension	2	0.00	0.00	-0.00
			Max. Compression	26	-0.46	-0.00	0.03
			Max. Mx	8	-0.34	-0.64	0.02
			Max. My	2	-0.34	-0.00	0.66
			Max. Vy	8	0.22	-0.64	0.02
			Max. Vx	2	-0.22	-0.00	0.66
			Max. Torque	8			0.01
L2	128 - 123	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.55	-0.11	0.06
			Max. Mx	8	-6.11	-24.45	0.27
			Max. My	2	-6.11	-0.04	24.41
			Max. Vy	8	7.31	-24.45	0.27
			Max. Vx	2	-7.31	-0.04	24.41
			Max. Torque	24			-2.18
L3	123 - 118	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.07	-0.11	0.07
			Max. Mx	8	-6.47	-61.89	0.24
			Max. My	2	-6.46	-0.05	61.85
			Max. Vy	8	7.67	-61.89	0.24
			Max. Vx	2	-7.67	-0.05	61.85
			Max. Torque	24			-2.18
L4	118 - 113	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.61	-0.12	0.07
			Max. Mx	8	-6.83	-101.10	0.21
			Max. My	2	-6.83	-0.05	101.06
			Max. Vy	8	8.02	-101.10	0.21
			Max. Vx	2	-8.02	-0.05	101.06
			Max. Torque	24			-2.18
L5	113 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.68	-0.13	0.54
			Max. Mx	8	-9.95	-148.89	0.40
			Max. My	2	-9.95	-0.06	149.11
			Max. Vy	8	11.19	-148.89	0.40
			Max. Vx	2	-11.22	-0.06	149.11
			Max. Torque	24			-3.05
L6	108 - 103	Pole	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
L7	103 - 98	Pole	Max. Compression	26	-18.26	-0.14	0.54
			Max. Mx	8	-10.38	-205.70	0.37
			Max. My	2	-10.38	-0.07	206.07
			Max. Vy	8	11.54	-205.70	0.37
			Max. Vx	2	-11.57	-0.07	206.07
			Max. Torque	24			-3.05
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.04	-0.36	0.55
			Max. Mx	8	-11.98	-266.26	0.40
			Max. My	2	-11.97	-0.17	266.68
L8	98 - 93	Pole	Max. Vy	8	13.29	-266.26	0.40
			Max. Vx	2	-13.32	-0.17	266.68
			Max. Torque	24			-3.69
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.64	-0.37	0.55
			Max. Mx	8	-12.46	-333.48	0.37
			Max. My	2	-12.45	-0.18	334.06
			Max. Vy	8	13.62	-333.48	0.37
			Max. Vx	2	-13.65	-0.18	334.06
			Max. Torque	24			-3.69
L9	93 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.81	-0.98	0.20
			Max. Mx	8	-17.61	-418.20	0.31
			Max. My	2	-17.60	-0.41	418.41
			Max. Vy	8	18.53	-418.20	0.31
			Max. Vx	2	-18.55	-0.41	418.41
			Max. Torque	12			4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.12	-0.98	0.20
			Max. Mx	8	-17.88	-460.01	0.30
L10	88 - 82.25	Pole	Max. My	2	-17.88	-0.41	460.25
			Max. Vy	8	18.66	-460.01	0.30
			Max. Vx	2	-18.67	-0.41	460.25
			Max. Torque	12			4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.26	-0.98	0.20
			Max. Mx	8	-18.78	-554.20	0.27
			Max. My	2	-18.78	-0.42	554.51
			Max. Vy	8	19.03	-554.20	0.27
			Max. Vx	2	-19.04	-0.42	554.51
L11	82.25 - 80.75	Pole	Max. Torque	12			4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.06	-0.98	0.20
			Max. Mx	8	-19.51	-649.98	0.24
			Max. My	2	-19.51	-0.43	650.36
			Max. Vy	8	19.32	-649.98	0.24
			Max. Vx	2	-19.33	-0.43	650.36
			Max. Torque	12			4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.33	-0.98	0.20
L12	80.75 - 75.75	Pole	Max. Mx	8	-20.44	-749.07	0.22
			Max. My	2	-20.43	-0.44	749.52
			Max. Vy	8	19.96	-749.07	0.22
			Max. Vx	2	-19.97	-0.44	749.52
			Max. Torque	12			5.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.16	-0.98	0.20
			Max. Mx	8	-21.22	-849.44	0.21
			Max. My	2	-21.22	-0.44	849.96
			Max. Vy	8	20.22	-849.44	0.21
L13	75.75 - 70.75	Pole	Max. Vx	2	-20.23	-0.44	849.96
			Max. Torque	12			5.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.16	-0.98	0.20
			Max. Mx	8	-21.22	-849.44	0.21
			Max. My	2	-21.22	-0.44	849.96
L14	70.75 - 65.75	Pole	Max. Vy	8	20.22	-849.44	0.21
			Max. Vx	2	-20.23	-0.44	849.96
			Max. Torque	12			5.00
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.16	-0.98	0.20
			Max. Mx	8	-21.22	-849.44	0.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L15	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.01	-0.98	0.20
			Max. Mx	8	-22.03	-951.08	0.20
			Max. My	2	-22.03	-0.44	951.67
			Max. Vy	8	20.47	-951.08	0.20
			Max. Vx	2	-20.48	-0.44	951.67
			Max. Torque	24			-5.00
L16	60.75 - 57.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.56	-0.98	0.20
			Max. Mx	8	-22.53	-1012.65	0.19
			Max. My	2	-22.52	-0.45	1013.27
			Max. Vy	8	20.61	-1012.65	0.19
			Max. Vx	2	-20.63	-0.45	1013.27
			Max. Torque	24			-4.99
L17	57.75 - 57.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.62	-0.98	0.20
			Max. Mx	8	-22.60	-1017.80	0.19
			Max. My	2	-22.60	-0.45	1018.43
			Max. Vy	8	20.61	-1017.80	0.19
			Max. Vx	2	-20.63	-0.45	1018.43
			Max. Torque	24			-4.99
L18	57.5 - 52.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.95	-0.98	0.20
			Max. Mx	8	-23.73	-1121.67	0.18
			Max. My	2	-23.73	-0.45	1122.37
			Max. Vy	8	20.95	-1121.67	0.18
			Max. Vx	2	-20.96	-0.45	1122.37
			Max. Torque	24			-4.99
L19	52.5 - 47.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.28	-0.98	0.20
			Max. Mx	8	-24.88	-1227.15	0.17
			Max. My	2	-24.88	-0.45	1227.92
			Max. Vy	8	21.27	-1227.15	0.17
			Max. Vx	2	-21.28	-0.45	1227.92
			Max. Torque	24			-4.99
L20	47.5 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.96	-0.98	0.20
			Max. Mx	8	-25.47	-1280.47	0.17
			Max. My	2	-25.47	-0.45	1281.28
			Max. Vy	8	21.42	-1280.47	0.17
			Max. Vx	2	-21.43	-0.45	1281.28
			Max. Torque	24			-4.98
L21	40.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.31	-0.98	0.20
			Max. Mx	8	-27.45	-1388.51	0.16
			Max. My	2	-27.45	-0.46	1389.38
			Max. Vy	8	21.80	-1388.51	0.16
			Max. Vx	2	-21.82	-0.46	1389.38
			Max. Torque	24			-4.98
L22	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.74	-0.98	0.20
			Max. Mx	8	-28.71	-1498.17	0.16
			Max. My	2	-28.70	-0.46	1499.11
			Max. Vy	8	22.08	-1498.17	0.16
			Max. Vx	2	-22.10	-0.46	1499.11
			Max. Torque	24			-4.98
L23	35 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.18	-0.98	0.20
			Max. Mx	8	-29.98	-1609.17	0.15
			Max. My	2	-29.98	-0.46	1610.18
			Max. Vy	8	22.35	-1609.17	0.15
			Max. Vx	2	-22.36	-0.46	1610.18
			Max. Torque	24			-4.98

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L24	30 - 26.25	Pole	Max. Torque	24			-4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.28	-0.98	0.20
			Max. Mx	8	-30.95	-1693.26	0.15
			Max. My	2	-30.95	-0.46	1694.32
			Max. Vy	8	22.53	-1693.26	0.15
			Max. Vx	2	-22.55	-0.46	1694.32
L25	26.25 - 26	Pole	Max. Torque	24			-4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.35	-0.98	0.20
			Max. Mx	8	-31.03	-1698.89	0.15
			Max. My	2	-31.03	-0.46	1699.95
			Max. Vy	8	22.53	-1698.89	0.15
			Max. Vx	2	-22.55	-0.46	1699.95
L26	26 - 21	Pole	Max. Torque	24			-4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.92	-0.98	0.20
			Max. Mx	8	-32.42	-1812.12	0.15
			Max. My	2	-32.42	-0.46	1813.25
			Max. Vy	8	22.78	-1812.12	0.15
			Max. Vx	2	-22.80	-0.46	1813.25
L27	21 - 16	Pole	Max. Torque	24			-4.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.50	-0.98	0.20
			Max. Mx	8	-33.84	-1926.50	0.15
			Max. My	2	-33.84	-0.46	1927.70
			Max. Vy	8	23.00	-1926.50	0.15
			Max. Vx	2	-23.01	-0.46	1927.70
L28	16 - 11	Pole	Max. Torque	24			-4.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.09	-0.98	0.20
			Max. Mx	8	-35.27	-2041.90	0.16
			Max. My	2	-35.27	-0.46	2043.17
			Max. Vy	8	23.19	-2041.90	0.16
			Max. Vx	2	-23.21	-0.46	2043.17
L29	11 - 6	Pole	Max. Torque	24			-4.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.69	-0.98	0.20
			Max. Mx	8	-36.72	-2158.25	0.16
			Max. My	2	-36.72	-0.46	2159.58
			Max. Vy	8	23.38	-2158.25	0.16
			Max. Vx	2	-23.39	-0.46	2159.58
L30	6 - 1	Pole	Max. Torque	24			-4.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.27	-0.98	0.20
			Max. Mx	8	-38.18	-2275.51	0.16
			Max. My	2	-38.18	-0.46	2276.91
			Max. Vy	8	23.56	-2275.51	0.16
			Max. Vx	2	-23.57	-0.46	2276.91
L31	1 - 0	Pole	Max. Torque	24			-4.97
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.59	-0.98	0.20
			Max. Mx	8	-38.48	-2299.07	0.17
			Max. My	2	-38.48	-0.46	2300.48
			Max. Vy	8	23.59	-2299.07	0.17
			Max. Vx	2	-23.61	-0.46	2300.48
			Max. Torque	24			-4.97

