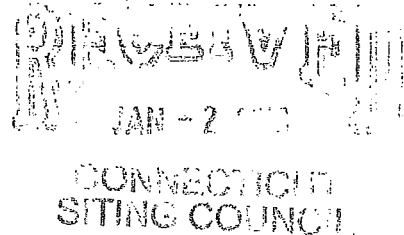


280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

Also admitted in Massachusetts

December 28, 2012

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



Re: **EM-VER-125-111214 – 70 Herb Road, Sharon, Connecticut**  
**EM-VER-134-120416 – 51 Stony Lane, Stafford Springs, Connecticut**  
**EM-VER-139-120202A – Mountain Road, Suffield, Connecticut**  
**EM-VER-140-120919 – 580 Chapel Street, Thomaston, Connecticut**  
**EM-VER-168-120316 – 478 Good Hill Road, Woodbury, Connecticut**  
**EM-VER-137-120411 – 40 Taugwonk Spur, Stonington, Connecticut**  
**EM-VER-144-120925 – Booth Hill Road, Trumbull, Connecticut**

<sup>120907</sup>  
**Completion of Construction Activity**

Dear Ms. Roberts:

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



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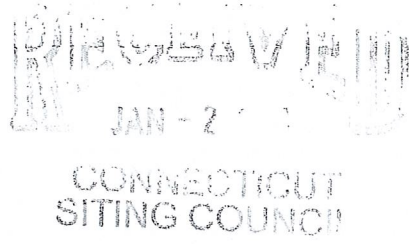
12012147-v1

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EM-VER-144-120907

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Hartford, CT 06103-3597  
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Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

Also admitted in Massachusetts

September 6, 2012

RECEIVED  
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CONNECTICUT  
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap  
800 Booth Hill Road, Trumbull, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains six (6) wireless telecommunications antennas at the 232-foot level on an existing 490-foot tower at the above-referenced address. The tower is owned by Crown Castle. Cellco’s use of the tower was approved by the Council in 1987. Cellco now intends to modify its facility by adding three (3) model BXA-70063-6CF LTE antennas, for a total of nine (9) antennas, at the same 232-foot level. Cellco also intends to attach six (6) additional coax cables to the lattice tower. Attached behind Tab 1 are the specifications for the new 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 Timothy M. Herbst, First Selectman of the Town of Trumbull. A copy of this letter is also being sent to Francis F. Daddario, 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 new antennas will be located at the 232-foot level on the existing 490-foot tower.



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# ROBINSON & COLE<sub>LLP</sub>

Linda Roberts  
September 6, 2012  
Page 2

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

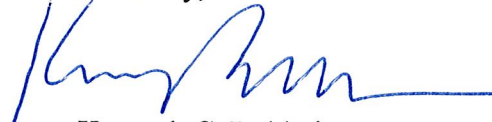
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

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

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed modifications. (See 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:

Timothy M. Herbst, Trumbull First Selectman  
Francis F. Daddario  
Sandy M. Carter



## BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

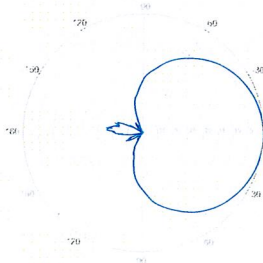
Replace "X" with desired electrical downtilt.

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



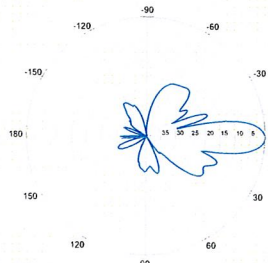
Electrical Characteristics	696-900 MHz	
	696-806 MHz	806-900 MHz
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
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 <sup>2</sup> Side: 0.24 m <sup>2</sup>	Front: 5.5 ft <sup>2</sup> Side: 2.6 ft <sup>2</sup>
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



