



Danbury, CT, 06810  
P.: 203.797.1112

July 11, 2013

**VIA OVERNIGHT COURIER**

Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051  
Attn: Ms. Melanie Bachman, Acting Executive Director

**ORIGINAL**

RECEIVED  
JUL 12 2013

Re: Sprint Spectrum, L.P. – exempt modification  
171 Town Hill Road, Plymouth (Terryville) Connecticut

CONNECTICUT  
SITING COUNCIL

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. (“Sprint”). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of the Town of Plymouth.

Sprint plans to modify the existing wireless communications facility owned by T-Mobile and located at 171 Town Hill Road, Plymouth (Terryville) (coordinates 41°-40’-06.21” N, 73°-01-11.63” W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove the existing six (6) CMDA antennas and add three (3) dual-band panel LTE antennas to the existing platform at a centerline height of approximately 154.9’. Sprint will also install six (6) RRHs (remote radio heads) behind the antennas. Sprint will also place DC power and fiber runs along the existing coaxial cable run. The proposed modifications will not extend the height of the approximately 169’ structure.



Ms. Melanie Bachman

July 11, 2013

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2. Sprint will remove and replace two (2) existing cabinets mounted on the existing concrete pad with three (3) new cabinets. The existing GPS antenna will be replaced by another GPS antenna. These changes will have no effect on the site boundaries.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.
4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 16.839%; the combined site operations will result in a total power density of approximately 79.379%.

Please contact me by phone at (203) 610-1071 or by e-mail at [mjhowlett@optonline.net](mailto:mjhowlett@optonline.net) with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Melanie J. Howlett

Attachments

cc: Honorable Vincent Festa, Jr. Mayor, Town of Plymouth  
Terryville Country Fair, Inc. (underlying property owner)











**TECHNICAL**  
 12728 Parkview Drive  
 Denver, CO 80231  
 Phone: (303) 751-7200  
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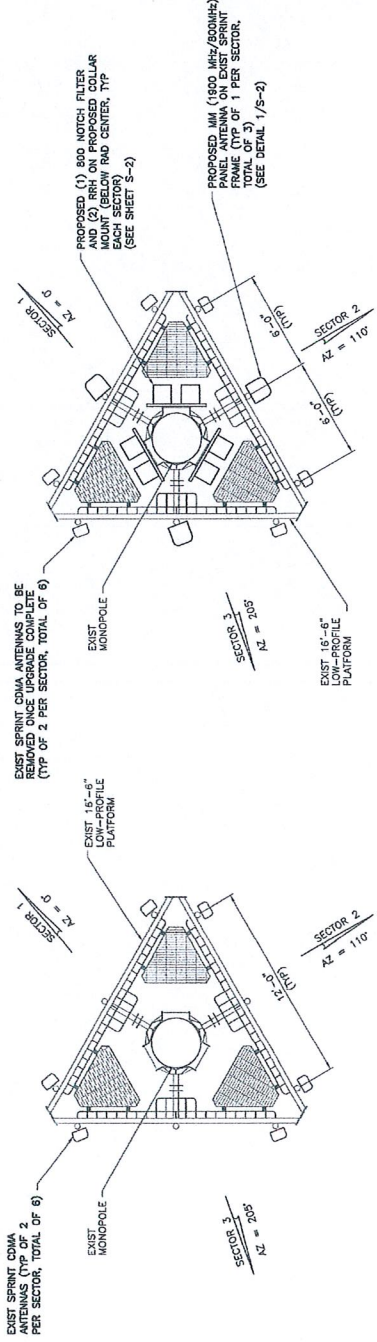
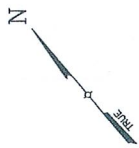
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SUBMITTALS	
NO.	DESCRIPTION
0	9/25/12 FOR COMMENT KR
1	12/04/12 FOR COMMENTS H,MR
2	01/29/13 FOR COMMENTS NS

SHEET NO. A-3

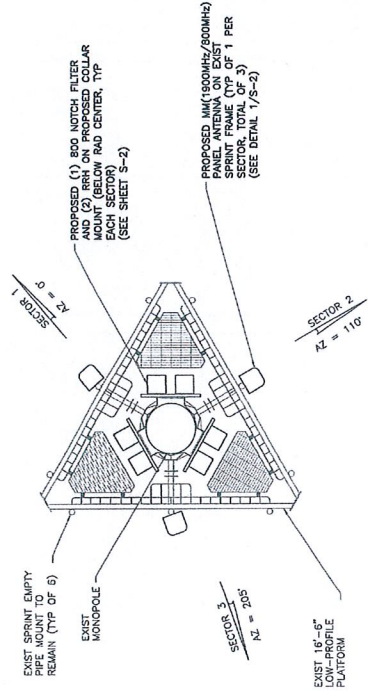
SITE NUMBER: CT5-4XC712  
 SITE NAME: TERRYVILLE-VOICESTREAM™  
 SITE ADDRESS: 171 TOWN HILL ROAD, TERRYVILLE, CT 06786  
 SHEET TITLE: ANTENNA LAYOUT PLANS  
 SHEET NO.: A-3

USE PLUMBING SCENARIO 124



1 ANTENNA LAYOUT PLAN (EXIST)  
 SCALE: 1/4" = 1'-0"

2 ANTENNA LAYOUT PLAN (INTERIM)  
 SCALE: 1/4" = 1'-0"



3 ANTENNA LAYOUT PLAN (FINAL)  
 SCALE: 1/4" = 1'-0"

THE PROPOSED INSTALLATION & EXISTING MONOPOLE SHALL BE ANALYZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT (TO BE COORDINATED BY OTHERS).



Date: April 4, 2013

Patrick Byrum  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277



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

**Subject: Structural Analysis Report**

**Carrier Designation: Sprint PCS Co-Locate – Interim Load**

**Carrier Site Number:** CT54XC712

**Crown Castle Designation:**

**Crown Castle BU Number:** 826768  
**Crown Castle Site Name:** PLYMOUTH/RT 6  
**Crown Castle JDE Job Number:** 224617  
**Crown Castle Work Order Number:** 581753  
**Crown Castle Application Number:** 179691 Rev. 1

**Engineering Firm Designation:**

**Crown Castle Project Number:** 581753

**Site Data:**

**171 Town Hill Road, Plymouth, Litchfield County, CT**  
**Latitude 41° 40' 6.197", Longitude -73° 1' 11.842"**  
**169 Foot - Monopole Tower**

Dear Patrick Byrum,

Crown Castle 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 581753, in accordance with application 179691, 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 TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

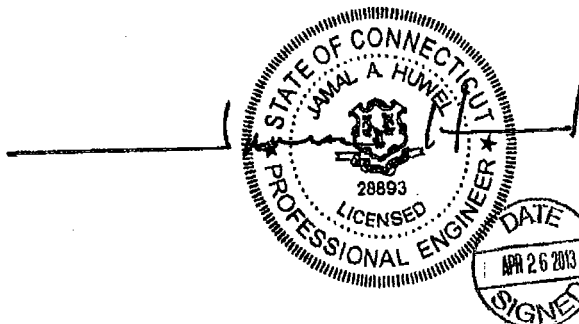
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Crown Castle 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.

Structural analysis prepared by: Nathan Martinak, EIT / MRC

Respectfully submitted by:

Jamal A. Huwel, P.E.  
Manager Engineering



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## 1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by PIROD MANUFACTURES INC. in September of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

**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
155.0	155.0	3	alcatel lucent	1900MHz RRH	3	1-1/4	-
		3	alcatel lucent	800MHZ RRH			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			

**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
165.0	169.0	1	decibel	ASP-952	4	7/8	1
		1	rfs celwave	PD220			
		1	rfs celwave	PD455-6			
		1	sinclair	SRL-229			
165.0	165.0	6	ericsson	AIR 21 w/ Mount Pipe	16	1-5/8	3
		3	ericsson	AIR 33 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	9	decibel	DB980H90E-M w/ Mount Pipe	9	1-5/8	1
		1	tower mounts	Platform Mount [LP 403-1]			
135.0	135.0	3	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 304-1]			
125.0	125.0	12	decibel	DB846G90A-XY w/ Mount Pipe	15	1-5/8	1
		1	tower mounts	Platform Mount [LP 304-1]			
121.0	125.0	1	rfs celwave	201-4	1	1/2	1
	121.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115.0	115.0	6	ericsson	RRUS 11	2 1	3/4 3/8	2
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		12	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F	12	1-5/8	
		6	kathrein	AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			
105.0	105.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
80.0	91.0	1	rfs celwave	PD455-6	1	7/8	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:  
 1) Existing Equipment  
 2) Reserved Equipment  
 3) Existing, Proposed, and Future Loading

**Table 3 - Design 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)
170	170	12	ems wireless	RR65-16-00XP	12	1-5/8
160	160	12	ems wireless	RR65-16-00XP	12	1-5/8
150	150	12	ems wireless	RR65-16-00XP	12	1-5/8
140	140	12	ems wireless	RR65-16-00XP	12	1-5/8
130	130	12	ems wireless	RR65-16-00XP	12	1-5/8
120	120	12	ems wireless	RR65-16-00XP	12	1-5/8

**3) ANALYSIS PROCEDURE**

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	3491991	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, Inc.	3491992	CCISITES

**3.1) Analysis Method**

tnxTower (version 6.0.4.0), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Base plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-2.15	1062.23	1.0	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.3125	2	-9.82	1674.11	26.2	Pass
L3	129.125 - 95.4583	Pole	TP41.75x32.1538x0.375	3	-21.09	2486.28	49.9	Pass
L4	95.4583 - 62.625	Pole	TP49.063x39.8058x0.375	4	-29.99	2928.68	69.7	Pass
L5	62.625 - 30.625	Pole	TP56.125x46.9553x0.375	5	-40.02	3355.11	81.1	Pass
L6	30.625 - 0	Pole	TP62.938x53.8467x0.375	6	-53.25	3684.97	92.4	Pass
							Summary	
							Pole (L6)	92.4 Pass
							Rating =	92.4 Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	82.2	Pass
1,2	Base Plate	0	92.4	Pass
1	Base Foundation	0	85.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>92.4%</b>
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Notes:

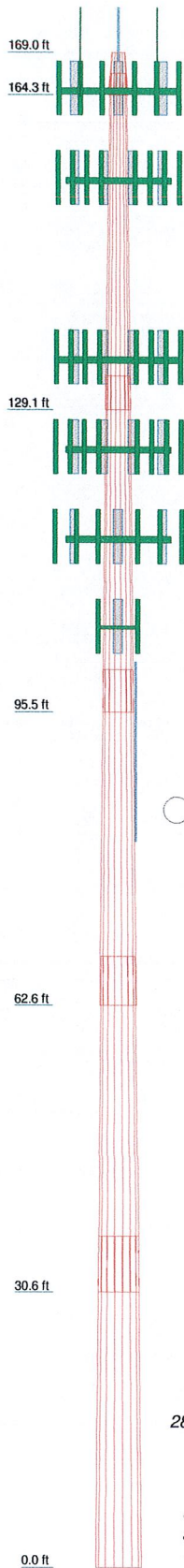
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Base plate has the same capacity as its respective shaft.

### 4.1) Recommendations

The tower and its base and anchor foundations have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

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

Section	1	2	3	4	5	6	
Length (ft)	4.75	37.50	37.50	37.50	37.50	36.88	
Number of Sides	18	18	18	18	18	18	
Thickness (in)	0.2500	0.3125	0.3750	0.3750	0.3750	0.3750	
Socket Length (ft)	2.36	3.63	4.67	5.50	6.25	53.8467	
Top Dia (in)	18.0000	21.5000	32.1588	39.8058	46.9553	62.9880	
Bot Dia (in)	26.0000	34.0630	41.7500	48.0630	56.1250		
Grade				A572-65			
Weight (K)	0.3	3.5	5.6	6.7	7.8	8.7	32.4



### DESIGNED APPURTENANCE LOADING

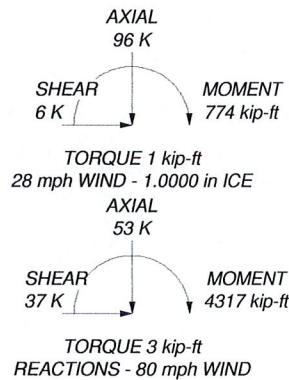
TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 403-1]	165	BXA-70063/6CF w/ Mount Pipe	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
AIR 33 w/ Mount Pipe	165	Platform Mount [LP 304-1]	125
AIR 33 w/ Mount Pipe	165	(4) DB846G90A-XY w/ Mount Pipe	125
AIR 33 w/ Mount Pipe	165	(4) DB846G90A-XY w/ Mount Pipe	125
ATMAA1412D-1A20	165	(4) DB846G90A-XY w/ Mount Pipe	125
ATMAA1412D-1A20	165	Side Arm Mount [SO 701-1]	121
ATMAA1412D-1A20	165	201-4	121
PD455-6	165	Platform Mount [LP 303-1]	115
SRL-229	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
PD220	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
ASP-952	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
Platform Mount [LP 403-1]	155	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
(3) DB980H90E-M w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
(3) DB980H90E-M w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
1900MHZ RRH	155	(2) RRU11	115
1900MHZ RRH	155	(2) RRU11	115
1900MHZ RRH	155	(2) RRU11	115
800MHZ RRH	155	(2) LGP2140X	115
800MHZ RRH	155	(4) LGP2140X	115
800MHZ RRH	155	(6) LGP2140X	115
Platform Mount [LP 304-1]	135	DC6-48-60-18-8F	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	Pipe Mount [PM 601-3]	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-70063/6CF w/ Mount Pipe	135	Side Arm Mount [SO 701-1]	80
BXA-70063/6CF w/ Mount Pipe	135	PD455-6	80

### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

### TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 92.4%



<p><b>Crown Castle</b> 2000 Corporate Drive Canonsburg, PA 15317 We are Solutions Phone: (724) 416-2000 FAX: (724) 416-4594</p>	Job: <b>BU #826768</b>
	Project: Crown Castle
	Client: Crown Castle
	Code: TIA/EIA-222-F
	Path: R:\SA Models - Letters\Work Area\N\Nortna\82676811 Item\826768.dwg
Drawn by: NMartinak	App'd:
Date: 03/06/13	Scale: NTS
	Dwg No. E-1

## Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- 4) Tower is located in Litchfield County, Connecticut.
- 5) Basic wind speed of 80 mph.
- 6) Nominal ice thickness of 1.0000 in.
- 7) Ice thickness is considered to increase with height.
- 8) Ice density of 56 pcf.
- 9) A wind speed of 28 mph is used in combination with ice.
- 10) Temperature drop of 50 °F.
- 11) Deflections calculated using a wind speed of 50 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 1.333.
- 15) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check Poles ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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## 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	169.00-164.25	4.75	2.38	18	18.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.13	37.50	3.83	18	21.5000	34.0630	0.3125	1.2500	A572-65 (65 ksi)
L3	129.13-95.46	37.50	4.67	18	32.1538	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	95.46-62.63	37.50	5.50	18	39.8058	49.0630	0.3750	1.5000	A572-65 (65 ksi)
L5	62.63-30.63	37.50	6.25	18	46.9553	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	30.63-0.00	36.88		18	53.8467	62.9380	0.3750	1.5000	A572-65 (65 ksi)



### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	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
	26.4011	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	22.6396	21.0154	1191.8828	7.5216	10.9220	109.1268	2385.3338	10.5097	3.2340	10.349
	34.5885	33.4763	4817.6476	11.9814	17.3040	278.4123	9641.6344	16.7413	5.4451	17.424
L3	33.6459	37.8247	4826.0007	11.2815	16.3341	295.4552	9658.3516	18.9159	4.9991	13.331
	42.3941	49.2466	10650.982	14.6881	21.2090	502.1916	21315.979	24.6280	6.6880	17.835
L4	41.5897	46.9325	9218.9729	13.9979	20.2213	455.9030	18450.076	23.4707	6.3458	16.922
	49.8199	57.9509	17355.672	17.2842	24.9240	696.3437	34734.182	28.9810	7.9751	21.267
L5	49.0453	55.4422	15197.840	16.5360	23.8533	637.1383	30415.677	27.7264	7.6041	20.278
	56.9908	66.3564	26056.150	19.7913	28.5115	913.8821	52146.586	33.1845	9.2180	24.581
L6	56.2421	63.6447	22990.474	18.9825	27.3541	840.4754	46011.200	31.8284	8.8170	23.512
	63.9089	74.4656	36823.777	22.2099	31.9725	1151.7327	73696.008	37.2399	10.4171	27.779