**Maximum Reactions**

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	54.59	-6.63	0.00
	Max. H <sub>x</sub>	20	38.49	23.58	-0.00
	Max. H <sub>z</sub>	2	38.49	-0.00	23.59
	Max. M <sub>x</sub>	2	2300.48	-0.00	23.59
	Max. M <sub>z</sub>	8	2299.07	-23.58	-0.00
	Max. Torsion	12	4.97	-11.81	-20.45
	Min. Vert	5	28.87	-11.78	20.40
	Min. H <sub>x</sub>	8	38.49	-23.58	-0.00
	Min. H <sub>z</sub>	14	38.49	-0.00	-23.59
	Min. M <sub>x</sub>	14	-2300.32	-0.00	-23.59
	Min. M <sub>z</sub>	20	-2298.13	23.58	-0.00
	Min. Torsion	24	-4.97	11.81	20.45

### 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	32.08	0.00	0.00	-0.06	-0.35	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	38.49	0.00	-23.59	-2300.48	-0.46	0.61
0.9 Dead+1.0 Wind 0 deg - No Ice	28.87	0.00	-23.59	-2263.43	-0.34	0.60
1.2 Dead+1.0 Wind 30 deg - No Ice	38.49	11.78	-20.40	-1989.38	-1149.09	-3.92
0.9 Dead+1.0 Wind 30 deg - No Ice	28.87	11.78	-20.40	-1957.35	-1130.45	-3.93
1.2 Dead+1.0 Wind 60 deg - No Ice	38.49	20.40	-11.78	-1148.18	-1989.03	0.16
0.9 Dead+1.0 Wind 60 deg - No Ice	28.87	20.40	-11.78	-1129.67	-1956.89	0.16
1.2 Dead+1.0 Wind 90 deg - No Ice	38.49	23.58	0.00	-0.17	-2299.07	4.20
0.9 Dead+1.0 Wind 90 deg - No Ice	28.87	23.58	0.00	-0.12	-2261.95	4.21
1.2 Dead+1.0 Wind 120 deg - No Ice	38.49	20.44	11.80	1150.88	-1993.98	-0.44
0.9 Dead+1.0 Wind 120 deg - No Ice	28.87	20.44	11.80	1132.38	-1961.77	-0.44
1.2 Dead+1.0 Wind 150 deg - No Ice	38.49	11.81	20.45	1994.26	-1151.79	-4.97
0.9 Dead+1.0 Wind 150 deg - No Ice	28.87	11.81	20.45	1962.17	-1133.16	-4.97
1.2 Dead+1.0 Wind 180 deg - No Ice	38.49	0.00	23.59	2300.32	-0.46	-0.61
0.9 Dead+1.0 Wind 180 deg - No Ice	28.87	0.00	23.59	2263.32	-0.34	-0.60
1.2 Dead+1.0 Wind 210 deg - No Ice	38.49	-11.78	20.40	1989.31	1148.01	3.92
0.9 Dead+1.0 Wind 210 deg - No Ice	28.87	-11.78	20.40	1957.29	1129.66	3.93
1.2 Dead+1.0 Wind 240 deg - No Ice	38.49	-20.40	11.78	1148.02	1988.09	-0.16
0.9 Dead+1.0 Wind 240 deg - No Ice	28.87	-20.40	11.78	1129.56	1956.21	-0.16
1.2 Dead+1.0 Wind 270 deg - No Ice	38.49	-23.58	0.00	-0.17	2298.13	-4.20
0.9 Dead+1.0 Wind 270 deg - No Ice	28.87	-23.58	0.00	-0.12	2261.26	-4.21



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
No Ice						
1.2 Dead+1.0 Wind 300 deg - No Ice	38.49	-20.44	-11.80	-1151.03	1993.05	0.44
0.9 Dead+1.0 Wind 300 deg - No Ice	28.87	-20.44	-11.80	-1132.49	1961.09	0.44
1.2 Dead+1.0 Wind 330 deg - No Ice	38.49	-11.81	-20.45	-1994.32	1151.02	4.97
0.9 Dead+1.0 Wind 330 deg - No Ice	28.87	-11.81	-20.45	-1962.22	1132.59	4.97
1.2 Dead+1.0 Ice+1.0 Temp	54.59	0.00	-0.00	-0.20	-0.98	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	54.59	0.00	-6.63	-657.79	-1.10	0.18
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	54.59	3.31	-5.74	-569.09	-329.54	-0.80
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	54.59	5.74	-3.31	-328.66	-569.96	0.04
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	54.59	6.63	-0.00	-0.24	-658.63	0.87
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	54.59	5.75	3.32	328.89	-571.14	-0.14
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	54.59	3.32	5.75	569.83	-330.21	-1.11
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	54.59	0.00	6.63	657.34	-1.10	-0.18
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	54.59	-3.31	5.74	568.65	327.33	0.80
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	54.59	-5.74	3.31	328.20	567.76	-0.04
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	54.59	-6.63	-0.00	-0.24	656.44	-0.87
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	54.59	-5.75	-3.32	-329.34	568.94	0.14
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	54.59	-3.32	-5.75	-570.27	328.03	1.11
Dead+Wind 0 deg - Service	32.08	0.00	-5.75	-555.61	-0.39	0.15
Dead+Wind 30 deg - Service	32.08	2.87	-4.97	-480.49	-277.76	-0.97
Dead+Wind 60 deg - Service	32.08	4.97	-2.87	-277.33	-480.62	0.04
Dead+Wind 90 deg - Service	32.08	5.74	0.00	-0.07	-555.49	1.04
Dead+Wind 120 deg - Service	32.08	4.98	2.88	277.89	-481.82	-0.11
Dead+Wind 150 deg - Service	32.08	2.88	4.98	481.56	-278.45	-1.23
Dead+Wind 180 deg - Service	32.08	0.00	5.75	555.48	-0.39	-0.15
Dead+Wind 210 deg - Service	32.08	-2.87	4.97	480.36	276.98	0.97
Dead+Wind 240 deg - Service	32.08	-4.97	2.87	277.20	479.85	-0.04
Dead+Wind 270 deg - Service	32.08	-5.74	0.00	-0.07	554.72	-1.04
Dead+Wind 300 deg - Service	32.08	-4.98	-2.88	-278.02	481.05	0.11
Dead+Wind 330 deg - Service	32.08	-2.88	-4.98	-481.69	277.68	1.23

## 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	-32.08	0.00	0.00	32.08	0.00	0.000%
2	0.00	-38.49	-23.59	-0.00	38.49	23.59	0.000%
3	0.00	-28.87	-23.59	-0.00	28.87	23.59	0.000%
4	11.78	-38.49	-20.40	-11.78	38.49	20.40	0.000%
5	11.78	-28.87	-20.40	-11.78	28.87	20.40	0.000%
6	20.40	-38.49	-11.78	-20.40	38.49	11.78	0.000%
7	20.40	-28.87	-11.78	-20.40	28.87	11.78	0.000%
8	23.58	-38.49	0.00	-23.58	38.49	-0.00	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
9	23.58	-28.87	0.00	-23.58	28.87	0.00	0.000%
10	20.44	-38.49	11.80	-20.44	38.49	-11.80	0.000%
11	20.44	-28.87	11.80	-20.44	28.87	-11.80	0.000%
12	11.81	-38.49	20.45	-11.81	38.49	-20.45	0.000%
13	11.81	-28.87	20.45	-11.81	28.87	-20.45	0.000%
14	0.00	-38.49	23.59	-0.00	38.49	-23.59	0.000%
15	0.00	-28.87	23.59	-0.00	28.87	-23.59	0.000%
16	-11.78	-38.49	20.40	11.78	38.49	-20.40	0.000%
17	-11.78	-28.87	20.40	11.78	28.87	-20.40	0.000%
18	-20.40	-38.49	11.78	20.40	38.49	-11.78	0.000%
19	-20.40	-28.87	11.78	20.40	28.87	-11.78	0.000%
20	-23.58	-38.49	0.00	23.58	38.49	-0.00	0.000%
21	-23.58	-28.87	0.00	23.58	28.87	0.00	0.000%
22	-20.44	-38.49	-11.80	20.44	38.49	11.80	0.000%
23	-20.44	-28.87	-11.80	20.44	28.87	11.80	0.000%
24	-11.81	-38.49	-20.45	11.81	38.49	20.45	0.000%
25	-11.81	-28.87	-20.45	11.81	28.87	20.45	0.000%
26	0.00	-54.59	0.00	-0.00	54.59	0.00	0.000%
27	0.00	-54.59	-6.63	-0.00	54.59	6.63	0.000%
28	3.31	-54.59	-5.74	-3.31	54.59	5.74	0.000%
29	5.74	-54.59	-3.31	-5.74	54.59	3.31	0.000%
30	6.63	-54.59	0.00	-6.63	54.59	0.00	0.000%
31	5.75	-54.59	3.32	-5.75	54.59	-3.32	0.000%
32	3.32	-54.59	5.75	-3.32	54.59	-5.75	0.000%
33	0.00	-54.59	6.63	-0.00	54.59	-6.63	0.000%
34	-3.31	-54.59	5.74	3.31	54.59	-5.74	0.000%
35	-5.74	-54.59	3.31	5.74	54.59	-3.31	0.000%
36	-6.63	-54.59	0.00	6.63	54.59	0.00	0.000%
37	-5.75	-54.59	-3.32	5.75	54.59	3.32	0.000%
38	-3.32	-54.59	-5.75	3.32	54.59	5.75	0.000%
39	0.00	-32.08	-5.75	0.00	32.08	5.75	0.000%
40	2.87	-32.08	-4.97	-2.87	32.08	4.97	0.000%
41	4.97	-32.08	-2.87	-4.97	32.08	2.87	0.000%
42	5.74	-32.08	0.00	-5.74	32.08	-0.00	0.000%
43	4.98	-32.08	2.88	-4.98	32.08	-2.88	0.000%
44	2.88	-32.08	4.98	-2.88	32.08	-4.98	0.000%
45	0.00	-32.08	5.75	0.00	32.08	-5.75	0.000%
46	-2.87	-32.08	4.97	2.87	32.08	-4.97	0.000%
47	-4.97	-32.08	2.87	4.97	32.08	-2.87	0.000%
48	-5.74	-32.08	0.00	5.74	32.08	-0.00	0.000%
49	-4.98	-32.08	-2.88	4.98	32.08	2.88	0.000%
50	-2.88	-32.08	-4.98	2.88	32.08	4.98	0.000%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00057411
3	Yes	5	0.00000001	0.00025281
4	Yes	7	0.00000001	0.00011800
5	Yes	6	0.00000001	0.00050644
6	Yes	7	0.00000001	0.00012772
7	Yes	6	0.00000001	0.00055017
8	Yes	6	0.00000001	0.00027135
9	Yes	6	0.00000001	0.00009551
10	Yes	7	0.00000001	0.00012714
11	Yes	6	0.00000001	0.00054737