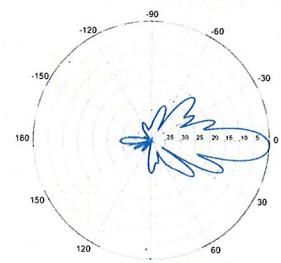
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

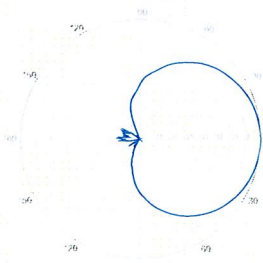


0° | Vertical | 750 MHz

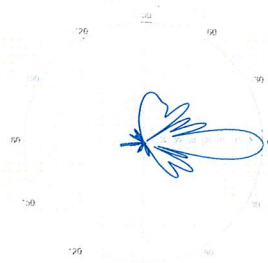
BXA-70063-6CF-EDIN-2



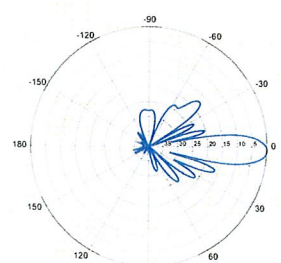
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



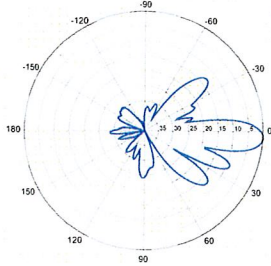
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

**BXA-70063-6CF-EDIN-X**

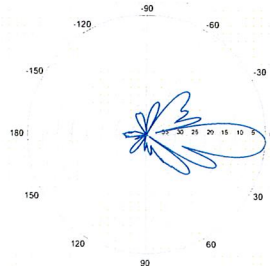
X-Pol | FET Panel | 63° | 14.5 dBd

**BXA-70063-6CF-EDIN-3**



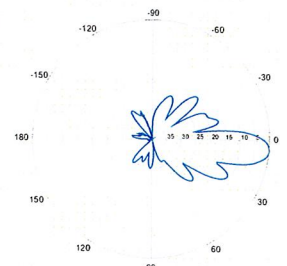
3° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-4**

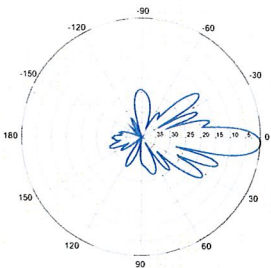


4° | Vertical | 750 MHz

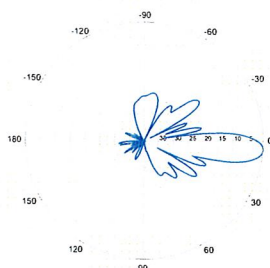
**BXA-70063-6CF-EDIN-5**



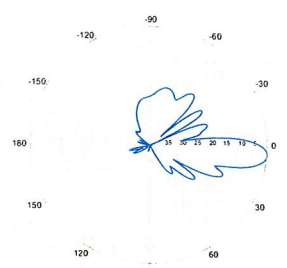
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

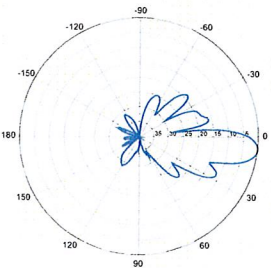


4° | Vertical | 850 MHz



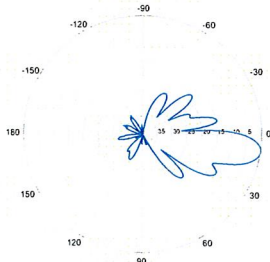
5° | Vertical | 850 MHz

**BXA-70063-6CF-EDIN-6**



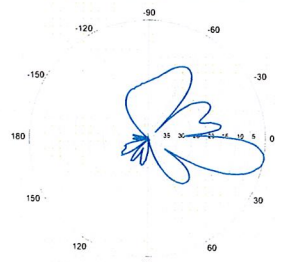
6° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-8**

