ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

August 28, 2013

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

Re: **EM-VER-100-120416 – 38 Lower Road, North Canaan, Connecticut**
EM-VER-051-121114 – 3965 Congress Street, Fairfield, Connecticut
EM-VER-135-130603 – 1590 Newfield Avenue, Stamford, Connecticut
EM-VER-014-130607 – 180 North Main Street, Branford, Connecticut
EM-VER-033-130618 – 179 Shunpike Road, Cromwell, Connecticut
EM-VER-041-130524 – 135 Honey Hill Road, East Haddam, Connecticut
EM-VER-027-130603 – 48 Cow Hill Road, Clinton, Connecticut
EM-VER-076-130425 – 252 Ridge Road, Madison, Connecticut

Completion of Construction Activity

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facilities has been completed.

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

12413244-v1

Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

EM-VER-076-130425
252 RidgeRoad, Madison

July 29, 2014

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

Re: **Completion of Construction Activity**

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the Cellco Partnership d/b/a Verizon Wireless telecommunications facility modifications listed below has been completed.

EM-VER-083-130308 – 213 Court Street, Middletown, Connecticut
EM-VER-089-130308 – 200 Stanley Street, New Britain, Connecticut
EM-VER-137-130314 – 7 Broadway Avenue Ext., Stonington, Connecticut
EM-VER-148-130312 – 20 Alexander Drive, Wallingford, Connecticut
EM-VER-089-130322 – Lester Street, New Britain, Connecticut
EM-VER-110-130325 – 21-35 East Main Street (a/k/a 1 Central Square), Plainville, Connecticut
EM-VER-155-130322 – 1358 New Britain Avenue, West Hartford, Connecticut
EM-VER-084-130411 – 26185 Research Drive, Milford, Connecticut
EM-VER-104-130401 – 2 Hinkley Hill Road, Norwich, Connecticut
EM-VER-148-130408 – 90 North Plains Industrial Road, Wallingford, Connecticut
EM-VER-159-130411 – 250 Silas Deane Highway, Wethersfield, Connecticut
EM-VER-146-130416 – 197 South Street, Vernon, Connecticut
EM-VER-076-130425 – 252 Ridge Road, Madison, Connecticut
EM-VER-077-130425 – 53 Slater Street, Manchester, Connecticut
EM-VER-129-130425 – 400 Main Street, Somers, Connecticut
EM-VER-052-130430 – Town Farm Road, Farmington, Connecticut
EM-VER-080-130430 – 38 Elm Street, Meriden, Connecticut

EM-VER-014-130509 – 850 West Main Street, Branford, Connecticut
EM-VER-025-130506 – 705 West Johnson Avenue, Cheshire, Connecticut
EM-VER-041-130524 – 135 Henry Hill Road, East Haddam, Connecticut
EM-VER-115-130524 – 54 Waterbury Road, Prospect, Connecticut
EM-VER-156-130524 – 668 Jones Hill Road, West Haven, Connecticut
EM-VER-027-130603 – 48 Cow Hill Road, Clinton, Connecticut
EM-VER-148-130603 – 945 East Center Street, Wallingford, Connecticut

If you have any questions or need any additional information regarding this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

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

May 13, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-076-130425** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 252 Ridge Road, Madison, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated April 23, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Fillmore McPherson, First Selectman, Town of Madison
Christine Poutot, Chm., Planning & Zoning Administrator, Town of Madison
Crown Castle

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

April 29, 2013

The Honorable Fillmore McPherson
First Selectman
Town of Madison
Madison Town Campus
8 Campus Drive
Madison, CT 06443-2563

RE: **EM-VER-076-130425** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 252 Ridge Road, Madison, Connecticut.

Dear First Selectman McPherson:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by May 13, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/jb

c: Christine Poutot, Chm., Planning & Zoning Administrator, Town of Madison

CSC
CONNECTICUT SITING COUNCIL

ROBINSON & C(

EM-VER-076-130425

KENNETH C. BALDWIN

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Also admitted in Massachusetts

April 23, 2013

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
252 Ridge Road, Madison, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 130-foot level on the existing 150-foot tower at 252 Ridge Road in Madison. The tower is owned by Crown Castle. The Siting Council ("Council") approved Cellco's use of the Ridge Road facility in 2009. Cellco now intends to replace three (3) of its existing antennas with three (3) model BXA-70063-6CF LTE antennas at the same height on the tower. Attached behind Tab 1 are the specifications for the replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Fillmore McPherson, First Selectman of the Town of Madison. The Town of Madison is the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be located at the 130-foot level of the 150-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility are included behind Tab 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed antenna modifications. (*See* Structural Letter attached behind Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Fillmore McPherson, Madison First Selectman
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

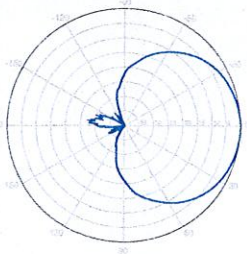
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

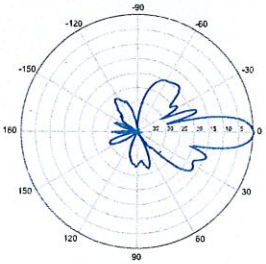
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



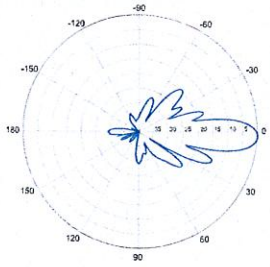
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

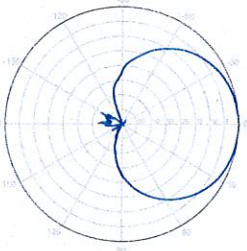


0° | Vertical | 750 MHz

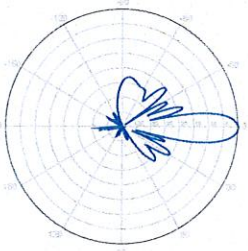
BXA-70063-6CF-EDIN-2



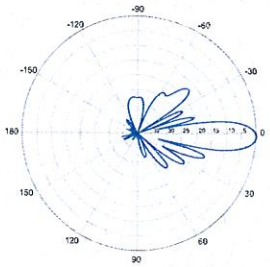
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

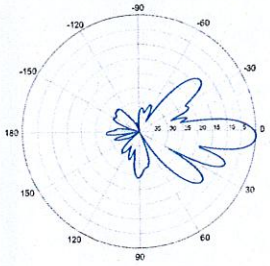


2° | Vertical | 850 MHz

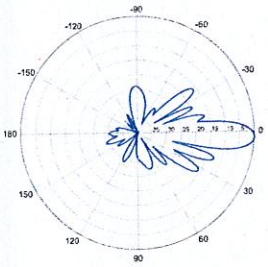
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