12	Yes	7	0.00000001	0.00014536
13	Yes	6	0.00000001	0.00063002
14	Yes	5	0.00000001	0.00057400
15	Yes	5	0.00000001	0.00025278
16	Yes	7	0.00000001	0.00014119
17	Yes	6	0.00000001	0.00061177
18	Yes	7	0.00000001	0.00012811
19	Yes	6	0.00000001	0.00055213
20	Yes	6	0.00000001	0.00027120
21	Yes	6	0.00000001	0.00009548
22	Yes	7	0.00000001	0.00012971
23	Yes	6	0.00000001	0.00055897
24	Yes	7	0.00000001	0.00011642
25	Yes	6	0.00000001	0.00049965
26	Yes	4	0.00000001	0.00010123
27	Yes	6	0.00000001	0.00078801
28	Yes	6	0.00000001	0.00097448
29	Yes	6	0.00000001	0.00098117
30	Yes	6	0.00000001	0.00079479
31	Yes	6	0.00000001	0.00098022
32	Yes	7	0.00000001	0.00013482
33	Yes	6	0.00000001	0.00078629
34	Yes	6	0.00000001	0.00098885
35	Yes	6	0.00000001	0.00097371
36	Yes	6	0.00000001	0.00078968
37	Yes	6	0.00000001	0.00097986
38	Yes	6	0.00000001	0.00096995
39	Yes	5	0.00000001	0.00007130
40	Yes	5	0.00000001	0.00035400
41	Yes	5	0.00000001	0.00038807
42	Yes	5	0.00000001	0.00022076
43	Yes	5	0.00000001	0.00038240
44	Yes	5	0.00000001	0.00055178
45	Yes	5	0.00000001	0.00007124
46	Yes	5	0.00000001	0.00051086
47	Yes	5	0.00000001	0.00039002
48	Yes	5	0.00000001	0.00022016
49	Yes	5	0.00000001	0.00040131
50	Yes	5	0.00000001	0.00036109

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	26.567	43	1.7263	0.0181
L2	128 - 123	24.759	43	1.7261	0.0181
L3	123 - 118	22.957	43	1.7139	0.0171
L4	118 - 113	21.171	43	1.6961	0.0159
L5	113 - 108	19.411	43	1.6655	0.0148
L6	108 - 103	17.688	43	1.6235	0.0136
L7	103 - 98	16.016	43	1.5684	0.0124
L8	98 - 93	14.408	43	1.5017	0.0112
L9	93 - 88	12.875	43	1.4236	0.0099
L10	88 - 82.25	11.430	43	1.3350	0.0087
L11	85.75 - 80.75	10.812	43	1.2904	0.0080
L12	80.75 - 75.75	9.487	43	1.2313	0.0073
L13	75.75 - 70.75	8.246	44	1.1385	0.0063
L14	70.75 - 65.75	7.105	44	1.0388	0.0053
L15	65.75 - 60.75	6.072	44	0.9333	0.0044
L16	60.75 - 57.75	5.152	44	0.8231	0.0036

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L17	57.75 - 57.5	4.656	44	0.7551	0.0032
L18	57.5 - 52.5	4.617	44	0.7519	0.0032
L19	52.5 - 47.5	3.863	44	0.6870	0.0028
L20	47.5 - 40.75	3.179	44	0.6197	0.0024
L21	45 - 40	2.864	44	0.5856	0.0022
L22	40 - 35	2.269	44	0.5464	0.0020
L23	35 - 30	1.733	44	0.4762	0.0017
L24	30 - 26.25	1.271	44	0.4054	0.0014
L25	26.25 - 26	0.974	44	0.3522	0.0012
L26	26 - 21	0.956	44	0.3489	0.0012
L27	21 - 16	0.625	44	0.2828	0.0009
L28	16 - 11	0.363	44	0.2166	0.0007
L29	11 - 6	0.172	44	0.1490	0.0005
L30	6 - 1	0.051	44	0.0815	0.0002
L31	1 - 0	0.001	44	0.0135	0.0000

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.00	Lighting Rod 5/8" x 5'	43	26.567	1.7263	0.0181	57075
128.00	TPA65R-BU8D_CCIV2 w/ Mount Pipe	43	24.759	1.7261	0.0181	57075
124.00	VV-65B-R1_TMO w/ Mount Pipe	43	23.317	1.7169	0.0173	21834
110.00	MX08FRO665-21 w/ Mount Pipe	43	18.372	1.6417	0.0141	6554
99.00	APX16DWV-16DWVS-C w/ Mount Pipe	43	14.724	1.5160	0.0114	4058
89.00	BXA-70063-4CF-EDIN-X w/ Mount Pipe	43	11.711	1.3547	0.0090	3239
75.00	APXV18-206517S-C w/ Mount Pipe	44	8.068	1.1233	0.0061	2934

**Maximum Tower Deflections - Design Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	110.017	2	7.1674	0.0735
L2	128 - 123	102.534	2	7.1665	0.0734
L3	123 - 118	95.073	2	7.1168	0.0692
L4	118 - 113	87.676	2	7.0429	0.0643
L5	113 - 108	80.385	2	6.9159	0.0599
L6	108 - 103	73.255	12	6.7414	0.0553
L7	103 - 98	66.337	12	6.5124	0.0502
L8	98 - 93	59.683	12	6.2345	0.0453
L9	93 - 88	53.341	12	5.9098	0.0402
L10	88 - 82.25	47.359	12	5.5412	0.0352
L11	85.75 - 80.75	44.798	12	5.3559	0.0325
L12	80.75 - 75.75	39.311	12	5.1106	0.0294
L13	75.75 - 70.75	34.169	12	4.7250	0.0253
L14	70.75 - 65.75	29.444	12	4.3108	0.0215
L15	65.75 - 60.75	25.164	12	3.8727	0.0180
L16	60.75 - 57.75	21.351	12	3.4148	0.0147
L17	57.75 - 57.5	19.296	12	3.1322	0.0128

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L18	57.5 - 52.5	19.133	12	3.1191	0.0128
L19	52.5 - 47.5	16.009	12	2.8493	0.0111
L20	47.5 - 40.75	13.173	12	2.5698	0.0096
L21	45 - 40	11.866	12	2.4281	0.0089
L22	40 - 35	9.399	12	2.2653	0.0081
L23	35 - 30	7.180	12	1.9739	0.0068
L24	30 - 26.25	5.267	12	1.6805	0.0056
L25	26.25 - 26	4.034	12	1.4595	0.0047
L26	26 - 21	3.958	12	1.4461	0.0047
L27	21 - 16	2.588	12	1.1718	0.0037
L28	16 - 11	1.504	12	0.8975	0.0027
L29	11 - 6	0.711	12	0.6170	0.0018
L30	6 - 1	0.212	12	0.3375	0.0010
L31	1 - 0	0.006	12	0.0558	0.0002

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.00	Lighting Rod 5/8" x 5'	2	110.017	7.1674	0.0735	14465
128.00	TPA65R-BU8D_CCIW2 w/ Mount Pipe	2	102.534	7.1665	0.0734	14465
124.00	VV-65B-R1_TMO w/ Mount Pipe	2	96.561	7.1291	0.0702	5476
110.00	MX08FRO665-21 w/ Mount Pipe	12	76.083	6.8173	0.0572	1623
99.00	APX16DWV-16DWVS-C w/ Mount Pipe	12	60.990	6.2942	0.0463	1000
89.00	BXA-70063-4CF-EDIN-X w/ Mount Pipe	12	48.523	5.6230	0.0363	794
75.00	APXV18-2065175-C w/ Mount Pipe	12	33.433	4.6620	0.0247	715

