Robinson + Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
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Also admitted in Massachusetts

EM-VER-027-130603
48 Cow Hill Road, Clinton

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

ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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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

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

June 27, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER -027-130603** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 48 Cow Hill Road, Clinton, 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 May 29, 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 William W. Fritz, Jr., First Selectman, Town of Clinton
Thomas Lane, Zoning Enforcement Officer, Town of Clinton
Crown Castle

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Also admitted in Massachusetts

EM-VER-027-130603

ORIGINAL

May 29, 2013

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

Re: **Notice of Exempt Modification – Facility Modification**
48 Cow Hill Road, Clinton, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 209-foot level of the existing 212-foot tower at 48 Cow Hill Road in Clinton. The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 1992 (Docket No. 148). Cellco now intends to replace two (2) of its existing antennas with two (2) 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 William W. Fritz, Clinton's First Selectman. A copy of this letter is also being sent to Raymond E. Heser, 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 209-foot level of the existing 212-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 Analysis Report 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:
William W. Fritz, Clinton First Selectman
Raymond E. Heser
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

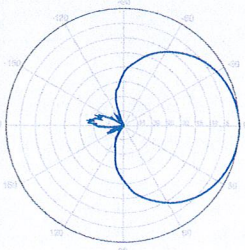
Replace "X" with desired electrical downtilt.

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 m^2 Side: 0.24 m^2	Front: 5.5 ft^2 Side: 2.6 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

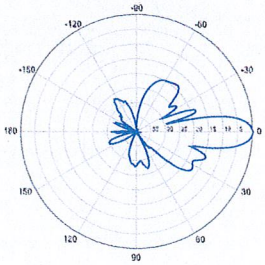
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



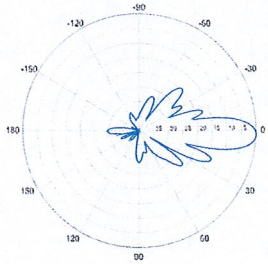
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

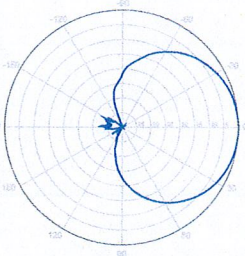


0° | Vertical | 750 MHz

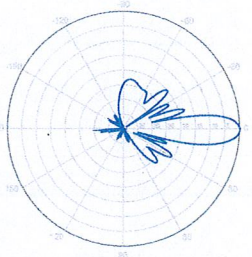
BXA-70063-6CF-EDIN-2



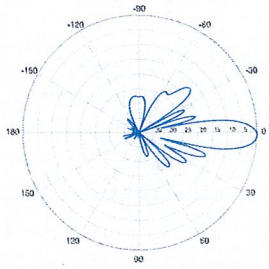
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

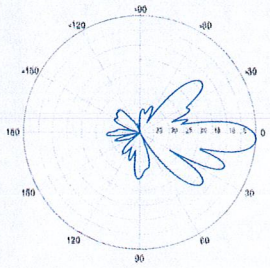


2° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-X

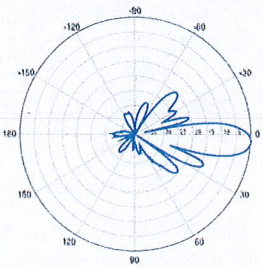
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



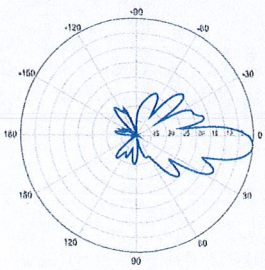
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

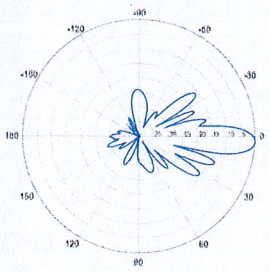


4° | Vertical | 750 MHz

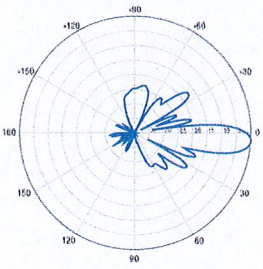
BXA-70063-6CF-EDIN-5



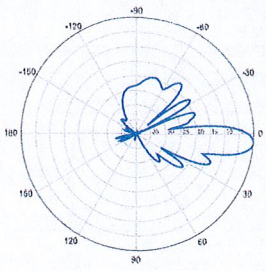
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

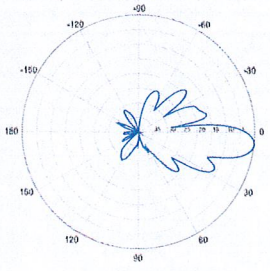


4° | Vertical | 850 MHz



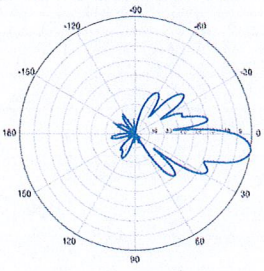
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



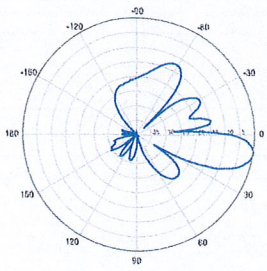
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

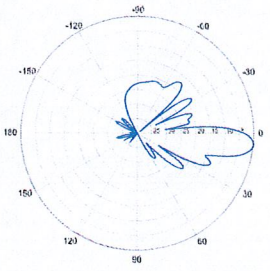


8° | Vertical | 750 MHz

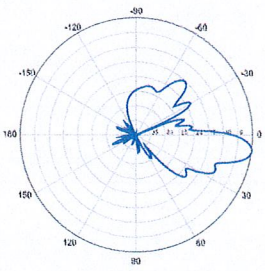
BXA-70063-6CF-EDIN-10



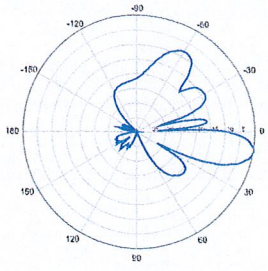
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

	General	Power	Density					
Site Name: Clinton								
Tower Height: Verizon @ 210ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*AT&T UMTS	1	500	190	0.0050	880	0.5867	0.85%	
*AT&T GSM	6	296	190	0.0177	880	0.5867	3.02%	
*AT&T GSM	3	427	190	0.0128	1900	1.0000	1.28%	
*AT&T LTE	1	500	190	0.0050	740	0.4933	1.01%	
*T-Mobile GSM	8	126	137	0.0193	1945	1.0000	1.93%	
*T-Mobile UMTS	2	711	137	0.0272	2100	1.0000	2.72%	
*Pocket (now MetroPCS)	3	631	182	0.0205	2130	1.0000	2.05%	
*Sprint CDMA/LTE	3	693	198	0.0191	1900	1.0000	1.91%	
*Sprint CDMA/LTE	1	390	198	0.0036	850	0.5667	0.63%	
*Nextel	9	100	175	0.0106	851	0.5673	1.86%	
*Town	6	100	125	0.0138	46	0.2000	6.90%	
*MediaFLO			228				6.63%	
Verizon PCS	**11**	**216**	**210**	**0.0194**	**1970**	**1.0000**	**1.94%**	
Verizon Cellular	**9**	**235**	**210**	**0.0172**	**869**	**0.5793**	**2.98%**	
Verizon AWS	**1**	**1750**	**210**	**0.0143**	**2145**	**1.0000**	**1.43%**	
Verizon 700	**1**	**778**	**210**	**0.0063**	**698**	**0.4653**	**1.36%**	
								38.50%
* Source: Siting Council								

Date: **April 23, 2013**

Marianne Dunst
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6580

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
(859) 624-8360
csandlin@verticalstructures.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Change-Out**	
	Carrier Site Number:	119685
	Carrier Site Name:	Clinton CT
Crown Castle Designation:	**Crown Castle BU Number:**	806363
	Crown Castle Site Name:	HRT 105
	Crown Castle JDE Job Number:	232704
	Crown Castle Work Order Number:	601844
	Crown Castle Application Number:	186869 Rev. 1
Engineering Firm Designation:	**Vertical Structures, Inc. Project Number:**	2013-004-035
Site Data:	**48 Cow Hill Road, Clinton, CT, Middlesex County** **Latitude *41° 17' 20.2"*, Longitude *-72° 32' 18.5"*** **212.625 Foot - Self Support Tower**	

Dear Marianne Dunst,

Vertical Structures, Inc. 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 539691.

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.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 Connecticut State Building Code 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 *Vertical Structures, Inc.* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Chris Sandlin, P.E.
Project Engineer

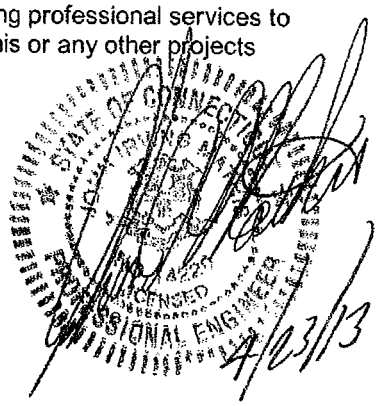


TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 212.625 ft Self Support tower designed by Rohn in 1992. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E. The tower was reworked in 2007 to accommodate additional loading.

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 and 50 mph under service loads. Also, per Crown Castle's direction and in accordance with ASCE-7-05 we have considered a fastest mile wind speed of 38 mph with an escalating 0.75 inch ice thickness.

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
208.0	209.0	2	antel	BXA-70063/6CF-EDIN 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
208.0	209.0	2	antel	BXA-70063/4CF w/ Mount Pipe	18	1 5/8	3
		1	antel	BXA-70063/6CF-EDIN w/Mount Pipe			1
		6	antel	LPA-171080/8CFx2 w/ Mount Pipe			
		6	antel	LPA-80080/6CF w/ mount pipe			
	208.0	1		Sector Mount [SM 510-3]			
199.0	199.0	1		Sector Mount [SM 505-3]			1
	198.0	3	alcatel lucent	1900MHz RRH (65MHz) TMA	3	1 1/4	2
		3	alcatel lucent	800MHz 2x50W RRH w/ Filter			
		3	celwave	APXVSPP18-C-A20 w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
189.0	190.0	6	adc	Cleargain Dual Band 800/1900 TMA	12 2 1	1 5/8 7/8 1/4	1
		6	ericsson	RRUS-11 BTS			
		3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ mount pipe			
		6	powerwave technologies	LGP13519 Diplexer			
		1	raycap	DC6-48-60-18-8F			
	189.0	1		14' Angle Sector Frame (3)			
183.0	183.0	3	celwave	APXV18-206517LS w/Mount Pipe	6	1 5/8	1
175.0	179.0	2	radiowaves	HPD2-23	12 5	1 1/4 3/8	1
	176.0	12	decibel	DB844H90E-XY w/Mount Pipe			
	175.0	1		Sector Mount [SM 510-3]			
167.0	173.0	1	celwave	1151-3	1	7/8	1
	167.0	1		Side Arm Mount [SO 308-1]			
164.0	173.0	1	celwave	1151-3	1 1	7/8 1/4	1
	164.0	1		Side Arm Mount [SO 308-1]			
	162.0	1	sinclair	SD310-HL			
147.0	153.0	1	celwave	1151-3	1	7/8	1
	147.0	1		Side Arm Mount [SO 308-1]			
145.0	148.0	1		SD310-HL	1	7/8	1
	145.0	1		Side Arm Mount [SO 308-1]			
139.0	140.0	3	celwave	APX16DWV-16DWV-S-E-A20	6 6	1 5/8 1 1/4	1
		3	celwave	ATMAA1412D-1A20 TMA			
		3	celwave	ATMPP1412D-1CWA TMA			
		3	ems wireless	RR90-17-02DP w/Mount Pipe			
	139.0	1		Side Arm Mount [SO 201-3]			
128.0	132.0	1	celwave	1142-2C	1	7/8	1
	128.0	1		Side Arm Mount [SO 308-1]			
51.0	51.0	1		GPS	1	1/2	1
		1		Side Arm Mount [SO 702-1]			

