

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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

July 25, 2011

Jennifer A. Herz, Esq.  
Brown Rudnick LLP  
CityPlace I, 185 Asylum Street  
Hartford, CT 06103

RE: **EM-T-MOBILE-097-110708** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 21 Berkshire Road, Newtown, Connecticut.

Dear Attorney Herz:

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 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;
- Not less than 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 July 8, 2011. 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,

Linda Roberts  
Executive Director

LR/CDM/laf

c: The Honorable Patricia E. Llodra, First Selectman, Town of Newtown  
Gary Frenette, Zoning Enforcement Officer, Town of Newtown  
Crown Castle USA, Inc.



EM-T-MOBILE-097-110708



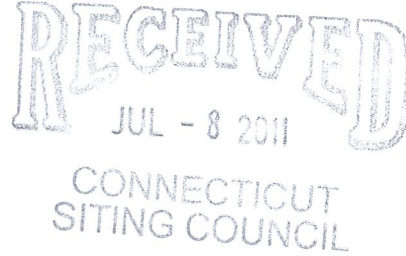
JENNIFER A. HERZ  
Direct Dial: (860) 509-6527  
jherz@brownrudnick.com

CityPlace I  
185 Asylum  
Street  
Hartford  
Connecticut  
06103  
tel 860.509.6500  
fax 860.509.6501

Via Hand Delivery

ORIGINAL

July 8, 2011



Robert Stein, Chairman  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification / Newtown @ 21 Berkshire Road

Dear Chairman Stein:

On behalf of T-Mobile Northeast, LLC ("T-Mobile"), enclosed for filing is an original and 5 copies of T-Mobile's Notice of Exempt Modification for the Facility located at 21 Berkshire Road in Newtown.

I also enclose herewith a check in the amount of \$625.00 representing the filing fee.

I would appreciate it if you would date-stamp the enclosed copy of this transmittal letter and return it to the courier delivering this package.

If you have any questions, please feel free to contact me.

Very truly yours,

**BROWN RUDNICK LLP**

Jennifer A. Herz

JH/bh  
Enclosures

cc/encl: First Selectman E. Patricia Llodra

# 40285013 v1 - 029431/0001

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## CONNECTICUT SITING COUNCIL

In re:

T-Mobile Northeast, LLC's Notice to Make an Exempt Modification to an Existing Facility at 21 Berkshire Road, Newtown, Connecticut. : EXEMPT MODIFICATION NO. \_\_\_\_\_  
: July 8, 2011

### NOTICE OF EXEMPT MODIFICATION

Pursuant to Conn. Agencies Regs. §§ 16-50j-73 and 16-50j-72(b), T-Mobile Northeast, LLC ("T-Mobile") hereby gives notice to the Connecticut Siting Council ("Council") and the Town of Newtown of T-Mobile's intent to make an exempt modification to the existing monopole tower (the "Tower") located at 21 Berkshire Road in Newtown, Connecticut. Specifically, T-Mobile plans to upgrade its wireless system in Connecticut by implementing its Universal Mobile Telecommunications System ("UMTS"). UMTS is a third-generation ("3G") technology that utilizes a code division multiple access ("CDMA") base to allow for fast and large data transfers. To accomplish this upgrade, T-Mobile must modify its antenna and equipment configurations at many of its existing sites.

Once the UMTS upgrade is complete, T-Mobile will operate on a more unified communication system, allowing international wireless telephones to function world-wide. Furthermore, UMTS will enhance global positioning system ("GPS") navigation capabilities and provide emergency responders with more advanced tracking capabilities. The proposed UMTS technology is compatible with the existing second-generation ("2G") Global System for Mobile Communication ("GSM") currently on the Tower and the proposed upgrade is expected to enhance the existing 2G system. In order to accomplish the upgrade at this site, T-Mobile plans to add UMTS technology and install associated equipment at the base of the Tower.

Under the Council's regulations (Conn. Agencies Regs. § 16-50j-72(b)), T-Mobile's plans do not constitute a modification subject to the Council's review because T-Mobile will not change the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

The Tower is a 185-foot monopole tower located at 21 Berkshire Road in Newtown, Connecticut (latitude N 41° 24' 45.53", longitude W -73° 16' 12.34"). The Tower is owned by Crown Castle. Multiple carriers are currently located on the Tower. Currently, T-Mobile has 3 panel antennas and 6 Tower Mounted Amplifiers ("TMA") with a centerline of 145 feet mounted on the Tower. A site plan with Tower specifications is attached.

T-Mobile plans install 3 UMTS (Model No.APX16DWV) antennas on the Tower. Additionally, T-Mobile plans to remove and replace its 6 existing TMA with 6 new TMA. The 6 new TMA will include 3 Twin AWS and 3 Twin PCS. The centerline of the new antennas and TMAs will remain at 145 feet.

To confirm the Tower can support these changes, T-Mobile commissioned Tower Vertical Structures, Inc. to perform a Structural Analysis of the Tower (attached). According to the Structural Analysis Report, dated June 22, 2011, the Tower has "sufficient capacity" for T-Mobile's planned modifications (Structural Analysis Report, page 1).

Within the existing compound T-Mobile plans to locate its proposed UMTS equipment cabinet on its proposed 5-foot by 5-foot (approximately) concrete pad extension. The planned extension will be located adjacent to T-Mobile's existing pad and within the existing fenced area. Therefore, no increase in the size of the boundaries of the site is necessary.

Excluding brief, minor, construction-related noise during the addition of the antennas, TMAs and the installation of the equipment cabinet, the proposed changes to the Tower will not increase noise levels at the site.

The proposed antennas will not adversely impact the health and safety of the surrounding community or the people working on the Tower. The total radio frequency exposure measured around the Tower will be well below the National Council on Radiation Protection and Measurements' ("NCRP") standard adopted by the Federal Communications Commission ("FCC"). The worst-case power density analysis measured at the base of the Tower indicates that T-Mobile's antennas will emit 4.65% of the NCRP's standard for maximum permissible exposure. Collectively, the antennas on the Tower will emit 24.12% of the NCRP's standard for maximum permissible exposure. Therefore, the power density levels will be below the FCC mandated radio frequency exposure limits in all locations around the Tower, even with extremely conservative assumptions. The power density analysis is attached.

In conclusion, T-Mobile's proposed plan install antennas, TMAs and ground equipment at this site does not constitute a modification subject to the Council's jurisdiction because T-Mobile will not increase the height of the Tower, will not extend the boundaries of the site, will not increase the noise levels at the site, and the total radio frequency electromagnetic radiation power density will stay within all applicable standards. *See* Conn. Agencies Regs. § 16-50j-72.

T-MOBILE NORTHEAST, LLC

By: 

Jennifer A. Herz

Brown Rudnick LLP

185 Asylum Street

Hartford, CT 06103-3402

Email - [jherz@brownrudnick.com](mailto:jherz@brownrudnick.com)

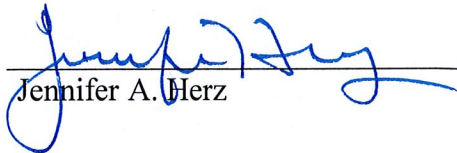
Phone - 860.509.6527 /Fax - 860.509.6501

**Certificate of Service**

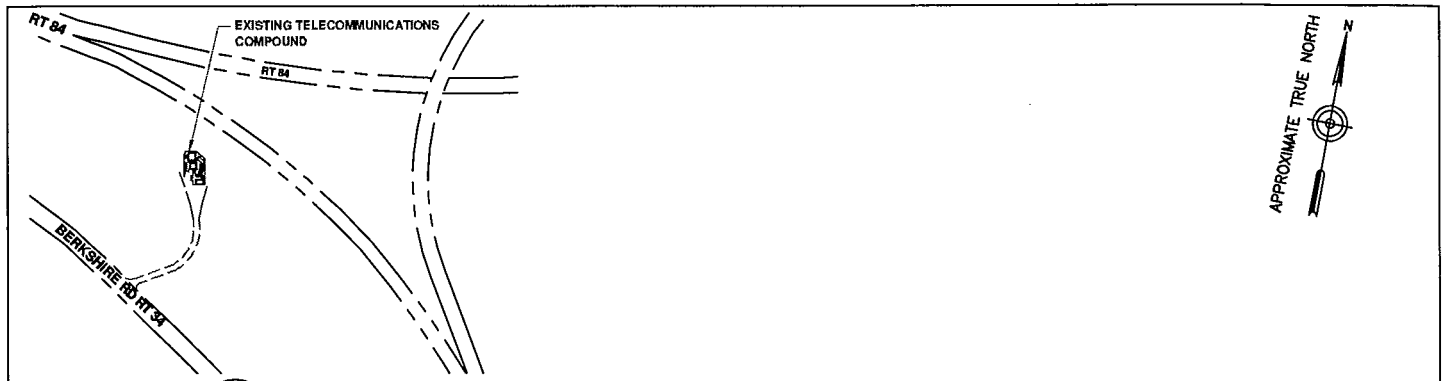
This is to certify that on this 8<sup>th</sup> day of July, 2011, the foregoing Notice of Exempt

Modification was sent, via first class mail, to the following:

First Selectman E. Patricia Llodra  
Newtown Municipal Center  
3 Primrose Street  
Newtown, CT 06470