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
L1	133 - 128 (1)	TP14x14x0.375	5.00	0.00	0.0	16.0516	-0.34	606.75	0.001
L2	128 - 123 (2)	TP14x14x0.375	5.00	0.00	0.0	16.0516	-6.11	606.75	0.010
L3	123 - 118 (3)	TP22.7502x22x0.1875	5.00	0.00	0.0	13.4276	-6.47	725.09	0.009
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	5.00	0.00	0.0	13.8741	-6.83	749.20	0.009
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	5.00	0.00	0.0	14.3205	-9.95	773.31	0.013
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	5.00	0.00	0.0	14.7670	-10.38	797.42	0.013
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	5.00	0.00	0.0	15.2134	-11.98	821.52	0.015
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	5.00	0.00	0.0	15.6599	-12.45	845.63	0.015
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	5.00	0.00	0.0	16.1063	-17.60	869.74	0.020
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	5.75	0.00	0.0	16.3072	-17.87	880.59	0.020
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	5.00	0.00	0.0	21.9911	-18.77	1286.48	0.015
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	5.00	0.00	0.0	22.5865	-19.51	1321.31	0.015

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> φP <sub>n</sub>
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	5.00	0.00	0.0	23.1818	-20.43	1356.13	0.015
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	5.00	0.00	0.0	23.7771	-21.22	1390.96	0.015
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	5.00	0.00	0.0	24.3724	-22.02	1425.79	0.015
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	3.00	0.00	0.0	24.7296	-22.52	1446.68	0.016
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	0.25	0.00	0.0	45.4929	-22.59	2661.33	0.008
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	5.00	0.00	0.0	45.9736	-23.72	2689.45	0.009
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	5.00	0.00	0.0	46.4243	-24.88	2715.82	0.009
L20	47.5 - 40.75 (20)	TP33.966x32.9532x0.45	6.75	0.00	0.0	46.9601	-25.46	2747.16	0.009
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	5.00	0.00	0.0	50.5556	-27.44	2957.50	0.009
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	5.00	0.00	0.0	50.3772	-28.70	2947.07	0.010
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	5.00	0.00	0.0	51.4934	-29.98	3012.36	0.010
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	3.75	0.00	0.0	52.3305	-30.95	3061.33	0.010
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	0.25	0.00	0.0	57.8918	-31.03	3386.67	0.009
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	5.00	0.00	0.0	57.7224	-32.42	3376.76	0.010
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	5.00	0.00	0.0	58.9278	-33.84	3447.28	0.010
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	5.00	0.00	0.0	58.6680	-35.27	3432.08	0.010
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	5.00	0.00	0.0	59.8437	-36.72	3500.86	0.010
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	5.00	0.00	0.0	60.2566	-38.18	3525.01	0.011
L31	1 - 0 (31)	TP39.58x39.43x0.4875	1.00	0.00	0.0	60.4888	-38.48	3538.60	0.011

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>rx</sub> kip-ft	Ratio M <sub>ux</sub> φM <sub>rx</sub>	M <sub>uy</sub> kip-ft	φM <sub>ry</sub> kip-ft	Ratio M <sub>uy</sub> φM <sub>ry</sub>
L1	133 - 128 (1)	TP14x14x0.375	0.66	219.34	0.003	0.00	219.34	0.000
L2	128 - 123 (2)	TP14x14x0.375	24.45	219.34	0.111	0.00	219.34	0.000
L3	123 - 118 (3)	TP22.7502x22x0.1875	61.89	404.88	0.153	0.00	404.88	0.000
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	101.10	427.97	0.236	0.00	427.97	0.000
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	149.10	451.39	0.330	0.00	451.39	0.000
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	206.02	475.10	0.434	0.00	475.10	0.000
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	266.61	499.08	0.534	0.00	499.08	0.000
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	333.93	523.31	0.638	0.00	523.31	0.000
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	418.62	547.75	0.764	0.00	547.75	0.000
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	460.52	558.81	0.824	0.00	558.81	0.000
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	554.91	893.20	0.621	0.00	893.20	0.000
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	650.90	935.05	0.696	0.00	935.05	0.000
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	750.19	977.43	0.768	0.00	977.43	0.000
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	850.76	1020.31	0.834	0.00	1020.31	0.000
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	952.60	1063.66	0.896	0.00	1063.66	0.000
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	1014.28	1089.88	0.931	0.00	1089.88	0.000
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	1019.45	2138.88	0.477	0.00	2138.88	0.000
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	1123.52	2215.45	0.507	0.00	2215.45	0.000
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	1229.20	2291.67	0.536	0.00	2291.67	0.000
L20	47.5 - 40.75	TP33.966x32.9532x0.45	1282.62	2345.23	0.547	0.00	2345.23	0.000

Section No.	Elevation ft	Size	$M_{ux}$ kip-ft	$\phi M_{nx}$ kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	$M_{uy}$ kip-ft	$\phi M_{ny}$ kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
(20)								
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	1390.86	2539.47	0.548	0.00	2539.47	0.000
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	1500.72	2590.61	0.579	0.00	2590.61	0.000
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	1611.92	2707.47	0.595	0.00	2707.47	0.000
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	1696.15	2796.82	0.606	0.00	2796.82	0.000
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	1701.78	3088.59	0.551	0.00	3088.59	0.000
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	1815.22	3148.41	0.577	0.00	3148.41	0.000
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	1929.79	3282.21	0.588	0.00	3282.21	0.000
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	2045.39	3337.72	0.613	0.00	3337.72	0.000
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	2161.93	3473.72	0.622	0.00	3473.72	0.000
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	2279.38	3568.43	0.639	0.00	3568.43	0.000
L31	1 - 0 (31)	TP39.58x39.43x0.4875	2302.97	3596.15	0.640	0.00	3596.15	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	133 - 128 (1)	TP14x14x0.375	0.22	182.03	0.001	0.00	218.04	0.000
L2	128 - 123 (2)	TP14x14x0.375	7.31	182.03	0.040	2.07	218.04	0.009
L3	123 - 118 (3)	TP22.7502x22x0.1875	7.67	217.53	0.035	2.08	429.82	0.005
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	8.02	224.76	0.036	2.08	458.88	0.005
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	11.21	231.99	0.048	2.94	488.88	0.006
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	11.56	239.22	0.048	2.94	519.84	0.006
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	13.29	246.46	0.054	3.48	551.75	0.006
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	13.65	253.69	0.054	3.68	584.61	0.006
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	18.57	260.92	0.071	4.98	618.42	0.008
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	18.70	264.18	0.071	4.98	633.94	0.008
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	19.07	385.94	0.049	4.98	936.71	0.005
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	19.36	396.39	0.049	4.97	988.12	0.005
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	20.00	406.84	0.049	5.00	1040.88	0.005
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	20.26	417.29	0.049	5.00	1095.03	0.005
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	20.51	427.74	0.048	4.99	1150.55	0.004
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	20.65	434.00	0.048	4.99	1184.53	0.004
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	20.65	798.40	0.026	4.99	2166.83	0.002
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	20.99	806.84	0.026	4.99	2243.18	0.002
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	21.31	814.75	0.026	4.98	2319.15	0.002
L20	47.5 - 40.75 (20)	TP33.966x32.9532x0.45	21.46	824.15	0.026	4.98	2372.98	0.002
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	21.84	887.25	0.025	4.98	2571.69	0.002
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	22.12	884.12	0.025	4.98	2621.67	0.002
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	22.39	903.71	0.025	4.98	2739.12	0.002
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	22.57	918.40	0.025	4.98	2828.90	0.002
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	22.57	1016.00	0.022	4.98	3128.43	0.002
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	22.82	1013.03	0.023	4.97	3186.93	0.002
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	23.04	1034.18	0.022	4.97	3321.43	0.001
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	23.23	1029.62	0.023	4.97	3375.57	0.001
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	23.42	1050.26	0.022	4.97	3512.21	0.001
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	23.60	1057.50	0.022	4.97	3606.50	0.001
L31	1 - 0 (31)	TP39.58x39.43x0.4875	23.63	1061.58	0.022	4.97	3634.34	0.001

