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

VIA ELECTRONIC MAIL

September 13, 2018

William Stone
Real Estate Specialist
Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

RE: **EM-T-MOBILE-111-180907** – T-Mobile notice of intent to modify an existing telecommunications facility located at 171 Town Hill Road, Plymouth, Connecticut.

Dear Mr. Stone:

The Connecticut Siting Council (Council) is in receipt of your correspondence of September 13, 2018 submitted in response to the Council's September 7, 2018 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission of the updated Structural Analysis Report renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/FC/emr

Robidoux, Evan

From: Stone, William <William.Stone@crowncastle.com>
Sent: Wednesday, September 12, 2018 2:14 PM
To: Bachman, Melanie; Nwankwo, Ifeanyi
Cc: CSC-DL Siting Council
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth
Attachments: AT&T 171 Town Hill Road Passing SA 08 06 18.pdf

Thank you Melanie and Ifeanyi! One original will be overnighted for delivery tomorrow. Soft copy attached.

Best regards,

WILL STONE
Real Estate Specialist
T: (518) 373-3543 | M: (518) 210-0495 I F: (724) 416-6581

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
Crowncastle.com

From: Bachman, Melanie
Sent: Wednesday, September 12, 2018 1:05 PM
To: Stone, William ; Nwankwo, Ifeanyi
Cc: CSC-DL Siting Council
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

No need to apologize or reinvent the wheel here. If you could send one hard copy of the AT&T structural analysis for our physical file, that would be appreciated. Ifeanyi could correct me, but I believe we already have an electronic copy of the AT&T structural analysis that we could post to our webpage for the T-Mobile request.

Thanks.

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
860-827-2951

From: Stone, William [mailto:William.Stone@crowncastle.com]
Sent: Wednesday, September 12, 2018 1:00 PM
To: Bachman, Melanie <Melanie.Bachman@ct.gov>; Nwankwo, Ifeanyi <Ifeanyi.Nwankwo@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Ms. Bachman – I apologize. It read that as you wanted T-Mobile's analysis to be revised to include AT&T's changes. Can you please let me know if you would like me to send hard copies of the AT&T analysis or if a soft copy is sufficient.

Thank you!

WILL STONE
Real Estate Specialist
T: (518) 373-3543 | M: (518) 210-0495 I F: (724) 416-6581

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
Crowncastle.com

From: Bachman, Melanie <Melanie.Bachman@ct.gov>
Sent: Wednesday, September 12, 2018 12:15 PM
To: Stone, William <William.Stone@crowncastle.com>; Nwankwo, Ifeanyi <Ifeanyi.Nwankwo@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Good afternoon, Mr. Stone.

I'm sorry that you don't agree with Ifeanyi, but please be advised that I do agree with Ifeanyi and advised him to submit the below response to your inquiry. Frankly, I don't see how you would lose any time or money by simply submitting a copy of AT&T's existing structural analysis that includes T-Mobile's planned antenna installation in response to the incomplete letter issued by the Council so that an accurate structural analysis would be part of the record of both AT&T and T-Mobile's requests for exempt modification at this site. If you disagree, please let me know.

Thanks.

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
860-827-2951

received this e-mail by mistake, please notify us immediately by replying to the message so that we can take appropriate action immediately and see to it that this mistake is rectified.

From: Stone, William [mailto:William.Stone@crowncastle.com]
Sent: Wednesday, September 12, 2018 11:51 AM
To: Nwankwo, Ifeanyi <Ifeanyi.Nwankwo@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Ifeanyichukwu,

I don't agree with this at all. If you look at the date on the structural's you'll see that T-Mobile's predates AT&T's. Now we are forced to lose time and money over what is a very easy thing to explain. Can you please consult with Ms. Bachman to ensure this is the correct course of action?

Thank you,

WILL STONE
Real Estate Specialist
T: (518) 373-3543 | M: (518) 210-0495 I F: (724) 416-6581

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
Crowncastle.com

From: Nwankwo, Ifeanyi <Ifeanyi.Nwankwo@ct.gov>
Sent: Wednesday, September 12, 2018 11:37 AM
To: Stone, William <William.Stone@crowncastle.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Good Morning Mr. Stone

Thank you for your email.

The Council received the AT&T request on the 31st of August while T-Mobile's request was received on the 7th of September.
Also the AT&T request does incorporate T-Mobiles proposed modifications.

However Following the Council's process of "First come First Serve" T-Mobile being the later applicant would need to present a request that shows that AT&T's proposed equipment have been considered in the Structural Analysis Report submitted with T-Mobile's request for exempt modification.

I hope this answers your question. Please contact me if you have any questions.
Thank you.

Best Regards
Ifeanyichukwu Nwankwo

Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
P: 860.827.2941 | F: 860.827.2950 | E: Ifeanyi.Nwankwo@ct.gov

www.ct.gov/csc

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

From: Stone, William [mailto:William.Stone@crowncastle.com]
Sent: Wednesday, September 12, 2018 9:52 AM
To: Robidoux, Evan
Cc: CSC-DL Siting Council
Subject: RE: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Evan – the AT&T application was put in after the T-Mobile application. So at the time the TMO project structural analysis was run, AT&T was not making that change and hence not accounted for on T-Mobile's structural analysis. I am in the process of confirming that AT&T's SA did incorporate T-Mobile's proposed changes. If that is the case, do you need me to revise the T-Mobile Structural analysis?

Thank you!

WILL STONE
Real Estate Specialist
T: (518) 373-3543 | M: (518) 210-0495 I F: (724) 416-6581

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
Crowncastle.com

From: Robidoux, Evan <Evan.Robidoux@ct.gov>
Sent: Wednesday, September 12, 2018 8:03 AM
To: Stone, William <William.Stone@crowncastle.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Council Incomplete Letter for EM-T-MOBILE-111-180907-TownHillRd-Plymouth

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

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This email may contain confidential or privileged material. Use or disclosure of it by anyone other than the recipient is unauthorized. If you are not an intended recipient, please delete this email.
This email may contain confidential or privileged material. Use or disclosure of it by anyone other than the recipient is unauthorized. If you are not an intended recipient, please delete this email.

Date: **August 06, 2018**

Amanda Brown
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
(770) 693-0835

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1086
	Carrier Site Name:	Plymouth
Crown Castle Designation:	**Crown Castle BU Number:**	826768
	Crown Castle Site Name:	PLYMOUTH/RT 6
	Crown Castle JDE Job Number:	522180
	Crown Castle Work Order Number:	1609552
	Crown Castle Application Number:	449240 Rev. 0
Engineering Firm Designation:	**Destek Engineering, LLC Project Number:**	1802192
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 Amanda Brown,

Destek Engineering, LLC 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 1228977, in accordance with application 449240, revision 0.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis.

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 *Destek Engineering, LLC* 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: Wade Baxter, EIT

Respectfully submitted by: 08-06-2018

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
President

tnxTower Report - version 8.0.2.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 169 ft Monopole tower designed by Pirod 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-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 40 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1 and crest height of 0 feet.

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
115.0	115.0	3	ericsson	RRUS 12 B2	2 1	5/8 3/8	-
		3	ericsson	RRUS 4426 B66			
		3	ericsson	RRUS 4478 B14			
		3	ericsson	RRUS 4478 B5			
		6	kaelus	DBCT108F1V92-1			
		3	kathrein	80010965 w/ Mount Pipe			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8C			
		1	site pro 1	HRK12			

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
164.0	186.0	1	rfi antennas	COL45-70	10 7	1-5/8 7/8	1
	168.0	2	rfi antennas	COL45-70			
	165.0	3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	2	1-3/8	2
		3	ericsson	RADIO 4449 B12/B71			
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20	-	-	1
	164.0	1	tower mounts	Platform Mount [LP 403-1]			
155.0	155.0	3	alcatel lucent	1900MHz RRH	4	1-1/4	1
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 305-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
142.0	142.0	3	alcatel lucent	B4 RRH2X60-4R	14	1-5/8	1
		3	alcatel lucent	RRH2X60-AWS			
		3	alcatel lucent	RRH2x60-700			
		6	antel	LPA-80080/6CF w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 403-1]			
121.0	125.0	1	rfs celwave	201-4	1	1/2	1
	121.0	1	tower mounts	Pipe Mount [PM 601-1]			
115.0	115.0	3	ericsson	RRUS 11	-	-	3
		3	quintel technology	QS66512-3 w/ Mount Pipe			
		3	cci antennas	DTMABP7819VG12A	12 2 4	1-5/8 3/8 5/8	1
		6	cci antennas	TPX-070821			
		3	ericsson	RRUS 11			
		3	ericsson	WCS RRUS-32-B30			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		2	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 305-1]			
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]			
74.0	83.0	1	decibel	DB810T3E-XT	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 306-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