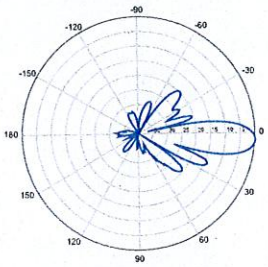


3° | Vertical | 750 MHz

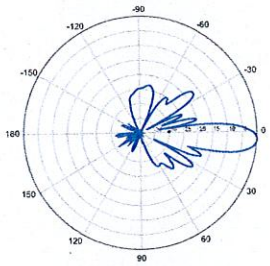


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

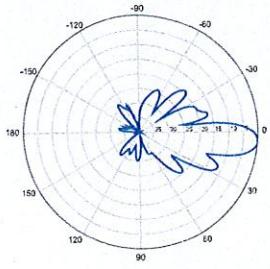


4° | Vertical | 750 MHz

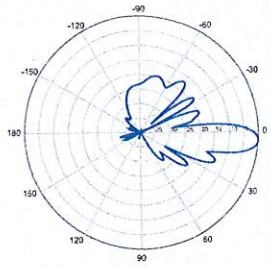


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

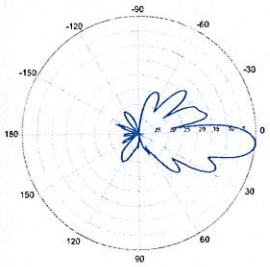


5° | Vertical | 750 MHz

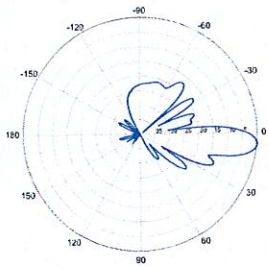


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

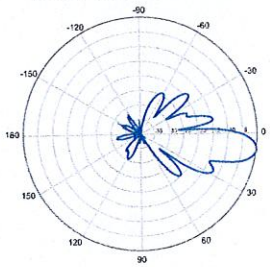


6° | Vertical | 750 MHz

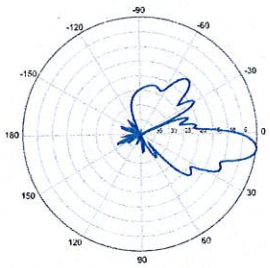


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

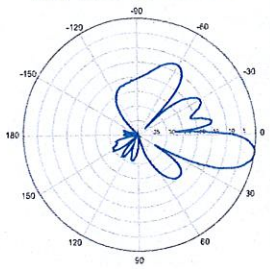


8° | Vertical | 750 MHz

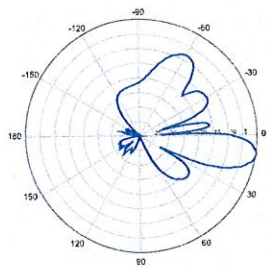


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

	General	Power	Density					
Site Name: Madion 3								
Tower Height: Verizon @ 130ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*T-Mobile	8	151	150	0.0193	1945	1.0000	1.93%	
*AT&T UMTS	2	565	140	0.0207	880	0.5867	3.53%	
*AT&T UMTS	2	875	140	0.0321	1900	1.0000	3.21%	
*AT&T GSM	1	283	140	0.0052	880	0.5867	0.88%	
*AT&T GSM	4	525	140	0.0385	1900	1.0000	3.85%	
*AT&T LTE	1	1313	140	0.0241	734	0.4893	4.92%	
Verizon PCS	**11**	**250**	**130**	**0.0585**	**1970**	**1.0000**	**5.85%**	
Verizon Cellular	**9**	**257**	**130**	**0.0492**	**869**	**0.5793**	**8.50%**	
Verizon AWS	**1**	**1750**	**130**	**0.0372**	**2145**	**1.0000**	**3.72%**	
Verizon 700	**1**	**1050**	**130**	**0.0223**	**698**	**0.4653**	**4.80%**	
								41.20%
* Source: Siting Council								

Date: **April 16, 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:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Madison 3, CT
Crown Castle Designation:	**Crown Castle BU Number:**	5800059
	Crown Castle Site Name:	Ridge Road, Madison
	Crown Castle JDE Job Number:	230164
	Crown Castle Work Order Number:	600463
	Crown Castle Application Number:	185303 Rev. 2
Engineering Firm Designation:	**Crown Castle Project Number:**	600463
Site Data:	**258 Ridge Road, MADISON, New Haven County, CT**	
	Latitude *41° 18' 33.3"*, Longitude *-72° 36' 51.57"*	
	150 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 600463, in accordance with application 185303, revision 2.

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 85 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: Christopher Hall, E.I.T. / JGK

Respectfully submitted by:

Aaron C. Poot, P.E.
Manager Engineering

STATE OF CONNECTICUT
AARON C. POOT
No. 25050
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.0.4.0

4/16/13

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Valmont / PennSummit and DaVinci Engineering, Inc. in October of 2008. The tower was originally designed for a wind speed of 115 mph per TIA-222-G. The tower is designed to accommodate a 30' extension that has not yet been installed.

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 85 mph with no ice, 37.6 mph with 0.75 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
130	130	3	antel	BXA-70063/6CF 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
150	159	1	dbspectra	DS4C06F36D-N	2	7/8	2
	150	1	tower mounts	Pipe Mount [PM 601-1]			
		3	remec	GSM PCS 1900 MASTHEAD AMPLIFIER	12	1-5/8	1
		3	rfs celwave	APX16PV-16PVL-E w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			
140	140	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	3	3/8	2
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21903			
		1	tower mounts	Platform Mount [LP 304-1]			
138	138	6	ericsson	TME-RRUS-11	-	-	2
		1	tower mounts	Side Arm Mount [SO 102-3]			
130	130	3	antel	BXA-70063/4CF w/ Mount Pipe	-	-	3
		3	antel	BXA-185063/8CF w/ Mount Pipe	18	1-5/8	1
		6	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 304-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
124	124	1	kathrein	800 10251 w/ Mount Pipe	1 1	7/8 11/32	1
		1	radiowaves	HP2-4.7NS			
		1	tower mounts	Side Arm Mount [SO 701-1]			
113	113	3	kathrein	800 10252 w/ Mount Pipe	3	7/8	1
		1	tower mounts	T-Arm Mount [TA 702-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) 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)
150	150	12	allgon	7273	-	-
		2	decibel	DB616		
		6	generic	TMA		
140	140	12	antel	RWA-80017	-	-
		6	generic	TMA		
130	130	12	allgon	7273	-	-
		6	generic	TMA		
120	120	12	allgon	7273	-	-
		6	generic	TMA		
80	80	1	generic	4-FT STD. MICROWAVE	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	ANS Consultants, Inc.	2354009	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont PennSummit / DaVinci Engineering, Inc.	2354010	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont PennSummit / DaVinci Engineering, Inc.	2354011	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.