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_u$	$M_{ux}$	$M_{uy}$	$V_u$	$T_u$			
		$\phi P_n$	$\phi M_{nx}$	$\phi M_{ny}$	$\phi V_n$	$\phi T_n$			
L1	133 - 128 (1)	0.001	0.003	0.000	0.001	0.000	0.004	1.050	
L2	128 - 123 (2)	0.010	0.111	0.000	0.040	0.009	0.124	1.050	
L3	123 - 118 (3)	0.009	0.153	0.000	0.035	0.005	0.163	1.050	
L4	118 - 113 (4)	0.009	0.236	0.000	0.036	0.005	0.247	1.050	
L5	113 - 108 (5)	0.013	0.330	0.000	0.048	0.006	0.346	1.050	
L6	108 - 103 (6)	0.013	0.434	0.000	0.048	0.006	0.450	1.050	
L7	103 - 98 (7)	0.015	0.534	0.000	0.054	0.006	0.552	1.050	
L8	98 - 93 (8)	0.015	0.638	0.000	0.054	0.006	0.656	1.050	
L9	93 - 88 (9)	0.020	0.764	0.000	0.071	0.008	0.791	1.050	
L10	88 - 82.25 (10)	0.020	0.824	0.000	0.071	0.008	0.851	1.050	
L11	82.25 - 80.75 (11)	0.015	0.621	0.000	0.049	0.005	0.639	1.050	
L12	80.75 - 75.75 (12)	0.015	0.696	0.000	0.049	0.005	0.714	1.050	
L13	75.75 - 70.75 (13)	0.015	0.768	0.000	0.049	0.005	0.785	1.050	
L14	70.75 - 65.75 (14)	0.015	0.834	0.000	0.049	0.005	0.852	1.050	
L15	65.75 - 60.75 (15)	0.015	0.896	0.000	0.048	0.004	0.914	1.050	
L16	60.75 - 57.75 (16)	0.016	0.931	0.000	0.048	0.004	0.949	1.050	
L17	57.75 - 57.5 (17)	0.008	0.477	0.000	0.026	0.002	0.486	1.050	
L18	57.5 - 52.5 (18)	0.009	0.507	0.000	0.026	0.002	0.517	1.050	
L19	52.5 - 47.5 (19)	0.009	0.536	0.000	0.026	0.002	0.546	1.050	
L20	47.5 - 40.75 (20)	0.009	0.547	0.000	0.026	0.002	0.557	1.050	
L21	40.75 - 40 (21)	0.009	0.548	0.000	0.025	0.002	0.558	1.050	
L22	40 - 35 (22)	0.010	0.579	0.000	0.025	0.002	0.590	1.050	
L23	35 - 30 (23)	0.010	0.595	0.000	0.025	0.002	0.606	1.050	
L24	30 - 26.25 (24)	0.010	0.606	0.000	0.025	0.002	0.617	1.050	
L25	26.25 - 26 (25)	0.009	0.551	0.000	0.022	0.002	0.561	1.050	
L26	26 - 21 (26)	0.010	0.577	0.000	0.023	0.002	0.587	1.050	
L27	21 - 16 (27)	0.010	0.588	0.000	0.022	0.001	0.598	1.050	
L28	16 - 11 (28)	0.010	0.613	0.000	0.023	0.001	0.624	1.050	
L29	11 - 6 (29)	0.010	0.622	0.000	0.022	0.001	0.633	1.050	
L30	6 - 1 (30)	0.011	0.639	0.000	0.022	0.001	0.650	1.050	
L31	1 - 0 (31)	0.011	0.640	0.000	0.022	0.001	0.652	1.050	

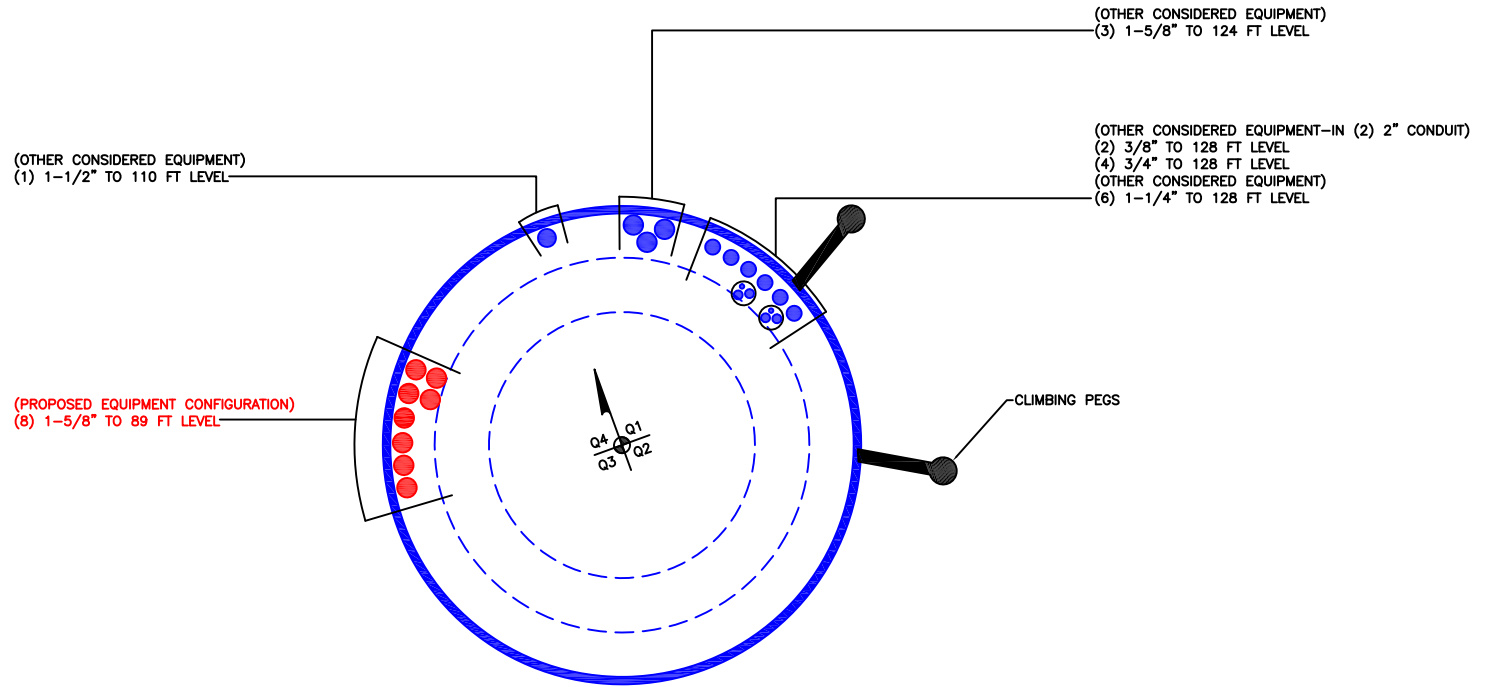
### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	133 - 128	Pole	TP14x14x0.375	1	-0.34	637.09	0.3	Pass
L2	128 - 123	Pole	TP14x14x0.375	2	-6.11	637.09	11.8	Pass
L3	123 - 118	Pole	TP22.7502x22x0.1875	3	-6.47	761.35	15.6	Pass
L4	118 - 113	Pole	TP23.5004x22.7502x0.1875	4	-6.83	786.66	23.5	Pass



Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L5	113 - 108	Pole	TP24.2506x23.5004x0.1875	5	-9.95	811.97	33.0	Pass	
L6	108 - 103	Pole	TP25.0007x24.2506x0.1875	6	-10.38	837.29	42.8	Pass	
L7	103 - 98	Pole	TP25.7509x25.0007x0.1875	7	-11.98	862.60	52.6	Pass	
L8	98 - 93	Pole	TP26.5011x25.7509x0.1875	8	-12.45	887.92	62.5	Pass	
L9	93 - 88	Pole	TP27.2513x26.5011x0.1875	9	-17.60	913.23	75.3	Pass	
L10	88 - 82.25	Pole	TP28.114x27.2513x0.1875	10	-17.87	924.62	81.0	Pass	
L11	82.25 - 80.75	Pole	TP27.9641x27.2139x0.25	11	-18.77	1350.80	60.8	Pass	
L12	80.75 - 75.75	Pole	TP28.7143x27.9641x0.25	12	-19.51	1387.38	68.0	Pass	
L13	75.75 - 70.75	Pole	TP29.4646x28.7143x0.25	13	-20.43	1423.94	74.8	Pass	
L14	70.75 - 65.75	Pole	TP30.2148x29.4646x0.25	14	-21.22	1460.51	81.1	Pass	
L15	65.75 - 60.75	Pole	TP30.9651x30.2148x0.25	15	-22.02	1497.08	87.0	Pass	
L16	60.75 - 57.75	Pole	TP31.4152x30.9651x0.25	16	-22.52	1519.01	90.4	Pass	
L17	57.75 - 57.5	Pole	TP31.4527x31.4152x0.4625	17	-22.59	2794.40	46.3	Pass	
L18	57.5 - 52.5	Pole	TP32.2029x31.4527x0.4563	18	-23.72	2823.92	49.2	Pass	
L19	52.5 - 47.5	Pole	TP32.9532x32.2029x0.45	19	-24.88	2851.61	52.0	Pass	
L20	47.5 - 40.75	Pole	TP33.966x32.9532x0.45	20	-25.46	2884.52	53.0	Pass	
L21	40.75 - 40	Pole	TP33.5785x32.8283x0.4813	21	-27.44	3105.37	53.1	Pass	
L22	40 - 35	Pole	TP34.3287x33.5785x0.4688	22	-28.70	3094.42	56.2	Pass	
L23	35 - 30	Pole	TP35.0789x34.3287x0.4688	23	-29.98	3162.98	57.7	Pass	
L24	30 - 26.25	Pole	TP35.6415x35.0789x0.4688	24	-30.95	3214.40	58.8	Pass	
L25	26.25 - 26	Pole	TP35.679x35.6415x0.5188	25	-31.03	3556.00	53.4	Pass	
L26	26 - 21	Pole	TP36.4292x35.679x0.5063	26	-32.42	3545.60	55.9	Pass	
L27	21 - 16	Pole	TP37.1794x36.4292x0.5063	27	-33.84	3619.64	57.0	Pass	
L28	16 - 11	Pole	TP37.9296x37.1794x0.4938	28	-35.27	3603.68	59.4	Pass	
L29	11 - 6	Pole	TP38.6798x37.9296x0.4938	29	-36.72	3675.90	60.3	Pass	
L30	6 - 1	Pole	TP39.43x38.6798x0.4875	30	-38.18	3701.26	61.9	Pass	
L31	1 - 0	Pole	TP39.58x39.43x0.4875	31	-38.48	3715.53	62.1	Pass	
							Summary		
							Pole (L16)	90.4	Pass
							<b>RATING =</b>	<b>90.4</b>	<b>Pass</b>

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



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

Site BU: 876382  
Work Order: 2264931



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**Pole Geometry**

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	133	10	0	0	14	14	0.375		A500-42
2	123	40.75	3.5	18	22.00	28.114	0.1875	Auto	A607-60
3	85.75	45	4.25	18	27.21	33.966	0.25	Auto	A607-65
4	45	45	0	18	32.83	39.58	0.28125	Auto	A607-65