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 169.00-164.25				1	1	1		
L2 164.25-129.13				1	1	1		
L3 129.13-95.46				1	1	1		
L4 95.46-62.63				1	1	1		
L5 62.63-30.63				1	1	1		
L6 30.63-0.00				1	1	1		

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter r	Weight
				ft			in	r in	r in	pff
**										

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
				ft		ft <sup>2</sup> /ft	pff
LDF5-50A(7/8")	C	No	Inside Pole	165.00 - 0.00	4	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
LDF7-50A(1-5/8")	C	No	Inside Pole	165.00 - 0.00	16	4" Ice	0.00
						No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight plf	
						ft <sup>2</sup> /ft			
LDF7-50A(1-5/8")	B	No	Inside Pole	155.00 - 0.00	9	2" Ice	0.00	0.82	
						4" Ice	0.00	0.82	
						No Ice	0.00	0.82	
						1/2" Ice	0.00	0.82	
						1" Ice	0.00	0.82	
						2" Ice	0.00	0.82	
HB114-1-08U4-M6F( 1 1/4")	B	No	Inside Pole	155.00 - 0.00	3	4" Ice	0.00	0.82	
						No Ice	0.00	1.30	
						1/2" Ice	0.00	1.30	
						1" Ice	0.00	1.30	
						2" Ice	0.00	1.30	
						4" Ice	0.00	1.30	
LDF7-50A(1-5/8")	A	No	Inside Pole	135.00 - 0.00	12	No Ice	0.00	0.82	
						1/2" Ice	0.00	0.82	
						1" Ice	0.00	0.82	
						2" Ice	0.00	0.82	
						4" Ice	0.00	0.82	
						No Ice	0.00	0.82	
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	125.00 - 0.00	12	4" Ice	0.00	0.82	
						No Ice	0.00	0.82	
						1/2" Ice	0.00	2.33	
						1" Ice	0.00	4.46	
						2" Ice	0.00	10.54	
						4" Ice	0.00	30.04	
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	125.00 - 0.00	3	No Ice	0.20	0.82	
						1/2" Ice	0.30	2.33	
						1" Ice	0.40	4.46	
						2" Ice	0.60	10.54	
						4" Ice	1.00	30.04	
						No Ice	0.00	0.15	
LDF4-50A(1/2")	A	No	CaAa (Out Of Face)	121.00 - 0.00	1	1/2" Ice	0.00	0.84	
						1" Ice	0.00	2.14	
						2" Ice	0.00	6.58	
						4" Ice	0.00	22.78	
						No Ice	0.00	0.82	
						1/2" Ice	0.00	2.33	
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	115.00 - 0.00	12	1" Ice	0.00	4.46	
						2" Ice	0.00	10.54	
						4" Ice	0.00	30.04	
						No Ice	0.00	0.82	
						1/2" Ice	0.00	2.33	
						1" Ice	0.00	4.46	
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	105.00 - 0.00	6	2" Ice	0.00	10.54	
						4" Ice	0.00	30.04	
						No Ice	0.00	0.82	
						1/2" Ice	0.00	2.33	
						1" Ice	0.00	4.46	
						2" Ice	0.00	10.54	
LDF5-50A(7/8")	A	No	Inside Pole	80.00 - 0.00	1	4" Ice	0.00	30.04	
						No Ice	0.00	0.33	
						1/2" Ice	0.00	0.33	
						1" Ice	0.00	0.33	
						2" Ice	0.00	0.33	
						4" Ice	0.00	0.33	
** **	FB-L98-002-XXX( 3/8)	A	No	Inside Pole	115.00 - 0.00	1	No Ice	0.00	0.06
1/2" Ice							0.00	0.06	
1" Ice							0.00	0.06	
2" Ice							0.00	0.06	
4" Ice							0.00	0.06	
No Ice							0.00	0.53	
WR-VG86T( 3/4)	A	No	Inside Pole	115.00 - 0.00	2	1/2" Ice	0.00	0.53	
						1" Ice	0.00	0.53	
						2" Ice	0.00	0.53	
						4" Ice	0.00	0.53	
						No Ice	0.00	2.80	
						1/2" Ice	0.00	4.33	
2" Rigid Conduit	C	No	CaAa (Out Of Face)	115.00 - 0.00	1	1" Ice	0.00	6.47	
						2" Ice	0.00	12.57	
						4" Ice	0.00	32.12	
						No Ice	0.00	2.80	
						1/2" Ice	0.00	4.33	
						1" Ice	0.00	6.47	
**									

### Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	169.00-164.25	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	0.01
L2	164.25-129.13	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.29
		C	0.000	0.000	0.000	0.000	0.51
L3	129.13-95.46	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	0.000	0.000	0.38
		C	0.000	0.000	0.000	17.548	1.10
L4	95.46-62.63	A	0.000	0.000	0.000	0.000	0.53
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	19.503	1.29
L5	62.63-30.63	A	0.000	0.000	0.000	0.000	0.52
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	19.008	1.26
L6	30.63-0.00	A	0.000	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.35
		C	0.000	0.000	0.000	18.191	1.21

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

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	169.00-164.25	A	1.214	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	0.01
L2	164.25-129.13	A	1.195	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.29
		C		0.000	0.000	0.000	0.000	0.51
L3	129.13-95.46	A	1.158	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	0.000	0.000	0.38
		C		0.000	0.000	0.000	38.729	4.46
L4	95.46-62.63	A	1.110	0.000	0.000	0.000	0.000	1.53
		B		0.000	0.000	0.000	0.000	0.37
		C		0.000	0.000	0.000	42.310	5.52
L5	62.63-30.63	A	1.042	0.000	0.000	0.000	0.000	1.43
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	40.322	5.12
L6	30.63-0.00	A	1.000	0.000	0.000	0.000	0.000	1.28
		B		0.000	0.000	0.000	0.000	0.35
		C		0.000	0.000	0.000	37.345	4.55

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	169.00-164.25	0.0000	0.0000	0.0000	0.0000
L2	164.25-129.13	0.0000	0.0000	0.0000	0.0000
L3	129.13-95.46	-0.5883	0.3397	-1.0579	0.6108
L4	95.46-62.63	-0.6661	0.3846	-1.2000	0.6928
L5	62.63-30.63	-0.6789	0.3920	-1.2288	0.7094
L6	30.63-0.00	-0.6887	0.3976	-1.2351	0.7131

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub>		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
Platform Mount [LP 403-1]	C	None			0.0000	165.00	No Ice	18.85	18.85	1.50
							1/2" Ice	24.30	24.30	1.80
							1" Ice	29.75	29.75	2.09
							2" Ice	40.65	40.65	2.69
							4" Ice	62.45	62.45	3.87
(2) AIR 21 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
(2) AIR 21 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
AIR 33 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
AIR 33 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
AIR 33 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
ATMAA1412D-1A20	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
PD455-6	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.05	6.05	0.02
							1/2" Ice	8.28	8.28	0.07



## 1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by PIROD MANUFACTURES INC. in September of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

**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
155.0	155.0	3	alcatel lucent	1900MHz RRH	3	1-1/4	-
		3	alcatel lucent	800MHz RRH			
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			

**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
165.0	169.0	1	decibel	ASP-952	4	7/8	1
		1	rfs celwave	PD220			
		1	rfs celwave	PD455-6			
		1	sinclair	SRL-229			
165.0	165.0	6	ericsson	AIR 21 w/ Mount Pipe	16	1-5/8	3
		3	ericsson	AIR 33 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	9	decibel	DB980H90E-M w/ Mount Pipe	9	1-5/8	1
		1	tower mounts	Platform Mount [LP 403-1]			
135.0	135.0	3	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 304-1]			
125.0	125.0	12	decibel	DB846G90A-XY w/ Mount Pipe	15	1-5/8	1
		1	tower mounts	Platform Mount [LP 304-1]			
121.0	125.0	1	rfs celwave	201-4	1	1/2	1
	121.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
			4.00				Ice	10.53	10.53	0.12
							1" Ice	15.07	15.07	0.28
							2" Ice	24.37	24.37	0.77
							4" Ice			
SRL-229	A	From Leg	4.00	0.0000	165.00	No Ice	6.45	6.45	0.03	
			0.00			1/2"	8.63	8.63	0.07	
			4.00			Ice	10.83	10.83	0.13	
						1" Ice	15.28	15.28	0.29	
						2" Ice	24.01	24.01	0.79	
						4" Ice				
PD220	B	From Leg	4.00	0.0000	165.00	No Ice	3.08	3.08	0.02	
			0.00			1/2"	5.30	5.30	0.05	
			4.00			Ice	7.54	7.54	0.09	
						1" Ice	12.06	12.06	0.21	
						2" Ice	21.31	21.31	0.62	
						4" Ice				
ASP-952	C	From Leg	4.00	0.0000	165.00	No Ice	3.02	3.02	0.02	
			0.00			1/2"	4.16	4.16	0.04	
			4.00			Ice	5.30	5.30	0.07	
						1" Ice	6.96	6.96	0.15	
						2" Ice	9.76	9.76	0.40	
						4" Ice				
**										
Platform Mount [LP 403-1]	C	None		0.0000	155.00	No Ice	18.85	18.85	1.50	
						1/2"	24.30	24.30	1.80	
						Ice	29.75	29.75	2.09	
						1" Ice	40.65	40.65	2.69	
						2" Ice	62.45	62.45	3.87	
						4" Ice				
(3) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00	0.0000	155.00	No Ice	4.04	3.62	0.03	
			0.00			1/2"	4.50	4.48	0.06	
			0.00			Ice	4.95	5.22	0.11	
						1" Ice	5.87	6.74	0.22	
						2" Ice	8.05	10.00	0.55	
						4" Ice				
(3) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00	0.0000	155.00	No Ice	4.04	3.62	0.03	
			0.00			1/2"	4.50	4.48	0.06	
			0.00			Ice	4.95	5.22	0.11	
						1" Ice	5.87	6.74	0.22	
						2" Ice	8.05	10.00	0.55	
						4" Ice				
(3) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00	0.0000	155.00	No Ice	4.04	3.62	0.03	
			0.00			1/2"	4.50	4.48	0.06	
			0.00			Ice	4.95	5.22	0.11	
						1" Ice	5.87	6.74	0.22	
						2" Ice	8.05	10.00	0.55	
						4" Ice				
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.0000	155.00	No Ice	8.50	6.95	0.08	
			0.00			1/2"	9.15	8.13	0.15	
			0.00			Ice	9.77	9.02	0.22	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
						4" Ice				
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.0000	155.00	No Ice	8.50	6.95	0.08	
			0.00			1/2"	9.15	8.13	0.15	
			0.00			Ice	9.77	9.02	0.22	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
						4" Ice				
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.0000	155.00	No Ice	8.50	6.95	0.08	
			0.00			1/2"	9.15	8.13	0.15	
			0.00			Ice	9.77	9.02	0.22	
						1" Ice	11.03	10.84	0.41	
						2" Ice	13.68	14.85	0.91	
						4" Ice				

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
1900MHz RRH	A	From Leg	4.00	0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00			1/2"	3.14	4.06	0.08
			0.00			Ice	3.39	4.34	0.11
						1" Ice	3.91	4.91	0.19
						2" Ice	5.05	6.15	0.41
1900MHz RRH	B	From Leg	4.00	0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00			1/2"	3.14	4.06	0.08
			0.00			Ice	3.39	4.34	0.11
						1" Ice	3.91	4.91	0.19
						2" Ice	5.05	6.15	0.41
1900MHz RRH	C	From Leg	4.00	0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00			1/2"	3.14	4.06	0.08
			0.00			Ice	3.39	4.34	0.11
						1" Ice	3.91	4.91	0.19
						2" Ice	5.05	6.15	0.41
800MHZ RRH	A	From Leg	4.00	0.0000	155.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			0.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
800MHZ RRH	B	From Leg	4.00	0.0000	155.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			0.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
800MHZ RRH	C	From Leg	4.00	0.0000	155.00	No Ice	2.49	2.07	0.05
			0.00			1/2"	2.71	2.27	0.07
			0.00			Ice	2.93	2.48	0.10
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
**									
Platform Mount [LP 304-1]	C	None		0.0000	135.00	No Ice	17.46	17.46	1.35
						1/2"	22.44	22.44	1.62
						Ice	27.42	27.42	1.90
						1" Ice	37.38	37.38	2.45
						2" Ice	57.30	57.30	3.55
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00	0.0000	135.00	No Ice	4.56	10.73	0.05
			0.00			1/2"	5.11	11.99	0.11
			0.00			Ice	5.61	12.97	0.19
						1" Ice	6.65	14.98	0.36
						2" Ice	8.83	19.22	0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00	0.0000	135.00	No Ice	4.56	10.73	0.05
			0.00			1/2"	5.11	11.99	0.11
			0.00			Ice	5.61	12.97	0.19
						1" Ice	6.65	14.98	0.36
						2" Ice	8.83	19.22	0.86
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00	0.0000	135.00	No Ice	4.56	10.73	0.05
			0.00			1/2"	5.11	11.99	0.11
			0.00			Ice	5.61	12.97	0.19
						1" Ice	6.65	14.98	0.36
						2" Ice	8.83	19.22	0.86
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00	0.0000	135.00	No Ice	3.18	3.35	0.03
			0.00			1/2"	3.56	3.97	0.06
			0.00			Ice	3.96	4.60	0.10
						1" Ice	4.85	5.89	0.19



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
						2" Ice 6.77	8.89	0.49	
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	3.18	3.35	0.03
						No Ice	3.56	3.97	0.06
						1/2" Ice	3.96	4.60	0.10
						1" Ice	4.85	5.89	0.19
						2" Ice	6.77	8.89	0.49
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	3.18	3.35	0.03
						No Ice	3.56	3.97	0.06
						1/2" Ice	3.96	4.60	0.10
						1" Ice	4.85	5.89	0.19
						2" Ice	6.77	8.89	0.49
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	7.98	5.70	0.04
						No Ice	8.62	6.85	0.10
						1/2" Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	7.98	5.70	0.04
						No Ice	8.62	6.85	0.10
						1/2" Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	7.98	5.70	0.04
						No Ice	8.62	6.85	0.10
						1/2" Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	0.37	0.08	0.00
						No Ice	0.45	0.14	0.01
						1/2" Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	0.37	0.08	0.00
						No Ice	0.45	0.14	0.01
						1/2" Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice	0.37	0.08	0.00
						No Ice	0.45	0.14	0.01
						1/2" Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
**									
Platform Mount [LP 304-1]	C	None		0.0000	125.00	4" Ice	17.46	17.46	1.35
						No Ice	22.44	22.44	1.62
						1/2" Ice	27.42	27.42	1.90
						1" Ice	37.38	37.38	2.45
						2" Ice	57.30	57.30	3.55
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	125.00	4" Ice	5.23	7.53	0.04
						No Ice	5.78	8.72	0.09
						1/2" Ice	6.30	9.62	0.16
						1" Ice	7.37	11.45	0.32
						2" Ice	9.69	15.60	0.77
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00 0.00	0.0000	125.00	4" Ice	5.23	7.53	0.04
						No Ice	5.78	8.72	0.09

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral						ft
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
			0.00				Ice	6.30	9.62	0.16
							1" Ice	7.37	11.45	0.32
							2" Ice	9.69	15.60	0.77
							4" Ice			
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00	0.0000	125.00		No Ice	5.23	7.53	0.04
			0.00				1/2"	5.78	8.72	0.09
			0.00				Ice	6.30	9.62	0.16
							1" Ice	7.37	11.45	0.32
							2" Ice	9.69	15.60	0.77
							4" Ice			
**										
Side Arm Mount [SO 701-1]	A	From Leg	2.00	0.0000	121.00		No Ice	0.85	1.67	0.07
			0.00				1/2"	1.14	2.34	0.08
			0.00				Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice	3.17	7.03	0.18
							4" Ice			
201-4	A	From Leg	4.00	0.0000	121.00		No Ice	1.13	1.13	0.00
			0.00				1/2"	2.00	2.00	0.01
			4.00				Ice	2.90	2.90	0.03
							1" Ice	4.31	4.31	0.08
							2" Ice	6.53	6.53	0.24
							4" Ice			
**										
Platform Mount [LP 303-1]	C	None		0.0000	115.00		No Ice	14.66	14.66	1.25
							1/2"	18.87	18.87	1.48
							Ice	23.08	23.08	1.71
							1" Ice	31.50	31.50	2.18
							2" Ice	48.34	48.34	3.10
							4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	A	From Leg	4.00	0.0000	115.00		No Ice	7.85	6.65	0.09
			0.00				1/2"	8.45	7.87	0.15
			0.00				Ice	9.09	8.84	0.22
							1" Ice	10.38	10.73	0.39
							2" Ice	13.07	14.69	0.88
							4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	B	From Leg	4.00	0.0000	115.00		No Ice	7.85	6.65	0.09
			0.00				1/2"	8.45	7.87	0.15
			0.00				Ice	9.09	8.84	0.22
							1" Ice	10.38	10.73	0.39
							2" Ice	13.07	14.69	0.88
							4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	C	From Leg	4.00	0.0000	115.00		No Ice	7.85	6.65	0.09
			0.00				1/2"	8.45	7.87	0.15
			0.00				Ice	9.09	8.84	0.22
							1" Ice	10.38	10.73	0.39
							2" Ice	13.07	14.69	0.88
							4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	115.00		No Ice	8.50	6.30	0.07
			0.00				1/2"	9.15	7.48	0.14
			0.00				Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87
							4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	115.00		No Ice	8.50	6.30	0.07
			0.00				1/2"	9.15	7.48	0.14
			0.00				Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87
							4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.0000	115.00		No Ice	8.50	6.30	0.07
			0.00				1/2"	9.15	7.48	0.14
			0.00				Ice	9.77	8.37	0.21
							1" Ice	11.03	10.18	0.38
							2" Ice	13.68	14.02	0.87

