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Also admitted in Massachusetts

December 22, 2016

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

Re: **EM-VER-086-160923 – Cellco Partnership d/b/a Verizon Wireless**
557 Route 82, Montville, Connecticut

Dear Ms. Bachman:

On October 17, 2016, the Siting Council acknowledged receipt of the Cellco Partnership d/b/a Verizon Wireless ("Cellco") notice of intent to modify its existing telecommunications facility at 557 Route 82 in Montville, Connecticut. The modifications involved the replacement of certain antennas and the installation of new remote radio heads at the above-referenced facility.

As a condition of the acknowledgement, Cellco was required to provide the Council with a copy of a Structural Analysis Report referencing Rev. G of the structural standards. The updated Structural Analysis Report is attached for your records.

If you have any questions please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks

15897063-v1

PAUL J. FORD & COMPANY

Date: **November 22, 2016**

Rebecca Klein
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6525

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
rferrante@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117761
	Carrier Site Name:	Montville NW
Crown Castle Designation:	**Crown Castle BU Number:**	876371
	Crown Castle Site Name:	WALDEN / CAROLYN BESADE
	Crown Castle JDE Job Number:	391417
	Crown Castle Work Order Number:	1328321
	Crown Castle Application Number:	357746 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-2062.003.7805
Site Data:	**557 Rte. 82, Oakdale, New London County, CT** **Latitude *41° 30' 20.3"*, Longitude *-72° 11' 51.1"*** **180 Foot - Monopole Tower**	

Dear Rebecca Klein,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 972794, in accordance with application 357746, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 136 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Ryan Ferrante

Ryan Ferrante, EI
Structural Designer

STATE OF CONNECTICUT
JUSTIN THEINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
11-22-16

tnxTower Report - version 7.0.5.1

PJF PAUL J. FORD & COMPANY

Date: **November 22, 2016**

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Respectfully submitted by:

Ryan Ferrante, EI
Structural Designer

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1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in November of 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 136 mph converted to a nominal 3-second gust wind speed of 105 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
167.0	169.0	3	alcatel lucent	B66A RRH4X45	2	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		3	alcatel lucent	RRH2x60-700			
		3	amphenol	QUAD656C0000X w/ Mount Pipe			
		6	commscope	HBXX-6516DS-A2M w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
180.0	180.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Platform Mount [LP 601-1]			
167.0	169.0	4	antel	LPA-80063/6CF w/ Mount Pipe	1 12	1/2 1-5/8	1
		2	antel	LPA-80080-6CF-EDIN w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	167.0	1	gps	GPS_A			
		1	tower mounts	Platform Mount [LP 601-1]			
		3	antel	BXA-171063-8BF-2 w/ Mount Pipe	-	-	3
		3	antel	BXA-70063/6CF-2 w/ Mount Pipe			
148.0	148.0	3	ericsson	RRUS-11	-	-	2
		1	tower mounts	Pipe Mount [PM 601-3]			
		3	ericsson	TME-RRUS-11	-	-	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	147.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	-	-	2
		3	ericsson	RRUS11 A2			
		3	powerwave technologies	1001940			
		6	powerwave technologies	7770.00 w/ Mount Pipe	1 2 12	3/8 7/16 1-5/8	1
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 601-1]			
75.0	76.0	1	gps	GPS_A	1	1/2	1
	75.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	Dr. Clarence Welti, 10/29/99	2053524	CCISITES
POST-MODIFICATION INSPECTION	Vertical Structures, 2009-004-024, 6/12/09	2447495	CCISITES
POST-MODIFICATION INSPECTION	TEP, 131001.876371, 5/28/13	3868204	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6063, 11/23/99	1615419	CCISITES
TOWER MANUFACTURER DRAWINGS	EEI, 6063, 11/22/99	1615393	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), 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.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 133	Pole	TP27.99x18x0.25	1	-9.97	1555.43	62.0	Pass
L2	133 - 131	Pole	TP27.8996x26.6398x0.3125	2	-11.19	2032.93	57.4	Pass
L3	131 - 104.5	Pole	TP33.4638x27.8996x0.4395	3	-16.94	2546.78	73.3	Pass
L4	104.5 - 87.42	Pole	TP37.05x33.4638x0.4591	4	-19.94	3137.39	68.2	Pass
L5	87.42 - 69	Pole	TP40.2846x35.0462x0.5053	5	-27.97	3880.26	69.0	Pass
L6	69 - 42.88	Pole	TP45.76x40.2846x0.5153	6	-34.53	4628.95	66.0	Pass
L7	42.88 - 34.5	Pole	TP46.767x43.4193x0.5712	7	-38.68	5180.33	62.6	Pass
L8	34.5 - 0	Pole	TP54x46.767x0.5324	8	-52.04	5341.98	71.0	Pass
							Summary	
						Pole (L3)	73.3	Pass
						Rating =	73.3	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.1	Pass
1	Base Plate	0	49.5	Pass
1	Base Foundation Structural	0	28.1	Pass
1	Base Foundation Soil Interaction	0	24.3	Pass

Structure Rating (max from all components) =	**73.3%**

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

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in New London County, Connecticut.
2) Basic wind speed of 105 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.00 ft.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.00 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Deflections calculated using a wind speed of 60 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.
15) 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-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G 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		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	180.00-133.00	47.00	4.00	18	18.0000	27.9900	0.2500	1.0000	A572-65 (65 ksi)
L2	133.00-131.00	6.00	0.00	18	26.6398	27.8996	0.3125	1.2500	A572-65 (65 ksi)
L3	131.00-104.50	26.50	0.00	18	27.8996	33.4637	0.4395	1.7579	Reinf 48.37 ksi (48 ksi)
L4	104.50-87.42	17.08	5.17	18	33.4637	37.0500	0.4591	1.8365	Reinf 53.05 ksi (53 ksi)
L5	87.42-69.00	23.59	0.00	18	35.0462	40.2846	0.5053	2.0212	Reinf 53.21 ksi (53 ksi)
L6	69.00-42.88	26.12	6.25	18	40.2846	45.7600	0.5153	2.0612	Reinf 56.36 ksi (56 ksi)
L7	42.88-34.50	14.63	0.00	18	43.4193	46.7670	0.5712	2.2847	Reinf 56.46 ksi (56 ksi)
L8	34.50-0.00	34.50		18	46.7670	54.0000	0.5324	2.1295	Reinf 53.54 ksi (54 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	18.2777	14.0846	560.6340	6.3012	9.1440	61.3117	1122.0058	7.0437	2.7280	10.912
	28.4218	22.0117	2139.9506	9.8477	14.2189	150.5002	4282.7170	11.0079	4.4862	17.945
L2	27.9036	26.1134	2286.7193	9.3462	13.5330	168.9734	4576.4476	13.0592	4.1386	13.244
	28.3300	27.3630	2630.9525	9.7934	14.1730	185.6313	5265.3670	13.6841	4.3603	13.953
L3	28.3300	38.3035	3649.0671	9.7483	14.1730	257.4661	7302.9357	19.1554	4.1369	9.413
	33.9800	46.0648	6347.0757	11.7236	16.9996	373.3665	12702.5031	23.0368	5.1162	11.642
L4	33.9800	48.0969	6619.1810	11.7166	16.9996	389.3731	13247.0716	24.0530	5.0816	11.068
	37.6216	53.3231	9019.8279	12.9898	18.8214	479.2326	18051.5243	26.6666	5.7127	12.443
L5	36.7526	55.3986	8350.3218	12.2620	17.8035	469.0276	16711.6312	27.7045	5.2788	10.447
	40.9060	63.8001	12754.7622	14.1216	20.4646	623.2610	25526.3074	31.9061	6.2007	12.271
L6	40.9060	65.0439	12996.8849	14.1181	20.4646	635.0923	26010.8714	32.5281	6.1832	11.999
	46.4659	73.9991	19138.1306	16.0619	23.2461	823.2842	38301.4436	37.0066	7.1468	13.87
L7	45.5413	77.6804	18018.2025	15.2111	22.0570	816.8933	36060.1138	38.8476	6.6365	11.619
	47.4885	83.7496	22580.0910	16.3995	23.7576	950.4349	45189.8935	41.8828	7.2257	12.651
L8	47.4885	78.1261	21099.3105	16.4133	23.7576	888.1063	42226.3841	39.0705	7.2940	13.701
	54.8330	90.3482	32631.6221	18.9810	27.4320	1189.5459	65306.1817	45.1827	8.5670	16.092

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
VXL7-50(1-5/8")	C	No	Inside Pole	180.00 - 0.00	6	No Ice	0.00	0.75
						1/2" Ice	0.00	0.75
						1" Ice	0.00	0.75
***								
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	167.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LDF4-50A(1/2")	C	No	Inside Pole	167.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	167.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
***								
LCF158-50A(1-5/8")	C	No	Inside Pole	147.00 - 0.00	12	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80
						1" Ice	0.00	0.80
FB-L98B-002-75000(3/8")	C	No	Inside Pole	147.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	C	No	Inside Pole	147.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
***								
LCF12-50J(1/2)	C	No	Inside Pole	75.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	132.75 - 1.75	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00

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	180.00-133.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.78
L2	133.00-131.00	A	0.000	0.000	0.000	0.000	0.00
		B	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
		C	0.000	0.000	0.000	0.292	0.05
L3	131.00-104.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.417	0.72
L4	104.50-87.42	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	2.847	0.46
L5	87.42-69.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.070	0.50
L6	69.00-42.88	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.353	0.71
L7	42.88-34.50	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	1.397	0.23
L8	34.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.458	0.94