**Reinforcement Configuration**

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	0	26.25	plate	PL 6.125x1.25	3			M2						M2										
2	26.25	57.75	plate	PL 4.875x1.25	3			M2						M2										
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

**Reinforcement Details**

	B (in)	H (in)	Gross Area (in <sup>2</sup> )	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in <sup>2</sup> )	Bolt Hole Size (in)	Reinforcement Material
1	6.125	1.25	7.65625	0.625	Welded	n/a	PC 8.8 - M20 (100)	27.000	15.000	6.094	1.1875	A572-65
2	4.875	1.25	6.09375	0.625	PC 8.8 - M20 (100)	27	PC 8.8 - M20 (100)	21.000	18.000	4.531	1.1875	A572-65

**Connection Details for Custom Reinforcements**

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
PL 6.125x1.25	Top	9	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	CJP Groove	6.125	1.25	45	0.25	-	-	-
PL 4.875x1.25	Top	7	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	9	N	3	3	-	-	-	-	-	-	-	-	-

# TNX Geometry Input

Increment (ft):  [Export to TNX](#)

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	133 - 128	5		0	14.000	14.000	0.375	A500-42	1.000
2	128 - 123	5	0	0	14.000	14.000	0.375	A500-42	1.000
3	123 - 118	5		18	22.000	22.750	0.1875	A607-60	1.000
4	118 - 113	5		18	22.750	23.500	0.1875	A607-60	1.000
5	113 - 108	5		18	23.500	24.251	0.1875	A607-60	1.000
6	108 - 103	5		18	24.251	25.001	0.1875	A607-60	1.000
7	103 - 98	5		18	25.001	25.751	0.1875	A607-60	1.000
8	98 - 93	5		18	25.751	26.501	0.1875	A607-60	1.000
9	93 - 88	5		18	26.501	27.251	0.1875	A607-60	1.000
10	88 - 85.75	5.75	3.5	18	27.251	28.114	0.1875	A607-60	1.000
11	85.75 - 80.75	5		18	27.214	27.964	0.25	A607-65	1.000
12	80.75 - 75.75	5		18	27.964	28.714	0.25	A607-65	1.000
13	75.75 - 70.75	5		18	28.714	29.465	0.25	A607-65	1.000
14	70.75 - 65.75	5		18	29.465	30.215	0.25	A607-65	1.000
15	65.75 - 60.75	5		18	30.215	30.965	0.25	A607-65	1.000
16	60.75 - 57.75	3		18	30.965	31.415	0.25	A607-65	1.000
17	57.75 - 57.5	0.25		18	31.415	31.453	0.4625	A607-65	0.946
18	57.5 - 52.5	5		18	31.453	32.203	0.45625	A607-65	0.949
19	52.5 - 47.5	5		18	32.203	32.953	0.45	A607-65	0.953
20	47.5 - 45	6.75	4.25	18	32.953	33.966	0.45	A607-65	0.948
21	45 - 40	5		18	32.828	33.578	0.48125	A607-65	0.950
22	40 - 35	5		18	33.578	34.329	0.46875	A607-65	0.966
23	35 - 30	5		18	34.329	35.079	0.46875	A607-65	0.958
24	30 - 26.25	3.75		18	35.079	35.642	0.46875	A607-65	0.953
25	26.25 - 26	0.25		18	35.642	35.679	0.51875	A607-65	0.943
26	26 - 21	5		18	35.679	36.429	0.50625	A607-65	0.957
27	21 - 16	5		18	36.429	37.179	0.50625	A607-65	0.949
28	16 - 11	5		18	37.179	37.930	0.49375	A607-65	0.964
29	11 - 6	5		18	37.930	38.680	0.49375	A607-65	0.957
30	6 - 1	5		18	38.680	39.430	0.4875	A607-65	0.961
31	1 - 0	1		18	39.430	39.580	0.4875	A607-65	0.960

## TNX Section Forces

Increment (ft):		TNX Output			
	5	Section Height (ft)	P <sub>u</sub> (K)	M <sub>ux</sub> (kip-ft)	V <sub>u</sub> (K)
1		133 - 128	0.34	0.66	0.22
2		128 - 123	6.11	24.47	7.31
3		123 - 118	6.47	61.91	7.67
4		118 - 113	6.83	101.12	8.02
5		113 - 108	9.95	149.11	11.22
6		108 - 103	10.38	206.07	11.57
7		103 - 98	11.97	266.68	13.32
8		98 - 93	12.45	334.06	13.65
9		93 - 88	17.60	418.62	18.57
10		88 - 85.75	17.87	460.52	18.70
11		85.75 - 80.75	18.77	554.91	19.07
12		80.75 - 75.75	19.51	650.90	19.36
13		75.75 - 70.75	20.43	750.19	20.00
14		70.75 - 65.75	21.22	850.76	20.26
15		65.75 - 60.75	22.02	952.60	20.51
16		60.75 - 57.75	22.52	1014.29	20.65
17		57.75 - 57.5	22.59	1019.45	20.65
18		57.5 - 52.5	23.72	1123.52	20.99
19		52.5 - 47.5	24.88	1229.20	21.31
20		47.5 - 45	25.46	1282.62	21.46
21		45 - 40	27.44	1390.86	21.84
22		40 - 35	28.70	1500.72	22.12
23		35 - 30	29.98	1611.92	22.39
24		30 - 26.25	30.95	1696.15	22.57
25		26.25 - 26	31.03	1701.79	22.57
26		26 - 21	32.42	1815.22	22.82
27		21 - 16	33.83	1929.79	23.04
28		16 - 11	35.27	2045.39	23.23
29		11 - 6	36.72	2161.93	23.42
30		6 - 1	38.18	2279.38	23.60
31		1 - 0	38.48	2302.98	23.63

# Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14x14x0.375	Pole	0.3%	Pass
128 - 123	Pole	TP14x14x0.375	Pole	11.7%	Pass
123 - 118	Pole	TP22.75x22x0.1875	Pole	15.5%	Pass
118 - 113	Pole	TP23.5x22.75x0.1875	Pole	23.5%	Pass
113 - 108	Pole	TP24.251x23.5x0.1875	Pole	32.9%	Pass
108 - 103	Pole	TP25.001x24.251x0.1875	Pole	42.8%	Pass
103 - 98	Pole	TP25.751x25.001x0.1875	Pole	52.6%	Pass
98 - 93	Pole	TP26.501x25.751x0.1875	Pole	62.5%	Pass
93 - 88	Pole	TP27.251x26.501x0.1875	Pole	75.2%	Pass
88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	80.9%	Pass
85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	60.8%	Pass
80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	67.9%	Pass
75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	74.8%	Pass
70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	81.1%	Pass
65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	87.0%	Pass
60.75 - 57.75	Pole	TP31.415x30.965x0.25	Pole	90.3%	Pass
57.75 - 57.5	Pole + Reinf.	TP31.453x31.415x0.4625	Reinf. 2 Tension Rupture	78.5%	Pass
57.5 - 52.5	Pole + Reinf.	TP32.203x31.453x0.4563	Reinf. 2 Tension Rupture	83.3%	Pass
52.5 - 47.5	Pole + Reinf.	TP32.953x32.203x0.45	Reinf. 2 Tension Rupture	87.9%	Pass
47.5 - 45	Pole + Reinf.	TP33.966x32.953x0.45	Reinf. 2 Tension Rupture	90.1%	Pass
45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	90.3%	Pass
40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	93.9%	Pass
35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	97.4%	Pass
30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	99.9%	Pass
26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Tension Rupture	85.0%	Pass
26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Tension Rupture	87.7%	Pass
21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Tension Rupture	90.3%	Pass
16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Tension Rupture	92.8%	Pass
11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Tension Rupture	95.0%	Pass
6 - 1	Pole + Reinf.	TP39.43x38.68x0.4875	Reinf. 1 Tension Rupture	97.2%	Pass
1 - 0	Pole + Reinf.	TP39.58x39.43x0.4875	Reinf. 1 Tension Rupture	97.6%	Pass
				Summary	
			Pole	90.3%	Pass
			Reinforcement	99.9%	Pass
			Overall	99.9%	Pass



## Additional Calculations

Section Elevation (ft)	Moment of Inertia (in <sup>4</sup> )			Area (in <sup>2</sup> )			% Capacity*		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
133 - 128	373	n/a	373	16.05	n/a	16.05	0.3%		
128 - 123	373	n/a	373	16.05	n/a	16.05	11.7%		
123 - 118	863	n/a	863	13.43	n/a	13.43	15.5%		
118 - 113	952	n/a	952	13.87	n/a	13.87	23.5%		
113 - 108	1047	n/a	1047	14.32	n/a	14.32	32.9%		
108 - 103	1148	n/a	1148	14.77	n/a	14.77	42.8%		
103 - 98	1256	n/a	1256	15.21	n/a	15.21	52.6%		
98 - 93	1369	n/a	1369	15.66	n/a	15.66	62.5%		
93 - 88	1490	n/a	1490	16.11	n/a	16.11	75.2%		
88 - 85.75	1546	n/a	1546	16.31	n/a	16.31	80.9%		
85.75 - 80.75	2133	n/a	2133	21.99	n/a	21.99	60.8%		
80.75 - 75.75	2311	n/a	2311	22.59	n/a	22.59	67.9%		
75.75 - 70.75	2499	n/a	2499	23.18	n/a	23.18	74.8%		
70.75 - 65.75	2696	n/a	2696	23.78	n/a	23.78	81.1%		
65.75 - 60.75	2904	n/a	2904	24.37	n/a	24.37	87.0%		
60.75 - 57.75	3033	n/a	3033	24.73	n/a	24.73	90.3%		
57.75 - 57.5	3044	2463	5508	24.76	18.28	43.04	49.4%		78.5%
57.5 - 52.5	3269	2577	5846	25.35	18.28	43.63	52.9%		83.3%
52.5 - 47.5	3505	2693	6198	25.95	18.28	44.23	56.3%		87.9%
47.5 - 45	3627	2752	6379	26.25	18.28	44.53	57.9%		90.1%
45 - 40	4162	2791	6953	29.72	18.28	48.00	55.9%		90.3%
40 - 35	4450	2912	7362	30.39	18.28	48.67	58.7%		93.9%
35 - 30	4750	3035	7786	31.06	18.28	49.34	61.3%		97.4%
30 - 26.25	4985	3129	8114	31.56	18.28	49.85	63.2%		99.9%
26.25 - 26	5000	3953	8953	31.60	22.97	54.57	57.6%	85.0%	
26 - 21	5325	4114	9439	32.27	22.97	55.24	59.9%	87.7%	
21 - 16	5664	4277	9941	32.94	22.97	55.91	62.1%	90.3%	
16 - 11	6016	4445	10461	33.61	22.97	56.58	64.3%	92.8%	
11 - 6	6383	4615	10998	34.28	22.97	57.25	66.4%	95.0%	
6 - 1	6764	4789	11553	34.95	22.97	57.92	68.5%	97.2%	
1 - 0	6843	4824	11666	35.08	22.97	58.05	68.9%	97.6%	

Note: Section capacity checked using 5 degree increments.

