STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

March 29, 2019

Mark Roberts
QC Development
P.O. Box 916
Storrs, CT 06268

RE: **PE1133-CING-20180912 –** New Cingular Wireless PCS, LLC sub-petition for a declaratory ruling for approval of an eligible facility request for modifications to an existing telecommunications facility located at 1684 Chamberlain Highway, Berlin, Connecticut.

Dear Mr. Roberts:

The Connecticut Siting Council (Council) is in receipt of your correspondence dated March 27, 2019 regarding the minor project changes to the eligible facility request for the above-referenced site that was approved by the Council on October 12, 2018. AT&T has submitted a revised Structural Analysis Report that has determined its extension and equipment could be supported by the existing monopole without any structural reinforcements.

Therefore, Condition Nos. 1 and 2 of the Council's Petition No. 1133 sub-petition decision of October 12, 2018 have been met. Pursuant to the Council's Petition No. 1133 decision of March 6, 2015 and the October 12, 2018 decision on this sub-petition, the proposed revisions to the previously acknowledged tower modifications are hereby approved.

This approval applies only to the minor project changes dated March 27, 2019. Any minor changes to the eligible facility request require advance notification and approval.

Thank you for your attention and cooperation.

Sincerely,

Melanie Bachman
Executive Director

MB/IN/emr

c: Lucia Chiocchio, Esq., Cuddy & Feder, LLP
The Honorable Mark H. Kaczynski, Mayor, Town of Berlin
Jack Healy, Town Manager, Town of Berlin
Maureen Giusti, Zoning Enforcement Officer, Town of Berlin
Crown Castle, Tower Owner

S:\PETITIONS\1101-1200\1133\3_Subpetitions_ByTown\Berlin\ATTCING\PE1133-CING-20180912-minormodificationsDcltr_berlin_chamberlain.docx

QC Development
PO Box 916
Storrs, CT 06268
860-670-9068
Mark.Roberts@QCDevelopment.net

March 27, 2019

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

RE: PE1133-CING-20180912 - New Cingular Wireless PCS, LLC
1684 Chamberlain Highway, Berlin, CT

Dear Ms. Bachman:

In reference to the above eligible facilities request approval issued on October 12, 2018 this is to notify the Council that Crown Castle has re-run the Structural Analysis for this project according to the TIA-222 Rev. H and determined that reinforcements to the existing monopole are *not* required to support the planned monopole extension.

The new structural analysis dated January 18, 2019 and attached hereto was prepared by Paul J. Ford and Company and is stamped by Justin Kline, a CT Professional Engineer. Mr. Kline also prepared the previous structural analysis report and Modification Drawings dated September 4, 2018 that were originally filed with the Council and are referenced in the Council's October 12 approval.

Please feel free to call me at (860) 670-9068 with any questions regarding this matter.

Sincerely,

Mark Roberts
QC Development
Consultant for AT&T

Attachment

PAUL J. FORD & COMPANY

Date: **January 18, 2019**

Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679

Subject:	**Structural Modification Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1031
	Carrier Site Name:	BERLIN CHAMBERLAIN HWY
Crown Castle Designation:	**Crown Castle BU Number:**	876382
	Crown Castle Site Name:	BERLIN / LAVIANA ORCHARD
	Crown Castle JDE Job Number:	481239
	Crown Castle Work Order Number:	1682153
	Crown Castle Order Number:	423171 Rev. 6
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37519-0043.002.7700
Site Data:	**1684 Chamberlain Highway, BERLIN, Hartford County, CT**	
	Latitude *41° 35' 23.07"*, Longitude *-72° 48' 19.2"*	
	123 Foot w/10 Ft Proposed Extension - Monopole Tower	

Dear Charles Trask,

Paul J. Ford and Company is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower.

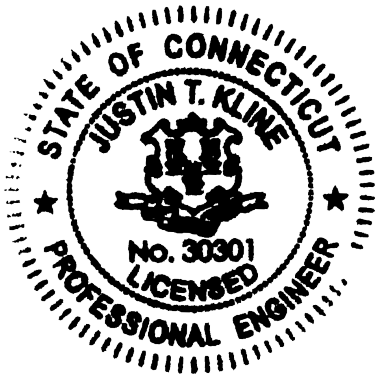
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Modified Structure w/ Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code per section 1609.3 and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

All modifications and equipment proposed in this report shall be installed in accordance with the proposed modifications drawings, referenced in Table 3 of this report, for the determined available structural capacity to be effective.

Respectfully submitted by:



Gowtham Penumatsa
Structural Designer
gpenumatsa@pauljford.com

tnxTower Report - version 8.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 123 ft Monopole tower designed by SUMMIT.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
133.0	133.0	3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	1 2 6	3/8 3/4 1-1/4
		3	ericsson	RRUS 11		
		1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Side Arm Mount [SO 901-3]		

Table 2 – Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	121.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
	120.0	1	tower mounts	Platform Mount [LP 1201-1]		
118.0	118.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		1	tower mounts	Pipe Mount [PM 601-3]		
		1	tower mounts	Side Arm Mount [SO 102-3]		
100.0	101.0	3	andrew	ETT19V2S12UB	6	1-5/8
		3	ericsson	KRY 112 144/1		
		3	rfs celwave	APX16DWV-16DWVS-C w/ Mount Pipe		
	100.0	1	tower mounts	T-Arm Mount [TA 602-3]		
93.0	94.0	3	alcatel lucent	RRH2X40-AWS	13	1-5/8
		3	andrew	LNX-6514DS-A1M w/ Mount Pipe		
		3	antel	BXA-171063-12CF-EDIN-X w/ Mount Pipe		
		2	antel	BXA-171063-8BF-2 w/ Mount Pipe		
		1	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe		
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		6	rfs celwave	FD9R6004/2C-3L		
	93.0	1	tower mounts	Platform Mount [LP 1201-1]		
75.0	75.0	3	rfs celwave	APXV18-206517S-C	6	1-5/8
		1	tower mounts	Pipe Mount [PM 601-3]		
50.0	51.0	1	lucent	KS24019-L112A	1	1/2
	50.0	1	tower mounts	Side Arm Mount [SO 702-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 05/05/2000	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29200-0802, 06/06/2000	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29200-0802, 06/06/2000	1629384	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 080828.04, 12/11/2008	2611098	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 145202, 9/8/2014	5287888	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37508-0979, 10/29/2008	2339268	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.
5) Monopole will be modified in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14x14x0.349	Pole	6.1%	Pass
128 - 123.5	Pole	TP14x14x0.349	Pole	12.0%	Pass
123.5 - 123	Pole	TP22x14x0.349	Pole	5.2%	Pass
123 - 118	Pole	TP22.75x22x0.1875	Pole	11.6%	Pass
118 - 113	Pole	TP23.5x22.75x0.1875	Pole	20.1%	Pass
113 - 108	Pole	TP24.251x23.5x0.1875	Pole	28.2%	Pass
108 - 103	Pole	TP25.001x24.251x0.1875	Pole	35.9%	Pass
103 - 98	Pole	TP25.751x25.001x0.1875	Pole	44.3%	Pass
98 - 93	Pole	TP26.501x25.751x0.1875	Pole	52.9%	Pass
93 - 88	Pole	TP27.251x26.501x0.1875	Pole	65.8%	Pass
88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	71.0%	Pass
85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	53.6%	Pass
80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	60.2%	Pass
75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	66.8%	Pass
70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	73.1%	Pass
65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	79.0%	Pass
60.75 - 57	Pole	TP31.528x30.965x0.25	Pole	83.2%	Pass
57 - 56.75	Pole + Reinf.	TP31.565x31.528x0.4625	Reinf. 2 Tension Rupture	72.6%	Pass
56.75 - 51.75	Pole + Reinf.	TP32.315x31.565x0.4563	Reinf. 2 Tension Rupture	77.5%	Pass
51.75 - 46.75	Pole + Reinf.	TP33.066x32.315x0.45	Reinf. 2 Tension Rupture	82.3%	Pass
46.75 - 45	Pole + Reinf.	TP33.966x33.066x0.45	Reinf. 2 Tension Rupture	83.9%	Pass
45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	84.5%	Pass
40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	88.6%	Pass
35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	92.4%	Pass
30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	95.2%	Pass
26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Compression	83.7%	Pass
26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Compression	86.9%	Pass
21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Compression	90.0%	Pass
16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Compression	92.9%	Pass
11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Compression	95.7%	Pass
6 - 1	Pole + Reinf.	TP39.43x38.68x0.4876	Reinf. 1 Compression	98.4%	Pass
1 - 0	Pole + Reinf.	TP39.58x39.43x0.4876	Reinf. 1 Compression	98.9%	Pass
				Summary	
			Pole	83.2%	Pass
			Reinforcement	98.9%	Pass
			Overall	98.9%	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	85.3	Pass
1	Base Plate	0	52.3	Pass
1	Base Foundation Structural Steel	0	68.0	Pass
1	Base Foundation Soil Interaction	0	47.3	Pass

Structure Rating (max from all components) =	98.9%

Notes:

- All Structural rating are per TIA-222-H Section 15.5

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed.

- Install the proposed modifications per the attached drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Tower base elevation above sea level: 345.0400 ft.
3) Basic wind speed of 125 mph.
4) Risk Category II.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height 0.0000 ft.
9) Nominal ice thickness of 1.2750 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.00 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.05.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

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	
L1	133.0000-128.0000	5.0000	0.00	Round	14.0000	14.0000	0.3490		A53-B-35 (35 ksi)
L2	128.0000-123.5000	4.5000	0.00	Round	14.0000	14.0000	0.3490		A53-B-35 (35 ksi)
L3	123.5000-	0.5000	0.00	Round	14.0000	22.0000	0.3490		A53-B-35

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
	123.0000								(35 ksi)
L4	123.0000-118.0000	5.0000	0.00	18	22.0000	22.7502	0.1875	0.7500	A607-60 (60 ksi)
L5	118.0000-113.0000	5.0000	0.00	18	22.7502	23.5004	0.1875	0.7500	A607-60 (60 ksi)
L6	113.0000-108.0000	5.0000	0.00	18	23.5004	24.2506	0.1875	0.7500	A607-60 (60 ksi)
L7	108.0000-103.0000	5.0000	0.00	18	24.2506	25.0007	0.1875	0.7500	A607-60 (60 ksi)
L8	103.0000-98.0000	5.0000	0.00	18	25.0007	25.7509	0.1875	0.7500	A607-60 (60 ksi)
L9	98.0000-93.0000	5.0000	0.00	18	25.7509	26.5011	0.1875	0.7500	A607-60 (60 ksi)
L10	93.0000-88.0000	5.0000	0.00	18	26.5011	27.2513	0.1875	0.7500	A607-60 (60 ksi)
L11	88.0000-82.2500	5.7500	3.50	18	27.2513	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L12	82.2500-80.7500	5.0000	0.00	18	27.2139	27.9641	0.2500	1.0000	A607-65 (65 ksi)
L13	80.7500-75.7500	5.0000	0.00	18	27.9641	28.7143	0.2500	1.0000	A607-65 (65 ksi)
L14	75.7500-70.7500	5.0000	0.00	18	28.7143	29.4646	0.2500	1.0000	A607-65 (65 ksi)
L15	70.7500-65.7500	5.0000	0.00	18	29.4646	30.2148	0.2500	1.0000	A607-65 (65 ksi)
L16	65.7500-60.7500	5.0000	0.00	18	30.2148	30.9651	0.2500	1.0000	A607-65 (65 ksi)
L17	60.7500-57.0000	3.7500	0.00	18	30.9651	31.5277	0.2500	1.0000	A607-65 (65 ksi)
L18	57.0000-56.7500	0.2500	0.00	18	31.5277	31.5652	0.4625	1.8500	A607-65 (65 ksi)
L19	56.7500-51.7500	5.0000	0.00	18	31.5652	32.3155	0.4562	1.8250	A607-65 (65 ksi)
L20	51.7500-46.7500	5.0000	0.00	18	32.3155	33.0657	0.4500	1.8000	A607-65 (65 ksi)
L21	46.7500-40.7500	6.0000	4.25	18	33.0657	33.9660	0.4500	1.8000	A607-65 (65 ksi)
L22	40.7500-40.0000	5.0000	0.00	18	32.8283	33.5785	0.4813	1.9252	A607-65 (65 ksi)
L23	40.0000-35.0000	5.0000	0.00	18	33.5785	34.3287	0.4688	1.8752	A607-65 (65 ksi)
L24	35.0000-30.0000	5.0000	0.00	18	34.3287	35.0789	0.4688	1.8752	A607-65 (65 ksi)
L25	30.0000-26.2500	3.7500	0.00	18	35.0789	35.6415	0.4688	1.8752	A607-65 (65 ksi)
L26	26.2500-26.0000	0.2500	0.00	18	35.6415	35.6790	0.5188	2.0752	A607-65 (65 ksi)
L27	26.0000-21.0000	5.0000	0.00	18	35.6790	36.4292	0.5063	2.0252	A607-65 (65 ksi)
L28	21.0000-16.0000	5.0000	0.00	18	36.4292	37.1794	0.5063	2.0252	A607-65 (65 ksi)
L29	16.0000-11.0000	5.0000	0.00	18	37.1794	37.9296	0.4938	1.9752	A607-65 (65 ksi)
L30	11.0000-6.0000	5.0000	0.00	18	37.9296	38.6798	0.4938	1.9752	A607-65 (65 ksi)
L31	6.0000-1.0000	5.0000	0.00	18	38.6798	39.4300	0.4875	1.9502	A607-65 (65 ksi)
L32	1.0000-0.0000	1.0000		18	39.4300	39.5800	0.4875	1.9502	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.0000	14.9672	348.8691	4.8279	7.0000	49.8384	697.7382	7.4791	0.0000	0

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	14.0000	14.9672	348.8691	4.8279	7.0000	49.8384	697.7382	7.4791	0.0000	0
L2	14.0000	14.9672	348.8691	4.8279	7.0000	49.8384	697.7382	7.4791	0.0000	0
	14.0000	14.9672	348.8691	4.8279	7.0000	49.8384	697.7382	7.4791	0.0000	0
L3	14.0000	14.9672	348.8691	4.8279	7.0000	49.8384	697.7382	7.4791	0.0000	0
	22.0000	23.7385	1391.3360	7.6558	11.0000	126.4851	2782.6720	11.8622	0.0000	0
L4	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
L5	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
L6	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
L7	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
L8	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
L9	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
L10	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
L11	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
L12	28.1284	21.3958	1965.3102	9.5722	13.8246	142.1599	3933.2064	10.6999	4.3496	17.399
	28.3569	21.9911	2133.9640	9.8385	14.2058	150.2181	4270.7359	10.9977	4.4817	17.927
L13	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
L14	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
L15	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
L16	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
L17	31.4042	24.3724	2904.9471	10.9038	15.7302	184.6727	5813.7166	12.1885	5.0098	20.039
	31.9755	24.8189	3067.5391	11.1036	16.0161	191.5286	6139.1146	12.4118	5.1089	20.436
L18	31.9427	45.6030	5560.0652	11.0282	16.0161	347.1550	11127.446 4	22.8058	4.7349	10.238
	31.9808	45.6580	5580.2311	11.0415	16.0351	348.0001	11167.804 9	22.8334	4.7415	10.252
L19	31.9818	45.0501	5508.1418	11.0437	16.0351	343.5044	11023.531 4	22.5293	4.7525	10.416
	32.7436	46.1365	5916.3391	11.3100	16.4163	360.3950	11840.463 1	23.0727	4.8845	10.706
L20	32.7446	45.5135	5838.7283	11.3122	16.4163	355.6673	11685.139 3	22.7611	4.8955	10.879
	33.5064	46.5850	6260.9126	11.5786	16.7974	372.7314	12530.063 5	23.2969	5.0276	11.172
L21	33.5064	46.5850	6260.9126	11.5786	16.7974	372.7314	12530.063 5	23.2969	5.0276	11.172
	34.4206	47.8709	6793.8105	11.8982	17.2547	393.7362	13596.560 6	23.9400	5.1860	11.524
L22	33.9080	49.4148	6532.2413	11.4832	16.6768	391.6969	13073.077 8	24.7121	4.9307	10.245
	34.0222	50.5608	6997.3488	11.7495	17.0579	410.2123	14003.904 9	25.2852	5.0627	10.519
L23	34.0242	49.2663	6823.3436	11.7539	17.0579	400.0114	13655.665 4	24.6378	5.0847	10.846
	34.7859	50.3825	7297.7352	12.0203	17.4390	418.4729	14605.073 0	25.1960	5.2168	11.128
L24	34.7859	50.3825	7297.7352	12.0203	17.4390	418.4729	14605.073 0	25.1960	5.2168	11.128
	35.5477	51.4988	7793.6205	12.2866	17.8201	437.3509	15597.496 1	25.7543	5.3488	11.41
L25	35.5477	51.4988	7793.6205	12.2866	17.8201	437.3509	15597.496 1	25.7543	5.3488	11.41
	36.1190	52.3360	8179.9262	12.4863	18.1059	451.7827	16370.615 7	26.1730	5.4478	11.621
L26	36.1113	57.8356	9013.8081	12.4686	18.1059	497.8386	18039.476 8	28.9233	5.3598	10.331
	36.1494	57.8973	9042.7180	12.4819	18.1249	498.9102	18097.334 6	28.9542	5.3664	10.344
L27	36.1513	56.5224	8834.2576	12.4863	18.1249	487.4089	17680.139	28.2666	5.3884	10.643

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	36.9131	57.7280	9411.6700	12.7526	18.5060	508.5730	18835.7246	28.8695	5.5205	10.904
L28	36.9131	57.7280	9411.6700	12.7526	18.5060	508.5730	18835.7241	28.8695	5.5205	10.904
	37.6748	58.9335	10013.7097	13.0189	18.8871	530.1869	20040.5957	29.4724	5.6525	11.164
L29	37.6768	57.4981	9776.4721	13.0234	18.8871	517.6261	19565.8084	28.7545	5.6745	11.491
	38.4385	58.6739	10388.5818	13.2897	19.2682	539.1560	20790.8331	29.3425	5.8065	11.759
L30	38.4385	58.6739	10388.5818	13.2897	19.2682	539.1560	20790.8331	29.3425	5.8065	11.759
	39.2003	59.8497	11025.7223	13.5560	19.6493	561.1247	22065.9524	29.9305	5.9386	12.026
L31	39.2013	59.1018	10891.5165	13.5582	19.6493	554.2947	21797.3643	29.5565	5.9496	12.203
	39.9630	60.2627	11546.0140	13.8246	20.0304	576.4239	23107.2206	30.1371	6.0816	12.474
L32	39.9630	60.2627	11546.0140	13.8246	20.0304	576.4239	23107.2206	30.1371	6.0816	12.474
	40.1154	60.4949	11679.9828	13.8778	20.1066	580.9018	23375.3343	30.2532	6.1080	12.528