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	180.00-133.00	A	1.751	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.78
L2	133.00-131.00	A	1.723	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	0.973	0.05
L3	131.00-104.50	A	1.703	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	14.445	0.72
L4	104.50-87.42	A	1.669	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.180	0.46
L5	87.42-69.00	A	1.635	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.901	0.50
L6	69.00-42.88	A	1.581	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	13.527	0.71
L7	42.88-34.50	A	1.524	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.340	0.23
L8	34.50-0.00	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	15.664	0.94

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180.00-133.00	0.0000	0.0000	0.0000	0.0000
L2	133.00-131.00	-0.1758	0.1015	-0.4675	0.2699
L3	131.00-104.50	-0.2004	0.1157	-0.5286	0.3052
L4	104.50-87.42	-0.2019	0.1166	-0.5400	0.3118
L5	87.42-69.00	-0.2028	0.1171	-0.5492	0.3171
L6	69.00-42.88	-0.2039	0.1177	-0.5455	0.3149
L7	42.88-34.50	-0.2044	0.1180	-0.5514	0.3183
L8	34.50-0.00	-0.1945	0.1123	-0.4983	0.2877

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	180.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
Platform Mount [LP 601-1]	C	None		0.00	180.00	No Ice 1/2" Ice 1" Ice	28.47 33.59 38.71	28.47 33.59 38.71	1.12 1.51 1.91
***									
(2) HBXX-6516DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	5.66 6.06 6.47	4.53 5.20 5.86	0.05 0.10 0.15
(2) HBXX-6516DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	5.66 6.06 6.47	4.53 5.20 5.86	0.05 0.10 0.15
(2) HBXX-6516DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	5.66 6.06 6.47	4.53 5.20 5.86	0.05 0.10 0.15
QUAD656C0000X w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28
QUAD656C0000X w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28
QUAD656C0000X w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28
RRH2x60-700	A	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	B	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700	C	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-PCS	A	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	B	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	C	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
B66A RRH4X45	A	From Leg	4.00 0.00 2.00	0.00	167.00	No Ice 1/2" Ice 1" Ice	2.58 2.79 3.01	1.63 1.81 2.00	0.07 0.09 0.11
B66A RRH4X45	B	From Leg	4.00	0.00	167.00	No Ice	2.58	1.63	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.79	1.81	0.09
			2.00			1" Ice	3.01	2.00	0.11
B66A RRH4X45	C	From Leg	4.00	0.00	167.00	No Ice	2.58	1.63	0.07
			0.00			1/2" Ice	2.79	1.81	0.09
			2.00			1" Ice	3.01	2.00	0.11
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.00	167.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			2.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.00	167.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			2.00			1" Ice	5.35	2.39	0.12
(2) LPA-80080-6CF-EDIN w/ Mount Pipe	A	From Leg	4.00	0.00	167.00	No Ice	4.56	10.27	0.05
			0.00			1/2" Ice	5.10	11.44	0.11
			2.00			1" Ice	5.61	12.32	0.19
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00	0.00	167.00	No Ice	9.83	10.22	0.05
			0.00			1/2" Ice	10.40	11.38	0.14
			2.00			1" Ice	10.93	12.27	0.25
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00	0.00	167.00	No Ice	9.83	10.22	0.05
			0.00			1/2" Ice	10.40	11.38	0.14
			2.00			1" Ice	10.93	12.27	0.25
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.00	167.00	No Ice	0.31	0.08	0.00
			0.00			1/2" Ice	0.39	0.12	0.01
			2.00			1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.00	167.00	No Ice	0.31	0.08	0.00
			0.00			1/2" Ice	0.39	0.12	0.01
			2.00			1" Ice	0.47	0.17	0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.00	167.00	No Ice	0.31	0.08	0.00
			0.00			1/2" Ice	0.39	0.12	0.01
			2.00			1" Ice	0.47	0.17	0.01
GPS_A	A	From Leg	4.00	0.00	167.00	No Ice	0.26	0.26	0.00
			0.00			1/2" Ice	0.32	0.32	0.00
			0.00			1" Ice	0.39	0.39	0.01
Platform Mount [LP 601-1]	C	None		0.00	167.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
***									
TME-RRUS-11	A	From Leg	1.00	0.00	148.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
TME-RRUS-11	B	From Leg	1.00	0.00	148.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
TME-RRUS-11	C	From Leg	1.00	0.00	148.00	No Ice	2.78	1.19	0.05
			0.00			1/2" Ice	2.99	1.33	0.07
			0.00			1" Ice	3.21	1.49	0.09
RRUS-11	A	From Leg	1.00	0.00	148.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.09
RRUS-11	B	From Leg	1.00	0.00	148.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.09
RRUS-11	C	From Leg	1.00	0.00	148.00	No Ice	2.79	1.19	0.05
			0.00			1/2" Ice	3.00	1.34	0.07
			0.00			1" Ice	3.21	1.50	0.09
Pipe Mount [PM 601-3]	C	None		0.00	148.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	147.00	No Ice	5.81	4.63	0.09
			0.00			1/2" Ice	6.27	5.51	0.14
			0.00			1" Ice	6.70	6.21	0.21
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.00	147.00	No Ice	5.81	4.63	0.09
			0.00			1/2" Ice	6.27	5.51	0.14
			0.00			1" Ice	6.70	6.21	0.21
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.00	147.00	No Ice	5.81	4.63	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	6.27	5.51	0.14
			0.00			1" Ice	6.70	6.21	0.21
(2) LGP21401	A	From Leg	4.00	0.00	147.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			0.00			1" Ice	1.38	0.54	0.03
(2) LGP21401	B	From Leg	4.00	0.00	147.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			0.00			1" Ice	1.38	0.54	0.03
(2) LGP21401	C	From Leg	4.00	0.00	147.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			0.00			1" Ice	1.38	0.54	0.03
(2) LGP21901	A	From Leg	4.00	0.00	147.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP21901	B	From Leg	4.00	0.00	147.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(2) LGP21901	C	From Leg	4.00	0.00	147.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
DC6-48-60-18-8F	A	From Leg	4.00	0.00	147.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			0.00			1" Ice	1.64	1.64	0.06
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.00	0.00	147.00	No Ice	13.21	9.58	0.10
			0.00			1/2" Ice	13.90	11.05	0.20
			0.00			1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00	0.00	147.00	No Ice	13.21	9.58	0.10
			0.00			1/2" Ice	13.90	11.05	0.20
			0.00			1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.00	147.00	No Ice	13.21	9.58	0.10
			0.00			1/2" Ice	13.90	11.05	0.20
			0.00			1" Ice	14.59	12.50	0.30
RRUS11 A2	A	From Leg	4.00	0.00	147.00	No Ice	2.79	1.72	0.07
			0.00			1/2" Ice	3.00	1.90	0.10
			0.00			1" Ice	3.21	2.07	0.13
RRUS11 A2	B	From Leg	4.00	0.00	147.00	No Ice	2.79	1.72	0.07
			0.00			1/2" Ice	3.00	1.90	0.10
			0.00			1" Ice	3.21	2.07	0.13
RRUS11 A2	C	From Leg	4.00	0.00	147.00	No Ice	2.79	1.72	0.07
			0.00			1/2" Ice	3.00	1.90	0.10
			0.00			1" Ice	3.21	2.07	0.13
1001940	A	From Leg	4.00	0.00	147.00	No Ice	0.18	0.08	0.00
			0.00			1/2" Ice	0.23	0.13	0.00
			0.00			1" Ice	0.30	0.18	0.01
1001940	B	From Leg	4.00	0.00	147.00	No Ice	0.18	0.08	0.00
			0.00			1/2" Ice	0.23	0.13	0.00
			0.00			1" Ice	0.30	0.18	0.01
1001940	C	From Leg	4.00	0.00	147.00	No Ice	0.18	0.08	0.00
			0.00			1/2" Ice	0.23	0.13	0.00
			0.00			1" Ice	0.30	0.18	0.01
6' x 2" Mount Pipe	A	From Leg	4.00	0.00	147.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	4.00	0.00	147.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	4.00	0.00	147.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
Platform Mount [LP 601-1]	C	None		0.00	147.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
***									
GPS_A	A	From Leg	3.00	0.00	75.00	No Ice	0.26	0.26	0.00
			0.00			1/2" Ice	0.32	0.32	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / 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 701-1] ***	A	From Leg	1.00 1.50 0.00 0.00	0.00	75.00	1" Ice No Ice 1/2" Ice 1" Ice	0.39 0.85 1.14 1.43	0.39 1.67 2.34 3.01	0.01 0.07 0.08 0.09