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)
212	212	4	celwave	PD10017		
		6	rohn	6' Sidearm		
		12	sinclair	SRL410C		
200	200	2		6' Grid Dish		
190	190	3	rohn	Mounting Frame		
		9	swedcom	ALP9212N		
100	100	1	decibel	DB222		
		1	rohn	Mount		
90	90	1	decibel	DB225		
		1	rohn	Mount		
80	80	2	decibel	DB225-2		
		2	rohn	Mount		
60	60	1	decibel	DB212-2		
		1	decibel	DB225		
		1	decibel	DB225-2		
		3	rohn	Mount		
50	50	1	decibel	DB212-2		
		1	rohn	Mount		
40	40	1	decibel	DB212		
		1	rohn	Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Change-Out Revision #1	186869	CCIsites
Tower Drawing	Rohn Drawing No. C921279	262274	CCIsites
Foundation Drawing	Rohn Drawing No. A921278-1	262273	CCIsites
Geotechnical Report	Dr. Clarence Welti Report Dated July 6, 1992	262276	CCIsites
Rework Drawings	Vertical Structures Job No. 2007-004-075	2169576	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. Vertical Structures, Inc. 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 (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T1	212.625 - 202.458	Leg	ROHN 2.5 STD	2	-5564.11	51333.83	12.7	Pass
		Diagonal	ROHN 2 STD	8	-2936.54	24117.17	12.2	Pass
		Horizontal	ROHN 1.5 STD	7	-2172.98	20300.52	10.7 12.9 (b)	Pass
		Top Girt	ROHN 1.5 STD	4	-228.36	20340.78	1.1	Pass
		Inner Bracing	L2x2x1/8	17	-4.35	5828.76	0.3	Pass
T2	202.458 - 182.292	Leg	ROHN 3 EH	28	-37114.70	84964.22	43.7	Pass
		Diagonal	ROHN 2 STD	39	-9539.35	17252.62	55.3	Pass
		Horizontal	ROHN 1.5 STD	37	-5303.13	20251.47	26.2 31.1 (b)	Pass
		Inner Bracing	L2x2x1/8	40	-7.52	5726.17	0.3	Pass
T3	182.292 - 162.104	Leg	ROHN 4 EH	67	-77173.20	140142.28	55.1	Pass
		Diagonal	ROHN 2 STD	72	-10460.40	14724.98	71.0	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
		Horizontal	ROHN 1.5 STD	70	-6710.40	17358.06	38.7 39.1 (b)	Pass
		Inner Bracing	L2x2x1/8	79	-7.19	4212.61	0.3	Pass
T4	162.104 - 141.896	Leg	ROHN 5 EH	106	-114552.00	207361.47	55.2	Pass
		Diagonal	ROHN 2 STD	111	-10512.60	12580.63	83.6	Pass
		Horizontal	ROHN 2 STD	109	-7418.12	24641.04	30.1 43.2 (b)	Pass
		Inner Bracing	L2x2x1/8	119	-7.86	2887.25	0.4	Pass
T5	141.896 - 121.688	Leg	ROHN 6 EHS	145	-149489.00	213793.20	69.9	Pass
		Diagonal	ROHN 2.5 STD	150	-12824.10	15376.69	83.4	Pass
		Horizontal	ROHN 2 STD	148	-7817.58	20379.30	38.4 45.5 (b)	Pass
		Inner Bracing	L2x2x1/8	157	-7.91	2178.27	0.4	Pass
T6	121.688 - 101.479	Leg	ROHN 6 EH	172	-179798.00	266297.40	67.5	Pass
		Diagonal	ROHN 2.5 STD	177	-11778.10	13473.43	87.4	Pass
		Horizontal	ROHN 2 STD	175	-7860.94	14810.83	53.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	186	-7.53	4589.77	0.3	Pass
T7	101.479 - 81.2708	Leg	ROHN 6 EH	199	-208369.00	266297.40	78.2	Pass
		Diagonal	ROHN 3 STD	204	-11769.50	23342.43	50.4	Pass
		Horizontal	ROHN 2.5 STD	202	-8370.37	25350.59	33.0 48.7 (b)	Pass
		Inner Bracing	L3x3x3/16	213	-7.46	4535.72	0.5	Pass
T8	81.2708 - 61	Leg	ROHN 8 EHS	226	-235237.00	334029.79	70.4	Pass
		Diagonal	ROHN 3 STD	231	-11851.00	20458.62	57.9	Pass
		Horizontal	ROHN 2.5 STD	229	-8821.49	19807.45	44.5 51.4 (b)	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	238	-9.06	7384.85	0.3	Pass
T9	61 - 40.6667	Leg	ROHN 8 EHS	253	-262503.00	334051.12	78.6	Pass
		Diagonal	ROHN 3 STD	258	-12823.50	17935.11	71.5	Pass
		Horizontal	ROHN 2.5 STD	256	-9899.75	15667.41	63.2	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	267	-9.27	5884.99	0.4	Pass
T10	40.6667 - 20.3333	Leg	ROHN 8 EH	280	-287482.00	437213.32	65.8 67.4 (b)	Pass
		Diagonal	ROHN 3 STD	287	-17711.60	30741.38	57.6	Pass
		Horizontal	ROHN 3 STD	283	-9970.33	27715.33	36.0 40.3 (b)	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	304	-4989.94	11745.65	42.5	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	305	-4474.65	8179.69	54.7	Pass
		Redund Hip 1 Bracing	ROHN 1.5 STD	308	-51.73	10699.36	0.5	Pass
		Redund Hip Diagonal Bracing	ROHN 2.5 STD	307	-48.19	7078.91	0.7	Pass
		Inner Bracing	ROHN 3 STD	310	-11.28	19625.00	1.6	Pass
T11	20.3333 - 0	Leg	ROHN 8 EH	313	-314703.00	437299.96	72.0	Pass
		Diagonal	ROHN 3 STD	320	-19880.20	29095.39	68.3	Pass
		Horizontal	ROHN 3 STD	316	-11825.00	22586.22	52.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
		Redund Horz 1 Bracing	ROHN 1.5 STD	318	-5458.84	9790.38	55.8	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	319	-4588.72	7507.55	61.1	Pass
		Redund Hip 1 Bracing	ROHN 1.5 STD	341	-52.14	8807.40	0.6	Pass
		Redund Hip Diagonal Bracing	ROHN 2.5 STD	340	-47.55	6355.22	0.7	Pass
		Inner Bracing	ROHN 3 STD	343	-10.11	16082.00	1.4	Pass
							Summary	
						Leg (T9)	78.6	Pass
						Diagonal (T6)	87.4	Pass
						Horizontal (T9)	63.2	Pass
						Top Girt (T1)	1.1	Pass
						Redund Horz 1 Bracing (T11)	55.8	Pass
						Redund Diag 1 Bracing (T11)	61.1	Pass
						Redund Hip 1 Bracing (T11)	0.6	Pass
						Redund Hip Diagonal Bracing (T11)	0.7	Pass
						Inner Bracing (T10)	1.6	Pass
						Bolt Checks	67.4	Pass
						Rating =	87.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	62.1	Pass
1	Base Foundation Soil Interaction	0	56.0	Pass

Structure Rating (max from all components) =	87.4%

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

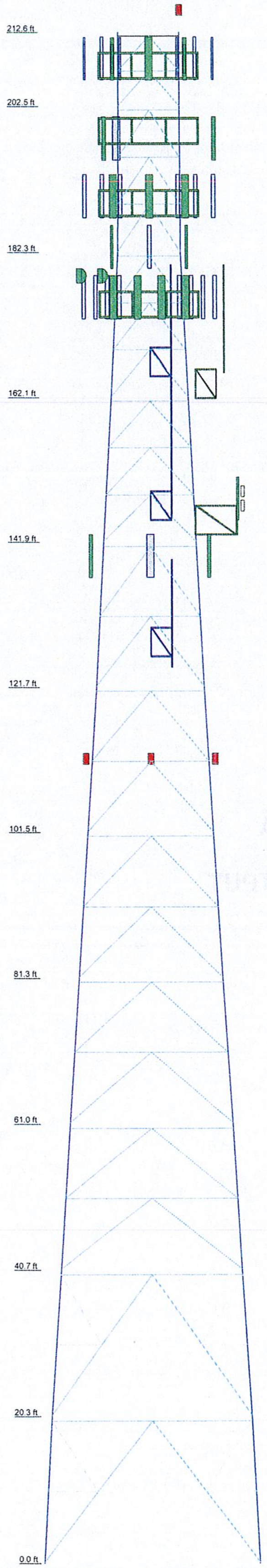
4.1) Recommendations

N/A

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Horizontals	Red. Horizontals	Red. Diagonals	Red. Hips	Inner Bracing	Face Width (ft)	# Panels @ (ft)	Weight (lb)
T1	ROHN 2.5 STD				ROHN 1.5 STD						8.5	2 @ 4.79167	875.7
T2	ROHN 3 EH					ROHN 1.5 STD					8.54167		1460.9
T3	ROHN 4 EH		ROHN 2 STD							L2x2x1/8	8.625	9 @ 8.52778	1801.1
T4	ROHN 5 EH										10.7083		2359.2
T5	ROHN 6 EHS					ROHN 2 STD	N.A.	N.A.	N.A.		12.7917		2610.1
T6	ROHN 6 EH	A572-50	ROHN 2.5 STD	A572-50						L2 1/2x2 1/2x3/16	15.0417		3143.1
T7					N.A.					L3x3x3/16	17.5417	10 @ 9.79167	3529.0
T8						ROHN 2.5 STD					20.0417		4431.7
T9	ROHN 8 EHS		ROHN 3 STD							L3 1/2x3 1/2x1/4	22.6771		4801.5
T10	ROHN 8 EH					ROHN 3 STD	ROHN 1.5 STD	ROHN 2 STD	ROHN 1.5 STD	ROHN 3 STD	25.1771	2 @ 19.5833	5302.8
T11											27.8333		5459.7
											30.0417		35733.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
Flash Beacon Lighting	212
Sector Mount [SM 510-3] (Verizon Wireless)	208
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	208
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	208
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	208
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	208
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	208
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	208
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	208
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	208
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	208
Sector Mount [SM 505-3]	199
APXVSPP18-C-A20 w/ Mount Pipe	199
APXVSPP18-C-A20 w/ Mount Pipe	199
APXVSPP18-C-A20 w/ Mount Pipe	199
1900MHz RRH (65MHz) TMA	199
1900MHz RRH (65MHz) TMA	199
1900MHz RRH (65MHz) TMA	199
800MHz 2x50W RRH w/ Filter	199
800MHz 2x50W RRH w/ Filter	199
800MHz 2x50W RRH w/ Filter	199
(4) 6' Empty Mount Pipe	199
(4) 6' Empty Mount Pipe	199
(4) 6' Empty Mount Pipe	199
14' Angle Sector Frame (3)	189
(2) 7770.00 w/ mount pipe	189
(2) 7770.00 w/ mount pipe	189
(2) 7770.00 w/ mount pipe	189
(2) LGP13519 Diplexer	189
(2) LGP13519 Diplexer	189
(2) LGP13519 Diplexer	189
(2) Cleargain Dual Band 800/1900 TMA (VSI)	189
(2) Cleargain Dual Band 800/1900 TMA (VSI)	189
(2) Cleargain Dual Band 800/1900 TMA (VSI)	189
AM-X-CD-14-65-00T-RET w/ Mount Pipe	189
AM-X-CD-14-65-00T-RET w/ Mount Pipe	189

TYPE	ELEVATION
AM-X-CD-14-65-00T-RET w/ Mount Pipe	189
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	189
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	189
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	189
DC6-48-60-18-8F	189
APXV18-206517LS w/Mount Pipe	183
APXV18-206517LS w/Mount Pipe	183
APXV18-206517LS w/Mount Pipe	183
Sector Mount [SM 510-3]	175
(4) DB844H90E-XY w/Mount Pipe	175
(4) DB844H90E-XY w/Mount Pipe	175
(4) DB844H90E-XY w/Mount Pipe	175
8'x2" Antenna Mount Pipe	175
8'x2" Antenna Mount Pipe	175
HPD2-23	175
HPD2-23	175
Side Arm Mount [SO 308-1]	167
1151-3	167
1151-3	164
Side Arm Mount [SO 308-1]	164
SD310-HL	164
Side Arm Mount [SO 308-1]	147
1151-3	147
Side Arm Mount [SO 308-1]	145
SD310-HL	145
Side Arm Mount [SO 201-3]	139
RR90-17-02DP w/Mount Pipe	139
RR90-17-02DP w/Mount Pipe	139
RR90-17-02DP w/Mount Pipe	139
APX16DWV-16DWV-S-E-A20	139
APX16DWV-16DWV-S-E-A20	139
APX16DWV-16DWV-S-E-A20	139
ATMPP1412D-1CWA TMA	139
ATMPP1412D-1CWA TMA	139
ATMPP1412D-1CWA TMA	139
ATMAA1412D-1A20 TMA	139
ATMAA1412D-1A20 TMA	139
ATMAA1412D-1A20 TMA	139
Side Arm Mount [SO 308-1]	128
1142-2C	128
Intermediate Side Lights (VSI)	111
Intermediate Side Lights (VSI)	111
Intermediate Side Lights (VSI)	111
Side Arm Mount [SO 702-1]	51
Generic GPS (VSI)	51