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 133.0000-128.0000				1	1	1			
L2 128.0000-123.5000				1	1	1			
L3 123.5000-123.0000				1	1	1			
L4 123.0000-118.0000				1	1	1			
L5 118.0000-113.0000				1	1	1			
L6 113.0000-108.0000				1	1	1			
L7 108.0000-103.0000				1	1	1			
L8 103.0000-98.0000				1	1	1			
L9 98.0000-93.0000				1	1	1			
L10 93.0000-88.0000				1	1	1			
L11 88.0000-82.2500				1	1	1			
L12 82.2500-80.7500				1	1	1			
L13 80.7500-75.7500				1	1	1			
L14 75.7500-70.7500				1	1	1			
L15 70.7500-65.7500				1	1	1			
L16 65.7500-60.7500				1	1	1			
L17 60.7500-57.0000				1	1	1			
L18 57.0000-56.7500				1	1	0.944643			
L19 56.7500-51.7500				1	1	0.947749			
L20 51.7500-46.7500				1	1	0.951404			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L21 46.7500-40.7500				1	1	0.948243			
L22 40.7500-40.0000				1	1	0.949573			
L23 40.0000-35.0000				1	1	0.966228			
L24 35.0000-30.0000				1	1	0.95829			
L25 30.0000-26.2500				1	1	0.95256			
L26 26.2500-26.0000				1	1	0.942605			
L27 26.0000-21.0000				1	1	0.956973			
L28 21.0000-16.0000				1	1	0.948762			
L29 16.0000-11.0000				1	1	0.964376			
L30 11.0000-6.0000				1	1	0.956622			
L31 6.0000-1.0000				1	1	0.961179			
L32 1.0000-0.0000				1	1	0.959705			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***											

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 1/4" Flat Reinforcement	C	No	No	CaAa (Out Of Face)	59.7500 - 0.0000	1	No Ice	0.2083	0.00
							1/2" Ice	0.3194	0.00
							1" Ice	0.4306	0.00
							2" Ice	0.6528	0.00
**********									
LDF6-50A(1-1/4)	C	No	No	CaAa (Out Of Face)	133.0000 - 0.0000	1	No Ice	0.1550	0.60
							1/2" Ice	0.2550	1.85
							1" Ice	0.3550	3.72
							2" Ice	0.5550	9.27
LDF6-50A(1-1/4)	C	No	No	CaAa (Out Of Face)	133.0000 - 0.0000	5	No Ice	0.0000	0.60
							1/2" Ice	0.0000	1.85
							1" Ice	0.0000	3.72
							2" Ice	0.0000	9.27
WR-VG86ST-BRD(3/4)	C	No	No	CaAa (Out Of Face)	133.0000 - 0.0000	1	No Ice	0.0795	0.58
							1/2" Ice	0.1795	1.38
							1" Ice	0.2795	2.78
							2" Ice	0.4795	7.41
WR-VG86ST-BRD(3/4)	C	No	No	CaAa (Out Of Face)	133.0000 - 0.0000	1	No Ice	0.0000	0.58
							1/2" Ice	0.0000	1.38
							1" Ice	0.0000	2.78
							2" Ice	0.0000	7.41

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
FB-L98B-034-XXX(3/8)	C	No	No	CaAa (Out Of Face)	133.0000 - 0.0000	1	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.60
							1" Ice	0.0000	1.76
							2" Ice	0.0000	5.91
***									
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.82
							1/2" Ice	0.0000	0.82
							1" Ice	0.0000	0.82
							2" Ice	0.0000	0.82
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	93.0000 - 0.0000	12	No Ice	0.0000	0.82
							1/2" Ice	0.0000	0.82
							1" Ice	0.0000	0.82
							2" Ice	0.0000	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	No	Inside Pole	93.0000 - 0.0000	1	No Ice	0.0000	1.30
							1/2" Ice	0.0000	1.30
							1" Ice	0.0000	1.30
							2" Ice	0.0000	1.30
***									
AVA7-50(1-5/8)	C	No	No	CaAa (Out Of Face)	75.0000 - 0.0000	2	No Ice	0.0000	0.70
							1/2" Ice	0.0000	2.23
							1" Ice	0.0000	4.38
							2" Ice	0.0000	10.50
AVA7-50(1-5/8)	C	No	No	Inside Pole	75.0000 - 0.0000	4	No Ice	0.0000	0.70
							1/2" Ice	0.0000	0.70
							1" Ice	0.0000	0.70
							2" Ice	0.0000	0.70
***									
****									
HB114-1-08U4-M5J(1-1/4)	C	No	No	Inside Pole	120.0000 - 0.0000	3	No Ice	0.0000	1.08
							1/2" Ice	0.0000	1.08
							1" Ice	0.0000	1.08
							2" Ice	0.0000	1.08
HB114-21U3M12-XXXF(1-1/4)	C	No	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.1540	1.22
							1/2" Ice	0.2540	2.47
							1" Ice	0.3540	4.32
							2" Ice	0.5540	9.87
***									
LDF4-50A(1/2)	C	No	No	CaAa (Out Of Face)	50.0000 - 0.0000	1	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.84
							1" Ice	0.0000	2.14
							2" Ice	0.0000	6.56

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	133.0000-128.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.173	0.02
L2	128.0000-123.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.055	0.02
L3	123.5000-123.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.117	0.00
L4	123.0000-118.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.480	0.03
L5	118.0000-	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
	113.0000	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.05
L6	113.0000-108.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.05
L7	108.0000-103.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.05
L8	103.0000-98.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.06
L9	98.0000-93.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.07
L10	93.0000-88.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.13
L11	88.0000-82.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.234	0.15
L12	82.2500-80.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.583	0.04
L13	80.7500-75.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.13
L14	75.7500-70.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.14
L15	70.7500-65.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.15
L16	65.7500-60.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.942	0.15
L17	60.7500-57.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.030	0.11
L18	57.0000-56.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.149	0.01
L19	56.7500-51.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L20	51.7500-46.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L21	46.7500-40.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.581	0.18
L22	40.7500-40.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.448	0.02
L23	40.0000-35.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L24	35.0000-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L25	30.0000-26.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.238	0.11
L26	26.2500-26.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.149	0.01
L27	26.0000-21.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L28	21.0000-16.0000	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L29	16.0000-11.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L30	11.0000-6.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L31	6.0000-1.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.984	0.15
L32	1.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.597	0.03

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	133.0000-	A	1.463	0.000	0.000	0.000	0.000	0.00
	128.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.098	0.26
L2	128.0000-	A	1.458	0.000	0.000	0.000	0.000	0.00
	123.5000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.679	0.23
L3	123.5000-	A	1.455	0.000	0.000	0.000	0.000	0.00
	123.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.408	0.03
L4	123.0000-	A	1.451	0.000	0.000	0.000	0.000	0.00
	118.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.964	0.27
L5	118.0000-	A	1.445	0.000	0.000	0.000	0.000	0.00
	113.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.278	0.30
L6	113.0000-	A	1.439	0.000	0.000	0.000	0.000	0.00
	108.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.259	0.30
L7	108.0000-	A	1.432	0.000	0.000	0.000	0.000	0.00
	103.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.239	0.30
L8	103.0000-	A	1.425	0.000	0.000	0.000	0.000	0.00
	98.0000	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.218	0.31
L9	98.0000-93.0000	A	1.418	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.196	0.32
L10	93.0000-88.0000	A	1.410	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.173	0.37
L11	88.0000-82.2500	A	1.402	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.070	0.43
L12	82.2500-80.7500	A	1.396	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.844	0.11
L13	80.7500-75.7500	A	1.390	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.112	0.37
L14	75.7500-70.7500	A	1.381	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.085	0.43
L15	70.7500-65.7500	A	1.371	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.056	0.44
L16	65.7500-60.7500	A	1.361	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.025	0.44
L17	60.7500-57.0000	A	1.351	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	5.895	0.33
L18	57.0000-56.7500	A	1.346	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	0.426	0.02
L19	56.7500-51.7500	A	1.340	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.493	0.43
L20	51.7500-46.7500	A	1.327	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.440	0.44
L21	46.7500-40.7500	A	1.311	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.051	0.53
L22	40.7500-40.0000	A	1.301	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.256	0.07
L23	40.0000-35.0000	A	1.291	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.293	0.44
L24	35.0000-30.0000	A	1.273	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.218	0.43
L25	30.0000-26.2500	A	1.255	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.107	0.32
L26	26.2500-26.0000	A	1.246	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	0.405	0.02
L27	26.0000-21.0000	A	1.232	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.051	0.41
L28	21.0000-16.0000	A	1.203	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.931	0.40
L29	16.0000-11.0000	A	1.166	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.777	0.39
L30	11.0000-6.0000	A	1.113	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.561	0.37
L31	6.0000-1.0000	A	1.019	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.171	0.34
L32	1.0000-0.0000	A	0.839	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.286	0.06

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	133.0000-128.0000	-1.5212	0.8783	-1.9779	1.1419
L2	128.0000-123.5000	-1.5212	0.8783	-1.9752	1.1404
L3	123.5000-123.0000	-1.6111	0.9301	-2.1886	1.2636
L4	123.0000-118.0000	-1.7148	0.9900	-2.7126	1.5661
L5	118.0000-	-2.1431	1.2373	-3.2322	1.8661

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
	113.0000				
L6	113.0000-108.0000	-2.1575	1.2457	-3.2671	1.8863
L7	108.0000-103.0000	-2.1713	1.2536	-3.3000	1.9053
L8	103.0000-98.0000	-2.1844	1.2612	-3.3309	1.9231
L9	98.0000-93.0000	-2.1969	1.2684	-3.3597	1.9397
L10	93.0000-88.0000	-2.2088	1.2752	-3.3866	1.9552
L11	88.0000-82.2500	-2.2210	1.2823	-3.4133	1.9706
L12	82.2500-80.7500	-2.2241	1.2841	-3.4213	1.9753
L13	80.7500-75.7500	-2.2311	1.2882	-3.4295	1.9800
L14	75.7500-70.7500	-2.2416	1.2942	-3.4501	1.9919
L15	70.7500-65.7500	-2.2516	1.3000	-3.4687	2.0027
L16	65.7500-60.7500	-2.2612	1.3055	-3.4852	2.0122
L17	60.7500-57.0000	-2.9681	1.7136	-4.2468	2.4519
L18	57.0000-56.7500	-3.2082	1.8523	-4.5024	2.5995
L19	56.7500-51.7500	-3.2174	1.8576	-4.5153	2.6069
L20	51.7500-46.7500	-3.2345	1.8674	-4.5375	2.6197
L21	46.7500-40.7500	-3.2527	1.8779	-4.5579	2.6315
L22	40.7500-40.0000	-3.2532	1.8782	-4.5586	2.6319
L23	40.0000-35.0000	-3.2622	1.8835	-4.5518	2.6280
L24	35.0000-30.0000	-3.2778	1.8925	-4.5611	2.6334
L25	30.0000-26.2500	-3.2911	1.9001	-4.5645	2.6353
L26	26.2500-26.0000	-3.2975	1.9038	-4.5649	2.6355
L27	26.0000-21.0000	-3.3051	1.9082	-4.5623	2.6340
L28	21.0000-16.0000	-3.3193	1.9164	-4.5496	2.6267
L29	16.0000-11.0000	-3.3329	1.9242	-4.5214	2.6104
L30	11.0000-6.0000	-3.3462	1.9319	-4.4653	2.5781
L31	6.0000-1.0000	-3.3591	1.9394	-4.3343	2.5024
L32	1.0000-0.0000	-3.3666	1.9437	-4.0315	2.3276

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_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
5/8" X 5' Lightning Rod	C	None		0.00	135.5000	No Ice	0.3125	0.3125	0.01
						1/2" Ice	0.8260	0.8260	0.01
						1" Ice	1.3216	1.3216	0.02
						2" Ice	1.9568	1.9568	0.04
*******									
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice	9.8953	7.1792	0.10
						1/2" Ice	10.4700	8.3621	0.18
						1" Ice	11.0098	9.2588	0.26
						2" Ice	12.1119	11.0860	0.46
OPA-65R-LCUU-H6 w/	B	From Leg	4.0000	0.00	133.0000	No Ice	9.8953	7.1792	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice	10.4700 11.0098 12.1119	8.3621 9.2588 11.0860	0.18 0.26 0.46
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	9.8953 10.4700 11.0098 12.1119	7.1792 8.3621 9.2588 11.0860	0.10 0.18 0.26 0.46
RRUS 11	A	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.7908 2.9984 3.2134 3.6656	1.1923 1.3395 1.4957 1.8390	0.05 0.07 0.10 0.15
RRUS 11	B	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.7908 2.9984 3.2134 3.6656	1.1923 1.3395 1.4957 1.8390	0.05 0.07 0.10 0.15
RRUS 11	C	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.7908 2.9984 3.2134 3.6656	1.1923 1.3395 1.4957 1.8390	0.05 0.07 0.10 0.15
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.2117 1.8924 2.1051 2.5703	1.2117 1.8924 2.1051 2.5703	0.03 0.05 0.08 0.14
Side Arm Mount [SO 901-3]	C	None		0.00	133.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.6600 2.1700 2.6800 3.7000	1.6600 2.1700 2.6800 3.7000	0.32 0.33 0.34 0.37
****									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.2619 8.8215 9.3462 10.4181	6.9458 8.1266 9.0212 10.8440	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.2619 8.8215 9.3462 10.4181	6.9458 8.1266 9.0212 10.8440	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.2619 8.8215 9.3462 10.4181	6.9458 8.1266 9.0212 10.8440	0.08 0.15 0.23 0.41
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.5799 7.0306 7.4733 8.3846	4.9591 5.7544 6.4723 7.9407	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.5799 7.0306 7.4733 8.3846	4.9591 5.7544 6.4723 7.9407	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.5799 7.0306 7.4733 8.3846	4.9591 5.7544 6.4723 7.9407	0.08 0.13 0.19 0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) TD-RRH8x20-25	A	From Leg	4.0000 0.00 1.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.0455 4.2975 4.5570 5.0981	1.5345 1.7142 1.9008 2.2951	0.07 0.10 0.13 0.20
Platform Mount [LP 1201-1]	C	None		0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	23.1000 26.8000 30.5000 37.9000	23.1000 26.8000 30.5000 37.9000	2.10 2.50 2.90 3.70
2.375" OD x 5' Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1875 1.4956 1.8071 2.4580	1.1875 1.4956 1.8071 2.4580	0.02 0.03 0.04 0.08
2.375" OD x 5' Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1875 1.4956 1.8071 2.4580	1.1875 1.4956 1.8071 2.4580	0.02 0.03 0.04 0.08
2.375" OD x 5' Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1875 1.4956 1.8071 2.4580	1.1875 1.4956 1.8071 2.4580	0.02 0.03 0.04 0.08
****									
800MHz 2X50W RRH W/FILTER	A	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.0583 2.2398 2.4287 2.8287	1.9317 2.1087 2.2931 2.6843	0.06 0.09 0.11 0.17
800MHz 2X50W RRH W/FILTER	B	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.0583 2.2398 2.4287 2.8287	1.9317 2.1087 2.2931 2.6843	0.06 0.09 0.11 0.17
800MHz 2X50W RRH W/FILTER	C	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.0583 2.2398 2.4287 2.8287	1.9317 2.1087 2.2931 2.6843	0.06 0.09 0.11 0.17
PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.3218 2.5266 2.7388 3.1855	2.2381 2.4407 2.6507 3.0929	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.3218 2.5266 2.7388 3.1855	2.2381 2.4407 2.6507 3.0929	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000 0.00 0.00	0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.3218 2.5266 2.7388 3.1855	2.2381 2.4407 2.6507 3.0929	0.06 0.08 0.11 0.17
Side Arm Mount [SO 102-3]	C	None		0.00	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.0000 3.4800 3.9600 4.9200	3.0000 3.4800 3.9600 4.9200	0.08 0.11 0.14 0.20
Pipe Mount [PM 601-3]	C	None		0.00	118.0000	No Ice 1/2" Ice 1" Ice	4.3900 5.4800 6.5700 8.7500	4.3900 5.4800 6.5700 8.7500	0.20 0.24 0.28 0.36