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 180.00-133.00	155.05	1.12	30.00	91.453	A	0.000	91.453	91.453	100.00	0.000	0.000
					B	0.000	91.453		100.00	0.000	0.000
					C	0.000	91.453		100.00	0.000	0.000
L2 133.00-131.00	132.00	1.07	28.68	4.686	A	0.000	4.686	4.686	100.00	0.000	0.000
					B	0.000	4.686		100.00	0.000	0.000
					C	0.000	4.686		100.00	0.000	0.292
L3 131.00-104.50	117.35	1.034	27.74	68.801	A	0.000	68.801	68.801	100.00	0.000	0.000
					B	0.000	68.801		100.00	0.000	0.000
					C	0.000	68.801		100.00	0.000	4.417
L4 104.50-87.42	95.82	0.976	26.18	50.956	A	0.000	50.956	50.956	100.00	0.000	0.000
					B	0.000	50.956		100.00	0.000	0.000
					C	0.000	50.956		100.00	0.000	2.847
L5 87.42-69.00	78.05	0.921	24.69	59.603	A	0.000	59.603	59.603	100.00	0.000	0.000
					B	0.000	59.603		100.00	0.000	0.000
					C	0.000	59.603		100.00	0.000	3.070
L6 69.00-42.88	55.66	0.836	22.41	95.090	A	0.000	95.090	95.090	100.00	0.000	0.000
					B	0.000	95.090		100.00	0.000	0.000
					C	0.000	95.090		100.00	0.000	4.353
L7 42.88-34.50	38.66	0.753	20.20	32.483	A	0.000	32.483	32.483	100.00	0.000	0.000
					B	0.000	32.483		100.00	0.000	0.000
					C	0.000	32.483		100.00	0.000	1.397
L8 34.50-0.00	16.84	0.7	18.77	147.087	A	0.000	147.087	147.087	100.00	0.000	0.000
					B	0.000	147.087		100.00	0.000	0.000
					C	0.000	147.087		100.00	0.000	5.458

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	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 180.00-133.00	155.05	1.12	6.80	1.7510	105.169	A	0.000	105.169	105.169	100.00	0.000	0.000
						B	0.000	105.169		100.00	0.000	0.000
						C	0.000	105.169		100.00	0.000	0.000
L2 133.00-131.00	132.00	1.07	6.50	1.7230	5.270	A	0.000	5.270	5.270	100.00	0.000	0.000
						B	0.000	5.270		100.00	0.000	0.000
						C	0.000	5.270		100.00	0.000	0.973
L3 131.00-104.50	117.35	1.034	6.29	1.7029	76.322	A	0.000	76.322	76.322	100.00	0.000	0.000
						B	0.000	76.322		100.00	0.000	0.000
						C	0.000	76.322		100.00	0.000	14.445
L4 104.50-87.42	95.82	0.976	5.94	1.6687	55.707	A	0.000	55.707	55.707	100.00	0.000	0.000
						B	0.000	55.707		100.00	0.000	0.000
						C	0.000	55.707		100.00	0.000	9.180
L5 87.42-69.00	78.05	0.921	5.60	1.6348	64.726	A	0.000	64.726	64.726	100.00	0.000	0.000
						B	0.000	64.726		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	64.726		100.00	0.000	9.901
L6 69.00-42.88	55.66	0.836	5.08	1.5805	101.970	A	0.000	101.970	101.970	100.00	0.000	0.000
						B	0.000	101.970		100.00	0.000	0.000
						C	0.000	101.970		100.00	0.000	13.527
L7 42.88-34.50	38.66	0.753	4.58	1.5239	34.690	A	0.000	34.690	34.690	100.00	0.000	0.000
						B	0.000	34.690		100.00	0.000	0.000
						C	0.000	34.690		100.00	0.000	4.340
L8 34.50-0.00	16.84	0.7	4.26	1.4024	155.151	A	0.000	155.151	155.151	100.00	0.000	0.000
						B	0.000	155.151		100.00	0.000	0.000
						C	0.000	155.151		100.00	0.000	15.664

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 180.00-133.00	155.05	1.12	8.77	91.453	A	0.000	91.453	91.453	100.00	0.000	0.000
					B	0.000	91.453		100.00	0.000	0.000
					C	0.000	91.453		100.00	0.000	0.000
L2 133.00-131.00	132.00	1.07	8.38	4.686	A	0.000	4.686	4.686	100.00	0.000	0.000
					B	0.000	4.686		100.00	0.000	0.000
					C	0.000	4.686		100.00	0.000	0.292
L3 131.00-104.50	117.35	1.034	8.10	68.801	A	0.000	68.801	68.801	100.00	0.000	0.000
					B	0.000	68.801		100.00	0.000	0.000
					C	0.000	68.801		100.00	0.000	4.417
L4 104.50-87.42	95.82	0.976	7.65	50.956	A	0.000	50.956	50.956	100.00	0.000	0.000
					B	0.000	50.956		100.00	0.000	0.000
					C	0.000	50.956		100.00	0.000	2.847
L5 87.42-69.00	78.05	0.921	7.21	59.603	A	0.000	59.603	59.603	100.00	0.000	0.000
					B	0.000	59.603		100.00	0.000	0.000
					C	0.000	59.603		100.00	0.000	3.070
L6 69.00-42.88	55.66	0.836	6.55	95.090	A	0.000	95.090	95.090	100.00	0.000	0.000
					B	0.000	95.090		100.00	0.000	0.000
					C	0.000	95.090		100.00	0.000	4.353
L7 42.88-34.50	38.66	0.753	5.90	32.483	A	0.000	32.483	32.483	100.00	0.000	0.000
					B	0.000	32.483		100.00	0.000	0.000
					C	0.000	32.483		100.00	0.000	1.397
L8 34.50-0.00	16.84	0.7	5.48	147.087	A	0.000	147.087	147.087	100.00	0.000	0.000
					B	0.000	147.087		100.00	0.000	0.000
					C	0.000	147.087		100.00	0.000	5.458

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice

Comb. No.	Description
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
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	180 - 133	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.46	0.89	0.10
			Max. Mx	20	-9.97	526.52	-1.55
			Max. My	2	-10.06	-1.57	513.27
			Max. Vy	20	-20.74	526.52	-1.55
			Max. Vx	2	-20.31	-1.57	513.27
			Max. Torque	7			0.59
L2	133 - 131	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.21	0.89	0.10
			Max. Mx	20	-11.19	652.52	-1.88
			Max. My	2	-11.28	-1.90	636.74
			Max. Vy	20	-21.28	652.52	-1.88
			Max. Vx	2	-20.85	-1.90	636.74
			Max. Torque	7			0.58
L3	131 - 104.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.44	0.89	0.10
			Max. Mx	20	-16.94	1249.07	-3.34
			Max. My	2	-17.01	-3.37	1222.06
			Max. Vy	20	-23.80	1249.07	-3.34
			Max. Vx	2	-23.38	-3.37	1222.06
			Max. Torque	5			0.69
L4	104.5 - 87.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.16	0.89	0.10
			Max. Mx	20	-19.94	1539.10	-4.00
			Max. My	2	-20.00	-4.04	1507.04
			Max. Vy	20	-24.93	1539.10	-4.00
			Max. Vx	2	-24.51	-4.04	1507.04
			Max. Torque	5			0.75

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	87.42 - 69	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.21	0.89	0.57
			Max. Mx	20	-27.97	2156.25	-5.07
			Max. My	2	-28.01	-5.36	2114.17
			Max. Vy	20	-27.35	2156.25	-5.07
			Max. Vx	2	-26.89	-5.36	2114.17
			Max. Torque	5			1.03
L6	69 - 42.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.14	0.89	0.57
			Max. Mx	20	-34.53	2716.28	-6.17
			Max. My	2	-34.56	-6.46	2665.10
			Max. Vy	20	-29.06	2716.28	-6.17
			Max. Vx	2	-28.60	-6.46	2665.10
			Max. Torque	3			1.15
L7	42.88 - 34.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.14	0.89	0.57
			Max. Mx	20	-41.90	3151.87	-6.97
			Max. My	2	-41.92	-7.27	3094.02
			Max. Vy	20	-30.40	3151.87	-6.97
			Max. Vx	2	-29.94	-7.27	3094.02
			Max. Torque	3			1.30
L8	34.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85.23	0.89	0.57
			Max. Mx	20	-55.60	4240.11	-8.82
			Max. My	2	-55.60	-9.13	4166.90
			Max. Vy	20	-32.74	4240.11	-8.82
			Max. Vx	2	-32.30	-9.13	4166.90
			Max. Torque	3			1.63

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	85.23	8.70	-0.01
	Max. H_x	20	55.61	32.71	-0.05
	Max. H_z	3	41.71	-0.05	32.27
	Max. M_x	2	4166.90	-0.05	32.27
	Max. M_z	8	4239.70	-32.71	0.05
	Max. Torsion	3	1.63	-0.05	32.27
	Min. Vert	5	41.71	-16.40	27.98
	Min. H_x	9	41.71	-32.71	0.05
	Min. H_z	14	55.61	0.05	-32.27
	Min. M_x	14	-4165.85	0.05	-32.27
	Min. M_z	20	-4240.11	32.71	-0.05
	Min. Torsion	15	-1.63	0.05	-32.27

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	46.34	0.00	0.00	-0.41	0.17	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	55.61	0.05	-32.27	-4166.90	-9.13	-1.63
0.9 Dead+1.6 Wind 0 deg - No Ice	41.71	0.05	-32.27	-4117.53	-9.06	-1.63
1.2 Dead+1.6 Wind 30 deg - No Ice	55.61	16.40	-27.98	-3613.25	-2127.96	-1.41
0.9 Dead+1.6 Wind 30 deg - No Ice	41.71	16.40	-27.98	-3570.43	-2102.82	-1.41
1.2 Dead+1.6 Wind 60 deg - No Ice	55.61	28.35	-16.18	-2091.62	-3676.38	-0.82
0.9 Dead+1.6 Wind 60 deg - No Ice	41.71	28.35	-16.18	-2066.77	-3632.92	-0.82
1.2 Dead+1.6 Wind 90 deg - No Ice	55.61	32.71	-0.05	-9.86	-4239.70	-0.00
0.9 Dead+1.6 Wind 90 deg - No Ice	41.71	32.71	-0.05	-9.60	-4189.58	-0.00
1.2 Dead+1.6 Wind 120 deg - No Ice	55.61	28.30	16.09	2074.45	-3667.12	0.81
0.9 Dead+1.6 Wind 120 deg - No Ice	41.71	28.30	16.09	2050.09	-3623.78	0.81
1.2 Dead+1.6 Wind 150 deg - No Ice	55.61	16.31	27.92	3602.95	-2111.83	1.41