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	150 - 110	Pole	TP39.633x28.4x0.25	1	-9.59	1556.78	26.9	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-12.56	1936.62	35.6	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-23.53	3345.18	42.1	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-42.20	4844.04	44.3	Pass
							Summary	
						Pole (L4)	44.3	Pass
						Rating =	44.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	39.0	Pass
1	Base Plate	0	35.3	Pass
1	Base Foundation	0	51.0	Pass

Structure Rating (max from all components) =	51%

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

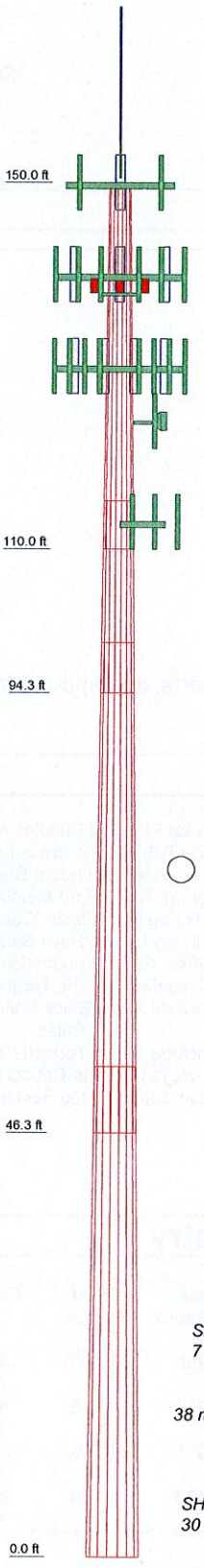
4.1) Recommendations

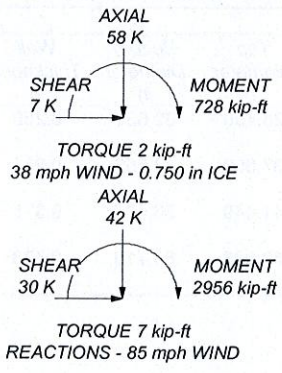
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	40.000	21.000	53.500	53.500
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.281	0.375	0.438
Socket Length (ft)	5.250	5.500	7.250	
Top Dia (in)	28.400	37.659	41.449	53.686
Bot Dia (in)	39.633	43.556	56.472	68.710
Grade	A572-65			
Weight (K)	3.6	2.6	10.5	15.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 5'	152.5	(2) LGP21903	140
DS4C06F36D-N	150	DC6-48-60-18-8F	140
APX16PV-16PVL-E w/ Mount Pipe	150	Platform Mount [LP 304-1]	140
APX16PV-16PVL-E w/ Mount Pipe	150	(2) TME-RRUS-11	138
APX16PV-16PVL-E w/ Mount Pipe	150	(2) TME-RRUS-11	138
GSM PCS 1900 MASTHEAD AMPLIFIER	150	(2) TME-RRUS-11	138
		(2) 5' x 2" Pipe Mount	138
GSM PCS 1900 MASTHEAD AMPLIFIER	150	(2) 5' x 2" Pipe Mount	138
		(2) 5' x 2" Pipe Mount	138
GSM PCS 1900 MASTHEAD AMPLIFIER	150	Side Arm Mount [SO 102-3]	138
Pipe Mount [PM 601-1]	150	(2) DB846F65ZAXY w/ Mount Pipe	130
Platform Mount [LP 303-1]	150	(2) DB846F65ZAXY w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	(2) DB846F65ZAXY w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	BXA-185063/8CF w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	BXA-185063/8CF w/ Mount Pipe	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	BXA-185063/8CF w/ Mount Pipe	130
		BXA-70063/6CF w/ Mount Pipe	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	BXA-70063/6CF w/ Mount Pipe	130
		BXA-70063/6CF w/ Mount Pipe	130
AM-X-CD-16-65-00T-RET w/ Mount Pipe	140	Platform Mount [LP 304-1]	130
		800 10251 w/ Mount Pipe	124
(2) LGP21401	140	5' x 2" Pipe Mount	124
(2) LGP21401	140	Side Arm Mount [SO 701-1]	124
(2) LGP21401	140	HP2-4.7NS	124
(2) LGP21903	140	T-Arm Mount [TA 702-1]	113
(2) LGP21903	140	(3) 800 10252 w/ Mount Pipe	113

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 44.3%

CROWN CASTLE
We Are Solutions

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-2254

Job: **BU #5800059**			
Project:			
Client: Crown Castle	Drawn by: JKazmierczak		App'd:
Code: TIA/EIA-222-F	Date: 04/16/13		Scale: NTS
Path: R:\SA Models - Letters\Work Area\CHall\5800059\temp\5800059.eri			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 New Haven County, Connecticut.
5) Basic wind speed of 85 mph.
6) Nominal ice thickness of 0.750 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.000 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50.000 °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	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check Poles
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

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	150.000-110.000	40.000	5.250	18	28.400	39.633	0.250	1.000	A572-65 (65 ksi)
L2	110.000-94.250	21.000	5.500	18	37.659	43.556	0.281	1.125	A572-65 (65 ksi)
L3	94.250-46.250	53.500	7.250	18	41.449	56.472	0.375	1.500	A572-65 (65 ksi)
L4	46.250-0.000	53.500		18	53.686	68.710	0.438	1.750	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	28.838	22.337	2236.246	9.993	14.427	155.002	4475.435	11.171	4.558	18.234

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
	40.244	31.250	6123.656	13.981	20.134	304.152	12255.369	15.628	6.535	26.142
L2	39.737	33.366	5889.316	13.269	19.131	307.848	11786.380	16.686	6.133	21.806
	44.228	38.631	9139.882	15.363	22.126	413.075	18291.791	19.319	7.171	25.496
L3	43.657	48.888	10420.184	14.581	21.056	494.878	20854.080	24.449	6.635	17.693
	57.343	66.769	26545.722	19.914	28.688	925.332	53126.374	33.391	9.279	24.744
L4	56.582	73.942	26487.969	18.903	27.273	971.231	53010.792	36.978	8.679	19.837
	69.770	94.805	55829.000	24.237	34.905	1599.470	111731.461	47.411	11.323	25.881

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
L1 150.000-110.000				1	1	1		
L2 110.000-94.250				1	1	1		
L3 94.250-46.250				1	1	1		
L4 46.250-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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 klf
LCF158-50A(1-5/8")	A	No	Inside Pole	150.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF5-50A(7/8")	A	No	Inside Pole	150.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
***								
FXL 1873 PE(1 5/8")	C	No	Inside Pole	140.000 - 0.000	12	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
FB-L98B-002-75000(3/8")	C	No	Inside Pole	140.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG122ST-BRDA(3/8)	C	No	Inside Pole	140.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
***								

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AVA7-50(1-5/8)	B	No	Inside Pole	130.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	130.000 - 0.000	2	No Ice	0.201	0.001
						1/2" Ice	0.301	0.002
						1" Ice	0.401	0.004
						2" Ice	0.601	0.010
						4" Ice	1.001	0.030
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	130.000 - 0.000	4	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.030
***								
LDF5-50A(7/8")	C	No	Inside Pole	124.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
7921A(11/32")	C	No	Inside Pole	124.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
***								
LDF5-50A(7/8")	C	No	Inside Pole	121.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF5-50A(7/8")	B	No	CaAa (Out Of Face)	121.000 - 113.000	3	No Ice	0.109	0.000
						1/2" Ice	0.209	0.001
						1" Ice	0.309	0.003
						2" Ice	0.509	0.008
						4" Ice	0.909	0.025
***								
Safety Line 5/8	C	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
***								

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	150.000-110.000	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	10.656	0.26
		C	0.000	0.000	0.000	0.000	0.05
L2	110.000-94.250	A	0.000	0.000	0.000	0.000	0.16
		B	0.000	0.000	0.000	6.332	0.20
		C	0.000	0.000	0.000	0.000	0.04
L3	94.250-46.250	A	0.000	0.000	0.000	0.000	0.49
		B	0.000	0.000	0.000	19.296	0.60
		C	0.000	0.000	0.000	0.000	0.13
L4	46.250-0.000	A	0.000	0.000	0.000	0.000	0.47
		B	0.000	0.000	0.000	18.593	0.58
		C	0.000	0.000	0.000	0.000	0.13