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
*********									
ETT19V2S12UB	A	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.5718 0.6683 0.7722 1.0022	0.2761 0.3495 0.4323 0.6201	0.01 0.02 0.03 0.04
ETT19V2S12UB	B	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.5718 0.6683 0.7722 1.0022	0.2761 0.3495 0.4323 0.6201	0.01 0.02 0.03 0.04
ETT19V2S12UB	C	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.5718 0.6683 0.7722 1.0022	0.2761 0.3495 0.4323 0.6201	0.01 0.02 0.03 0.04
KRY 112 144/1	A	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3500 0.4259 0.5093 0.6981	0.1750 0.2343 0.3009 0.4565	0.01 0.01 0.02 0.03
APX16DWV-16DWVS-C w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.8239 7.2751 7.7192 8.6333	3.4938 4.2631 4.9598 6.4031	0.06 0.11 0.16 0.30
APX16DWV-16DWVS-C w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.8239 7.2751 7.7192 8.6333	3.4938 4.2631 4.9598 6.4031	0.06 0.11 0.16 0.30
APX16DWV-16DWVS-C w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.8239 7.2751 7.7192 8.6333	3.4938 4.2631 4.9598 6.4031	0.06 0.11 0.16 0.30
T-Arm Mount [TA 602-3]	C	None		0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.5900 15.4400 19.2900 26.9900	11.5900 15.4400 19.2900 26.9900	0.77 0.99 1.21 1.64
2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4250 1.9250 2.2939 3.0596	1.4250 1.9250 2.2939 3.0596	0.03 0.04 0.05 0.09
2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4250 1.9250 2.2939 3.0596	1.4250 1.9250 2.2939 3.0596	0.03 0.04 0.05 0.09
2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	100.0000	No Ice 1/2" Ice	1.4250 1.9250 2.2939	1.4250 1.9250 2.2939	0.03 0.04 0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice 2" Ice	3.0596	3.0596	0.09
*****									
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.9453 5.3243 5.7120 6.5142	3.6927 4.2947 4.9133 6.1810	0.03 0.07 0.12 0.23
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.9453 5.3243 5.7120 6.5142	3.6927 4.2947 4.9133 6.1810	0.03 0.07 0.12 0.23
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.9453 5.3243 5.7120 6.5142	3.6927 4.2947 4.9133 6.1810	0.03 0.07 0.12 0.23
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4106 8.9745 9.5048 10.5853	7.0817 8.2729 9.1847 11.0232	0.06 0.13 0.21 0.39
BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9298 4.6923	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9298 4.6923	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
BXA-171063-12CF-EDIN-X w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.0290 5.5830 6.1033 7.1662	5.2887 6.4594 7.3479 9.1478	0.04 0.09 0.14 0.27
BXA-171063-12CF-EDIN-X w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.0290 5.5830 6.1033 7.1662	5.2887 6.4594 7.3479 9.1478	0.04 0.09 0.14 0.27
BXA-171063-12CF-EDIN-X w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.0290 5.5830 6.1033 7.1662	5.2887 6.4594 7.3479 9.1478	0.04 0.09 0.14 0.27
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	93.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9298 4.6923	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
RRH2X40-AWS	A	From Leg	4.0000 0.00	0.00	93.0000	No Ice 1/2"	2.1614 2.3597	1.4199 1.5903	0.04 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	2.5655	1.7676	0.08
						1" Ice	2.9991	2.1432	0.13
						2" Ice			
RRH2X40-AWS	B	From Leg	4.0000	0.00	93.0000	No Ice	2.1614	1.4199	0.04
			0.00			1/2"	2.3597	1.5903	0.06
			1.00			Ice	2.5655	1.7676	0.08
						1" Ice	2.9991	2.1432	0.13
						2" Ice			
RRH2X40-AWS	C	From Leg	4.0000	0.00	93.0000	No Ice	2.1614	1.4199	0.04
			0.00			1/2"	2.3597	1.5903	0.06
			1.00			Ice	2.5655	1.7676	0.08
						1" Ice	2.9991	2.1432	0.13
						2" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.0000	0.00	93.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.01
			1.00			Ice	0.4656	0.1685	0.01
						1" Ice	0.6468	0.2940	0.02
						2" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000	0.00	93.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.01
			1.00			Ice	0.4656	0.1685	0.01
						1" Ice	0.6468	0.2940	0.02
						2" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000	0.00	93.0000	No Ice	0.3142	0.0762	0.00
			0.00			1/2"	0.3862	0.1189	0.01
			1.00			Ice	0.4656	0.1685	0.01
						1" Ice	0.6468	0.2940	0.02
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000	0.00	93.0000	No Ice	4.8000	2.0000	0.04
			0.00			1/2"	5.0704	2.1926	0.08
			1.00			Ice	5.3481	2.3926	0.12
						1" Ice	5.9259	2.8148	0.21
						2" Ice			
Platform Mount [LP 1201-1]	C	None		0.00	93.0000	No Ice	23.1000	23.1000	2.10
						1/2"	26.8000	26.8000	2.50
						Ice	30.5000	30.5000	2.90
						1" Ice	37.9000	37.9000	3.70
						2" Ice			
****									
APXV18-206517S-C	A	From Face	1.0000	0.00	75.0000	No Ice	5.1667	3.0375	0.03
			0.00			1/2"	5.6182	3.4693	0.05
			0.00			Ice	6.0772	3.9086	0.09
						1" Ice	7.0173	4.8093	0.17
						2" Ice			
APXV18-206517S-C	B	From Face	1.0000	0.00	75.0000	No Ice	5.1667	3.0375	0.03
			0.00			1/2"	5.6182	3.4693	0.05
			0.00			Ice	6.0772	3.9086	0.09
						1" Ice	7.0173	4.8093	0.17
						2" Ice			
APXV18-206517S-C	C	From Face	1.0000	0.00	75.0000	No Ice	5.1667	3.0375	0.03
			0.00			1/2"	5.6182	3.4693	0.05
			0.00			Ice	6.0772	3.9086	0.09
						1" Ice	7.0173	4.8093	0.17
						2" Ice			
Pipe Mount [PM 601-3]	C	None		0.00	75.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice			
****									
****									
KS24019-L112A	A	From Face	2.0000	0.00	50.0000	No Ice	0.1407	0.1407	0.01
			0.00			1/2"	0.1979	0.1979	0.01
			1.00			Ice	0.2621	0.2621	0.01
						1" Ice	0.4148	0.4148	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 702-1]	A	None		0.00	50.0000	2" Ice	1.0000	1.4300	0.03
						No Ice	1.0000	2.0500	0.04
						1/2" Ice	1.0000	2.6700	0.05
						1" Ice	1.0000	3.9100	0.07
						2" Ice			
****									

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 133.0000-128.0000	130.5000	1.339	47.723	5.833	A	0.000	5.833	5.833	100.00	0.000	0.000
					B	0.000	5.833		100.00	0.000	0.000
					C	0.000	5.833		100.00	0.000	1.173
L2 128.0000-123.5000	125.7500	1.328	47.352	5.250	A	0.000	5.250	5.250	100.00	0.000	0.000
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.055
L3 123.5000-123.0000	123.2315	1.323	47.150	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.117
L4 123.0000-118.0000	120.4860	1.316	46.927	9.455	A	0.000	9.455	9.455	100.00	0.000	0.000
					B	0.000	9.455		100.00	0.000	0.000
					C	0.000	9.455		100.00	0.000	1.480
L5 118.0000-113.0000	115.4865	1.305	46.510	9.772	A	0.000	9.772	9.772	100.00	0.000	0.000
					B	0.000	9.772		100.00	0.000	0.000
					C	0.000	9.772		100.00	0.000	1.942
L6 113.0000-108.0000	110.4869	1.292	46.079	10.090	A	0.000	10.090	10.090	100.00	0.000	0.000
					B	0.000	10.090		100.00	0.000	0.000
					C	0.000	10.090		100.00	0.000	1.942
L7 108.0000-103.0000	105.4873	1.28	45.632	10.407	A	0.000	10.407	10.407	100.00	0.000	0.000
					B	0.000	10.407		100.00	0.000	0.000
					C	0.000	10.407		100.00	0.000	1.942
L8 103.0000-98.0000	100.4877	1.267	45.168	10.724	A	0.000	10.724	10.724	100.00	0.000	0.000
					B	0.000	10.724		100.00	0.000	0.000
					C	0.000	10.724		100.00	0.000	1.942
L9 98.0000-93.0000	95.4880	1.253	44.685	11.042	A	0.000	11.042	11.042	100.00	0.000	0.000
					B	0.000	11.042		100.00	0.000	0.000
					C	0.000	11.042		100.00	0.000	1.942
L10 93.0000-88.0000	90.4884	1.239	44.182	11.359	A	0.000	11.359	11.359	100.00	0.000	0.000
					B	0.000	11.359		100.00	0.000	0.000
					C	0.000	11.359		100.00	0.000	1.942
L11 88.0000-82.2500	85.1101	1.223	43.616	13.455	A	0.000	13.455	13.455	100.00	0.000	0.000
					B	0.000	13.455		100.00	0.000	0.000
					C	0.000	13.455		100.00	0.000	2.234
L12 82.2500-80.7500	81.4990	1.212	43.220	3.530	A	0.000	3.530	3.530	100.00	0.000	0.000
					B	0.000	3.530		100.00	0.000	0.000
					C	0.000	3.530		100.00	0.000	0.583
L13 80.7500-75.7500	78.2390	1.202	42.850	11.974	A	0.000	11.974	11.974	100.00	0.000	0.000
					B	0.000	11.974		100.00	0.000	0.000
					C	0.000	11.974		100.00	0.000	1.942
L14 75.7500-70.7500	73.2393	1.185	42.258	12.292	A	0.000	12.292	12.292	100.00	0.000	0.000
					B	0.000	12.292		100.00	0.000	0.000
					C	0.000	12.292		100.00	0.000	1.942
L15 70.7500-	68.2395	1.168	41.63	12.609	A	0.000	12.609	12.609	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
65.7500			4		B	0.000	12.609		100.00	0.000	0.000
					C	0.000	12.609		100.00	0.000	1.942
L16 65.7500-60.7500	63.2398	1.149	40.972	12.926	A	0.000	12.926	12.926	100.00	0.000	0.000
					B	0.000	12.926		100.00	0.000	0.000
					C	0.000	12.926		100.00	0.000	1.942
L17 60.7500-57.0000	58.8694	1.132	40.359	9.903	A	0.000	9.903	9.903	100.00	0.000	0.000
					B	0.000	9.903		100.00	0.000	0.000
					C	0.000	9.903		100.00	0.000	2.030
L18 57.0000-56.7500	56.8750	1.124	40.067	0.666	A	0.000	0.666	0.666	100.00	0.000	0.000
					B	0.000	0.666		100.00	0.000	0.000
					C	0.000	0.666		100.00	0.000	0.149
L19 56.7500-51.7500	54.2402	1.113	39.669	13.484	A	0.000	13.484	13.484	100.00	0.000	0.000
					B	0.000	13.484		100.00	0.000	0.000
					C	0.000	13.484		100.00	0.000	2.984
L20 51.7500-46.7500	49.2404	1.09	38.870	13.802	A	0.000	13.802	13.802	100.00	0.000	0.000
					B	0.000	13.802		100.00	0.000	0.000
					C	0.000	13.802		100.00	0.000	2.984
L21 46.7500-40.7500	43.7366	1.063	37.912	16.982	A	0.000	16.982	16.982	100.00	0.000	0.000
					B	0.000	16.982		100.00	0.000	0.000
					C	0.000	16.982		100.00	0.000	3.581
L22 40.7500-40.0000	40.3748	1.046	37.279	2.123	A	0.000	2.123	2.123	100.00	0.000	0.000
					B	0.000	2.123		100.00	0.000	0.000
					C	0.000	2.123		100.00	0.000	0.448
L23 40.0000-35.0000	37.4908	1.029	36.702	14.335	A	0.000	14.335	14.335	100.00	0.000	0.000
					B	0.000	14.335		100.00	0.000	0.000
					C	0.000	14.335		100.00	0.000	2.984
L24 35.0000-30.0000	32.4910	0.999	35.612	14.653	A	0.000	14.653	14.653	100.00	0.000	0.000
					B	0.000	14.653		100.00	0.000	0.000
					C	0.000	14.653		100.00	0.000	2.984
L25 30.0000-26.2500	28.1200	0.969	34.545	11.198	A	0.000	11.198	11.198	100.00	0.000	0.000
					B	0.000	11.198		100.00	0.000	0.000
					C	0.000	11.198		100.00	0.000	2.238
L26 26.2500-26.0000	26.1250	0.954	34.014	0.753	A	0.000	0.753	0.753	100.00	0.000	0.000
					B	0.000	0.753		100.00	0.000	0.000
					C	0.000	0.753		100.00	0.000	0.149
L27 26.0000-21.0000	23.4913	0.933	33.262	15.222	A	0.000	15.222	15.222	100.00	0.000	0.000
					B	0.000	15.222		100.00	0.000	0.000
					C	0.000	15.222		100.00	0.000	2.984
L28 21.0000-16.0000	18.4915	0.887	31.627	15.539	A	0.000	15.539	15.539	100.00	0.000	0.000
					B	0.000	15.539		100.00	0.000	0.000
					C	0.000	15.539		100.00	0.000	2.984
L29 16.0000-11.0000	13.4917	0.85	30.304	15.857	A	0.000	15.857	15.857	100.00	0.000	0.000
					B	0.000	15.857		100.00	0.000	0.000
					C	0.000	15.857		100.00	0.000	2.984
L30 11.0000-6.0000	8.4918	0.85	30.304	16.175	A	0.000	16.175	16.175	100.00	0.000	0.000
					B	0.000	16.175		100.00	0.000	0.000
					C	0.000	16.175		100.00	0.000	2.984
L31 6.0000-1.0000	3.4920	0.85	30.304	16.493	A	0.000	16.493	16.493	100.00	0.000	0.000
					B	0.000	16.493		100.00	0.000	0.000
					C	0.000	16.493		100.00	0.000	2.984
L32 1.0000-0.0000	0.4997	0.85	30.304	3.337	A	0.000	3.337	3.337	100.00	0.000	0.000
					B	0.000	3.337		100.00	0.000	0.000
					C	0.000	3.337		100.00	0.000	0.597

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 133.0000-128.0000	130.5000	1.339	7.636	1.4629	7.052	A	0.000	7.052	7.052	100.00	0.000	0.000
						B	0.000	7.052		100.00	0.000	0.000
						C	0.000	7.052		100.00	0.000	4.098

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L2 128.0000-123.5000	125.7500	1.328	7.576	1.4575	6.343	A	0.000	6.343	6.343	100.00	0.000	0.000
						B	0.000	6.343		100.00	0.000	0.000
						C	0.000	6.343		100.00	0.000	3.679
L3 123.5000-123.0000	123.2315	1.323	7.544	1.4546	0.871	A	0.000	0.871	0.871	100.00	0.000	0.000
						B	0.000	0.871		100.00	0.000	0.000
						C	0.000	0.871		100.00	0.000	0.408
L4 123.0000-118.0000	120.4860	1.316	7.508	1.4513	10.664	A	0.000	10.664	10.664	100.00	0.000	0.000
						B	0.000	10.664		100.00	0.000	0.000
						C	0.000	10.664		100.00	0.000	4.964
L5 118.0000-113.0000	115.4865	1.305	7.442	1.4451	10.976	A	0.000	10.976	10.976	100.00	0.000	0.000
						B	0.000	10.976		100.00	0.000	0.000
						C	0.000	10.976		100.00	0.000	6.278
L6 113.0000-108.0000	110.4869	1.292	7.373	1.4388	11.288	A	0.000	11.288	11.288	100.00	0.000	0.000
						B	0.000	11.288		100.00	0.000	0.000
						C	0.000	11.288		100.00	0.000	6.259
L7 108.0000-103.0000	105.4873	1.28	7.301	1.4321	11.600	A	0.000	11.600	11.600	100.00	0.000	0.000
						B	0.000	11.600		100.00	0.000	0.000
						C	0.000	11.600		100.00	0.000	6.239
L8 103.0000-98.0000	100.4877	1.267	7.227	1.4252	11.912	A	0.000	11.912	11.912	100.00	0.000	0.000
						B	0.000	11.912		100.00	0.000	0.000
						C	0.000	11.912		100.00	0.000	6.218
L9 98.0000-93.0000	95.4880	1.253	7.150	1.4179	12.223	A	0.000	12.223	12.223	100.00	0.000	0.000
						B	0.000	12.223		100.00	0.000	0.000
						C	0.000	12.223		100.00	0.000	6.196
L10 93.0000-88.0000	90.4884	1.239	7.069	1.4103	12.534	A	0.000	12.534	12.534	100.00	0.000	0.000
						B	0.000	12.534		100.00	0.000	0.000
						C	0.000	12.534		100.00	0.000	6.173
L11 88.0000-82.2500	85.1101	1.223	6.979	1.4017	14.799	A	0.000	14.799	14.799	100.00	0.000	0.000
						B	0.000	14.799		100.00	0.000	0.000
						C	0.000	14.799		100.00	0.000	7.070
L12 82.2500-80.7500	81.4990	1.212	6.915	1.3956	3.881	A	0.000	3.881	3.881	100.00	0.000	0.000
						B	0.000	3.881		100.00	0.000	0.000
						C	0.000	3.881		100.00	0.000	1.844
L13 80.7500-75.7500	78.2390	1.202	6.856	1.3900	13.132	A	0.000	13.132	13.132	100.00	0.000	0.000
						B	0.000	13.132		100.00	0.000	0.000
						C	0.000	13.132		100.00	0.000	6.112
L14 75.7500-70.7500	73.2393	1.185	6.761	1.3808	13.442	A	0.000	13.442	13.442	100.00	0.000	0.000
						B	0.000	13.442		100.00	0.000	0.000
						C	0.000	13.442		100.00	0.000	6.085
L15 70.7500-65.7500	68.2395	1.168	6.661	1.3711	13.752	A	0.000	13.752	13.752	100.00	0.000	0.000
						B	0.000	13.752		100.00	0.000	0.000
						C	0.000	13.752		100.00	0.000	6.056
L16 65.7500-60.7500	63.2398	1.149	6.556	1.3607	14.060	A	0.000	14.060	14.060	100.00	0.000	0.000
						B	0.000	14.060		100.00	0.000	0.000
						C	0.000	14.060		100.00	0.000	6.025
L17 60.7500-57.0000	58.8694	1.132	6.457	1.3510	10.747	A	0.000	10.747	10.747	100.00	0.000	0.000
						B	0.000	10.747		100.00	0.000	0.000
						C	0.000	10.747		100.00	0.000	5.895
L18 57.0000-56.7500	56.8750	1.124	6.411	1.3463	0.722	A	0.000	0.722	0.722	100.00	0.000	0.000
						B	0.000	0.722		100.00	0.000	0.000
						C	0.000	0.722		100.00	0.000	0.426
L19 56.7500-51.7500	54.2402	1.113	6.347	1.3400	14.601	A	0.000	14.601	14.601	100.00	0.000	0.000
						B	0.000	14.601		100.00	0.000	0.000
						C	0.000	14.601		100.00	0.000	8.493
L20 51.7500-46.7500	49.2404	1.09	6.219	1.3271	14.908	A	0.000	14.908	14.908	100.00	0.000	0.000
						B	0.000	14.908		100.00	0.000	0.000
						C	0.000	14.908		100.00	0.000	8.440
L21 46.7500-40.7500	43.7366	1.063	6.066	1.3114	18.293	A	0.000	18.293	18.293	100.00	0.000	0.000
						B	0.000	18.293		100.00	0.000	0.000
						C	0.000	18.293		100.00	0.000	10.051
L22 40.7500-40.0000	40.3748	1.046	5.965	1.3010	2.287	A	0.000	2.287	2.287	100.00	0.000	0.000
						B	0.000	2.287		100.00	0.000	0.000
						C	0.000	2.287		100.00	0.000	1.256
L23 40.0000-35.0000	37.4908	1.029	5.872	1.2914	15.412	A	0.000	15.412	15.412	100.00	0.000	0.000
						B	0.000	15.412		100.00	0.000	0.000
						C	0.000	15.412		100.00	0.000	8.293
L24 35.0000-30.0000	32.4910	0.999	5.698	1.2730	15.714	A	0.000	15.714	15.714	100.00	0.000	0.000
						B	0.000	15.714		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	15.714		100.00	0.000	8.218
L25 30.0000-26.2500	28.1200	0.969	5.527	1.2548	11.982	A	0.000	11.982	11.982	100.00	0.000	0.000
						B	0.000	11.982		100.00	0.000	0.000
						C	0.000	11.982		100.00	0.000	6.107
L26 26.2500-26.0000	26.1250	0.954	5.442	1.2456	0.805	A	0.000	0.805	0.805	100.00	0.000	0.000
						B	0.000	0.805		100.00	0.000	0.000
						C	0.000	0.805		100.00	0.000	0.405
L27 26.0000-21.0000	23.4913	0.933	5.322	1.2324	16.249	A	0.000	16.249	16.249	100.00	0.000	0.000
						B	0.000	16.249		100.00	0.000	0.000
						C	0.000	16.249		100.00	0.000	8.051
L28 21.0000-16.0000	18.4915	0.887	5.060	1.2033	16.542	A	0.000	16.542	16.542	100.00	0.000	0.000
						B	0.000	16.542		100.00	0.000	0.000
						C	0.000	16.542		100.00	0.000	7.931
L29 16.0000-11.0000	13.4917	0.85	4.849	1.1659	16.829	A	0.000	16.829	16.829	100.00	0.000	0.000
						B	0.000	16.829		100.00	0.000	0.000
						C	0.000	16.829		100.00	0.000	7.777
L30 11.0000-6.0000	8.4918	0.85	4.849	1.1132	17.102	A	0.000	17.102	17.102	100.00	0.000	0.000
						B	0.000	17.102		100.00	0.000	0.000
						C	0.000	17.102		100.00	0.000	7.561
L31 6.0000-1.0000	3.4920	0.85	4.849	1.0185	17.341	A	0.000	17.341	17.341	100.00	0.000	0.000
						B	0.000	17.341		100.00	0.000	0.000
						C	0.000	17.341		100.00	0.000	7.171
L32 1.0000-0.0000	0.4997	0.85	4.849	0.8385	3.476	A	0.000	3.476	3.476	100.00	0.000	0.000
						B	0.000	3.476		100.00	0.000	0.000
						C	0.000	3.476		100.00	0.000	1.286