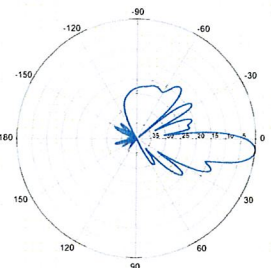


8° | Vertical | 750 MHz

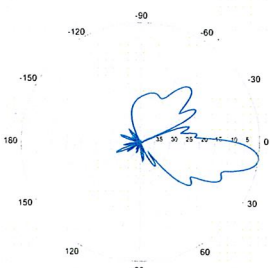
**BXA-70063-6CF-EDIN-10**



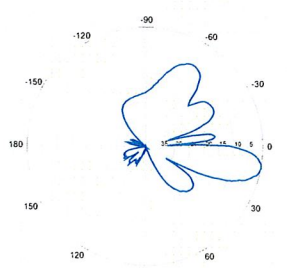
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

		General		Power		Density							
Site Name: Trumbull													
Tower Height: Verizon @ 232Ft.													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*Various			field measurements taken in vicinity of tower										
*T-Mobile GSM	8	91	247	0.0043	1945	1.0000	25.40%						
*T-Mobile UMTS	2	470	247	0.0055	2100	1.0000	0.43%						
*Marcus - Andrew DB408-B	10	2800	325	0.0034	450	0.3000	0.55%						
*Marcus - Radiowaves SPD3	1	100	300	0.0002	5.8 GHz	1.0000	1.13%						
*Marcus - Radiowaves SPD4	1	100	175	0.0012	5.8 GHz	1.0000	0.02%						
*Marcus - Radiowaves SD2-	1	100	75	0.0015	5.8 GHz	1.0000	0.12%						
<b>Verizon PCS</b>	<b>15</b>	<b>197</b>	<b>232</b>	<b>0.0197</b>	<b>1970</b>	<b>1.0000</b>	<b>0.15%</b>						
<b>Verizon Cellular</b>	<b>9</b>	<b>221</b>	<b>232</b>	<b>0.0133</b>	<b>869</b>	<b>0.5793</b>	<b>1.97%</b>						
<b>Verizon AWS</b>	<b>1</b>	<b>477</b>	<b>232</b>	<b>0.0032</b>	<b>2145</b>	<b>1.0000</b>	<b>2.29%</b>						
<b>Verizon 700</b>	<b>1</b>	<b>738</b>	<b>232</b>	<b>0.0049</b>	<b>698</b>	<b>0.4653</b>	<b>0.32%</b>						
							<b>1.06%</b>						
								<b>33.45%</b>					
* Source: Siting Council													

Date: June 7, 2012

Ms. Eva Morales  
Crown Castle USA Inc.  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277  
(704) 405-6613



Tower Engineering Professionals  
3703 Junction Blvd  
Raleigh, NC 27603  
(919) 661- 6351  
crown@tepgroup.net

Subject: Structural Analysis Report – Revision 1

**Carrier Designation:** Verizon Wireless Co-Locate  
Carrier Site Name: Trumbull CT  
Carrier Site Number: N/A

**Crown Castle Designation:** Crown Castle BU Number: 873128  
Crown Castle Site Name: Trumbull  
Crown Castle JDE Job Number: 184159  
Crown Castle Work Order Number: 500733  
Crown Castle Application Number: 147028 Rev 0

**Engineering Firm Designation:** TEP Project Number: 121984

**Site Data:** 800 Booth Hill Rd., Shelton, Fairfield County, CT 06611  
Latitude 41° 16' 44.26", Longitude -73° 11' 6.4"  
490 Foot – Guyed Tower

Dear Ms. Morales,

Tower Engineering Professionals 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 468787, in accordance with application 147028, revision 0.

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

LC7: Existing + Proposed + Reserved 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 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ASCE7-05 Minimum Design Loads for Buildings and Other Structures, and the 2003 International Building Code with the 2005 Connecticut Supplements.

All modifications and equipment proposed in this report shall be installed in accordance with Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at Tower Engineering Professionals 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.

Analysis prepared by: Jessica R. Moebs, P.E.