By:   
Jennifer A. Herz

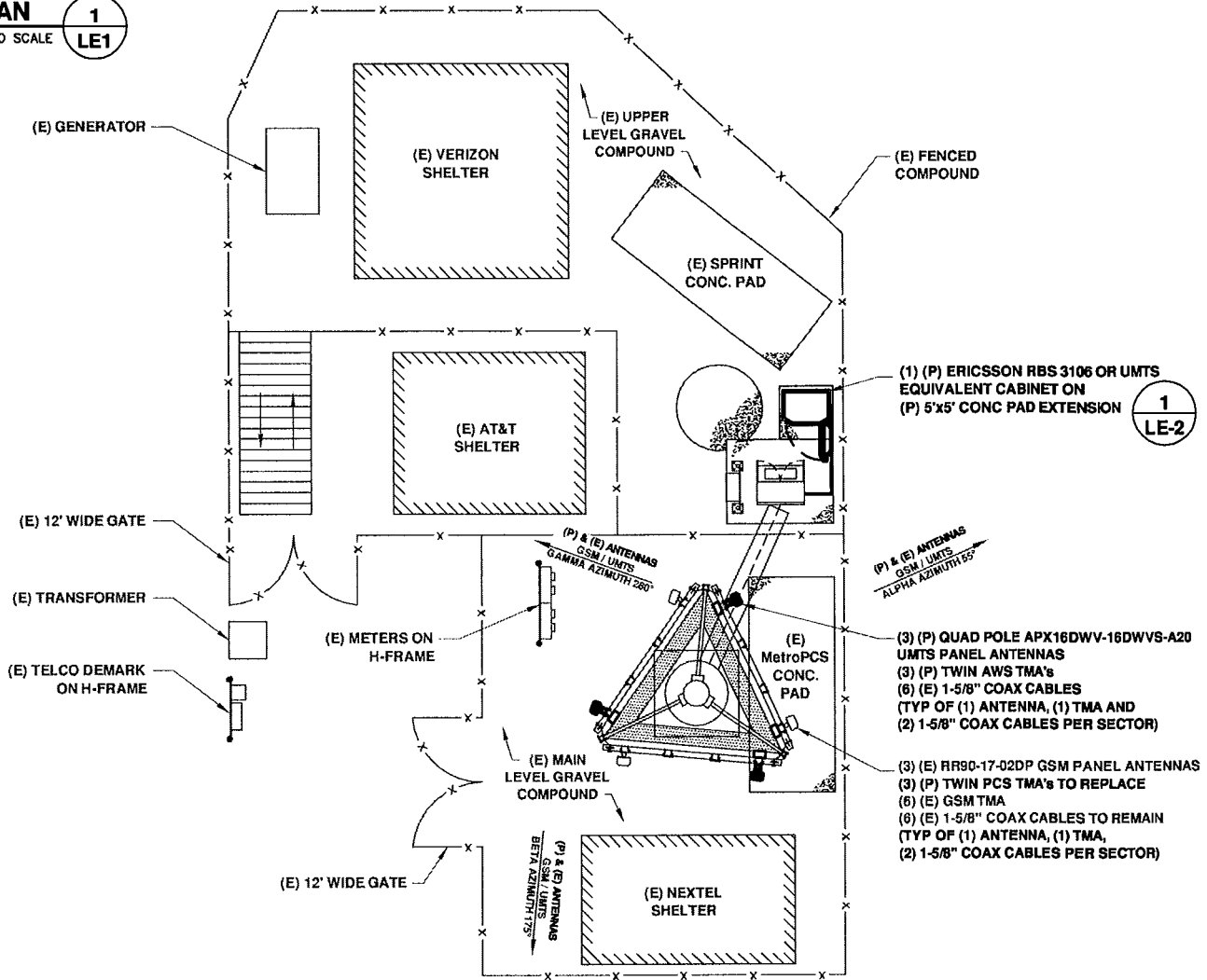
# 40285001 v1 - 029431/0001



**KEY PLAN**

SCALE: NOT TO SCALE

1  
LE1



1  
LE-2

**COMPOUND PLAN**

SCALE: 1/16"=1'-0"

2  
LE1

SUBMITTALS	
LE REV A	06-04-11
LE REV 0	06-06-11
LE REV 1	06-08-11
LE REV 2	06-09-11

**ATLANTIS GROUP**

1340 Centre Street  
 Suite 203  
 Newton, MA 02459  
 Office: 617-965-0789  
 Fax: 617-213-5056

**LEASE EXHIBIT**

SITE NUMBER: CT11123A  
 SITE NAME: NEWTOWN MONOPOLE

21 BERKSHIRE ROAD  
 NEWTOWN, CT 06470

DRAWN BY: GC      CHECKED BY: SM

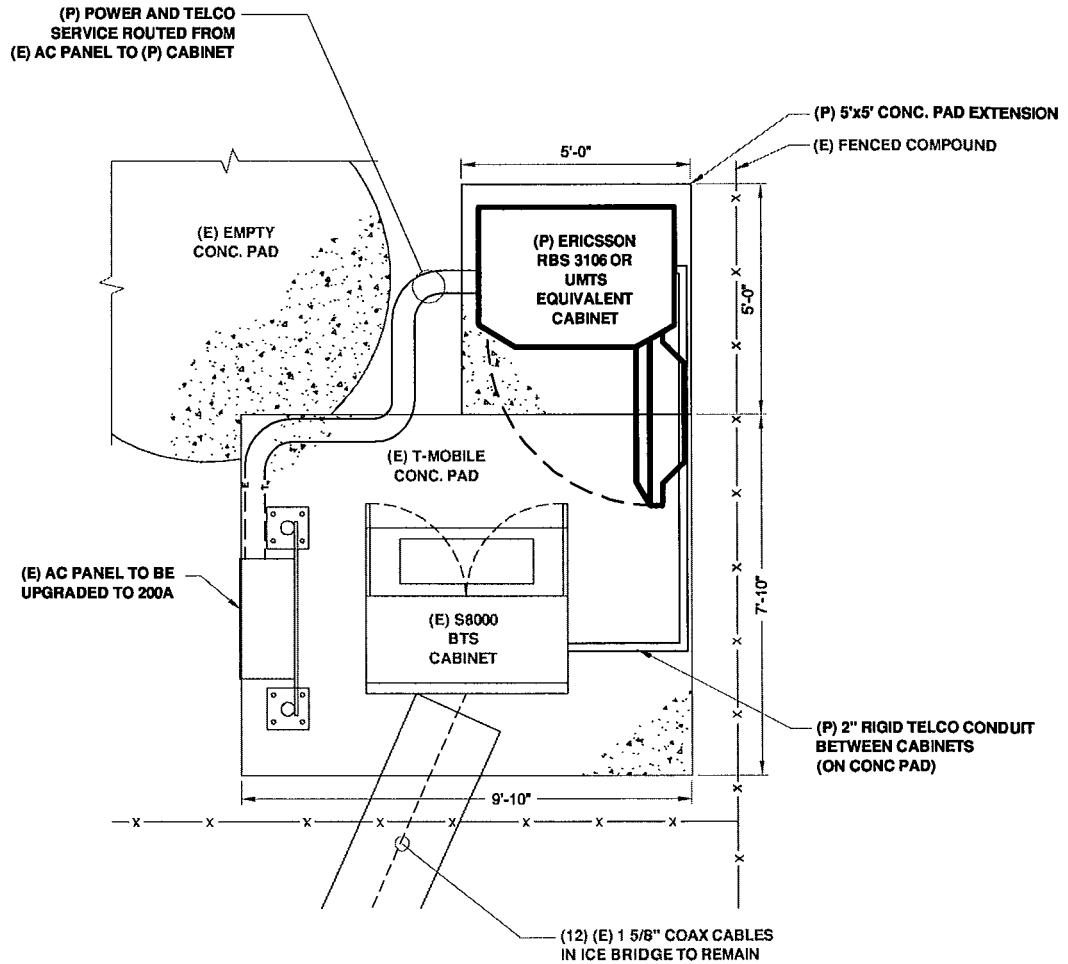
**NORTHEAST TOWERS**  
 199 BRICKYARD ROAD  
 FARMINGTON, CT 06032  
 OFFICE: (860) 677-1999

FOR

**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
 FAX: (860) 692-7159

PAGE 1 OF 3





**EQUIPMENT PLAN**

SCALE: 1/4"=1'-0"

1  
LE2

SUBMITTALS	
LE REV A	06-04-11
LE REV 0	06-06-11
LE REV 1	06-08-11
LE REV 2	06-09-11

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 1340 Centre Street  
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 Newton, MA 02459  
 Office: 617-965-0789  
 Fax: 617-213-5056

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 SITE NAME: NEWTOWN MONOPOLE  
  