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
(2) RRUS 11	A	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
(2) RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
(2) RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
(2) LGP2140X	A	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.26	0.38	0.02
						1/2"	1.42	0.49	0.03
						Ice	1.58	0.62	0.04
						1" Ice	1.94	0.89	0.06
						2" Ice	2.75	1.54	0.14
(4) LGP2140X	B	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.26	0.38	0.02
						1/2"	1.42	0.49	0.03
						Ice	1.58	0.62	0.04
						1" Ice	1.94	0.89	0.06
						2" Ice	2.75	1.54	0.14
(6) LGP2140X	C	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.26	0.38	0.02
						1/2"	1.42	0.49	0.03
						Ice	1.58	0.62	0.04
						1" Ice	1.94	0.89	0.06
						2" Ice	2.75	1.54	0.14
DC6-48-60-18-8F	C	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.27	1.27	0.02
						1/2"	1.46	1.46	0.04
						Ice	1.66	1.66	0.05
						1" Ice	2.09	2.09	0.10
						2" Ice	3.10	3.10	0.21
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	115.00	4" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
** Pipe Mount [PM 601-3]	C	None		0.0000	105.00	4" Ice			
No Ice						4.39	4.39	0.20	
1/2"						5.48	5.48	0.24	
						Ice	6.57	6.57	0.28

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00	0.00	0.0000	105.00	1" Ice	8.75	8.75	0.36
							2" Ice	13.11	13.11	0.53
							4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00	0.00	0.0000	105.00	2" Ice	9.92	12.28	0.68
							4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00	0.00	0.0000	105.00	4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
							1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			
Side Arm Mount [SO 701-1]	A	From Leg	2.00	0.00	0.0000	80.00	No Ice	0.85	1.67	0.07
							1/2" Ice	1.14	2.34	0.08
							Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice	3.17	7.03	0.18
							4" Ice			
							1" Ice	2.01	4.35	0.12
PD455-6	A	From Leg	4.00	0.00	0.0000	80.00	No Ice	6.05	6.05	0.02
							1/2" Ice	8.28	8.28	0.07
							Ice	10.53	10.53	0.12
							1" Ice	15.07	15.07	0.28
							2" Ice	24.37	24.37	0.77
							4" Ice			

### Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp



Comb. No.	Description
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

**Maximum Member Forces**

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164.25	Pole	Max Tension	14	0.76	-0.02	0.18
			Max. Compression	14	-4.62	-0.06	0.61
			Max. Mx	11	-2.15	4.49	-0.05
			Max. My	2	-2.15	0.00	4.57
			Max. Vy	11	-3.17	4.49	-0.05
			Max. Vx	8	3.21	0.00	-4.41
			Max. Torque	11			-1.77
L2	164.25 - 129.125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.06	0.06	1.10
			Max. Mx	11	-9.82	285.04	0.04
			Max. My	2	-9.83	0.02	285.13
			Max. Vy	11	-15.06	285.04	0.04
			Max. Vx	8	15.06	0.03	-284.84
			Max. Torque	5			2.09
L3	129.125 - 95.4583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.63	5.93	-1.45
			Max. Mx	11	-21.09	1006.22	-0.86
			Max. My	8	-21.11	1.55	-1003.09
			Max. Vy	11	-27.79	1006.22	-0.86
			Max. Vx	8	27.65	1.55	-1003.09
			Max. Torque	11			-2.55
L4	95.4583 - 62.625	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-58.50	14.11	-2.85
			Max. Mx	11	-29.99	1957.53	-1.95
			Max. My	8	-30.00	3.83	-1948.31
			Max. Vy	11	-31.45	1957.53	-1.95
			Max. Vx	8	31.28	3.83	-1948.31
			Max. Torque	5			3.58
L5	62.625 - 30.625	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-75.24	23.03	-5.61
			Max. Mx	11	-40.02	2989.89	-3.40
			Max. My	8	-40.03	6.28	-2974.34
			Max. Vy	11	-34.40	2989.89	-3.40
			Max. Vx	8	34.23	6.28	-2974.34
			Max. Torque	5			3.53
L6	30.625 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-95.99	33.69	-8.94
			Max. Mx	11	-53.25	4317.40	-5.20

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-53.25	9.35	-4294.33
			Max. Vy	11	-37.44	4317.40	-5.20
			Max. Vx	8	37.28	9.35	-4294.33
			Max. Torque	4			3.41

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	95.99	0.00	-0.00
	Max. H <sub>x</sub>	11	53.27	37.42	-0.03
	Max. H <sub>z</sub>	2	53.27	-0.03	37.25
	Max. M <sub>x</sub>	2	4291.15	-0.03	37.25
	Max. M <sub>z</sub>	5	4305.87	-37.42	0.03
	Max. Torsion	4	3.41	-32.42	18.65
	Min. Vert	1	53.27	0.00	0.00
	Min. H <sub>x</sub>	5	53.27	-37.42	0.03
	Min. H <sub>z</sub>	8	53.27	0.03	-37.25
	Min. M <sub>x</sub>	8	-4294.33	0.03	-37.25
	Min. M <sub>z</sub>	11	-4317.40	37.42	-0.03
	Min. Torsion	10	-3.41	32.42	-18.65

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overtuning Moment, M <sub>x</sub> kip-ft	Overtuning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	53.27	0.00	0.00	1.55	5.60	0.00
Dead+Wind 0 deg - No Ice	53.27	0.03	-37.25	-4291.15	2.19	-1.10
Dead+Wind 30 deg - No Ice	53.27	18.74	-32.28	-3717.81	-2153.17	-2.61
Dead+Wind 60 deg - No Ice	53.27	32.42	-18.65	-2147.86	-3730.02	-3.41
Dead+Wind 90 deg - No Ice	53.27	37.42	-0.03	-1.97	-4305.87	-3.30
Dead+Wind 120 deg - No Ice	53.27	32.39	18.60	2144.87	-3726.43	-2.31
Dead+Wind 150 deg - No Ice	53.27	18.68	32.25	3717.44	-2146.95	-0.70
Dead+Wind 180 deg - No Ice	53.27	-0.03	37.25	4294.33	9.35	1.10
Dead+Wind 210 deg - No Ice	53.27	-18.74	32.28	3721.01	2164.69	2.61
Dead+Wind 240 deg - No Ice	53.27	-32.42	18.65	2151.07	3741.53	3.41
Dead+Wind 270 deg - No Ice	53.27	-37.42	0.03	5.20	4317.40	3.30
Dead+Wind 300 deg - No Ice	53.27	-32.39	-18.60	-2141.65	3737.98	2.31
Dead+Wind 330 deg - No Ice	53.27	-18.68	-32.25	-3714.23	2158.50	0.70
Dead+Ice+Temp	95.99	-0.00	0.00	8.94	33.69	0.00
Dead+Wind 0 deg+Ice+Temp	95.99	0.00	-6.08	-728.09	33.28	-0.21
Dead+Wind 30 deg+Ice+Temp	95.99	3.06	-5.27	-629.59	-336.91	-0.55
Dead+Wind 60 deg+Ice+Temp	95.99	5.30	-3.05	-360.00	-607.77	-0.75
Dead+Wind 90 deg+Ice+Temp	95.99	6.11	-0.00	8.46	-706.72	-0.74
Dead+Wind 120 deg+Ice+Temp	95.99	5.29	3.04	377.06	-607.26	-0.54
Dead+Wind 150 deg+Ice+Temp	95.99	3.05	5.27	647.02	-336.03	-0.19
Dead+Wind 180 deg+Ice+Temp	95.99	-0.00	6.08	746.02	34.28	0.21
Dead+Wind 210 deg+Ice+Temp	95.99	-3.06	5.27	647.52	404.47	0.55
Dead+Wind 240 deg+Ice+Temp	95.99	-5.30	3.05	377.93	675.32	0.75
Dead+Wind 270 deg+Ice+Temp	95.99	-6.11	0.00	9.47	774.28	0.74

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
deg+Ice+Temp						
Dead+Wind 300	95.99	-5.29	-3.04	-359.12	674.82	0.54
deg+Ice+Temp						
Dead+Wind 330	95.99	-3.05	-5.27	-629.09	403.59	0.19
deg+Ice+Temp						
Dead+Wind 0 deg - Service	53.27	0.01	-14.55	-1676.54	4.38	-0.43
Dead+Wind 30 deg - Service	53.27	7.32	-12.61	-1452.42	-838.20	-1.02
Dead+Wind 60 deg - Service	53.27	12.66	-7.29	-838.68	-1454.64	-1.34
Dead+Wind 90 deg - Service	53.27	14.62	-0.01	0.20	-1679.75	-1.30
Dead+Wind 120 deg - Service	53.27	12.65	7.27	839.46	-1453.24	-0.91
Dead+Wind 150 deg - Service	53.27	7.30	12.60	1454.21	-835.78	-0.28
Dead+Wind 180 deg - Service	53.27	-0.01	14.55	1679.73	7.18	0.43
Dead+Wind 210 deg - Service	53.27	-7.32	12.61	1455.61	849.76	1.02
Dead+Wind 240 deg - Service	53.27	-12.66	7.29	841.88	1466.19	1.34
Dead+Wind 270 deg - Service	53.27	-14.62	0.01	3.00	1691.30	1.30
Dead+Wind 300 deg - Service	53.27	-12.65	-7.27	-836.26	1464.79	0.91
Dead+Wind 330 deg - Service	53.27	-7.30	-12.60	-1451.01	847.33	0.28

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-53.27	0.00	0.00	53.27	0.00	0.000%
2	0.03	-53.27	-37.25	-0.03	53.27	37.25	0.000%
3	18.74	-53.27	-32.28	-18.74	53.27	32.28	0.000%
4	32.42	-53.27	-18.65	-32.42	53.27	18.65	0.000%
5	37.42	-53.27	-0.03	-37.42	53.27	0.03	0.000%
6	32.39	-53.27	18.60	-32.39	53.27	-18.60	0.000%
7	18.68	-53.27	32.25	-18.68	53.27	-32.25	0.000%
8	-0.03	-53.27	37.25	0.03	53.27	-37.25	0.000%
9	-18.74	-53.27	32.28	18.74	53.27	-32.28	0.000%
10	-32.42	-53.27	18.65	32.42	53.27	-18.65	0.000%
11	-37.42	-53.27	0.03	37.42	53.27	-0.03	0.000%
12	-32.39	-53.27	-18.60	32.39	53.27	18.60	0.000%
13	-18.68	-53.27	-32.25	18.68	53.27	32.25	0.000%
14	0.00	-95.99	0.00	0.00	95.99	-0.00	0.000%
15	0.00	-95.99	-6.08	-0.00	95.99	6.08	0.000%
16	3.06	-95.99	-5.27	-3.06	95.99	5.27	0.000%
17	5.30	-95.99	-3.05	-5.30	95.99	3.05	0.000%
18	6.11	-95.99	-0.00	-6.11	95.99	0.00	0.000%
19	5.29	-95.99	3.04	-5.29	95.99	-3.04	0.000%
20	3.05	-95.99	5.27	-3.05	95.99	-5.27	0.000%
21	-0.00	-95.99	6.08	0.00	95.99	-6.08	0.000%
22	-3.06	-95.99	5.27	3.06	95.99	-5.27	0.000%
23	-5.30	-95.99	3.05	5.30	95.99	-3.05	0.000%
24	-6.11	-95.99	0.00	6.11	95.99	-0.00	0.000%
25	-5.29	-95.99	-3.04	5.29	95.99	3.04	0.000%
26	-3.05	-95.99	-5.27	3.05	95.99	5.27	0.000%
27	0.01	-53.27	-14.55	-0.01	53.27	14.55	0.000%
28	7.32	-53.27	-12.61	-7.32	53.27	12.61	0.000%
29	12.66	-53.27	-7.29	-12.66	53.27	7.29	0.000%
30	14.62	-53.27	-0.01	-14.62	53.27	0.01	0.000%
31	12.65	-53.27	7.27	-12.65	53.27	-7.27	0.000%
32	7.30	-53.27	12.60	-7.30	53.27	-12.60	0.000%
33	-0.01	-53.27	14.55	0.01	53.27	-14.55	0.000%
34	-7.32	-53.27	12.61	7.32	53.27	-12.61	0.000%
35	-12.66	-53.27	7.29	12.66	53.27	-7.29	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
36	-14.62	-53.27	0.01	14.62	53.27	-0.01	0.000%
37	-12.65	-53.27	-7.27	12.65	53.27	7.27	0.000%
38	-7.30	-53.27	-12.60	7.30	53.27	12.60	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	4	0.00000001	0.00042869
3	Yes	5	0.00000001	0.00062521
4	Yes	5	0.00000001	0.00067442
5	Yes	5	0.00000001	0.00005654
6	Yes	5	0.00000001	0.00062247
7	Yes	5	0.00000001	0.00065140
8	Yes	4	0.00000001	0.00047818
9	Yes	5	0.00000001	0.00066873
10	Yes	5	0.00000001	0.00062174
11	Yes	5	0.00000001	0.00005418
12	Yes	5	0.00000001	0.00066789
13	Yes	5	0.00000001	0.00063661
14	Yes	4	0.00000001	0.00010948
15	Yes	5	0.00000001	0.00019658
16	Yes	5	0.00000001	0.00020361
17	Yes	5	0.00000001	0.00020307
18	Yes	5	0.00000001	0.00019096
19	Yes	5	0.00000001	0.00020483
20	Yes	5	0.00000001	0.00020731
21	Yes	5	0.00000001	0.00020031
22	Yes	5	0.00000001	0.00021970
23	Yes	5	0.00000001	0.00022087
24	Yes	5	0.00000001	0.00020741
25	Yes	5	0.00000001	0.00021869
26	Yes	5	0.00000001	0.00021537
27	Yes	4	0.00000001	0.00016069
28	Yes	5	0.00000001	0.00005718
29	Yes	5	0.00000001	0.00006692
30	Yes	4	0.00000001	0.00031626
31	Yes	5	0.00000001	0.00005704
32	Yes	5	0.00000001	0.00006225
33	Yes	4	0.00000001	0.00016321
34	Yes	5	0.00000001	0.00006584
35	Yes	5	0.00000001	0.00005709
36	Yes	4	0.00000001	0.00031373
37	Yes	5	0.00000001	0.00006589
38	Yes	5	0.00000001	0.00005960

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	35.800	36	1.6922	0.0077
L2	166.625 - 129.125	34.958	36	1.6922	0.0077
L3	132.958 - 95.4583	23.380	36	1.5487	0.0036
L4	100.125 - 62.625	13.593	36	1.2594	0.0022
L5	68.125 - 30.625	6.356	36	0.8670	0.0013
L6	36.875 - 0	1.902	36	0.4631	0.0006

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	Platform Mount [LP 403-1]	36	34.383	1.6914	0.0077	40745
155.00	Platform Mount [LP 403-1]	36	30.864	1.6700	0.0068	19056
135.00	Platform Mount [LP 304-1]	36	24.050	1.5629	0.0038	8801
125.00	Platform Mount [LP 304-1]	36	20.828	1.4895	0.0029	7247
121.00	Side Arm Mount [SO 701-1]	36	19.585	1.4573	0.0027	6796
115.00	Platform Mount [LP 303-1]	36	17.773	1.4058	0.0024	6216
105.00	Pipe Mount [PM 601-3]	36	14.910	1.3105	0.0023	5441
80.00	Side Arm Mount [SO 701-1]	36	8.750	1.0201	0.0017	4884