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 133.0000-128.0000	130.5000	1.339	9.838	5.833	A	0.000	5.833	5.833	100.00	0.000	0.000
					B	0.000	5.833		100.00	0.000	0.000
					C	0.000	5.833		100.00	0.000	1.173
L2 128.0000-123.5000	125.7500	1.328	9.761	5.250	A	0.000	5.250	5.250	100.00	0.000	0.000
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.055
L3 123.5000-123.0000	123.2315	1.323	9.720	0.750	A	0.000	0.750	0.750	100.00	0.000	0.000
					B	0.000	0.750		100.00	0.000	0.000
					C	0.000	0.750		100.00	0.000	0.117
L4 123.0000-118.0000	120.4860	1.316	9.674	9.455	A	0.000	9.455	9.455	100.00	0.000	0.000
					B	0.000	9.455		100.00	0.000	0.000
					C	0.000	9.455		100.00	0.000	1.480
L5 118.0000-113.0000	115.4865	1.305	9.588	9.772	A	0.000	9.772	9.772	100.00	0.000	0.000
					B	0.000	9.772		100.00	0.000	0.000
					C	0.000	9.772		100.00	0.000	1.942
L6 113.0000-108.0000	110.4869	1.292	9.499	10.090	A	0.000	10.090	10.090	100.00	0.000	0.000
					B	0.000	10.090		100.00	0.000	0.000
					C	0.000	10.090		100.00	0.000	1.942
L7 108.0000-103.0000	105.4873	1.28	9.407	10.407	A	0.000	10.407	10.407	100.00	0.000	0.000
					B	0.000	10.407		100.00	0.000	0.000
					C	0.000	10.407		100.00	0.000	1.942
L8 103.0000-98.0000	100.4877	1.267	9.311	10.724	A	0.000	10.724	10.724	100.00	0.000	0.000
					B	0.000	10.724		100.00	0.000	0.000
					C	0.000	10.724		100.00	0.000	1.942
L9 98.0000-93.0000	95.4880	1.253	9.212	11.042	A	0.000	11.042	11.042	100.00	0.000	0.000
					B	0.000	11.042		100.00	0.000	0.000
					C	0.000	11.042		100.00	0.000	1.942
L10 93.0000-88.0000	90.4884	1.239	9.108	11.359	A	0.000	11.359	11.359	100.00	0.000	0.000
					B	0.000	11.359		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	11.359		100.00	0.000	1.942
L11 88.0000-82.2500	85.1101	1.223	8.991	13.455	A	0.000	13.455	13.455	100.00	0.000	0.000
					B	0.000	13.455		100.00	0.000	0.000
					C	0.000	13.455		100.00	0.000	2.234
L12 82.2500-80.7500	81.4990	1.212	8.910	3.530	A	0.000	3.530	3.530	100.00	0.000	0.000
					B	0.000	3.530		100.00	0.000	0.000
					C	0.000	3.530		100.00	0.000	0.583
L13 80.7500-75.7500	78.2390	1.202	8.833	11.974	A	0.000	11.974	11.974	100.00	0.000	0.000
					B	0.000	11.974		100.00	0.000	0.000
					C	0.000	11.974		100.00	0.000	1.942
L14 75.7500-70.7500	73.2393	1.185	8.711	12.292	A	0.000	12.292	12.292	100.00	0.000	0.000
					B	0.000	12.292		100.00	0.000	0.000
					C	0.000	12.292		100.00	0.000	1.942
L15 70.7500-65.7500	68.2395	1.168	8.583	12.609	A	0.000	12.609	12.609	100.00	0.000	0.000
					B	0.000	12.609		100.00	0.000	0.000
					C	0.000	12.609		100.00	0.000	1.942
L16 65.7500-60.7500	63.2398	1.149	8.446	12.926	A	0.000	12.926	12.926	100.00	0.000	0.000
					B	0.000	12.926		100.00	0.000	0.000
					C	0.000	12.926		100.00	0.000	1.942
L17 60.7500-57.0000	58.8694	1.132	8.320	9.903	A	0.000	9.903	9.903	100.00	0.000	0.000
					B	0.000	9.903		100.00	0.000	0.000
					C	0.000	9.903		100.00	0.000	2.030
L18 57.0000-56.7500	56.8750	1.124	8.260	0.666	A	0.000	0.666	0.666	100.00	0.000	0.000
					B	0.000	0.666		100.00	0.000	0.000
					C	0.000	0.666		100.00	0.000	0.149
L19 56.7500-51.7500	54.2402	1.113	8.178	13.484	A	0.000	13.484	13.484	100.00	0.000	0.000
					B	0.000	13.484		100.00	0.000	0.000
					C	0.000	13.484		100.00	0.000	2.984
L20 51.7500-46.7500	49.2404	1.09	8.013	13.802	A	0.000	13.802	13.802	100.00	0.000	0.000
					B	0.000	13.802		100.00	0.000	0.000
					C	0.000	13.802		100.00	0.000	2.984
L21 46.7500-40.7500	43.7366	1.063	7.815	16.982	A	0.000	16.982	16.982	100.00	0.000	0.000
					B	0.000	16.982		100.00	0.000	0.000
					C	0.000	16.982		100.00	0.000	3.581
L22 40.7500-40.0000	40.3748	1.046	7.685	2.123	A	0.000	2.123	2.123	100.00	0.000	0.000
					B	0.000	2.123		100.00	0.000	0.000
					C	0.000	2.123		100.00	0.000	0.448
L23 40.0000-35.0000	37.4908	1.029	7.566	14.335	A	0.000	14.335	14.335	100.00	0.000	0.000
					B	0.000	14.335		100.00	0.000	0.000
					C	0.000	14.335		100.00	0.000	2.984
L24 35.0000-30.0000	32.4910	0.999	7.341	14.653	A	0.000	14.653	14.653	100.00	0.000	0.000
					B	0.000	14.653		100.00	0.000	0.000
					C	0.000	14.653		100.00	0.000	2.984
L25 30.0000-26.2500	28.1200	0.969	7.121	11.198	A	0.000	11.198	11.198	100.00	0.000	0.000
					B	0.000	11.198		100.00	0.000	0.000
					C	0.000	11.198		100.00	0.000	2.238
L26 26.2500-26.0000	26.1250	0.954	7.012	0.753	A	0.000	0.753	0.753	100.00	0.000	0.000
					B	0.000	0.753		100.00	0.000	0.000
					C	0.000	0.753		100.00	0.000	0.149
L27 26.0000-21.0000	23.4913	0.933	6.857	15.222	A	0.000	15.222	15.222	100.00	0.000	0.000
					B	0.000	15.222		100.00	0.000	0.000
					C	0.000	15.222		100.00	0.000	2.984
L28 21.0000-16.0000	18.4915	0.887	6.520	15.539	A	0.000	15.539	15.539	100.00	0.000	0.000
					B	0.000	15.539		100.00	0.000	0.000
					C	0.000	15.539		100.00	0.000	2.984
L29 16.0000-11.0000	13.4917	0.85	6.247	15.857	A	0.000	15.857	15.857	100.00	0.000	0.000
					B	0.000	15.857		100.00	0.000	0.000
					C	0.000	15.857		100.00	0.000	2.984
L30 11.0000-6.0000	8.4918	0.85	6.247	16.175	A	0.000	16.175	16.175	100.00	0.000	0.000
					B	0.000	16.175		100.00	0.000	0.000
					C	0.000	16.175		100.00	0.000	2.984
L31 6.0000-1.0000	3.4920	0.85	6.247	16.493	A	0.000	16.493	16.493	100.00	0.000	0.000
					B	0.000	16.493		100.00	0.000	0.000
					C	0.000	16.493		100.00	0.000	2.984
L32 1.0000-0.0000	0.4997	0.85	6.247	3.337	A	0.000	3.337	3.337	100.00	0.000	0.000
					B	0.000	3.337		100.00	0.000	0.000
					C	0.000	3.337		100.00	0.000	0.597

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
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
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	27	0.00	-0.00	-0.00
			Max. Compression	26	-2.78	0.14	0.45
			Max. Mx	20	-1.06	10.40	0.13
			Max. My	2	-1.05	0.01	10.56
			Max. Vy	20	-2.21	10.40	0.13
			Max. Vx	2	-2.21	0.01	10.56
			Max. Torque	20			-0.31

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L2	128 - 123.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-3.42	0.27	0.39
			Max. Mx	20	-1.34	20.92	0.13
			Max. My	2	-1.33	0.03	21.08
			Max. Vy	20	-2.46	20.92	0.13
			Max. Vx	2	-2.46	0.03	21.08
			Max. Torque	20			-0.29
L3	123.5 - 123	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-3.50	0.28	0.38
			Max. Mx	20	-1.37	22.16	0.13
			Max. My	2	-1.37	0.03	22.32
			Max. Vy	20	-2.49	22.16	0.13
			Max. Vx	2	-2.50	0.03	22.32
			Max. Torque	20			-0.28
L4	123 - 118	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.44	0.52	2.86
			Max. Mx	20	-4.68	44.82	1.26
			Max. My	2	-4.62	0.05	47.15
			Max. Vy	20	-6.54	44.82	1.26
			Max. Vx	2	-6.86	0.05	47.15
			Max. Torque	20			-1.31
L5	118 - 113	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.69	0.81	2.75
			Max. Mx	20	-5.64	83.67	1.27
			Max. My	2	-5.57	0.08	87.59
			Max. Vy	20	-8.01	83.67	1.27
			Max. Vx	2	-8.34	0.08	87.59
			Max. Torque	20			-1.31
L6	113 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-13.52	1.10	2.63
			Max. Mx	20	-5.95	124.97	1.27
			Max. My	2	-5.89	0.12	130.48
			Max. Vy	20	-8.50	124.97	1.27
			Max. Vx	2	-8.83	0.12	130.48
			Max. Torque	20			-1.26
L7	108 - 103	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-14.35	1.39	2.51
			Max. Mx	20	-6.28	168.72	1.28
			Max. My	2	-6.22	0.15	175.83
			Max. Vy	20	-8.99	168.72	1.28
			Max. Vx	2	-9.32	0.15	175.83
			Max. Torque	20			-1.21
L8	103 - 98	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.86	1.70	2.38
			Max. Mx	20	-7.81	218.87	1.28
			Max. My	2	-7.75	0.18	227.57
			Max. Vy	20	-11.10	218.87	1.28
			Max. Vx	2	-11.43	0.18	227.57
			Max. Torque	6			1.21
L9	98 - 93	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.75	2.01	2.25
			Max. Mx	20	-8.21	275.60	1.28
			Max. My	2	-8.15	0.22	285.91
			Max. Vy	20	-11.59	275.60	1.28
			Max. Vx	2	-11.92	0.22	285.91
			Max. Torque	6			1.20
L10	93 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.41	2.35	2.96
			Max. Mx	20	-11.66	358.33	1.49
			Max. My	2	-11.58	0.26	371.17
			Max. Vy	20	-16.23	358.33	1.49
			Max. Vx	2	-16.68	0.26	371.17
			Max. Torque	6			1.57
L11	88 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.85	2.50	2.90
			Max. Mx	20	-11.90	395.09	1.49
			Max. My	2	-11.82	0.28	408.92
			Max. Vy	20	-16.44	395.09	1.49
			Max. Vx	2	-16.89	0.28	408.92

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			1.57
L12	82.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.36	2.84	2.76
			Max. Mx	20	-12.74	478.66	1.48
			Max. My	2	-12.67	0.32	494.67
			Max. Vy	20	-16.97	478.66	1.48
			Max. Vx	2	-17.42	0.32	494.67
			Max. Torque	6			1.57
L13	80.75 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.46	3.18	2.61
			Max. Mx	20	-13.41	564.69	1.48
			Max. My	2	-13.34	0.37	582.88
			Max. Vy	20	-17.44	564.69	1.48
			Max. Vx	2	-17.89	0.37	582.88
			Max. Torque	6			1.57
L14	75.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.37	3.58	2.42
			Max. Mx	20	-14.42	656.00	1.47
			Max. My	2	-14.36	0.42	676.36
			Max. Vy	20	-18.60	656.00	1.47
			Max. Vx	2	-19.05	0.42	676.36
			Max. Torque	6			1.57
L15	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.59	4.00	2.22
			Max. Mx	20	-15.17	750.13	1.45
			Max. My	2	-15.11	0.47	772.64
			Max. Vy	20	-19.05	750.13	1.45
			Max. Vx	2	-19.50	0.47	772.64
			Max. Torque	6			1.56
L16	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.82	4.42	2.02
			Max. Mx	20	-15.94	846.50	1.43
			Max. My	2	-15.89	0.52	871.14
			Max. Vy	20	-19.50	846.50	1.43
			Max. Vx	2	-19.94	0.52	871.14
			Max. Torque	4			1.57
L17	60.75 - 57	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.75	4.73	1.86
			Max. Mx	20	-16.53	920.25	1.42
			Max. My	2	-16.48	0.56	946.50
			Max. Vy	20	-19.85	920.25	1.42
			Max. Vx	2	-20.29	0.56	946.50
			Max. Torque	4			1.63
L18	57 - 56.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.83	4.76	1.85
			Max. Mx	20	-16.60	925.21	1.42
			Max. My	2	-16.56	0.57	951.57
			Max. Vy	20	-19.86	925.21	1.42
			Max. Vx	2	-20.30	0.57	951.57
			Max. Torque	4			1.63
L19	56.75 - 51.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.45	5.18	1.63
			Max. Mx	20	-17.71	1025.90	1.40
			Max. My	2	-17.67	0.62	1054.38
			Max. Vy	20	-20.40	1025.90	1.40
			Max. Vx	2	-20.84	0.62	1054.38
			Max. Torque	4			1.72
L20	51.75 - 46.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.17	5.65	1.42
			Max. Mx	20	-18.89	1129.49	1.38
			Max. My	2	-18.85	0.69	1160.08
			Max. Vy	20	-21.00	1129.49	1.38

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-21.44	0.69	1160.08
			Max. Torque	4			1.83
L21	46.75 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.75	5.81	1.34
			Max. Mx	20	-19.28	1166.40	1.37
			Max. My	2	-19.24	0.71	1197.72
			Max. Vy	20	-21.18	1166.40	1.37
			Max. Vx	2	-21.62	0.71	1197.72
			Max. Torque	4			1.86
L22	40.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.49	6.25	1.11
			Max. Mx	20	-21.25	1273.75	1.35
			Max. My	2	-21.22	0.77	1307.19
			Max. Vy	20	-21.75	1273.75	1.35
			Max. Vx	2	-22.19	0.77	1307.19
			Max. Torque	4			1.94
L23	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.22	6.69	0.87
			Max. Mx	20	-22.49	1383.73	1.32
			Max. My	2	-22.46	0.82	1419.27
			Max. Vy	20	-22.23	1383.73	1.32
			Max. Vx	2	-22.67	0.82	1419.27
			Max. Torque	4			2.03
L24	35 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.95	7.13	0.64
			Max. Mx	20	-23.76	1496.05	1.30
			Max. My	2	-23.73	0.88	1533.70
			Max. Vy	20	-22.70	1496.05	1.30
			Max. Vx	2	-23.13	0.88	1533.70
			Max. Torque	4			2.11
L25	30 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.26	7.46	0.46
			Max. Mx	20	-24.72	1581.79	1.27
			Max. My	2	-24.69	0.92	1621.00
			Max. Vy	20	-23.03	1581.79	1.27
			Max. Vx	2	-23.47	0.92	1621.00
			Max. Torque	15			-2.18
L26	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.35	7.48	0.45
			Max. Mx	20	-24.80	1587.55	1.27
			Max. My	2	-24.77	0.93	1626.86
			Max. Vy	20	-23.04	1587.55	1.27
			Max. Vx	2	-23.48	0.93	1626.86
			Max. Torque	15			-2.19
L27	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.20	7.90	0.21
			Max. Mx	20	-26.18	1703.88	1.24
			Max. My	2	-26.16	0.99	1745.27
			Max. Vy	20	-23.48	1703.88	1.24
			Max. Vx	2	-23.91	0.99	1745.27
			Max. Torque	15			-2.33
L28	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.05	8.30	-0.02
			Max. Mx	20	-27.58	1822.28	1.21
			Max. My	2	-27.57	1.05	1865.73
			Max. Vy	20	-23.88	1822.28	1.21
			Max. Vx	2	-24.31	1.05	1865.73
			Max. Torque	15			-2.47
L29	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.89	8.69	-0.24
			Max. Mx	20	-29.01	1942.61	1.17
			Max. My	2	-29.00	1.11	1988.11
			Max. Vy	20	-24.25	1942.61	1.17
			Max. Vx	2	-24.68	1.11	1988.11
			Max. Torque	15			-2.60
L30	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.72	9.06	-0.46
			Max. Mx	20	-30.45	2064.78	1.14

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-30.45	1.17	2112.32
			Max. Vy	20	-24.62	2064.78	1.14
			Max. Vx	2	-25.04	1.17	2112.32
			Max. Torque	15			-2.74
L31	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.51	9.40	-0.65
			Max. Mx	20	-31.92	2188.77	1.10
			Max. My	2	-31.92	1.23	2238.32
			Max. Vy	20	-24.98	2188.77	1.10
			Max. Vx	2	-25.40	1.23	2238.32
			Max. Torque	15			-2.88
L32	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.86	9.45	-0.69
			Max. Mx	20	-32.21	2213.78	1.09
			Max. My	2	-32.21	1.24	2263.73
			Max. Vy	20	-25.05	2213.78	1.09
			Max. Vx	2	-25.47	1.24	2263.73
			Max. Torque	15			-2.91

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	55.86	0.00	7.07
	Max. H_x	20	32.23	25.03	0.00
	Max. H_z	2	32.23	0.00	25.45
	Max. M_x	2	2263.73	0.00	25.45
	Max. M_z	8	2211.27	-25.03	0.00
	Max. Torsion	3	2.91	0.00	25.45
	Min. Vert	7	24.17	-21.68	12.73
	Min. H_x	8	32.23	-25.03	0.00
	Min. H_z	14	32.23	0.00	-25.45
	Min. M_x	14	-2261.54	0.00	-25.45
	Min. M_z	20	-2213.78	25.03	0.00
	Min. Torsion	15	-2.91	0.00	-25.45