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)
169	169	12	-	RR65-19-00XP	12	1-5/8
165	165	12	-	RR65-19-00XP	12	1-5/8
155	155	12	-	RR65-19-00XP	12	1-5/8
145	145	12	-	RR65-19-00XP	12	1-5/8
135	135	12	-	RR65-19-00XP	12	1-5/8
125	125	12	-	RR65-19-00XP	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	Pirod; A-117464; 9/1/2000	3491992	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod; A-117464; 9/1/2000	3678682	CCISITES
4-GEOTECHNICAL REPORTS	Clarence Welti Assoc.' 8/14/2000	3491991	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORT	PJF&Co.; 37518-2650.001.7805 08/01/2018	7703276	CCISITES
4-MOUNT STRUCTURAL ANALYSIS REPORT	Hudson Design Group CT1086 07/11/2018	-	CCI

3.1) Analysis Method

tnxTower (version 8.0.2.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) 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. Destek Engineering, LLC 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	-0.24	1506.86	0.1	Pass
L2	164.25 - 129.75	Pole	TP34.0625x21.5x0.3125	2	-12.78	2368.37	21.6	Pass
L3	129.75 - 96.08	Pole	TP41.75x32.1327x0.375	3	-25.34	3489.81	37.9	Pass
L4	96.08 - 63.25	Pole	TP49.0625x39.8023x0.375	4	-35.26	3910.87	55.0	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.9543x0.375	5	-46.53	4259.40	67.4	Pass
L6	31.25 - 0	Pole	TP62.9375x53.8466x0.375	6	-61.76	4606.06	78.9	Pass
							Summary	
						Pole (L6)	78.9	Pass
						Rating =	78.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	64.8	Pass
2	Base Plate	0	78.9	Pass
1	Base Foundation	0	71.0	Pass
1	Base Foundation Soil Interaction	0	56.5	Pass

Structure Rating (max from all components) =	78.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Base plates are assumed to have the same capacity as their respective splice bolts or shaft.

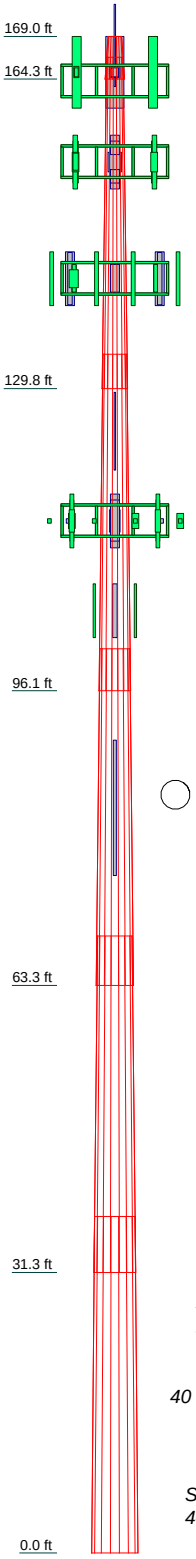
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	4.75	18	0.2500	2.38	18.0000	26.0000		0.3
2	36.88	18	0.3125	3.83	21.5000	34.0625		3.4
3	37.50	18	0.3750	4.67	32.1327	41.7500		5.6
4	37.50	18	0.3750	5.50	39.8023	49.0625		6.7
5	37.50	18	0.3750	6.25	46.9543	56.1250		7.8
6	37.50	18	0.3750		53.8466	62.9375		8.8
							A572-65	32.5



ALL REACTIONS ARE FACTORED

AXIAL 109 K

SHEAR 9 K

MOMEI 1000 kip

TORQUE 0 kip-ft
40 mph WIND - 0.7500 in ICE

AXIAL 62 K

SHEAR 40 K

MOMEI 4604 kip-ft

TORQUE 1 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
AIR 32 B2A/B66AA w/ Mount Pipe	164	DB-T1-6Z-8AB-0Z	142
AIR 32 B2A/B66AA w/ Mount Pipe	164	Platform Mount [LP 403-1]	142
AIR 32 B2A/B66AA w/ Mount Pipe	164	201-4	121
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	Pipe Mount [PM 601-1]	121
		7770.00 w/ Mount Pipe	115
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	7770.00 w/ Mount Pipe	115
		7770.00 w/ Mount Pipe	115
APXVAARR24_43-U-NA20 w/ Mount Pipe	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
RADIO 4449 B12/B71	164		
RADIO 4449 B12/B71	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
RADIO 4449 B12/B71	164		
(2) COL45-70	164	AM-X-CD-16-65-00T-RET w/ Mount Pipe	115
COL45-70	164	DTMABP7819VG12A	115
ATMAA1412D-1A20	164	DTMABP7819VG12A	115
ATMAA1412D-1A20	164	DTMABP7819VG12A	115
ATMAA1412D-1A20	164	DC6-48-60-18-8F	115
Platform Mount [LP 403-1]	164	DC6-48-60-18-8F	115
(2) 2.375" OD x 6' Mount Pipe	164	(2) RRUS 11	115
2.375" OD x 6' Mount Pipe	164	RRUS 11	115
APXVTM14-C-120 w/ Mount Pipe	155	WCS RRUS-32-B30	115
APXVTM14-C-120 w/ Mount Pipe	155	WCS RRUS-32-B30	115
APXVTM14-C-120 w/ Mount Pipe	155	WCS RRUS-32-B30	115
APXVSPP18-C-A20 w/ Mount Pipe	155	(2) TPX-070821	115
APXVSPP18-C-A20 w/ Mount Pipe	155	(2) TPX-070821	115
APXVSPP18-C-A20 w/ Mount Pipe	155	(2) TPX-070821	115
TD-RRH8x20-25	155	80010965 w/ Mount Pipe	115
TD-RRH8x20-25	155	80010965 w/ Mount Pipe	115
TD-RRH8x20-25	155	80010965 w/ Mount Pipe	115
800MHZ RRH	155	QS66512-2 w/ Mount Pipe	115
800MHZ RRH	155	QS66512-2 w/ Mount Pipe	115
800MHZ RRH	155	QS66512-2 w/ Mount Pipe	115
1900MHz RRH	155	(3) DBCT108F1V92-1	115
1900MHz RRH	155	(2) DBCT108F1V92-1	115
1900MHz RRH	155	DBCT108F1V92-1	115
Platform Mount [LP 305-1]	155	RRUS 4478 B5	115
2.375" OD x 6' Mount Pipe	155	RRUS 4478 B5	115
2.375" OD x 6' Mount Pipe	155	RRUS 4478 B5	115
2.375" OD x 6' Mount Pipe	155	RRUS 4478 B14	115
(2) LPA-80080/6CF w/ Mount Pipe	142	(2) RRUS 4478 B14	115
(2) LPA-80080/6CF w/ Mount Pipe	142	RRUS 12 B2	115
(2) LPA-80080/6CF w/ Mount Pipe	142	RRUS 12 B2	115
(2) SBNHH-1D65B w/ Mount Pipe	142	RRUS 12 B2	115
(2) SBNHH-1D65B w/ Mount Pipe	142	DC6-48-60-18-8C	115
(2) SBNHH-1D65B w/ Mount Pipe	142	RRUS 4426 B66	115
B4 RRH2X60-4R	142	(2) RRUS 4426 B66	115
B4 RRH2X60-4R	142	Platform Mount [LP 305-1]	115
B4 RRH2X60-4R	142	Miscellaneous [NA 507-1]	115
RRH2x60-700	142	APXV18-206517S-C w/ Mount Pipe	105
RRH2x60-700	142	APXV18-206517S-C w/ Mount Pipe	105
RRH2x60-700	142	APXV18-206517S-C w/ Mount Pipe	105
RRH2X60-AWS	142	Pipe Mount [PM 601-3]	105
RRH2X60-AWS	142	DB810T3E-XT	74
RRH2X60-AWS	142	Side Arm Mount [SO 306-1]	74

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 Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 78.9%

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

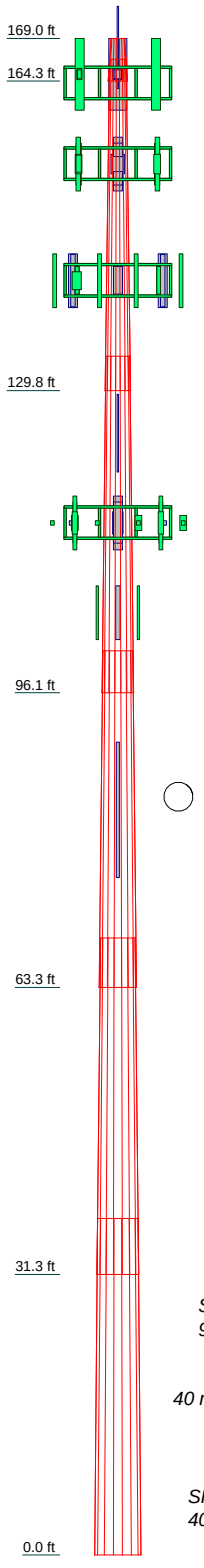
Job: 826768 - Plymouth/Rt 6			
Project: 1802191			
Client: Crown Castle	Drawn by: Ahmet Colakoglu		App'd:
Code: TIA-222-G	Date: 08/06/18		Scale: NTS
Path: Z:\Projects\2018\02 - Crown Castle\1802192 - 826768 Plymouth RT 6 WO 160955\2\TNXTower\826768.eri			Dwg No. E-1