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	91.316	11	4.3186	0.0195
L2	166.625 - 129.125	89.169	11	4.3186	0.0195
L3	132.958 - 95.4583	59.644	11	3.9520	0.0091
L4	100.125 - 62.625	34.683	11	3.2138	0.0056
L5	68.125 - 30.625	16.222	11	2.2127	0.0033
L6	36.875 - 0	4.855	11	1.1822	0.0014

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	Platform Mount [LP 403-1]	11	87.702	4.3165	0.0196	16252
155.00	Platform Mount [LP 403-1]	11	78.728	4.2618	0.0174	7558
135.00	Platform Mount [LP 304-1]	11	61.352	3.9882	0.0098	3478
125.00	Platform Mount [LP 304-1]	11	53.137	3.8010	0.0074	2860
121.00	Side Arm Mount [SO 701-1]	11	49.965	3.7189	0.0068	2682
115.00	Platform Mount [LP 303-1]	11	45.344	3.5874	0.0062	2452
105.00	Pipe Mount [PM 601-3]	11	38.043	3.3441	0.0058	2145
80.00	Side Arm Mount [SO 701-1]	11	22.329	2.6033	0.0042	1921



### Compression Checks

#### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P K	Allow. P <sub>a</sub> K	Ratio $\frac{P}{P_a}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.75	0.00	0.0	39.000	20.4326	-2.15	796.87	0.003
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	37.50	0.00	0.0	39.000	32.2025	-9.82	1255.90	0.008
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	37.50	0.00	0.0	39.000	47.8252	-21.09	1865.18	0.011
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	37.50	0.00	0.0	39.000	56.3349	-29.99	2197.06	0.014
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	37.50	0.00	0.0	39.000	64.5374	-40.02	2516.96	0.016
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	36.88	0.00	0.0	37.123	74.4656	-53.25	2764.42	0.019

#### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> kip-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M <sub>y</sub> kip-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.57	0.424	39.000	0.011	0.00	0.000	39.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	285.13	13.286	39.000	0.341	0.00	0.000	39.000	0.000
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	1006.2 2	25.501	39.000	0.654	0.00	0.000	39.000	0.000
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	1957.5 3	35.705	39.000	0.916	0.00	0.000	39.000	0.000
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	2989.8 9	41.512	39.000	1.064	0.00	0.000	39.000	0.000
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	4317.4 0	44.983	37.123	1.212	0.00	0.000	37.123	0.000

#### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	169 - 164.25 (1)	TP26x18x0.25	3.13	0.153	26.000	0.012	0.01	0.000	26.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	15.06	0.468	26.000	0.036	1.05	0.024	26.000	0.001
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	27.79	0.581	26.000	0.045	2.12	0.026	26.000	0.001
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	31.45	0.558	26.000	0.043	3.55	0.032	26.000	0.001
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	34.40	0.533	26.000	0.041	3.44	0.023	26.000	0.001
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	37.44	0.503	26.000	0.039	3.31	0.017	26.000	0.001

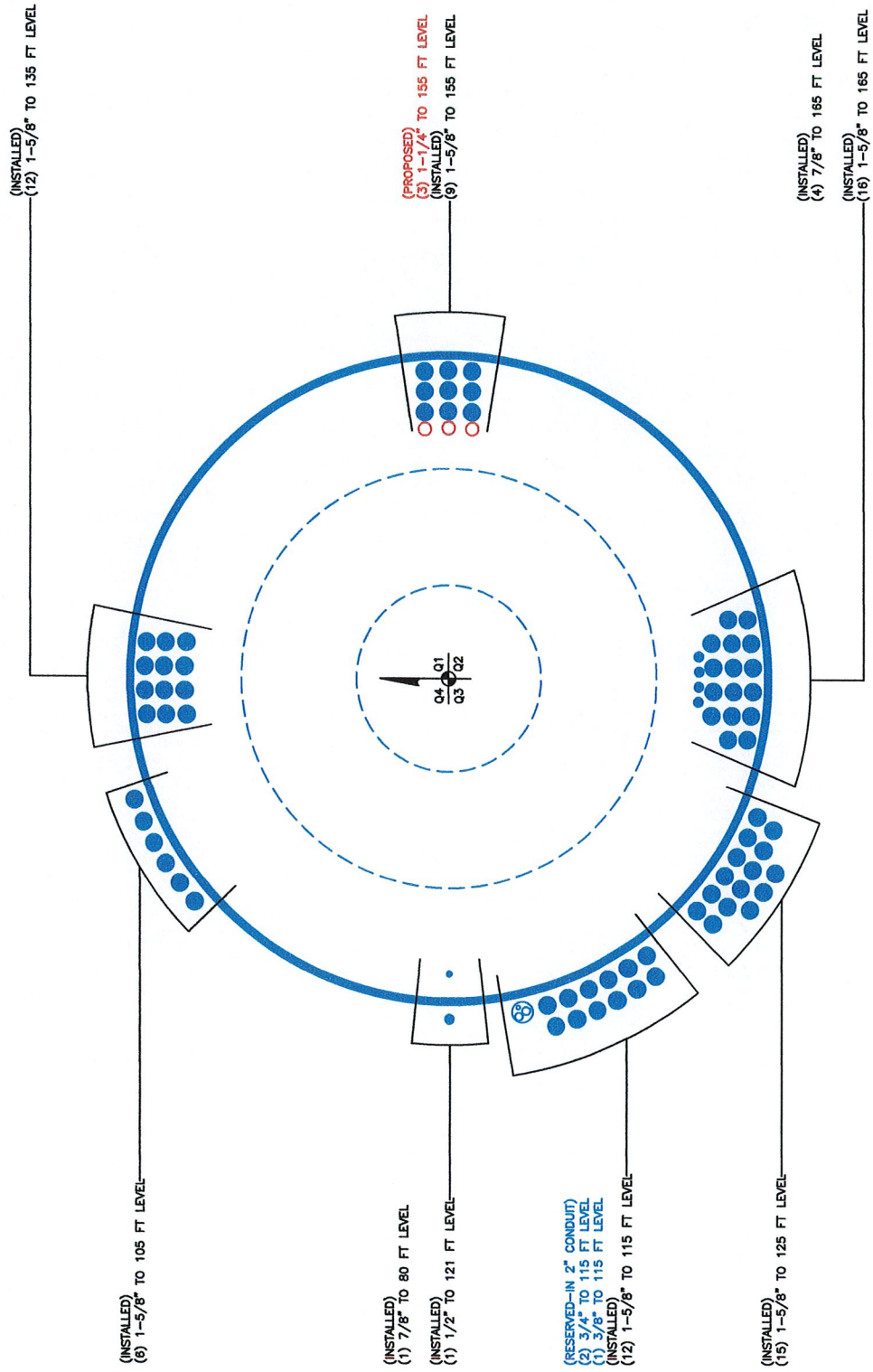
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164.25 (1)	0.003	0.011	0.000	0.012	0.000	0.014	1.333	H1-3+VT ✓
L2	164.25 - 129.125 (2)	0.008	0.341	0.000	0.036	0.001	0.349	1.333	H1-3+VT ✓
L3	129.125 - 95.4583 (3)	0.011	0.654	0.000	0.045	0.001	0.666	1.333	H1-3+VT ✓
L4	95.4583 - 62.625 (4)	0.014	0.916	0.000	0.043	0.001	0.930	1.333	H1-3+VT ✓
L5	62.625 - 30.625 (5)	0.016	1.064	0.000	0.041	0.001	1.081	1.333	H1-3+VT ✓
L6	30.625 - 0 (6)	0.019	1.212	0.000	0.039	0.001	1.231	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF * P_{allow}$ K	% Capacity	Pass Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-2.15	1062.23	1.0	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.3125	2	-9.82	1674.11	26.2	Pass
L3	129.125 - 95.4583	Pole	TP41.75x32.1538x0.375	3	-21.09	2486.28	49.9	Pass
L4	95.4583 - 62.625	Pole	TP49.063x39.8058x0.375	4	-29.99	2928.68	69.7	Pass
L5	62.625 - 30.625	Pole	TP56.125x46.9553x0.375	5	-40.02	3355.11	81.1	Pass
L6	30.625 - 0	Pole	TP62.938x53.8467x0.375	6	-53.25	3684.97	92.4	Pass
Summary								
Pole (L6)							92.4	Pass
RATING =							92.4	Pass

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



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



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

## TIA Rev F

### Site Data

BU#: 826768  
 Site Name: PLYMOUTH / RT 6  
 App #: 179691, rev 1

Pole Manufacturer: Pirod

Reactions		
Moment:	4317	ft-kips
Axial:	53	kips
Shear:	37	kips

### Anchor Rod Data

Qty:	45	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	68	in

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiffened Cases

### Anchor Rod Results

Maximum Rod Tension: 66.5 Kips  
 Allowable Tension: 81.0 Kips  
 Anchor Rod Stress Ratio: 82.2% **Pass**

#### Rigid

Service, ASD  
 Ft\*ASIF

### Plate Data

Diam:	73	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.44	in

### Base Plate Results

Base Plate Stress: Rohn/Pirod, OK  
 Allowable Plate Stress: 50.0 ksi  
 Base Plate Stress Ratio: Rohn/Pirod, OK

#### Flexural Check

#### Rigid

Service ASD  
 0.75\*Fy\*ASIF  
 Y.L. Length:  
 25.75

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

### Stiffener Results N/A for Rohn / Pirod

Horizontal Weld : N/A  
 Vertical Weld: N/A  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: N/A  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: N/A  
 Plate Comp. (AISC Bracket): N/A

### Pole Results

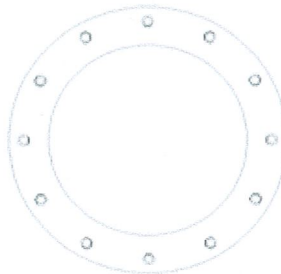
Pole Punching Shear Check: N/A

### Pole Data

Diam:	62.938	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
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\* 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



## Monopole Pier and Pad Foundation

BU # : 826768

Site Name: PLYMOUTH / RT 6

App. Number: 179691, rev 1

TIA-222 Revision: F



Design Reactions		
Shear, <b>S</b> :	37	kips
Moment, <b>M</b> :	4317	ft-kips
Tower Height, <b>H</b> :	169	ft
Tower Weight, <b>Wt</b> :	53	kips
Base Diameter, <b>BD</b> :	5.25	ft

Foundation Dimensions		
Depth, <b>D</b> :	8.5	ft
Pad Width, <b>W</b> :	27	ft
Neglected Depth, <b>N</b> :	3.5	ft
Thickness, <b>T</b> :	2.50	ft
Pier Diameter, <b>Pd</b> :	7.50	ft
Ext. Above Grade, <b>E</b> :	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, <b>Cc</b> :	3.0	in

Soil Properties		
Soil Unit Weight, <b>γ</b> :	0.135	kcf
Ult. Bearing Capacity, <b>Bc</b> :	12.0	ksf
Angle of Friction, <b>Φ</b> :	30	deg
Cohesion, <b>Co</b> :	0.000	ksf
Passive Pressure, <b>Pp</b> :	0.250	ksf
Base Friction, <b>μ</b> :	0.60	

Material Properties		
Rebar Yield Strength, <b>Fy</b> :	60000	psi
Concrete Strength, <b>F'c</b> :	4000	psi
Concrete Unit Weight, <b>δc</b> :	0.150	kcf
Seismic Zone, <b>z</b> :	1	

Rebar Properties		
Pier Rebar Size, <b>Sp</b> :	9	
Pier Rebar Quantity, <b>mp</b> :	39	32
Pad Rebar Size, <b>Spad</b> :	9	
Pad Rebar Quantity, <b>mpad</b> :	36	15
Pier Tie Size, <b>St</b> :	4	3
Tie Quantity, <b>mt</b> :	11	7

Design Checks			
	Capacity/ Availability	Demand/ Limits	Check
<i>Req'd Pier Diam.(ft)</i>	7.5	7.245	<b>OK</b>
<i>Overturing (ft-kips)</i>	8201.36	4317.00	<b>52.6%</b>
<i>Shear Capacity (kips)</i>	335.03	37.00	<b>11.0%</b>
<i>Bearing (ksf)</i>	9.00	3.05	<b>33.9%</b>
<i>Pad Shear - 1-way (kips)</i>	812.57	666.11	<b>82.0%</b>
<i>Pad Shear - 2-way (kips)</i>	1834.78	146.43	<b>8.0%</b>
<i>Pad Moment Capacity (k-ft)</i>	4123.81	1916.81	<b>46.5%</b>
<i>Pier Moment Capacity (k-ft)</i>	5327.72	4557.50	<b>85.5%</b>

FALSE

## Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) =  kips

<u>Pier Properties</u>		<u>Material Properties</u>	
<b>Concrete:</b>		Concrete compressive strength =	<input type="text" value="4000"/> psi
Pier Diameter =	<input type="text" value="7.5"/> ft	Reinforcement yield strength =	<input type="text" value="60000"/> psi
Concrete Area =	6361.7 in <sup>2</sup>	Modulus of elasticity =	<input type="text" value="29000"/> ksi
<b>Reinforcement:</b>		Reinforcement yield strain =	<input type="text" value="0.00207"/>
Clear Cover =	<input type="text" value="3.00"/> in	Limiting compressive strain =	<input type="text" value="0.003"/>
Cage Diameter =	6.91 ft	<b><u>Seismic Properties</u></b>	
Bar Size =	<input type="text" value="9"/>	Seismic Zone =	<input type="text" value="1"/>
Bar Diameter =	1.13 in		
Bar Area =	1 in <sup>2</sup>		
Number of Bars =	<input type="text" value="39"/>		

### Minimum Area of Steel

Required area of steel = 31.81 in<sup>2</sup>  
 Provided area of steel = 39.00 in<sup>2</sup>      **OK**

### Axial Loading

Load factor =   
 Reduction factor = 0.9  
 Factored axial load = -76.5556 kips

### Neutral Axis

Distance from extreme edge to neutral axis = 12.74 in  
 Equivalent compression zone factor = 0.85  
 Distance from extreme edge to  
 equivalent compression zone factor = 10.83 in  
 Distance from centroid to neutral axis = 32.26 in

### Compression Zone

Area of steel in compression zone = 7.00 in<sup>2</sup>  
 Angle from centroid of pier to intersection of  
 equivalent compression zone and edge of pier = 40.59 deg  
 Area of concrete in compression = 433.96 in<sup>2</sup>  
 Force in concrete =  $0.85 * f_c * Acc$  = 1475.48 kips  
 Total reinforcement forces = -1398.92 kips  
 Factored axial load = -76.56 kips  
 Force in concrete = -1475.48 kips  
  
 Sum of the forces in concrete = 0.00 kips      **OK**

### Maximum Moment

First moment of the concrete  
 area in compression about the centroid = 16730.29 in<sup>3</sup>  
 Distance between centroid of concrete  
 in compression and centroid of pier = 38.55 in  
 Moment of concrete in compression = 56882.99 in-kips  
 Total reinforcement moment = 35464.24 in-kips  
 Nominal moment strength of column = 92347.23 in-kips  
 Factored moment strength of column = 63932.70 in-kips