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.85	0.00	0.00	-0.87	1.02	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	32.23	-0.00	-25.45	-2263.73	1.24	-2.90
0.9 Dead+1.0 Wind 0 deg - No Ice	24.17	-0.00	-25.45	-2238.39	0.92	-2.91
1.2 Dead+1.0 Wind 30 deg - No Ice	32.23	12.52	-22.04	-1960.64	-1104.94	-2.59
0.9 Dead+1.0 Wind 30 deg - No Ice	24.17	12.52	-22.04	-1938.65	-1093.06	-2.57
1.2 Dead+1.0 Wind 60 deg - No Ice	32.23	21.68	-12.73	-1132.49	-1914.81	-1.57
0.9 Dead+1.0 Wind 60 deg - No Ice	24.17	21.68	-12.73	-1119.66	-1893.98	-1.54
1.2 Dead+1.0 Wind 90 deg - No Ice	32.23	25.03	0.00	-1.09	-2211.27	-0.13
0.9 Dead+1.0 Wind 90 deg - No Ice	24.17	25.03	0.00	-0.80	-2187.17	-0.08
1.2 Dead+1.0 Wind 120 deg - No Ice	32.23	21.68	12.73	1130.30	-1914.81	1.36

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 120 deg - No Ice	24.17	21.68	12.73	1118.07	-1893.98	1.40
1.2 Dead+1.0 Wind 150 deg - No Ice	32.23	12.52	22.04	1958.45	-1104.94	2.47
0.9 Dead+1.0 Wind 150 deg - No Ice	24.17	12.52	22.04	1937.05	-1093.06	2.49
1.2 Dead+1.0 Wind 180 deg - No Ice	32.23	-0.00	25.45	2261.54	1.24	2.90
0.9 Dead+1.0 Wind 180 deg - No Ice	24.17	-0.00	25.45	2236.79	0.92	2.91
1.2 Dead+1.0 Wind 210 deg - No Ice	32.23	-12.52	22.04	1958.46	1107.43	2.57
0.9 Dead+1.0 Wind 210 deg - No Ice	24.17	-12.52	22.04	1937.06	1094.90	2.54
1.2 Dead+1.0 Wind 240 deg - No Ice	32.23	-21.68	12.73	1130.31	1917.31	1.55
0.9 Dead+1.0 Wind 240 deg - No Ice	24.17	-21.68	12.73	1118.08	1895.83	1.51
1.2 Dead+1.0 Wind 270 deg - No Ice	32.23	-25.03	0.00	-1.09	2213.78	0.13
0.9 Dead+1.0 Wind 270 deg - No Ice	24.17	-25.03	0.00	-0.80	2189.03	0.08
1.2 Dead+1.0 Wind 300 deg - No Ice	32.23	-21.68	-12.73	-1132.50	1917.31	-1.33
0.9 Dead+1.0 Wind 300 deg - No Ice	24.17	-21.68	-12.73	-1119.67	1895.83	-1.37
1.2 Dead+1.0 Wind 330 deg - No Ice	32.23	-12.52	-22.04	-1960.65	1107.43	-2.44
0.9 Dead+1.0 Wind 330 deg - No Ice	24.17	-12.52	-22.04	-1938.65	1094.90	-2.46
1.2 Dead+1.0 Ice	55.86	-0.00	-0.00	0.69	9.45	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	55.86	-0.00	-7.07	-632.02	9.51	-1.35
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	55.86	3.50	-6.12	-547.26	-302.25	-1.03
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	55.86	6.06	-3.53	-315.67	-530.47	-0.43
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	55.86	6.99	-0.00	0.69	-614.00	0.28
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	55.86	6.06	3.53	317.05	-530.47	0.92
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	55.86	3.50	6.12	548.63	-302.25	1.32
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	55.86	-0.00	7.07	633.39	9.51	1.36
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	55.86	-3.50	6.12	548.64	321.27	1.03
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	55.86	-6.06	3.53	317.05	549.49	0.43
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	55.86	-6.99	-0.00	0.69	633.02	-0.28
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	55.86	-6.06	-3.53	-315.67	549.49	-0.92
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	55.86	-3.50	-6.12	-547.26	321.27	-1.31
Dead+Wind 0 deg - Service	26.85	0.00	-5.25	-464.67	1.04	-0.60
Dead+Wind 30 deg - Service	26.85	2.58	-4.54	-402.54	-225.69	-0.53
Dead+Wind 60 deg - Service	26.85	4.47	-2.62	-232.79	-391.67	-0.32
Dead+Wind 90 deg - Service	26.85	5.16	-0.00	-0.90	-452.42	-0.02
Dead+Wind 120 deg - Service	26.85	4.47	2.62	230.98	-391.67	0.28
Dead+Wind 150 deg - Service	26.85	2.58	4.54	400.73	-225.69	0.51
Dead+Wind 180 deg - Service	26.85	0.00	5.25	462.87	1.04	0.60
Dead+Wind 210 deg - Service	26.85	-2.58	4.54	400.73	227.77	0.53
Dead+Wind 240 deg - Service	26.85	-4.47	2.62	230.98	393.75	0.32

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg - Service	26.85	-5.16	-0.00	-0.90	454.50	0.02
Dead+Wind 300 deg - Service	26.85	-4.47	-2.62	-232.79	393.75	-0.28
Dead+Wind 330 deg - Service	26.85	-2.58	-4.54	-402.54	227.77	-0.51

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-26.85	0.00	0.00	26.85	0.00	0.000%
2	0.00	-32.23	-25.45	0.00	32.23	25.45	0.000%
3	0.00	-24.17	-25.45	0.00	24.17	25.45	0.000%
4	12.52	-32.23	-22.04	-12.52	32.23	22.04	0.000%
5	12.52	-24.17	-22.04	-12.52	24.17	22.04	0.000%
6	21.68	-32.23	-12.73	-21.68	32.23	12.73	0.000%
7	21.68	-24.17	-12.73	-21.68	24.17	12.73	0.000%
8	25.03	-32.23	0.00	-25.03	32.23	0.00	0.000%
9	25.03	-24.17	0.00	-25.03	24.17	0.00	0.000%
10	21.68	-32.23	12.73	-21.68	32.23	-12.73	0.000%
11	21.68	-24.17	12.73	-21.68	24.17	-12.73	0.000%
12	12.52	-32.23	22.04	-12.52	32.23	-22.04	0.000%
13	12.52	-24.17	22.04	-12.52	24.17	-22.04	0.000%
14	0.00	-32.23	25.45	0.00	32.23	-25.45	0.000%
15	0.00	-24.17	25.45	0.00	24.17	-25.45	0.000%
16	-12.52	-32.23	22.04	12.52	32.23	-22.04	0.000%
17	-12.52	-24.17	22.04	12.52	24.17	-22.04	0.000%
18	-21.68	-32.23	12.73	21.68	32.23	-12.73	0.000%
19	-21.68	-24.17	12.73	21.68	24.17	-12.73	0.000%
20	-25.03	-32.23	0.00	25.03	32.23	0.00	0.000%
21	-25.03	-24.17	0.00	25.03	24.17	0.00	0.000%
22	-21.68	-32.23	-12.73	21.68	32.23	12.73	0.000%
23	-21.68	-24.17	-12.73	21.68	24.17	12.73	0.000%
24	-12.52	-32.23	-22.04	12.52	32.23	22.04	0.000%
25	-12.52	-24.17	-22.04	12.52	24.17	22.04	0.000%
26	0.00	-55.86	0.00	0.00	55.86	0.00	0.000%
27	0.00	-55.86	-7.07	0.00	55.86	7.07	0.000%
28	3.50	-55.86	-6.12	-3.50	55.86	6.12	0.000%
29	6.06	-55.86	-3.53	-6.06	55.86	3.53	0.000%
30	6.99	-55.86	0.00	-6.99	55.86	0.00	0.000%
31	6.06	-55.86	3.53	-6.06	55.86	-3.53	0.000%
32	3.50	-55.86	6.12	-3.50	55.86	-6.12	0.000%
33	0.00	-55.86	7.07	0.00	55.86	-7.07	0.000%
34	-3.50	-55.86	6.12	3.50	55.86	-6.12	0.000%
35	-6.06	-55.86	3.53	6.06	55.86	-3.53	0.000%
36	-6.99	-55.86	0.00	6.99	55.86	0.00	0.000%
37	-6.06	-55.86	-3.53	6.06	55.86	3.53	0.000%
38	-3.50	-55.86	-6.12	3.50	55.86	6.12	0.000%
39	0.00	-26.85	-5.25	0.00	26.85	5.25	0.000%
40	2.58	-26.85	-4.54	-2.58	26.85	4.54	0.000%
41	4.47	-26.85	-2.62	-4.47	26.85	2.62	0.000%
42	5.16	-26.85	0.00	-5.16	26.85	0.00	0.000%
43	4.47	-26.85	2.62	-4.47	26.85	-2.62	0.000%
44	2.58	-26.85	4.54	-2.58	26.85	-4.54	0.000%
45	0.00	-26.85	5.25	0.00	26.85	-5.25	0.000%
46	-2.58	-26.85	4.54	2.58	26.85	-4.54	0.000%
47	-4.47	-26.85	2.62	4.47	26.85	-2.62	0.000%
48	-5.16	-26.85	0.00	5.16	26.85	0.00	0.000%
49	-4.47	-26.85	-2.62	4.47	26.85	2.62	0.000%
50	-2.58	-26.85	-4.54	2.58	26.85	4.54	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	0.00061182
3	Yes	5	0.00000001	0.00027466
4	Yes	6	0.00000001	0.00042235
5	Yes	6	0.00000001	0.00012699
6	Yes	6	0.00000001	0.00046199
7	Yes	6	0.00000001	0.00014101
8	Yes	5	0.00000001	0.00047600
9	Yes	5	0.00000001	0.00020334
10	Yes	6	0.00000001	0.00043717
11	Yes	6	0.00000001	0.00013299
12	Yes	6	0.00000001	0.00043193
13	Yes	6	0.00000001	0.00013050
14	Yes	5	0.00000001	0.00061022
15	Yes	5	0.00000001	0.00027415
16	Yes	6	0.00000001	0.00046555
17	Yes	6	0.00000001	0.00014214
18	Yes	6	0.00000001	0.00042188
19	Yes	6	0.00000001	0.00012747
20	Yes	5	0.00000001	0.00047640
21	Yes	5	0.00000001	0.00020342
22	Yes	6	0.00000001	0.00044464
23	Yes	6	0.00000001	0.00013476
24	Yes	6	0.00000001	0.00045416
25	Yes	6	0.00000001	0.00013799
26	Yes	4	0.00000001	0.00005321
27	Yes	5	0.00000001	0.00064888
28	Yes	6	0.00000001	0.00015862
29	Yes	6	0.00000001	0.00019385
30	Yes	5	0.00000001	0.00034130
31	Yes	6	0.00000001	0.00018208
32	Yes	6	0.00000001	0.00015712
33	Yes	5	0.00000001	0.00064054
34	Yes	6	0.00000001	0.00021453
35	Yes	6	0.00000001	0.00016938
36	Yes	5	0.00000001	0.00035507
37	Yes	6	0.00000001	0.00018210
38	Yes	6	0.00000001	0.00021685
39	Yes	4	0.00000001	0.00071555
40	Yes	5	0.00000001	0.00009569
41	Yes	5	0.00000001	0.00012200
42	Yes	4	0.00000001	0.00057693
43	Yes	5	0.00000001	0.00010205
44	Yes	5	0.00000001	0.00009899
45	Yes	4	0.00000001	0.00070643
46	Yes	5	0.00000001	0.00012435
47	Yes	5	0.00000001	0.00009452
48	Yes	4	0.00000001	0.00058013
49	Yes	5	0.00000001	0.00010894
50	Yes	5	0.00000001	0.00011592

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	21.25	39	1.37	0.01
L2	128 - 123.5	19.82	39	1.36	0.01
L3	123.5 - 123	18.54	39	1.35	0.00
L4	123 - 118	18.40	39	1.35	0.00
L5	118 - 113	16.99	39	1.34	0.00
L6	113 - 108	15.60	39	1.31	0.00
L7	108 - 103	14.24	39	1.28	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L8	103 - 98	12.92	39	1.24	0.00
L9	98 - 93	11.64	39	1.19	0.00
L10	93 - 88	10.43	39	1.13	0.00
L11	88 - 82.25	9.27	39	1.07	0.00
L12	85.75 - 80.75	8.78	39	1.03	0.00
L13	80.75 - 75.75	7.72	39	0.99	0.00
L14	75.75 - 70.75	6.72	39	0.92	0.00
L15	70.75 - 65.75	5.81	39	0.84	0.00
L16	65.75 - 60.75	4.97	39	0.76	0.00
L17	60.75 - 57	4.22	39	0.67	0.00
L18	57 - 56.75	3.72	39	0.60	0.00
L19	56.75 - 51.75	3.69	39	0.60	0.00
L20	51.75 - 46.75	3.08	39	0.55	0.00
L21	46.75 - 40.75	2.54	39	0.50	0.00
L22	45 - 40	2.36	39	0.48	0.00
L23	40 - 35	1.87	39	0.45	0.00
L24	35 - 30	1.43	39	0.39	0.00
L25	30 - 26.25	1.05	39	0.33	0.00
L26	26.25 - 26	0.81	39	0.29	0.00
L27	26 - 21	0.79	39	0.29	0.00
L28	21 - 16	0.52	39	0.23	0.00
L29	16 - 11	0.30	39	0.18	0.00
L30	11 - 6	0.14	39	0.12	0.00
L31	6 - 1	0.04	39	0.07	0.00
L32	1 - 0	0.00	39	0.01	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
135.5000	5/8" X 5' Lightning Rod	39	21.25	1.37	0.01	30942
133.0000	OPA-65R-LCUU-H6 w/ Mount Pipe	39	21.25	1.37	0.01	30942
120.0000	APXVSPP18-C-A20 w/ Mount Pipe	39	17.55	1.34	0.00	21163
118.0000	800MHz 2X50W RRH W/FILTER	39	16.99	1.34	0.00	16590
100.0000	ETT19V2S12UB	39	12.15	1.21	0.00	5685
93.0000	BXA-70063-4CF-EDIN-X w/ Mount Pipe	39	10.43	1.13	0.00	4581
75.0000	APXV18-206517S-C	39	6.58	0.90	0.00	3822
50.0000	KS24019-L112A	39	2.89	0.53	0.00	5365

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	103.14	2	6.62	0.03
L2	128 - 123.5	96.23	2	6.60	0.03
L3	123.5 - 123	90.05	2	6.54	0.02
L4	123 - 118	89.36	2	6.54	0.02
L5	118 - 113	82.55	2	6.48	0.02
L6	113 - 108	75.83	2	6.38	0.02
L7	108 - 103	69.24	2	6.22	0.02
L8	103 - 98	62.83	2	6.03	0.02
L9	98 - 93	56.65	2	5.79	0.01
L10	93 - 88	50.74	2	5.51	0.01
L11	88 - 82.25	45.15	2	5.18	0.01
L12	85.75 - 80.75	42.74	2	5.02	0.01
L13	80.75 - 75.75	37.59	2	4.80	0.01

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L14	75.75 - 70.75	32.75	2	4.46	0.01
L15	70.75 - 65.75	28.28	2	4.08	0.01
L16	65.75 - 60.75	24.21	2	3.69	0.01
L17	60.75 - 57	20.56	2	3.27	0.01
L18	57 - 56.75	18.12	2	2.95	0.01
L19	56.75 - 51.75	17.97	2	2.93	0.01
L20	51.75 - 46.75	15.03	2	2.68	0.00
L21	46.75 - 40.75	12.35	2	2.42	0.00
L22	45 - 40	11.48	2	2.33	0.00
L23	40 - 35	9.11	2	2.18	0.00
L24	35 - 30	6.97	2	1.90	0.00
L25	30 - 26.25	5.12	2	1.63	0.00
L26	26.25 - 26	3.93	2	1.42	0.00
L27	26 - 21	3.86	2	1.40	0.00
L28	21 - 16	2.53	2	1.14	0.00
L29	16 - 11	1.47	2	0.87	0.00
L30	11 - 6	0.70	2	0.60	0.00
L31	6 - 1	0.21	2	0.33	0.00
L32	1 - 0	0.01	2	0.05	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
135.5000	5/8" X 5' Lightning Rod	2	103.14	6.62	0.03	6806
133.0000	OPA-65R-LCUU-H6 w/ Mount Pipe	2	103.14	6.62	0.03	6806
120.0000	APXVSPP18-C-A20 w/ Mount Pipe	2	85.27	6.51	0.02	4727
118.0000	800MHz 2X50W RRH W/FILTER	2	82.55	6.48	0.02	3737
100.0000	ETT19V2S12UB	2	59.10	5.89	0.02	1209
93.0000	BXA-70063-4CF-EDIN-X w/ Mount Pipe	2	50.74	5.51	0.01	967
75.0000	APXV18-206517S-C	2	32.05	4.40	0.01	796
50.0000	KS24019-L112A	2	14.06	2.60	0.00	1106

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K
L1	133 - 128 (1)	TP14x14x0.349	5.0000	0.0000	0.0	14.9672	-1.05
L2	128 - 123.5 (2)	TP14x14x0.349	4.5000	0.0000	0.0	14.9672	-1.33
L3	123.5 - 123 (3)	TP22x14x0.349	0.5000	0.0000	0.0	14.9672	-1.33
L4	123 - 118 (4)	TP22.7502x22x0.1875	5.0000	0.0000	0.0	13.4276	-4.62
L5	118 - 113 (5)	TP23.5004x22.7502x0.1875	5.0000	0.0000	0.0	13.8741	-5.57
L6	113 - 108 (6)	TP24.2506x23.5004x0.1875	5.0000	0.0000	0.0	14.3205	-5.89
L7	108 - 103 (7)	TP25.0007x24.2506x0.1875	5.0000	0.0000	0.0	14.7670	-6.22
L8	103 - 98 (8)	TP25.7509x25.0007x0.18	5.0000	0.0000	0.0	15.213	-7.75