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 Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 78.9%



ALL REACTIONS ARE FACTORED

AXIAL 109 K

SHEAR 9 K — *MOMENT 1000 kip-ft*

TORQUE 0 kip-ft

40 mph WIND - 0.7500 in ICE

AXIAL 62 K

SHEAR 40 K — *MOMENT 4604 kip-ft*

TORQUE 1 kip-ft

REACTIONS - 93 mph WIND

Section	1	2	3	4	5	6
Length (ft)	4.75	36.88	37.50	37.50	37.50	37.50
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	32.1327	39.8023	46.9543	53.8466
Bot Dia (in)	26.0000	34.0625	41.7500	49.0625	56.1250	62.9375
Grade	A572-65					
Weight (K)	0.3	3.4	5.6	6.7	7.8	8.8

Total Weight (K) 32.5

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job: *826768 - Plymouth/Rt 6*			
Project: *1802191*			
Client: Crown Castle	Drawn by: Ahmet Colakoglu	App'd:	
Code: TIA-222-G	Date: 08/06/18	Scale: NTS	
Path: Z:\Projects\2018\02 - Crown Castle\1802192 - 826768 Plymouth RT 6 WO 160955\2\TNXTower\826768.eri		Dwg No. E-1	

Tower Input Data

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

4) Tower is located in Litchfield County, Connecticut.
5) Basic wind speed of 93 mph.
6) Structure Class II.
7) Exposure Category C.
8) Topographic Category 1.
9) Crest Height 0.00 ft.
10) Nominal ice thickness of 0.7500 in.
11) Ice thickness is considered to increase with height.
12) Ice density of 56 pcf.
13) A wind speed of 40 mph is used in combination with ice.
14) Temperature drop of 50 °F.
15) Deflections calculated using a wind speed of 60 mph.
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	169.00-164.25	4.75	2.38	18	18.0000	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164.25-129.75	36.88	3.83	18	21.5000	34.0625	0.3125	1.2500	A572-65 (65 ksi)
L3	129.75-96.08	37.50	4.67	18	32.1327	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	96.08-63.25	37.50	5.50	18	39.8023	49.0625	0.3750	1.5000	A572-65 (65 ksi)

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
L5	63.25-31.25	37.50	6.25	18	46.9543	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	31.25-0.00	37.50		18	53.8466	62.9375	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.2391	14.0846	560.6340	6.3012	9.1440	61.3117	1122.0058	7.0437	2.7280	10.912
	26.3625	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	22.6051	21.0154	1191.8828	7.5216	10.9220	109.1268	2385.3338	10.5097	3.2340	10.349
	34.5398	33.4758	4817.4335	11.9812	17.3038	278.4040	9641.2058	16.7411	5.4450	17.424
L3	33.5680	37.7996	4816.4040	11.2740	16.3234	295.0611	9639.1455	18.9034	4.9954	13.321
	42.3362	49.2466	10650.9822	14.6881	21.2090	502.1916	21315.9793	24.6280	6.6880	17.835
L4	41.5295	46.9284	9216.5336	13.9967	20.2196	455.8222	18445.1946	23.4686	6.3452	16.921
	49.7615	57.9503	17355.1378	17.2841	24.9238	696.3293	34733.1119	28.9807	7.9750	21.267
L5	48.9866	55.4411	15196.9230	16.5357	23.8528	637.1126	30413.8426	27.7258	7.6040	20.277
	56.9330	66.3564	26056.1506	19.7913	28.5115	913.8821	52146.5865	33.1845	9.2180	24.581
L6	56.1579	63.6445	22990.2730	18.9824	27.3541	840.4705	46010.7971	31.8283	8.8170	23.512
	63.8506	74.4650	36822.8946	22.2097	31.9722	1151.7142	73694.2417	37.2396	10.4170	27.779

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 169.00-164.25				1	1	1			
L2 164.25-129.75				1	1	1			
L3 129.75-96.08				1	1	1			
L4 96.08-63.25				1	1	1			
L5 63.25-31.25				1	1	1			
L6 31.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***									
LDF4-50A(1/2)	C	Surface Ar (CaAa)	121.00 - 0.00	1	1	0.000 0.000	0.6250		0.15
LDF4-50A(1/2)	C	Surface Ar (CaAa)	121.00 - 0.00	1	1	-0.250 -0.250	0.6250		0.15
LDF5-50A(7/8)	C	Surface Ar (CaAa)	74.00 - 0.00	1	1	0.010 0.010	1.0300		0.33

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
FB-L98B-034-XXX(3/8)	A	Surface Ar (CaAa)	115.00 - 0.00	2	2	0.400 0.400	0.0000		0.06
WR-VG82ST-BRDA(5/8)	A	Surface Ar (CaAa)	115.00 - 0.00	4	4	0.400 0.400	0.0000		0.31
FB-L98B-034-XXX(3/8)	A	Surface Ar (CaAa)	115.00 - 0.00	1	1	0.395 0.395	0.3937		0.06
WR-VG82ST-BRDA(5/8)	A	Surface Ar (CaAa)	115.00 - 0.00	2	1	0.395 0.395	0.6450		0.31
2" (Nominal) Conduit ***	A	Surface Ar (CaAa)	115.00 - 0.00	14	7	0.050 0.400	2.3750		0.72
LDF7-50A(1-5/8) ***	C	Surface Ar (CaAa)	105.00 - 0.00	6	6	-0.250 -0.050	1.9800		0.82

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
810921-701(7/8)	C	No	Inside Pole	164.00 - 0.00	7	No Ice	0.00	0.34
						1/2" Ice	0.00	0.34
						1" Ice	0.00	0.34
AVA7-50(1-5/8)	C	No	Inside Pole	164.00 - 0.00	6	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
LDF7-50A(1-5/8)	C	No	Inside Pole	164.00 - 0.00	4	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
MLCH HYBRID 6X12(1-3/8) ***Coax for LC8*** ***	C	No	Inside Pole	164.00 - 0.00	2	No Ice	0.00	1.72
						1/2" Ice	0.00	1.72
						1" Ice	0.00	1.72
HB114-1-08U4-M6F(1-1/4)	C	No	Inside Pole	155.00 - 0.00	3	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
HB114-21U3M12-XXXF(1-1/4) ***	C	No	Inside Pole	155.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	142.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LDF7-50A(1-5/8) *** ***	C	No	Inside Pole	142.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	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	0.00
L2	164.25-129.75	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	0.74
L3	129.75-96.08	A	0.000	0.000	33.420	0.000	0.23

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	13.712	0.000	1.09
L4	96.08-63.25	A	0.000	0.000	57.990	0.000	0.40
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	44.213	0.000	1.19
L5	63.25-31.25	A	0.000	0.000	56.524	0.000	0.39
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	45.312	0.000	1.16
L6	31.25-0.00	A	0.000	0.000	55.199	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	44.250	0.000	1.14

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	169.00-164.25	A	1.764	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	164.25-129.75	A	1.740	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	0.74
L3	129.75-96.08	A	1.696	0.000	0.000	79.151	0.000	1.35
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	37.590	0.000	1.55
L4	96.08-63.25	A	1.638	0.000	0.000	135.650	0.000	2.29
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	93.792	0.000	2.30
L5	63.25-31.25	A	1.554	0.000	0.000	130.086	0.000	2.15
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	99.357	0.000	2.31
L6	31.25-0.00	A	1.392	0.000	0.000	124.050	0.000	1.99
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	94.821	0.000	2.18

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	164.25-129.75	0.0000	0.0000	0.0000	0.0000
L3	129.75-96.08	-2.5885	-2.9946	-1.6793	-2.6358
L4	96.08-63.25	-2.4576	-1.2514	-1.6569	-1.7754
L5	63.25-31.25	-2.5905	-0.9863	-1.7795	-1.3672
L6	31.25-0.00	-2.7237	-1.0067	-1.9098	-1.4331