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 NEWTOWN, CT 06470

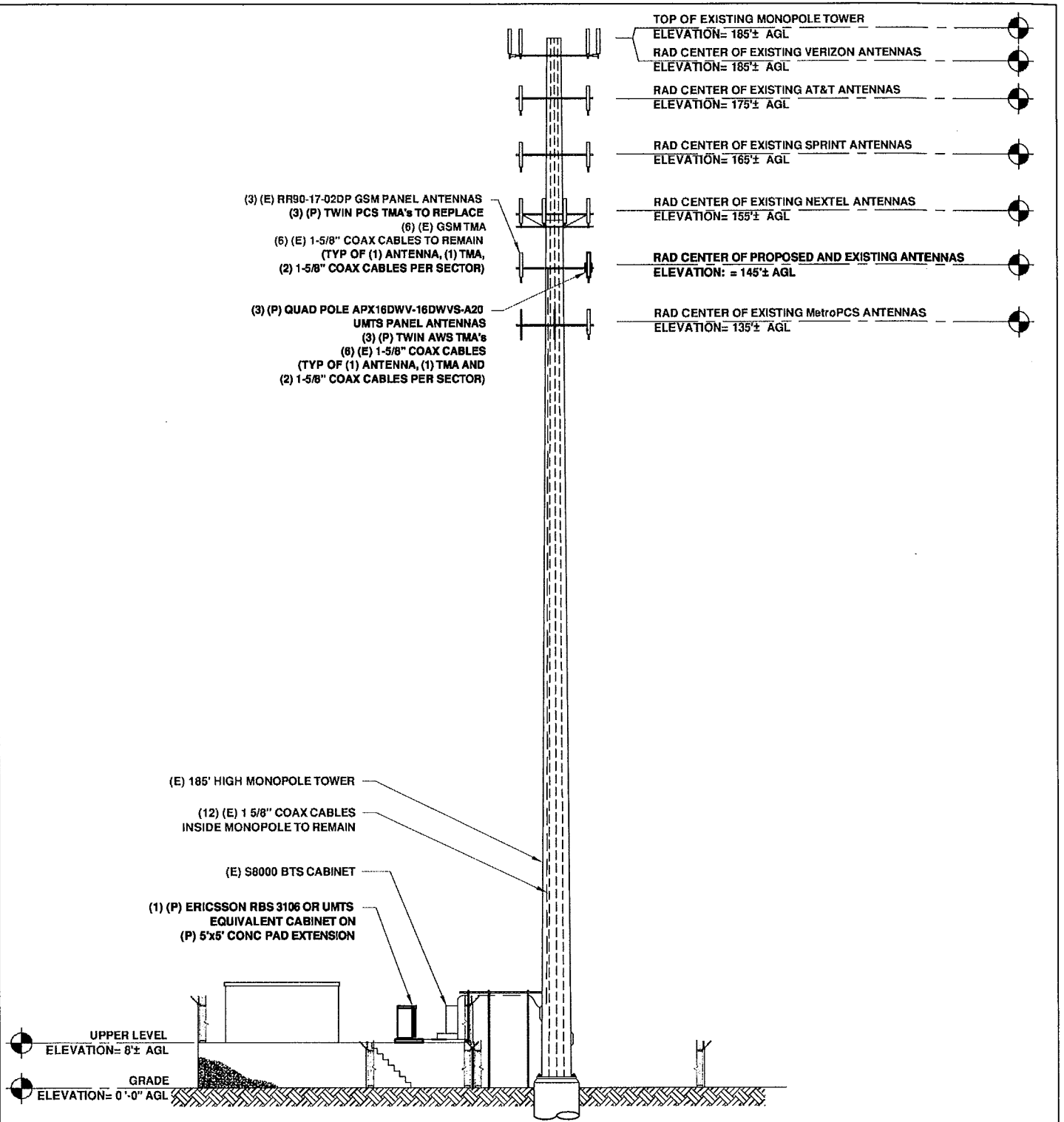
**NORTHEAST TOWERS**  
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 FARMINGTON, CT 06032  
 OFFICE: (860) 677-1999  
 FOR  
**T-MOBILE NORTHEAST, LLC**  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 OFFICE: (860) 692-7100  
 FAX: (860) 692-7199

DRAWN BY: GC

CHECKED BY: SM

PAGE 2 OF 3





**EAST ELEVATION VIEW**

SCALE: 1" = 24'-0"

1  
LE3

SUBMITTALS	
LE REV A	06-04-11
LE REV 0	06-06-11
LE REV 1	06-08-11
LE REV 2	06-09-11

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1340 Centre Street  
Suite 203  
Newton, MA 02459  
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BLOOMFIELD, CT 06002  
OFFICE: (860) 692-7100  
FAX: (860) 692-7159

DRAWN BY: GC

CHECKED BY: SM

PAGE 3 OF 3

Date: June 22, 2011



Eva Morales  
Crown Castle USA Inc.  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
(704) 405-6612

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

**Subject: Structural Analysis Report**

**Carrier Designation:** **T-Mobile Change-Out**  
**Carrier Site Number:** CT11123A  
**Carrier Site Name:** Newton

**Crown Castle Designation:** **Crown Castle BU Number:** 806354  
**Crown Castle Site Name:** BRG 123  
**Crown Castle JDE Job Number:** 159571  
**Crown Castle Work Order Number:** 415318

**Engineering Firm Designation:** **Vertical Structures, Inc. Project Number:** 2011-004-056

**Site Data:** **Route 34-Washington Avenue, Newtown, CT, Fairfield County**  
**Latitude 41° 24' 45.53", Longitude -73° 16' 12.34"**  
**185 Foot - Monopole Tower**

Dear Eva Morales,

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 419932, in accordance with application 124225, revision 5.

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:

LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**  
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

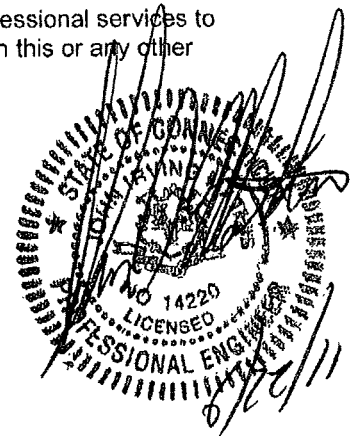
The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

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 USA Inc.. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

  
Jordan Kays, P.E.  
Project Engineer



Date: June 22, 2011



Eva Morales  
Crown Castle USA Inc.  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
(704) 405-6612

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

**Subject: Structural Analysis Report**

<b>Carrier Designation:</b>	<b>T-Mobile Change-Out</b>	
	<b>Carrier Site Number:</b>	CT11123A
	<b>Carrier Site Name:</b>	Newton
<b>Crown Castle Designation:</b>	<b>Crown Castle BU Number:</b>	806354
	<b>Crown Castle Site Name:</b>	BRG 123
	<b>Crown Castle JDE Job Number:</b>	159571
	<b>Crown Castle Work Order Number:</b>	415318
<b>Engineering Firm Designation:</b>	<b>Vertical Structures, Inc. Project Number:</b>	2011-004-056
<b>Site Data:</b>	<b>Route 34-Washington Avenue, Newtown, CT, Fairfield County</b> <b>Latitude 41° 24' 45.53", Longitude -73° 16' 12.34"</b> <b>185 Foot - Monopole Tower</b>	

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The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 85 mph fastest mile.

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We at Vertical Structures, Inc. appreciate the opportunity of providing our continuing professional services to you and Crown Castle USA Inc.. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Jordan Kays, P.E.  
Project Engineer

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## 1) INTRODUCTION

This tower is a 185 ft Monopole tower designed by EEI in 1999. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower was reworked in 2009 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
145	148	3	celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	6	1 5/8	1A
		3	celwave	ATMAA1412D-1A20 TMA			
		3	celwave	ATMPP1412D-1CWA TMA			

Notes:

1A) Proposed TMA's to be Installed Directly Behind Existing & Proposed Antennas

**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
185	187	6	decibel	DB846F65ZAXY w/ Mount Pipe	12	1 5/8	1
		6	decibel	DB948F85T2E-M w/ Mount Pipe			
	185	1	eei	10'-8" Low Profile Platform			
180	194	1	decibel	DB222	1	1/2	1
	185	1		10' Pipe Mount			
175	177	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1 5/8	1
		6	powerwave technologies	LGP2140X			
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe	1 2	3/8 5/8	2
		3	powerwave technologies	TT19-08BP111-001 TMA			
		6	ericsson	RRUS-11 BTS			
	1	raycap	DC6-48-60-18-8F Surge Arrestor				
175	1		Platform Mount [LP 601-1]			1	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165	167	6	decibel	DB980H90T2E-M w/ Mount Pipe	6	1 5/8	1
	165	1		Platform Mount [LP 601-1]			
155	158	12	decibel	DB844H90 w/ Mount Pipe	12	1 1/4	1
	155	1		Platform Mount [LP 602-1]			
145	148	6	ericsson	KRY 112 71 TMA	6	1 5/8	3
		3	ems wireless	RR90-17-02DP w/ Mount Pipe			1
	145	1		Platform Mount [LP 601-1]			
135	135	1		T-Arm Mount [TA 602-3]	6	1 5/8	1
		3	kathrein	800 10504 w/ Mount Pipe			
		3	kathrein	860 10025 TMS			
100	100	2		2' Sidearm	2	1/2	1
		2		Generic GPS			
40	40	1		2' Sidearm	1	1/2	1
		1		Generic GPS			

- 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)
185	185	1	EEI	10'-8" L.P. Platform		
		12	Swedcom	ALP 9212		
175	175	1	EEI	12' L.P. Platform		
		12	Swedcom	ALP 11011		
165	165	9	Decibel	DB 980		
		1	EEI	12' L.P. Platform		
155	155	1	EEI	12' L.P. Platform		
		12	Swedcom	ALP 9011		
145	145	1	EEI	12' L.P. Platform		
		6	EMS Wireless	RR65-18		
		1	Scala	OGB9-900		
110	110	1		Generic GPS		
		1		Sidearm		
50	50	1		Generic GPS		
		1		Sidearm		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Online Application	T-Mobile Change-Out Revision #5	124225	CCI iSite
Tower Drawing	EEl Drawing No. GS51352	822035	CCI iSite
Foundation Drawing	EEl Drawing No. F4743-185	822037	CCI iSite
Geotechnical Report	Clarence Welti Associates Report Dated "February 14, 1999"	2297011	CCI iSite
Rework Drawings	Vertical Structures Job No. 2009- 004-022	2381114	CCI iSite

#### 3.1) Analysis Method

RISATower (version 5.4.2.0), 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. Crown Castle's CCIplate 1.4 analysis tool was used to evaluate the anchor bolts, base plate, and any flange splices.