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	150.000-110.000	A	0.883	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	21.964	0.69
		C		0.000	0.000	0.000	0.000	0.05
L2	110.000-94.250	A	0.859	0.000	0.000	0.000	0.000	0.16
		B		0.000	0.000	0.000	11.897	0.50
		C		0.000	0.000	0.000	0.000	0.04
L3	94.250-46.250	A	0.820	0.000	0.000	0.000	0.000	0.49
		B		0.000	0.000	0.000	35.784	1.49
		C		0.000	0.000	0.000	0.000	0.13
L4	46.250-0.000	A	0.750	0.000	0.000	0.000	0.000	0.47
		B		0.000	0.000	0.000	33.772	1.39
		C		0.000	0.000	0.000	0.000	0.13

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.000-110.000	0.344	0.199	0.624	0.360
L2	110.000-94.250	0.468	0.270	0.778	0.449
L3	94.250-46.250	0.476	0.275	0.797	0.460
L4	46.250-0.000	0.485	0.280	0.813	0.469

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
Lighting Rod 5/8" x 5'	C	None		0.000	152.500	No Ice	0.313	0.313	0.03
						1/2" Ice	0.826	0.826	0.03
						1" Ice	1.322	1.322	0.04
						2" Ice	1.957	1.957	0.07
						4" Ice	3.338	3.338	0.16
***									
DS4C06F36D-N	A	From Leg	1.000 0.000 9.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.500 7.367 9.250 13.067 19.246	5.500 7.367 9.250 13.067 19.246	0.07 0.11 0.16 0.30 0.72
APX16PV-16PVL-E w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.936 7.439 7.942 8.978 11.175	3.289 3.995 4.661 6.044 9.023	0.06 0.10 0.16 0.28 0.65
APX16PV-16PVL-E w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.936 7.439 7.942 8.978 11.175	3.289 3.995 4.661 6.044 9.023	0.06 0.10 0.16 0.28 0.65
APX16PV-16PVL-E w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice	6.936 7.439 7.942	3.289 3.995 4.661	0.06 0.10 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	8.978	6.044	0.28
							2" Ice	11.175	9.023	0.65
							4" Ice			
GSM PCS 1900 MASTHEAD AMPLIFIER	A	From Leg	4.000	0.000	0.000	150.000	No Ice	1.434	0.394	0.01
			0.000				1/2" Ice	1.596	0.505	0.02
			0.000				1" Ice	1.767	0.624	0.03
							2" Ice	2.135	0.889	0.06
							4" Ice	2.975	1.522	0.14
GSM PCS 1900 MASTHEAD AMPLIFIER	B	From Leg	4.000	0.000	0.000	150.000	No Ice	1.434	0.394	0.01
			0.000				1/2" Ice	1.596	0.505	0.02
			0.000				1" Ice	1.767	0.624	0.03
							2" Ice	2.135	0.889	0.06
							4" Ice	2.975	1.522	0.14
GSM PCS 1900 MASTHEAD AMPLIFIER	C	From Leg	4.000	0.000	0.000	150.000	No Ice	1.434	0.394	0.01
			0.000				1/2" Ice	1.596	0.505	0.02
			0.000				1" Ice	1.767	0.624	0.03
							2" Ice	2.135	0.889	0.06
							4" Ice	2.975	1.522	0.14
Pipe Mount [PM 601-1]	A	From Leg	0.500	0.000	0.000	150.000	No Ice	3.000	0.900	0.07
			0.000				1/2" Ice	3.740	1.120	0.08
			0.000				1" Ice	4.480	1.340	0.09
							2" Ice	5.960	1.780	0.12
							4" Ice	8.920	2.660	0.18
Platform Mount [LP 303-1]	C	None			0.000	150.000	No Ice	14.660	14.660	1.25
							1/2" Ice	18.870	18.870	1.48
							1" Ice	23.080	23.080	1.71
							2" Ice	31.500	31.500	2.18
							4" Ice	48.340	48.340	3.10
***										
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	140.000	No Ice	6.119	4.254	0.06
			0.000				1/2" Ice	6.626	5.014	0.10
			0.000				1" Ice	7.128	5.711	0.16
							2" Ice	8.164	7.155	0.29
							4" Ice	10.360	10.412	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	140.000	No Ice	6.119	4.254	0.06
			0.000				1/2" Ice	6.626	5.014	0.10
			0.000				1" Ice	7.128	5.711	0.16
							2" Ice	8.164	7.155	0.29
							4" Ice	10.360	10.412	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	140.000	No Ice	6.119	4.254	0.06
			0.000				1/2" Ice	6.626	5.014	0.10
			0.000				1" Ice	7.128	5.711	0.16
							2" Ice	8.164	7.155	0.29
							4" Ice	10.360	10.412	0.66
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	140.000	No Ice	8.498	6.304	0.07
			0.000				1/2" Ice	9.149	7.479	0.14
			0.000				1" Ice	9.767	8.368	0.21
							2" Ice	11.031	10.179	0.38
							4" Ice	13.679	14.024	0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	140.000	No Ice	8.498	6.304	0.07
			0.000				1/2" Ice	9.149	7.479	0.14
			0.000				1" Ice	9.767	8.368	0.21
							2" Ice	11.031	10.179	0.38
							4" Ice	13.679	14.024	0.87
AM-X-CD-16-65-00T-RET	C	From Leg	4.000	0.000	0.000	140.000	No Ice	8.498	6.304	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
w/ Mount Pipe			0.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	9.149 9.767 11.031 13.679	7.479 8.368 10.179 14.024	0.14 0.21 0.38 0.87
(2) LGP21401	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.01 0.02 0.03 0.05 0.14
(2) LGP21903	A	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	C	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	0.01 0.01 0.02 0.03 0.07
DC6-48-60-18-8F	B	From Leg	4.000 0.000 0.000	0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.02 0.04 0.05 0.10 0.21
Platform Mount [LP 304-1]	C	None		0.000	140.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.460 22.440 27.420 37.380 57.300	17.460 22.440 27.420 37.380 57.300	1.35 1.62 1.90 2.45 3.55
***									
(2) TME-RRUS-11	A	From Leg	2.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.423 3.725 4.038 4.720 6.246	1.850 2.192 2.552 3.378 5.290	0.06 0.08 0.12 0.19 0.43
(2) TME-RRUS-11	B	From Leg	2.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.423 3.725 4.038 4.720 6.246	1.850 2.192 2.552 3.378 5.290	0.06 0.08 0.12 0.19 0.43