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	17	LDF4-50A(1/2)	129.75 - 121.00	1.0000	1.0000
L2	18	LDF4-50A(1/2)	129.75 - 121.00	1.0000	1.0000
L2	23	FB-L98B-034-XXX(3/8)	129.75 - 115.00	1.0000	1.0000
L2	24	WR-VG82ST-BRDA(5/8)	129.75 - 115.00	1.0000	1.0000
L2	27	FB-L98B-034-XXX(3/8)	129.75 - 115.00	1.0000	1.0000
L2	28	WR-VG82ST-BRDA(5/8)	129.75 - 115.00	1.0000	1.0000
L2	29	2" (Nominal) Conduit	129.75 - 115.00	1.0000	1.0000
L2	31	LDF7-50A(1-5/8)	129.75 - 105.00	1.0000	1.0000
L3	17	LDF4-50A(1/2)	96.08 - 121.00	1.0000	1.0000
L3	18	LDF4-50A(1/2)	96.08 - 121.00	1.0000	1.0000
L3	20	LDF5-50A(7/8)	96.08 - 74.00	1.0000	1.0000
L3	23	FB-L98B-034-XXX(3/8)	96.08 - 115.00	1.0000	1.0000
L3	24	WR-VG82ST-BRDA(5/8)	96.08 - 115.00	1.0000	1.0000
L3	27	FB-L98B-034-XXX(3/8)	96.08 - 115.00	1.0000	1.0000
L3	28	WR-VG82ST-BRDA(5/8)	96.08 - 115.00	1.0000	1.0000
L3	29	2" (Nominal) Conduit	96.08 - 115.00	1.0000	1.0000
L3	31	LDF7-50A(1-5/8)	96.08 - 105.00	1.0000	1.0000
L4	17	LDF4-50A(1/2)	63.25 - 96.08	1.0000	1.0000
L4	18	LDF4-50A(1/2)	63.25 - 96.08	1.0000	1.0000
L4	20	LDF5-50A(7/8)	63.25 - 74.00	1.0000	1.0000
L4	23	FB-L98B-034-XXX(3/8)	63.25 - 96.08	1.0000	1.0000
L4	24	WR-VG82ST-BRDA(5/8)	63.25 - 96.08	1.0000	1.0000
L4	27	FB-L98B-034-XXX(3/8)	63.25 - 96.08	1.0000	1.0000
L4	28	WR-VG82ST-BRDA(5/8)	63.25 - 96.08	1.0000	1.0000
L4	29	2" (Nominal) Conduit	63.25 - 96.08	1.0000	1.0000
L4	31	LDF7-50A(1-5/8)	63.25 - 96.08	1.0000	1.0000
L5	17	LDF4-50A(1/2)	31.25 - 63.25	1.0000	1.0000
L5	18	LDF4-50A(1/2)	31.25 - 63.25	1.0000	1.0000
L5	20	LDF5-50A(7/8)	31.25 - 63.25	1.0000	1.0000
L5	23	FB-L98B-034-XXX(3/8)	31.25 - 63.25	1.0000	1.0000
L5	24	WR-VG82ST-BRDA(5/8)	31.25 - 63.25	1.0000	1.0000
L5	27	FB-L98B-034-XXX(3/8)	31.25 - 63.25	1.0000	1.0000
L5	28	WR-VG82ST-BRDA(5/8)	31.25 - 63.25	1.0000	1.0000
L5	29	2" (Nominal) Conduit	31.25 - 63.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L5	31	LDF7-50A(1-5/8)	31.25 - 63.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
(2) COL45-70	A	From Leg	4.00 0.00 4.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.38 2.32 3.27	1.38 2.32 3.27	0.01 0.02 0.03
COL45-70	C	From Leg	4.00 0.00 22.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.38 2.32 3.27	1.38 2.32 3.27	0.01 0.02 0.03
ATMAA1412D-1A20	A	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Leg	4.00 0.00	0.0000	164.00	No Ice	1.00 1.13	0.41 0.50	0.01 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			1/2" Ice	1.26	0.59	0.03
						1" Ice			
ATMAA1412D-1A20	C	From Leg	4.00 0.00 1.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
Platform Mount [LP 403-1]	C	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	18.85 24.30 29.75	18.85 24.30 29.75	1.50 1.80 2.09
(2) 2.375" OD x 6' Mount Pipe	B	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
2.375" OD x 6' Mount Pipe	C	None		0.0000	164.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.03 0.04 0.05
***									
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	C	From Leg	4.00	0.0000	155.00	No Ice	2.13	1.77	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	2.32	1.95	0.07
			0.00				1" Ice	2.51	2.13	0.10
1900MHz RRH	A	From Leg	4.00		0.0000	155.00	No Ice	2.49	3.26	0.04
			0.00				1/2" Ice	2.70	3.48	0.08
			0.00				1" Ice	2.91	3.72	0.11
1900MHz RRH	B	From Leg	4.00		0.0000	155.00	No Ice	2.49	3.26	0.04
			0.00				1/2" Ice	2.70	3.48	0.08
			0.00				1" Ice	2.91	3.72	0.11
1900MHz RRH	C	From Leg	4.00		0.0000	155.00	No Ice	2.49	3.26	0.04
			0.00				1/2" Ice	2.70	3.48	0.08
			0.00				1" Ice	2.91	3.72	0.11
Platform Mount [LP 305-1]	C	None			0.0000	155.00	No Ice	18.01	18.01	1.12
							1/2" Ice	23.33	23.33	1.35
							1" Ice	28.65	28.65	1.58
2.375" OD x 6' Mount Pipe	A	None			0.0000	155.00	No Ice	1.43	1.43	0.03
							1/2" Ice	1.92	1.92	0.04
							1" Ice	2.29	2.29	0.05
2.375" OD x 6' Mount Pipe	B	None			0.0000	155.00	No Ice	1.43	1.43	0.03
							1/2" Ice	1.92	1.92	0.04
							1" Ice	2.29	2.29	0.05
2.375" OD x 6' Mount Pipe	C	None			0.0000	155.00	No Ice	1.43	1.43	0.03
							1/2" Ice	1.92	1.92	0.04
							1" Ice	2.29	2.29	0.05
***										
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00		0.0000	142.00	No Ice	4.56	10.26	0.05
			0.00				1/2" Ice	5.11	11.43	0.11
			0.00				1" Ice	5.61	12.31	0.19
(2) LPA-80080/6CF w/ Mount Pipe	B	From Leg	4.00		0.0000	142.00	No Ice	4.56	10.26	0.05
			0.00				1/2" Ice	5.11	11.43	0.11
			0.00				1" Ice	5.61	12.31	0.19
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00		0.0000	142.00	No Ice	4.56	10.26	0.05
			0.00				1/2" Ice	5.11	11.43	0.11
			0.00				1" Ice	5.61	12.31	0.19
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00		0.0000	142.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.13
			0.00				1" Ice	9.40	9.08	0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00		0.0000	142.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.13
			0.00				1" Ice	9.40	9.08	0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00		0.0000	142.00	No Ice	8.32	7.00	0.07
			0.00				1/2" Ice	8.88	8.19	0.13
			0.00				1" Ice	9.40	9.08	0.21
B4 RRH2X60-4R	A	From Leg	4.00		0.0000	142.00	No Ice	3.36	2.00	0.06
			0.00				1/2" Ice	3.61	2.24	0.08
			0.00				1" Ice	3.88	2.48	0.10
B4 RRH2X60-4R	B	From Leg	4.00		0.0000	142.00	No Ice	3.36	2.00	0.06
			0.00				1/2" Ice	3.61	2.24	0.08
			0.00				1" Ice	3.88	2.48	0.10
B4 RRH2X60-4R	C	From Leg	4.00		0.0000	142.00	No Ice	3.36	2.00	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	3.61	2.24	0.08
			0.00				1" Ice	3.88	2.48	0.10
RRH2x60-700	A	From Leg	4.00		0.0000	142.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			0.00				1" Ice	4.03	2.29	0.11
RRH2x60-700	B	From Leg	4.00		0.0000	142.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			0.00				1" Ice	4.03	2.29	0.11
RRH2x60-700	C	From Leg	4.00		0.0000	142.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			0.00				1" Ice	4.03	2.29	0.11
RRH2X60-AWS	A	From Leg	4.00		0.0000	142.00	No Ice	3.50	2.10	0.06
			0.00				1/2" Ice	3.76	2.34	0.08
			0.00				1" Ice	4.03	2.58	0.11
RRH2X60-AWS	B	From Leg	4.00		0.0000	142.00	No Ice	3.50	2.10	0.06
			0.00				1/2" Ice	3.76	2.34	0.08
			0.00				1" Ice	4.03	2.58	0.11
RRH2X60-AWS	C	From Leg	4.00		0.0000	142.00	No Ice	3.50	2.10	0.06
			0.00				1/2" Ice	3.76	2.34	0.08
			0.00				1" Ice	4.03	2.58	0.11
DB-T1-6Z-8AB-0Z	C	From Leg	4.00		0.0000	142.00	No Ice	4.80	2.00	0.04
			0.00				1/2" Ice	5.07	2.19	0.08
			0.00				1" Ice	5.35	2.39	0.12
Platform Mount [LP 403-1]	C	None			0.0000	142.00	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
***										
201-4	A	From Leg	1.00		0.0000	121.00	No Ice	1.13	1.13	0.00
			0.00				1/2" Ice	2.00	2.00	0.01
			4.00				1" Ice	2.90	2.90	0.03
Pipe Mount [PM 601-1]	C	None			0.0000	121.00	No Ice	3.00	0.90	0.07
							1/2" Ice	3.74	1.12	0.08
							1" Ice	4.48	1.34	0.09
***										
7770.00 w/ Mount Pipe	A	From Leg	4.00		0.0000	115.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
7770.00 w/ Mount Pipe	B	From Leg	4.00		0.0000	115.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
7770.00 w/ Mount Pipe	C	From Leg	4.00		0.0000	115.00	No Ice	5.75	4.25	0.06
			0.00				1/2" Ice	6.18	5.01	0.10
			0.00				1" Ice	6.61	5.71	0.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00		0.0000	115.00	No Ice	8.26	6.30	0.07
			0.00				1/2" Ice	8.82	7.48	0.14
			0.00				1" Ice	9.35	8.37	0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00		0.0000	115.00	No Ice	8.26	6.30	0.07
			0.00				1/2" Ice	8.82	7.48	0.14
			0.00				1" Ice	9.35	8.37	0.21