Respectfully submitted by:

Andrew T. Haldane, P.E.

Revision #	Date Issued	Description
0	April 19, 2012	Original structural analysis
1	June 7, 2012	Revised location of reserved loading





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Table 4 – Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

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tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 490-ft guyed tower. The original design code and wind speed are unknown. The tower has been modified multiple times. All information provided to TEP was assumed to be accurate and complete.

## 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 and the ASCE7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch escalating ice thickness, and 50 mph under service loads.

**Table 1 – Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
235	232	3	Antel	BXA-70063/6CF-EDIN w/ Mount Pipe	6	7/8	1

Notes:

- 1) See "Appendix B – Base Level Drawing" for feed line configuration.

**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
457	473	1	Dielectric	TFU-33J	1	4" Φ	1
	452	1	Decibel	DB420			
442	447	3	RFS Celwave	PD10041-1	3	7/8	1
	442	1	Tower Mounts	Side Arm Mount [SO306-1]			
		1	Tower Mounts	Side Arm Mount [SO602-3]			
419	419	3	Jampro	JADP1-3	1	3" Φ	2
		1	ERI	1183-3CP	-	-	3
393	393	3	Shively Labs	6014-2	1	3" Φ	1
367	367	1	ERI	SHP-2AE	1	3	1
		1	Tower Mounts	Pipe Mount [PM 502-1]			
	354	3	RFS Celwave	455-5	1	1-5/8	
344	350	1	RFS Celwave	AO9009-3	1	1-1/4	1
	344	1	Tower Mounts	Side Arm Mount [SO302-3]	2	7/8	
		1	Tower Mounts	Side Arm Mount [SO602-1]	1	1/2	
333	338	1	Andrew	PG1N0F-0090-310	1	1-1/4	1
	333	1	Tower Mounts	Side Arm Mount [SO307-1]			
330	333	1	Sinclair	SRL-101A	1	7/8	1
	330	1	Tower Mounts	Side Arm Mount [SO302-1]			
	330	1	Dielectric	TLP-8M			
	327	1	Decibel	DB413-A			
324		1	Decibel	DB230-E	1	1-5/8	
	324	1	Generic	TMA – 12"x12"x6"	1	1/2	1
		2	Tower Mounts	Pipe Mount [PM601-1]		1/4	
		1	Tower Mounts	Side Arm Mount [SO307-1]			
324	324	1	Unknown	2' Dish	-	-	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
308	308	3	Shively Labs	6014-2	1	1-5/8	1
284	289	1	Decibel	DB810M-XC	2	1-1/4	1
278	284	1	Tower Mounts	Side Arm Mount [SO307-1]	1	1-5/8	1
269	283	1	Decibel	DBS567KR90-XC	1	1-5/8	1
259	274	1	Decibel	DB810M-XC	1	1-1/4	1
253	269	1	Decibel	DB230-4E	1	1-1/4	1
253	269	1	Tower Mounts	Side Arm Mount [SO 307-1]	1	1-1/4	1
253	264	1	Decibel	DB809KT3E-Y	1	1-1/4	1
253	259	1	Tower Mounts	Side Arm Mount [SO 311-1]	1	1-1/4	1
253	258	1	Andrew	PG1N0F-0090-310	-	-	1
247	253	1	Tower Mounts	Side Arm Mount [SO 302-1]	-	-	1
247	247	3	EMS Wireless	RR90-17-02DP w/ Mount Pipe	12	7/8	1
247	247	3	RFS Celwave	APXV18-206516S-C-A20 w/ Mount Pipe	12	7/8	1
235	247	6	RFS Celwave	ATMAP1412D-1A20	12	7/8	1
235	235	1	Tower Mounts	Side Arm Mount [SO 302-3]	1	7/8	1
235	235	1	Tower Mounts	Sector Mount [SM 302-3]	1	7/8	1
235	232	2	Antel	BXA-80080/6CF w/ Mount Pipe	12	7/8	1
215	232	3	Antel	BXA-185063/8CF w/ Mount Pipe	12	7/8	1
215	222	1	Antel	BXA-80063/6CF w/ Mount Pipe	1	7/8	1
215	215	1	Decibel	DB810T3E-XT	1	7/8	1
204	215	1	Tower Mounts	Side Arm Mount [SO 307-1]	1	7/8	1
204	208	1	Andrew	PG1DOF-0093-011	1	7/8	1
200	204	1	Tower Mounts	Side Arm Mount [SO 202-1]	1	7/8	1
200	200	1	Mark	P-9A72GN-U	1	7/8	1
189	200	1	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1
189	189	1	Kathrein	CL6-450	1	1/2	1
179	189	1	Generic	TMA	1	1/2	1
179	179	1	Radiowaves	SPD4-5.2	1	1/2	1
154	179	1	Tower Mounts	Pipe Mount [PM 601-1]	1	1/2	1
154	154	1	Mark	P-21A72	2	EW-63	1
146	154	1	Andrew	PL6-65-PXA	2	EW-63	1
146	146	1	Tower Mounts	Pipe Mount [PM 601-1]	2	EW-63	1
135	145	1	Decibel	DB264-A	1	7/8	1
135	145	1	RFS Celwave	220-5	1	7/8	1
135	135	3	Antennas Direct	DB4-HDTV	2	7/8	1
117	135	2	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1
117	135	1	Tower Mounts	Side Arm Mount [SO 307-1]	1	7/8	1
117	117	1	Mark	P-9A48GN-U	1	7/8	1
117	117	1	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107	107	2	Kathrein	PR-950			
		2	Tower Mounts	Pipe Mount [PM 601-1]	2	7/8	1
101	101	1	Radiowaves	SPD2-5.8			
		1	Generic	TMA	1	7/8	1
70	70	1	Mark	P-9A48GN-U			
		1	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1
59.5	59.5	1	RFS Celwave	MGAR3-23N			
		1	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1
54	54	1	Decibel	ASP-816			
		1	Tower Mounts	Pipe Mount [PM 601-1]	1	7/8	1