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							4" Ice			
(2) TME-RRUS-11	C	From Leg	2.000	0.000	0.000	138.000	No Ice	3.423	1.850	0.06
			0.000				1/2" Ice	3.725	2.192	0.08
			0.000				1" Ice	4.038	2.552	0.12
							2" Ice	4.720	3.378	0.19
							4" Ice	6.246	5.290	0.43
(2) 5' x 2" Pipe Mount	A	From Leg	2.000	0.000	0.000	138.000	No Ice	1.000	1.000	0.03
			0.000				1/2" Ice	1.393	1.393	0.04
			0.000				1" Ice	1.703	1.703	0.05
							2" Ice	2.351	2.351	0.08
							4" Ice	3.778	3.778	0.20
(2) 5' x 2" Pipe Mount	B	From Leg	2.000	0.000	0.000	138.000	No Ice	1.000	1.000	0.03
			0.000				1/2" Ice	1.393	1.393	0.04
			0.000				1" Ice	1.703	1.703	0.05
							2" Ice	2.351	2.351	0.08
							4" Ice	3.778	3.778	0.20
(2) 5' x 2" Pipe Mount	C	From Leg	2.000	0.000	0.000	138.000	No Ice	1.000	1.000	0.03
			0.000				1/2" Ice	1.393	1.393	0.04
			0.000				1" Ice	1.703	1.703	0.05
							2" Ice	2.351	2.351	0.08
							4" Ice	3.778	3.778	0.20
Side Arm Mount [SO 102-3]	C	None			0.000	138.000	No Ice	3.000	3.000	0.08
							1/2" Ice	3.480	3.480	0.11
							1" Ice	3.960	3.960	0.14
							2" Ice	4.920	4.920	0.20
							4" Ice	6.840	6.840	0.32
***										
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	130.000	No Ice	7.271	7.821	0.05
			0.000				1/2" Ice	7.877	9.010	0.11
			0.000				1" Ice	8.484	9.912	0.19
							2" Ice	9.724	11.812	0.37
							4" Ice	12.325	15.978	0.87
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	130.000	No Ice	7.271	7.821	0.05
			0.000				1/2" Ice	7.877	9.010	0.11
			0.000				1" Ice	8.484	9.912	0.19
							2" Ice	9.724	11.812	0.37
							4" Ice	12.325	15.978	0.87
(2) DB846F65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	130.000	No Ice	7.271	7.821	0.05
			0.000				1/2" Ice	7.877	9.010	0.11
			0.000				1" Ice	8.484	9.912	0.19
							2" Ice	9.724	11.812	0.37
							4" Ice	12.325	15.978	0.87
BXA-185063/8CF w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	130.000	No Ice	3.181	2.997	0.03
			0.000				1/2" Ice	3.559	3.614	0.06
			0.000				1" Ice	3.963	4.236	0.09
							2" Ice	4.855	5.529	0.19
							4" Ice	6.773	8.423	0.47
BXA-185063/8CF w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	130.000	No Ice	3.181	2.997	0.03
			0.000				1/2" Ice	3.559	3.614	0.06
			0.000				1" Ice	3.963	4.236	0.09
							2" Ice	4.855	5.529	0.19
							4" Ice	6.773	8.423	0.47
BXA-185063/8CF w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	130.000	No Ice	3.181	2.997	0.03
			0.000				1/2" Ice	3.559	3.614	0.06
			0.000				1" Ice	3.963	4.236	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.855	5.529	0.19
						2" Ice	6.773	8.423	0.47
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice	7.979	5.695	0.04
						1/2" Ice	8.621	6.849	0.10
						1" Ice	9.228	7.715	0.17
						2" Ice	10.473	9.497	0.33
						4" Ice	13.082	13.262	0.80
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice	7.979	5.695	0.04
						1/2" Ice	8.621	6.849	0.10
						1" Ice	9.228	7.715	0.17
						2" Ice	10.473	9.497	0.33
						4" Ice	13.082	13.262	0.80
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000	No Ice	7.979	5.695	0.04
						1/2" Ice	8.621	6.849	0.10
						1" Ice	9.228	7.715	0.17
						2" Ice	10.473	9.497	0.33
						4" Ice	13.082	13.262	0.80
Platform Mount [LP 304-1]	C	None		0.000	130.000	No Ice	17.460	17.460	1.35
						1/2" Ice	22.440	22.440	1.62
						1" Ice	27.420	27.420	1.90
						2" Ice	37.380	37.380	2.45
						4" Ice	57.300	57.300	3.55
***									
800 10251 w/ Mount Pipe	B	From Leg	3.000 0.000 0.000	-55.000	124.000	No Ice	4.883	2.256	0.04
						1/2" Ice	5.288	2.773	0.07
						1" Ice	5.703	3.306	0.11
						2" Ice	6.567	4.424	0.21
						4" Ice	8.448	7.080	0.50
5' x 2" Pipe Mount	B	From Leg	3.000 0.000 0.000	-55.000	124.000	No Ice	1.000	1.000	0.03
						1/2" Ice	1.393	1.393	0.04
						1" Ice	1.703	1.703	0.05
						2" Ice	2.351	2.351	0.08
						4" Ice	3.778	3.778	0.20
Side Arm Mount [SO 701-1]	B	From Leg	1.500 0.000 0.000	-55.000	124.000	No Ice	0.850	1.670	0.07
						1/2" Ice	1.140	2.340	0.08
						1" Ice	1.430	3.010	0.09
						2" Ice	2.010	4.350	0.12
						4" Ice	3.170	7.030	0.18
***									
(3) 800 10252 w/ Mount Pipe	B	From Leg	3.000 0.000 0.000	-55.000	113.000	No Ice	7.578	3.787	0.04
						1/2" Ice	8.022	4.352	0.09
						1" Ice	8.476	4.935	0.15
						2" Ice	9.418	6.154	0.29
						4" Ice	11.461	8.932	0.66
T-Arm Mount [TA 702-1]	B	From Leg	1.500 0.000 0.000	-55.000	113.000	No Ice	2.780	2.230	0.11
						1/2" Ice	3.390	2.430	0.14
						1" Ice	4.000	2.630	0.17
						2" Ice	5.220	3.030	0.23
						4" Ice	7.660	3.830	0.35
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-4.7NS	B	Paraboloid w/Shroud (HP)	From Leg	3.000 0.000 0.000	-11.000		124.000	2.042	No Ice	3.270	0.03
									1/2" Ice	3.550	0.05
									1" Ice	3.820	0.06
									2" Ice	4.360	0.10
									4" Ice	5.460	0.17

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
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	150 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.41	-1.93	-0.62
			Max. Mx	5	-9.58	-316.59	-0.12

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	-9.59	-0.87	-318.62
			Max. Vy	11	-15.14	315.42	-0.20
			Max. Vx	8	15.11	-0.87	-318.62
			Max. Torque	3			-3.83
L2	110 - 94.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.90	-4.49	-2.10
			Max. Mx	5	-12.57	-578.94	2.25
			Max. My	8	-12.58	0.81	-576.12
			Max. Vy	11	-17.94	576.66	-3.27
			Max. Vx	8	17.56	0.81	-576.12
			Max. Torque	3			-6.05
L3	94.25 - 46.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-35.18	-6.39	-3.19
			Max. Mx	5	-23.54	-1532.65	11.73
			Max. My	8	-23.54	9.18	-1513.96
			Max. Vy	11	-23.38	1531.54	-12.78
			Max. Vx	8	23.00	9.18	-1513.96
			Max. Torque	3			-6.29
L4	46.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-57.95	-8.93	-4.66
			Max. Mx	11	-42.20	2943.99	-23.72
			Max. My	8	-42.20	18.78	-2906.93
			Max. Vy	11	-29.46	2943.99	-23.72
			Max. Vx	8	29.08	18.78	-2906.93
			Max. Torque	3			-6.59

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	57.95	-0.00	-0.00
	Max. H_x	11	42.21	29.44	-0.20
	Max. H_z	2	42.21	-0.17	29.06
	Max. M_x	2	2904.36	-0.17	29.06
	Max. M_z	5	2943.94	-29.40	0.21
	Max. Torsion	9	6.56	14.90	-25.27
	Min. Vert	1	42.21	0.00	0.00
	Min. H_x	5	42.21	-29.40	0.21
	Min. H_z	8	42.21	0.19	-29.07
	Min. M_x	8	-2906.93	0.19	-29.07
	Min. M_z	11	-2943.99	29.44	-0.20
	Min. Torsion	3	-6.59	-14.91	25.27