#### 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
L1	185 - 149.5	Pole	TP36.0404x29x0.25	1	-8975.05	1435427.66	37.7	Pass
L2	149.5 - 114.1	Pole	TP42.4605x34.5468x0.3125	2	-17663.20	2114671.11	73.7	Pass
L3	114.1 - 76.68	Pole	TP49.157x40.6977x0.375	3	-27415.10	2937985.20	88.1	Pass
L4	76.68 - 38.26	Pole	TP55.9285x47.1057x0.4375	4	-40284.40	3900077.91	91.4	Pass
L5	38.26 - 0	Pole	TP62.5x53.5873x0.5	5	-59606.40	5115214.00	90.6	Pass
							Summary	
						Pole (L4)	91.4	Pass
						Rating =	91.4	Pass

**Table 6 - Tower Component Stresses vs. Capacity - LC1**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	80.6	Pass
1	Base Plate	0	83.9	Pass
	Base Foundation (Compared w/ Design Loads)	0	99.8	Pass

<b>Structure Rating (max from all components) =</b>	<b>99.8%</b>
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Notes:

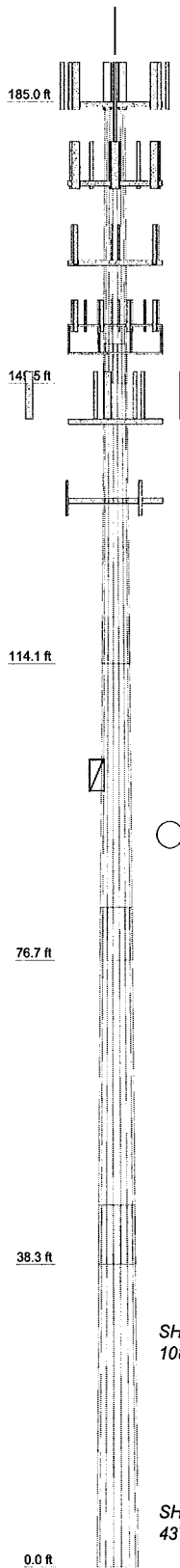
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity.

**4.1) Recommendations**

N/A

**APPENDIX A**  
**RISA TOWER OUTPUT**

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	35.50	18	0.2500	5.01	29.0000	36.0404		3093.2
2	40.41	18	0.3125	5.81	34.5468	42.4605		5208.9
3	43.23	18	0.3750	6.65	40.6977	49.1570	A572-65	7800.6
4	45.07	18	0.4375	7.49	47.1057	55.9285		10878.2
5	45.75	18	0.5000	53.5973	62.5000			14216.8
								41197.7



### DESIGNED APPURTENANCE LOADING

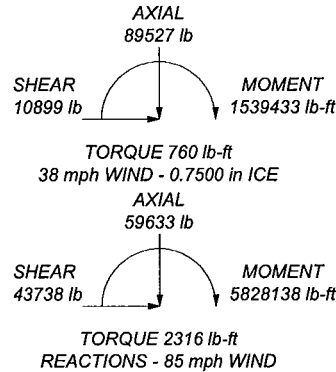
TYPE	ELEVATION	TYPE	ELEVATION
EEl 10'-8" Low-Profile Platform (TIA-G)	185	(4) DB844H90 w/Mount Pipe	155
Monopole Transition Ladder (VSI)	185	(4) DB844H90 w/Mount Pipe	155
DB846F65ZAXY w/Mount Pipe	185	Platform Mount (LP 601-1) (T-Mobile)	145
(2) DB948F85T2E-M w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) DB948F85T2E-M w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) DB948F85T2E-M w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB846F65ZAXY w/Mount Pipe	185	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DB222	180	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
10'x4" Pipe Mount	180	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
Platform Mount [LP 601-1]	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) 7770.00 w/ mount pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) 7770.00 w/ mount pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) 7770.00 w/ mount pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
P65-16-XLH-RR w/ Mount Pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
P65-16-XLH-RR w/ Mount Pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
P65-16-XLH-RR w/ Mount Pipe	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) RRUS-11 BTS	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) RRUS-11 BTS	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) RRUS-11 BTS	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
TT19-08BP111-001 TMA	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
TT19-08BP111-001 TMA	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
TT19-08BP111-001 TMA	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
DC6-48-60-18-8F Surge Arrestor	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) LGP2140X	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) LGP2140X	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) LGP2140X	175	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
Platform Mount [LP 601-1]	165	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) DB980H90T2E-M w/Mount Pipe	165	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) DB980H90T2E-M w/Mount Pipe	165	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(2) DB980H90T2E-M w/Mount Pipe	165	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
Platform Mount [LP 602-1]	155	RR90-17-02DP w/Mount Pipe (T-Mobile)	145
(4) DB844H90 w/Mount Pipe	155	RR90-17-02DP w/Mount Pipe (T-Mobile)	145

### MATERIAL STRENGTH

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

### TOWER DESIGN NOTES

1. Tower is located in Fairfield 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: 91.4%



<b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job: BRG 123, CT BU#806354</b>
	<b>Project: Vertical Structures Job No. 2011-004-056</b>
	Client: Crown Castle      Drawn by: Jordan Kays      App'd:
	Code: TIA/EIA-222-F      Date: 06/22/11      Scale: NTS
	Path: \\nas1\kays\Open Jobs\BRG 123, CT 004-056\RISA806354.er

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	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

- Tower is located in Fairfield 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 pole design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

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

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	185.00-149.50	35.50	5.01	18	29.0000	36.0404	0.2500	1.0000	A572-65 (65 ksi)
L2	149.50-114.10	40.41	5.81	18	34.5468	42.4605	0.3125	1.2500	A572-65 (65 ksi)
L3	114.10-76.68	43.23	6.65	18	40.6977	49.1570	0.3750	1.5000	A572-65 (65 ksi)
L4	76.68-38.26	45.07	7.49	18	47.1057	55.9285	0.4375	1.7500	A572-65 (65 ksi)
L5	38.26-0.00	45.75		18	53.5873	62.5000	0.5000	2.0000	A572-65 (65 ksi)

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 2 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	29.4474	22.8131	2382.3081	10.2063	14.7320	161.7098	4767.7509	11.4087	4.6640	18.656
	36.5964	28.3997	4596.0425	12.7056	18.3085	251.0329	9198.1326	14.2025	5.9031	23.612
L2	36.0760	33.9562	5027.8136	12.1532	17.5498	286.4887	10062.2429	16.9813	5.5302	17.697
	43.1155	41.8055	9382.6455	14.9625	21.5699	434.9872	18777.6370	20.9067	6.9230	22.154
L3	42.4800	47.9941	9858.8083	14.3146	20.6744	476.8600	19730.5891	24.0016	6.5028	17.341
	49.9153	58.0628	17456.3904	17.3176	24.9718	699.0454	34935.7504	29.0369	7.9916	21.311
L4	49.1543	64.8047	17831.4286	16.5672	23.9297	745.1587	35686.3203	32.4085	7.5206	17.19
	56.7913	77.0562	29977.1322	19.6993	28.4117	1055.0990	59993.7092	38.5354	9.0734	20.739
L5	55.8956	84.2495	29997.5476	18.8460	27.2223	1101.9461	60034.5667	42.1328	8.5514	17.103
	63.4642	98.3940	47784.7640	22.0100	31.7500	1505.0319	95632.4044	49.2063	10.1200	20.24

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L1 185.00- 149.50				1	1	1		
L2 149.50- 114.10				1	1	1		
L3 114.10- 76.68				1	1	1		
L4 76.68-38.26				1	1	1		
L5 38.26-0.00				1	1	1		

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

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>	Weight
						ft <sup>2</sup> /ft	plf
HJ7-50A (1-5/8 AIR)	C	No	Inside Pole	185.00 - 5.00	12	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
LDF4-50A (1/2 FOAM)	A	No	Inside Pole	185.00 - 5.00	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
CR 50 1873 (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	46.00 - 5.00	12	No Ice	0.02
						1/2" Ice	0.02
						1" Ice	0.03
						2" Ice	0.05
						4" Ice	0.08
CR 50 1873 (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	177.00 - 46.00	12	No Ice	0.03
						1/2" Ice	0.05
						1" Ice	0.07
						2" Ice	0.10
						4" Ice	0.16

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
						ft <sup>2</sup> /ft	plf	
FB-L98B-002-75000 (3/8")	B	No	CaAa (Out Of Face)	177.00 - 5.00	1	No Ice	0.00	0.10
						1/2" Ice	0.00	0.65
						1" Ice	0.00	1.80
						2" Ice	0.00	5.95
						4" Ice	0.00	21.57
WR-VG82ST-BRDA (5/8")	B	No	CaAa (Out Of Face)	177.00 - 5.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.93
						1" Ice	0.00	2.32
						2" Ice	0.00	6.93
						4" Ice	0.00	23.49
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	167.00 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF6-50A (1-1/4 FOAM)	B	No	Inside Pole	158.00 - 5.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF7-50A (1-5/8 FOAM) (T-Mobile)	A	No	Inside Pole	148.00 - 5.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (T-Mobile)	A	No	CaAa (Out Of Face)	148.00 - 5.00	6	No Ice	0.03	0.82
						1/2" Ice	0.05	2.33
						1" Ice	0.07	4.46
						2" Ice	0.10	10.54
						4" Ice	0.17	30.04
CR 50 1873 (1-5/8 FOAM)	C	No	Inside Pole	135.00 - 5.00	6	No Ice	0.00	0.83
						1/2" Ice	0.00	0.83
						1" Ice	0.00	0.83
						2" Ice	0.00	0.83
						4" Ice	0.00	0.83
LDF4-50A (1/2 FOAM)	C	No	Inside Pole	100.00 - 5.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF4-50A (1/2 FOAM)	C	No	Inside Pole	40.00 - 5.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight lb
L1	185.00-149.50	A	0.000	0.000	0.000	0.000	5.33
		B	0.000	0.000	0.000	10.890	352.22
		C	0.000	0.000	0.000	0.000	529.14
L2	149.50-114.10	A	0.000	0.000	0.000	6.712	338.89
		B	0.000	0.000	0.000	14.018	647.11
		C	0.000	0.000	0.000	0.000	720.04
L3	114.10-76.68	A	0.000	0.000	0.000	7.409	373.83

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Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight lb
L4	76.68-38.26	B	0.000	0.000	0.000	14.818	684.04
		C	0.000	0.000	0.000	0.000	844.46
		A	0.000	0.000	0.000	7.607	383.82
		B	0.000	0.000	0.000	13.682	702.32
L5	38.26-0.00	C	0.000	0.000	0.000	0.000	871.63
		A	0.000	0.000	0.000	6.585	332.27
		B	0.000	0.000	0.000	6.585	607.99
		C	0.000	0.000	0.000	0.000	759.33