Notes:

- 1) Existing equipment.
- 2) Existing equipment to be removed, feed lines to be re-used.
- 3) Reserved equipment.

**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)

UNKNOWN

**3) ANALYSIS PROCEDURE**

**Table 4 – Documents Provided**

Document	Remarks	Reference	Source
Geotechnical Report	FDH Engineering, Project No. 04-1229E, dated January 25, 2005	1418454	CCISITES
Foundation Mapping	Tower Engineering Professionals, Job No. 071092, dated December 3, 2007	1520339	CCISITES
Foundation Mapping	FDH Engineering, dated December 17, 2002	1520339	CCISITES
Tower Mapping	New-Tech Construction, Inc., dated December 13, 2003	1327906	CCISITES
Guy Anchor Mapping	Tower Engineering Professionals, Job No. 110967, dated October 2011	-	TEP
Structural Modification Drawings	Tower Engineering Professionals, Job No. 101274, dated April 16, 2010	2633757	CCISITES
Tower Maintenance Drawings	Tower Engineering Professionals, Job No. 101274, November 15, 2010	2755396	CCISITES
Structural Modification Drawings	Tower Engineering Professionals, Job No. 090621, March 27, 2009	2407618	CCISITES
Structural Modification Drawings	Tower Engineering Professionals, Job No. 110967, November 3, 2011	3006419	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) The tower and foundation were built in accordance with the manufacturer's specifications.
- 2) The tower and foundation 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 "Appendix B – Base Level Drawing".
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
- 5) All tower components are in sufficient condition to carry their full design capacity.
- 6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 7.
- 7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.
- 8) The following material grades were used:
  - a. Leg Grade: A7-33
  - b. Bracing Grade: A7-33
  - c. Connection bolts: A307