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+1.6 Wind 150 deg - No Ice	41.71	16.31	27.92	3560.52	-2086.90	1.41
1.2 Dead+1.6 Wind 180 deg - No Ice	55.61	-0.05	32.27	4165.85	9.55	1.62
0.9 Dead+1.6 Wind 180 deg - No Ice	41.71	-0.05	32.27	4116.77	9.37	1.63
1.2 Dead+1.6 Wind 210 deg - No Ice	55.61	-16.40	27.98	3612.22	2128.39	1.41
0.9 Dead+1.6 Wind 210 deg - No Ice	41.71	-16.40	27.98	3569.67	2103.13	1.41
1.2 Dead+1.6 Wind 240 deg - No Ice	55.61	-28.35	16.18	2090.59	3676.81	0.81
0.9 Dead+1.6 Wind 240 deg - No Ice	41.71	-28.35	16.18	2066.01	3633.23	0.82
1.2 Dead+1.6 Wind 270 deg - No Ice	55.61	-32.71	0.05	8.82	4240.11	0.00
0.9 Dead+1.6 Wind 270 deg - No Ice	41.71	-32.71	0.05	8.83	4189.89	0.01
1.2 Dead+1.6 Wind 300 deg - No Ice	55.61	-28.30	-16.09	-2075.50	3667.55	-0.81
0.9 Dead+1.6 Wind 300 deg - No Ice	41.71	-28.30	-16.09	-2050.86	3624.09	-0.81
1.2 Dead+1.6 Wind 330 deg - No Ice	55.61	-16.31	-27.92	-3604.00	2112.26	-1.40
0.9 Dead+1.6 Wind 330 deg - No Ice	41.71	-16.31	-27.92	-3561.29	2087.21	-1.41
1.2 Dead+1.0 Ice	85.23	-0.00	0.00	-0.57	0.89	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	85.23	0.01	-8.62	-1138.64	-0.90	-0.65
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	85.23	4.36	-7.47	-987.14	-576.89	-0.51
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	85.23	7.54	-4.32	-571.32	-998.05	-0.24
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	85.23	8.70	-0.01	-2.57	-1151.47	0.10
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	85.23	7.53	4.30	566.70	-996.12	0.41
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	85.23	4.34	7.46	983.94	-573.54	0.61
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	85.23	-0.01	8.62	1137.37	2.97	0.65
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	85.23	-4.36	7.47	985.89	578.98	0.51
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	85.23	-7.54	4.32	570.05	1000.13	0.24
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	85.23	-8.70	0.01	1.30	1153.54	-0.10
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	85.23	-7.53	-4.30	-567.97	998.19	-0.41
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	85.23	-4.34	-7.46	-985.23	575.63	-0.61
Dead+Wind 0 deg - Service	46.34	0.01	-5.89	-756.79	-1.51	-0.07
Dead+Wind 30 deg - Service	46.34	2.99	-5.11	-656.31	-386.18	-0.13
Dead+Wind 60 deg - Service	46.34	5.18	-2.95	-380.08	-667.31	-0.15
Dead+Wind 90 deg - Service	46.34	5.97	-0.01	-2.13	-769.60	-0.14
Dead+Wind 120 deg - Service	46.34	5.17	2.94	376.28	-665.62	-0.09
Dead+Wind 150 deg - Service	46.34	2.98	5.10	653.75	-383.24	-0.01
Dead+Wind 180 deg - Service	46.34	-0.01	5.89	755.92	1.88	0.07
Dead+Wind 210 deg - Service	46.34	-2.99	5.11	655.44	386.54	0.13
Dead+Wind 240 deg - Service	46.34	-5.18	2.95	379.21	667.68	0.15
Dead+Wind 270 deg - Service	46.34	-5.97	0.01	1.26	769.96	0.14
Dead+Wind 300 deg - Service	46.34	-5.17	-2.94	-377.15	665.98	0.09
Dead+Wind 330 deg - Service	46.34	-2.98	-5.10	-654.62	383.61	0.01

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-46.34	0.00	0.00	46.34	0.00	0.000%
2	0.05	-55.61	-32.27	-0.05	55.61	32.27	0.000%
3	0.05	-41.71	-32.27	-0.05	41.71	32.27	0.000%
4	16.40	-55.61	-27.98	-16.40	55.61	27.98	0.000%
5	16.40	-41.71	-27.98	-16.40	41.71	27.98	0.000%
6	28.35	-55.61	-16.18	-28.35	55.61	16.18	0.000%
7	28.35	-41.71	-16.18	-28.35	41.71	16.18	0.000%
8	32.71	-55.61	-0.05	-32.71	55.61	0.05	0.000%
9	32.71	-41.71	-0.05	-32.71	41.71	0.05	0.000%
10	28.30	-55.61	16.09	-28.30	55.61	-16.09	0.000%
11	28.30	-41.71	16.09	-28.30	41.71	-16.09	0.000%
12	16.31	-55.61	27.92	-16.31	55.61	-27.92	0.000%
13	16.31	-41.71	27.92	-16.31	41.71	-27.92	0.000%
14	-0.05	-55.61	32.27	0.05	55.61	-32.27	0.000%
15	-0.05	-41.71	32.27	0.05	41.71	-32.27	0.000%
16	-16.40	-55.61	27.98	16.40	55.61	-27.98	0.000%
17	-16.40	-41.71	27.98	16.40	41.71	-27.98	0.000%
18	-28.35	-55.61	16.18	28.35	55.61	-16.18	0.000%
19	-28.35	-41.71	16.18	28.35	41.71	-16.18	0.000%
20	-32.71	-55.61	0.05	32.71	55.61	-0.05	0.000%
21	-32.71	-41.71	0.05	32.71	41.71	-0.05	0.000%
22	-28.30	-55.61	-16.09	28.30	55.61	16.09	0.000%
23	-28.30	-41.71	-16.09	28.30	41.71	16.09	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
24	-16.31	-55.61	-27.92	16.31	55.61	27.92	0.000%
25	-16.31	-41.71	-27.92	16.31	41.71	27.92	0.000%
26	0.00	-85.23	0.00	0.00	85.23	0.00	0.000%
27	0.01	-85.23	-8.62	-0.01	85.23	8.62	0.000%
28	4.36	-85.23	-7.47	-4.36	85.23	7.47	0.000%
29	7.54	-85.23	-4.32	-7.54	85.23	4.32	0.000%
30	8.70	-85.23	-0.01	-8.70	85.23	0.01	0.000%
31	7.53	-85.23	4.30	-7.53	85.23	-4.30	0.000%
32	4.34	-85.23	7.46	-4.34	85.23	-7.46	0.000%
33	-0.01	-85.23	8.62	0.01	85.23	-8.62	0.000%
34	-4.36	-85.23	7.47	4.36	85.23	-7.47	0.000%
35	-7.54	-85.23	4.32	7.54	85.23	-4.32	0.000%
36	-8.70	-85.23	0.01	8.70	85.23	-0.01	0.000%
37	-7.53	-85.23	-4.30	7.53	85.23	4.30	0.000%
38	-4.34	-85.23	-7.46	4.34	85.23	7.46	0.000%
39	0.01	-46.34	-5.89	-0.01	46.34	5.89	0.000%
40	2.99	-46.34	-5.11	-2.99	46.34	5.11	0.000%
41	5.18	-46.34	-2.95	-5.18	46.34	2.95	0.000%
42	5.97	-46.34	-0.01	-5.97	46.34	0.01	0.000%
43	5.17	-46.34	2.94	-5.17	46.34	-2.94	0.000%
44	2.98	-46.34	5.10	-2.98	46.34	-5.10	0.000%
45	-0.01	-46.34	5.89	0.01	46.34	-5.89	0.000%
46	-2.99	-46.34	5.11	2.99	46.34	-5.11	0.000%
47	-5.18	-46.34	2.95	5.18	46.34	-2.95	0.000%
48	-5.97	-46.34	0.01	5.97	46.34	-0.01	0.000%
49	-5.17	-46.34	-2.94	5.17	46.34	2.94	0.000%
50	-2.98	-46.34	-5.10	2.98	46.34	5.10	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	0.00007909
3	Yes	4	0.00000001	0.00094682
4	Yes	6	0.00000001	0.00021031
5	Yes	6	0.00000001	0.00006239
6	Yes	6	0.00000001	0.00021527
7	Yes	6	0.00000001	0.00006395
8	Yes	5	0.00000001	0.00006685
9	Yes	4	0.00000001	0.00076271
10	Yes	6	0.00000001	0.00021237
11	Yes	6	0.00000001	0.00006323
12	Yes	6	0.00000001	0.00020935
13	Yes	6	0.00000001	0.00006235
14	Yes	5	0.00000001	0.00012643
15	Yes	5	0.00000001	0.00005571
16	Yes	6	0.00000001	0.00021547
17	Yes	6	0.00000001	0.00006421
18	Yes	6	0.00000001	0.00021119
19	Yes	6	0.00000001	0.00006254
20	Yes	4	0.00000001	0.00097694
21	Yes	4	0.00000001	0.00041141
22	Yes	6	0.00000001	0.00021095
23	Yes	6	0.00000001	0.00006272
24	Yes	6	0.00000001	0.00021329
25	Yes	6	0.00000001	0.00006370
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00019488
28	Yes	5	0.00000001	0.00099378
29	Yes	6	0.00000001	0.00013557
30	Yes	5	0.00000001	0.00017916
31	Yes	6	0.00000001	0.00013309
32	Yes	5	0.00000001	0.00098239
33	Yes	5	0.00000001	0.00019789
34	Yes	6	0.00000001	0.00013699
35	Yes	6	0.00000001	0.00013091