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

△

1. Tower is located in Middlesex 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: 87.4%

MAX. CORNER REACTIONS AT BASE:
DOWN: 313052 lb
SHEAR: 36065 lb

UPLIFT: -268255 lb
SHEAR: 32713 lb

AXIAL 122908 lb
SHEAR 18645 lb
MOMENT 2405762 lb-ft
TORQUE 7056 lb-ft
38 mph WIND - 0.7500 in ICE

AXIAL 59970 lb
SHEAR 60760 lb
MOMENT 7624558 lb-ft
TORQUE 44326 lb-ft
REACTIONS - 85 mph WIND

Vertical Structures, Inc. 309 Spangler Drive, Suite E, Richmond, KY 40475, Phone: (859) 624-8360, FAX: (859) 624-8369	Job: HRT 105, CT BU#806363		
	Project: Vertical Structures Job No. 2013-004-035		
	Client: Crown Castle	Drawn by: Casey Hymore	App'd:
	Code: TIA/EIA-222-F	Date: 04/23/13	Scale: NTS
	Path:		Dwg No. E-1

tnxTower

Vertical Structures, Inc.
309 Spangler Drive, Suite E
Richmond, KY 40475
Phone: (859) 624-8360
FAX: (859) 624-8369

Job	Page
HRT 105, CT BU#806363	1 of 29
Project	**Date**
Vertical Structures Job No. 2013-004-035	16:45:29 04/23/13
Client	**Designed by**
Crown Castle	Casey Hymore

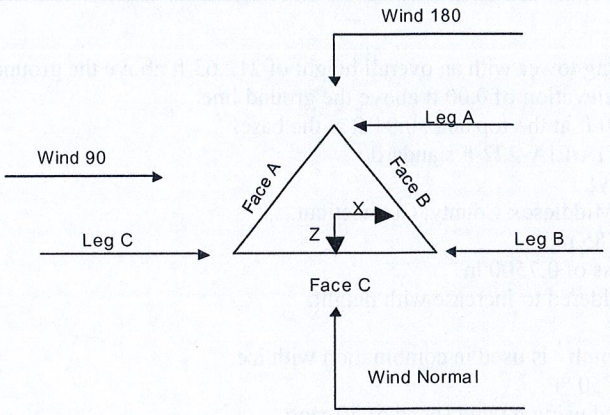
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 212.63 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.50 ft at the top and 30.04 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
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
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	212.63-202.46			8.50	1	10.17
T2	202.46-182.29			8.54	1	20.17
T3	182.29-162.10			8.63	1	20.19
T4	162.10-141.90			10.71	1	20.21
T5	141.90-121.69			12.79	1	20.21
T6	121.69-101.48			15.04	1	20.21
T7	101.48-81.27			17.54	1	20.21
T8	81.27-61.00			20.04	1	20.27
T9	61.00-40.67			22.68	1	20.33
T10	40.67-20.33			25.18	1	20.33
T11	20.33-0.00			27.83	1	20.33

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	212.63-202.46	4.79	K Brace Down	No	Yes	6.0000	1.0000
T2	202.46-182.29	6.53	K Brace Down	No	Yes	6.0000	1.0000
T3	182.29-162.10	6.53	K Brace Down	No	Yes	6.0000	1.2500
T4	162.10-141.90	6.53	K Brace Down	No	Yes	6.2500	1.2500

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T5	141.90-121.69	9.79	K Brace Down	No	Yes	6.2500	1.2500
T6	121.69-101.48	9.79	K Brace Down	No	Yes	6.2500	1.2500
T7	101.48-81.27	9.79	K Brace Down	No	Yes	6.2500	1.2500
T8	81.27-61.00	9.79	K Brace Down	No	Yes	6.2500	2.0000
T9	61.00-40.67	9.79	K Brace Down	No	Yes	7.0000	2.0000
T10	40.67-20.33	19.58	K1 Down	No	Yes	7.0000	2.0000
T11	20.33-0.00	19.58	K1 Down	No	Yes	7.0000	2.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 212.63-202.46	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T2 202.46-182.29	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T3 182.29-162.10	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T4 162.10-141.90	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 141.90-121.69	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T6 121.69-101.48	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T7 101.48-81.27	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T8 81.27-61.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T9 61.00-40.67	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T10 40.67-20.33	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T11 20.33-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 212.63-202.46	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T2 202.46-182.29	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T3 182.29-162.10	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 1.5 STD	A572-50 (50 ksi)
T4 162.10-141.90	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T5 141.90-121.69	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T6 121.69-101.48	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2 STD	A572-50 (50 ksi)
T7 101.48-81.27	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T8 81.27-61.00	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T9 61.00-40.67	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)
T10 40.67-20.33	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T11 20.33-0.00	None	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T1 212.63-202.46	Single Angle		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T2 202.46-182.29	Single Angle		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T3 182.29-162.10	Single Angle		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T4 162.10-141.90	Single Angle		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T5 141.90-121.69	Single Angle		A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T6 121.69-101.48	Single Angle		A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 101.48-81.27	Single Angle		A572-50 (50 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T8 81.27-61.00	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 61.00-40.67	Single Angle		A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T10 40.67-20.33	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)
T11 20.33-0.00	Single Angle		A572-50 (50 ksi)	Pipe	ROHN 3 STD	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
T10 40.67-20.33	A36 (36 ksi)	Horizontal (1)	Pipe	ROHN 1.5 STD	1
		Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1

Tower Elevation ft	Redundant Bracing Grade		Redundant Type	Redundant Size	K Factor
		Hip Diagonal		ROHN 2.5 STD	1
T11	A36	Horizontal (1)	Pipe	ROHN 1.5 STD	1
20.33-0.00	(36 ksi)	Diagonal (1)	Pipe	ROHN 2 STD	1
		Hip (1)	Pipe	ROHN 1.5 STD	1
		Hip Diagonal		ROHN 2.5 STD	1

Tower Section Geometry *(cont'd)*

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
T1	1.88	0.2500	A36	1	1	1	30.0000	30.0000
212.63-202.46			(36 ksi)					
T2	2.82	0.2500	A36	1	1	1	30.0000	30.0000
202.46-182.29			(36 ksi)					
T3	2.82	0.2500	A36	1	1	1	30.0000	30.0000
182.29-162.10			(36 ksi)					
T4	2.82	0.2500	A36	1	1	1	30.0000	30.0000
162.10-141.90			(36 ksi)					
T5	1.88	0.2500	A36	1	1	1	30.0000	30.0000
141.90-121.69			(36 ksi)					
T6	1.88	0.2500	A36	1	1	1	30.0000	30.0000
121.69-101.48			(36 ksi)					
T7	1.88	0.2500	A36	1	1	1	30.0000	30.0000
101.48-81.27			(36 ksi)					
T8 81.27-61.00	1.88	0.2500	A36	1	1	1	30.0000	30.0000
			(36 ksi)					
T9 61.00-40.67	1.88	0.2500	A36	1	1	1	30.0000	30.0000
			(36 ksi)					
T10	2.50	0.1996	A36	1	1	1	30.0000	30.0000
40.67-20.33			(36 ksi)					
T11 20.33-0.00	2.50	0.1996	A36	1	1	1	30.0000	30.0000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
212.63-202.46				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
202.46-182.29				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
182.29-162.10				1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1
162.10-141.90				1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
141.90-121.69				1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1
121.69-101.48				1	1	1	1	1	1	1
T7	No	No	1	1	1	1	1	1	1	1
101.48-81.27				1	1	1	1	1	1	1
T8	No	No	1	1	1	1	1	1	1	1
81.27-61.00				1	1	1	1	1	1	1
T9	No	No	1	1	1	1	1	1	1	1
61.00-40.67				1	1	1	1	1	1	1
T10	No	No	1	1	1	1	1	1	1	1
40.67-20.33				1	1	1	1	1	1	1
T11	No	No	1	1	1	1	1	1	1	1
20.33-0.00				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
212.63-202.46														
T2	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
202.46-182.29														
T3	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
182.29-162.10														
T4	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
162.10-141.90														
T5	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
141.90-121.69														
T6	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
121.69-101.48														
T7	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
101.48-81.27														
T8 81.27-61.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T9 61.00-40.67	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
T10	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75
40.67-20.33														
T11 20.33-0.00	0.0000	1	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	1	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 212.63-202.46	0.0000	0.0000	0.0000	0.0000	0.9500	0.9500	4.7500	1.4375
T2 202.46-182.29	0.0000	0.0000	0.0000	0.0000	0.9500	0.9500	4.7500	1.7500
T3 182.29-162.10	0.0000	0.0000	0.0000	0.0000	0.9500	0.9500	4.7500	2.2500
T4 162.10-141.90	0.0000	0.0000	0.0000	0.0000	1.1875	1.1875	4.7500	2.7815
T5 141.90-121.69	0.0000	0.0000	0.0000	0.0000	1.1875	1.1875	4.7500	3.3125
T6 121.69-101.48	0.0000	0.0000	0.0000	0.0000	1.1875	1.1875	4.7500	3.3125
T7 101.48-81.27	0.0000	0.0000	0.0000	0.0000	1.4375	1.4375	4.7500	3.3125
T8 81.27-61.00	0.0000	0.0000	0.0000	0.0000	1.4375	1.4375	4.7500	4.3125
T9 61.00-40.67	0.0000	0.0000	0.0000	0.0000	1.4375	1.4375	4.7500	4.3125
T10 40.67-20.33	0.0000	0.0000	0.0000	0.0000	1.7500	1.7500	4.7500	4.3125
T11 20.33-0.00	0.0000	0.0000	0.0000	0.0000	1.7500	1.7500	4.7500	4.3125