**Maximum Allowable Moment =  ft-kips**



**Individual Bars**

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in <sup>2</sup> )	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-32.26	-34.17	-0.007599	0.00	-60.00	-60.00
2	9.23	6.65	-25.62	-27.53	-0.006034	0.00	-60.00	-60.00
3	18.46	13.12	-19.14	-21.05	-0.004509	0.00	-60.00	-60.00
4	27.69	19.26	-13.01	-14.92	-0.003064	0.00	-60.00	-60.00
5	36.92	24.89	-7.37	-9.28	-0.001736	0.00	-50.35	-50.35
6	46.15	29.88	-2.38	-4.29	-0.00056	0.00	-16.25	-16.25
7	55.38	34.10	1.84	-0.07	0.0004329	0.00	12.55	12.55
8	64.62	37.44	5.17	3.26	0.0012183	1.00	35.33	31.93
9	73.85	39.80	7.54	5.63	0.0017752	1.00	51.48	48.08
10	83.08	41.13	8.87	6.96	0.0020894	1.00	60.00	56.60
11	92.31	41.40	9.14	7.23	0.0021526	1.00	60.00	56.60
12	101.54	40.60	8.34	6.42	0.0019633	1.00	56.94	53.54
13	110.77	38.74	6.48	4.57	0.0015263	1.00	44.26	40.86
14	120.00	35.88	3.62	1.71	0.000853	1.00	24.74	21.34
15	129.23	32.10	-0.17	-2.08	-3.92E-05	0.00	-1.14	-1.14
16	138.46	27.48	-4.79	-6.70	-0.001127	0.00	-32.69	-32.69
17	147.69	22.15	-10.12	-12.03	-0.002383	0.00	-60.00	-60.00
18	156.92	16.24	-16.02	-17.93	-0.003774	0.00	-60.00	-60.00
19	166.15	9.92	-22.35	-24.26	-0.005263	0.00	-60.00	-60.00
20	175.38	3.33	-28.93	-30.84	-0.006814	0.00	-60.00	-60.00
21	184.62	-3.33	-35.60	-37.51	-0.008384	0.00	-60.00	-60.00
22	193.85	-9.92	-42.18	-44.09	-0.009935	0.00	-60.00	-60.00
23	203.08	-16.24	-48.50	-50.42	-0.011425	0.00	-60.00	-60.00
24	212.31	-22.15	-54.41	-56.32	-0.012815	0.00	-60.00	-60.00
25	221.54	-27.48	-59.74	-61.65	-0.014071	0.00	-60.00	-60.00
26	230.77	-32.10	-64.36	-66.27	-0.015159	0.00	-60.00	-60.00
27	240.00	-35.88	-68.15	-70.06	-0.016051	0.00	-60.00	-60.00
28	249.23	-38.74	-71.01	-72.92	-0.016725	0.00	-60.00	-60.00
29	258.46	-40.60	-72.86	-74.77	-0.017162	0.00	-60.00	-60.00
30	267.69	-41.40	-73.67	-75.58	-0.017351	0.00	-60.00	-60.00
31	276.92	-41.13	-73.40	-75.31	-0.017288	0.00	-60.00	-60.00
32	286.15	-39.80	-72.06	-73.97	-0.016973	0.00	-60.00	-60.00
33	295.38	-37.44	-69.70	-71.61	-0.016417	0.00	-60.00	-60.00
34	304.62	-34.10	-66.36	-68.27	-0.015631	0.00	-60.00	-60.00
35	313.85	-29.88	-62.15	-64.06	-0.014638	0.00	-60.00	-60.00
36	323.08	-24.89	-57.16	-59.07	-0.013462	0.00	-60.00	-60.00
37	332.31	-19.26	-51.52	-53.43	-0.012135	0.00	-60.00	-60.00
38	341.54	-13.12	-45.38	-47.30	-0.01069	0.00	-60.00	-60.00
39	350.77	-6.65	-38.91	-40.82	-0.009165	0.00	-60.00	-60.00

Date: April 4, 2013

Patrick Byrum  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277



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

**Subject: Structural Analysis Report**

**Carrier Designation:** *Sprint PCS Co-Locate*  
**Carrier Site Number:** CT54XC712

**Crown Castle Designation:**  
**Crown Castle BU Number:** 826768  
**Crown Castle Site Name:** PLYMOUTH/RT 6  
**Crown Castle JDE Job Number:** 224617  
**Crown Castle Work Order Number:** 581753  
**Crown Castle Application Number:** 179691 Rev. 1

**Engineering Firm Designation:** **Crown Castle Project Number:** 581753

**Site Data:** 171 Town Hill Road, Plymouth, Litchfield County, CT  
Latitude 41° 40' 6.197", Longitude -73° 1' 11.842"  
169 Foot - Monopole Tower

Dear Patrick Byrum,

Crown Castle 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 581753, in accordance with application 179691, 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 TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 mph fastest mile.

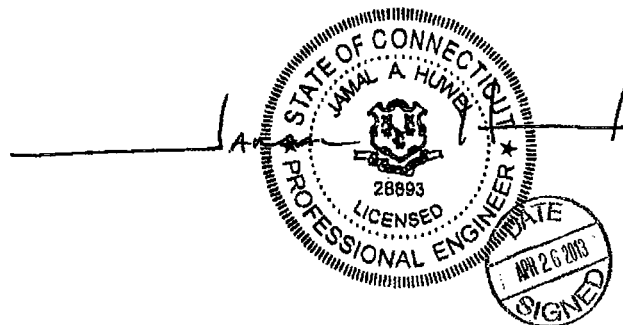
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Crown Castle 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.

Structural analysis prepared by: Nathan Martinak, EIT / MRC

Respectfully submitted by:

Jamal A. Huwel, P.E.  
Manager Engineering





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## 1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by PIROD MANUFACTURES INC. in September of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28.1 mph with 1 inch ice thickness and 50 mph under service loads.

**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
155.0	155.0	3	alcatel lucent	1900MHz RRH	3	1-1/4	-
		3	alcatel lucent	800MHz RRH			
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			

**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
165.0	169.0	1	decibel	ASP-952	4	7/8	1
		1	rfs celwave	PD220			
		1	rfs celwave	PD455-6			
		1	sinclair	SRL-229			
165.0	165.0	6	ericsson	AIR 21 w/ Mount Pipe	16	1-5/8	3
		3	ericsson	AIR 33 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	9	decibel	DB980H90E-M w/ Mount Pipe	9	1-5/8	4
		1	tower mounts	Platform Mount [LP 403-1]	-	-	1
135.0	135.0	3	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	12	1-5/8	1
		3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 304-1]			
125.0	125.0	12	decibel	DB846G90A-XY w/ Mount Pipe	15	1-5/8	1
		1	tower mounts	Platform Mount [LP 304-1]			
121.0	125.0	1	rfs celwave	201-4	1	1/2	1
	121.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115.0	115.0	6	ericsson	RRUS 11	2 1	3/4 3/8	2
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		12	powerwave technologies	LGP2140X			
		1	raycap	DC6-48-60-18-8F	12	1-5/8	1
		6	kathrein	AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			
105.0	105.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
80.0	91.0	1	rfs celwave	PD455-6	1	7/8	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			

- Notes:  
 1) Existing Equipment  
 2) Reserved Equipment  
 3) Existing, Proposed, and Future Loading  
 4) Equipment to be Removed, not considered in this analysis

**Table 3 - Design 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)
170	170	12	ems wireless	RR65-16-00XP	12	1-5/8
160	160	12	ems wireless	RR65-16-00XP	12	1-5/8
150	150	12	ems wireless	RR65-16-00XP	12	1-5/8
140	140	12	ems wireless	RR65-16-00XP	12	1-5/8
130	130	12	ems wireless	RR65-16-00XP	12	1-5/8
120	120	12	ems wireless	RR65-16-00XP	12	1-5/8

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	3491991	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, Inc.	3491992	CCISITES

#### 3.1) Analysis Method

tnxTower (version 6.0.4.0), 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Base plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-2.16	1062.23	1.0	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.3125	2	-9.79	1674.11	23.8	Pass
L3	129.125 - 95.4583	Pole	TP41.75x32.1538x0.375	3	-20.83	2486.28	46.6	Pass
L4	95.4583 - 62.625	Pole	TP49.063x39.8058x0.375	4	-29.45	2928.68	65.9	Pass
L5	62.625 - 30.625	Pole	TP56.125x46.9553x0.375	5	-39.21	3355.11	77.1	Pass
L6	30.625 - 0	Pole	TP62.938x53.8467x0.375	6	-52.10	3684.97	88.3	Pass
							Summary	
						Pole (L6)	88.3	Pass
						Rating =	88.3	Pass

**Table 6 - Tower Component Stresses vs. Capacity – LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	78.5	Pass
1,2	Base Plate	0	88.3	Pass
1	Base Foundation	0	81.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>88.3%</b>
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Notes:

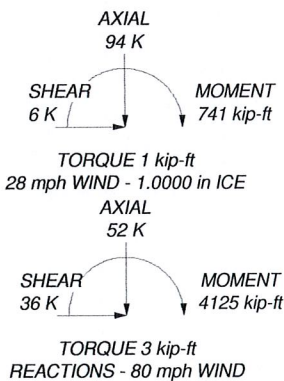
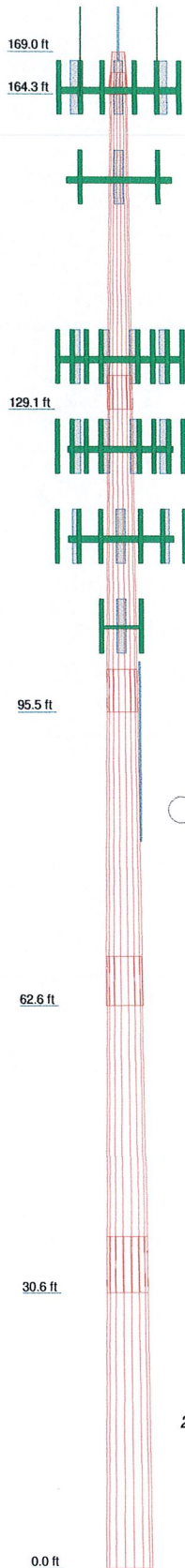
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Base plate has the same capacity as its respective shaft.

### 4.1) Recommendations

The tower and its base and anchor foundations have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

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

Section	1	2	3	4	5	6	
Length (ft)	4.75	37.50	37.50	37.50	37.50	36.88	
Number of Sides	18	18	18	18	18	18	
Thickness (in)	0.2500	0.3125	0.3750	0.3750	0.3750	0.3750	
Socket Length (ft)	2.38	3.83	4.67	5.50	6.25		
Top Dia (in)	18.0000	21.5000	32.1538	39.8058	46.9553	53.8467	
Bot Dia (in)	26.0000	34.0630	41.7500	49.0630	56.1250	62.9380	
Grade				A572-65			
Weight (K)	0.3	3.5	5.6	6.7	7.8	8.7	



### DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 403-1]	165	BXA-70063/6CF w/ Mount Pipe	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
(2) AIR 21 w/ Mount Pipe	165	(2) FD9R6004/2C-3L	135
AIR 33 w/ Mount Pipe	165	Platform Mount [LP 304-1]	125
AIR 33 w/ Mount Pipe	165	(4) DB846G90A-XY w/ Mount Pipe	125
AIR 33 w/ Mount Pipe	165	(4) DB846G90A-XY w/ Mount Pipe	125
ATMAA1412D-1A20	165	(4) DB846G90A-XY w/ Mount Pipe	125
ATMAA1412D-1A20	165	Side Arm Mount [SO 701-1]	121
ATMAA1412D-1A20	165	201-4	121
PD455-6	165	Platform Mount [LP 303-1]	115
SRL-229	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
PD220	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
ASP-952	165	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
Platform Mount [LP 403-1]	155	(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
APXVSP18-C-A20 w/ Mount Pipe	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
1900MHZ RRH	155	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
1900MHZ RRH	155	(2) RRU5 11	115
1900MHZ RRH	155	(2) RRU5 11	115
800MHZ RRH	155	(2) RRU5 11	115
800MHZ RRH	155	(2) RRU5 11	115
800MHZ RRH	155	(2) RRU5 11	115
(3) 4' x 2" Pipe Mount	155	(2) LGP2140X	115
(3) 4' x 2" Pipe Mount	155	(4) LGP2140X	115
(3) 4' x 2" Pipe Mount	155	(6) LGP2140X	115
Platform Mount [LP 304-1]	135	DC6-48-60-18-8F	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
(2) LPA-80080/6CF w/ Mount Pipe	135	6' x 2" Mount Pipe	115
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	6' x 2" Mount Pipe	115
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	Pipe Mount [PM 601-3]	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	135	APXV18-206517S-C w/ Mount Pipe	105
BXA-70063/6CF w/ Mount Pipe	135	Side Arm Mount [SO 701-1]	80
BXA-70063/6CF w/ Mount Pipe	135	PD455-6	80

### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

### TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 88.3%

<p><b>Crown Castle</b> 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-4594</p> <p>We are Solutions</p>	<b>Job: BU #826768</b>	
	Project:	Drawn by: NMartinak
	Client: Crown Castle	App'd:
	Code: TIA/EIA-222-F	Date: 03/06/13
	Path: R:\SA Models - Letters\Work Area\NMartinak\22276892_Final\826768.dwg	Scale: NTS Dwg No. E-1

## Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- 5) Tower is located in Litchfield County, Connecticut.
- 6) Basic wind speed of 80 mph.
- 7) Nominal ice thickness of 1.0000 in.
- 8) Ice thickness is considered to increase with height.
- 9) Ice density of 56 pcf.
- 10) A wind speed of 28 mph is used in combination with ice.
- 11) Temperature drop of 50 °F.
- 12) Deflections calculated using a wind speed of 50 mph.
- 13) A non-linear (P-delta) analysis was used.
- 14) Pressures are calculated at each section.
- 15) Stress ratio used in pole design is 1.333.
- 16) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>√ Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>Add IBC .6D+W Combination</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retension Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>SR Members Have Cut Ends</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> </ul> | <ul style="list-style-type: none"> <li>Treat Feedline Bundles As Cylinder</li> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feedline Torque</li> <li>Include Angle Block Shear Check</li> <li style="padding-left: 20px;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

## 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	169.00-164.25	4.75	2.38	18	18.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.13	37.50	3.83	18	21.5000	34.0630	0.3125	1.2500	A572-65 (65 ksi)
L3	129.13-95.46	37.50	4.67	18	32.1538	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	95.46-62.63	37.50	5.50	18	39.8058	49.0630	0.3750	1.5000	A572-65 (65 ksi)
L5	62.63-30.63	37.50	6.25	18	46.9553	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	30.63-0.00	36.88		18	53.8467	62.9380	0.3750	1.5000	A572-65 (65 ksi)



### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	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
	26.4011	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	22.6396	21.0154	1191.8828	7.5216	10.9220	109.1268	2385.3338	10.5097	3.2340	10.349
	34.5885	33.4763	4817.6476	11.9814	17.3040	278.4123	9641.6344	16.7413	5.4451	17.424
L3	33.6459	37.8247	4826.0007	11.2815	16.3341	295.4552	9658.3516	18.9159	4.9991	13.331
	42.3941	49.2466	10650.982	14.6881	21.2090	502.1916	21315.979	24.6280	6.6880	17.835
L4	41.5897	46.9325	9218.9729	13.9979	20.2213	455.9030	18450.076	23.4707	6.3458	16.922
	49.8199	57.9509	17355.672	17.2842	24.9240	696.3437	34734.182	28.9810	7.9751	21.267
L5	49.0453	55.4422	15197.840	16.5360	23.8533	637.1383	30415.677	27.7264	7.6041	20.278
	56.9908	66.3564	26056.150	19.7913	28.5115	913.8821	52146.586	33.1845	9.2180	24.581
L6	56.2421	63.6447	22990.474	18.9825	27.3541	840.4754	46011.200	31.8284	8.8170	23.512
	63.9089	74.4656	36823.777	22.2099	31.9725	1151.7327	73696.008	37.2399	10.4171	27.779

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 169.00-164.25				1	1	1		
L2 164.25-129.13				1	1	1		
L3 129.13-95.46				1	1	1		
L4 95.46-62.63				1	1	1		
L5 62.63-30.63				1	1	1		
L6 30.63-0.00				1	1	1		

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimete r	Weight
				ft			in	r in	r in	plf
**										

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
LDF5-50A(7/8")	C	No	Inside Pole	165.00 - 0.00	4	No Ice	0.33
						1/2" Ice	0.33
						1" Ice	0.33
						2" Ice	0.33
LDF7-50A(1-5/8")	C	No	Inside Pole	165.00 - 0.00	16	4" Ice	0.33
						No Ice	0.82
						1/2" Ice	0.82
						1" Ice	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
						ft <sup>2</sup> /ft	plf	
HB114-1-08U4-M6F( 1 1/4")	B	No	Inside Pole	155.00 - 0.00	3	2" Ice	0.00	0.82
						4" Ice	0.00	0.82
						No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
LDF7-50A(1-5/8")	A	No	Inside Pole	135.00 - 0.00	12	4" Ice	0.00	1.30
						No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	125.00 - 0.00	12	4" Ice	0.00	0.82
						No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	125.00 - 0.00	3	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
						LDF4-50A(1/2")	A	No
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	115.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
						LDF7-50A(1-5/8")	A	No
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF5-50A(7/8")	A	No	Inside Pole	80.00 - 0.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
**								
**								
FB-L98-002-XXX( 3/8)	A	No	Inside Pole	115.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86T( 3/4)	A	No	Inside Pole	115.00 - 0.00	2	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
						2" Ice	0.00	0.53
						4" Ice	0.00	0.53
2" Rigid Conduit	C	No	CaAa (Out Of Face)	115.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	4.33
						1" Ice	0.00	6.47
						2" Ice	0.00	12.57
						4" Ice	0.00	32.12
**								

### Feed Line/Linear Appurtenances Section Areas

Tower Section <i>n</i>	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight  K
L1	169.00-164.25	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	0.01
L2	164.25-129.13	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.51
L3	129.13-95.46	A	0.000	0.000	0.000	0.000	0.40
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	17.548	1.10
L4	95.46-62.63	A	0.000	0.000	0.000	0.000	0.53
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	19.503	1.29
L5	62.63-30.63	A	0.000	0.000	0.000	0.000	0.52
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	19.008	1.26
L6	30.63-0.00	A	0.000	0.000	0.000	0.000	0.50
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	18.191	1.21