36	Yes	5	0.00000001	0.00017964
37	Yes	6	0.00000001	0.00013035
38	Yes	6	0.00000001	0.00013545
39	Yes	4	0.00000001	0.00015746
40	Yes	4	0.00000001	0.00080972
41	Yes	4	0.00000001	0.00086024
42	Yes	4	0.00000001	0.00016724
43	Yes	4	0.00000001	0.00080793
44	Yes	4	0.00000001	0.00081353
45	Yes	4	0.00000001	0.00015849
46	Yes	4	0.00000001	0.00084702
47	Yes	4	0.00000001	0.00081082
48	Yes	4	0.00000001	0.00016506
49	Yes	4	0.00000001	0.00083703
50	Yes	4	0.00000001	0.00081752

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	26.92	48	1.43	0.00
L2	137 - 131	14.96	48	1.12	0.00
L3	131 - 104.5	13.58	48	1.07	0.00
L4	104.5 - 87.42	8.36	48	0.81	0.00
L5	92.59 - 69	6.50	48	0.69	0.00
L6	69 - 42.88	3.52	48	0.50	0.00
L7	49.13 - 34.5	1.79	48	0.33	0.00
L8	34.5 - 0	0.88	48	0.25	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	(2) DB980H90E-M w/ Mount Pipe	48	26.92	1.43	0.00	36578
167.00	(2) HBXX-6516DS-A2M w/ Mount Pipe	48	23.06	1.34	0.00	14068
148.00	TME-RRUS-11	48	17.73	1.21	0.00	5714
147.00	(2) 7770.00 w/ Mount Pipe	48	17.46	1.20	0.00	5541
75.00	GPS_A	48	4.18	0.55	0.00	6312

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 133	147.98	20	7.85	0.01
L2	137 - 131	82.33	20	6.17	0.00
L3	131 - 104.5	74.74	20	5.89	0.00
L4	104.5 - 87.42	46.06	20	4.44	0.00
L5	92.59 - 69	35.79	20	3.80	0.00
L6	69 - 42.88	19.39	20	2.75	0.00
L7	49.13 - 34.5	9.85	20	1.84	0.00
L8	34.5 - 0	4.83	20	1.37	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	(2) DB980H90E-M w/ Mount Pipe	20	147.98	7.85	0.01	6899
167.00	(2) HBXX-6516DS-A2M w/ Mount Pipe	20	126.83	7.38	0.01	2651
148.00	TME-RRUS-11	20	97.55	6.65	0.01	1072
147.00	(2) 7770.00 w/ Mount Pipe	20	96.10	6.61	0.01	1039
75.00	GPS_A	20	23.03	3.02	0.00	1152

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	180 - 133 (1)	TP27.99x18x0.25	47.00	0.00	0.0	21.3370	-9.97	1555.43	0.006
L2	133 - 131 (2)	TP27.8996x26.6398x0.3125	6.00	0.00	0.0	27.3630	-11.19	2032.93	0.006
L3	131 - 104.5 (3)	TP33.4638x27.8996x0.4395	26.50	0.00	0.0	46.0648	-16.94	2546.78	0.007
L4	104.5 - 87.42 (4)	TP37.05x33.4638x0.4591	17.08	0.00	0.0	51.7412	-19.94	3137.39	0.006
L5	87.42 - 69 (5)	TP40.2846x35.0462x0.5053	23.59	0.00	0.0	63.8001	-27.97	3880.26	0.007
L6	69 - 42.88 (6)	TP45.76x40.2846x0.5153	26.12	0.00	0.0	71.8563	-34.53	4628.95	0.007
L7	42.88 - 34.5 (7)	TP46.767x43.4193x0.5712	14.63	0.00	0.0	80.2732	-38.68	5180.33	0.007
L8	34.5 - 0 (8)	TP54x46.767x0.5324	34.50	0.00	0.0	87.2927	-52.04	5341.98	0.010

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	180 - 133 (1)	TP27.99x18x0.25	526.52	858.84	0.613	0.00	858.84	0.000
L2	133 - 131 (2)	TP27.8996x26.6398x0.3125	652.52	1149.29	0.568	0.00	1149.29	0.000
L3	131 - 104.5 (3)	TP33.4638x27.8996x0.4395	1249.07	1720.19	0.726	0.00	1720.19	0.000
L4	104.5 - 87.42 (4)	TP37.05x33.4638x0.4591	1539.11	2279.16	0.675	0.00	2279.16	0.000
L5	87.42 - 69 (5)	TP40.2846x35.0462x0.5053	2156.26	3158.84	0.683	0.00	3158.84	0.000
L6	69 - 42.88 (6)	TP45.76x40.2846x0.5153	2716.29	4165.98	0.652	0.00	4165.98	0.000
L7	42.88 - 34.5 (7)	TP46.767x43.4193x0.5712	2899.98	4693.25	0.618	0.00	4693.25	0.000
L8	34.5 - 0 (8)	TP54x46.767x0.5324	3960.52	5660.97	0.700	0.00	5660.97	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		K	K		kip-ft	kip-ft	
L1	180 - 133 (1)	TP27.99x18x0.25	20.74	777.72	0.027	0.47	1719.78	0.000
L2	133 - 131 (2)	TP27.8996x26.6398x0.3125	21.28	1016.47	0.021	0.46	2301.39	0.000
L3	131 - 104.5 (3)	TP33.4638x27.8996x0.4395	23.80	1273.39	0.019	0.33	3444.59	0.000
L4	104.5 - 87.42 (4)	TP37.05x33.4638x0.4591	24.93	1568.69	0.016	0.26	4563.88	0.000
L5	87.42 - 69 (5)	TP40.2846x35.0462x0.5053	27.35	1940.13	0.014	0.40	6325.42	0.000
L6	69 - 42.88 (6)	TP45.76x40.2846x0.5153	29.06	2314.47	0.013	0.28	8342.17	0.000
L7	42.88 - 34.5 (7)	TP46.767x43.4193x0.5712	29.83	2604.19	0.011	0.24	9398.00	0.000
L8	34.5 - 0 (8)	TP54x46.767x0.5324	32.27	2689.69	0.012	0.05	11335.83	0.000