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u
	ft		ft	ft		in^2	K
		75				4	
L9	98 - 93 (9)	TP26.5011x25.7509x0.18	5.0000	0.0000	0.0	15.659	-8.15
		75				9	
L10	93 - 88 (10)	TP27.2513x26.5011x0.18	5.0000	0.0000	0.0	16.106	-11.58
		75				3	
L11	88 - 82.25	TP28.114x27.2513x0.187	5.7500	0.0000	0.0	16.307	-11.82
	(11)	5				2	
L12	82.25 - 80.75	TP27.9641x27.2139x0.25	5.0000	0.0000	0.0	21.991	-12.67
	(12)					1	
L13	80.75 - 75.75	TP28.7143x27.9641x0.25	5.0000	0.0000	0.0	22.586	-13.34
	(13)					5	
L14	75.75 - 70.75	TP29.4646x28.7143x0.25	5.0000	0.0000	0.0	23.181	-14.36
	(14)					8	
L15	70.75 - 65.75	TP30.2148x29.4646x0.25	5.0000	0.0000	0.0	23.777	-15.11
	(15)					1	
L16	65.75 - 60.75	TP30.9651x30.2148x0.25	5.0000	0.0000	0.0	24.372	-15.89
	(16)					4	
L17	60.75 - 57	TP31.5277x30.9651x0.25	3.7500	0.0000	0.0	24.818	-16.48
	(17)					9	
L18	57 - 56.75	TP31.5652x31.5277x0.46	0.2500	0.0000	0.0	45.658	-16.56
	(18)	25				1	
L19	56.75 - 51.75	TP32.3155x31.5652x0.45	5.0000	0.0000	0.0	46.136	-17.67
	(19)	63				5	
L20	51.75 - 46.75	TP33.0657x32.3155x0.45	5.0000	0.0000	0.0	46.585	-18.85
	(20)					0	
L21	46.75 - 40.75	TP33.966x33.0657x0.45	6.0000	0.0000	0.0	46.960	-19.24
	(21)					1	
L22	40.75 - 40	TP33.5785x32.8283x0.48	5.0000	0.0000	0.0	50.560	-21.22
	(22)	13				8	
L23	40 - 35 (23)	TP34.3287x33.5785x0.46	5.0000	0.0000	0.0	50.382	-22.46
		88				5	
L24	35 - 30 (24)	TP35.0789x34.3287x0.46	5.0000	0.0000	0.0	51.498	-23.73
		88				8	
L25	30 - 26.25	TP35.6415x35.0789x0.46	3.7500	0.0000	0.0	52.336	-24.69
	(25)	88				0	
L26	26.25 - 26	TP35.679x35.6415x0.518	0.2500	0.0000	0.0	57.897	-24.77
	(26)	8				3	
L27	26 - 21 (27)	TP36.4292x35.679x0.506	5.0000	0.0000	0.0	57.728	-26.16
		3				0	
L28	21 - 16 (28)	TP37.1794x36.4292x0.50	5.0000	0.0000	0.0	58.933	-27.57
		63				5	
L29	16 - 11 (29)	TP37.9296x37.1794x0.49	5.0000	0.0000	0.0	58.673	-29.00
		38				9	
L30	11 - 6 (30)	TP38.6798x37.9296x0.49	5.0000	0.0000	0.0	59.849	-30.45
		38				7	
L31	6 - 1 (31)	TP39.43x38.6798x0.4876	5.0000	0.0000	0.0	60.262	-31.92
						7	
L32	1 - 0 (32)	TP39.58x39.43x0.4876	1.0000	0.0000	0.0	60.494	-32.21
						9	

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}
	ft		kip-ft
L1	133 - 128 (1)	TP14x14x0.349	10.56
L2	128 - 123.5	TP14x14x0.349	21.08
	(2)		
L3	123.5 - 123	TP22x14x0.349	21.08
	(3)		
L4	123 - 118 (4)	TP22.7502x22x0.1875	47.15
L5	118 - 113 (5)	TP23.5004x22.7502x0.18	87.59
		75	
L6	113 - 108 (6)	TP24.2506x23.5004x0.18	130.48
		75	

Section No.	Elevation ft	Size	M_{ux} kip-ft
L7	108 - 103 (7)	TP25.0007x24.2506x0.1875	175.83
L8	103 - 98 (8)	TP25.7509x25.0007x0.1875	227.57
L9	98 - 93 (9)	TP26.5011x25.7509x0.1875	285.91
L10	93 - 88 (10)	TP27.2513x26.5011x0.1875	371.17
L11	88 - 82.25 (11)	TP28.114x27.2513x0.1875	408.92
L12	82.25 - 80.75 (12)	TP27.9641x27.2139x0.25	494.67
L13	80.75 - 75.75 (13)	TP28.7143x27.9641x0.25	582.88
L14	75.75 - 70.75 (14)	TP29.4646x28.7143x0.25	676.36
L15	70.75 - 65.75 (15)	TP30.2148x29.4646x0.25	772.64
L16	65.75 - 60.75 (16)	TP30.9651x30.2148x0.25	871.14
L17	60.75 - 57 (17)	TP31.5277x30.9651x0.25	946.50
L18	57 - 56.75 (18)	TP31.5652x31.5277x0.4625	951.57
L19	56.75 - 51.75 (19)	TP32.3155x31.5652x0.4563	1054.38
L20	51.75 - 46.75 (20)	TP33.0657x32.3155x0.45	1160.08
L21	46.75 - 40.75 (21)	TP33.966x33.0657x0.45	1197.72
L22	40.75 - 40 (22)	TP33.5785x32.8283x0.4813	1307.19
L23	40 - 35 (23)	TP34.3287x33.5785x0.4688	1419.28
L24	35 - 30 (24)	TP35.0789x34.3287x0.4688	1533.70
L25	30 - 26.25 (25)	TP35.6415x35.0789x0.4688	1621.00
L26	26.25 - 26 (26)	TP35.679x35.6415x0.5188	1626.87
L27	26 - 21 (27)	TP36.4292x35.679x0.5063	1745.27
L28	21 - 16 (28)	TP37.1794x36.4292x0.5063	1865.73
L29	16 - 11 (29)	TP37.9296x37.1794x0.4938	1988.12
L30	11 - 6 (30)	TP38.6798x37.9296x0.4938	2112.32
L31	6 - 1 (31)	TP39.43x38.6798x0.4876	2238.32
L32	1 - 0 (32)	TP39.58x39.43x0.4876	2263.73

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K
L1	133 - 128 (1)	TP14x14x0.349	2.21
L2	128 - 123.5 (2)	TP14x14x0.349	2.46
L3	123.5 - 123 (3)	TP22x14x0.349	2.50
L4	123 - 118 (4)	TP22.7502x22x0.1875	6.86
L5	118 - 113 (5)	TP23.5004x22.7502x0.1875	8.34
L6	113 - 108 (6)	TP24.2506x23.5004x0.1875	8.83

Section No.	Elevation ft	Size	Actual V_u K
		75	
L7	108 - 103 (7)	TP25.0007x24.2506x0.18	9.32
		75	
L8	103 - 98 (8)	TP25.7509x25.0007x0.18	11.43
		75	
L9	98 - 93 (9)	TP26.5011x25.7509x0.18	11.92
		75	
L10	93 - 88 (10)	TP27.2513x26.5011x0.18	16.68
		75	
L11	88 - 82.25 (11)	TP28.114x27.2513x0.187 5	16.89
L12	82.25 - 80.75 (12)	TP27.9641x27.2139x0.25	17.42
L13	80.75 - 75.75 (13)	TP28.7143x27.9641x0.25	17.89
L14	75.75 - 70.75 (14)	TP29.4646x28.7143x0.25	19.05
L15	70.75 - 65.75 (15)	TP30.2148x29.4646x0.25	19.50
L16	65.75 - 60.75 (16)	TP30.9651x30.2148x0.25	19.94
L17	60.75 - 57 (17)	TP31.5277x30.9651x0.25	20.29
L18	57 - 56.75 (18)	TP31.5652x31.5277x0.46 25	20.30
L19	56.75 - 51.75 (19)	TP32.3155x31.5652x0.45 63	20.84
L20	51.75 - 46.75 (20)	TP33.0657x32.3155x0.45	21.44
L21	46.75 - 40.75 (21)	TP33.966x33.0657x0.45	21.62
L22	40.75 - 40 (22)	TP33.5785x32.8283x0.48 13	22.19
L23	40 - 35 (23)	TP34.3287x33.5785x0.46 88	22.67
L24	35 - 30 (24)	TP35.0789x34.3287x0.46 88	23.13
L25	30 - 26.25 (25)	TP35.6415x35.0789x0.46 88	23.47
L26	26.25 - 26 (26)	TP35.679x35.6415x0.518 8	23.48
L27	26 - 21 (27)	TP36.4292x35.679x0.506 3	23.91
L28	21 - 16 (28)	TP37.1794x36.4292x0.50 63	24.31
L29	16 - 11 (29)	TP37.9296x37.1794x0.49 38	24.68
L30	11 - 6 (30)	TP38.6798x37.9296x0.49 38	25.04
L31	6 - 1 (31)	TP39.43x38.6798x0.4876	25.40
L32	1 - 0 (32)	TP39.58x39.43x0.4876	25.47

CCIpole

per TIA-222- H

Site BU: 876382

Work Order:

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	9.5	0	0	14	14	0.349		A53-B-35
2	123.5	0.5	0	0	14.00	22	0.349		A53-B-35
3	123	40.75	3.5	18	22.00	28.114	0.1875	Auto	A607-60
4	85.75	45	4.25	18	27.21	33.966	0.25	Auto	A607-65
5	45	45	0	18	32.83	39.58	0.2813	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	.125 x 1.25; (1) (1.187	3			o						o						o			
2	26.25	57	plate	.875 x 1.25; (1) (1.187	3			o						o						o			
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.125	1.25	7.65625	0.625	n/a	n/a	15.000	6.094	1.1875	A572-65
2	4.875	1.25	6.09375	0.625	27.000	21.000	18.000	4.531	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	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	0.349	A53-B-35	1.000
2	128 - 123.5	4.5	0	0	14.000	14.000	0.349	A53-B-35	1.000
3	123.5 - 123	0.5	0	0	14.000	22.000	0.349	A53-B-35	1.000
4	123 - 118	5		18	22.000	22.750	0.1875	A607-60	1.000
5	118 - 113	5		18	22.750	23.500	0.1875	A607-60	1.000
6	113 - 108	5		18	23.500	24.251	0.1875	A607-60	1.000
7	108 - 103	5		18	24.251	25.001	0.1875	A607-60	1.000
8	103 - 98	5		18	25.001	25.751	0.1875	A607-60	1.000
9	98 - 93	5		18	25.751	26.501	0.1875	A607-60	1.000
10	93 - 88	5		18	26.501	27.251	0.1875	A607-60	1.000
11	88 - 85.75	5.75	3.5	18	27.251	28.114	0.1875	A607-60	1.000
12	85.75 - 80.75	5		18	27.214	27.964	0.25	A607-65	1.000
13	80.75 - 75.75	5		18	27.964	28.714	0.25	A607-65	1.000
14	75.75 - 70.75	5		18	28.714	29.465	0.25	A607-65	1.000
15	70.75 - 65.75	5		18	29.465	30.215	0.25	A607-65	1.000
16	65.75 - 60.75	5		18	30.215	30.965	0.25	A607-65	1.000
17	60.75 - 57	3.75		18	30.965	31.528	0.25	A607-65	1.000
18	57 - 56.75	0.25		18	31.528	31.565	0.4625	A607-65	0.945
19	56.75 - 51.75	5		18	31.565	32.315	0.45625	A607-65	0.948
20	51.75 - 46.75	5		18	32.315	33.066	0.45	A607-65	0.951
21	46.75 - 45	6	4.25	18	33.066	33.966	0.45	A607-65	0.948
22	45 - 40	5		18	32.828	33.578	0.4813	A607-65	0.950
23	40 - 35	5		18	33.578	34.329	0.4688	A607-65	0.966
24	35 - 30	5		18	34.329	35.079	0.4688	A607-65	0.958
25	30 - 26.25	3.75		18	35.079	35.642	0.4688	A607-65	0.953
26	26.25 - 26	0.25		18	35.642	35.679	0.5188	A607-65	0.943
27	26 - 21	5		18	35.679	36.429	0.5063	A607-65	0.957
28	21 - 16	5		18	36.429	37.179	0.5063	A607-65	0.949
29	16 - 11	5		18	37.179	37.930	0.4938	A607-65	0.964
30	11 - 6	5		18	37.930	38.680	0.4938	A607-65	0.957
31	6 - 1	5		18	38.680	39.430	0.48755	A607-65	0.961
32	1 - 0	1		18	39.430	39.580	0.48755	A607-65	0.960

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	133 - 128	1.05	10.56	2.21
2	128 - 123.5	1.33	21.08	2.46
3	123.5 - 123	1.37	22.32	2.50
4	123 - 118	4.62	47.15	6.86
5	118 - 113	5.57	87.59	8.34
6	113 - 108	5.89	130.48	8.83
7	108 - 103	6.22	175.83	9.32
8	103 - 98	7.75	227.57	11.43
9	98 - 93	8.15	285.91	11.92
10	93 - 88	11.58	371.17	16.68
11	88 - 85.75	11.82	408.92	16.89
12	85.75 - 80.75	12.67	494.67	17.42
13	80.75 - 75.75	13.34	582.88	17.89
14	75.75 - 70.75	14.36	676.36	19.05
15	70.75 - 65.75	15.11	772.64	19.50
16	65.75 - 60.75	15.89	871.14	19.94
17	60.75 - 57	16.48	946.50	20.29
18	57 - 56.75	16.56	951.57	20.30
19	56.75 - 51.75	17.67	1054.38	20.84
20	51.75 - 46.75	18.85	1160.08	21.44
21	46.75 - 45	19.24	1197.72	21.62
22	45 - 40	21.22	1307.19	22.19
23	40 - 35	22.46	1419.27	22.67
24	35 - 30	23.73	1533.70	23.13
25	30 - 26.25	24.69	1621.00	23.47
26	26.25 - 26	24.77	1626.86	23.48
27	26 - 21	26.16	1745.27	23.91
28	21 - 16	27.57	1865.73	24.31
29	16 - 11	29.00	1988.11	24.68
30	11 - 6	30.45	2112.32	25.04
31	6 - 1	31.92	2238.32	25.40
32	1 - 0	32.21	2263.73	25.47

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14x14x0.349	Pole	6.1%	Pass
128 - 123.5	Pole	TP14x14x0.349	Pole	12.0%	Pass
123.5 - 123	Pole	TP22x14x0.349	Pole	5.2%	Pass
123 - 118	Pole	TP22.75x22x0.1875	Pole	11.6%	Pass
118 - 113	Pole	TP23.5x22.75x0.1875	Pole	20.1%	Pass
113 - 108	Pole	TP24.251x23.5x0.1875	Pole	28.2%	Pass
108 - 103	Pole	TP25.001x24.251x0.1875	Pole	35.9%	Pass
103 - 98	Pole	TP25.751x25.001x0.1875	Pole	44.3%	Pass
98 - 93	Pole	TP26.501x25.751x0.1875	Pole	52.9%	Pass
93 - 88	Pole	TP27.251x26.501x0.1875	Pole	65.8%	Pass
88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	71.0%	Pass
85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	53.6%	Pass
80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	60.2%	Pass
75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	66.8%	Pass
70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	73.1%	Pass
65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	79.0%	Pass
60.75 - 57	Pole	TP31.528x30.965x0.25	Pole	83.2%	Pass
57 - 56.75	Pole + Reinf.	TP31.565x31.528x0.4625	Reinf. 2 Tension Rupture	72.6%	Pass
56.75 - 51.75	Pole + Reinf.	TP32.315x31.565x0.4563	Reinf. 2 Tension Rupture	77.5%	Pass
51.75 - 46.75	Pole + Reinf.	TP33.066x32.315x0.45	Reinf. 2 Tension Rupture	82.3%	Pass
46.75 - 45	Pole + Reinf.	TP33.966x33.066x0.45	Reinf. 2 Tension Rupture	83.9%	Pass
45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	84.5%	Pass
40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	88.6%	Pass
35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	92.4%	Pass
30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	95.2%	Pass
26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Compression	83.7%	Pass
26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Compression	86.9%	Pass
21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Compression	90.0%	Pass
16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Compression	92.9%	Pass
11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Compression	95.7%	Pass
6 - 1	Pole + Reinf.	TP39.43x38.68x0.4876	Reinf. 1 Compression	98.4%	Pass
1 - 0	Pole + Reinf.	TP39.58x39.43x0.4876	Reinf. 1 Compression	98.9%	Pass
				Summary	
			Pole	83.2%	Pass
			Reinforcement	98.9%	Pass
			Overall	98.9%	Pass

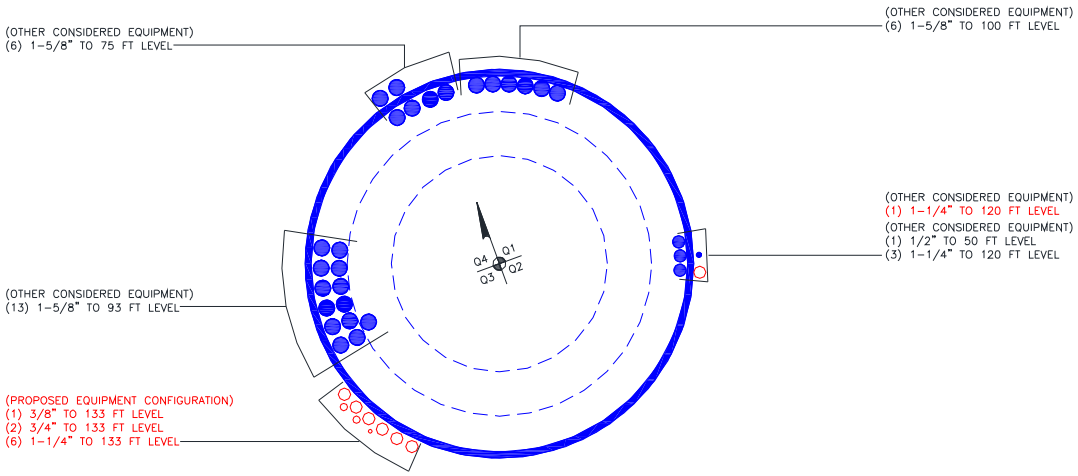
Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
133 - 128	349	n/a	349	14.97	n/a	14.97	6.1%		
128 - 123.5	349	n/a	349	14.97	n/a	14.97	12.0%		
123.5 - 123	1391	n/a	1391	23.74	n/a	23.74	5.2%		
123 - 118	863	n/a	863	13.43	n/a	13.43	11.6%		
118 - 113	952	n/a	952	13.87	n/a	13.87	20.1%		
113 - 108	1047	n/a	1047	14.32	n/a	14.32	28.2%		
108 - 103	1148	n/a	1148	14.77	n/a	14.77	35.9%		
103 - 98	1256	n/a	1256	15.21	n/a	15.21	44.3%		
98 - 93	1369	n/a	1369	15.66	n/a	15.66	52.9%		
93 - 88	1490	n/a	1490	16.11	n/a	16.11	65.8%		
88 - 85.75	1546	n/a	1546	16.31	n/a	16.31	71.0%		
85.75 - 80.75	2133	n/a	2133	21.99	n/a	21.99	53.6%		
80.75 - 75.75	2311	n/a	2311	22.59	n/a	22.59	60.2%		
75.75 - 70.75	2499	n/a	2499	23.18	n/a	23.18	66.8%		
70.75 - 65.75	2696	n/a	2696	23.78	n/a	23.78	73.1%		
65.75 - 60.75	2904	n/a	2904	24.37	n/a	24.37	79.0%		
60.75 - 57	3066	n/a	3066	24.82	n/a	24.82	83.2%		
57 - 56.75	3077	2480	5558	24.85	18.28	43.13	45.6%		72.6%
56.75 - 51.75	3304	2594	5898	25.44	18.28	43.72	49.2%		77.5%
51.75 - 46.75	3541	2710	6252	26.04	18.28	44.32	52.6%		82.3%
46.75 - 45	3627	2752	6379	26.25	18.28	44.53	53.8%		83.9%
45 - 40	4163	2791	6954	29.73	18.28	48.01	52.3%		84.5%
40 - 35	4451	2912	7362	30.40	18.28	48.68	55.2%		88.6%
35 - 30	4751	3035	7786	31.07	18.28	49.35	58.0%		92.4%
30 - 26.25	4985	3129	8115	31.57	18.28	49.85	60.1%		95.2%
26.25 - 26	5001	3953	8954	31.60	22.97	54.57	54.8%	83.7%	
26 - 21	5326	4114	9440	32.27	22.97	55.24	57.4%	86.9%	
21 - 16	5665	4277	9942	32.94	22.97	55.91	59.9%	90.0%	
16 - 11	6017	4445	10462	33.61	22.97	56.58	62.3%	92.9%	
11 - 6	6384	4615	10999	34.28	22.97	57.25	64.7%	95.7%	
6 - 1	6766	4789	11554	34.95	22.97	57.92	67.0%	98.4%	
1 - 0	6844	4824	11667	35.09	22.97	58.06	67.5%	98.9%	