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	42.21	0.00	0.00	1.15	-2.45	0.00
Dead+Wind 0 deg - No Ice	42.21	0.17	-29.06	-2904.36	-21.47	5.17
Dead+Wind 30 deg - No Ice	42.21	14.91	-25.27	-2526.20	-1497.78	6.59
Dead+Wind 60 deg - No Ice	42.21	25.59	-14.69	-1469.01	-2564.97	6.01
Dead+Wind 90 deg - No Ice	42.21	29.40	-0.21	-22.63	-2943.94	3.94
Dead+Wind 120 deg - No Ice	42.21	25.36	14.34	1432.02	-2537.53	0.80
Dead+Wind 150 deg - No Ice	42.21	14.54	25.05	2502.91	-1455.55	-2.47
Dead+Wind 180 deg - No Ice	42.21	-0.19	29.07	2906.93	18.78	-5.25
Dead+Wind 210 deg - No Ice	42.21	-14.90	25.27	2528.44	1491.75	-6.56
Dead+Wind 240 deg - No Ice	42.21	-25.62	14.68	1469.93	2563.97	-6.00
Dead+Wind 270 deg - No Ice	42.21	-29.44	0.20	23.72	2943.99	-3.96

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 300 deg - No Ice	42.21	-25.39	-14.36	-1431.35	2537.24	-0.85
Dead+Wind 330 deg - No Ice	42.21	-14.57	-25.06	-2502.71	1454.23	2.44
Dead+Ice+Temp	57.95	0.00	0.00	4.66	-8.93	-0.00
Dead+Wind 0 deg+Ice+Temp	57.95	0.03	-6.88	-708.69	-12.19	1.33
Dead+Wind 30 deg+Ice+Temp	57.95	3.51	-5.98	-615.05	-372.96	1.61
Dead+Wind 60 deg+Ice+Temp	57.95	6.03	-3.47	-354.94	-634.30	1.41
Dead+Wind 90 deg+Ice+Temp	57.95	6.94	-0.04	0.48	-727.74	0.86
Dead+Wind 120 deg+Ice+Temp	57.95	5.99	3.41	357.45	-629.23	0.07
Dead+Wind 150 deg+Ice+Temp	57.95	3.44	5.94	619.83	-365.38	-0.71
Dead+Wind 180 deg+Ice+Temp	57.95	-0.03	6.88	718.17	-5.37	-1.34
Dead+Wind 210 deg+Ice+Temp	57.95	-3.51	5.98	624.46	354.64	-1.60
Dead+Wind 240 deg+Ice+Temp	57.95	-6.04	3.47	364.05	617.12	-1.41
Dead+Wind 270 deg+Ice+Temp	57.95	-6.95	0.03	8.67	710.80	-0.86
Dead+Wind 300 deg+Ice+Temp	57.95	-6.00	-3.41	-348.40	612.22	-0.09
Dead+Wind 330 deg+Ice+Temp	57.95	-3.45	-5.94	-610.88	348.14	0.70
Dead+Wind 0 deg - Service	42.21	0.06	-10.06	-1004.37	-9.07	1.79
Dead+Wind 30 deg - Service	42.21	5.16	-8.74	-873.49	-519.99	2.28
Dead+Wind 60 deg - Service	42.21	8.86	-5.08	-507.62	-889.32	2.08
Dead+Wind 90 deg - Service	42.21	10.17	-0.07	-7.06	-1020.48	1.37
Dead+Wind 120 deg - Service	42.21	8.77	4.96	496.36	-879.82	0.28
Dead+Wind 150 deg - Service	42.21	5.03	8.67	866.97	-505.37	-0.86
Dead+Wind 180 deg - Service	42.21	-0.06	10.06	1006.80	4.86	-1.82
Dead+Wind 210 deg - Service	42.21	-5.16	8.74	875.81	514.62	-2.27
Dead+Wind 240 deg - Service	42.21	-8.87	5.08	509.48	885.70	-2.08
Dead+Wind 270 deg - Service	42.21	-10.19	0.07	8.98	1017.21	-1.37
Dead+Wind 300 deg - Service	42.21	-8.79	-4.97	-494.59	876.44	-0.29
Dead+Wind 330 deg - Service	42.21	-5.04	-8.67	-865.36	501.64	0.84

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-42.21	0.00	0.00	42.21	0.00	0.000%
2	0.17	-42.21	-29.06	-0.17	42.21	29.06	0.000%
3	14.91	-42.21	-25.27	-14.91	42.21	25.27	0.000%
4	25.59	-42.21	-14.69	-25.59	42.21	14.69	0.000%
5	29.40	-42.21	-0.21	-29.40	42.21	0.21	0.000%
6	25.36	-42.21	14.34	-25.36	42.21	-14.34	0.000%
7	14.54	-42.21	25.05	-14.54	42.21	-25.05	0.000%
8	-0.19	-42.21	29.07	0.19	42.21	-29.07	0.000%
9	-14.90	-42.21	25.27	14.90	42.21	-25.27	0.000%
10	-25.62	-42.21	14.68	25.62	42.21	-14.68	0.000%
11	-29.44	-42.21	0.20	29.44	42.21	-0.20	0.000%
12	-25.39	-42.21	-14.36	25.39	42.21	14.36	0.000%
13	-14.57	-42.21	-25.06	14.57	42.21	25.06	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0.00	-57.95	0.00	-0.00	57.95	-0.00	0.000%
15	0.03	-57.95	-6.88	-0.03	57.95	6.88	0.000%
16	3.51	-57.95	-5.98	-3.51	57.95	5.98	0.000%
17	6.03	-57.95	-3.47	-6.03	57.95	3.47	0.000%
18	6.94	-57.95	-0.04	-6.94	57.95	0.04	0.000%
19	5.99	-57.95	3.41	-5.99	57.95	-3.41	0.000%
20	3.44	-57.95	5.94	-3.44	57.95	-5.94	0.000%
21	-0.03	-57.95	6.88	0.03	57.95	-6.88	0.000%
22	-3.51	-57.95	5.98	3.51	57.95	-5.98	0.000%
23	-6.04	-57.95	3.47	6.04	57.95	-3.47	0.000%
24	-6.95	-57.95	0.03	6.95	57.95	-0.03	0.000%
25	-6.00	-57.95	-3.41	6.00	57.95	3.41	0.000%
26	-3.45	-57.95	-5.94	3.45	57.95	5.94	0.000%
27	0.06	-42.21	-10.06	-0.06	42.21	10.06	0.000%
28	5.16	-42.21	-8.74	-5.16	42.21	8.74	0.000%
29	8.86	-42.21	-5.08	-8.86	42.21	5.08	0.000%
30	10.17	-42.21	-0.07	-10.17	42.21	0.07	0.000%
31	8.77	-42.21	4.96	-8.77	42.21	-4.96	0.000%
32	5.03	-42.21	8.67	-5.03	42.21	-8.67	0.000%
33	-0.06	-42.21	10.06	0.06	42.21	-10.06	0.000%
34	-5.16	-42.21	8.74	5.16	42.21	-8.74	0.000%
35	-8.87	-42.21	5.08	8.87	42.21	-5.08	0.000%
36	-10.19	-42.21	0.07	10.19	42.21	-0.07	0.000%
37	-8.79	-42.21	-4.97	8.79	42.21	4.97	0.000%
38	-5.04	-42.21	-8.67	5.04	42.21	8.67	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	0.00035780
3	Yes	5	0.00000001	0.00002096
4	Yes	4	0.00000001	0.00076333
5	Yes	4	0.00000001	0.00025003
6	Yes	4	0.00000001	0.00087062
7	Yes	4	0.00000001	0.00093546
8	Yes	4	0.00000001	0.00033724
9	Yes	4	0.00000001	0.00077095
10	Yes	5	0.00000001	0.00002044
11	Yes	4	0.00000001	0.00028226
12	Yes	4	0.00000001	0.00080996
13	Yes	4	0.00000001	0.00077371
14	Yes	4	0.00000001	0.00000597
15	Yes	4	0.00000001	0.00046969
16	Yes	4	0.00000001	0.00050660
17	Yes	4	0.00000001	0.00050667
18	Yes	4	0.00000001	0.00048284
19	Yes	4	0.00000001	0.00050575
20	Yes	4	0.00000001	0.00050504
21	Yes	4	0.00000001	0.00047787
22	Yes	4	0.00000001	0.00049908
23	Yes	4	0.00000001	0.00049958
24	Yes	4	0.00000001	0.00046671
25	Yes	4	0.00000001	0.00048473
26	Yes	4	0.00000001	0.00048481
27	Yes	4	0.00000001	0.00005652
28	Yes	4	0.00000001	0.00010774
29	Yes	4	0.00000001	0.00006648
30	Yes	4	0.00000001	0.00004314
31	Yes	4	0.00000001	0.00006061
32	Yes	4	0.00000001	0.00007102
33	Yes	4	0.00000001	0.00005613
34	Yes	4	0.00000001	0.00007032
35	Yes	4	0.00000001	0.00010263