Pole Interaction Design Data

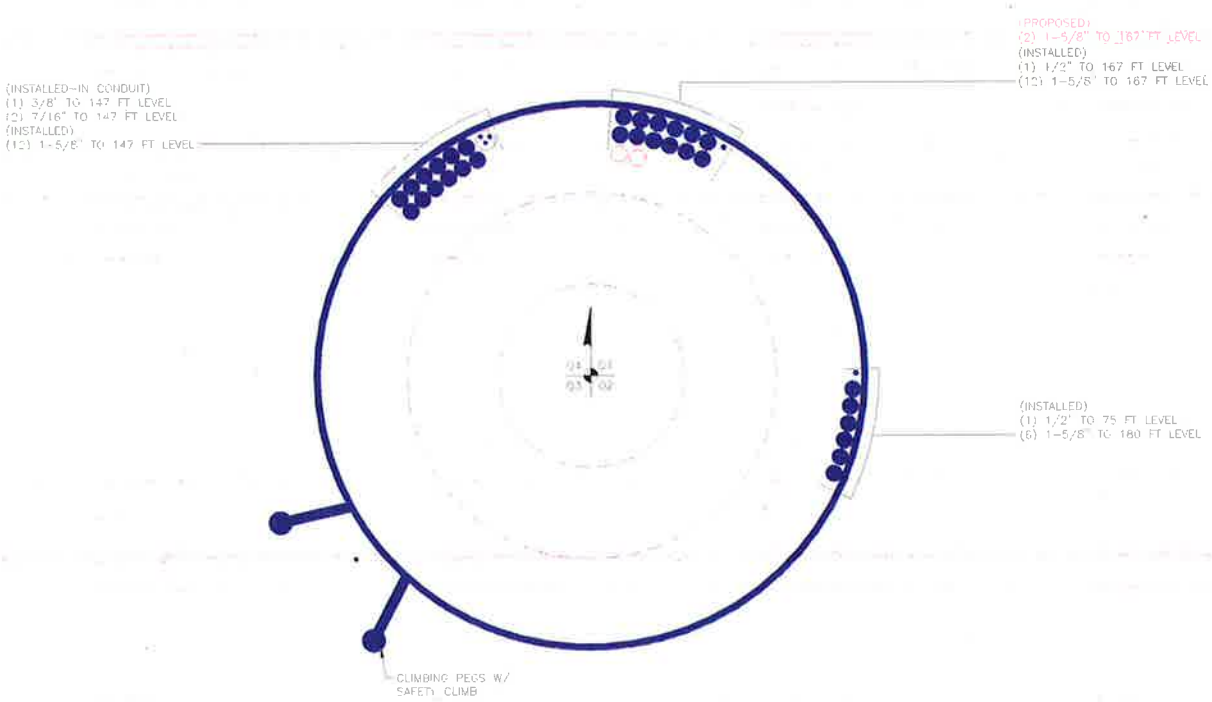
Section No.	Elevation	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft								
L1	180 - 133 (1)	0.006	0.613	0.000	0.027	0.000	0.620 ✔	1.000	4.8.2 ✔
L2	133 - 131 (2)	0.006	0.568	0.000	0.021	0.000	0.574 ✔	1.000	4.8.2 ✔
L3	131 - 104.5 (3)	0.007	0.726	0.000	0.019	0.000	0.733 ✔	1.000	4.8.2 ✔
L4	104.5 - 87.42 (4)	0.006	0.675	0.000	0.016	0.000	0.682 ✔	1.000	4.8.2 ✔
L5	87.42 - 69 (5)	0.007	0.683	0.000	0.014	0.000	0.690 ✔	1.000	4.8.2 ✔
L6	69 - 42.88 (6)	0.007	0.652	0.000	0.013	0.000	0.660 ✔	1.000	4.8.2 ✔
L7	42.88 - 34.5 (7)	0.007	0.618	0.000	0.011	0.000	0.626 ✔	1.000	4.8.2 ✔
L8	34.5 - 0 (8)	0.010	0.700	0.000	0.012	0.000	0.710 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 133	Pole	TP27.99x18x0.25	1	-9.97	1555.43	62.0	Pass
L2	133 - 131	Pole	TP27.8996x26.6398x0.3125	2	-11.19	2032.93	57.4	Pass
L3	131 - 104.5	Pole	TP33.4638x27.8996x0.4395	3	-16.94	2546.78	73.3	Pass
L4	104.5 - 87.42	Pole	TP37.05x33.4638x0.4591	4	-19.94	3137.39	68.2	Pass
L5	87.42 - 69	Pole	TP40.2846x35.0462x0.5053	5	-27.97	3880.26	69.0	Pass
L6	69 - 42.88	Pole	TP45.76x40.2846x0.5153	6	-34.53	4628.95	66.0	Pass
L7	42.88 - 34.5	Pole	TP46.767x43.4193x0.5712	7	-38.68	5180.33	62.6	Pass
L8	34.5 - 0	Pole	TP54x46.767x0.5324	8	-52.04	5341.98	71.0	Pass
							Summary	
						Pole (L3)	73.3	Pass
						RATING =	**73.3**	**Pass**

APPENDIX B

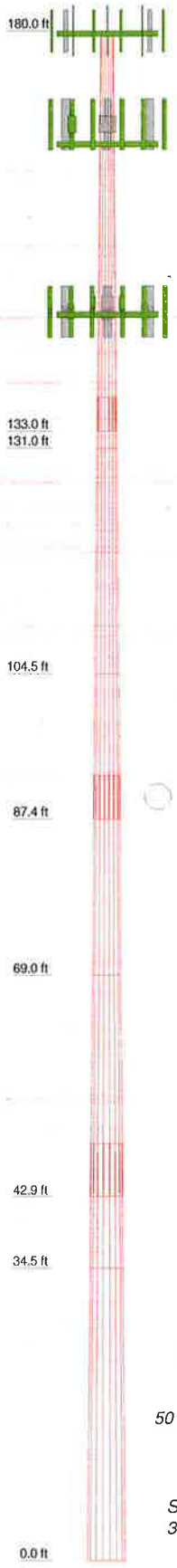
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8
Length (ft)	47.00	6.00	26.50	17.08	23.59	26.12	14.63	34.50
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.4395	0.4591	0.5053	0.5153	0.5712	0.5324
Socket Length (ft)	4.00			5.17		6.25		
Top Dia (in)	18.0000	26.6398	27.8996	33.4637	35.0462	40.2846	43.4193	46.7670
Bot Dia (in)	27.9900	27.8996	33.4637	37.0500	40.2846	45.7600	46.7670	54.0000
Grade	A572-65	A572-65	Reinf 48.37 ksi	Reinf 53.05 ksi	Reinf 53.21 ksi	Reinf 56.36 ksi	Reinf 56.46 ksi	Reinf 53.54 ksi
Weight (K)	2.9	0.5	3.8	2.9	4.8	6.2	4.0	9.9



ALL REACTIONS ARE FACTORED

AXIAL 85 K

SHEAR 9 K *MOMENT 1154 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 56 K

SHEAR 33 K *MOMENT 4240 kip-ft*

TORQUE 2 kip-ft
REACTIONS - 105 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90E-M w/ Mount Pipe	180	TME-RRUS-11	148
(2) DB980H90E-M w/ Mount Pipe	180	TME-RRUS-11	148
(2) DB980H90E-M w/ Mount Pipe	180	TME-RRUS-11	148
6' x 2" Mount Pipe	180	RRUS-11	148
6' x 2" Mount Pipe	180	RRUS-11	148
6' x 2" Mount Pipe	180	RRUS-11	148
Platform Mount [LP 601-1]	180	Pipe Mount [PM 601-3]	148
(2) HBXX-6516DS-A2M w/ Mount Pipe	167	(2) 7770.00 w/ Mount Pipe	147
(2) HBXX-6516DS-A2M w/ Mount Pipe	167	(2) 7770.00 w/ Mount Pipe	147
(2) HBXX-6516DS-A2M w/ Mount Pipe	167	(2) 7770.00 w/ Mount Pipe	147
QUAD656C0000X w/ Mount Pipe	167	(2) LGP21401	147
QUAD656C0000X w/ Mount Pipe	167	(2) LGP21401	147
QUAD656C0000X w/ Mount Pipe	167	(2) LGP21401	147
RRH2x60-700	167	(2) LGP21901	147
RRH2x60-700	167	(2) LGP21901	147
RRH2x60-700	167	(2) LGP21901	147
RRH2X60-PCS	167	DC6-48-60-18-8F	147
RRH2X60-PCS	167	HPA-65R-BUU-H8 w/ Mount Pipe	147
RRH2X60-PCS	167	HPA-65R-BUU-H8 w/ Mount Pipe	147
B66A RRH4X45	167	HPA-65R-BUU-H8 w/ Mount Pipe	147
B66A RRH4X45	167	RRUS11 A2	147
B66A RRH4X45	167	RRUS11 A2	147
DB-T1-6Z-8AB-0Z	167	RRUS11 A2	147
DB-T1-6Z-8AB-0Z	167	1001940	147
(2) LPA-80080-6CF-EDIN w/ Mount Pipe	167	1001940	147
		1001940	147
(2) LPA-80063/6CF w/ Mount Pipe	167	6' x 2" Mount Pipe	147
(2) LPA-80063/6CF w/ Mount Pipe	167	6' x 2" Mount Pipe	147
(2) FD9R6004/2C-3L	167	6' x 2" Mount Pipe	147
(2) FD9R6004/2C-3L	167	Platform Mount [LP 601-1]	147
(2) FD9R6004/2C-3L	167	GPS_A	75
GPS_A	167	Side Arm Mount [SO 701-1]	75
Platform Mount [LP 601-1]	167		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 56.36 ksi	56 ksi	71 ksi
Reinf 48.37 ksi	48 ksi	61 ksi	Reinf 56.46 ksi	56 ksi	71 ksi
Reinf 53.05 ksi	53 ksi	67 ksi	Reinf 53.54 ksi	54 ksi	67 ksi
Reinf 53.21 ksi	53 ksi	67 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 73.3%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: 180' MP; Oakdale, CT; Walden/ Carolyn Besade			
Project: PJF 37516-2062.003 (BU 876371)			
Client: Crown Castle	Drawn by: Ryan Ferrante	App'd:	
Code: TIA-222-G	Date: 11/22/16	Scale: N	
Path:		Dwg No.	