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 212.63-202.46	Flange	0.7500 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T2 202.46-182.29	Flange	0.8750 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T3 182.29-162.10	Flange	1.0000 A325N	4	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T4 162.10-141.90	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T5 141.90-121.69	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T6 121.69-101.48	Flange	1.0000 A325N	6	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T7 101.48-81.27	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T8 81.27-61.00	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T9 61.00-40.67	Flange	1.0000 A325N	8	0.6250 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	2	0.6250 A325X	0
T10 40.67-20.33	Flange	1.0000 A325N	8	0.7500 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	2	0.6250 A325X	0
T11 20.33-0.00	Flange	1.0000 A354-BC	0	0.7500 A325N	3	0.6250 A325N	0	0.6250 A325X	0	0.6250 A325X	0	0.7500 A325N	2	0.6250 A325X	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (Verizon Wireless)	C	Yes	Ar (CfAe)	209.00 - 8.00	1.0000	0.42	9	6	0.2700 1.0000	1.9800		0.82
LDF7-50A (1-5/8 FOAM) (Verizon Wireless)	C	Yes	Ar (CfAe)	209.00 - 8.00	1.0000	0.38	9	6	0.2700 1.0000	1.9800		0.82
Feedline Ladder (1-1/2" Rails) (Af) (Verizon Wireless) ***	C	Yes	Af (CfAe)	203.00 - 8.00	0.5000	0.4	1	1	1.5000	1.5000	12.0000	3.66
9114 (11/32)	A	Yes	Ar (CfAe)	179.00 - 8.00	1.0000	-0.45	5	3	0.0000	0.3800		0.03
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	128.00 - 8.00	1.0000	-0.35	5	5	1.1600	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	145.00 - 128.00	1.0000	-0.35	4	4	1.1600	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	147.00 - 145.00	1.0000	-0.35	3	3	1.1600	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	164.00 - 147.00	1.0000	-0.35	2	2	1.1600	1.0900		0.33
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	167.00 - 164.00	1.0000	-0.35	1	1	1.1600	1.0900		0.33
CR 50 1873 (1-5/8 FOAM)	A	Yes	Ar (CfAe)	190.00 - 8.00	1.0000	-0.42	12	6	0.2700 1.0000	1.9800		0.83
LDF5-50A (7/8 FOAM)	A	Yes	Ar (CfAe)	190.00 - 8.00	1.0000	-0.25	2	2	1.0000	1.0900		0.33
LDF1-50A (1/4 FOAM)	A	Yes	Ar (CfAe)	190.00 - 8.00	1.0000	-0.25	1	1	0.3500	0.3500		0.06
Feedline Ladder (1-1/2" Rails) (Af)	A	Yes	Af (CfAe)	190.00 - 8.00	0.5000	-0.4	1	1	3.0000	3.0000	12.0000	3.66
Feedline Ladder (1-1/2" Rails) (Af)	A	Yes	Af (CfAe)	198.00 - 8.00	0.5000	0.4	1	1	3.0000	3.0000	12.0000	3.66
HB114-1-08U 4-M5J (1-1/4")	A	Yes	Ar (CfAe)	198.00 - 8.00	1.0000	0.4	3	3	1.0000	1.5400		0.66
LDF4-50A (1/2 FOAM) ***	A	Yes	Ar (CfAe)	51.00 - 8.00	1.0000	0.45	1	1	0.6300	0.6300		0.15
LDF7-50A (1-5/8 FOAM)	B	Yes	Ar (CfAe)	140.00 - 8.00	1.0000	-0.4	12	6	1.0000	1.9800		0.82
Feedline Ladder (1-1/2" Rails) (Af)	B	Yes	Af (CfAe)	140.00 - 8.00	0.5000	-0.4	1	1	3.0000	3.0000	12.0000	3.66
LDF6-50A (1-1/4 FOAM)	B	Yes	Ar (CfAe)	176.00 - 8.00	1.0000	0.4	12	12	0.7000	1.5500		0.66
Feedline Ladder (1-1/2" Rails) (Af) **	B	Yes	Af (CfAe)	176.00 - 8.00	0.5000	0.4	1	1	3.0000	3.0000	12.0000	3.66
Feedline Ladder (1-1/2" Rails) (Af)	C	Yes	Af (CfAe)	183.00 - 8.00	0.5000	-0.35	1	1	3.0000	3.0000	12.0000	3.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
AVA7-50 (1-5/8 LOW DENSI. FOAM)	C	Yes	Ar (CfAe)	183.00 - 8.00	1.0000	-0.35	6	6	1.0000	1.9800		0.72

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 lb
T1	212.63-202.46	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	12.953	0.068	0.000	0.000	98.54
T2	202.46-182.29	A	15.304	5.854	0.000	0.000	199.13
		B	0.000	0.000	0.000	0.000	0.00
		C	40.631	2.698	0.000	0.000	377.12
T3	182.29-162.10	A	34.236	10.094	0.000	0.000	408.12
		B	21.539	3.474	0.000	0.000	160.91
		C	59.957	7.570	0.000	0.000	532.95
T4	162.10-141.90	A	38.384	10.104	0.000	0.000	422.84
		B	31.323	5.052	0.000	0.000	234.01
		C	60.019	7.578	0.000	0.000	533.50
T5	141.90-121.69	A	41.883	10.104	0.000	0.000	435.55
		B	49.452	9.630	0.000	0.000	481.23
		C	60.019	7.578	0.000	0.000	533.50
T6	121.69-101.48	A	43.145	10.104	0.000	0.000	440.14
		B	51.329	10.104	0.000	0.000	506.82
		C	60.019	7.578	0.000	0.000	533.50
T7	101.48-81.27	A	43.145	10.104	0.000	0.000	440.14
		B	51.329	10.104	0.000	0.000	506.82
		C	60.019	7.578	0.000	0.000	533.50
T8	81.27-61.00	A	43.278	10.135	0.000	0.000	441.50
		B	51.488	10.135	0.000	0.000	508.39
		C	60.204	7.602	0.000	0.000	535.15
T9	61.00-40.67	A	43.954	10.167	0.000	0.000	444.41
		B	51.647	10.167	0.000	0.000	509.96
		C	60.390	7.625	0.000	0.000	536.80
T10	40.67-20.33	A	44.479	10.167	0.000	0.000	445.91
		B	51.647	10.167	0.000	0.000	509.96
		C	60.390	7.625	0.000	0.000	536.80
T11	20.33-0.00	A	26.979	6.167	0.000	0.000	270.47
		B	31.327	6.167	0.000	0.000	309.32
		C	36.630	4.625	0.000	0.000	325.60

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 lb
T1	212.63-202.46	A	0.935	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		4.198	12.390	0.000	0.000	384.94
T2	202.46-182.29	A	0.927	10.211	23.484	0.000	0.000	688.66
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C		13.111	43.539	0.000	0.000	1375.81
T3	182.29-162.10	A	0.914	24.952	46.609	0.000	0.000	1445.73
		B		3.913	33.546	0.000	0.000	615.34
		C		19.223	74.590	0.000	0.000	2006.39
T4	162.10-141.90	A	0.901	29.033	51.778	0.000	0.000	1545.94
		B		5.644	48.755	0.000	0.000	886.44
		C		19.106	74.606	0.000	0.000	1991.52
T5	141.90-121.69	A	0.886	28.724	58.931	0.000	0.000	1623.98
		B		11.317	77.838	0.000	0.000	1830.44
		C		18.951	74.538	0.000	0.000	1972.52
T6	121.69-101.48	A	0.868	28.370	61.458	0.000	0.000	1637.21
		B		11.792	80.774	0.000	0.000	1909.24
		C		18.774	74.459	0.000	0.000	1950.83
T7	101.48-81.27	A	0.847	27.955	61.366	0.000	0.000	1612.59
		B		11.653	80.682	0.000	0.000	1885.95
		C		18.566	74.367	0.000	0.000	1925.47
T8	81.27-61.00	A	0.822	27.533	61.443	0.000	0.000	1587.69
		B		11.520	80.818	0.000	0.000	1863.41
		C		18.370	74.484	0.000	0.000	1900.53
T9	61.00-40.67	A	0.790	28.860	61.485	0.000	0.000	1569.84
		B		11.335	80.921	0.000	0.000	1832.48
		C		18.096	74.566	0.000	0.000	1866.49
T10	40.67-20.33	A	0.750	29.754	61.305	0.000	0.000	1536.28
		B		11.065	80.740	0.000	0.000	1787.77
		C		17.690	74.386	0.000	0.000	1817.88
T11	20.33-0.00	A	0.750	18.048	37.185	0.000	0.000	931.84
		B		6.711	48.974	0.000	0.000	1084.38
		C		10.730	45.119	0.000	0.000	1102.65

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	212.63-202.46	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.168	2.766	0.000	0.000
T2	202.46-182.29	A	1.631	4.950	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	3.340	8.187	0.000	0.000
T3	182.29-162.10	A	3.188	9.703	0.000	0.000
		B	1.799	5.031	0.000	0.000
		C	4.856	12.637	0.000	0.000
T4	162.10-141.90	A	3.522	10.581	0.000	0.000
		B	2.642	7.078	0.000	0.000
		C	4.910	12.229	0.000	0.000
T5	141.90-121.69	A	3.092	8.845	0.000	0.000
		B	3.514	8.983	0.000	0.000
		C	4.021	9.420	0.000	0.000
T6	121.69-101.48	A	2.975	8.452	0.000	0.000
		B	3.432	8.704	0.000	0.000
		C	3.776	8.766	0.000	0.000
T7	101.48-81.27	A	3.446	8.990	0.000	0.000
		B	3.976	9.287	0.000	0.000
		C	4.374	9.346	0.000	0.000
T8	81.27-61.00	A	3.320	8.518	0.000	0.000
		B	3.830	8.834	0.000	0.000

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
		C	4.215	8.882	0.000	0.000
T9	61.00-40.67	A	3.262	8.272	0.000	0.000
		B	3.725	8.443	0.000	0.000
		C	4.099	8.480	0.000	0.000
T10	40.67-20.33	A	3.621	9.406	0.000	0.000
		B	4.096	9.482	0.000	0.000
		C	4.507	9.510	0.000	0.000
T11	20.33-0.00	A	2.101	5.455	0.000	0.000
		B	2.377	5.499	0.000	0.000
		C	2.615	5.515	0.000	0.000

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	212.63-202.46	-8.6747	6.9971	-4.4795	3.6128
T2	202.46-182.29	-14.9350	7.2546	-9.0584	3.9750
T3	182.29-162.10	-5.7052	12.3280	-1.7545	8.4458
T4	162.10-141.90	-4.4233	14.2829	-0.2988	10.0574
T5	141.90-121.69	-4.6772	9.2666	-0.8754	6.3116
T6	121.69-101.48	-5.5766	9.9750	-1.4141	6.8013
T7	101.48-81.27	-6.0500	10.7815	-1.5309	7.4592
T8	81.27-61.00	-6.3597	11.3003	-1.6712	8.0187
T9	61.00-40.67	-7.0001	12.1600	-1.8918	8.2922
T10	40.67-20.33	-7.4872	12.7381	-1.9662	8.2910
T11	20.33-0.00	-5.9049	10.0341	-1.5859	6.5926

Discrete Tower Loads

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 lb
Flash Beacon Lighting	B	From Leg	0.00	3.00	0.0000	212.00	No Ice	2.70	2.70	50.00
			0.00				1/2" Ice	3.10	3.10	70.00
							1" Ice	3.50	3.50	90.00
							2" Ice	4.30	4.30	130.00
							4" Ice	5.90	5.90	210.00
Intermediate Side Lights (VSI)	A	From Leg	1.00	0.00	0.0000	111.00	No Ice	0.79	0.79	29.13
			0.00				1/2" Ice	1.04	1.04	39.42
							1" Ice	1.32	1.32	53.41
							2" Ice	1.98	1.98	89.69
							4" Ice	3.59	3.59	212.79
Intermediate Side Lights (VSI)	B	From Leg	1.00	0.00	0.0000	111.00	No Ice	0.79	0.79	29.13
			0.00				1/2" Ice	1.04	1.04	39.42
							1" Ice	1.32	1.32	53.41
							2" Ice	1.98	1.98	89.69
							4" Ice	3.59	3.59	212.79