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
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 1/2" Ice 1" Ice	8.26 8.82 9.35	6.30 7.48 8.37	0.07 0.14 0.21
DTMABP7819VG12A	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DTMABP7819VG12A	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DTMABP7819VG12A	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	0.02 0.03 0.05
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	0.02 0.03 0.05
(2) RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
RRUS 11	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
WCS RRUS-32-B30	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
WCS RRUS-32-B30	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
WCS RRUS-32-B30	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
(2) TPX-070821	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
80010965 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	14.05 14.69 15.30	7.63 8.90 9.96	0.13 0.22 0.33
80010965 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	115.00	No Ice 1/2" Ice 1" Ice	14.05 14.69 15.30	7.63 8.90 9.96	0.13 0.22 0.33
80010965 w/ Mount Pipe	C	From Leg	4.00	0.0000	115.00	No Ice	14.05	7.63	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	14.69	8.90	0.22
			0.00			1" Ice	15.30	9.96	0.33
QS66512-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.14
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.14
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	115.00	No Ice	8.37	8.46	0.14
			0.00			1/2" Ice	8.93	9.66	0.21
			0.00			1" Ice	9.46	10.55	0.30
(3) DBCT108F1V92-1	A	From Leg	4.00	0.0000	115.00	No Ice	0.64	0.60	0.03
			0.00			1/2" Ice	0.74	0.71	0.04
			0.00			1" Ice	0.85	0.81	0.04
(2) DBCT108F1V92-1	B	From Leg	4.00	0.0000	115.00	No Ice	0.64	0.60	0.03
			0.00			1/2" Ice	0.74	0.71	0.04
			0.00			1" Ice	0.85	0.81	0.04
DBCT108F1V92-1	C	From Leg	4.00	0.0000	115.00	No Ice	0.64	0.60	0.03
			0.00			1/2" Ice	0.74	0.71	0.04
			0.00			1" Ice	0.85	0.81	0.04
RRUS 4478 B5	A	From Leg	4.00	0.0000	115.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 4478 B5	B	From Leg	4.00	0.0000	115.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 4478 B5	C	From Leg	4.00	0.0000	115.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 4478 B14	A	From Leg	4.00	0.0000	115.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
(2) RRUS 4478 B14	C	From Leg	4.00	0.0000	115.00	No Ice	1.84	1.06	0.06
			0.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
RRUS 12 B2	A	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
RRUS 12 B2	B	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
RRUS 12 B2	C	From Leg	4.00	0.0000	115.00	No Ice	3.14	1.28	0.05
			0.00			1/2" Ice	3.36	1.43	0.07
			0.00			1" Ice	3.59	1.60	0.10
DC6-48-60-18-8C	B	From Leg	4.00	0.0000	115.00	No Ice	1.14	1.14	0.03
			0.00			1/2" Ice	1.79	1.79	0.05
			0.00			1" Ice	2.00	2.00	0.07
RRUS 4426 B66	B	From Leg	4.00	0.0000	115.00	No Ice	1.64	0.73	0.05
			0.00				1.80	0.84	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	1.97	0.97	0.08
						1" Ice			
(2) RRUS 4426 B66	C	From Leg	4.00	0.0000	115.00	No Ice	1.64	0.73	0.05
			0.00			1/2" Ice	1.80	0.84	0.06
			0.00			1" Ice	1.97	0.97	0.08
Platform Mount [LP 305-1]	C	None		0.0000	115.00	No Ice	18.01	18.01	1.12
						1/2" Ice	23.33	23.33	1.35
						1" Ice	28.65	28.65	1.58
Miscellaneous [NA 507-1]	C	None		0.0000	115.00	No Ice	4.80	4.80	0.25
						1/2" Ice	6.70	6.70	0.29
						1" Ice	8.60	8.60	0.34
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00	0.0000	105.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.00	0.0000	105.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00	0.0000	105.00	No Ice	5.40	4.70	0.05
			0.00			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
Pipe Mount [PM 601-3]	C	None		0.0000	105.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
***									
DB810T3E-XT	A	From Leg	4.00	0.0000	74.00	No Ice	4.53	4.53	0.05
			0.00			1/2" Ice	6.07	6.07	0.08
			9.00			1" Ice	7.63	7.63	0.12
Side Arm Mount [SO 306-1]	C	None		0.0000	74.00	No Ice	0.98	2.18	0.04
						1/2" Ice	1.70	3.80	0.06
						1" Ice	2.42	5.42	0.08
****									

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 169.00-164.25	166.48	1.409	29.64	8.827	A	0.000	8.827	8.827	100.00	0.000	0.000
					B	0.000	8.827		100.00	0.000	0.000
					C	0.000	8.827		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	28.81	82.146	A	0.000	82.146	82.146	100.00	0.000	0.000
					B	0.000	82.146		100.00	0.000	0.000
					C	0.000	82.146		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	27.27	106.487	A	0.000	106.487	106.487	100.00	33.420	0.000
					B	0.000	106.487		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	106.487		100.00	13.712	0.000
L4 96.08-63.25	79.35	1.205	25.32	124.878	A	0.000	124.878	124.878	100.00	57.990	0.000
					B	0.000	124.878		100.00	0.000	0.000
					C	0.000	124.878		100.00	44.213	0.000
L5 63.25-31.25	47.14	1.08	22.64	141.226	A	0.000	141.226	141.226	100.00	56.524	0.000
					B	0.000	141.226		100.00	0.000	0.000
					C	0.000	141.226		100.00	45.312	0.000
L6 31.25-0.00	15.65	0.856	18.71	156.261	A	0.000	156.261	156.261	100.00	55.199	0.000
					B	0.000	156.261		100.00	0.000	0.000
					C	0.000	156.261		100.00	44.250	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-164.25	166.48	1.409	5.48	1.7635	10.224	A	0.000	10.224	10.224	100.00	0.000	0.000
						B	0.000	10.224		100.00	0.000	0.000
						C	0.000	10.224		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	5.33	1.7404	92.286	A	0.000	92.286	92.286	100.00	0.000	0.000
						B	0.000	92.286		100.00	0.000	0.000
						C	0.000	92.286		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	5.04	1.6956	116.254	A	0.000	116.254	116.254	100.00	79.151	0.000
						B	0.000	116.254		100.00	0.000	0.000
						C	0.000	116.254		100.00	37.590	0.000
L4 96.08-63.25	79.35	1.205	4.68	1.6376	134.156	A	0.000	134.156	134.156	100.00	135.650	0.000
						B	0.000	134.156		100.00	0.000	0.000
						C	0.000	134.156		100.00	93.792	0.000
L5 63.25-31.25	47.14	1.08	4.19	1.5545	149.960	A	0.000	149.960	149.960	100.00	130.086	0.000
						B	0.000	149.960		100.00	0.000	0.000
						C	0.000	149.960		100.00	99.357	0.000
L6 31.25-0.00	15.65	0.856	3.46	1.3922	164.357	A	0.000	164.357	164.357	100.00	124.050	0.000
						B	0.000	164.357		100.00	0.000	0.000
						C	0.000	164.357		100.00	94.821	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 169.00-164.25	166.48	1.409	11.04	8.827	A	0.000	8.827	8.827	100.00	0.000	0.000
					B	0.000	8.827		100.00	0.000	0.000
					C	0.000	8.827		100.00	0.000	0.000
L2 164.25-129.75	145.90	1.37	10.73	82.146	A	0.000	82.146	82.146	100.00	0.000	0.000
					B	0.000	82.146		100.00	0.000	0.000
					C	0.000	82.146		100.00	0.000	0.000
L3 129.75-96.08	112.40	1.297	10.15	106.487	A	0.000	106.487	106.487	100.00	33.420	0.000
					B	0.000	106.487		100.00	0.000	0.000
					C	0.000	106.487		100.00	13.712	0.000
L4 96.08-63.25	79.35	1.205	9.43	124.878	A	0.000	124.878	124.878	100.00	57.990	0.000
					B	0.000	124.878		100.00	0.000	0.000
					C	0.000	124.878		100.00	44.213	0.000
L5 63.25-31.25	47.14	1.08	8.43	141.226	A	0.000	141.226	141.226	100.00	56.524	0.000
					B	0.000	141.226		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L6 31.25-0.00	15.65	0.856	6.97	156.261	C	0.000	141.226		100.00	45.312	0.000
					A	0.000	156.261	156.261	100.00	55.199	0.000
					B	0.000	156.261		100.00	0.000	0.000
					C	0.000	156.261		100.00	44.250	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164.25	Pole	Max Tension	20	0.00	-0.00	-0.00
			Max. Compression	26	-0.44	0.00	0.00
			Max. Mx	8	-0.24	-0.40	0.00
			Max. My	14	-0.24	0.00	-0.40
			Max. Vy	8	0.22	-0.40	0.00
			Max. Vx	14	0.22	0.00	-0.40
			Max. Torque	16			0.00
L2	164.25 - 129.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.30	1.29	0.08
			Max. Mx	20	-12.78	331.56	-0.54
			Max. My	14	-12.80	0.67	-330.73
			Max. Vy	8	17.55	-331.10	0.36
			Max. Vx	14	17.48	0.67	-330.73
			Max. Torque	4			0.75
L3	129.75 - 96.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.69	2.04	-0.18
			Max. Mx	20	-25.34	1068.94	-2.84
			Max. My	14	-25.37	3.03	-1063.78
			Max. Vy	8	28.79	-1067.73	1.86
			Max. Vx	14	28.57	3.03	-1063.78
			Max. Torque	4			0.82
L4	96.08 - 63.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.61	3.40	2.76
			Max. Mx	20	-35.25	2057.12	-4.22
			Max. My	2	-35.31	-3.44	2036.12
			Max. Vy	8	33.09	-2055.35	4.74
			Max. Vx	14	32.27	5.52	-2035.89
			Max. Torque	7			1.29
L5	63.25 - 31.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-86.95	4.83	4.36
			Max. Mx	20	-46.53	3151.83	-5.81
			Max. My	2	-46.58	-5.10	3095.70
			Max. Vy	8	36.84	-3149.41	7.28
			Max. Vx	14	35.41	7.98	-3094.68
			Max. Torque	7			1.29
L6	31.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-109.15	6.71	6.37
			Max. Mx	20	-61.76	4604.16	-7.60
			Max. My	2	-61.77	-7.00	4485.06
			Max. Vy	8	40.37	-4600.87	10.31
			Max. Vx	14	38.47	10.92	-4482.97
			Max. Torque	7			1.29