36	Yes	4	0.00000001	0.00004479
37	Yes	4	0.00000001	0.00005223
38	Yes	4	0.00000001	0.00005056

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	12.647	29	0.718	0.005
L2	115.25 - 94.25	7.614	29	0.629	0.005
L3	99.75 - 46.25	5.682	29	0.547	0.003
L4	53.5 - 0	1.611	29	0.275	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.500	Lighting Rod 5/8" x 5'	29	12.647	0.718	0.005	80063
150.000	DS4C06F36D-N	29	12.647	0.718	0.005	80063
140.000	(2) 7770.00 w/ Mount Pipe	29	11.144	0.701	0.005	40032
138.000	(2) TME-RRUS-11	29	10.846	0.698	0.005	33360
130.000	(2) DB846F65ZAXY w/ Mount Pipe	29	9.670	0.680	0.005	20016
124.000	HP2-4.7NS	29	8.813	0.663	0.005	15396
113.000	(3) 800 10252 w/ Mount Pipe	29	7.318	0.619	0.004	11495

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 110	36.466	4	2.070	0.014
L2	115.25 - 94.25	21.962	4	1.815	0.013
L3	99.75 - 46.25	16.393	4	1.577	0.009
L4	53.5 - 0	4.651	4	0.794	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.500	Lighting Rod 5/8" x 5'	4	36.466	2.070	0.014	27805
150.000	DS4C06F36D-N	4	36.466	2.070	0.014	27805
140.000	(2) 7770.00 w/ Mount Pipe	4	32.134	2.022	0.014	13902
138.000	(2) TME-RRUS-11	4	31.275	2.011	0.014	11585
130.000	(2) DB846F65ZAXY w/ Mount Pipe	4	27.887	1.960	0.015	6950
124.000	HP2-4.7NS	4	25.417	1.910	0.014	5346
113.000	(3) 800 10252 w/ Mount Pipe	4	21.108	1.785	0.013	3993

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	150 - 110 (1)	TP39.633x28.4x0.25	40.000	0.000	0.0	38.825	30.080	-9.59	1167.88	0.008
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	21.000	0.000	0.0	39.000	37.252	-12.56	1452.83	0.009
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	53.500	0.000	0.0	39.000	64.346	-23.53	2509.51	0.009
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	53.500	0.000	0.0	38.331	94.805	-42.20	3633.94	0.012

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	150 - 110 (1)	TP39.633x28.4x0.25	318.62	13.571	38.825	0.350	0.00	0.000	38.825	0.000
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	580.63	18.144	39.000	0.465	0.00	0.000	39.000	0.000
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	1539.12	21.497	39.000	0.551	0.00	0.000	39.000	0.000
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	2955.85	22.176	38.331	0.579	0.00	0.000	38.331	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	150 - 110 (1)	TP39.633x28.4x0.25	15.11	0.502	26.000	0.039	1.61	0.034	26.000	0.001
L2	110 - 94.25 (2)	TP43.556x37.659x0.281	18.01	0.483	26.000	0.037	5.54	0.085	26.000	0.003
L3	94.25 - 46.25 (3)	TP56.472x41.449x0.375	23.45	0.364	26.000	0.028	5.76	0.039	26.000	0.002
L4	46.25 - 0 (4)	TP68.71x53.686x0.438	29.52	0.311	26.000	0.024	6.01	0.022	26.000	0.001