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 lb
Intermediate Side Lights (VSI)	C	From Leg	1.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.79 1.04 1.32 1.98 3.59	0.79 1.04 1.32 1.98 3.59	29.13 39.42 53.41 89.69 212.79
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Sector Mount [SM 510-3] (Verizon Wireless)	A	None		0.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	40.10 57.33 74.56 109.02 177.94	40.10 57.33 74.56 109.02 177.94	2396.40 3089.00 3781.60 5166.80 7937.20
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	A	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.35 4.79 5.25 6.17 8.11	10.51 11.56 12.49 14.40 18.43	42.90 104.60 177.42 348.65 824.28
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	B	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.35 4.79 5.25 6.17 8.11	10.51 11.56 12.49 14.40 18.43	42.90 104.60 177.42 348.65 824.28
(2) LPA-80080/6CF w/ mount pipe (Verizon Wireless)	C	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.35 4.79 5.25 6.17 8.11	10.51 11.56 12.49 14.40 18.43	42.90 104.60 177.42 348.65 824.28
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	B	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.98 9.70 11.08 13.96	5.66 6.92 8.03 9.93 13.93	46.20 104.67 175.63 344.24 826.15
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	A	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.50 2.86 3.24 4.01 5.87	4.42 5.09 5.76 7.17 10.25	26.75 58.67 98.96 198.35 499.64
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	B	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.50 2.86 3.24 4.01 5.87	4.42 5.09 5.76 7.17 10.25	26.75 58.67 98.96 198.35 499.64
(2) LPA-171080/8CFx2 w/ Mount Pipe (Verizon Wireless)	C	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.50 2.86 3.24 4.01 5.87	4.42 5.09 5.76 7.17 10.25	26.75 58.67 98.96 198.35 499.64
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	A	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.98 9.70 11.08 13.96	5.66 6.92 8.03 9.93 13.93	46.20 104.67 175.63 344.24 826.15
BXA-70063/6CF-EDIN w/ Mount Pipe (Verizon Wireless)	C	From Face	5.00 0.00 1.00	-6.0000	208.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.23 8.98 9.70 11.08 13.96	5.66 6.92 8.03 9.93 13.93	46.20 104.67 175.63 344.24 826.15
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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 lb
Sector Mount [SM 505-3]	A	None		0.0000	199.00	No Ice	34.86	34.86	1725.30
						1/2" Ice	49.79	49.79	2316.90
						1" Ice	64.72	64.72	2908.50
						2" Ice	94.58	94.58	4091.70
						4" Ice	154.30	154.30	6458.10
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 -3.00 -1.00	-36.0000	199.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88
						4" Ice	13.68	14.85	908.85
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	3.50 -3.50 -1.00	-46.0000	199.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88
						4" Ice	13.68	14.85	908.85
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	2.00 -4.50 -1.00	-66.0000	199.00	No Ice	8.50	6.95	82.55
						1/2" Ice	9.15	8.13	147.74
						1" Ice	9.77	9.02	224.90
						2" Ice	11.03	10.84	405.88
						4" Ice	13.68	14.85	908.85
1900MHz RRH (65MHz) TMA	C	From Leg	4.00 -3.00 -1.00	-36.0000	199.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA	B	From Leg	3.50 -3.50 -1.00	-46.0000	199.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
1900MHz RRH (65MHz) TMA	A	From Leg	2.00 -4.50 -1.00	-66.0000	199.00	No Ice	2.77	2.70	60.00
						1/2" Ice	3.01	2.94	83.90
						1" Ice	3.26	3.18	111.08
						2" Ice	3.78	3.70	176.02
						4" Ice	4.93	4.85	353.75
800MHz 2x50W RRH w/ Filter	C	From Leg	4.00 -3.00 -1.00	-36.0000	199.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
800MHz 2x50W RRH w/ Filter	B	From Leg	3.50 -3.50 -1.00	-46.0000	199.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
800MHz 2x50W RRH w/ Filter	A	From Leg	2.00 -4.50 -1.00	-66.0000	199.00	No Ice	2.40	2.25	64.00
						1/2" Ice	2.61	2.46	86.12
						1" Ice	2.83	2.68	111.30
						2" Ice	3.30	3.13	171.62
						4" Ice	4.34	4.15	337.52
(4) 6' Empty Mount Pipe	C	From Leg	4.00 -3.00 -1.00	0.0000	199.00	No Ice	1.43	1.43	22.90
						1/2" Ice	1.95	1.95	36.54
						1" Ice	2.34	2.34	55.61
						2" Ice	3.20	3.20	102.08
						4" Ice	5.15	5.15	258.02
(4) 6' Empty Mount Pipe	B	From Leg	3.50 -3.50	0.0000	199.00	No Ice	1.43	1.43	22.90
						1/2" Ice	1.95	1.95	36.54

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 lb
			-1.00			1" Ice	2.34	2.34	55.61
						2" Ice	3.20	3.20	102.08
						4" Ice	5.15	5.15	258.02
(4) 6' Empty Mount Pipe	A	From Leg	2.00	0.0000	199.00	No Ice	1.43	1.43	22.90
			-4.50			1/2" Ice	1.95	1.95	36.54
			-1.00			1" Ice	2.34	2.34	55.61
						2" Ice	3.20	3.20	102.08
						4" Ice	5.15	5.15	258.02
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14' Angle Sector Frame (3)	A	None		0.0000	189.00	No Ice	24.75	24.75	750.00
						1/2" Ice	33.19	33.19	1125.00
						1" Ice	41.63	41.63	1500.00
						2" Ice	58.50	58.50	2250.00
						4" Ice	92.25	92.25	3750.00
(2) 7770.00 w/ mount pipe	A	From Face	5.00	-7.0000	189.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99
			1.00			1" Ice	7.30	5.92	159.01
						2" Ice	8.38	7.41	293.01
						4" Ice	10.69	10.76	679.74
(2) 7770.00 w/ mount pipe	B	From Face	5.00	-9.0000	189.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99
			1.00			1" Ice	7.30	5.92	159.01
						2" Ice	8.38	7.41	293.01
						4" Ice	10.69	10.76	679.74
(2) 7770.00 w/ mount pipe	C	From Face	5.00	-8.0000	189.00	No Ice	6.22	4.35	56.90
			0.00			1/2" Ice	6.77	5.20	102.99
			1.00			1" Ice	7.30	5.92	159.01
						2" Ice	8.38	7.41	293.01
						4" Ice	10.69	10.76	679.74
(2) LGP13519 Diplexer	A	From Face	5.00	-7.0000	189.00	No Ice	0.27	0.18	5.50
			0.00			1/2" Ice	0.34	0.25	7.92
			1.00			1" Ice	0.43	0.32	11.41
						2" Ice	0.62	0.49	22.43
						4" Ice	1.10	0.94	66.02
(2) LGP13519 Diplexer	B	From Face	5.00	-9.0000	189.00	No Ice	0.27	0.18	5.50
			0.00			1/2" Ice	0.34	0.25	7.92
			1.00			1" Ice	0.43	0.32	11.41
						2" Ice	0.62	0.49	22.43
						4" Ice	1.10	0.94	66.02
(2) LGP13519 Diplexer	C	From Face	5.00	-8.0000	189.00	No Ice	0.27	0.18	5.50
			0.00			1/2" Ice	0.34	0.25	7.92
			1.00			1" Ice	0.43	0.32	11.41
						2" Ice	0.62	0.49	22.43
						4" Ice	1.10	0.94	66.02
(2) Cleargain Dual Band 800/1900 TMA (VSI)	A	From Face	5.00	-7.0000	189.00	No Ice	1.54	0.80	22.50
			0.00			1/2" Ice	1.71	0.94	33.51
			1.00			1" Ice	1.89	1.08	46.74
						2" Ice	2.27	1.39	80.63
						4" Ice	3.14	2.11	183.58
(2) Cleargain Dual Band 800/1900 TMA (VSI)	B	From Face	5.00	-9.0000	189.00	No Ice	1.54	0.80	22.50
			0.00			1/2" Ice	1.71	0.94	33.51
			1.00			1" Ice	1.89	1.08	46.74
						2" Ice	2.27	1.39	80.63
						4" Ice	3.14	2.11	183.58
(2) Cleargain Dual Band 800/1900 TMA (VSI)	C	From Face	5.00	-8.0000	189.00	No Ice	1.54	0.80	22.50
			0.00			1/2" Ice	1.71	0.94	33.51
			1.00			1" Ice	1.89	1.08	46.74

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 lb
						2" Ice	2.27	1.39	80.63
						4" Ice	3.14	2.11	183.58
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Face	5.00 0.00 1.00	-7.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 77.95 129.96 254.09 610.07
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Face	5.00 0.00 1.00	-9.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 77.95 129.96 254.09 610.07
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Face	5.00 0.00 1.00	-8.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	34.75 77.95 129.96 254.09 610.07
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	A	From Face	5.00 0.00 1.00	-7.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	B	From Face	5.00 0.00 1.00	-9.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
(2) RRUS-11 BTS (19.69 x 16.97 x 7.17)	C	From Face	5.00 0.00 1.00	-8.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	47.62 68.42 92.25 149.81 309.89
DC6-48-60-18-8F	A	From Face	5.00 0.00 1.00	-7.0000	189.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.80 3.04 3.54 4.66	4.32 4.60 4.88 5.49 6.80	18.90 50.21 85.17 166.87 382.77
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APXV18-206517LS w/Mount Pipe	A	From Leg	1.00 0.00 0.00	54.0000	183.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.06 5.51 5.96 6.90 8.99	4.44 5.37 6.17 7.83 11.36	49.40 88.94 139.08 263.36 638.76
APXV18-206517LS w/Mount Pipe	B	From Leg	1.00 0.00 0.00	54.0000	183.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.06 5.51 5.96 6.90 8.99	4.44 5.37 6.17 7.83 11.36	49.40 88.94 139.08 263.36 638.76
APXV18-206517LS w/Mount Pipe	C	From Leg	1.00 0.00 0.00	54.0000	183.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.06 5.51 5.96 6.90 8.99	4.44 5.37 6.17 7.83 11.36	49.40 88.94 139.08 263.36 638.76
**									
Sector Mount [SM 510-3]	A	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice	40.10 57.33 74.56	40.10 57.33 74.56	2396.40 3089.00 3781.60

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 lb
						2" Ice	109.02	109.02	5166.80
						4" Ice	177.94	177.94	7937.20
(4) DB844H90E-XY w/Mount Pipe	A	From Face	5.00 0.00 1.00	-6.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.58 4.20 4.73 5.86 8.27	5.40 6.49 7.30 8.96 12.49	35.55 76.59 127.74 251.11 616.43
(4) DB844H90E-XY w/Mount Pipe	B	From Face	5.00 0.00 1.00	-6.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.58 4.20 4.73 5.86 8.27	5.40 6.49 7.30 8.96 12.49	35.55 76.59 127.74 251.11 616.43
(4) DB844H90E-XY w/Mount Pipe	C	From Face	5.00 0.00 1.00	-6.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.58 4.20 4.73 5.86 8.27	5.40 6.49 7.30 8.96 12.49	35.55 76.59 127.74 251.11 616.43
8'x2" Antenna Mount Pipe	C	From Leg	3.00 3.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	26.00 40.34 59.96 115.66 297.15
8'x2" Antenna Mount Pipe	C	From Leg	3.00 -3.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	26.00 40.34 59.96 115.66 297.15
**									
Side Arm Mount [SO 308-1]	B	From Leg	3.00 0.00 0.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	53.00 78.75 104.50 156.01 259.02
Side Arm Mount [SO 308-1]	A	Stand-Off Right	3.00 0.00 0.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	53.00 78.75 104.50 156.01 259.02
1151-3	B	From Leg	6.00 0.00 9.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.18 5.73 7.30 10.48 14.75	4.18 5.73 7.30 10.48 14.75	16.00 46.53 86.79 197.06 540.93
1151-3	A	Stand-Off Right	6.00 0.00 6.00	0.0000	167.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.18 5.73 7.30 10.48 14.75	4.18 5.73 7.30 10.48 14.75	16.00 46.53 86.79 197.06 540.93
**									
SD310-HL	A	Stand-Off Right	6.00 0.00 -2.00	0.0000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.76 1.01 1.26 1.80 3.09	0.76 1.01 1.26 1.80 3.09	7.10 13.19 22.08 48.87 142.70
**									
Side Arm Mount [SO 308-1]	A	Stand-Off Right	3.00 0.00	0.0000	147.00	No Ice 1/2" Ice	0.98 1.70	3.03 5.22	53.00 78.75

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 lb
			0.00			1" Ice	2.42	7.41	104.50
						2" Ice	3.86	11.79	156.01
						4" Ice	6.74	20.55	259.02
Side Arm Mount [SO 308-1]	C	Stand-Off Left	3.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	53.00 78.75 104.50 156.01 259.02
1151-3	A	Stand-Off Right	6.00 0.00 6.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.18 5.73 7.30 10.48 14.75	4.18 5.73 7.30 10.48 14.75	16.00 46.53 86.79 197.06 540.93
SD310-HL	C	Stand-Off Left	6.00 0.00 3.00	0.0000	145.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.50 2.70 3.90 6.30 11.10	1.50 2.70 3.90 6.30 11.10	15.00 19.50 24.00 33.00 51.00
**									
Side Arm Mount [SO 201-3]	A	None		0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.71 7.91 10.11 14.51 23.31	5.71 7.91 10.11 14.51 23.31	288.00 351.14 414.28 540.56 793.12
RR90-17-02DP w/Mount Pipe	A	From Leg	2.00 0.00 1.00	30.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
RR90-17-02DP w/Mount Pipe	B	From Leg	2.00 0.00 1.00	19.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
RR90-17-02DP w/Mount Pipe	C	From Leg	2.00 0.00 1.00	24.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	43.55 81.64 130.14 249.13 609.39
APX16DWV-16DWV-S-E-A 20	A	From Leg	2.00 0.00 1.00	84.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.23 7.68 8.14 9.09 11.09	2.15 2.49 2.84 3.55 5.08	40.70 74.24 112.65 204.92 456.62
APX16DWV-16DWV-S-E-A 20	B	From Leg	2.00 0.00 1.00	90.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.23 7.68 8.14 9.09 11.09	2.15 2.49 2.84 3.55 5.08	40.70 74.24 112.65 204.92 456.62
APX16DWV-16DWV-S-E-A 20	C	From Leg	2.00 0.00 1.00	54.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.23 7.68 8.14 9.09 11.09	2.15 2.49 2.84 3.55 5.08	40.70 74.24 112.65 204.92 456.62
ATMPP1412D-1CWA TMA	A	From Leg	2.00 0.00 1.00	30.0000	139.00	No Ice 1/2" Ice 1" Ice	1.17 1.32 1.48	0.42 0.53 0.65	12.50 19.51 28.38