PAUL J. FORD & COMPANY
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v4.4 - Effective 7-12-13

Date: 11/22/2016
PJF Project: 37516-2062.003
Client Ref. # BU 876371
Site Name: Walden / Carolyn Besade
Description: 180' MP
Owner: Crown Castle
Engineer: RMF

Asymmetric Anchor Rod Analysis

Moment =	4240	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	56.0	kips	ASIF =	N/A	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	33.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	20							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
2	2.250	#18J A615 Gr 75	75	100	22.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
3	2.250	#18J A615 Gr 75	75	100	45.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
4	2.250	#18J A615 Gr 75	75	100	67.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
5	2.250	#18J A615 Gr 75	75	100	90.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
6	2.250	#18J A615 Gr 75	75	100	112.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
7	2.250	#18J A615 Gr 75	75	100	135.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
8	2.250	#18J A615 Gr 75	75	100	157.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
9	2.250	#18J A615 Gr 75	75	100	180.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
10	2.250	#18J A615 Gr 75	75	100	202.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
11	2.250	#18J A615 Gr 75	75	100	225.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
12	2.250	#18J A615 Gr 75	75	100	247.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
13	2.250	#18J A615 Gr 75	75	100	270.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
14	2.250	#18J A615 Gr 75	75	100	292.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
15	2.250	#18J A615 Gr 75	75	100	315.0	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
16	2.250	#18J A615 Gr 75	75	100	337.5	63.00	0.00	3.98	152.96	147.36	156.26	0.00	260.00	60.1%
17	2.250	A193 Gr B7	105	125	11.3	74.00	0.00	3.98	179.00	173.41	182.30	0.00	325.00	56.1%
18	2.250	A193 Gr B7	105	125	101.3	74.00	0.00	3.98	179.00	173.41	182.30	0.00	325.00	56.1%
19	2.250	A193 Gr B7	105	125	191.3	74.00	0.00	3.98	179.00	173.41	182.30	0.00	325.00	56.1%
20	2.250	A193 Gr B7	105	125	281.3	74.00	0.00	3.98	179.00	173.41	182.30	0.00	325.00	56.1%
								79.58						

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Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	3153.4	ft-kips
Axial, Pu:	44.8	kips
Shear, Vu:	26.4	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	63	in

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ή):	156.3 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	60.1% Pass	

Plate Data		
Diam:	69	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	10.71	in

Base Plate Results Flexural Check

		Stiffened
Base Plate Stress:	25.3 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	46.9% Pass	Y.L. Length: N/A, Roark

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.75	in
Fillet V. Weld:	0.4375	in
Width:	7	in
Height:	20	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Stiffener Results

Horizontal Weld :	49.5% Pass
Vertical Weld:	30.3% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	10.1% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	38.2% Pass
Plate Comp. (AISC Bracket):	41.2% Pass

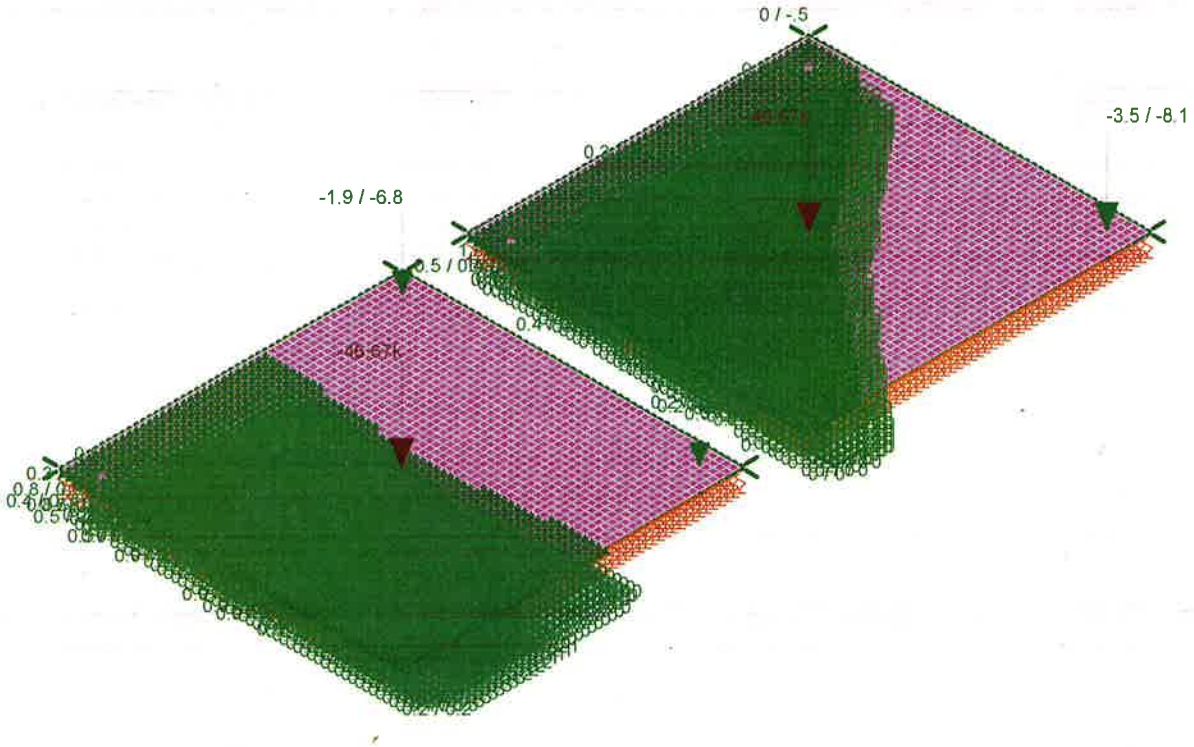
Pole Results

Pole Punching Shear Check:	9.4% Pass

Pole Data		
Diam:	54	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

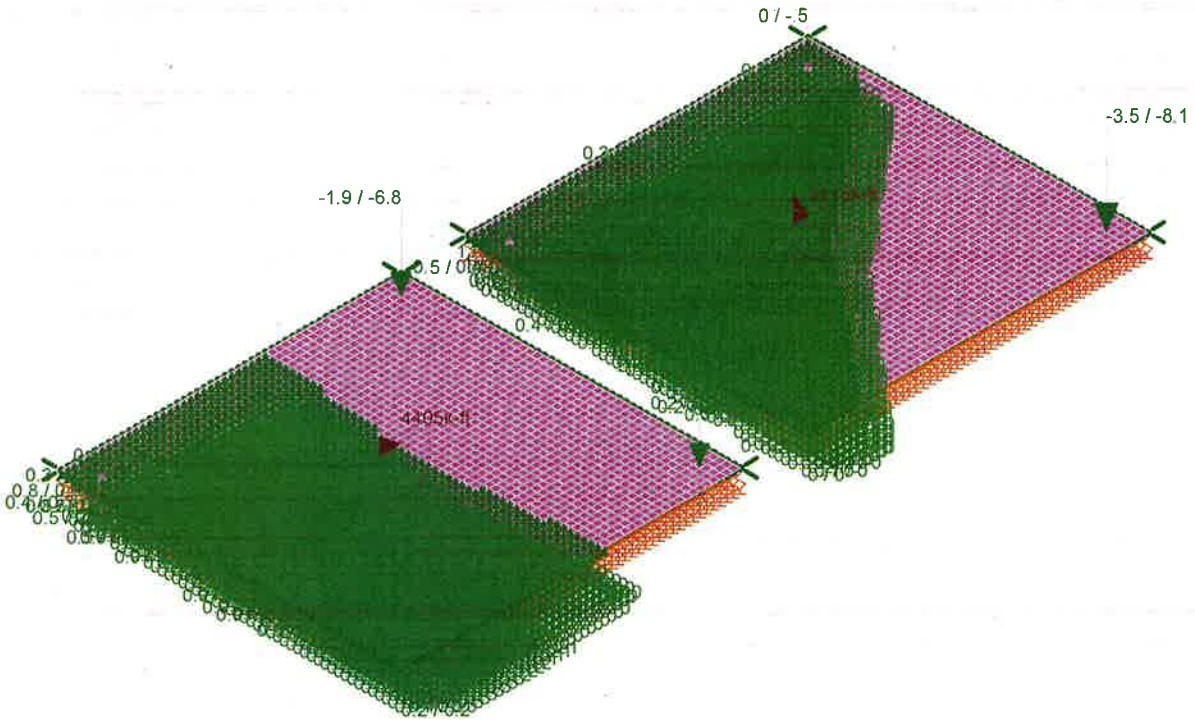
* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



Loads: BLC 1, Dead
Envelope Only Solution
Y-direction Reaction Units are k and k-ft (Enveloped)

Paul J. Ford and Company	BU 876371	SK - 1
KAT/ RMF		Nov 22, 2016 at 2:23 PM
37516-2062.003.7805		37516-2062.003.7805_Foundation ...



Loads: BLC 2, Moment
Envelope Only Solution
Y-direction Reaction Units are k and k-ft (Enveloped)

Paul J. Ford and Company	BU 876371	SK - 2
KAT/ RMF		Nov 22, 2016 at 2:23 PM
37516-2062.003.7805		37516-2062.003.7805_Foundation ...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	None
Aluminum Code	None - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	None		-1		2				
2	Moment	None				3				

Load Combinations

	Description	Solve	P...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	0.9 Dead + Moment	Yes	Y		1	.9	2	1																		
2	1.2 Dead + Moment	Yes	Y		1	1.2	2	1																		

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	SIDE	L	Y	-46.67
2	CORNER	L	Y	-46.67

Joint Loads and Enforced Displacements (BLC 2 : Moment)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*s^2*ft)]
1	SIDE	L	Mx	4405
2	CORNER	L	Mx	3115
3	CORNER	L	Mz	3115

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	.145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	.145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	.11	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	.11	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	.11	4	.75	60	60

Plate Forces (Mx) taken at face of pole from RISA-3D:

Compression (1.2)	Tension (0.9)
-19.741	-19.118
-19.514	-19.382
-19.589	-19.376
-19.907	-19.158
-20.433	-18.766
-21.147	-18.218
-22.042	-17.523
-23.121	-16.677
-24.395	-15.672
-25.883	-14.489
-27.613	-13.101
-29.627	-11.467
-31.985	-9.529
-34.78	-7.195
-38.156	-4.321
-42.358	-0.662
-47.815	4.214
-55.322	11.108
-66.391	21.548
-84.127	38.667
-114.447	68.436
-171.348	124.94
-269.683	223.16
-397.826	351.495
-495.684	449.614
-495.684	449.614
-397.826	351.495
-269.683	223.16
-171.348	124.94
-114.447	68.436
-84.127	38.667
-66.391	21.548
-55.322	11.108
-47.815	4.214
-42.358	-0.662
-38.156	-4.321
-34.78	-7.195
-31.985	-9.529
-29.627	-11.467
-27.613	-13.101
-25.883	-14.489
-24.395	-15.672
-23.121	-16.677
-22.042	-17.523
-21.147	-18.218
-20.433	-18.766
-19.907	-19.158
-19.589	-19.376
-19.514	-19.382
-19.741	-19.118
-4245.868	2137.056 k-ft
-2122.934	**1068.528** k-ft