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

Tower Section <i>n</i>	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight  K
L1	169.00-164.25	A	1.214	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	0.01
L2	164.25-129.13	A	1.195	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.51
L3	129.13-95.46	A	1.158	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	38.729	4.46
L4	95.46-62.63	A	1.110	0.000	0.000	0.000	0.000	1.53
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	42.310	5.52
L5	62.63-30.63	A	1.042	0.000	0.000	0.000	0.000	1.43
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	40.322	5.12
L6	30.63-0.00	A	1.000	0.000	0.000	0.000	0.000	1.28
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	37.345	4.55

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	169.00-164.25	0.0000	0.0000	0.0000	0.0000
L2	164.25-129.13	0.0000	0.0000	0.0000	0.0000
L3	129.13-95.46	-0.5883	0.3397	-1.0579	0.6108
L4	95.46-62.63	-0.6661	0.3846	-1.2000	0.6928
L5	62.63-30.63	-0.6789	0.3920	-1.2288	0.7094
L6	30.63-0.00	-0.6887	0.3976	-1.2351	0.7131

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub>		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
Platform Mount [LP 403-1]	C	None			0.0000	165.00	No Ice	18.85	18.85	1.50
							1/2" Ice	24.30	24.30	1.80
							1" Ice	29.75	29.75	2.09
							2" Ice	40.65	40.65	2.69
							4" Ice	62.45	62.45	3.87
(2) AIR 21 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
(2) AIR 21 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
(2) AIR 21 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.62	5.47	0.10
							1/2" Ice	7.13	6.28	0.15
							1" Ice	7.64	7.04	0.22
							2" Ice	8.68	8.61	0.36
							4" Ice	10.89	11.96	0.78
AIR 33 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
AIR 33 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
AIR 33 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.54	5.82	0.12
							1/2" Ice	7.04	6.63	0.17
							1" Ice	7.54	7.39	0.24
							2" Ice	8.58	8.96	0.39
							4" Ice	10.78	12.32	0.81
ATMAA1412D-1A20	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	B	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
ATMAA1412D-1A20	C	From Leg	4.00	0.00	0.0000	165.00	No Ice	0.47	1.17	0.01
							1/2" Ice	0.57	1.31	0.02
							1" Ice	0.69	1.47	0.03
							2" Ice	0.95	1.81	0.06
							4" Ice	1.57	2.58	0.14
PD455-6	A	From Leg	4.00	0.00	0.0000	165.00	No Ice	6.05	6.05	0.02
							1/2" Ice	8.28	8.28	0.07

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
			4.00							
						Ice	10.53	10.53	0.12	
						1" Ice	15.07	15.07	0.28	
						2" Ice	24.37	24.37	0.77	
						4" Ice				
SRL-229	A	From Leg	4.00		0.0000	165.00	No Ice	6.45	6.45	0.03
			0.00				1/2"	8.63	8.63	0.07
			4.00				Ice	10.83	10.83	0.13
							1" Ice	15.28	15.28	0.29
							2" Ice	24.01	24.01	0.79
							4" Ice			
PD220	B	From Leg	4.00		0.0000	165.00	No Ice	3.08	3.08	0.02
			0.00				1/2"	5.30	5.30	0.05
			4.00				Ice	7.54	7.54	0.09
							1" Ice	12.06	12.06	0.21
							2" Ice	21.31	21.31	0.62
							4" Ice			
ASP-952	C	From Leg	4.00		0.0000	165.00	No Ice	3.02	3.02	0.02
			0.00				1/2"	4.16	4.16	0.04
			4.00				Ice	5.30	5.30	0.07
							1" Ice	6.96	6.96	0.15
							2" Ice	9.76	9.76	0.40
							4" Ice			
**										
Platform Mount [LP 403-1]	C	None			0.0000	155.00	No Ice	18.85	18.85	1.50
							1/2"	24.30	24.30	1.80
							Ice	29.75	29.75	2.09
							1" Ice	40.65	40.65	2.69
							2" Ice	62.45	62.45	3.87
							4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00		0.0000	155.00	No Ice	8.50	6.95	0.08
			0.00				1/2"	9.15	8.13	0.15
			0.00				Ice	9.77	9.02	0.22
							1" Ice	11.03	10.84	0.41
							2" Ice	13.68	14.85	0.91
							4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00		0.0000	155.00	No Ice	8.50	6.95	0.08
			0.00				1/2"	9.15	8.13	0.15
			0.00				Ice	9.77	9.02	0.22
							1" Ice	11.03	10.84	0.41
							2" Ice	13.68	14.85	0.91
							4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00		0.0000	155.00	No Ice	8.50	6.95	0.08
			0.00				1/2"	9.15	8.13	0.15
			0.00				Ice	9.77	9.02	0.22
							1" Ice	11.03	10.84	0.41
							2" Ice	13.68	14.85	0.91
							4" Ice			
1900MHz RRH	A	From Leg	4.00		0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00				1/2"	3.14	4.06	0.08
			0.00				Ice	3.39	4.34	0.11
							1" Ice	3.91	4.91	0.19
							2" Ice	5.05	6.15	0.41
							4" Ice			
1900MHz RRH	B	From Leg	4.00		0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00				1/2"	3.14	4.06	0.08
			0.00				Ice	3.39	4.34	0.11
							1" Ice	3.91	4.91	0.19
							2" Ice	5.05	6.15	0.41
							4" Ice			
1900MHz RRH	C	From Leg	4.00		0.0000	155.00	No Ice	2.91	3.80	0.04
			0.00				1/2"	3.14	4.06	0.08
			0.00				Ice	3.39	4.34	0.11
							1" Ice	3.91	4.91	0.19
							2" Ice	5.05	6.15	0.41
							4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 2.49 1/2" 2.71 Ice 2.93 1" Ice 3.41 2" Ice 4.46 4" Ice 3.93	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 2.49 1/2" 2.71 Ice 2.93 1" Ice 3.41 2" Ice 4.46 4" Ice 3.93	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 2.49 1/2" 2.71 Ice 2.93 1" Ice 3.41 2" Ice 4.46 4" Ice 3.93	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
(3) 4' x 2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 0.79 1/2" 1.03 Ice 1.28 1" Ice 1.81 2" Ice 3.11 4" Ice 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
(3) 4' x 2" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 0.79 1/2" 1.03 Ice 1.28 1" Ice 1.81 2" Ice 3.11 4" Ice 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
(3) 4' x 2" Pipe Mount	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 0.79 1/2" 1.03 Ice 1.28 1" Ice 1.81 2" Ice 3.11 4" Ice 3.11	0.79 1.03 1.28 1.81 3.11	0.03 0.04 0.04 0.07 0.17
** Platform Mount [LP 304-1]	C	None		0.0000	135.00	No Ice 17.46 1/2" 22.44 Ice 27.42 1" Ice 37.38 2" Ice 57.30 4" Ice 57.30	17.46 22.44 27.42 37.38 57.30	1.35 1.62 1.90 2.45 3.55
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 4.56 1/2" 5.11 Ice 5.61 1" Ice 6.65 2" Ice 8.83 4" Ice 19.22	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 4.56 1/2" 5.11 Ice 5.61 1" Ice 6.65 2" Ice 8.83 4" Ice 19.22	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 4.56 1/2" 5.11 Ice 5.61 1" Ice 6.65 2" Ice 8.83 4" Ice 19.22	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 3.18 1/2" 3.56 Ice 3.96 1" Ice 4.85	3.35 3.97 4.60	0.03 0.06 0.10 0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K	
						2" Ice 6.77	8.89	0.49	
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	7.98	5.70	0.04
						1/2" Ice	8.62	6.85	0.10
						1" Ice	9.23	7.71	0.17
						2" Ice	10.47	9.50	0.33
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	7.98	5.70	0.04
						1/2" Ice	8.62	6.85	0.10
						1" Ice	9.23	7.71	0.17
						2" Ice	10.47	9.50	0.33
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	7.98	5.70	0.04
						1/2" Ice	8.62	6.85	0.10
						1" Ice	9.23	7.71	0.17
						2" Ice	10.47	9.50	0.33
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	0.0000	135.00	4" Ice			
						No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
** Platform Mount [LP 304-1]	C	None		0.0000	125.00	No Ice 17.46	17.46	1.35	
						1/2" Ice 22.44	22.44	1.62	
						Ice 27.42	27.42	1.90	
						1" Ice 37.38	37.38	2.45	
						2" Ice 57.30	57.30	3.55	
(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	125.00	4" Ice			
						No Ice	5.23	7.53	0.04
						1/2" Ice	5.78	8.72	0.09
						1" Ice	6.30	9.62	0.16
						2" Ice	7.37	11.45	0.32
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00 0.00	0.0000	125.00	4" Ice			
						No Ice	5.23	7.53	0.04
						1/2" Ice	5.78	8.72	0.09



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
			0.00			Ice	6.30	9.62	0.16
						1" Ice	7.37	11.45	0.32
						2" Ice	9.69	15.60	0.77
						4" Ice			
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	125.00	No Ice	5.23	7.53	0.04
						1/2"	5.78	8.72	0.09
						Ice	6.30	9.62	0.16
						1" Ice	7.37	11.45	0.32
						2" Ice	9.69	15.60	0.77
						4" Ice			
** Side Arm Mount [SO 701-1]	A	From Leg	2.00 0.00 0.00	0.0000	121.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
201-4	A	From Leg	4.00 0.00 4.00	0.0000	121.00	No Ice	1.13	1.13	0.00
						1/2"	2.00	2.00	0.01
						Ice	2.90	2.90	0.03
						1" Ice	4.31	4.31	0.08
						2" Ice	6.53	6.53	0.24
						4" Ice			
** Platform Mount [LP 303-1]	C	None		0.0000	115.00	No Ice	14.66	14.66	1.25
						1/2"	18.87	18.87	1.48
						Ice	23.08	23.08	1.71
						1" Ice	31.50	31.50	2.18
						2" Ice	48.34	48.34	3.10
						4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	7.85	6.65	0.09
						1/2"	8.45	7.87	0.15
						Ice	9.09	8.84	0.22
						1" Ice	10.38	10.73	0.39
						2" Ice	13.07	14.69	0.88
						4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	7.85	6.65	0.09
						1/2"	8.45	7.87	0.15
						Ice	9.09	8.84	0.22
						1" Ice	10.38	10.73	0.39
						2" Ice	13.07	14.69	0.88
						4" Ice			
(2) AP14/17-880/1940/088D/ADT/XXP w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	7.85	6.65	0.09
						1/2"	8.45	7.87	0.15
						Ice	9.09	8.84	0.22
						1" Ice	10.38	10.73	0.39
						2" Ice	13.07	14.69	0.88
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	8.50	6.30	0.07
						1/2"	9.15	7.48	0.14
						Ice	9.77	8.37	0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	8.50	6.30	0.07
						1/2"	9.15	7.48	0.14
						Ice	9.77	8.37	0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice	8.50	6.30	0.07
						1/2"	9.15	7.48	0.14
						Ice	9.77	8.37	0.21
						1" Ice	11.03	10.18	0.38
						2" Ice	13.68	14.02	0.87

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral					
(2) RRUS 11	A	From Leg	4.00	0.0000	115.00	4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
(2) RRUS 11	B	From Leg	4.00	0.0000	115.00	2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
						Ice	3.74	1.74	0.09
(2) RRUS 11	C	From Leg	4.00	0.0000	115.00	1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	3.25	1.37	0.05
						1/2"	3.49	1.55	0.07
(2) LGP2140X	A	From Leg	4.00	0.0000	115.00	Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
						No Ice	1.26	0.38	0.02
(4) LGP2140X	B	From Leg	4.00	0.0000	115.00	1/2"	1.42	0.49	0.03
						Ice	1.58	0.62	0.04
						1" Ice	1.94	0.89	0.06
						2" Ice	2.75	1.54	0.14
						4" Ice			
(6) LGP2140X	C	From Leg	4.00	0.0000	115.00	No Ice	1.26	0.38	0.02
						1/2"	1.42	0.49	0.03
						Ice	1.58	0.62	0.04
						1" Ice	1.94	0.89	0.06
						2" Ice	2.75	1.54	0.14
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	115.00	4" Ice			
						No Ice	1.27	1.27	0.02
						1/2"	1.46	1.46	0.04
						Ice	1.66	1.66	0.05
						1" Ice	2.09	2.09	0.10
6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	115.00	2" Ice	3.10	3.10	0.21
						4" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	115.00	1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
						No Ice	1.43	1.43	0.02
						1/2"	1.92	1.92	0.03
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	115.00	Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
						No Ice	1.43	1.43	0.02
** Pipe Mount [PM 601-3]	C	None	0.0000	105.00	No Ice	1/2"	5.48	5.48	0.24
						Ice	6.57	6.57	0.28

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz Lateral	Vert						
			ft	ft		ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00	0.00	0.0000	105.00	1" Ice	8.75	8.75	0.36
							2" Ice	13.11	13.11	0.53
							4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00	0.00	0.0000	105.00	1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00	0.00	0.0000	105.00	1" Ice	7.55	8.51	0.28
							2" Ice	9.92	12.28	0.68
							4" Ice			
							No Ice	5.40	4.70	0.05
							1/2" Ice	5.96	5.86	0.09
							Ice	6.48	6.73	0.15
** Side Arm Mount [SO 701- 1]	A	From Leg	2.00	0.00	0.0000	80.00	No Ice	0.85	1.67	0.07
							1/2" Ice	1.14	2.34	0.08
							Ice	1.43	3.01	0.09
							1" Ice	2.01	4.35	0.12
							2" Ice	3.17	7.03	0.18
							4" Ice			
PD455-6	A	From Leg	4.00	0.00	0.0000	80.00	No Ice	6.05	6.05	0.02
							1/2" Ice	8.28	8.28	0.07
							Ice	10.53	10.53	0.12
							1" Ice	15.07	15.07	0.28
							2" Ice	24.37	24.37	0.77
							4" Ice			

### Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp

Comb. No.	Description
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164.25	Pole	Max Tension	14	0.76	-0.02	0.18
			Max. Compression	14	-4.62	-0.06	0.61
			Max. Mx	11	-2.16	4.49	-0.04
			Max. My	2	-2.16	0.00	4.57
			Max. Vy	11	-3.16	4.49	-0.04
			Max. Vx	8	3.20	0.00	-4.41
			Max. Torque	11			
L2	164.25 - 129.125	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.17	0.05	1.10
			Max. Mx	11	-9.79	258.13	0.04
			Max. My	2	-9.79	0.01	258.22
			Max. Vy	11	-13.83	258.13	0.04
			Max. Vx	8	13.83	0.03	-257.92
			Max. Torque	5			
L3	129.125 - 95.4583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.51	5.91	-1.44
			Max. Mx	11	-20.83	938.32	-0.86
			Max. My	8	-20.85	1.55	-935.20
			Max. Vy	11	-26.53	938.32	-0.86
			Max. Vx	8	26.39	1.55	-935.20
			Max. Torque	11			
L4	95.4583 - 62.625	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57.14	14.06	-2.84
			Max. Mx	11	-29.45	1849.19	-1.95
			Max. My	8	-29.46	3.83	-1839.97
			Max. Vy	11	-30.19	1849.19	-1.95
			Max. Vx	8	30.02	3.83	-1839.97
			Max. Torque	5			
L5	62.625 - 30.625	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-73.66	22.98	-5.60
			Max. Mx	11	-39.21	2842.44	-3.39
			Max. My	8	-39.21	6.27	-2826.90
			Max. Vy	11	-33.16	2842.44	-3.39
			Max. Vx	8	32.99	6.27	-2826.90
			Max. Torque	5			
L6	30.625 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-94.14	33.63	-8.93
			Max. Mx	11	-52.10	4125.24	-5.19

Sectio n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-52.11	9.35	-4102.19
			Max. Vy	11	-36.26	4125.24	-5.19
			Max. Vx	8	36.10	9.35	-4102.19
			Max. Torque	4			3.42

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	94.14	0.00	-0.00
	Max. H <sub>x</sub>	11	52.12	36.24	-0.03
	Max. H <sub>z</sub>	2	52.12	-0.03	36.07
	Max. M <sub>x</sub>	2	4099.00	-0.03	36.07
	Max. M <sub>z</sub>	5	4113.72	-36.24	0.03
	Max. Torsion	4	3.41	-31.40	18.06
	Min. Vert	1	52.12	0.00	0.00
	Min. H <sub>x</sub>	5	52.12	-36.24	0.03
	Min. H <sub>z</sub>	8	52.12	0.03	-36.07
	Min. M <sub>x</sub>	8	-4102.19	0.03	-36.07
	Min. M <sub>z</sub>	11	-4125.24	36.24	-0.03
	Min. Torsion	10	-3.41	31.40	-18.06