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals 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	457 - 436	Leg	3	2	-22268.30	132219.07	16.8	Pass
T2	436 - 421	Leg	2 3/4	44	-34864.10	108535.79	32.1	Pass
T3	421 - 401	Leg	2 3/4	74	-77752.50	108535.79	71.6	Pass
T4	401 - 396	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	107	-92622.00	202308.07	45.8 56.0 (b)	Pass
T5	396 - 391	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	116	109961.00	202308.07	54.4	Pass
T6	391 - 386	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	125	130501.00	202308.07	64.5	Pass
T7	386 - 381	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	137	154319.00	202308.07	76.3	Pass
T8	381 - 376	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	149	159995.00	231972.65	69.0	Pass
T9	376 - 371	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	158	142640.00	231972.65	61.5	Pass
T10	371 - 366	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	167	127115.00	231972.65	54.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T11	366 - 361	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	179	112952.00	231972.65	48.7	Pass
T12	361 - 341	Leg	3	191	100061.00	163911.01	61.0	Pass
T13	341 - 321	Leg	3	236	-69750.80	135863.35	51.3	Pass
T14	321 - 301	Leg	3	269	-74980.10	135863.35	55.2	Pass
T15	301 - 281	Leg	3	302	-74166.60	135863.35	54.6	Pass
T16	281 - 261	Leg	3	336	100884.00	135863.35	74.3	Pass
T17	261 - 241	Leg	3	369	129070.00	164418.88	78.5	Pass
T18	241 - 221	Leg	3	414	105546.00	135863.35	77.7	Pass
T19	221 - 201	Leg	3 1/4	448	-80686.30	124390.00	64.9	Pass
T20	201 - 181	Leg	3 1/4	481	-83068.40	124390.00	66.8	Pass
T21	181 - 161	Leg	3 1/4	514	-85606.80	124390.00	68.8	Pass
T22	161 - 141	Leg	3 1/2	547	-88295.80	148821.00	59.3	Pass
T23	141 - 121	Leg	3 1/2	580	-91160.70	148821.00	61.3	Pass
T24	121 - 101	Leg	3 1/2	613	102933.00	148821.00	69.2	Pass
T25	101 - 81	Leg	3 1/2	646	104994.00	148821.00	70.6	Pass
T26	81 - 61	Leg	3 1/2	679	106972.00	148821.00	71.9	Pass
T27	61 - 41	Leg	3 1/2	712	108909.00	148821.00	73.2	Pass
T28	41 - 20	Leg	3 1/2	745	112154.00	145878.00	76.9	Pass
T29	20 - 6.70833	Leg	3 1/4	778	116496.00	130073.00	89.6	Pass
T30	6.70833 - 0	Leg	3 1/4	799	120052.00	137843.00	87.1	Pass
T1	457 - 436	Diagonal	L2 1/2x2x1/4	39	-1957.66	16402.56	11.9 48.2 (b)	Pass
T2	436 - 421	Diagonal	L2 1/2x2x3/16	50	-3335.08	12778.35	26.1	Pass
T3	421 - 401	Diagonal	L2 1/2x2x3/16	83	-6328.96	12778.35	49.5 57.6 (b)	Pass
T4	401 - 396	Diagonal	L2 1/2x2x3/16	110	-7172.24	12778.35	56.1 65.2 (b)	Pass
T5	396 - 391	Diagonal	L2 1/2x2x3/16	119	-8636.96	12778.35	67.6 78.6 (b)	Pass