Anchor Spring Constant

Ag =	0.908	in^2
E =	29000	ksi
Lu =	15	ft
k = An*E / Lu =	**146.29**	**k/in**

Pier Weight

Number Sides =	4	
Width/Diameter =		ft
Pier + Pad Height =	5	ft
Concrete Desnity =		pcf
Volume =	0	ft^3
Weight =	0	kips

Soil Weight

Height Above Grade =		ft
Soil Unit Weight =		pcf
Pad Width =		ft
Pad Length =		ft
Volume =	0.00	ft^3
Weight =	0.00	kips

Applied Reactions for RISA 3D

TNX Moment =	4240	k-ft
TNX Axial =	56	kips
TNX Shear =	33	kips
Total Unfactored Axial =	**46.67**	**kips**
Side Bending Moment =	**4405**	**k-ft**
Corner Bending Moment =	**3115**	**k-ft**

Tension from Anchors (Tension side only)

	Load (kips)	Distance to Center (ft)
1	6.8	11
2	6.8	11
3		
4		
5		
6		

Pole/Pier Diameter =	42	inches
Bending Moment = $\sum P*(D-d)$ =	1509.6	k-in
Bending Moment (Tension) =	**125.8**	**k-ft**

Anchor Capacity

Max Tension from RISA =	8.1	kips
An =	0.850	kips
Fu =	150	kips
Capacity (Kips) = 0.8*Fy*An =	102	
Ratio = 8.1 / 102 =	**7.9%**	

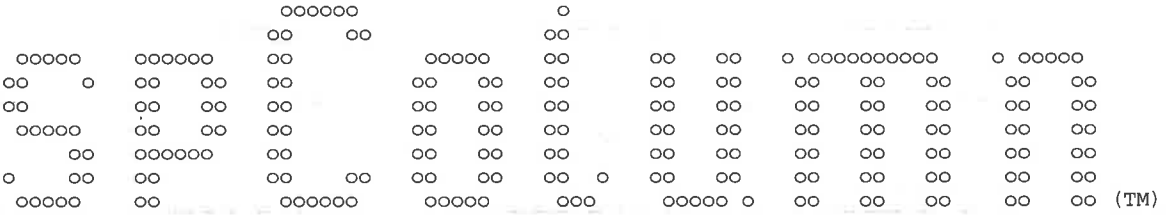
Bearing Check

Max Bearing Load =	1.095	kip
Plate Size =	0.5	ft
Ult Bearing Capacity =	24	ksf
Bearing Pressure =	4.38	ksf
Ratio =	**24.3%**	

Bending in Mat

Max (T) =	**1068.5 k-ft**
Max (C) =	**-2122.9 k-ft**

(per linear ft of plate)
(Divide by 2 for a 0.5 ft plate)



spColumn v5.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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General Information:
====================
File Name: g:\tower\375_crown_castle\2016\37516-2062_876371_w...\37516-2062.003.7805_mat bending.col
Project: BU 876371 / PJF 37516-2062
Column: Engineer:
Code: ACI 318-11 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Architectural

Material Properties:
====================
Concrete: Standard Steel: Standard
f'c = 4 ksi fy = 60 ksi
Ec = 3605 ksi Es = 29000 ksi
fc = 3.4 ksi Eps_yt = 0.00206897 in/in
Eps_u = 0.003 in/in
Beta1 = 0.85

Section:
========
Rectangular: Width = 300 in Depth = 60 in

Gross section area, Ag = 18000 in^2
Ix = 5.4e+006 in^4 Iy = 1.35e+008 in^4
rx = 17.3205 in ry = 86.6025 in
Xo = 0 in Yo = 0 in

Reinforcement:
==============
Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

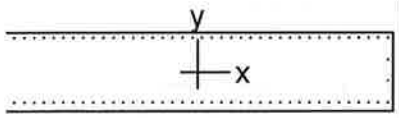
Layout: Rectangular
Pattern: Sides Different (Cover to transverse reinforcement)
Total steel area: As = 66.36 in^2 at rho = 0.37% (Note: rho < 0.50%)
Minimum clear spacing = 6.49 in

	Top	Bottom	Left	Right
Bars	40 # 8	40 # 8	2 # 8	2 # 8
Cover(in)	3	6	3	3

Factored Loads and Moments with Corresponding Capacities:
==========

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	0.00	1068.50	8001.00	7.488	6.72	53.13	0.02205	0.900
2	0.00	-2123.00	-7564.22	3.563	4.88	53.13	0.02967	0.900

*** End of output ***



300 x 60 in

Code: ACI 318-11

Units: English

Run axis: About X-axis

Run option: Investigation

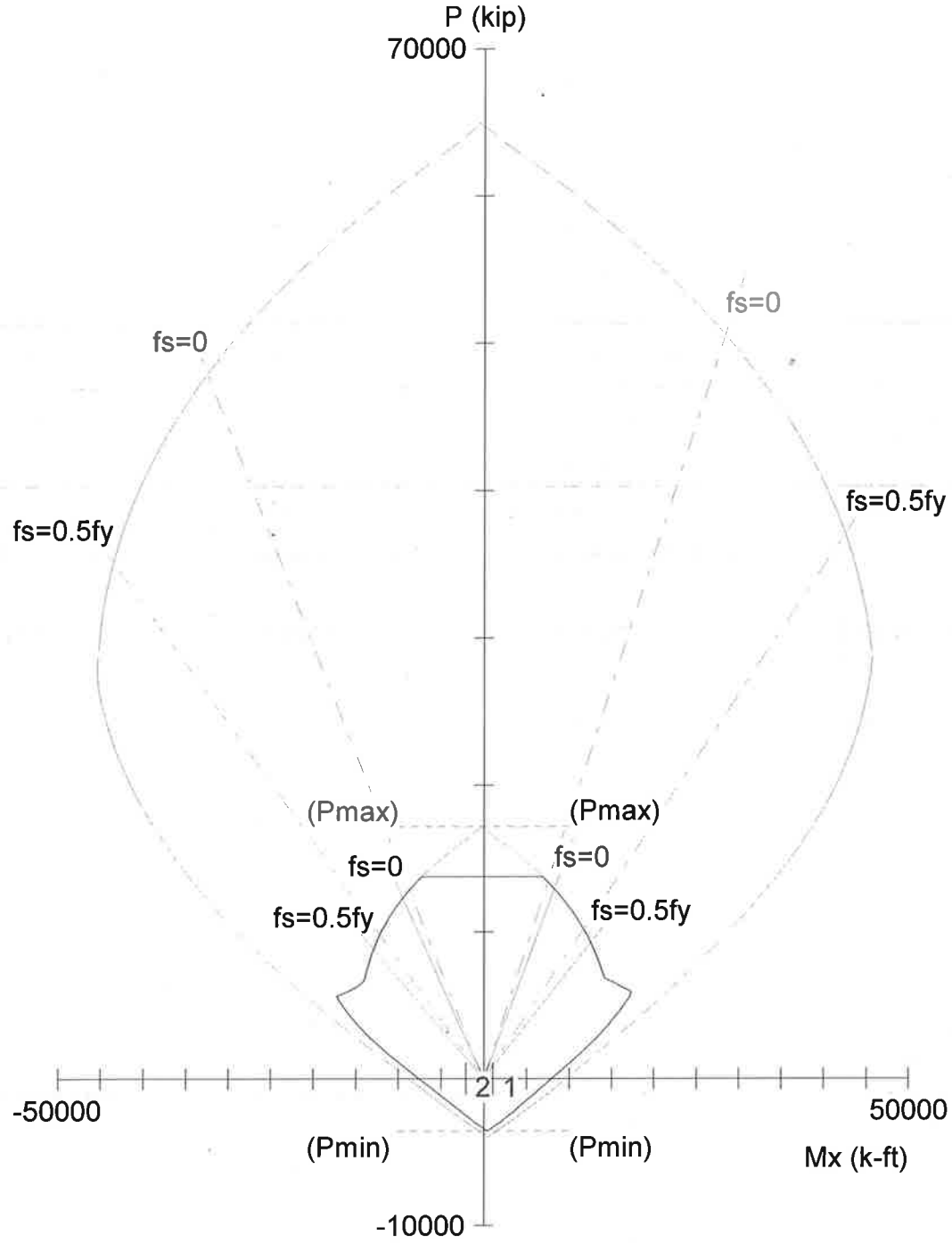
Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/22/16

Time: 14:24:21



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Project: BU 876371 / PJF 37516-2062

Column:		Engineer:	
f'c = 4 ksi	fy = 60 ksi	Ag = 18000 in^2	84 #8 bars
Ec = 3605 ksi	Es = 29000 ksi	As = 66.36 in^2	rho = 0.37%
fc = 3.4 ksi	e_yt = 0.00206897 in/in	Xo = 0.00 in	Ix = 5.4e+006 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 1.35e+008 in^4
Beta1 = 0.85		Min clear spacing = 6.49 in	Clear cover = 3.37 in

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65