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

APPENDIX B

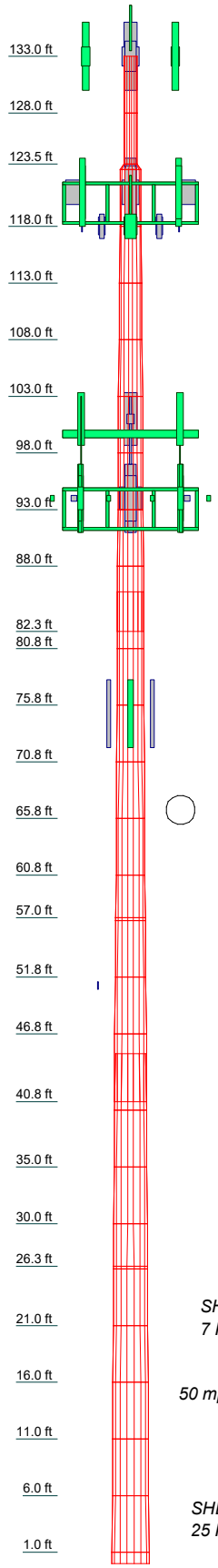
BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 75 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 100 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1-1/4" TO 120 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 50 FT LEVEL
(3) 1-1/4" TO 120 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(13) 1-5/8" TO 93 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 3/8" TO 133 FT LEVEL
(2) 3/4" TO 133 FT LEVEL
(6) 1-1/4" TO 133 FT LEVEL
Q1
Q2
Q3
Q4

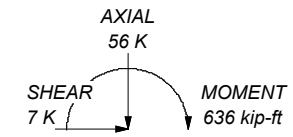
APPENDIX C

ADDITIONAL CALCULATIONS

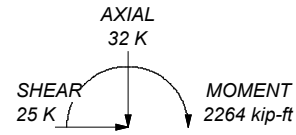
Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Length (ft)	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	1.0000
Number of Sides	0	0	0	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.3490	0.3490	0.3490	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.4500	0.4500	0.4500	0.4688	0.4688	0.4688	0.4688	0.5000	0.5000	0.5063	0.4938	0.4938	0.4875	0.4875
Socket Length (ft)											3.5000										4.2500											
Top Dia (in)	14.0000	14.0000	14.0000	22.0000	22.7502	23.5004	24.2506	25.0007	25.7509	26.5011	27.2513	27.9964	28.7143	29.4646	30.2148	30.9651	31.7153	32.4655	33.2158	33.9660	34.7162	35.4665	36.2167	36.9669	37.7172	38.4674	39.2176	39.9679	40.7181	41.4683	42.2186	42.9688
Bot Dia (in)	14.0000	14.0000	14.0000	22.7502	23.5004	24.2506	25.0007	25.7509	26.5011	27.2513	27.9964	28.7143	29.4646	30.2148	30.9651	31.7153	32.4655	33.2158	33.9660	34.7162	35.4665	36.2167	36.9669	37.7172	38.4674	39.2176	39.9679	40.7181	41.4683	42.2186	42.9688	43.7190
Grade	A53-B-35							A607-60													A607-65											
Weight (K)	0.3	0.2	0.0	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.0	0.7	0.7	0.9	0.8	0.8	0.8	0.6	0.0	0.9	0.9	1.0	1.0	1.0	0.2



ALL REACTIONS ARE FACTORED



TORQUE 1 kip-ft
50 mph WIND - 1.2750 in ICE



TORQUE 3 kip-ft
REACTIONS - 125 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 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 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 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 0.0000 ft
8. TIA-222 H Annex S

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job:	***123' Monopole w/proposed Extension / Berlin / Laviana Orchar***		
Project:	***PJF# 37519-0043.002.7700 / BU# 876382***		
Client: Crown Castle International	Drawn by: gpenumatsa	App'd:	
Code: TIA-222-H	Date: 01/16/19	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

v4.5.3 - Effective 11-27-18

Date: 1/16/2019
PJF Project: 37519-0043.002.7805
Client Ref. # BU 876382
Site Name:
Description:
Owner: CCI
Engineer: GP

Asymmetric Anchor Rod Analysis

Moment =	2264	k-ft	TIA Ref.	H		η =	0.50	for Base Plates, Rev. G Sect. 4.9.9
Axial =	32.0	kips (+Comp, -Tension)	ASIF =	N/A		Threads =	N-Included	for Flange Plates, Rev. G & H
Shear =	25.0	kips	Max Ratio =	100.0%		lar =	1.75	in, for Base Plates, Rev. H Sect 4.9.9 (Max of Original Items)
Anchor Qty =	12		Location =	Base Plate		Grout =	0.00	psi, for Base Plates, Rev. H Sect 4.9.9 (Note)

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Type	Area Override, in^2	Area, in^2	Max Net Comp, kips	Max Net Tension, kips	Tension Override, kips	Comp Override, kips	Tension Cap, kips	Comp Cap, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	37.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
2	2.250	#18J A615 Gr 75	75	100	52.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
3	2.250	#18J A615 Gr 75	75	100	127.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
4	2.250	#18J A615 Gr 75	75	100	142.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
5	2.250	#18J A615 Gr 75	75	100	217.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
6	2.250	#18J A615 Gr 75	75	100	232.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
7	2.250	#18J A615 Gr 75	75	100	307.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
8	2.250	#18J A615 Gr 75	75	100	322.5	46.00	Original	0.00	3.98	194.76	186.76	0.00	0.00	243.75	243.75	76.3%
9	2.250	#18J A615 Gr 75	75	100	0.0	48.08	Post-Installed	0.00	3.98	199.39	199.39	222.71	222.71	222.71	222.71	85.3%
10	2.250	#18J A615 Gr 75	75	100	90.0	48.08	Post-Installed	0.00	3.98	199.39	199.39	222.71	222.71	222.71	222.71	85.3%
11	2.250	#18J A615 Gr 75	75	100	180.0	48.08	Post-Installed	0.00	3.98	199.39	199.39	222.71	222.71	222.71	222.71	85.3%
12	2.250	#18J A615 Gr 75	75	100	270.0	48.08	Post-Installed	0.00	3.98	199.39	199.39	222.71	222.71	222.71	222.71	85.3%
									47.76							

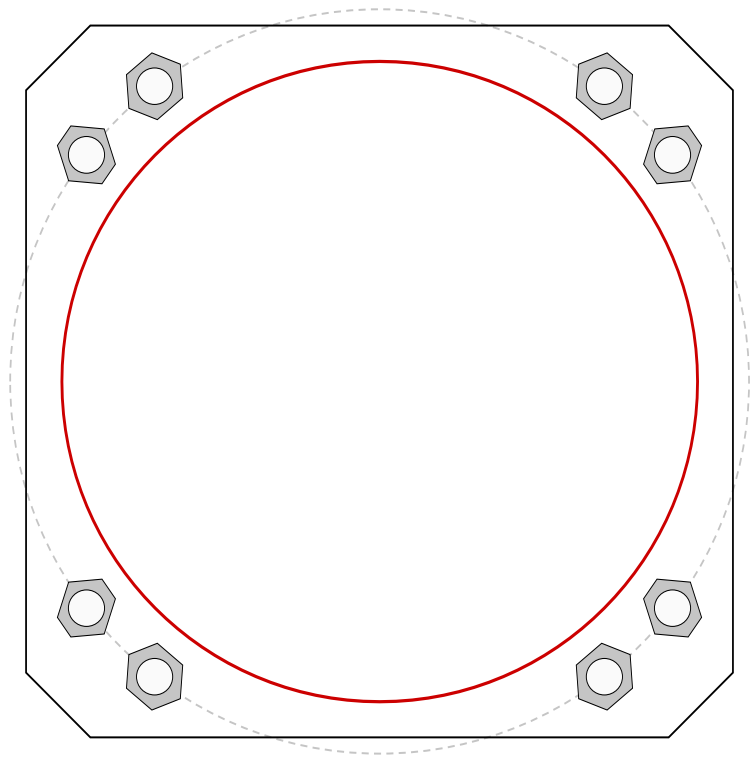
Monopole Base Plate Connection

Site Info	
BU #	876382
Site Name	
Order #	

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	1462.50
Axial Force (kips)	32.00
Shear Force (kips)	25.00

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 46" BC

Base Plate Data

44" OD x 2.75" Plate (F1554-55; Fy=55 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

39.58" x 0.28125" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, kip-in)*
Pu_c = 194.57	ϕPn_c = 243.75	**Stress Rating**
Vu = 3.13	ϕVn = 73.13	**76.2%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary		
Max Stress (ksi):	27.16	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**52.3%**	**Pass**

Drilled Pier Foundation

BU # :	876382
Site Name:	
Order Number:	

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	2264	
Axial Force (kips)	32	
Shear Force (kips)	25	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

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

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.41	-
Soil Safety Factor	2.68	-
Max Moment (kip-ft)	2387.29	-
Rating*	*47.3%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	143.49	-
End Bearing (kips)	848.23	-
Weight of Concrete (kips)	93.75	-
Total Capacity (kips)	991.72	-
Axial (kips)	125.75	-
Rating*	*12.1%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	5.23	-
Critical Moment (kip-ft)	2386.97	-
Critical Moment Capacity	3340.95	-
Rating*	*68.0%*	-

Soil Interaction Rating*	**47.3%**
Structural Foundation Rating*	**68.0%**

Check Limitation	
Apply TIA-222-H Section 15.5:	☑

*Rating per TIA-222-H Section 15.5

Soil Profile

Groundwater Depth	15	ft	# of Layers: 4

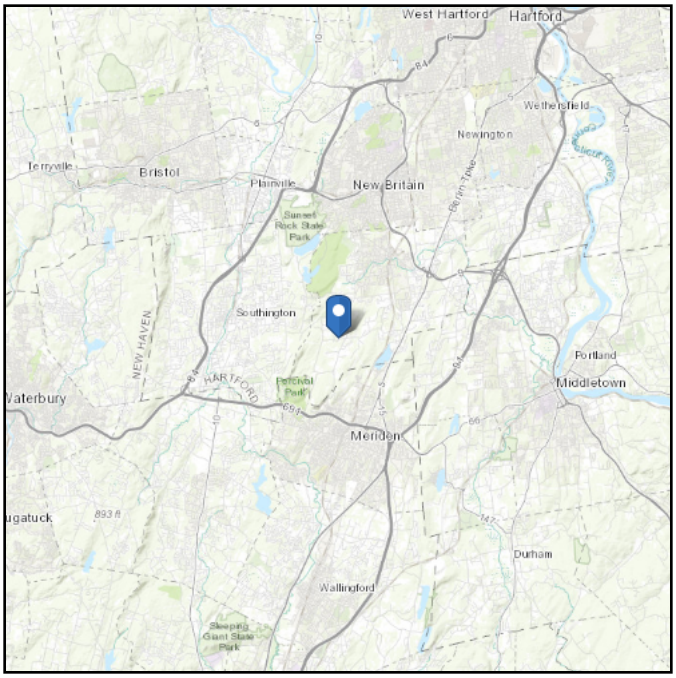
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	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	0.688	0.688				33	Cohesionless
3	5	15	10	135	150	0	38	0.000	0.000	0.60	0.60			Cohesionless
4	15	20	5	72.58	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 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 345.04 ft (NAVD 88)
Latitude: 41.589742
Longitude: -72.805333



Wind

Results:

Wind Speed:	123 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Tue Jan 15 2019

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

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

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

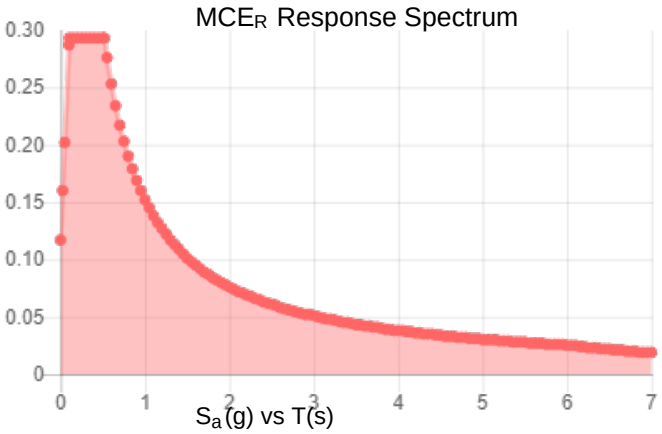
Seismic

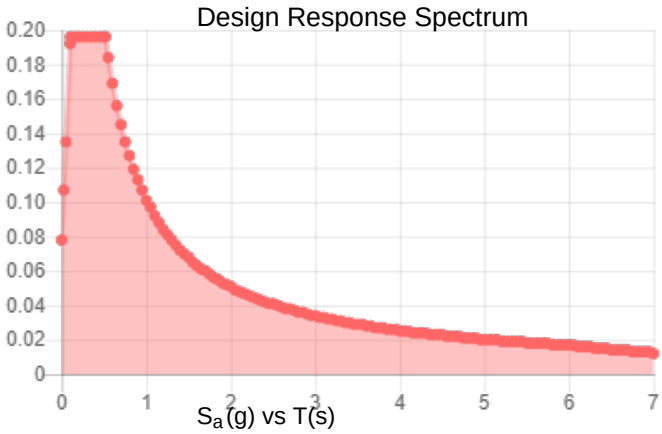
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.183	S_{DS} :	0.196
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.094
S_{MS} :	0.293	PGA_M :	0.15
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Jan 15 2019

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Jan 15 2019

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

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

APPENDIX D

MODIFICATION DRAWINGS

MODIFIED 123'-0" MONOPOLE

BU #876382 BERLIN/LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CONNECTICUT 06037
HARTFORD COUNTY
LAT: 41° 35' 23.07"; LONG: -72° 48' 19.2"
ORDER: 423171 REV. 6; WO: 1682153

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PAULJFORD.COM

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
MI-1	MI CHECKLIST AND NOTES
N-1	GENERAL NOTES
S-1	MONOPOLE PROFILE
S-2	EXTENSION PROFILE
S-3	EXTENSION DETAILS

HOT WORK INCLUDED	
NA	BASE GRINDING ONLY
NA	BASE WELDING (AND GRINDING)
NA	AERIAL GRINDING ONLY
NA	AERIAL WELDING (AND GRINDING)

WIND DESIGN DATA	
REFERENCE STANDARD	TIA-222-H
LOCAL CODE	2016 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	125 MPH
ICE THICKNESS	1.5 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

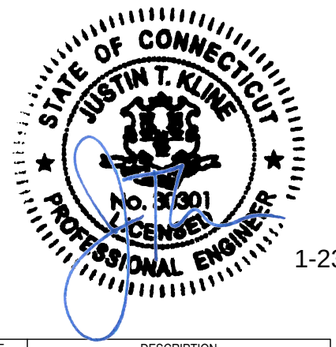
TOWER MANUFACTURER: SUMMIT MANUFACTURING, LLC
TOWER MANUFACTURER #: 10083

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1678454

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT PJFMOD@PAULJFORD.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

SAFETY CLIMB: "LOOK UP"
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO; PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS



1-23-19

REV	DATE	DESCRIPTION

BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

TITLE SHEET

T-1

V1.0 37519-0043.002.DWG

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE-CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED-SOW-10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10066 CED-STD-10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
NA			
CONSTRUCTION			
NA	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
NA	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
NA	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
NA	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	BASE PLATE GROUT VERIFICATION	ENG-STD-10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
NA	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10066 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-STD-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
NA	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
NA			
POST-CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
NA	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10119	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10283 CED-FRM-10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
NA			

MODIFICATION INSPECTION NOTES

GENERAL

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.

ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED-LST-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (POC).

REFER TO CROWN CED-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

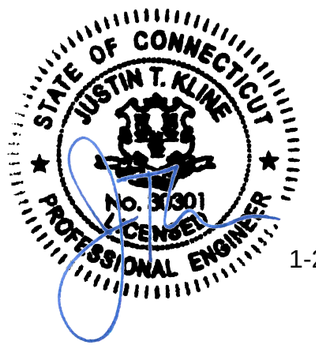
REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED-SOW-10007.