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight lb
L1	185.00-149.50	A	0.911	0.000	0.000	0.000	0.000	5.33
		B		0.000	0.000	0.000	20.921	1575.58
		C		0.000	0.000	0.000	0.000	529.14
L2	149.50-114.10	A	0.885	0.000	0.000	0.000	12.888	1002.39
		B		0.000	0.000	0.000	26.931	2221.91
		C		0.000	0.000	0.000	0.000	720.04
L3	114.10-76.68	A	0.852	0.000	0.000	0.000	14.034	1081.76
		B		0.000	0.000	0.000	28.092	2292.20
		C		0.000	0.000	0.000	0.000	844.46
L4	76.68-38.26	A	0.802	0.000	0.000	0.000	14.151	1077.66
		B		0.000	0.000	0.000	25.479	2277.27
		C		0.000	0.000	0.000	0.000	871.63
L5	38.26-0.00	A	0.750	0.000	0.000	0.000	11.918	890.51
		B		0.000	0.000	0.000	11.918	1873.49
		C		0.000	0.000	0.000	0.000	759.33

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	185.00-149.50	0.3667	0.2117	0.6158	0.3555
L2	149.50-114.10	0.4359	0.0098	0.7095	0.0161
L3	114.10-76.68	0.4447	0.0000	0.7300	0.0004
L4	76.68-38.26	0.4077	-0.0281	0.6740	-0.0459
L5	38.26-0.00	0.2072	-0.1196	0.3476	-0.2007

### Discrete Tower Loads



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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
EEI 10'-8" Low-Profile Platform (TIA-G)	C	None			0.0000	185.00	No Ice	18.80	18.80	1500.00
							1/2" Ice	22.80	22.80	2250.00
							1" Ice	26.80	26.80	3000.00
							2" Ice	34.80	34.80	4500.00
							4" Ice	50.80	50.80	7500.00
Monopole Transition Ladder (VSI)	B	From Centroid-Leg	3.00	0.00	0.0000	185.00	No Ice	6.00	6.00	160.00
							1/2" Ice	8.00	8.00	240.00
							1" Ice	10.00	10.00	320.00
							2" Ice	14.00	14.00	480.00
							4" Ice	22.00	22.00	800.00
DB846F65ZAXY w/Mount Pipe	C	From Centroid-Leg	7.16	1.00	60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
(2) DB948F85T2E-M w/Mount Pipe	A	From Centroid-Face	3.08	0.00	0.0000	185.00	No Ice	2.62	4.92	34.05
							1/2" Ice	3.23	6.01	68.79
							1" Ice	3.72	6.81	113.43
							2" Ice	4.73	8.46	223.18
							4" Ice	6.98	11.98	558.87
DB846F65ZAXY w/Mount Pipe	A	From Centroid-Leg	7.16	-1.00	-60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
DB846F65ZAXY w/Mount Pipe	A	From Centroid-Leg	7.16	1.00	60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
(2) DB948F85T2E-M w/Mount Pipe	B	From Centroid-Face	3.08	0.00	0.0000	185.00	No Ice	2.62	4.92	34.05
							1/2" Ice	3.23	6.01	68.79
							1" Ice	3.72	6.81	113.43
							2" Ice	4.73	8.46	223.18
							4" Ice	6.98	11.98	558.87
DB846F65ZAXY w/Mount Pipe	B	From Centroid-Leg	7.16	-1.00	-60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
DB846F65ZAXY w/Mount Pipe	B	From Centroid-Leg	7.16	1.00	60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
(2) DB948F85T2E-M w/Mount Pipe	C	From Centroid-Face	3.08	0.00	0.0000	185.00	No Ice	2.62	4.92	34.05
							1/2" Ice	3.23	6.01	68.79
							1" Ice	3.72	6.81	113.43
							2" Ice	4.73	8.46	223.18
							4" Ice	6.98	11.98	558.87
DB846F65ZAXY w/Mount Pipe	C	From Centroid-Leg	7.16	-1.00	-60.0000	185.00	No Ice	7.27	7.82	46.55
							1/2" Ice	7.88	9.01	111.10
							1" Ice	8.48	9.91	187.61
							2" Ice	9.72	11.81	367.24
							4" Ice	12.33	15.98	867.25
DB222	C	From Centroid-	1.80	0.00	0.0000	180.00	No Ice	1.60	1.60	16.00
							1/2" Ice	2.88	2.88	20.80

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 6 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight lb
		Face	14.00			1" Ice 4.16	4.16	25.60
						2" Ice 6.72	6.72	35.20
						4" Ice 11.84	11.84	54.40
10'x4" Pipe Mount	C	From Centroid-Face	1.80 0.00 5.00	0.0000	180.00	No Ice 4.50	4.50	109.00
						1/2" Ice 5.24	5.24	140.31
						1" Ice 5.85	5.85	178.35
						2" Ice 7.09	7.09	275.18
						4" Ice 9.69	9.69	556.20
***								
Platform Mount [LP 601-1]	C	None		0.0000	175.00	No Ice 28.47	28.47	1122.00
						1/2" Ice 33.59	33.59	1513.66
						1" Ice 38.71	38.71	1905.31
						2" Ice 48.95	48.95	2688.62
						4" Ice 69.43	69.43	4255.25
(2) 7770.00 w/ mount pipe	A	From Centroid-Face	3.46 0.00 2.00	-7.0000	175.00	No Ice 6.22	4.35	56.90
						1/2" Ice 6.77	5.20	102.99
						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 Centroid-Face	3.46 0.00 2.00	-7.0000	175.00	No Ice 6.22	4.35	56.90
						1/2" Ice 6.77	5.20	102.99
						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 Centroid-Face	3.46 0.00 2.00	-7.0000	175.00	No Ice 6.22	4.35	56.90
						1/2" Ice 6.77	5.20	102.99
						1" Ice 7.30	5.92	159.01
						2" Ice 8.38	7.41	293.01
						4" Ice 10.69	10.76	679.74
P65-16-XLH-RR w/ Mount Pipe	A	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 8.88	6.60	82.20
						1/2" Ice 9.63	7.88	147.36
						1" Ice 10.36	9.00	225.21
						2" Ice 11.75	10.93	408.26
						4" Ice 14.66	15.02	921.60
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 8.88	6.60	82.20
						1/2" Ice 9.63	7.88	147.36
						1" Ice 10.36	9.00	225.21
						2" Ice 11.75	10.93	408.26
						4" Ice 14.66	15.02	921.60
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 8.88	6.60	82.20
						1/2" Ice 9.63	7.88	147.36
						1" Ice 10.36	9.00	225.21
						2" Ice 11.75	10.93	408.26
						4" Ice 14.66	15.02	921.60
(2) RRUS-11 BTS	A	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 4.42	1.19	55.00
						1/2" Ice 4.71	1.35	80.77
						1" Ice 5.00	1.53	109.98
						2" Ice 5.61	1.90	179.45
						4" Ice 6.94	2.75	368.09
(2) RRUS-11 BTS	B	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 4.42	1.19	55.00
						1/2" Ice 4.71	1.35	80.77
						1" Ice 5.00	1.53	109.98
						2" Ice 5.61	1.90	179.45
						4" Ice 6.94	2.75	368.09
(2) RRUS-11 BTS	C	From Centroid-Face	3.46 0.00 2.00	0.0000	175.00	No Ice 4.42	1.19	55.00
						1/2" Ice 4.71	1.35	80.77
						1" Ice 5.00	1.53	109.98

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 7 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						ft
TT19-08BP111-001 TMA	A	From Centroid-Face	3.46	0.00	0.0000	175.00	2" Ice	5.61	1.90	179.45
							4" Ice	6.94	2.75	368.09
							No Ice	0.64	0.52	16.00
							1/2" Ice	0.76	0.62	21.80
							1" Ice	0.88	0.74	29.22
							2" Ice	1.14	0.99	49.70
TT19-08BP111-001 TMA	B	From Centroid-Face	3.46	0.00	0.0000	175.00	4" Ice	1.78	1.59	118.66
							No Ice	0.64	0.52	16.00
							1/2" Ice	0.76	0.62	21.80
							1" Ice	0.88	0.74	29.22
							2" Ice	1.14	0.99	49.70
							4" Ice	1.78	1.59	118.66
TT19-08BP111-001 TMA	C	From Centroid-Face	3.46	0.00	0.0000	175.00	No Ice	0.64	0.52	16.00
							1/2" Ice	0.76	0.62	21.80
							1" Ice	0.88	0.74	29.22
							2" Ice	1.14	0.99	49.70
							4" Ice	1.78	1.59	118.66
							No Ice	0.64	0.52	16.00
DC6-48-60-18-8F Surge Arrestor	C	From Centroid-Face	3.46	0.00	0.0000	175.00	No Ice	2.22	2.22	20.00
							1/2" Ice	2.44	2.44	39.25
							1" Ice	2.66	2.66	61.47
							2" Ice	3.15	3.15	115.61
							4" Ice	4.21	4.21	268.16
							No Ice	0.00	0.37	17.50
(2) LGP2140X	A	From Centroid-Face	3.46	0.00	-7.0000	175.00	1/2" Ice	0.00	0.48	24.46
							1" Ice	0.00	0.60	33.28
							2" Ice	0.00	0.87	57.28
							4" Ice	0.00	1.51	136.16
							No Ice	0.00	0.37	17.50
							1/2" Ice	0.00	0.48	24.46
(2) LGP2140X	B	From Centroid-Face	3.46	0.00	-7.0000	175.00	1" Ice	0.00	0.60	33.28
							2" Ice	0.00	0.87	57.28
							4" Ice	0.00	1.51	136.16
							No Ice	0.00	0.37	17.50
							1/2" Ice	0.00	0.48	24.46
							1" Ice	0.00	0.60	33.28
(2) LGP2140X	C	From Centroid-Face	3.46	0.00	-7.0000	175.00	2" Ice	0.00	0.87	57.28
							4" Ice	0.00	1.51	136.16
							No Ice	0.00	0.37	17.50
							1/2" Ice	0.00	0.48	24.46
							1" Ice	0.00	0.60	33.28
							2" Ice	0.00	0.87	57.28
*** Platform Mount [LP 601-1]	C	None			0.0000	165.00	No Ice	28.47	28.47	1122.00
							1/2" Ice	33.59	33.59	1513.66
							1" Ice	38.71	38.71	1905.31
							2" Ice	48.95	48.95	2688.62
							4" Ice	69.43	69.43	4255.25
							No Ice	4.27	3.86	34.05
(2) DB980H90T2E-M w/Mount Pipe	A	From Centroid-Face	3.46	0.00	0.0000	165.00	1/2" Ice	4.86	4.95	69.84
							1" Ice	5.37	5.75	116.19
							2" Ice	6.42	7.39	231.29
							4" Ice	8.86	10.87	585.45
							No Ice	4.27	3.86	34.05
							1/2" Ice	4.86	4.95	69.84
(2) DB980H90T2E-M w/Mount Pipe	B	From Centroid-Face	3.46	0.00	0.0000	165.00	1" Ice	5.37	5.75	116.19
							2" Ice	6.42	7.39	231.29
							4" Ice	8.86	10.87	585.45
							No Ice	4.27	3.86	34.05
							1/2" Ice	4.86	4.95	69.84
							1" Ice	5.37	5.75	116.19
(2) DB980H90T2E-M w/Mount Pipe	C	From Centroid-Face	3.46	0.00	0.0000	165.00	2" Ice	6.42	7.39	231.29
							4" Ice	8.86	10.87	585.45
							No Ice	4.27	3.86	34.05
							1/2" Ice	4.86	4.95	69.84
							1" Ice	5.37	5.75	116.19
							2" Ice	6.42	7.39	231.29