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	109.15	-0.00	-0.00
	Max. H_x	21	46.34	40.33	-0.06
	Max. H_z	3	46.34	-0.06	38.44
	Max. M_x	2	4485.06	-0.06	38.43
	Max. M_z	8	4600.87	-40.33	0.06
	Max. Torsion	7	1.29	-34.69	19.96
	Min. Vert	21	46.34	40.33	-0.06
	Min. H_x	8	61.79	-40.33	0.06
	Min. H_z	14	61.79	0.06	-38.44
	Min. M_x	14	-4482.97	0.06	-38.44
	Min. M_z	20	-4604.16	40.33	-0.06
	Min. Torsion	19	-1.29	34.69	-19.96

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	51.49	-0.00	-0.00	-1.11	1.57	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	61.78	0.06	-38.43	-4485.06	-7.00	-0.53
0.9 Dead+1.6 Wind 0 deg - No Ice	46.34	0.06	-38.44	-4438.57	-7.41	-0.52
1.2 Dead+1.6 Wind 30 deg - No Ice	61.79	19.38	-33.33	-3890.11	-2261.15	-1.05
0.9 Dead+1.6 Wind 30 deg - No Ice	46.34	19.38	-33.33	-3849.44	-2238.19	-1.05
1.2 Dead+1.6 Wind 60 deg - No Ice	61.79	34.69	-19.96	-2291.98	-3978.67	-1.28
0.9 Dead+1.6 Wind 60 deg - No Ice	46.34	34.69	-19.96	-2268.06	-3938.21	-1.29
1.2 Dead+1.6 Wind 90 deg - No Ice	61.79	40.33	-0.06	-10.31	-4600.87	-1.18
0.9 Dead+1.6 Wind 90 deg - No Ice	46.34	40.33	-0.06	-9.87	-4553.80	-1.18
1.2 Dead+1.6 Wind 120 deg - No Ice	61.79	33.43	19.17	2233.25	-3899.56	-0.75
0.9 Dead+1.6 Wind 120 deg - No Ice	46.34	33.43	19.17	2210.43	-3859.62	-0.76
1.2 Dead+1.6 Wind 150 deg - No Ice	61.79	19.27	33.26	3878.07	-2245.42	-0.13
0.9 Dead+1.6 Wind 150 deg - No Ice	46.34	19.27	33.26	3838.19	-2222.63	-0.14
1.2 Dead+1.6 Wind 180 deg - No Ice	61.79	-0.06	38.44	4482.97	10.92	0.53
0.9 Dead+1.6 Wind 180 deg - No Ice	46.34	-0.06	38.44	4436.54	10.32	0.52
1.2 Dead+1.6 Wind 210 deg - No Ice	61.79	-19.38	33.33	3887.40	2265.07	1.04
0.9 Dead+1.6 Wind 210 deg - No Ice	46.34	-19.38	33.33	3847.42	2241.10	1.04
1.2 Dead+1.6 Wind 240 deg - No Ice	61.79	-34.69	19.96	2289.27	3982.59	1.28
0.9 Dead+1.6 Wind 240 deg - No Ice	46.34	-34.69	19.96	2266.03	3941.11	1.29
1.2 Dead+1.6 Wind 270 deg - No Ice	61.78	-40.33	0.06	7.60	4604.16	1.18
0.9 Dead+1.6 Wind 270 deg - No Ice	46.34	-40.33	0.06	7.85	4556.71	1.18
1.2 Dead+1.6 Wind 300 deg - No Ice	61.79	-33.43	-19.17	-2235.96	3903.48	0.76
0.9 Dead+1.6 Wind 300 deg - No Ice	46.34	-33.43	-19.17	-2212.45	3862.53	0.76
1.2 Dead+1.6 Wind 330 deg - No Ice	61.79	-19.27	-33.26	-3880.79	2249.35	0.13
0.9 Dead+1.6 Wind 330 deg - No Ice	46.34	-19.27	-33.26	-3840.22	2225.54	0.14
1.2 Dead+1.0 Ice+1.0 Temp	109.15	0.00	0.00	-6.37	6.71	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	109.15	0.01	-7.71	-914.06	5.89	-0.13
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	109.15	3.88	-6.68	-793.09	-449.35	-0.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	109.15	7.60	-4.38	-495.91	-842.03	-0.43
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	109.15	9.00	-0.01	-7.89	-985.42	-0.42
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	109.15	6.70	3.85	445.95	-781.09	-0.30
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	109.15	3.86	6.67	778.51	-447.27	-0.10
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	109.15	-0.01	7.71	900.68	8.30	0.13

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	109.15	-3.88	6.68	779.71	463.55	0.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	109.15	-7.60	4.38	482.53	856.23	0.43
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	109.15	-9.00	0.01	-5.49	999.62	0.42
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	109.15	-6.70	-3.85	-459.33	795.28	0.30
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	109.15	-3.86	-6.67	-791.89	461.46	0.10
Dead+Wind 0 deg - Service	51.49	0.01	-8.95	-1038.54	-0.45	-0.12
Dead+Wind 30 deg - Service	51.49	4.51	-7.76	-900.68	-521.88	-0.24
Dead+Wind 60 deg - Service	51.49	8.07	-4.65	-531.04	-919.24	-0.30
Dead+Wind 90 deg - Service	51.49	9.39	-0.01	-3.20	-1063.29	-0.28
Dead+Wind 120 deg - Service	51.49	7.78	4.46	515.78	-900.88	-0.18
Dead+Wind 150 deg - Service	51.49	4.48	7.74	896.26	-518.24	-0.03
Dead+Wind 180 deg - Service	51.49	-0.01	8.95	1036.29	3.70	0.12
Dead+Wind 210 deg - Service	51.49	-4.51	7.76	898.42	525.13	0.24
Dead+Wind 240 deg - Service	51.49	-8.07	4.65	528.78	922.49	0.30
Dead+Wind 270 deg - Service	51.49	-9.39	0.01	0.94	1066.54	0.28
Dead+Wind 300 deg - Service	51.49	-7.78	-4.46	-518.04	904.13	0.18
Dead+Wind 330 deg - Service	51.49	-4.48	-7.74	-898.52	521.49	0.03