Pole Interaction Design Data

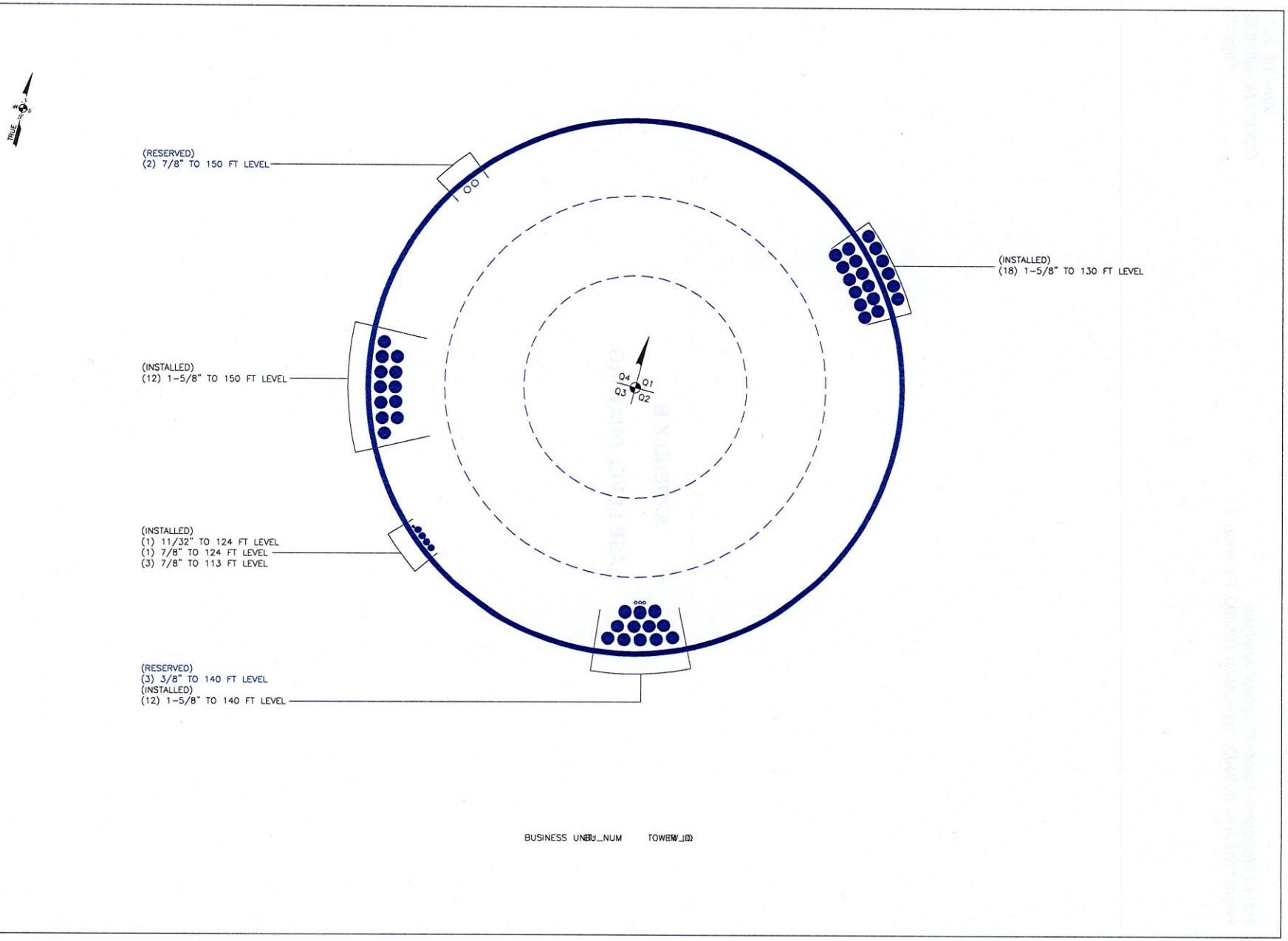
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 110 (1)	0.008	0.350	0.000	0.039	0.001	0.358 ✓	1.333	H1-3+VT ✓
L2	110 - 94.25 (2)	0.009	0.465	0.000	0.037	0.003	0.474 ✓	1.333	H1-3+VT ✓
L3	94.25 - 46.25 (3)	0.009	0.551	0.000	0.028	0.002	0.561 ✓	1.333	H1-3+VT ✓
L4	46.25 - 0 (4)	0.012	0.579	0.000	0.024	0.001	0.590 ✓	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	150 - 110	Pole	TP39.633x28.4x0.25	1	-9.59	1556.78	26.9	Pass
L2	110 - 94.25	Pole	TP43.556x37.659x0.281	2	-12.56	1936.62	35.6	Pass
L3	94.25 - 46.25	Pole	TP56.472x41.449x0.375	3	-23.53	3345.18	42.1	Pass
L4	46.25 - 0	Pole	TP68.71x53.686x0.438	4	-42.20	4844.04	44.3	Pass
							Summary	
						Pole (L4)	44.3	Pass
						RATING =	**44.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


TRUE
(RESERVED)
(2) 7/8" TO 150 FT LEVEL
(INSTALLED)
(18) 1-5/8" TO 130 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 150 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED)
(1) 11/32" TO 124 FT LEVEL
(1) 7/8" TO 124 FT LEVEL
(3) 7/8" TO 113 FT LEVEL
(RESERVED)
(3) 3/8" TO 140 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 140 FT LEVEL
BUSINESS UNIT_NUM
TOWER_ID

APPENDIX C

ADDITIONAL CALCULATIONS

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *5800059*
Site Name: *Ridge Road, Madison*
App #: *185303, Rev. 2*

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	76	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	77	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	24	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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

Pole Data		
Diam:	68.71	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2956	ft-kips
Unfactored Axial, P:	42	kips
Unfactored Shear, V:	30	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	76.0 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	39.0% Pass

Base Plate Results Flexural Check

Base Plate Stress:	17.7 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	35.3% Pass

PL Ref. Data
Yield Line (in): 40.18
Max PL Length: 40.18

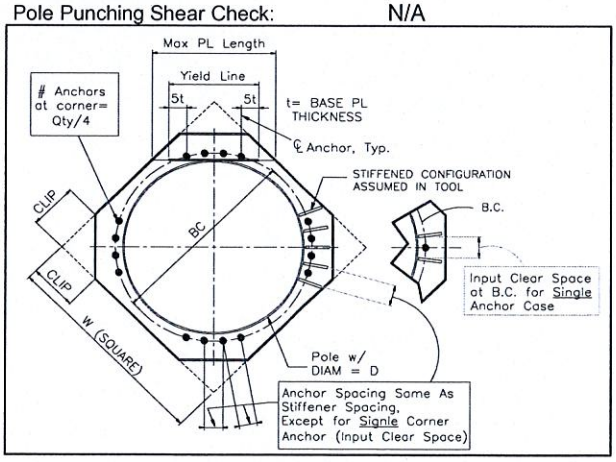
N/A - Unstiffened

Stiffener Results

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



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

CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 4/16/2013

BU:	5800059
Site Name:	Ridge Road, Madison
App Number:	185303, Rev. 2
Work Order:	600463

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2002
Seismic Category:	B

Forces

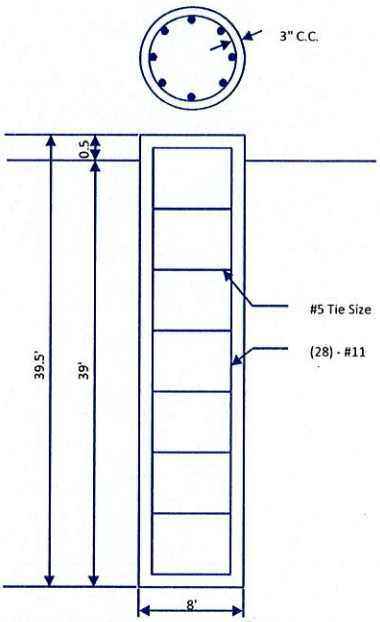
Compression	42 kips
Shear	30 kips
Moment	2956 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	8 ft
Ext. above grade:	0.5 ft
Depth below grade:	39 ft

Material Properties

Number of Rebar:	28
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	4000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in



Soil Profile: 1

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	4	0	4	65			0	0	0	
2	8	4	12	65	100	22	0	0	0	
3	8	12	20	42.6	400	27	0	0	0	
4	19	20	39	62.6	200	31	0	0	6	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	10.59 ft
Max Moment, Mu:	3205.94 k-ft
Soil Safety Factor:	7.12
Safety Factor Req'd:	2
RATING:	28.09%

Soil Axial Capacity

Skin Friction (k):	0.00 kips
End Bearing (k):	150.80 kips
Comp. Capacity (k), ϕCn:	150.80 kips
Comp. (k), Cu:	42.00 kips
RATING:	27.85%

Concrete/Steel Check

Mu (from soil analysis)	4167.72 k-ft
ϕMn	8169.57 k-ft
RATING:	51.02%

rho provided	0.60
rho required	0.33 OK
Rebar Spacing	8.39
Spacing required	22.56 OK
Dev. Length required	28.16
Dev. Length provided	53.51 OK

Overall Foundation Rating: 51.02%