1-23-19

REV	DATE	DESCRIPTION

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

MI CHECKLIST

MI-1

V1.0 37519-0043.002.DWG

1. GENERAL NOTES
   - 1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
   - 1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR THE FABRICATOR
   - 1.3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
   - 1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
   - 1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
   - 1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
   - 1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
   - 1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
   - 1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
   - 1.10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.
   - 1.11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.
   - 1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE YOUR CROWN POC. ALL ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED BY THE ENGINEER OF RECORD. IF THE GENERAL CONTRACTOR FINDS THAT THE CLIMBING FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE-FABRICATION MAPPING, OR WHILE ON-SITE, THE GENERAL CONTRACTOR SHALL CONTACT THE CROWN POC TO DETERMINE A METHOD OF RESOLUTION.
   - 1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.
   - 1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS: 3434 ENCRETE LANE, MORAINE, OHIO 45439 PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. STRUCTURAL STEEL
   - 2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
     - 2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
       - 2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
       - 2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
       - 2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
     - 2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
       - 2.1.2.1. "STRUCTURAL WELDING CODE - STEEL D1.1."
       - 2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"
   - 2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.
   - 2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
   - 2.4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   - 2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
   - 2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
   - 2.9. FIELD CUTTING OF STEEL:
     - 2.9.1. IMPORTANT CUTTING AND WELDING SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
     - 2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. TOUCH UP OF GALVANIZING
   - 3.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
   - 3.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
   - 3.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

4. HOT-DIP GALVANIZING
   - 4.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
   - 4.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.
   - 4.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

5. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER
   - 5.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
   - 5.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
   - 5.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO ANSI/TIA-222-G-2-2009 SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

6. FIELD NDE MINIMUM REQUIREMENTS - (NOT REQUIRED)

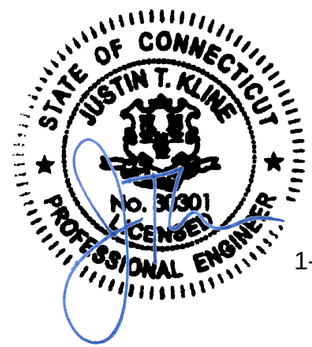
7. FOUNDATION WORK - (NOT REQUIRED)

8. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

9. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

10. BASE PLATE GROUT REMOVAL - (NOT REQUIRED)

11. BASE PLATE GROUT - (NOT REQUIRED)



1-23-19

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

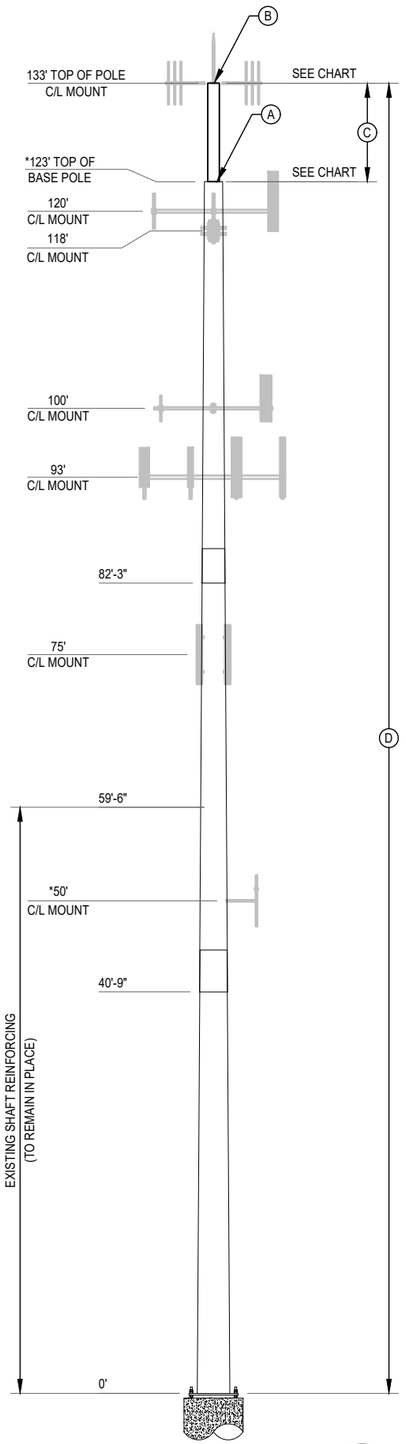
BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

GENERAL NOTES

N-1

V1.0 37519-0043.002.DWG

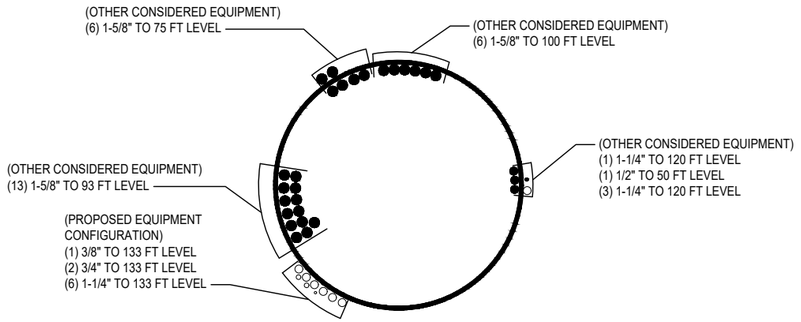


POLE ELEVATION 1 / S-1

TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	123'	REMOVE TOP HAT	S-1
B	133'-0"	REMOVE EXISTING LIGHTENING ROD FROM TOP OF POLE AND RELOCATE TO TOP OF NEW EXTENSION.	S-1
C	123' TO 133'	INSTALL NEW POLE EXTENSION	S-2 & S-3
D	10' TO 133'	INSTALL NEW SAFETY CLIMB AND SAFETY CLIMB BRACKETS. COORDINATE WITH TUF-TUG. SEE NOTE 1.14 ON SHEET N-1 AND CROWN DOCUMENT CED-CAT-10300 FOR SAFETY CLIMB INSTALLATION DETAILS.	N-1

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF THE EXTENSION



COAX LAYOUT 2 / S-1

MANUFACTURER POLE SPECIFICATIONS

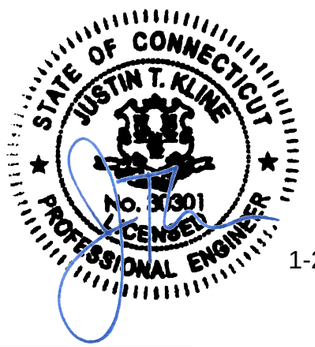
TAPER	0.150044 IN/FT
BASE PLATE STEEL	ASTM A572 GRADE 55 (55 KSI)
ANCHOR RODS	2 1/4"ø ASTM 615 GRADE 75
FLANGE PLATE STEEL	A36
FLANGE BOLTS	3/4"ø A325

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (FT)	DIAMETER ACROSS FLATS (IN)		POLE GRADE (ksi)	POLE SHAPE
				@ TOP	@ BOTTOM		
1	40.75	0.1875	3.50	22.000	28.114	60	18-SIDED
2	45.00	0.2500	4.25	27.214	33.966	65	18-SIDED
3	45.00	0.2813		32.828	39.580	65	18-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

PRIOR TO FABRICATION AND INSTALLATION CONTRACTOR SHALL VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.
"FOR PARTS NOT DETAILED WITHIN THE DRAWING AND STARTING WITH "CCI-", SEE CATALOG FOR DETAILS: CED-CAT-10300, MONOPOLE STANDARD DRAWINGS AND APPROVED REINFORCEMENT COMPONENTS



1-23-19

REV	DATE	DESCRIPTION

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679
www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

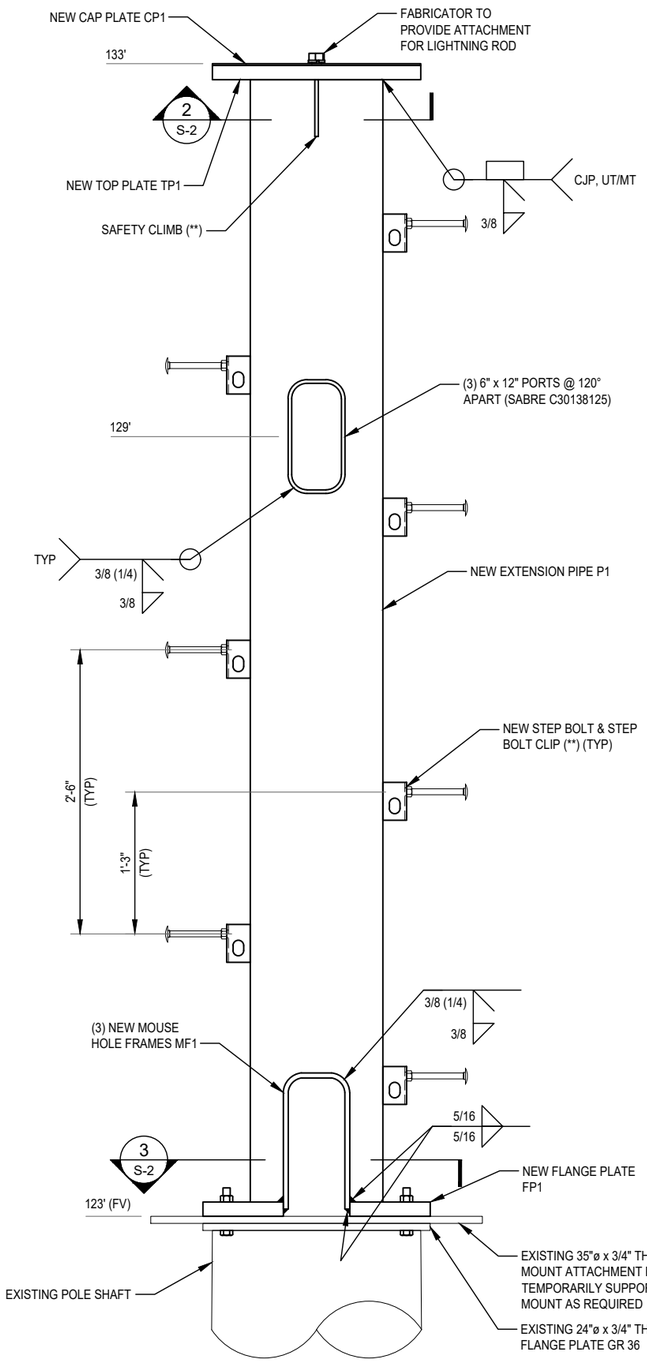
BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

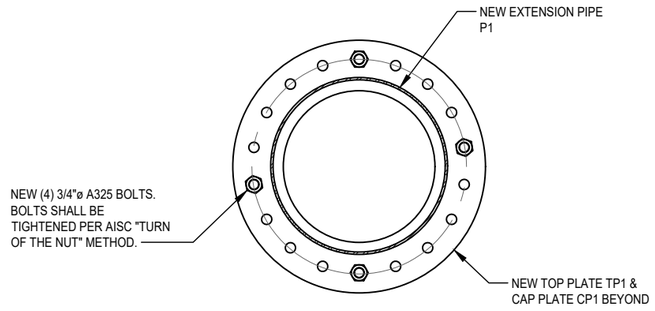
MONOPOLE PROFILE

S-1

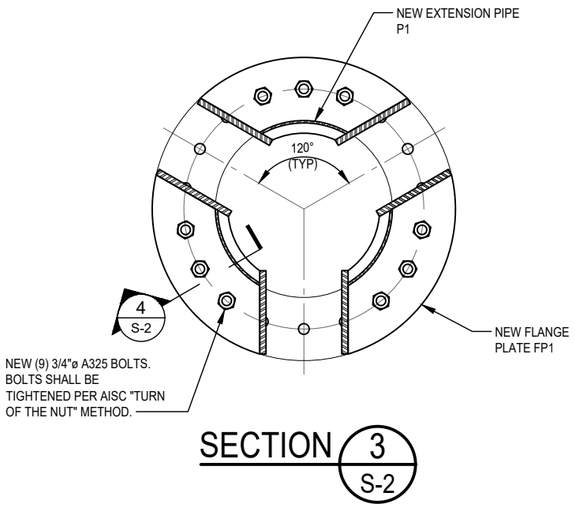
V1.0 37519-0043.002.DWG



PARTIAL ELEVATION 1 S-2

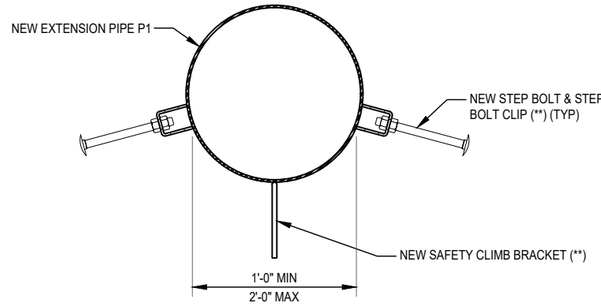


SECTION 2 S-2



SECTION 3 S-2

** SEE CROWN DOCUMENT CED-CAT-10300

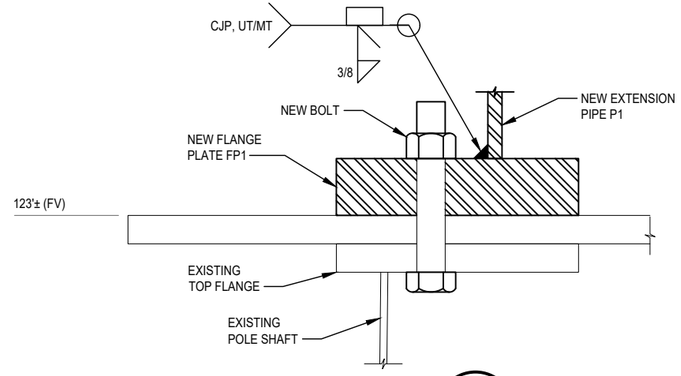


SAFETY CLIMB & STEP BOLT LAYOUT

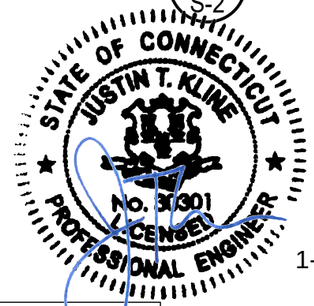
SAFETY CABLE NOTE:

EXISTING SAFETY CABLE SHALL BE REPLACED WITH A NEW CABLE THAT EXTENDS THE ENTIRE TOWER LENGTH. CONTRACTOR SHALL COORDINATE LOCATIONS OF EXISTING STEP BOLTS AND SAFETY CLIMB WITH NEW EXTENSION PRIOR TO FABRICATION. CONTRACTOR SHALL COORDINATE SOLUTION WITH TUF-TUG PRIOR TO FABRICATION. THE NEW SYSTEM SHALL BE CROWN APPROVED PRIOR TO CONSTRUCTION. (**)

CONTRACTOR TO VERIFY ALL EXISTING DIMENSIONS PRIOR TO FABRICATION OF EXTENSION



DETAIL 4 S-2



1-23-19

REV	DATE	DESCRIPTION

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679
www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

EXTENSION PROFILE

S-2

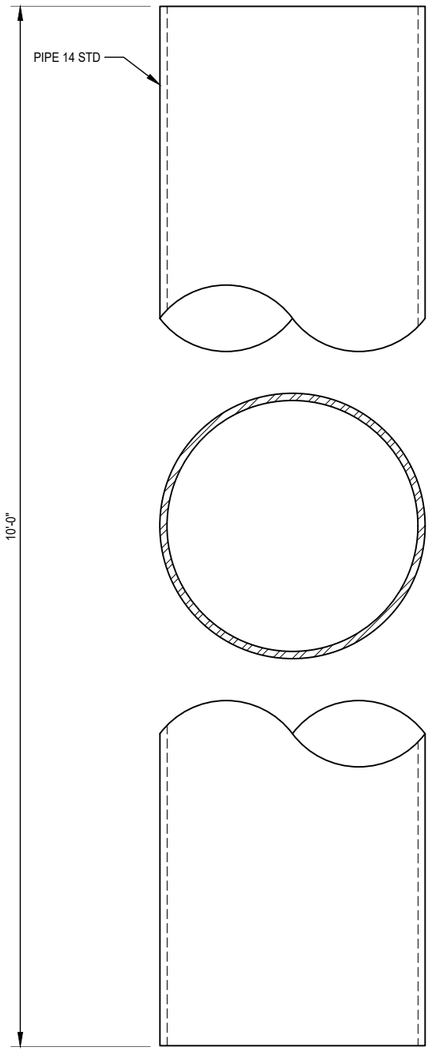
V1.0 37519-0043.002.DWG

MONOPOLE EXTENSION MATERIAL LIST			
MARK	QTY	MATERIAL	STEEL WEIGHT
CP1	1	CAP PLATE	33
TP1	1	TOP PLATE	134
FP1	1	FLANGE PLATE	192
P1	1	EXTENSION PIPE	545
MF1	3	BENT PLATE	123
	3	6" x 12" SABRE PORT	
	13	3/4"ø A325 BOLTS	
	7	STEP BOLT	
	14	LOCK WASHERS AND NUTS FOR STEP BOLT	
			1027

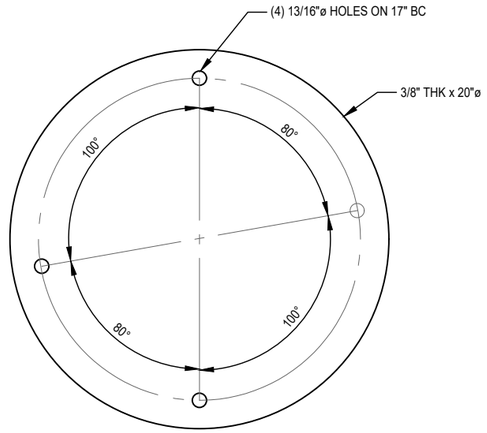
PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679
www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

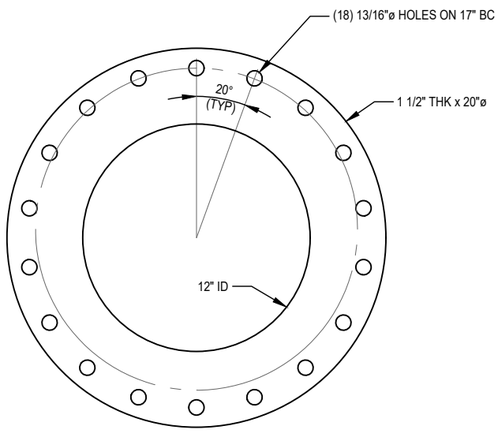
BU #876382 BERLIN/LAVIANA ORCHARD
BERLIN, CONNECTICUT
MODIFIED 123'-0" MONOPOLE



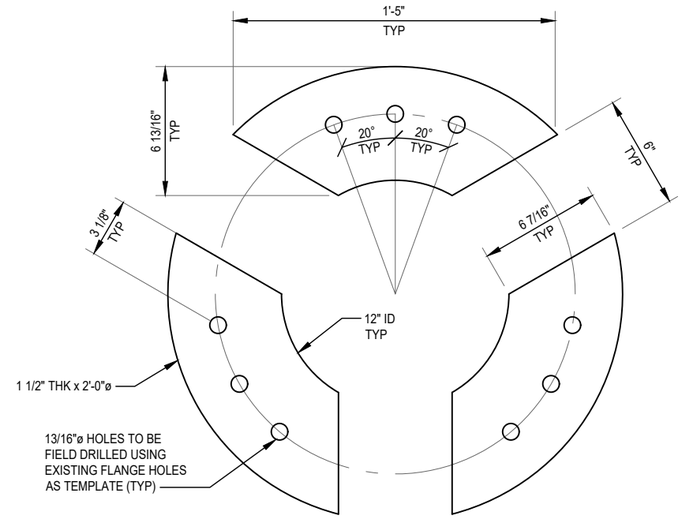
EXTENSION PIPE MK~P1
(Fy = 35 KSI)



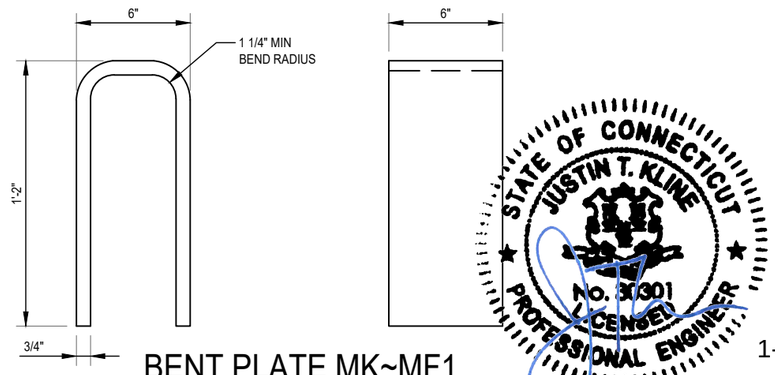
CAP PLATE MK~CP1
(Fy = 36 KSI)



TOP PLATE MK~TP1
(Fy = 36 KSI)



FLANGE PLATE MK~FP1
(1 REQUIRED) (Fy = 36 KSI)



BENT PLATE MK~MF1
(Fy = 36 KSI)

1-23-19

REV	DATE	DESCRIPTION

PROJECT No:	37519-0043.002.7700
DRAWN BY:	FE
DESIGNED BY:	GP
CHECKED BY:	BKK
DATE:	1-18-2019

EXTENSION DETAILS

S-3

V1.0 37519-0043.002.DWG