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-51.49	0.00	0.00	51.49	0.00	0.000%
2	0.06	-61.79	-38.44	-0.06	61.78	38.43	0.010%
3	0.06	-46.34	-38.44	-0.06	46.34	38.44	0.009%
4	19.38	-61.79	-33.33	-19.38	61.79	33.33	0.000%
5	19.38	-46.34	-33.33	-19.38	46.34	33.33	0.000%
6	34.69	-61.79	-19.96	-34.69	61.79	19.96	0.000%
7	34.69	-46.34	-19.96	-34.69	46.34	19.96	0.000%
8	40.34	-61.79	-0.06	-40.33	61.79	0.06	0.004%
9	40.34	-46.34	-0.06	-40.33	46.34	0.06	0.008%
10	33.43	-61.79	19.17	-33.43	61.79	-19.17	0.000%
11	33.43	-46.34	19.17	-33.43	46.34	-19.17	0.000%
12	19.27	-61.79	33.26	-19.27	61.79	-33.26	0.000%
13	19.27	-46.34	33.26	-19.27	46.34	-33.26	0.000%
14	-0.06	-61.79	38.44	0.06	61.79	-38.44	0.004%
15	-0.06	-46.34	38.44	0.06	46.34	-38.44	0.009%
16	-19.38	-61.79	33.33	19.38	61.79	-33.33	0.000%
17	-19.38	-46.34	33.33	19.38	46.34	-33.33	0.000%
18	-34.69	-61.79	19.96	34.69	61.79	-19.96	0.000%
19	-34.69	-46.34	19.96	34.69	46.34	-19.96	0.000%
20	-40.34	-61.79	0.06	40.33	61.78	-0.06	0.010%
21	-40.34	-46.34	0.06	40.33	46.34	-0.06	0.008%
22	-33.43	-61.79	-19.17	33.43	61.79	19.17	0.000%
23	-33.43	-46.34	-19.17	33.43	46.34	19.17	0.000%
24	-19.27	-61.79	-33.26	19.27	61.79	33.26	0.000%
25	-19.27	-46.34	-33.26	19.27	46.34	33.26	0.000%
26	0.00	-109.15	0.00	-0.00	109.15	-0.00	0.001%
27	0.01	-109.15	-7.71	-0.01	109.15	7.71	0.000%
28	3.88	-109.15	-6.68	-3.88	109.15	6.68	0.000%
29	7.60	-109.15	-4.38	-7.60	109.15	4.38	0.001%
30	9.00	-109.15	-0.01	-9.00	109.15	0.01	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
31	6.70	-109.15	3.85	-6.70	109.15	-3.85	0.000%
32	3.86	-109.15	6.67	-3.86	109.15	-6.67	0.000%
33	-0.01	-109.15	7.71	0.01	109.15	-7.71	0.000%
34	-3.88	-109.15	6.68	3.88	109.15	-6.68	0.000%
35	-7.60	-109.15	4.38	7.60	109.15	-4.38	0.001%
36	-9.00	-109.15	0.01	9.00	109.15	-0.01	0.001%
37	-6.70	-109.15	-3.85	6.70	109.15	3.85	0.001%
38	-3.86	-109.15	-6.67	3.86	109.15	6.67	0.001%
39	0.01	-51.49	-8.95	-0.01	51.49	8.95	0.003%
40	4.51	-51.49	-7.76	-4.51	51.49	7.76	0.003%
41	8.07	-51.49	-4.65	-8.07	51.49	4.65	0.003%
42	9.39	-51.49	-0.01	-9.39	51.49	0.01	0.003%
43	7.78	-51.49	4.46	-7.78	51.49	-4.46	0.003%
44	4.48	-51.49	7.74	-4.48	51.49	-7.74	0.003%
45	-0.01	-51.49	8.95	0.01	51.49	-8.95	0.003%
46	-4.51	-51.49	7.76	4.51	51.49	-7.76	0.003%
47	-8.07	-51.49	4.65	8.07	51.49	-4.65	0.003%
48	-9.39	-51.49	0.01	9.39	51.49	-0.01	0.003%
49	-7.78	-51.49	-4.46	7.78	51.49	4.46	0.003%
50	-4.48	-51.49	-7.74	4.48	51.49	7.74	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00014619	0.00012875
3	Yes	13	0.00010000	0.00011865
4	Yes	18	0.00000001	0.00006702
5	Yes	17	0.00000001	0.00012542
6	Yes	18	0.00000001	0.00006980
7	Yes	17	0.00000001	0.00013030
8	Yes	14	0.00006072	0.00007105
9	Yes	13	0.00009986	0.00014401
10	Yes	18	0.00000001	0.00006670
11	Yes	17	0.00000001	0.00012487
12	Yes	18	0.00000001	0.00006679
13	Yes	17	0.00000001	0.00012511
14	Yes	14	0.00006081	0.00006531
15	Yes	13	0.00010000	0.00013485
16	Yes	18	0.00000001	0.00006855
17	Yes	17	0.00000001	0.00012832
18	Yes	18	0.00000001	0.00006838
19	Yes	17	0.00000001	0.00012749
20	Yes	13	0.00014598	0.00013715
21	Yes	13	0.00009985	0.00012508
22	Yes	18	0.00000001	0.00006745
23	Yes	17	0.00000001	0.00012624
24	Yes	18	0.00000001	0.00006719
25	Yes	17	0.00000001	0.00012577
26	Yes	8	0.00000001	0.00000998
27	Yes	15	0.00000001	0.00010711
28	Yes	15	0.00000001	0.00011748
29	Yes	15	0.00000001	0.00012457
30	Yes	15	0.00000001	0.00011185
31	Yes	15	0.00000001	0.00011598
32	Yes	15	0.00000001	0.00011720
33	Yes	15	0.00000001	0.00010585
34	Yes	15	0.00000001	0.00011805
35	Yes	15	0.00000001	0.00012493
36	Yes	15	0.00000001	0.00011369
37	Yes	15	0.00000001	0.00011916
38	Yes	15	0.00000001	0.00011879
39	Yes	13	0.00011884	0.00003640
40	Yes	13	0.00011873	0.00005477
41	Yes	13	0.00011865	0.00006467
42	Yes	13	0.00011875	0.00003711
43	Yes	13	0.00011874	0.00005626
44	Yes	13	0.00011874	0.00005700
45	Yes	13	0.00011885	0.00003645
46	Yes	13	0.00011874	0.00006281
47	Yes	13	0.00011866	0.00005666
48	Yes	13	0.00011875	0.00003714
49	Yes	13	0.00011873	0.00006006
50	Yes	13	0.00011873	0.00005868

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	22.465	48	1.0654	0.0013
L2	166.625 - 129.75	21.935	48	1.0653	0.0013
L3	133.58 - 96.08	14.762	48	0.9785	0.0006
L4	100.75 - 63.25	8.606	48	0.7906	0.0004
L5	68.75 - 31.25	4.057	48	0.5466	0.0003
L6	37.5 - 0	1.236	48	0.2958	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	AIR 32 B2A/B66AA w/ Mount Pipe	48	21.350	1.0643	0.0012	87593
155.00	APXVTM14-C-120 w/ Mount Pipe	48	19.353	1.0519	0.0011	31584
142.00	(2) LPA-80080/6CF w/ Mount Pipe	48	16.529	1.0134	0.0008	16380
121.00	201-4	48	12.251	0.9158	0.0004	10368
115.00	7770.00 w/ Mount Pipe	48	11.116	0.8817	0.0004	9593
105.00	APXV18-206517S-C w/ Mount Pipe	48	9.325	0.8193	0.0004	8530
74.00	DB810T3E-XT	48	4.696	0.5886	0.0003	7763

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 164.25	97.048	20	4.6058	0.0054
L2	166.625 - 129.75	94.759	20	4.6058	0.0054
L3	133.58 - 96.08	63.780	20	4.2303	0.0026
L4	100.75 - 63.25	37.182	20	3.4180	0.0016
L5	68.75 - 31.25	17.525	20	2.3625	0.0012
L6	37.5 - 0	5.340	20	1.2780	0.0005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	AIR 32 B2A/B66AA w/ Mount Pipe	20	92.232	4.6013	0.0054	20652
155.00	APXVTM14-C-120 w/ Mount Pipe	20	83.609	4.5475	0.0048	7394
142.00	(2) LPA-80080/6CF w/ Mount Pipe	20	71.411	4.3810	0.0035	3831
121.00	201-4	20	52.930	3.9592	0.0019	2422
115.00	7770.00 w/ Mount Pipe	20	48.025	3.8120	0.0017	2239
105.00	APXV18-206517S-C w/ Mount Pipe	20	40.290	3.5419	0.0016	1990
74.00	DB810T3E-XT	20	20.287	2.5443	0.0013	1802

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	169 - 164.25 (1)	TP26x18x0.25	4.75	0.00	0.0	20.432 6	-0.24	1506.86	0.000

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	36.88	0.00	0.0	32.1816	-12.78	2368.37	0.005
L3	129.75 - 96.08 (3)	TP41.75x32.1327x0.375	37.50	0.00	0.0	47.8211	-25.34	3489.81	0.007
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	37.50	0.00	0.0	56.3337	-35.26	3910.87	0.009
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	37.50	0.00	0.0	64.5372	-46.53	4259.40	0.011
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	37.50	0.00	0.0	74.4650	-61.76	4606.06	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	169 - 164.25 (1)	TP26x18x0.25	0.40	796.43	0.001	0.00	796.43	0.000
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	331.89	1577.36	0.210	0.00	1577.36	0.000
L3	129.75 - 96.08 (3)	TP41.75x32.1327x0.375	1070.20	2878.99	0.372	0.00	2878.99	0.000
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	2058.03	3806.01	0.541	0.00	3806.01	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	3151.83	4753.57	0.663	0.00	4753.57	0.000
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	4604.16	5936.64	0.776	0.00	5936.64	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	169 - 164.25 (1)	TP26x18x0.25	0.22	753.43	0.000	0.00	1597.13	0.000
L2	164.25 - 129.75 (2)	TP34.0625x21.5x0.3125	17.58	1184.19	0.015	0.61	3163.16	0.000
L3	129.75 - 96.08 (3)	TP41.75x32.1327x0.375	28.80	1744.91	0.017	0.25	5773.14	0.000
L4	96.08 - 63.25 (4)	TP49.0625x39.8023x0.375	33.07	1955.44	0.017	1.28	7630.43	0.000
L5	63.25 - 31.25 (5)	TP56.125x46.9543x0.375	36.84	2129.70	0.017	1.18	9528.75	0.000
L6	31.25 - 0 (6)	TP62.9375x53.8466x0.375	40.36	2303.03	0.018	1.18	11898.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164.25 (1)	0.000	0.001	0.000	0.000	0.000	0.001	1.000	4.8.2