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 lb
						2" Ice	1.82	0.92	52.45
						4" Ice	2.61	1.57	131.40
ATMPP1412D-1CWA TMA	B	From Leg	2.00	19.0000	139.00	No Ice	1.17	0.42	12.50
			0.00			1/2" Ice	1.32	0.53	19.51
			1.00			1" Ice	1.48	0.65	28.38
						2" Ice	1.82	0.92	52.45
						4" Ice	2.61	1.57	131.40
ATMPP1412D-1CWA TMA	C	From Leg	2.00	24.0000	139.00	No Ice	1.17	0.42	12.50
			0.00			1/2" Ice	1.32	0.53	19.51
			1.00			1" Ice	1.48	0.65	28.38
						2" Ice	1.82	0.92	52.45
						4" Ice	2.61	1.57	131.40
ATMAA1412D-1A20 TMA	A	From Leg	2.00	84.0000	139.00	No Ice	1.17	0.47	13.00
			0.00			1/2" Ice	1.31	0.57	20.62
			1.00			1" Ice	1.47	0.69	30.11
						2" Ice	1.81	0.95	55.52
						4" Ice	2.58	1.57	137.44
ATMAA1412D-1A20 TMA	B	From Leg	2.00	90.0000	139.00	No Ice	1.17	0.47	13.00
			0.00			1/2" Ice	1.31	0.57	20.62
			1.00			1" Ice	1.47	0.69	30.11
						2" Ice	1.81	0.95	55.52
						4" Ice	2.58	1.57	137.44
ATMAA1412D-1A20 TMA	C	From Leg	2.00	54.0000	139.00	No Ice	1.17	0.47	13.00
			0.00			1/2" Ice	1.31	0.57	20.62
			1.00			1" Ice	1.47	0.69	30.11
						2" Ice	1.81	0.95	55.52
						4" Ice	2.58	1.57	137.44
**									
**									
Side Arm Mount [SO 308-1]	A	Stand-Off Right	3.00	0.0000	128.00	No Ice	0.98	3.03	53.00
			0.00			1/2" Ice	1.70	5.22	78.75
			0.00			1" Ice	2.42	7.41	104.50
						2" Ice	3.86	11.79	156.01
						4" Ice	6.74	20.55	259.02
1142-2C	A	Stand-Off Right	6.00	0.0000	128.00	No Ice	2.09	2.09	24.00
			0.00			1/2" Ice	3.37	3.37	40.81
			4.00			1" Ice	4.67	4.67	65.63
						2" Ice	7.32	7.32	139.94
						4" Ice	10.79	10.79	391.52
**									
Side Arm Mount [SO 702-1]	C	Stand-Off Right	1.50	0.0000	51.00	No Ice	1.00	1.43	27.00
			0.00			1/2" Ice	1.00	2.05	38.00
			0.00			1" Ice	1.00	2.67	49.00
						2" Ice	1.00	3.91	71.00
						4" Ice	1.00	6.39	115.00
Generic GPS (VSI)	C	Stand-Off Right	3.00	0.0000	51.00	No Ice	1.40	1.40	25.00
			0.00			1/2" Ice	1.70	1.70	30.00
			0.00			1" Ice	1.90	1.90	35.00
						2" Ice	2.20	2.20	40.00
						4" Ice	2.50	2.50	45.00

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 ft²	Weight lb
HPD2-23	C	Paraboloid w/Shroud (HP)	From Leg	3.00 -3.00 4.00	-90.0000		175.00	2.04	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.27 3.55 3.82 4.36 5.46	27.00 45.21 63.42 99.84 172.68
HPD2-23	C	Paraboloid w/Shroud (HP)	From Leg	3.00 3.00 4.00	74.0000		175.00	2.04	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.27 3.55 3.82 4.36 5.46	27.00 45.21 63.42 99.84 172.68

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	212.625	Leg	A325N	0.7500	4	782.24	19383.70	0.040 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	978.85	6442.72	0.152 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	1104.48	6442.72	0.171 ✓	1.333	Bolt Shear
T2	202.458	Leg	A325N	0.8750	4	7507.43	26160.00	0.287 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3179.78	6442.72	0.494 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	2668.92	6442.72	0.414 ✓	1.333	Bolt Shear
T3	182.292	Leg	A325N	1.0000	4	16465.70	34271.30	0.480 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3486.80	6442.72	0.541 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3355.20	6442.72	0.521 ✓	1.333	Bolt Shear
T4	162.104	Leg	A325N	1.0000	6	16746.20	34407.50	0.487 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3603.57	6442.72	0.559 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3709.06	6442.72	0.576 ✓	1.333	Bolt Shear
T5	141.896	Leg	A325N	1.0000	6	21913.60	34380.00	0.637 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4322.41	6442.72	0.671 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3908.79	6442.72	0.607 ✓	1.333	Bolt Shear
T6	121.688	Leg	A325N	1.0000	6	26348.60	34378.80	0.766 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3964.21	6442.72	0.615 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	3930.47	6442.72	0.610 ✓	1.333	Bolt Shear
T7	101.479	Leg	A325N	1.0000	8	22821.40	34440.80	0.663 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3980.08	6442.72	0.618 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4185.18	6442.72	0.650 ✓	1.333	Bolt Shear
T8	81.2708	Leg	A325N	1.0000	8	25617.60	34434.30	0.744 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	3950.33	6442.72	0.613 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	4417.61	6442.72	0.686 ✓	1.333	Bolt Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T9	61	Leg	A325N	1.0000	8	28437.40	34405.70	0.827 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	3	4274.49	6442.72	0.663 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.6250	2	5013.78	6442.72	0.778 ✓	1.333	Bolt Shear
T10	40.6667	Leg	A325N	1.0000	8	30920.80	34405.60	0.899 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	3	5903.86	9277.52	0.636 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	4985.17	9277.52	0.537 ✓	1.333	Bolt Shear
T11	20.3333	Diagonal	A325N	0.7500	3	6626.74	9277.52	0.714 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	2	5912.48	9277.52	0.637 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 2.5 STD	10.17	4.79	60.7 K=1.00	22.599	1.7040	-5592.10	38510.00	0.145 ✓
T2	202.458 - 182.292	ROHN 3 EH	20.17	6.53	68.9 K=1.00	21.134	3.0159	-37114.70	63739.10	0.582 ✓
T3	182.292 - 162.104	ROHN 4 EH	20.22	6.54	53.1 K=1.00	23.854	4.4074	-77173.20	105133.00	0.734 ✓
T4	162.104 - 141.896	ROHN 5 EH	20.24	6.54	42.7 K=1.00	25.452	6.1120	-114552.00	155560.00	0.736 ✓
T5	141.896 - 121.688	ROHN 6 EHS	20.25	9.81	52.9 K=1.00	23.891	6.7133	-149489.00	160385.00	0.932 ✓
T6	121.688 - 101.479	ROHN 6 EH	20.26	9.82	53.7 K=1.00	23.769	8.4049	-179798.00	199773.00	0.900 ✓
T7	101.479 - 81.2708	ROHN 6 EH	20.26	9.82	53.7 K=1.00	23.769	8.4049	-208369.00	199773.00	1.043 ✓
T8	81.2708 - 61	ROHN 8 EHS	20.33	9.82	40.4 K=1.00	25.782	9.7193	-235237.00	250585.00	0.939 ✓
T9	61 - 40.6667	ROHN 8 EHS	20.38	9.82	40.3 K=1.00	25.784	9.7193	-262503.00	250601.00	1.047 ✓
T10	40.6667 - 20.3333	ROHN 8 EH	20.39	9.82	40.9 K=1.00	25.699	12.7627	-287482.00	327992.00	0.876 ✓
T11	20.3333 - 0	ROHN 8 EH	20.37	9.81	40.9 K=1.00	25.704	12.7627	-314703.00	328057.00	0.959 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 2 STD	5.93	5.93	90.5 K=1.00	16.837	1.0745	-2936.54	18092.40	0.162 ✓
T2	202.458 - 182.292	ROHN 2 STD	7.30	7.30	111.3 K=1.00	12.045	1.0745	-9539.35	12942.70	0.737 ✓
T3	182.292 - 162.104	ROHN 2 STD	7.91	7.91	120.5 K=1.00	10.280	1.0745	-10460.40	11046.50	0.947 ✓
T4	162.104 - 141.896	ROHN 2 STD	8.55	8.55	130.4 K=1.00	8.783	1.0745	-10512.60	9437.83	1.114 ✓
T5	141.896 - 121.688	ROHN 2.5 STD	11.73	11.73	148.5 K=1.00	6.769	1.7040	-12824.10	11535.40	1.112 ✓
T6	121.688 - 101.479	ROHN 2.5 STD	12.53	12.53	158.7 K=1.00	5.932	1.7040	-11778.10	10107.60	1.165 ✓
T7	101.479 - 81.2708	ROHN 3 STD	13.37	13.37	137.9 K=1.00	7.858	2.2285	-11769.50	17511.20	0.672 ✓
T8	81.2708 - 61	ROHN 3 STD	14.28	14.28	147.3 K=1.00	6.887	2.2285	-11851.00	15347.80	0.772 ✓
T9	61 - 40.6667	ROHN 3 STD	15.25	15.25	157.3 K=1.00	6.038	2.2285	-12823.50	13454.70	0.953 ✓
T10	40.6667 - 20.3333	ROHN 3 STD	23.30	11.65	120.1 K=1.00	10.349	2.2285	-17711.60	23061.80	0.768 ✓
T11	20.3333 - 0	ROHN 3 STD	23.95	11.97	123.5 K=1.00	9.795	2.2285	-19880.20	21827.00	0.911 ✓

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 1.5 STD	8.52	4.14	79.8 K=1.00	19.049	0.7995	-2172.98	15229.20	0.143 ✓
T2	202.458 - 182.292	ROHN 1.5 STD	8.60	4.15	80.0 K=1.00	19.003	0.7995	-5303.13	15192.40	0.349 ✓
T3	182.292 - 162.104	ROHN 1.5 STD	10.02	4.82	93.0 K=1.00	16.288	0.7995	-6710.40	13021.80	0.515 ✓
T4	162.104 - 141.896	ROHN 2 STD	12.11	5.82	88.8 K=1.00	17.203	1.0745	-7418.12	18485.40	0.401 ✓
T5	141.896 - 121.688	ROHN 2 STD	13.94	6.69	102.1 K=1.00	14.228	1.0745	-7817.58	15288.30	0.511 ✓
T6	121.688 - 101.479	ROHN 2 STD	16.32	7.88	120.2 K=1.00	10.340	1.0745	-7860.94	11110.90	0.707 ✓
T7	101.479 - 81.2708	ROHN 2.5 STD	18.82	9.13	115.7 K=1.00	11.160	1.7040	-8370.37	19017.70	0.440 ✓
T8	81.2708 - 61	ROHN 2.5 STD	21.38	10.33	130.9 K=1.00	8.720	1.7040	-8821.49	14859.30	0.594 ✓
T9	61 - 40.6667	ROHN 2.5 STD	23.95	11.62	147.1 K=1.00	6.897	1.7040	-9899.75	11753.50	0.842 ✓
T10	40.6667 - 20.3333	ROHN 3 STD	25.25	12.27	126.5 K=1.00	9.330	2.2285	-9970.33	20791.70	0.480 ✓
T11	20.3333 - 0	ROHN 3 STD	27.90	13.59	140.1 K=1.00	7.603	2.2285	-11825.00	16943.90	0.698 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 1.5 STD	8.50	4.13	79.6 K=1.00	19.087	0.7995	-228.36	15259.40	0.015 ✔

Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 1.5 STD	6.31	5.95	114.8 K=1.00	11.022	0.7995	-4989.94	8811.44	0.566 ✔
T11	20.3333 - 0	ROHN 1.5 STD	6.97	6.61	127.5 K=1.00	9.187	0.7995	-5458.84	7344.62	0.743 ✔

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 2 STD	11.32	10.61	161.7 K=1.00	5.711	1.0745	-4474.65	6136.30	0.729 ✔
T11	20.3333 - 0	ROHN 2 STD	11.72	11.07	168.8 K=1.00	5.241	1.0745	-4588.72	5632.07	0.815 ✔

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 1.5 STD	6.31	6.31	121.7 K=1.00	10.040	0.7995	-51.73	8026.53	0.006 ✔
T11	20.3333 - 0	ROHN 1.5 STD	6.97	6.97	134.4 K=1.00	8.265	0.7995	-52.14	6607.20	0.008 ✔

Redundant Hip Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 2.5 STD	14.97	14.97	189.6 K=1.00	4.154	1.7040	-48.19	7078.91	0.007* ✓
T11	20.3333 - 0	ROHN 2.5 STD	15.80	15.80	200.1 K=1.00	3.729	1.7040	-47.55	6355.22	0.007* ✓

* DL controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	L2x2x1/8	4.26	4.26	128.6 K=1.00	9.027	0.4844	-4.35	4372.66	0.001 ✓
T2	202.458 - 182.292	L2x2x1/8	4.30	4.30	129.8 K=1.00	8.869	0.4844	-7.58	4295.70	0.002 ✓
T3	182.292 - 162.104	L2x2x1/8	5.01	5.01	151.3 K=1.00	6.524	0.4844	-7.19	3160.25	0.002 ✓
T4	162.104 - 141.896	L2x2x1/8	6.05	6.05	182.7 K=1.00	4.472	0.4844	-7.89	2165.98	0.004 ✓
T5	141.896 - 121.688	L2x2x1/8	6.97	6.97	210.4 K=1.00	3.374	0.4844	-7.91	1634.11	0.005 ✓
T6	121.688 - 101.479	L2 1/2x2 1/2x3/16	8.16	8.16	197.8 K=1.00	3.817	0.9020	-7.53	3443.19	0.002 ✓
T7	101.479 - 81.2708	L3x3x3/16	9.41	9.41	189.4 K=1.00	4.161	1.0900	-7.46	4535.72	0.002* ✓
T8	81.2708 - 61	L3 1/2x3 1/2x1/4	10.69	10.69	184.9 K=1.00	4.370	1.6900	-9.12	7384.85	0.001* ✓
T9	61 - 40.6667	L3 1/2x3 1/2x1/4	11.98	11.98	207.1 K=1.00	3.482	1.6900	-9.27	5884.99	0.002* ✓
T10	40.6667 - 20.3333	ROHN 3 STD	12.63	12.63	130.2 K=1.00	8.807	2.2285	-16.28	19625.00	0.001 ✓
T11	20.3333 - 0	ROHN 3 STD	13.95	13.95	143.9 K=1.00	7.217	2.2285	-15.52	16082.00	0.001 ✓

* DL controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 2.5 STD	10.17	4.79	60.7	30.000	1.7040	3128.98	51121.50	0.061 ✓
T2	202.458 - 182.292	ROHN 3 EH	20.17	6.53	68.9	30.000	3.0159	30029.70	90477.90	0.332 ✓
T3	182.292 - 162.104	ROHN 4 EH	20.22	6.54	53.1	30.000	4.4074	65863.00	132223.00	0.498 ✓
T4	162.104 - 141.896	ROHN 5 EH	20.24	6.54	42.7	30.000	6.1120	100477.00	183359.00	0.548 ✓
T5	141.896 - 121.688	ROHN 6 EHS	20.25	9.81	52.9	30.000	6.7133	131482.00	201398.00	0.653 ✓
T6	121.688 - 101.479	ROHN 6 EH	20.26	9.82	53.7	30.000	8.4049	158091.00	252148.00	0.627 ✓
T7	101.479 - 81.2708	ROHN 6 EH	20.26	9.82	53.7	30.000	8.4049	182571.00	252148.00	0.724 ✓
T8	81.2708 - 61	ROHN 8 EHS	20.33	9.82	40.4	30.000	9.7193	204941.00	291579.00	0.703 ✓
T9	61 - 40.6667	ROHN 8 EHS	20.38	9.82	40.3	30.000	9.7193	227499.00	291579.00	0.780 ✓
T10	40.6667 - 20.3333	ROHN 8 EH	20.39	9.82	40.9	30.000	12.7627	247366.00	382882.00	0.646 ✓
T11	20.3333 - 0	ROHN 8 EH	20.37	9.81	40.9	30.000	12.7627	269780.00	382882.00	0.705 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 2 STD	5.93	5.93	90.5	30.000	1.0745	2879.47	32235.90	0.089 ✓
T2	202.458 - 182.292	ROHN 2 STD	7.30	7.30	111.3	30.000	1.0745	9488.38	32235.90	0.294 ✓
T3	182.292 - 162.104	ROHN 2 STD	7.91	7.91	120.5	30.000	1.0745	10395.60	32235.90	0.322 ✓
T4	162.104 - 141.896	ROHN 2 STD	8.09	8.09	123.3	30.000	1.0745	10735.20	32235.90	0.333 ✓
T5	141.896 - 121.688	ROHN 2.5 STD	11.40	11.40	144.4	30.000	1.7040	12837.50	51121.50	0.251 ✓
T6	121.688 - 101.479	ROHN 2.5 STD	12.13	12.13	153.6	30.000	1.7040	11723.90	51121.50	0.229 ✓
T7	101.479 - 81.2708	ROHN 3 STD	12.94	12.94	133.4	30.000	2.2285	11661.40	66854.10	0.174 ✓
T8	81.2708 - 61	ROHN 3 STD	14.28	14.28	147.3	30.000	2.2285	11461.80	66854.10	0.171 ✓
T9	61 - 40.6667	ROHN 3 STD	15.25	15.25	157.3	30.000	2.2285	12365.50	66854.10	0.185 ✓
T10	40.6667 - 20.3333	ROHN 3 STD	23.30	11.65	120.1	30.000	2.2285	17108.30	66854.10	0.256 ✓
T11	20.3333 - 0	ROHN 3 STD	23.95	11.97	123.5	30.000	2.2285	19277.60	66854.10	0.288 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 1.5 STD	8.52	4.14	79.8	30.000	0.7995	2208.96	23983.70	0.092 ✓
T2	202.458 - 182.292	ROHN 1.5 STD	8.60	4.15	80.0	30.000	0.7995	5337.83	23983.70	0.223 ✓
T3	182.292 - 162.104	ROHN 1.5 STD	10.02	4.82	93.0	30.000	0.7995	6681.13	23983.70	0.279 ✓
T4	162.104 - 141.896	ROHN 2 STD	12.11	5.82	88.8	30.000	1.0745	7394.48	32235.90	0.229 ✓
T5	141.896 - 121.688	ROHN 2 STD	13.94	6.69	102.1	30.000	1.0745	7674.30	32235.90	0.238 ✓
T6	121.688 - 101.479	ROHN 2 STD	16.32	7.88	120.2	30.000	1.0745	7751.02	32235.90	0.240 ✓
T7	101.479 - 81.2708	ROHN 2.5 STD	18.82	9.13	115.7	30.000	1.7040	8295.39	51121.50	0.162 ✓
T8	81.2708 - 61	ROHN 2.5 STD	21.38	10.33	130.9	30.000	1.7040	8835.22	51121.50	0.173 ✓
T9	61 - 40.6667	ROHN 2.5 STD	23.95	11.62	147.1	30.000	1.7040	10027.60	51121.50	0.196 ✓
T10	40.6667 - 20.3333	ROHN 3 STD	25.25	12.27	126.5	30.000	2.2285	9630.63	66854.10	0.144 ✓
T11	20.3333 - 0	ROHN 3 STD	27.90	13.59	140.1	30.000	2.2285	11677.00	66854.10	0.175 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	ROHN 1.5 STD	8.50	4.13	79.6	30.000	0.7995	229.07	23983.70	0.010 ✓

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 1.5 STD	6.31	5.95	114.8	21.600	0.7995	4989.94	17268.30	0.289 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	20.3333 - 0	ROHN 1.5 STD	6.97	6.61	127.5	21.600	0.7995	5458.84	17268.30	0.316 ✓

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 2 STD	11.32	10.61	161.7	21.600	1.0745	4474.65	23209.90	0.193 ✓
T11	20.3333 - 0	ROHN 2 STD	11.72	11.07	168.8	21.600	1.0745	4588.72	23209.90	0.198 ✓

Redundant Hip Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T10	40.6667 - 20.3333	ROHN 2.5 STD	14.97	14.97	189.6	21.600	1.7040	87.07	36807.50	0.002 ✓
T11	20.3333 - 0	ROHN 2.5 STD	15.80	15.80	200.1	21.600	1.7040	89.02	36807.50	0.002 ✓

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T1	212.625 - 202.458	L2x2x1/8	4.25	4.25	81.5	21.600	0.4844	3.96	10462.50	0.000 ✓
T2	202.458 - 182.292	L2x2x1/8	4.30	4.30	82.4	21.600	0.4844	6.00	10462.50	0.001 ✓
T3	182.292 - 162.104	L2x2x1/8	4.34	4.34	83.1	21.600	0.4844	5.74	10462.50	0.001 ✓
T4	162.104 - 141.896	L2x2x1/8	5.38	5.38	103.1	21.600	0.4844	6.73	10462.50	0.001 ✓
T5	141.896 - 121.688	L2x2x1/8	6.42	6.42	123.1	21.600	0.4844	4.19	10462.50	0.000 ✓
T6	121.688 - 101.479	L2 1/2x2 1/2x3/16	7.55	7.55	116.5	21.600	0.9020	2.05	19483.20	0.000 ✓
T7	101.479 - 81.2708	L3x3x3/16	8.80	8.80	112.5	21.600	1.0900	1.14	23544.00	0.000 ✓
T10	40.6667 - 20.3333	ROHN 3 STD	12.63	12.63	130.2	30.000	2.2285	0.96	66854.10	0.000 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
T11	20.3333 - 0	ROHN 3 STD	13.95	13.95	143.9	30.000	2.2285	2.79	66854.10	0.000 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
T1	212.625 - 202.458	Leg	ROHN 2.5 STD	2	-5564.11	51333.83	12.7	Pass
		Diagonal	ROHN 2 STD	8	-2936.54	24117.17	12.2	Pass
		Horizontal	ROHN 1.5 STD	7	-2172.98	20300.52	10.7	Pass
							12.9 (b)	
		Top Girt	ROHN 1.5 STD	4	-228.36	20340.78	1.1	Pass
		Inner Bracing	L2x2x1/8	17	-4.35	5828.76	0.3	Pass
T2	202.458 - 182.292	Leg	ROHN 3 EH	28	-37114.70	84964.22	43.7	Pass
		Diagonal	ROHN 2 STD	39	-9539.35	17252.62	55.3	Pass
		Horizontal	ROHN 1.5 STD	37	-5303.13	20251.47	26.2	Pass
							31.1 (b)	
		Inner Bracing	L2x2x1/8	40	-7.52	5726.17	0.3	Pass
T3	182.292 - 162.104	Leg	ROHN 4 EH	67	-77173.20	140142.28	55.1	Pass
		Diagonal	ROHN 2 STD	72	-10460.40	14724.98	71.0	Pass
		Horizontal	ROHN 1.5 STD	70	-6710.40	17358.06	38.7	Pass
							39.1 (b)	
		Inner Bracing	L2x2x1/8	79	-7.19	4212.61	0.3	Pass
T4	162.104 - 141.896	Leg	ROHN 5 EH	106	-114552.00	207361.47	55.2	Pass
		Diagonal	ROHN 2 STD	111	-10512.60	12580.63	83.6	Pass
		Horizontal	ROHN 2 STD	109	-7418.12	24641.04	30.1	Pass
							43.2 (b)	
		Inner Bracing	L2x2x1/8	119	-7.86	2887.25	0.4	Pass
T5	141.896 - 121.688	Leg	ROHN 6 EHS	145	-149489.00	213793.20	69.9	Pass
		Diagonal	ROHN 2.5 STD	150	-12824.10	15376.69	83.4	Pass
		Horizontal	ROHN 2 STD	148	-7817.58	20379.30	38.4	Pass
							45.5 (b)	
		Inner Bracing	L2x2x1/8	157	-7.91	2178.27	0.4	Pass
T6	121.688 - 101.479	Leg	ROHN 6 EH	172	-179798.00	266297.40	67.5	Pass
		Diagonal	ROHN 2.5 STD	177	-11778.10	13473.43	87.4	Pass
		Horizontal	ROHN 2 STD	175	-7860.94	14810.83	53.1	Pass
		Inner Bracing	L2 1/2x2 1/2x3/16	186	-7.53	4589.77	0.3	Pass
T7	101.479 - 81.2708	Leg	ROHN 6 EH	199	-208369.00	266297.40	78.2	Pass
		Diagonal	ROHN 3 STD	204	-11769.50	23342.43	50.4	Pass
		Horizontal	ROHN 2.5 STD	202	-8370.37	25350.59	33.0	Pass
							48.7 (b)	
		Inner Bracing	L3x3x3/16	213	-7.46	4535.72	0.5	Pass
T8	81.2708 - 61	Leg	ROHN 8 EHS	226	-235237.00	334029.79	70.4	Pass
		Diagonal	ROHN 3 STD	231	-11851.00	20458.62	57.9	Pass
		Horizontal	ROHN 2.5 STD	229	-8821.49	19807.45	44.5	Pass
							51.4 (b)	
		Inner Bracing	L3 1/2x3 1/2x1/4	238	-9.06	7384.85	0.3	Pass
T9	61 - 40.6667	Leg	ROHN 8 EHS	253	-262503.00	334051.12	78.6	Pass
		Diagonal	ROHN 3 STD	258	-12823.50	17935.11	71.5	Pass