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	52.12	0.00	0.00	1.55	5.60	0.00
Dead+Wind 0 deg - No Ice	52.12	0.03	-36.07	-4099.00	2.19	-1.10
Dead+Wind 30 deg - No Ice	52.12	18.15	-31.25	-3551.41	-2057.09	-2.61
Dead+Wind 60 deg - No Ice	52.12	31.40	-18.06	-2051.78	-3563.61	-3.41
Dead+Wind 90 deg - No Ice	52.12	36.24	-0.03	-1.97	-4113.72	-3.31
Dead+Wind 120 deg - No Ice	52.12	31.37	18.01	2048.80	-3560.02	-2.31
Dead+Wind 150 deg - No Ice	52.12	18.09	31.22	3551.03	-2050.88	-0.70
Dead+Wind 180 deg - No Ice	52.12	-0.03	36.07	4102.19	9.35	1.10
Dead+Wind 210 deg - No Ice	52.12	-18.15	31.25	3554.60	2068.61	2.61
Dead+Wind 240 deg - No Ice	52.12	-31.40	18.06	2055.00	3575.12	3.41
Dead+Wind 270 deg - No Ice	52.12	-36.24	0.03	5.19	4125.24	3.31
Dead+Wind 300 deg - No Ice	52.12	-31.37	-18.01	-2045.58	3571.57	2.31
Dead+Wind 330 deg - No Ice	52.12	-18.09	-31.22	-3547.83	2062.43	0.70
Dead+Ice+Temp	94.14	-0.00	0.00	8.93	33.63	0.00
Dead+Wind 0 deg+Ice+Temp	94.14	0.00	-5.90	-695.30	33.22	-0.21
Dead+Wind 30 deg+Ice+Temp	94.14	2.97	-5.11	-601.20	-320.56	-0.55
Dead+Wind 60 deg+Ice+Temp	94.14	5.13	-2.95	-343.61	-579.41	-0.75
Dead+Wind 90 deg+Ice+Temp	94.14	5.93	-0.00	8.45	-673.97	-0.74
Dead+Wind 120 deg+Ice+Temp	94.14	5.13	2.94	360.64	-578.91	-0.54
Dead+Wind 150 deg+Ice+Temp	94.14	2.96	5.10	618.60	-319.69	-0.19
Dead+Wind 180 deg+Ice+Temp	94.14	-0.00	5.90	713.20	34.22	0.21
Dead+Wind 210 deg+Ice+Temp	94.14	-2.97	5.11	619.10	388.00	0.55
Dead+Wind 240 deg+Ice+Temp	94.14	-5.13	2.95	361.51	646.85	0.75
Dead+Wind 270 deg+Ice+Temp	94.14	-5.93	0.00	9.46	741.41	0.74

Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+Ice+Temp						
Dead+Wind 300	94.14	-5.13	-2.94	-342.74	646.35	0.54
deg+Ice+Temp						
Dead+Wind 330	94.14	-2.96	-5.10	-600.69	387.13	0.19
deg+Ice+Temp						
Dead+Wind 0 deg - Service	52.12	0.01	-14.09	-1601.28	4.37	-0.43
Dead+Wind 30 deg - Service	52.12	7.09	-12.21	-1387.24	-800.57	-1.02
Dead+Wind 60 deg - Service	52.12	12.27	-7.06	-801.05	-1389.46	-1.34
Dead+Wind 90 deg - Service	52.12	14.16	-0.01	0.20	-1604.49	-1.30
Dead+Wind 120 deg - Service	52.12	12.25	7.04	801.83	-1388.06	-0.91
Dead+Wind 150 deg - Service	52.12	7.07	12.20	1389.03	-798.15	-0.28
Dead+Wind 180 deg - Service	52.12	-0.01	14.09	1604.47	7.17	0.43
Dead+Wind 210 deg - Service	52.12	-7.09	12.21	1390.43	812.12	1.02
Dead+Wind 240 deg - Service	52.12	-12.27	7.06	804.25	1401.01	1.34
Dead+Wind 270 deg - Service	52.12	-14.16	0.01	3.00	1616.04	1.30
Dead+Wind 300 deg - Service	52.12	-12.25	-7.04	-798.63	1399.61	0.91
Dead+Wind 330 deg - Service	52.12	-7.07	-12.20	-1385.84	809.70	0.28

### Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-52.12	0.00	0.00	52.12	0.00	0.000%
2	0.03	-52.12	-36.07	-0.03	52.12	36.07	0.000%
3	18.15	-52.12	-31.25	-18.15	52.12	31.25	0.000%
4	31.40	-52.12	-18.06	-31.40	52.12	18.06	0.000%
5	36.24	-52.12	-0.03	-36.24	52.12	0.03	0.000%
6	31.37	-52.12	18.01	-31.37	52.12	-18.01	0.000%
7	18.09	-52.12	31.22	-18.09	52.12	-31.22	0.000%
8	-0.03	-52.12	36.07	0.03	52.12	-36.07	0.000%
9	-18.15	-52.12	31.25	18.15	52.12	-31.25	0.000%
10	-31.40	-52.12	18.06	31.40	52.12	-18.06	0.000%
11	-36.24	-52.12	0.03	36.24	52.12	-0.03	0.000%
12	-31.37	-52.12	-18.01	31.37	52.12	18.01	0.000%
13	-18.09	-52.12	-31.22	18.09	52.12	31.22	0.000%
14	0.00	-94.14	0.00	0.00	94.14	-0.00	0.000%
15	0.00	-94.14	-5.90	-0.00	94.14	5.90	0.000%
16	2.97	-94.14	-5.11	-2.97	94.14	5.11	0.000%
17	5.13	-94.14	-2.95	-5.13	94.14	2.95	0.000%
18	5.93	-94.14	-0.00	-5.93	94.14	0.00	0.000%
19	5.13	-94.14	2.94	-5.13	94.14	-2.94	0.000%
20	2.96	-94.14	5.10	-2.96	94.14	-5.10	0.000%
21	-0.00	-94.14	5.90	0.00	94.14	-5.90	0.000%
22	-2.97	-94.14	5.11	2.97	94.14	-5.11	0.000%
23	-5.13	-94.14	2.95	5.13	94.14	-2.95	0.000%
24	-5.93	-94.14	0.00	5.93	94.14	-0.00	0.000%
25	-5.13	-94.14	-2.94	5.13	94.14	2.94	0.000%
26	-2.96	-94.14	-5.10	2.96	94.14	5.10	0.000%
27	0.01	-52.12	-14.09	-0.01	52.12	14.09	0.000%
28	7.09	-52.12	-12.21	-7.09	52.12	12.21	0.000%
29	12.27	-52.12	-7.06	-12.27	52.12	7.06	0.000%
30	14.16	-52.12	-0.01	-14.16	52.12	0.01	0.000%
31	12.25	-52.12	7.04	-12.25	52.12	-7.04	0.000%
32	7.07	-52.12	12.20	-7.07	52.12	-12.20	0.000%
33	-0.01	-52.12	14.09	0.01	52.12	-14.09	0.000%
34	-7.09	-52.12	12.21	7.09	52.12	-12.21	0.000%
35	-12.27	-52.12	7.06	12.27	52.12	-7.06	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
36	-14.16	-52.12	0.01	14.16	52.12	-0.01	0.000%
37	-12.25	-52.12	-7.04	12.25	52.12	7.04	0.000%
38	-7.07	-52.12	-12.20	7.07	52.12	12.20	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	4	0.00000001	0.00040229
3	Yes	5	0.00000001	0.00052836
4	Yes	5	0.00000001	0.00057438
5	Yes	5	0.00000001	0.00005310
6	Yes	5	0.00000001	0.00052587
7	Yes	5	0.00000001	0.00055274
8	Yes	4	0.00000001	0.00044688
9	Yes	5	0.00000001	0.00056884
10	Yes	5	0.00000001	0.00052516
11	Yes	5	0.00000001	0.00005103
12	Yes	5	0.00000001	0.00056820
13	Yes	5	0.00000001	0.00053887
14	Yes	4	0.00000001	0.00010556
15	Yes	5	0.00000001	0.00017405
16	Yes	5	0.00000001	0.00017903
17	Yes	5	0.00000001	0.00017836
18	Yes	5	0.00000001	0.00016879
19	Yes	5	0.00000001	0.00018003
20	Yes	5	0.00000001	0.00018241
21	Yes	5	0.00000001	0.00017753
22	Yes	5	0.00000001	0.00019358
23	Yes	5	0.00000001	0.00019484
24	Yes	5	0.00000001	0.00018415
25	Yes	5	0.00000001	0.00019279
26	Yes	5	0.00000001	0.00018964
27	Yes	4	0.00000001	0.00014784
28	Yes	5	0.00000001	0.00004730
29	Yes	5	0.00000001	0.00005624
30	Yes	4	0.00000001	0.00029515
31	Yes	5	0.00000001	0.00004718
32	Yes	5	0.00000001	0.00005191
33	Yes	4	0.00000001	0.00015011
34	Yes	5	0.00000001	0.00005518
35	Yes	5	0.00000001	0.00004723
36	Yes	4	0.00000001	0.00029311
37	Yes	5	0.00000001	0.00005526
38	Yes	5	0.00000001	0.00004945

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	33.859	36	1.5930	0.0077
L2	166.625 - 129.125	33.067	36	1.5930	0.0077
L3	132.958 - 95.4583	22.170	36	1.4596	0.0036
L4	100.125 - 62.625	12.923	36	1.1932	0.0022
L5	68.125 - 30.625	6.055	36	0.8244	0.0013
L6	36.875 - 0	1.815	36	0.4415	0.0006



Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
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**Critical Deflections and Radius of Curvature - Service Wind**

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	Platform Mount [LP 403-1]	36	32.526	1.5922	0.0077	39857
155.00	Platform Mount [LP 403-1]	36	29.214	1.5721	0.0068	20151
135.00	Platform Mount [LP 304-1]	36	22.801	1.4726	0.0038	9703
125.00	Platform Mount [LP 304-1]	36	19.764	1.4052	0.0029	7927
121.00	Side Arm Mount [SO 701-1]	36	18.590	1.3757	0.0027	7402
115.00	Platform Mount [LP 303-1]	36	16.878	1.3285	0.0024	6734
105.00	Pipe Mount [PM 601-3]	36	14.170	1.2406	0.0023	5853
80.00	Side Arm Mount [SO 701-1]	36	8.329	0.9690	0.0017	5195

**Maximum Tower Deflections - Design Wind**

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	86.375	11	4.0658	0.0196
L2	166.625 - 129.125	84.354	11	4.0657	0.0196
L3	132.958 - 95.4583	56.562	11	3.7248	0.0091
L4	100.125 - 62.625	32.975	11	3.0452	0.0056
L5	68.125 - 30.625	15.453	11	2.1041	0.0033
L6	36.875 - 0	4.632	11	1.1270	0.0014

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	Platform Mount [LP 403-1]	11	82.973	4.0638	0.0196	15872
155.00	Platform Mount [LP 403-1]	11	74.527	4.0124	0.0174	7984
135.00	Platform Mount [LP 304-1]	11	58.172	3.7582	0.0098	3831
125.00	Platform Mount [LP 304-1]	11	50.424	3.5861	0.0074	3125
121.00	Side Arm Mount [SO 701-1]	11	47.430	3.5109	0.0068	2918
115.00	Platform Mount [LP 303-1]	11	43.063	3.3902	0.0062	2654
105.00	Pipe Mount [PM 601-3]	11	36.157	3.1661	0.0058	2306
80.00	Side Arm Mount [SO 701-1]	11	21.256	2.4730	0.0042	2043

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	$L_u$ ft	$Kl/r$	$F_a$ ksi	A in <sup>2</sup>	Actual P K	Allow. $P_a$ K	Ratio $\frac{P}{P_a}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.75	0.00	0.0	39.000	20.4326	-2.16	796.87	0.003
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	37.50	0.00	0.0	39.000	32.2025	-9.79	1255.90	0.008
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	37.50	0.00	0.0	39.000	47.8252	-20.83	1865.18	0.011
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	37.50	0.00	0.0	39.000	56.3349	-29.45	2197.06	0.013
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	37.50	0.00	0.0	39.000	64.5374	-39.21	2516.96	0.016
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	36.88	0.00	0.0	37.123	74.4656	-52.10	2764.42	0.019

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual $M_x$ kip-ft	Actual $f_{bx}$ ksi	Allow. $F_{bx}$ ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual $M_y$ kip-ft	Actual $f_{by}$ ksi	Allow. $F_{by}$ ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.57	0.423	39.000	0.011	0.00	0.000	39.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	258.21	12.031	39.000	0.308	0.00	0.000	39.000	0.000
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	938.33	23.780	39.000	0.610	0.00	0.000	39.000	0.000
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	1849.1 9	33.729	39.000	0.865	0.00	0.000	39.000	0.000
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	2842.4 4	39.465	39.000	1.012	0.00	0.000	39.000	0.000
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	4125.2 4	42.981	37.123	1.158	0.00	0.000	37.123	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	169 - 164.25 (1)	TP26x18x0.25	3.12	0.153	26.000	0.012	0.01	0.000	26.000	0.000
L2	164.25 - 129.125 (2)	TP34.063x21.5x0.3125	13.83	0.429	26.000	0.033	1.05	0.024	26.000	0.001
L3	129.125 - 95.4583 (3)	TP41.75x32.1538x0.375	26.53	0.555	26.000	0.043	2.12	0.026	26.000	0.001
L4	95.4583 - 62.625 (4)	TP49.063x39.8058x0.375	30.19	0.536	26.000	0.041	3.55	0.032	26.000	0.001
L5	62.625 - 30.625 (5)	TP56.125x46.9553x0.375	33.16	0.514	26.000	0.040	3.44	0.023	26.000	0.001
L6	30.625 - 0 (6)	TP62.938x53.8467x0.375	36.26	0.487	26.000	0.037	3.31	0.017	26.000	0.001