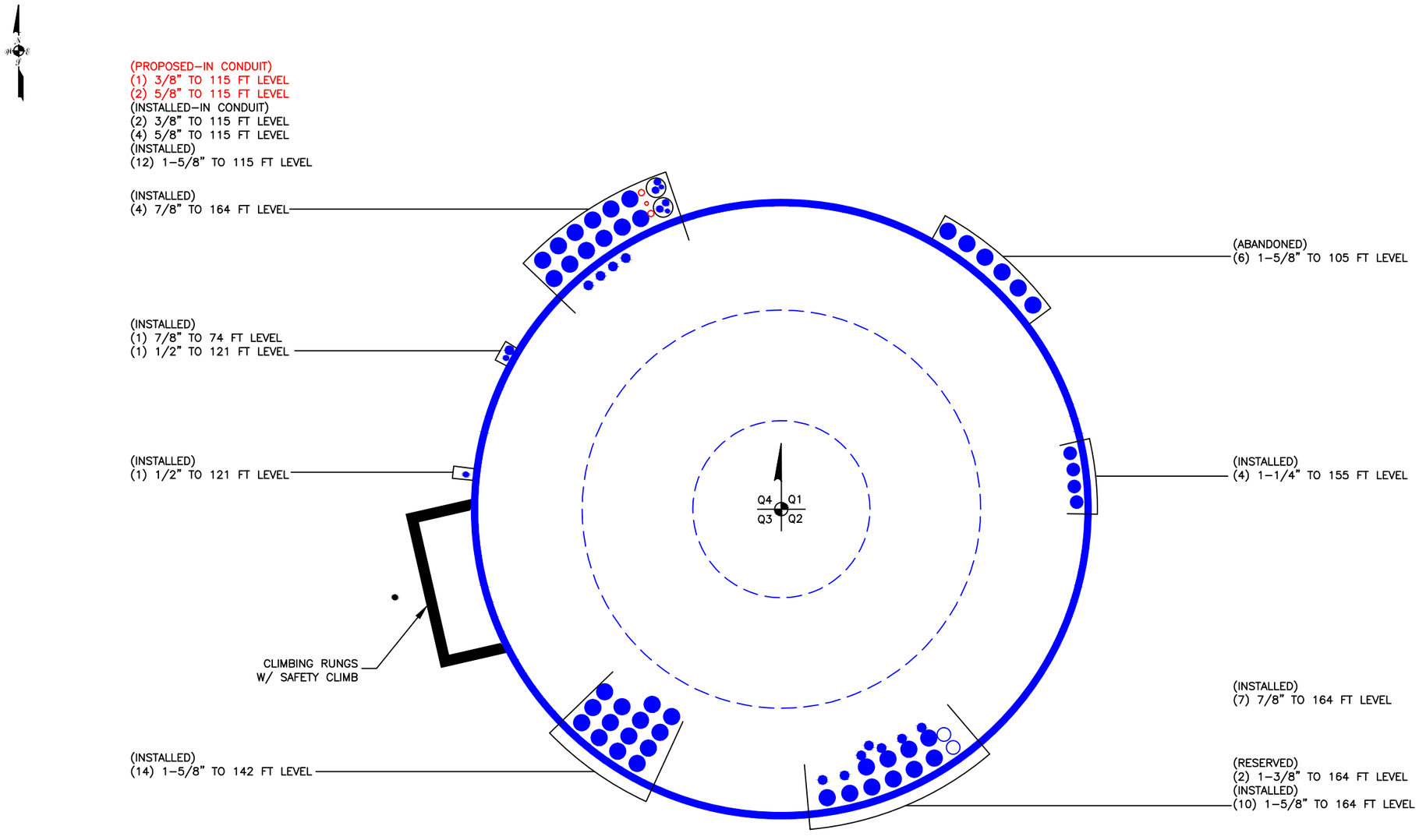
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	164.25 - 129.75 (2)	0.005	0.210	0.000	0.015	0.000	0.216	1.000	4.8.2
L3	129.75 - 96.08 (3)	0.007	0.372	0.000	0.017	0.000	0.379	1.000	4.8.2
L4	96.08 - 63.25 (4)	0.009	0.541	0.000	0.017	0.000	0.550	1.000	4.8.2
L5	63.25 - 31.25 (5)	0.011	0.663	0.000	0.017	0.000	0.674	1.000	4.8.2
L6	31.25 - 0 (6)	0.013	0.776	0.000	0.018	0.000	0.789	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	169 - 164.25	Pole	TP26x18x0.25	1	-0.24	1506.86	0.1	Pass
L2	164.25 - 129.75	Pole	TP34.0625x21.5x0.3125	2	-12.78	2368.37	21.6	Pass
L3	129.75 - 96.08	Pole	TP41.75x32.1327x0.375	3	-25.34	3489.81	37.9	Pass
L4	96.08 - 63.25	Pole	TP49.0625x39.8023x0.375	4	-35.26	3910.87	55.0	Pass
L5	63.25 - 31.25	Pole	TP56.125x46.9543x0.375	5	-46.53	4259.40	67.4	Pass
L6	31.25 - 0	Pole	TP62.9375x53.8466x0.375	6	-61.76	4606.06	78.9	Pass
							Summary	
						Pole (L6)	78.9	Pass
						RATING =	**78.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 826768 TOWER ID: C_BASELEVEL

APPENDIX C

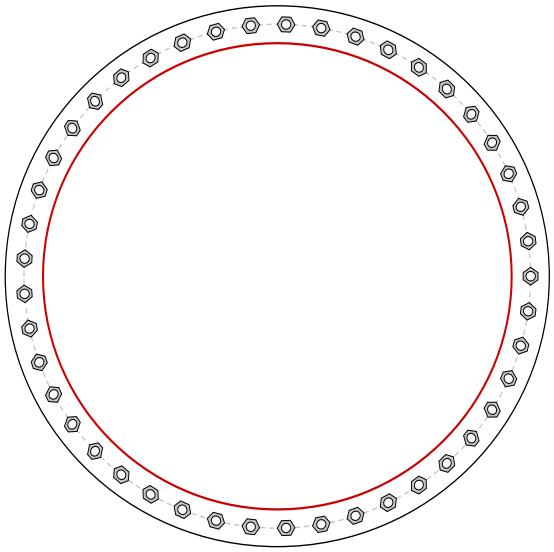
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

Site Info	
BU #	826768
Site Name	Plymouth/RT 6
Order #	449240 Rev.0

Analysis Considerations	
TIA-222 Revision	G
l_{ar} (in)	0
Eta Factor, η	0.5

Applied Loads	
Moment (kip-ft)	4604.16
Axial Force (kips)	61.76
Shear Force (kips)	40.36



Connection Properties

Anchor Rod Data

(45) 1-1/4" ø bolts (A687; Fy=105 ksi, Fu=150 ksi) on 68" BC

Base Plate Data

73" OD x 1.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

62.9375" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu = 73.59	ϕPn = 116.28	**Stress Rating**
Vu = 0.9	ϕVn = n/a	**64.8%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Ratio:	**Rohn/Pirod OK**

Pier and Pad Foundation

BU # :	826768
Site Name:	Plymouth/Rt 6
App. Number:	449240 Rev.0

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?:	☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	62	kips
Base Shear, Vu_comp:	40	kips
Moment, M_u:	4604	ft-kips
Tower Height, **H**:	169	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	7.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	39	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	11	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	8.5	ft
Pad Width, **W**:	27	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size, **Sp**:	9	
Pad Rebar Quantity, **mp**:	36	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	125	pcf
Ultimate Gross Bearing, Qult:	6.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:	75	
Base Friction, μ:	0.6	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	14	ft

<--Toggle between Gross and Net

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating**	**Check**
Lateral (Sliding) (kips)	519.79	40.00	**7.7%**	**Pass**
Bearing Pressure (ksf)	4.50	2.50	**55.6%**	**Pass**
*Overturning (kip*ft)*	8801.09	4973.17	**56.5%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	6851.58	4864.00	**71.0%**	**Pass**
Pier Compression (kip)	28118.83	113.69	**0.4%**	**Pass**
*Pad Flexure (kip*ft)*	3941.07	1656.43	**42.0%**	**Pass**
Pad Shear - 1-way (kips)	777.90	251.59	**32.3%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.062	**32.6%**	**Pass**

Soil Rating:	**56.5%**
Structural Rating:	**71.0%**