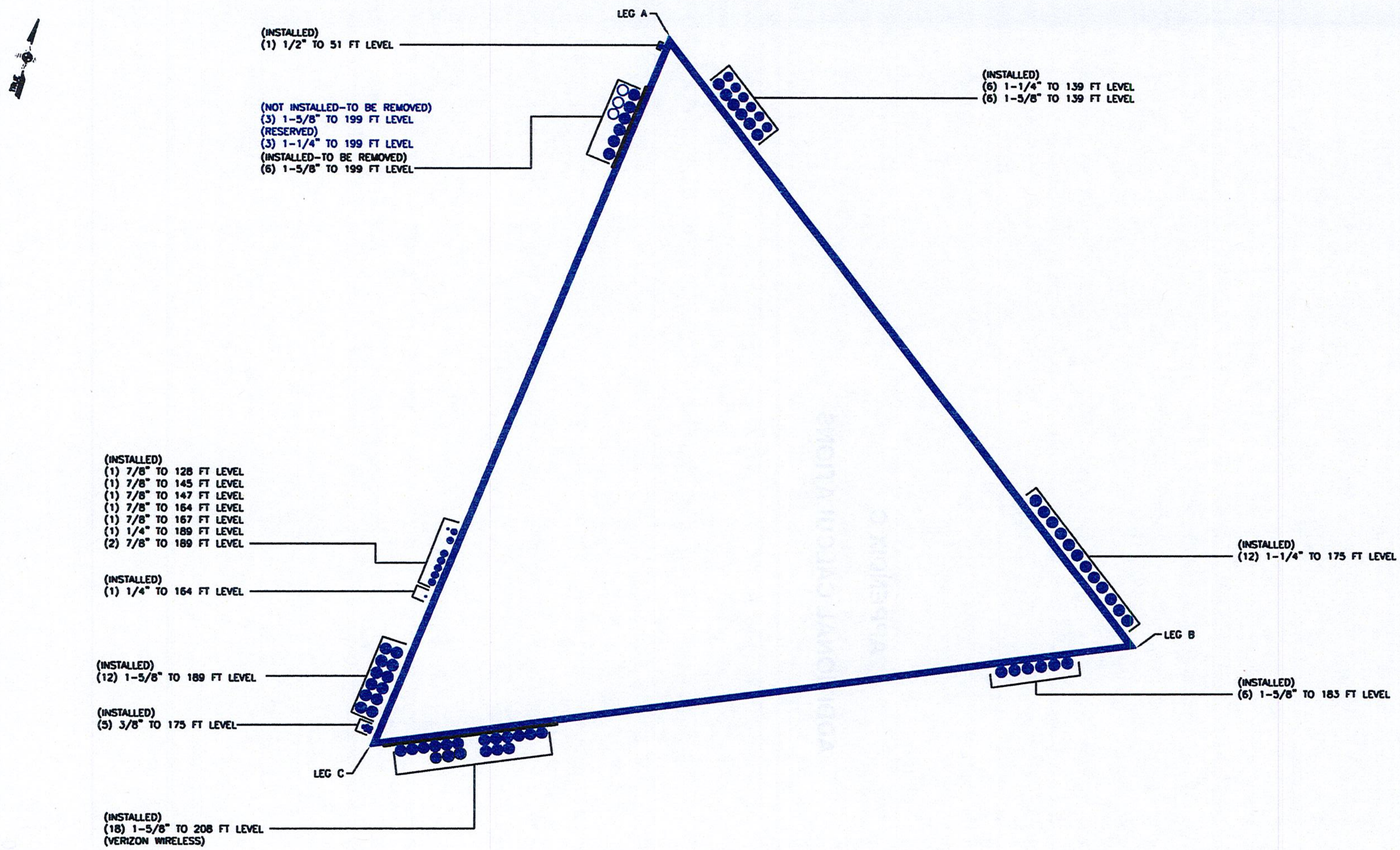
Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
		Horizontal	ROHN 2.5 STD	256	-9899.75	15667.41	63.2	Pass
		Inner Bracing	L3 1/2x3 1/2x1/4	267	-9.27	5884.99	0.4	Pass
T10	40.6667 - 20.3333	Leg	ROHN 8 EH	280	-287482.00	437213.32	65.8 67.4 (b)	Pass
		Diagonal	ROHN 3 STD	287	-17711.60	30741.38	57.6	Pass
		Horizontal	ROHN 3 STD	283	-9970.33	27715.33	36.0 40.3 (b)	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	304	-4989.94	11745.65	42.5	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	305	-4474.65	8179.69	54.7	Pass
		Redund Hip 1 Bracing	ROHN 1.5 STD	308	-51.73	10699.36	0.5	Pass
		Redund Hip Diagonal Bracing	ROHN 2.5 STD	307	-48.19	7078.91	0.7	Pass
		Inner Bracing	ROHN 3 STD	310	-11.28	19625.00	1.6	Pass
T11	20.3333 - 0	Leg	ROHN 8 EH	313	-314703.00	437299.96	72.0	Pass
		Diagonal	ROHN 3 STD	320	-19880.20	29095.39	68.3	Pass
		Horizontal	ROHN 3 STD	316	-11825.00	22586.22	52.4	Pass
		Redund Horz 1 Bracing	ROHN 1.5 STD	318	-5458.84	9790.38	55.8	Pass
		Redund Diag 1 Bracing	ROHN 2 STD	319	-4588.72	7507.55	61.1	Pass
		Redund Hip 1 Bracing	ROHN 1.5 STD	341	-52.14	8807.40	0.6	Pass
		Redund Hip Diagonal Bracing	ROHN 2.5 STD	340	-47.55	6355.22	0.7	Pass
		Inner Bracing	ROHN 3 STD	343	-10.11	16082.00	1.4	Pass
							Summary	
						Leg (T9)	78.6	Pass
						Diagonal (T6)	87.4	Pass
						Horizontal (T9)	63.2	Pass
						Top Girt (T1)	1.1	Pass
						Redund Horz 1 Bracing (T11)	55.8	Pass
						Redund Diag 1 Bracing (T11)	61.1	Pass
						Redund Hip 1 Bracing (T11)	0.6	Pass
						Redund Hip Diagonal Bracing (T11)	0.7	Pass
						Inner Bracing (T10)	1.6	Pass
						Bolt Checks	67.4	Pass
						RATING =	**87.4**	**Pass**

tnxTower	**Job** HRT 105, CT BU#806363	**Page** 29 of 29
Vertical Structures, Inc. *309 Spangler Drive, Suite E* *Richmond, KY 40475* *Phone: (859) 624-8360* *FAX: (859) 624-8369*	**Project** Vertical Structures Job No. 2013-004-035	**Date** 16:45:29 04/23/13
	Client Crown Castle	**Designed by** Casey Hymore

Program Version 6.0.4.0 - 4/17/2012 File:/nas1/CHymore/Open Jobs/2013-004-035 HRT 105, CT/tnx/806363.eri

APPENDIX B

BASE LEVEL DRAWING



CROWN REGION ADDRESS

USA

14/10/11 AS-BUILT INFORMATION ADDED PER WORK ORDER
31/10/11 AS-BUILT INFORMATION ADDED PER WORK ORDER
18/11/11 APPLICATION ADDED PER WORK ORDER
21/11/11 AS-BUILT INFORMATION ADDED PER WORK ORDER
05/04/12 AS-BUILT INFORMATION ADDED PER WORK ORDER
11/10/12 APPLICATION ADDED PER WORK ORDER
14/11/12 UPDATED PER WORK ORDER
17/04/13 UPDATED PER WORK ORDER
18/04/13 UPDATED PER WORK ORDER

DRAWN BY: SJK
CHECKED BY:
DRAWING DATE: 15/05/07

SITE NUMBER:
SITE NAME:

SITE NAME

HRT 105 943201

BUSINESS UNIT NUMBER

806363

SITE ADDRESS

48 COW HILL ROAD
CLINTON, CT 06413
MIDDLESEX COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BUSINESS UNIT: 806363 TOWER ID: C_BASELEVEL

BASE LEVEL DRAWING	SCALE: N.T.S.	1

PLOT DATE: 4/18/2013 FILE NAME: 806363_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

ANCHOR BOLT CALCULATIONS

Customer:	Crown Castle
Site Name:	HRT 105, CT BU#806363
Job Number:	2013-004-035
Tower Model:	212' Rohn SSMW Self-Supporting Tower
Date:	4/23/2013

Input Information:

# Bolts	10	
Bolt Diameter	1	in
Allowable Tension, F_u	125	ksi
Steel Grade	A354-BC	
Applied Shear	32.713	kips
Uplift per Leg	268.255	kips

Bolt Cross-Sectional Area, **A**	0.785	in^2
Applied Shear, f_v	4.17	ksi
Maximum Allowable Tensile Stress, F_t	41.25	ksi
Allowable Tension Force	323.98	kips
Maximum Allowable	431.86	kips
% Capacity	**62.1%**	

The Bolt Group is sufficient for the applied Uplift Force

Maximum Allowable Tensile Stress, F_t

$$0.43F_u - 1.8f_v \leq 0.33F_u$$

This equation is for threaded parts, A449 bolts over 1 1/2" dia. (threads included in shear plane) Manual of Steel Construction ASD, 9th Edition, pg. 5-74, Table J3.3

VERTICAL STRUCTURES, INC.

Overturning Calculation for Square Mat Foundations

Customer:	Crown Castle
Site Name:	HRT 105, CT BU#806363
Job Number:	2013-004-035
Tower Model:	212' Rohn SSMW Self-Supporting Tower
Date:	4/23/2013

Soil Ultimate Bearing	8	ksf	
Unit wt soil	0.1	kcf	
Unit wt concrete	0.15	kcf	
Mat Width	40.25	ft	
Mat Thickness	4.5	ft	
Depth of Soil Over Mat	0	ft	
Has Pedestals? (Y or N)	N		
Pedestal Round or Square? (R or S)	R		
Number of Pedestals	0		
Pedestal Height	0	ft	
Pedestal Diameter or Width	0	ft	
Applied Shear	60.76	kip	
Applied Axial Force	59.97	kip	
Applied Moment	7624.558	k-ft	
wt. Concrete =	1093.542	kip	
wt. Soil =	0.000	kip	
x =	3.582	ft	
Shear Moment =	273.42	k-ft	
Allowable Bearing =	4	ksf	
Mat Width / 6 =	6.71	ft	
e =	6.85	ft	
L =	39.83	ft	
Bearing =	0.99	ksf	BEARING ADEQUATE
Resisting Moment =	21148.2987	k-ft	
SF =	2.678		OVERTURNING ADEQUATE