Rating per TIA-222-H Section 15.5.

# Monopole Flange Plate Connection

Elevation = 123 ft.

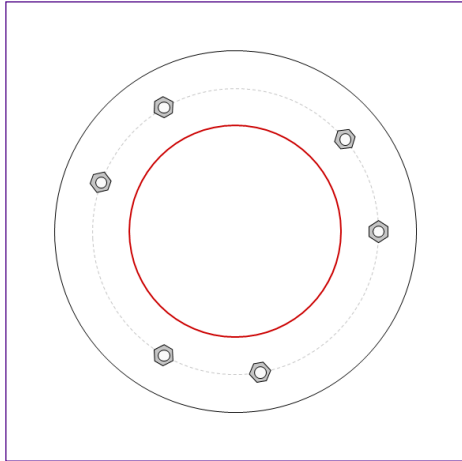


BU #	876382
Site Name	Berlin / Laviana Orchard
Order #	658776 REV. 1
TIA-222 Revision	H

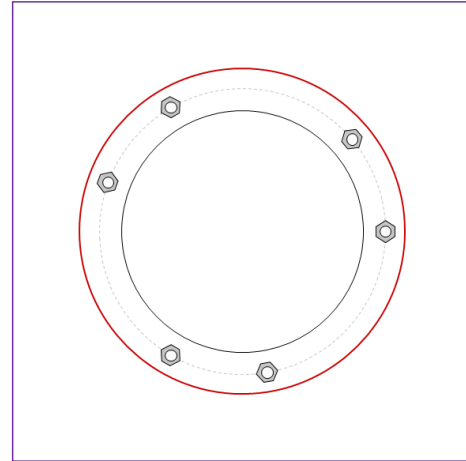
Applied Loads	
Moment (kip-ft)	24.47
Axial Force (kips)	6.11
Shear Force (kips)	7.31

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



## Connection Properties

### Bolt Data

(6) 3/4"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 19" BC

### Top Plate Data

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

### Top Stiffener Data

N/A

### Top Pole Data

14" x 0.375" round pole (A500-42; Fy=42 ksi, Fu=58 ksi)

### Bottom Plate Data

16" ID x 0.75" Plate (A36; Fy=36 ksi, Fu=58 ksi)

### Bottom Stiffener Data

N/A

### Bottom Pole Data

22" x 0.1875" 18-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

## Analysis Results

### Bolt Capacity

Max Load (kips)	9.28
Allowable (kips)	30.00
Stress Rating:	<b>29.5% Pass</b>

### Top Plate Capacity

Max Stress (ksi):	5.71	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	<b>16.8%</b>	<b>Pass</b>
Tension Side Stress Rating:	<b>7.1%</b>	<b>Pass</b>

### Bottom Plate Capacity

Max Stress (ksi):	17.61	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	<b>51.7%</b>	<b>Pass</b>
Tension Side Stress Rating:	<b>N/A</b>	

# CCIplate

Elevation (ft) 123 (Flange)

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending
1	Yes	Yes	Yes

Custom Bolt Connection										
Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, $\eta$ :	$I_{ax}$ (in):	Thread Type	Area Override, in <sup>2</sup>	Tension Only
1	1	0	0.75	A325	19	0.5	0	N-Included		No
2	1	40	0.75	A325	19	0.5	0	N-Included		No
3	1	120	0.75	A325	19	0.5	0	N-Included		No
4	1	160	0.75	A325	19	0.5	0	N-Included		No
5	1	240	0.75	A325	19	0.5	0	N-Included		No
6	1	280	0.75	A325	19	0.5	0	N-Included		No

## Plot Graphic



# Monopole Base Plate Connection

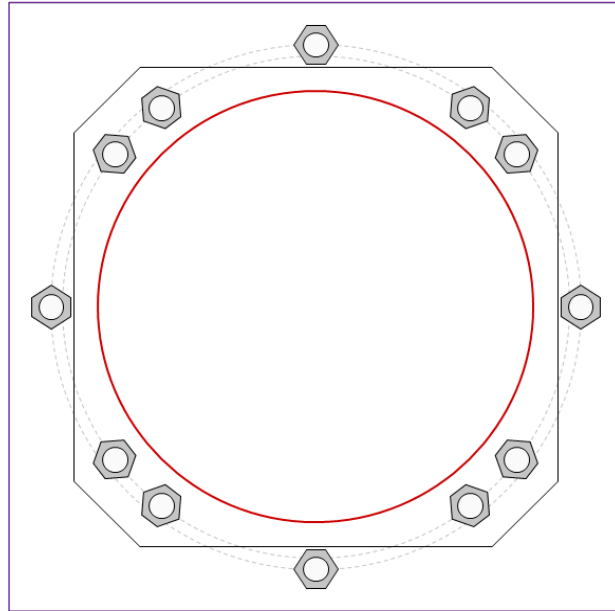


Site Info	
BU #	876382
Site Name	Berlin / Laviana Orchard
Order #	658776 REV. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
$I_{ar}$ (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	2302.98
Axial Force (kips)	38.48
Shear Force (kips)	23.63

\*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
GROUP 1: (8) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 46" BC <i>Anchor Spacing: 6 in</i>
GROUP 2: (4) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 48.08" BC
Base Plate Data
44" W x 2.75" Plate (A572-55; $F_y=55$ ksi, $F_u=70$ ksi); Clip: 6 in
Stiffener Data
N/A
Pole Data
39.58" x 0.2813" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary	<i>(units of kips, kip-in)</i>		
GROUP 1:	$P_u_t = 189.09$	$\phi P_n_t = 243.75$	<b>Stress Rating</b>
	$V_u = 2.95$	$\phi V_n = 149.1$	<b>73.9%</b>
	$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>
GROUP 2:	$P_u_t = 202.86$	$\phi P_n_t = 243.75$	<b>Stress Rating</b>
	$V_u = 0$	$\phi V_n = 149.1$	<b>79.3%</b>
	$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>
Base Plate Summary			
Max Stress (ksi):	27.77	(Flexural)	
Allowable Stress (ksi):	49.5		
Stress Rating:	<b>53.4%</b>		<b>Pass</b>

# CCIplate

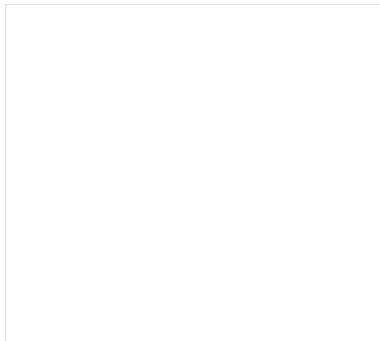
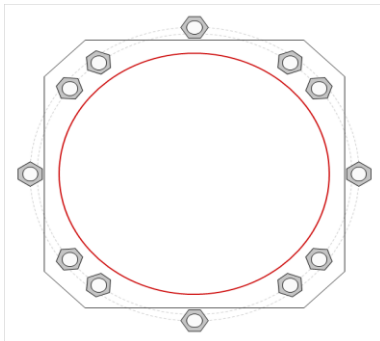
Elevation (ft) 0 (Base)

note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

Custom Bolt Connection										
Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, $\eta$	$l_{ar}$ (in):	Thread Type	Area Override, in <sup>2</sup>	Tension Only
1	1	37.5052825	2.25	A615-75	46	0.5	1.75	N-Included		No
2	1	52.4947175	2.25	A615-75	46	0.5	1.75	N-Included		No
3	1	127.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
4	1	142.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
5	1	217.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
6	1	232.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
7	1	307.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
8	1	322.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
9	2	0	2.25	A615-75	48.08	0.5	1.75	N-Included		No
10	2	90	2.25	A615-75	48.08	0.5	1.75	N-Included		No
11	2	180	2.25	A615-75	48.08	0.5	1.75	N-Included		No
12	2	270	2.25	A615-75	48.08	0.5	1.75	N-Included		No

## Plot Graphic



## Drilled Pier Foundation

BU # :	876382
Site Name:	Berlin / Laviana Orchard
Order Number:	658776 REV. 1
TIA-222 Revison:	H
Tower Type:	Monopole



Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	2302.97	
Axial Force (kips)	38.49	
Shear Force (kips)	23.62	