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 8 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral						Vert
***						4" Ice	8.86	10.87	585.45	
Platform Mount [LP 602-1]	C	None			0.0000	155.00	No Ice	32.03	32.03	1343.30
							1/2" Ice	38.71	38.71	1800.09
							1" Ice	45.39	45.39	2256.88
							2" Ice	58.75	58.75	3170.46
							4" Ice	85.47	85.47	4997.62
(4) DB844H90 w/Mount Pipe	A	From Centroid-Face	3.46	0.00	0.0000	155.00	No Ice	3.58	5.63	35.55
							1/2" Ice	4.20	6.73	77.48
							1" Ice	4.73	7.54	129.56
							2" Ice	5.86	9.21	254.87
							4" Ice	8.27	12.75	624.47
(4) DB844H90 w/Mount Pipe	B	From Centroid-Face	3.46	0.00	0.0000	155.00	No Ice	3.58	5.63	35.55
							1/2" Ice	4.20	6.73	77.48
							1" Ice	4.73	7.54	129.56
							2" Ice	5.86	9.21	254.87
							4" Ice	8.27	12.75	624.47
(4) DB844H90 w/Mount Pipe	C	From Centroid-Face	3.46	0.00	0.0000	155.00	No Ice	3.58	5.63	35.55
							1/2" Ice	4.20	6.73	77.48
							1" Ice	4.73	7.54	129.56
							2" Ice	5.86	9.21	254.87
							4" Ice	8.27	12.75	624.47
***										
Platform Mount [LP 601-1] (T-Mobile)	C	None			0.0000	145.00	No Ice	28.47	28.47	1122.00
							1/2" Ice	33.59	33.59	1513.66
							1" Ice	38.71	38.71	1905.31
							2" Ice	48.95	48.95	2688.62
							4" Ice	69.43	69.43	4255.25
RR90-17-02DP w/Mount Pipe (T-Mobile)	A	From Centroid-Face	3.46	6.00	25.0000	145.00	No Ice	4.91	3.64	43.55
							1/2" Ice	5.57	4.70	81.64
							1" Ice	6.14	5.48	130.14
							2" Ice	7.32	7.08	249.13
							4" Ice	9.81	10.47	609.39
RR90-17-02DP w/Mount Pipe (T-Mobile)	B	From Centroid-Face	3.46	6.00	25.0000	145.00	No Ice	4.91	3.64	43.55
							1/2" Ice	5.57	4.70	81.64
							1" Ice	6.14	5.48	130.14
							2" Ice	7.32	7.08	249.13
							4" Ice	9.81	10.47	609.39
RR90-17-02DP w/Mount Pipe (T-Mobile)	C	From Centroid-Face	3.46	6.00	10.0000	145.00	No Ice	4.91	3.64	43.55
							1/2" Ice	5.57	4.70	81.64
							1" Ice	6.14	5.48	130.14
							2" Ice	7.32	7.08	249.13
							4" Ice	9.81	10.47	609.39
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe (VSI) (T-Mobile)	A	From Centroid-Face	3.46	-6.00	25.0000	145.00	No Ice	7.55	3.57	62.60
							1/2" Ice	8.11	4.41	109.60
							1" Ice	8.66	5.13	166.60
							2" Ice	9.78	6.61	302.84
							4" Ice	12.14	9.78	695.10
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe (VSI) (T-Mobile)	B	From Centroid-Face	3.46	-6.00	25.0000	145.00	No Ice	7.55	3.57	62.60
							1/2" Ice	8.11	4.41	109.60
							1" Ice	8.66	5.13	166.60
							2" Ice	9.78	6.61	302.84
							4" Ice	12.14	9.78	695.10
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe (VSI) (T-Mobile)	C	From Centroid-Face	3.46	-6.00	10.0000	145.00	No Ice	7.55	3.57	62.60
							1/2" Ice	8.11	4.41	109.60
							1" Ice	8.66	5.13	166.60
							2" Ice	9.78	6.61	302.84

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 9 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
ATMAA1412D-1A20 TMA (T-Mobile)	A	From Centroid-Face	3.46	25.0000	145.00	4" Ice	12.14	9.78	695.10
			0.00			No Ice	0.00	0.47	13.00
			3.00			1/2" Ice	0.00	0.57	20.62
						1" Ice	0.00	0.69	30.11
						2" Ice	0.00	0.95	55.52
ATMAA1412D-1A20 TMA (T-Mobile)	B	From Centroid-Face	3.46	25.0000	145.00	4" Ice	0.00	1.57	137.44
			0.00			No Ice	0.00	0.47	13.00
			3.00			1/2" Ice	0.00	0.57	20.62
						1" Ice	0.00	0.69	30.11
						2" Ice	0.00	0.95	55.52
ATMAA1412D-1A20 TMA (T-Mobile)	C	From Centroid-Face	3.46	10.0000	145.00	4" Ice	0.00	1.57	137.44
			0.00			No Ice	0.00	0.47	13.00
			3.00			1/2" Ice	0.00	0.57	20.62
						1" Ice	0.00	0.69	30.11
						2" Ice	0.00	0.95	55.52
ATMPP1412D-1CWA TMA (T-Mobile)	A	From Centroid-Face	3.46	25.0000	145.00	4" Ice	0.00	1.57	137.44
			0.00			No Ice	0.29	0.42	12.50
			3.00			1/2" Ice	0.33	0.53	19.51
						1" Ice	0.37	0.65	28.38
						2" Ice	0.44	0.92	52.45
ATMPP1412D-1CWA TMA (T-Mobile)	B	From Centroid-Face	3.46	25.0000	145.00	4" Ice	0.60	1.57	131.40
			0.00			No Ice	0.29	0.42	12.50
			3.00			1/2" Ice	0.33	0.53	19.51
						1" Ice	0.37	0.65	28.38
						2" Ice	0.44	0.92	52.45
ATMPP1412D-1CWA TMA (T-Mobile)	C	From Centroid-Face	3.46	10.0000	145.00	4" Ice	0.60	1.57	131.40
			0.00			No Ice	0.29	0.42	12.50
			3.00			1/2" Ice	0.33	0.53	19.51
						1" Ice	0.37	0.65	28.38
						2" Ice	0.44	0.92	52.45
***									
T-Arm Mount [TA 602-3]	A	None		0.0000	135.00	4" Ice	0.60	1.57	131.40
						No Ice	11.59	11.59	774.30
						1/2" Ice	15.44	15.44	990.35
						1" Ice	19.29	19.29	1206.41
						2" Ice	26.99	26.99	1638.52
(2) 6' x 2" Antenna Mount Pipe (VSI)	A	From Centroid-Face	5.31	0.0000	135.00	4" Ice	42.39	42.39	2502.73
			-3.13			No Ice	1.43	1.43	23.00
			0.00			1/2" Ice	1.92	1.92	33.83
						1" Ice	2.29	2.29	48.71
						2" Ice	3.06	3.06	91.28
(2) 6' x 2" Antenna Mount Pipe (VSI)	B	From Centroid-Face	5.31	0.0000	135.00	4" Ice	4.70	4.70	231.84
			-3.13			No Ice	1.43	1.43	23.00
			0.00			1/2" Ice	1.92	1.92	33.83
						1" Ice	2.29	2.29	48.71
						2" Ice	3.06	3.06	91.28
(2) 6' x 2" Antenna Mount Pipe (VSI)	C	From Centroid-Face	5.31	0.0000	135.00	4" Ice	4.70	4.70	231.84
			-3.13			No Ice	1.43	1.43	23.00
			0.00			1/2" Ice	1.92	1.92	33.83
						1" Ice	2.29	2.29	48.71
						2" Ice	3.06	3.06	91.28
800 10504 w/ Mount Pipe	A	From Centroid-Face	5.31	-30.0000	135.00	4" Ice	4.70	4.70	231.84
			-3.13			No Ice	3.47	3.05	35.85
			0.00			1/2" Ice	3.84	3.68	65.14
						1" Ice	4.23	4.33	103.05
						2" Ice	5.08	5.67	198.43
			4" Ice	6.99	8.61	494.74			