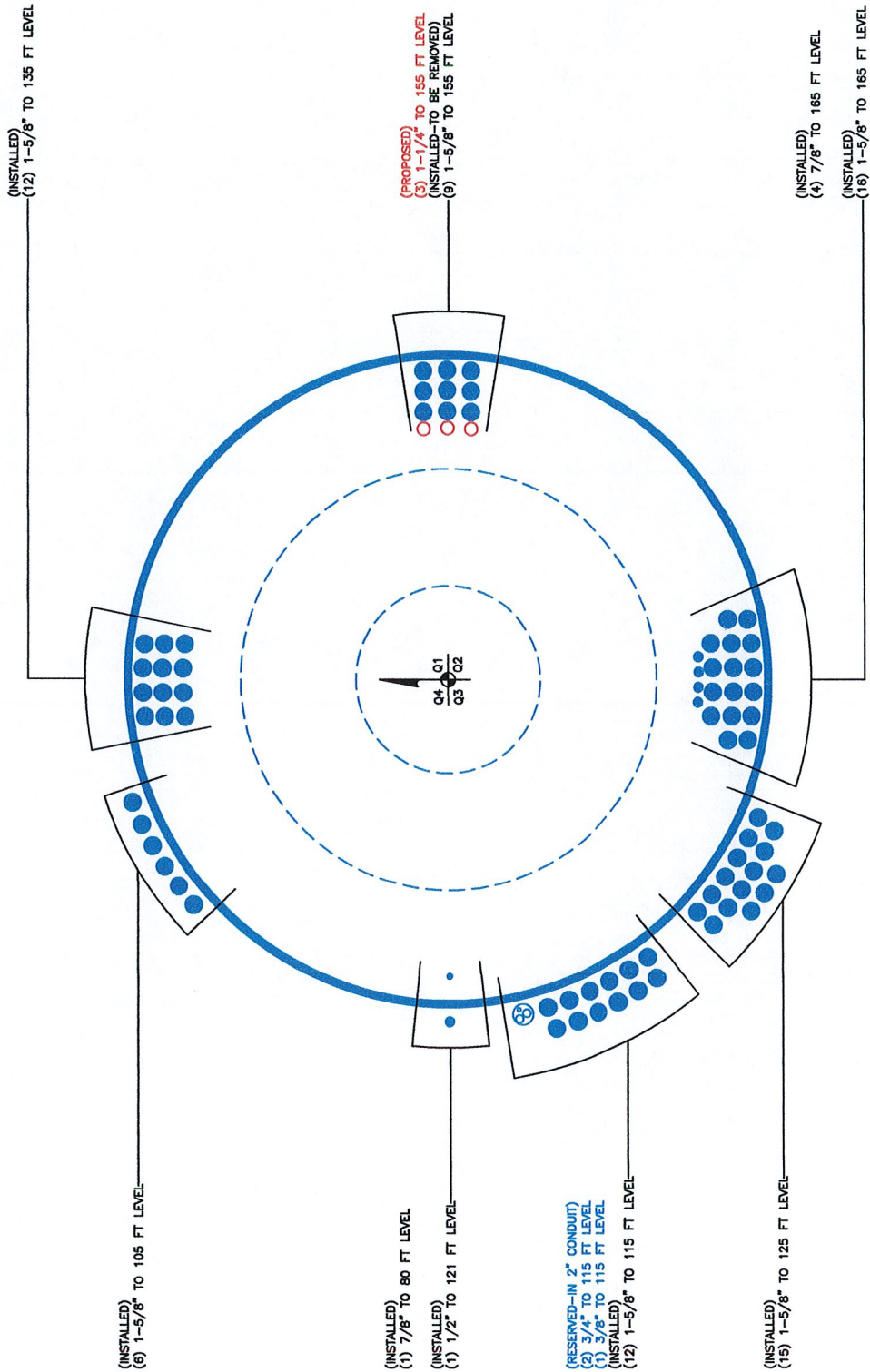
### Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$\frac{P}{P_a}$	$\frac{f_{bx}}{F_{bx}}$	$\frac{f_{by}}{F_{by}}$	$\frac{f_v}{F_v}$	$\frac{f_{vt}}{F_{vt}}$			
L1	169 - 164.25 (1)	0.003	0.011	0.000	0.012	0.000	0.014	1.333	H1-3+VT ✓
L2	164.25 - 129.125 (2)	0.008	0.308	0.000	0.033	0.001	0.317	1.333	H1-3+VT ✓
L3	129.125 - 95.4583 (3)	0.011	0.610	0.000	0.043	0.001	0.621	1.333	H1-3+VT ✓
L4	95.4583 - 62.625 (4)	0.013	0.865	0.000	0.041	0.001	0.879	1.333	H1-3+VT ✓
L5	62.625 - 30.625 (5)	0.016	1.012	0.000	0.040	0.001	1.028	1.333	H1-3+VT ✓
L6	30.625 - 0 (6)	0.019	1.158	0.000	0.037	0.001	1.177	1.333	H1-3+VT ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P <sub>allow</sub> K	% Capacity	Pass Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-2.16	1062.23	1.0	Pass
L2	164.25 - 129.125	Pole	TP34.063x21.5x0.3125	2	-9.79	1674.11	23.8	Pass
L3	129.125 - 95.4583	Pole	TP41.75x32.1538x0.375	3	-20.83	2486.28	46.6	Pass
L4	95.4583 - 62.625	Pole	TP49.063x39.8058x0.375	4	-29.45	2928.68	65.9	Pass
L5	62.625 - 30.625	Pole	TP56.125x46.9553x0.375	5	-39.21	3355.11	77.1	Pass
L6	30.625 - 0	Pole	TP62.938x53.8467x0.375	6	-52.10	3684.97	88.3	Pass
Summary								
Pole (L6)							88.3	Pass
RATING =							<b>88.3</b>	<b>Pass</b>

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



BUSINESS UNIT: B26768 TOWER ID: C\_BASELEVEL

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



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

## TIA Rev F

### Site Data

BU#: 826768
Site Name: PLYMOUTH / RT 6
App #: 179691, rev 1
Pole Manufacturer: Pirod

Reactions		
Moment:	4125	ft-kips
Axial:	52	kips
Shear:	36	kips

### Anchor Rod Data

Qty:	45	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	68	in

If No stiffeners, Criteria: **AISC ASD** <-Only Applicable to Unstiffened Cases

### Anchor Rod Results

Maximum Rod Tension: 63.6 Kips  
 Allowable Tension: 81.0 Kips  
 Anchor Rod Stress Ratio: 78.5% **Pass**

<b>Rigid</b>
Service, ASD
Fty*ASIF

### Plate Data

Diam:	73	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.44	in

### Base Plate Results

Base Plate Stress: Rohn/Pirod, OK  
 Allowable Plate Stress: 50.0 ksi  
 Base Plate Stress Ratio: Rohn/Pirod, OK

Flexural Check

<b>Rigid</b>
Service ASD
0.75*Fy*ASIF
Y.L. Length:
25.75

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

### Stiffener Results

N/A for Rohn / Pirod  
 Horizontal Weld : N/A  
 Vertical Weld: N/A  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: N/A  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: N/A  
 Plate Comp. (AISC Bracket): N/A

### Pole Results

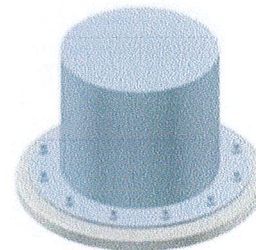
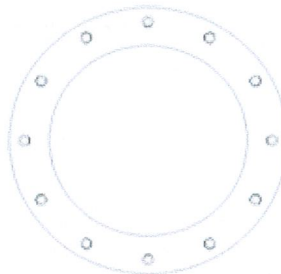
Pole Punching Shear Check: N/A

### Pole Data

Diam:	62.938	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
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\* 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



# Monopole Pier and Pad Foundation



BU # : 826768

Site Name: PLYMOUTH / RT 6

App. Number: 179691, rev 1

TIA-222 Revision: F

Design Reactions		
Shear, <b>S</b> :	36	kips
Moment, <b>M</b> :	4125	ft-kips
Tower Height, <b>H</b> :	169	ft
Tower Weight, <b>Wt</b> :	52	kips
Base Diameter, <b>BD</b> :	5.25	ft

Foundation Dimensions		
Depth, <b>D</b> :	8.5	ft
Pad Width, <b>W</b> :	27	ft
Neglected Depth, <b>N</b> :	3.5	ft
Thickness, <b>T</b> :	2.50	ft
Pier Diameter, <b>Pd</b> :	7.50	ft
Ext. Above Grade, <b>E</b> :	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, <b>Cc</b> :	3.0	in

Soil Properties		
Soil Unit Weight, <b>γ</b> :	0.135	kcf
Ult. Bearing Capacity, <b>Bc</b> :	12.0	ksf
Angle of Friction, <b>Φ</b> :	30	deg
Cohesion, <b>Co</b> :	0.000	ksf
Passive Pressure, <b>Pp</b> :	0.250	ksf
Base Friction, <b>μ</b> :	0.60	

Material Properties		
Rebar Yield Strength, <b>Fy</b> :	60000	psi
Concrete Strength, <b>F'c</b> :	4000	psi
Concrete Unit Weight, <b>δc</b> :	0.150	kcf
Seismic Zone, <b>z</b> :	1	

Rebar Properties		
Pier Rebar Size, <b>Sp</b> :	9	
Pier Rebar Quantity, <b>mp</b> :	39	32
Pad Rebar Size, <b>Spad</b> :	9	
Pad Rebar Quantity, <b>mpad</b> :	36	15
Pier Tie Size, <b>St</b> :	4	3
Tie Quantity, <b>mt</b> :	11	7

Design Checks			
	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	7.5	7.245	OK
Overturing (ft-kips)	8202.98	4125.00	50.3%
Shear Capacity (kips)	334.73	36.00	10.8%
Bearing (ksf)	9.00	2.95	32.7%
Pad Shear - 1-way (kips)	812.57	654.06	80.5%
Pad Shear - 2-way (kips)	1834.78	145.13	7.9%
Pad Moment Capacity (k-ft)	4123.81	1836.91	44.5%
Pier Moment Capacity (k-ft)	5324.93	4359.00	81.9%

FALSE



## Maximum Allowable Moment of a Circular Pier

Axial Load (Negative for Compression) =  kips

<u>Pier Properties</u>		<u>Material Properties</u>	
<b>Concrete:</b>		Concrete compressive strength =	<input type="text" value="4000"/> psi
Pier Diameter =	<input type="text" value="7.5"/> ft	Reinforcement yield strength =	<input type="text" value="60000"/> psi
Concrete Area =	6361.7 in <sup>2</sup>	Modulus of elasticity =	<input type="text" value="29000"/> ksi
<b>Reinforcement:</b>		Reinforcement yield strain =	<input type="text" value="0.00207"/>
Clear Cover =	<input type="text" value="3.00"/> in	Limiting compressive strain =	<input type="text" value="0.003"/>
Cage Diameter =	6.91 ft	<b><u>Seismic Properties</u></b>	
Bar Size =	<input type="text" value="9"/>	Seismic Zone =	<input type="text" value="1"/>
Bar Diameter =	1.13 in		
Bar Area =	1 in <sup>2</sup>		
Number of Bars =	<input type="text" value="39"/>		

### Minimum Area of Steel

Required area of steel = 31.81 in<sup>2</sup>  
 Provided area of steel = 39.00 in<sup>2</sup>      **OK**

### Axial Loading

Load factor =   
 Reduction factor = 0.9  
 Factored axial load = -75.1111 kips

### Neutral Axis

Distance from extreme edge to neutral axis = 12.73 in  
 Equivalent compression zone factor = 0.85  
 Distance from extreme edge to  
 equivalent compression zone factor = 10.82 in  
 Distance from centroid to neutral axis = 32.27 in

### Compression Zone

Area of steel in compression zone = 7.00 in<sup>2</sup>  
 Angle from centroid of pier to intersection of  
 equivalent compression zone and edge of pier = 40.58 deg  
 Area of concrete in compression = 433.65 in<sup>2</sup>  
 Force in concrete =  $0.85 * f_c * Acc$  = 1474.41 kips  
 Total reinforcement forces = -1399.30 kips  
 Factored axial load = -75.11 kips  
 Force in concrete = -1474.41 kips  
  
 Sum of the forces in concrete = 0.00 kips      **OK**

### Maximum Moment

First moment of the concrete  
 area in compression about the centroid = 16719.50 in<sup>3</sup>  
 Distance between centroid of concrete  
 in compression and centroid of pier = 38.56 in  
 Moment of concrete in compression = 56846.31 in-kips  
 Total reinforcement moment = 35452.47 in-kips  
 Nominal moment strength of column = 92298.79 in-kips  
 Factored moment strength of column = 63899.16 in-kips

**Maximum Allowable Moment =  ft-kips**



### Individual Bars

Bar #	Angle from first bar (deg)	Distance to centroid (in)	Distance to neutral axis (in)	Distance to equivalent comp. zone (in)	Strain	Area of steel in compression (in <sup>2</sup> )	Stress (ksi)	Axial force (kips)
1	0.00	0.00	-32.27	-34.18	-0.007604	0.00	-60.00	-60.00
2	9.23	6.65	-25.62	-27.53	-0.006038	0.00	-60.00	-60.00
3	18.46	13.12	-19.15	-21.06	-0.004512	0.00	-60.00	-60.00
4	27.69	19.26	-13.01	-14.92	-0.003067	0.00	-60.00	-60.00
5	36.92	24.89	-7.38	-9.29	-0.001738	0.00	-50.41	-50.41
6	46.15	29.88	-2.39	-4.30	-0.000562	0.00	-16.30	-16.30
7	55.38	34.10	1.83	-0.08	0.0004316	0.00	12.52	12.52
8	64.62	37.44	5.17	3.26	0.0012174	1.00	35.30	31.90
9	73.85	39.80	7.53	5.62	0.0017746	1.00	51.46	48.06
10	83.08	41.13	8.86	6.95	0.0020889	1.00	60.00	56.60
11	92.31	41.40	9.13	7.22	0.0021522	1.00	60.00	56.60
12	101.54	40.60	8.33	6.42	0.0019628	1.00	56.92	53.52
13	110.77	38.74	6.47	4.56	0.0015256	1.00	44.24	40.84
14	120.00	35.88	3.62	1.71	0.0008519	1.00	24.71	21.31
15	129.23	32.10	-0.17	-2.08	-4.07E-05	0.00	-1.18	-1.18
16	138.46	27.48	-4.79	-6.70	-0.001129	0.00	-32.75	-32.75
17	147.69	22.15	-10.12	-12.03	-0.002386	0.00	-60.00	-60.00
18	156.92	16.24	-16.03	-17.94	-0.003777	0.00	-60.00	-60.00
19	166.15	9.92	-22.35	-24.26	-0.005268	0.00	-60.00	-60.00
20	175.38	3.33	-28.94	-30.84	-0.006819	0.00	-60.00	-60.00
21	184.62	-3.33	-35.60	-37.51	-0.00839	0.00	-60.00	-60.00
22	193.85	-9.92	-42.19	-44.10	-0.009941	0.00	-60.00	-60.00
23	203.08	-16.24	-48.51	-50.42	-0.011432	0.00	-60.00	-60.00
24	212.31	-22.15	-54.42	-56.33	-0.012823	0.00	-60.00	-60.00
25	221.54	-27.48	-59.75	-61.66	-0.014079	0.00	-60.00	-60.00
26	230.77	-32.10	-64.37	-66.28	-0.015168	0.00	-60.00	-60.00
27	240.00	-35.88	-68.15	-70.06	-0.016061	0.00	-60.00	-60.00
28	249.23	-38.74	-71.01	-72.92	-0.016734	0.00	-60.00	-60.00
29	258.46	-40.60	-72.87	-74.78	-0.017172	0.00	-60.00	-60.00
30	267.69	-41.40	-73.67	-75.58	-0.017361	0.00	-60.00	-60.00
31	276.92	-41.13	-73.40	-75.31	-0.017298	0.00	-60.00	-60.00
32	286.15	-39.80	-72.07	-73.98	-0.016983	0.00	-60.00	-60.00
33	295.38	-37.44	-69.70	-71.61	-0.016426	0.00	-60.00	-60.00
34	304.62	-34.10	-66.37	-68.28	-0.01564	0.00	-60.00	-60.00
35	313.85	-29.88	-62.15	-64.06	-0.014647	0.00	-60.00	-60.00
36	323.08	-24.89	-57.16	-59.07	-0.01347	0.00	-60.00	-60.00
37	332.31	-19.26	-51.53	-53.44	-0.012142	0.00	-60.00	-60.00
38	341.54	-13.12	-45.39	-47.30	-0.010697	0.00	-60.00	-60.00
39	350.77	-6.65	-38.92	-40.83	-0.009171	0.00	-60.00	-60.00





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RADIO FREQUENCY EMISSIONS ANALYSIS REPORT  
EVALUATION OF HUMAN EXPOSURE POTENTIAL  
TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT54XC712

Terryville Voicestream  
171 Town Hill Road  
Terryville, CT 06783

**November 8, 2012**

November 8, 2012

Sprint  
Attn: RF Engineering Manager  
1 International Boulevard, Suite 800  
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT54XC712 – Terryville Voicestream**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 171 Town Hill Road, Terryville, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limit for the cellular band is approximately 567  $\mu\text{W}/\text{cm}^2$ , and the general population exposure limit for the PCS band is 1000  $\mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.





Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 171 Town Hill Road, Terryville, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

- 1) 4 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
- 2) 1 CDMA Carrier (850 MHz ) was considered for each sector of the proposed installation
- 3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 5) The antenna used in this modeling is the APXVSPPI8-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.





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- 6) The antenna mounting height centerline of the proposed antennas is **154.9 feet** above ground level (AGL)
- 7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CTS4XC712 - Terryville Voicestream
Site Address	171 Town Hill Road, Terryville, CT, 06783
Site Type	Monopole

Sector 1																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APX/SPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	154.9	148.9	1/2"	0.5	0	2773.8948	44.97867	4.49787%
1a	RFS	APX/SPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	154.9	148.9	1/2"	0.5	0	389.96892	6.323341	1.11523%
													Sector total Power Density Value:		5.613%		

Sector 2																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APX/SPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	154.9	148.9	1/2"	0.5	0	2773.8948	44.97867	4.49787%
2a	RFS	APX/SPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	154.9	148.9	1/2"	0.5	0	389.96892	6.323341	1.11523%
													Sector total Power Density Value:		5.613%		

Sector 3																	
Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBi)	Antenna Height (ft)	Antenna analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APX/SPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	4	80	15.9	154.9	148.9	1/2"	0.5	0	2773.8948	44.97867	4.49787%
3a	RFS	APX/SPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	154.9	148.9	1/2"	0.5	0	389.96892	6.323341	1.11523%
													Sector total Power Density Value:		5.613%		

Site Composite MPE %	
Carrier	MPE %
Sprint	16.839%
Pocket	6.176%
T-Mobile	1.310%
Town	20.350%
Verizon Wireless	18.130%
Nextel	4.876%
AT&T	11.710%
<b>Total Site MPE %</b>	<b>79.379%</b>





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## Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **16.839% (5.613% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **79.379%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government

Scott Heffernan  
RF Engineering Director

**EBI Consulting**  
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Burlington, MA 01803