Material Properties		
Concrete Strength, fc:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	20	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
<i>From 0.5' above grade to 20' below grade</i>		
Pier Diameter	6	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results			
Soil Lateral Check			
	Compression	Uplift	
D <sub>v=0</sub> (ft from TOC)	5.31	-	
Soil Safety Factor	2.61	-	
Max Moment (kip-ft)	2472.13	-	
Rating*	48.6%	-	
Soil Vertical Check			
	Compression	Uplift	
Skin Friction (kips)	127.23	-	
End Bearing (kips)	848.23	-	
Weight of Concrete (kips)	93.74	-	
Total Capacity (kips)	975.46	-	
Axial (kips)	132.23	-	
Rating*	12.9%	-	
Reinforced Concrete Flexure			
	Compression	Uplift	
Critical Depth (ft from TOC)	5.03	-	
Critical Moment (kip-ft)	2471.44	-	
Critical Moment Capacity	3353.63	-	
Rating*	70.2%	-	
Reinforced Concrete Shear			
	Compression	Uplift	
Critical Depth (ft from TOC)	14.85	-	
Critical Shear (kip)	358.36	-	
Critical Shear Capacity	427.56	-	
Rating*	79.8%	-	
Structural Foundation Rating*		79.8%	
Soil Interaction Rating*		48.6%	

\*Rating per TIA-222-H Section 15.5

Check Limitation		
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>	
	N/A	<input type="checkbox"/>
Design Options		
Input Effective Depths (else Actual):	<input type="checkbox"/>	
Consider non-tapered moment capacity:	<input type="checkbox"/>	
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>	
Utilize Shear-Friction Methodology:	<input type="checkbox"/>	
Override Critical Depth:	<input type="checkbox"/>	

[Go to Soil Calculations](#)

Soil Profile													
Groundwater Depth	15	# of Layers	4										

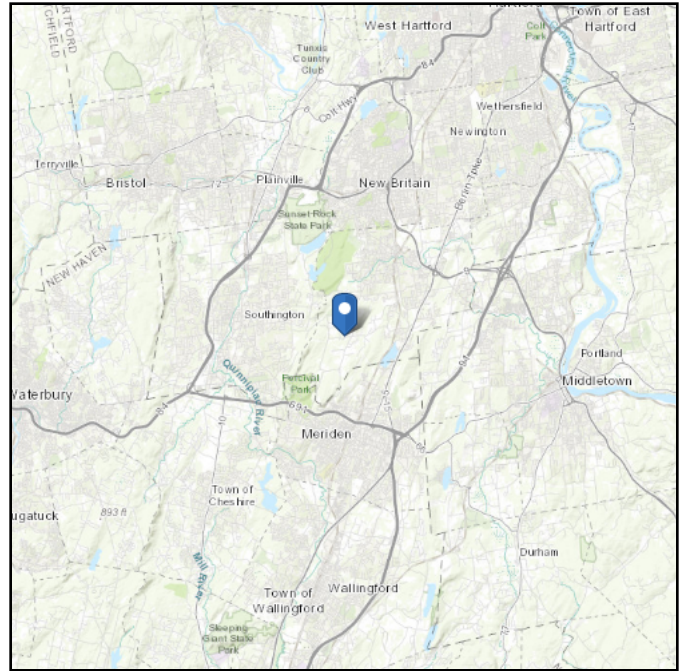
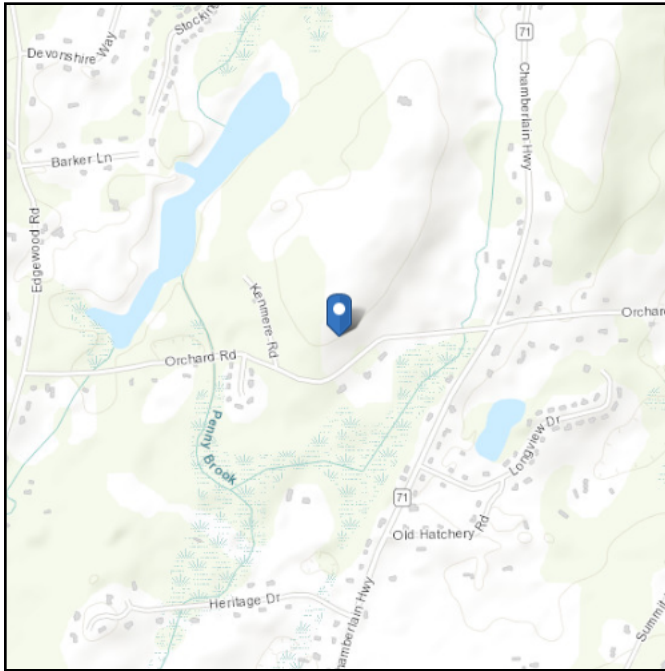
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	Y <sub>soil</sub> (pcf)	Y <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.33	3.33	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.33	5	1.67	135	150	0	38	0.000	0.000	0.00	0.00			Cohesionless
3	5	15	10	135	150	0	38	0.000	0.000	0.60	0.60			Cohesionless
4	15	20	5	75	87.6	0	38	0.000	0.000	0.60	0.60	40		Cohesionless

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Default (see Section 11.4.3)

**Latitude:** 41.589742  
**Longitude:** -72.805333  
**Elevation:** 352.2487813178924 ft (NAVD 88)



## Wind

### Results:

Wind Speed	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Wed Oct 18 2023

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 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

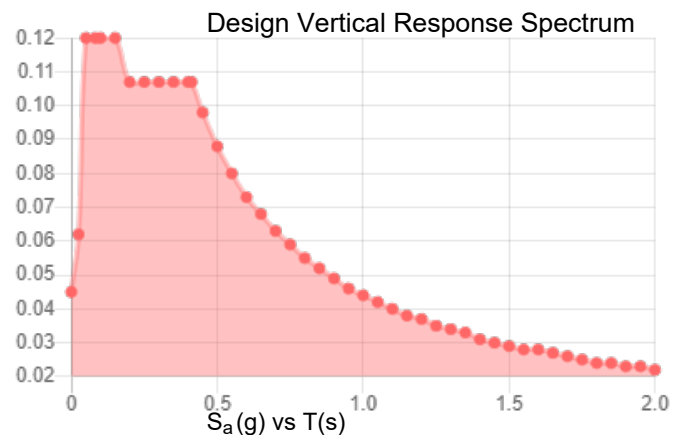
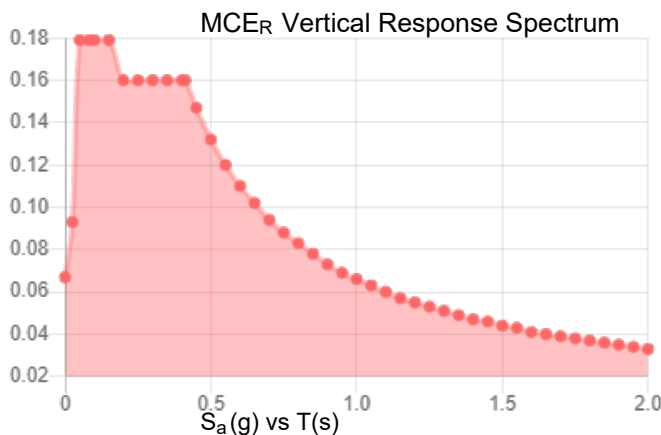
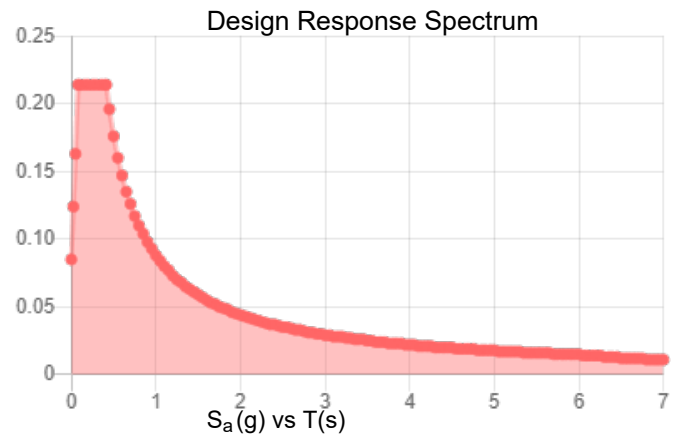
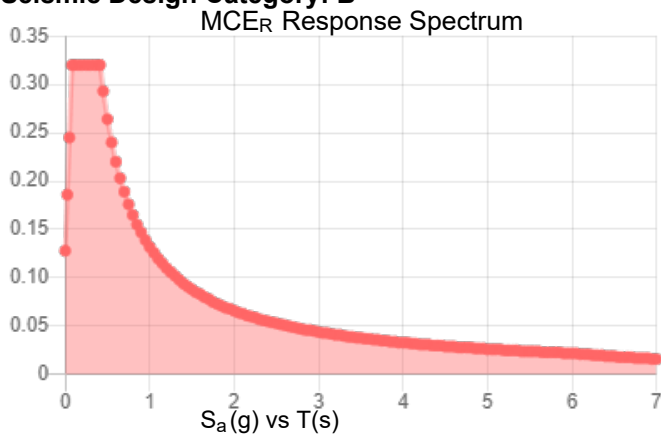
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:**

**Results:**

$S_s$ :	0.2	$S_{D1}$ :	0.088
$S_1$ :	0.055	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.11
$F_v$ :	2.4	PGA <sub>M</sub> :	0.174
$S_{MS}$ :	0.32	$F_{PGA}$ :	1.579
$S_{M1}$ :	0.132	$I_e$ :	1
$S_{DS}$ :	0.214	$C_v$ :	0.7

**Seismic Design Category: B**



**Data Accessed:**

**Wed Oct 18 2023**

**Date Source:**

**USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.**



## Ice

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**Results:**

Ice Thickness: 1.00 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Wed Oct 18 2023

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 500-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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