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b>	BRG 123, CT BU#806354	<b>Page</b>	10 of 12
	<b>Project</b>	Vertical Structures Job No. 2011-004-056	<b>Date</b>	14:22:00 06/22/11
	<b>Client</b>	Crown Castle	<b>Designed by</b>	Jordan Kays

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
800 10504 w/ Mount Pipe	B	From Centroid-Face	5.31	-30.0000	135.00	No Ice	3.47	3.05	35.85
			-3.13			1/2" Ice	3.84	3.68	65.14
			0.00			1" Ice	4.23	4.33	103.05
						2" Ice	5.08	5.67	198.43
						4" Ice	6.99	8.61	494.74
800 10504 w/ Mount Pipe	C	From Centroid-Face	5.31	-30.0000	135.00	No Ice	3.47	3.05	35.85
			-3.13			1/2" Ice	3.84	3.68	65.14
			0.00			1" Ice	4.23	4.33	103.05
						2" Ice	5.08	5.67	198.43
						4" Ice	6.99	8.61	494.74
860 10025 TMS	A	From Centroid-Face	5.31	-30.0000	135.00	No Ice	0.18	0.15	1.20
			-3.13			1/2" Ice	0.25	0.21	2.85
			0.00			1" Ice	0.33	0.29	5.48
						2" Ice	0.51	0.47	14.45
						4" Ice	0.98	0.93	52.66
860 10025 TMS	B	From Centroid-Face	5.31	-30.0000	135.00	No Ice	0.18	0.15	1.20
			-3.13			1/2" Ice	0.25	0.21	2.85
			0.00			1" Ice	0.33	0.29	5.48
						2" Ice	0.51	0.47	14.45
						4" Ice	0.98	0.93	52.66
860 10025 TMS	C	From Centroid-Face	5.31	-30.0000	135.00	No Ice	0.18	0.15	1.20
			-3.13			1/2" Ice	0.25	0.21	2.85
			0.00			1" Ice	0.33	0.29	5.48
						2" Ice	0.51	0.47	14.45
						4" Ice	0.98	0.93	52.66
***									
2' Sidearm (4" Tube) (VSI)	C	From Centroid-Leg	2.86	0.0000	100.00	No Ice	0.30	1.33	30.00
			0.00			1/2" Ice	0.50	1.67	40.00
			0.00			1" Ice	0.75	1.38	19.39
						2" Ice	1.00	1.89	21.41
						4" Ice	1.50	2.92	25.45
2' Sidearm (4" Tube) (VSI)	C	From Centroid-Face	2.86	30.0000	100.00	No Ice	0.30	1.33	30.00
			0.00			1/2" Ice	0.50	1.67	40.00
			0.00			1" Ice	0.75	1.38	19.39
						2" Ice	1.00	1.89	21.41
						4" Ice	1.50	2.92	25.45
2' Sidearm (4" Tube) (VSI)	C	From Centroid-Face	3.32	0.0000	40.00	No Ice	0.30	1.33	30.00
			0.00			1/2" Ice	0.50	1.67	40.00
			0.00			1" Ice	0.75	1.38	19.39
						2" Ice	1.00	1.89	21.41
						4" Ice	1.50	2.92	25.45
Generic GPS (VSI)	C	From Centroid-Leg	3.86	0.0000	100.00	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
Generic GPS (VSI)	C	From Centroid-Face	3.86	30.0000	100.00	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
Generic GPS (VSI)	C	From Centroid-Face	4.32	0.0000	40.00	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

<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 11 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

## Compression Checks

## Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>n</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
L1	185 - 149.5 (1)	TP36.0404x29x0.25	35.50	0.00	0.0	39.000	27.6113	-8975.05	1076840.00	0.008
L2	149.5 - 114.1 (2)	TP42.4605x34.5468x0.3125	40.41	0.00	0.0	39.000	40.6770	-17663.20	1586400.00	0.011
L3	114.1 - 76.68 (3)	TP49.157x40.6977x0.375	43.23	0.00	0.0	39.000	56.5139	-27415.10	2204040.00	0.012
L4	76.68 - 38.26 (4)	TP55.9285x47.1057x0.4375	45.07	0.00	0.0	39.000	75.0202	-40284.40	2925790.00	0.014
L5	38.26 - 0 (5)	TP62.5x53.5873x0.5	45.75	0.00	0.0	39.000	98.3940	-59606.40	3837370.00	0.016

## Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> lb-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio f <sub>bx</sub> /F <sub>bx</sub>	Actual M <sub>y</sub> lb-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio f <sub>by</sub> /F <sub>by</sub>
L1	185 - 149.5 (1)	TP36.0404x29x0.25	380692.50	-19.256	39.000	0.494	0.00	0.000	39.000	0.000
L2	149.5 - 114.1 (2)	TP42.4605x34.5468x0.3125	1298858.33	-37.855	39.000	0.971	0.00	0.000	39.000	0.000
L3	114.1 - 76.68 (3)	TP49.157x40.6977x0.375	2501275.00	-45.333	39.000	1.162	0.00	0.000	39.000	0.000
L4	76.68 - 38.26 (4)	TP55.9285x47.1057x0.4375	3913508.33	-46.968	39.000	1.204	0.00	0.000	39.000	0.000
L5	38.26 - 0 (5)	TP62.5x53.5873x0.5	5828141.33	-46.469	39.000	1.192	0.00	0.000	39.000	0.000

## Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P <sub>a</sub>	Ratio f <sub>bx</sub> F <sub>bx</sub>	Ratio f <sub>by</sub> F <sub>by</sub>	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	185 - 149.5 (1)	TP36.0404x29x0.25	0.008	0.494	0.000	0.502 ✓	1.333	H1-3 ✓
L2	149.5 - 114.1 (2)	TP42.4605x34.5468x0.3125	0.011	0.971	0.000	0.982 ✓	1.333	H1-3 ✓
L3	114.1 - 76.68 (3)	TP49.157x40.6977x0.375	0.012	1.162	0.000	1.175 ✓	1.333	H1-3 ✓
L4	76.68 - 38.26 (4)	TP55.9285x47.1057x0.4375	0.014	1.204	0.000	1.218 ✓	1.333	H1-3 ✓
L5	38.26 - 0 (5)	TP62.5x53.5873x0.5	0.016	1.192	0.000	1.207 ✓	1.333	H1-3 ✓

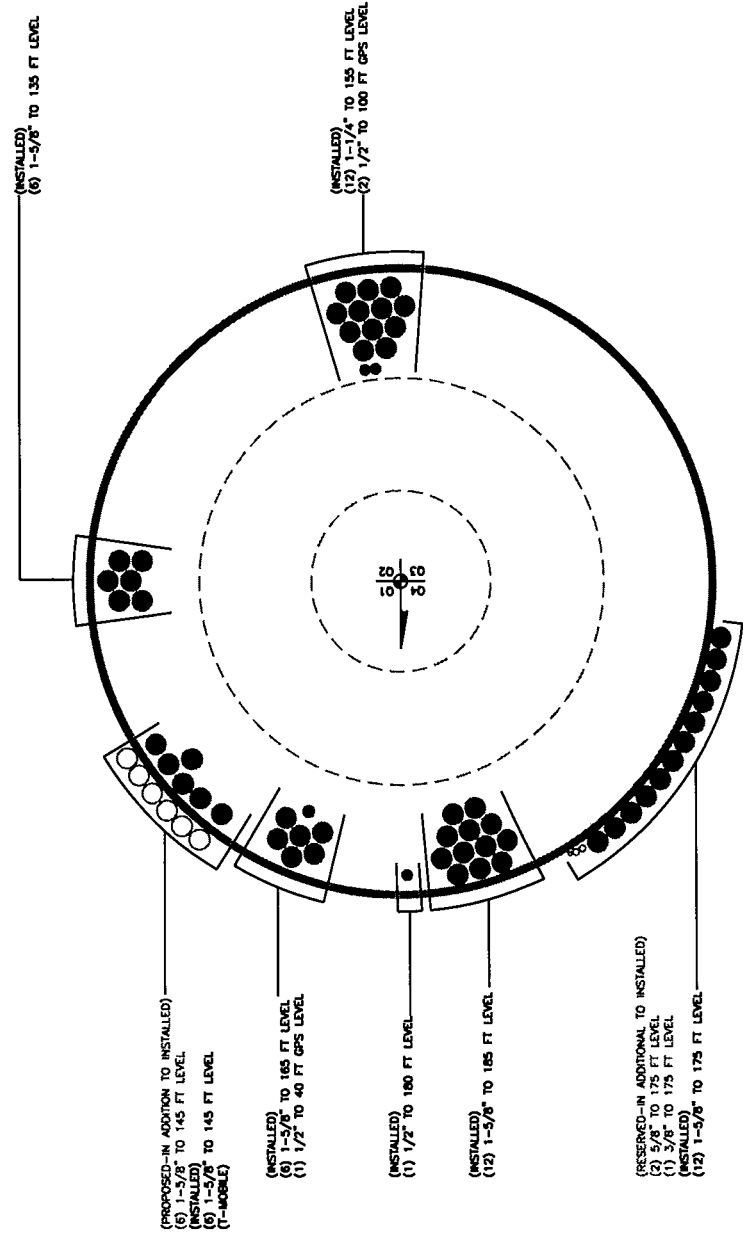


<b>RISATower</b>  <b>Vertical Structures, Inc.</b> 309 Spangler Drive, Suite E Richmond, KY 40475 Phone: (859) 624-8360 FAX: (859) 624-8369	<b>Job</b> BRG 123, CT BU#806354	<b>Page</b> 12 of 12
	<b>Project</b> Vertical Structures Job No. 2011-004-056	<b>Date</b> 14:22:00 06/22/11
	<b>Client</b> Crown Castle	<b>Designed by</b> Jordan Kays

## Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail	
L1	185 - 149.5	Pole	TP36.0404x29x0.25	1	-8975.05	1435427.66	37.7	Pass	
L2	149.5 - 114.1	Pole	TP42.4605x34.5468x0.3125	2	-17663.20	2114671.11	73.7	Pass	
L3	114.1 - 76.68	Pole	TP49.157x40.6977x0.375	3	-27415.10	2937985.20	88.1	Pass	
L4	76.68 - 38.26	Pole	TP55.9285x47.1057x0.4375	4	-40284.40	3900077.91	91.4	Pass	
L5	38.26 - 0	Pole	TP62.5x53.5873x0.5	5	-59606.40	5115214.00	90.6	Pass	
							Summary		
							Pole (L4)	91.4	Pass
							<b>RATING =</b>	<b>91.4</b>	<b>Pass</b>

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



(PROPOSED-IN ADDITION TO INSTALLED)  
 (6) 1-5/8" TO 145 FT LEVEL  
 (INSTALLED)  
 (6) 1-5/8" TO 145 FT LEVEL  
 (1--MOBILE)

(INSTALLED)  
 (6) 1-5/8" TO 165 FT LEVEL  
 (1) 1/2" TO 40 FT GPS LEVEL

(INSTALLED)  
 (1) 1/2" TO 180 FT LEVEL

(INSTALLED)  
 (12) 1-5/8" TO 165 FT LEVEL

(RESERVED-IN ADDITIONAL TO INSTALLED)  
 (2) 5/8" TO 175 FT LEVEL  
 (1) 3/8" TO 175 FT LEVEL  
 (INSTALLED)  
 (12) 1-5/8" TO 175 FT LEVEL

(INSTALLED)  
 (6) 1-5/8" TO 135 FT LEVEL

(INSTALLED)  
 (12) 1-1/4" TO 155 FT LEVEL  
 (2) 1/2" TO 100 FT GPS LEVEL

BUSINESS UNIT: 800304 TOWER B: C-BASELEVEL

**LEGEND: FEEDLINES**

- SOLID BLUE CIRCLE DENOTES EXISTING FEEDLINE
- OPEN RED CIRCLE DENOTES PROPOSED FEEDLINE
- x BLUE "X" DENOTES LOCATION NOT GIVEN

NOTE: ASSUME FEEDLINE ATTACHMENT HEIGHT TO TOWER STEEL AT 8- FEET ABOVE FINISHED GRADE UNLESS OTHERWISE SPECIFIED

BASE LEVEL DRAWING

SHEET NUMBER 1

CROWN REGION ADDRESS  
 USA

DATE: 11/27/11  
 DRAWING: 180785  
 CHECKED BY: CDR  
 DRAWING DATE: 180785

DRAWN BY: CDR  
 CHECKED BY: CDR  
 DRAWING DATE: 180785

SITE NUMBER: \_\_\_\_\_  
 SITE NAME: \_\_\_\_\_  
 SITE NAME: \_\_\_\_\_  
 BRG 123 943084  
 BUSINESS UNIT NUMBER: 800304

SITE ADDRESS: ROUTE 34 - WASHINGTON AVENUE  
 NEWTOWN, CT 06442  
 FAIRFIELD COUNTY  
 USA

SHEET TITLE: \_\_\_\_\_  
 SHEET NUMBER: \_\_\_\_\_

BASE LEVEL  
 SHEET NUMBER: \_\_\_\_\_

A1-0

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

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

## TIA Rev F

### Site Data

BU#: 806354
Site Name: BRG 123, CT
App #: 121274, Rev. 1
Pole Manufacturer: Other

Reactions		
Moment:	5828.138	ft-kips
Axial:	59.633	kips
Shear:	43.738	kips

### Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	73	in

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

### Anchor Rod Results

Maximum Rod Tension:	157.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	80.6% Pass

Stiffened
Service, ASD
Fty*ASIF

### Plate Data

Diam:	79	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	8.27	in

### Base Plate Results

Base Plate Stress:	29.3 ksi	Flexural Check
Allowable Plate Stress:	60.0 ksi	
Base Plate Stress Ratio:	48.9% Pass	

Stiffened
Service, ASD
0.75*Fy*ASIF
Y.L. Length:
N/A, Roark

### Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	15	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	50	ksi
Weld str.:	70	ksi

### Stiffener Results

Horizontal Weld :	83.9% Pass
Vertical Weld:	58.0% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	29.0% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	60.3% Pass
Plate Comp. (AISC Bracket):	78.4% Pass

### Pole Results

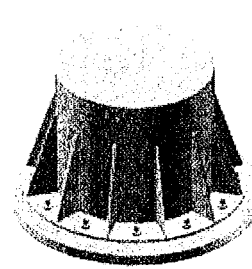
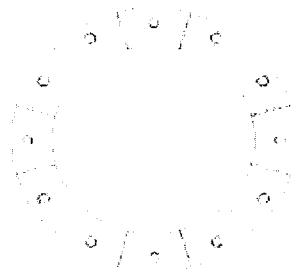
Pole Punching Shear Check:	14.6% Pass
----------------------------	------------

### Pole Data

Diam:	62.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

ASIF:	1.333
-------	-------



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

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

## Technical Memo

To: Northeast Tower Inc  
From: Amir Uzzaman - Radio Frequency Engineer  
cc: Jason Overbey  
Subject: Power Density Report for CT11123A  
Date: July 6, 2011

### 1. Introduction:

This report is the result of an Electromagnetic Field Intensities (EMF - Power Densities) study for the T-Mobile antenna installation on a Monopole at 21-23 Berkshire Rd., Newtown, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location.

### 2. Discussion:

The following assumptions were used in the calculations:

- 1) The emissions from T-Mobile transmitters are in the (1940-1949.8), (2140-2145), (2110-2120)MHz frequency Band.
- 2) The antenna array consists of three sectors, with 2 antennas per sector.
- 3) The model number for GSM antenna is RR90-17-02DP.
- 3) The model number for UMTS antenna is APX16DWV-16DWV.
- 4) GSM antenna center line height is 145 ft.
- 4) UMTS antenna center line height is 145 ft.
- 5) The maximum transmit power from any GSM sector is 1698.71 Watts Effective Radiated Power (EiRP) assuming 8 channels per sector.
- 5) The maximum transmit power from any UMTS sector is 2393.81 Watts Effective Radiated Power (EiRP) assuming 2 channels per sector.
- 6) All the antennas are simultaneously transmitting and receiving, 24 hours a day.
- 7) Power levels emitting from the antennas are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were then used with the above information to perform the calculations.

### 3. Conclusion:

Based on the above worst case assumptions, the power density calculation from the T-Mobile antenna installation on a Monopole at 21-23 Berkshire Rd., Newtown, CT, is 0.04647 mW/cm<sup>2</sup>. This value represents 4.647% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm<sup>2</sup>) set forth in the FCC/ANSI/IEEE C95.1-1991. Furthermore, the proposed antenna location for T-Mobile will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area. The combined Power Density from other carriers is 19.47%. The combined Power Density for the site is 24.117% of the M.P.E. standard.

# Connecticut Market



## Worst Case Power Density

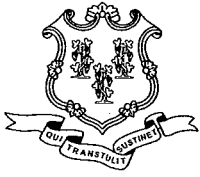
**Site:** CT11123A  
**Site Address:** 21-23 Berkshire Rd.  
**Town:** Newtown  
**Tower Height:** 185 ft.  
**Tower Style:** Monopole

GSM Data		UMTS Data	
Base Station TX output	20 W	Base Station TX output	40 W
Number of channels	8	Number of channels	2
Antenna Model	RR90-17-02DP	Antenna Model	APX16DWV-16DWV
Cable Size	1 5/8 in.	Cable Size	1 5/8 in.
Cable Length	150 ft.	Cable Length	150 ft.
Antenna Height	145.0 ft.	Antenna Height	145.0 ft.
Ground Reflection	1.6	Ground Reflection	1.6
Frequency	1945.0 MHz	Frequency	2.1 GHz
Jumper & Connector loss	4.50 dB	Jumper & Connector loss	1.50 dB
Antenna Gain	16.5 dBi	Antenna Gain	18.0 dBi
Cable Loss per foot	0.0116 dB	Cable Loss per foot	0.0116 dB
Total Cable Loss	1.7400 dB	Total Cable Loss	1.7400 dB
Total Attenuation	6.2400 dB	Total Attenuation	3.2400 dB
Total EIRP per Channel (In Watts)	53.27 dBm 212.34 W	Total EIRP per Channel (In Watts)	60.78 dBm 1196.91 W
Total EIRP per Sector (In Watts)	62.30 dBm 1698.71 W	Total EIRP per Sector (In Watts)	63.79 dBm 2393.81 W
nsg	10.2600	nsg	14.7600
<b>Power Density (S) = 0.019289 mW/cm<sup>2</sup></b>		<b>Power Density (S) = 0.027182 mW/cm<sup>2</sup></b>	
<b>T-Mobile Worst Case % MPE =</b>		<b>4.6471%</b>	
Equation Used : <input type="text"/>			
Office of Engineering and Technology (OET) Bulletin 65, Edition 97-01, August 1997			

## Co-Location Total

Carrier	% of Standard
Cingular	2.0000 %
Cingular	2.3200 %
Cingular	0.4900 %
MetroPCS	1.9900 %
Verizon	5.7400 %
Verizon	3.5100 %
Sprint	1.0500 %
Nextel	2.3700 %
Other Antenna Systems	
<b>Total Excluding T-Mobile</b>	<b>19.4700 %</b>
T-Mobile	4.6471
<b>Total % MPE for Site</b>	<b>24.1171%</b>





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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

July 11, 2011

The Honorable Patricia E. Llodra  
First Selectman  
Town of Newtown  
Town Hall  
3 Primrose Street  
Newtown, CT 06470-5307

RE: **EM-T-MOBILE-097-110708** - Omnipoint Communications, as subsidiary of T-Mobile USA, Inc., notice of intent to modify an existing telecommunications facility located at 21 Berkshire Road, Newtown, Connecticut.

Dear First Selectman Llodra:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by July 25, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts  
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Gary Frenette, Zoning Enforcement Officer, Town of Newtown