T6	391 - 386	Diagonal	L2 1/2x2x3/16	131	-11081.70	12778.35	86.7	Pass
T7	386 - 381	Diagonal	L2 1/2x2x3/16	143	-9855.03	12778.35	77.1 83.1 (b)	Pass
T8	381 - 376	Diagonal	L2 1/2x2x3/16	155	-7855.30	12778.35	61.5 86.0 (b)	Pass
T9	376 - 371	Diagonal	L2 1/2x2x3/16	163	-9895.13	12778.35	77.4 90.0 (b)	Pass
T10	371 - 366	Diagonal	L2 1/2x2x3/16	176	-8193.84	12778.35	64.1 74.5 (b)	Pass
T11	366 - 361	Diagonal	L2 1/2x2x3/16	190	-7194.21	12778.35	56.3 65.4 (b)	Pass
T12	361 - 341	Diagonal	L2 1/2x2x3/16	231	-6823.49	12778.35	53.4 62.1 (b)	Pass
T13	341 - 321	Diagonal	L2 1/2x2x3/16	267	-4883.39	12778.35	38.2 44.4 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T14	321 - 301	Diagonal	L2 1/2x2x3/16	301	-2560.72	12778.35	20.0 48.9 (b)	Pass
T15	301 - 281	Diagonal	L2 1/2x2x3/16	314	-4512.05	12778.35	35.3 86.2 (b)	Pass
T16	281 - 261	Diagonal	L2 1/2x2x3/16	347	-6130.40	12778.35	48.0 55.8 (b)	Pass
T17	261 - 241	Diagonal	L3x3x1/4	390	-7677.61	28660.57	26.8 45.8 (b)	Pass
T18	241 - 221	Diagonal	L3x3x1/4	444	-6600.66	28660.57	23.0 38.6 (b)	Pass
T19	221 - 201	Diagonal	L2 1/2x2x3/16	477	-4027.38	12778.35	31.5 76.9 (b)	Pass
T20	201 - 181	Diagonal	L2 1/2x2x3/16	510	-3010.64	12778.35	23.6 57.5 (b)	Pass
T21	181 - 161	Diagonal	L2 1/2x2x3/16	524	-3533.14	12778.35	27.6 67.5 (b)	Pass
T22	161 - 141	Diagonal	L3x3x1/4	554	-5523.03	28660.57	19.3 32.2 (b)	Pass
T23	141 - 121	Diagonal	L3x3x1/4	605	-7003.94	28660.57	24.4 40.8 (b)	Pass
T24	121 - 101	Diagonal	L2 1/2x2x3/16	638	-4545.12	12778.35	35.6 41.3 (b)	Pass
T25	101 - 81	Diagonal	L2 1/2x2x3/16	674	-2857.74	12778.35	22.4 54.6 (b)	Pass
T26	81 - 61	Diagonal	L2 1/2x2x3/16	707	-1436.41	12778.35	11.2 27.4 (b)	Pass
T27	61 - 41	Diagonal	L2 1/2x2x3/16	720	-1320.79	12778.35	10.3 25.2 (b)	Pass
T28	41 - 20	Diagonal	L2 1/2x2x3/16	758	-2890.32	12584.25	23.0 58.2 (b)	Pass
T29	20 - 6.70833	Diagonal	L2x2x3/16	780	3116.69	17929.92	17.4 59.5 (b)	Pass
T30	6.70833 - 0	Diagonal	L2x2x3/16	802	-4450.86	15527.18	28.7 85.0 (b)	Pass
T1	457 - 436	Horizontal	L2 1/2x2x1/4	37	-1003.23	7397.28	13.6	Pass
T2	436 - 421	Horizontal	L2 1/2x2x1/4	56	813.63	20988.00	3.9	Pass
T12	361 - 341	Secondary Horizontal	L2x2x1/4	217	-1733.11	6454.97	26.8	Pass
T17	261 - 241	Secondary Horizontal	2L3 1/2x3 1/2x3/8x3/8	383	-2235.56	92327.58	2.4	Pass
T1	457 - 436	Top Girt	C8x13.75	6	-0.60	51236.92	0.2	Pass
T2	436 - 421	Top Girt	L2 1/2x2x1/4	8	772.69	20334.40	3.8 16.2 (b)	Pass
T3	421 - 401	Top Girt	L2 1/2x2x1/4	47	427.35	20334.40	2.1 9.6 (b)	Pass
T4	401 - 396	Top Girt	L2 1/2x2x1/4	78	-370.92	10803.14	3.4 9.8 (b)	Pass
T6	391 - 386	Top Girt	L2 1/2x2x1/4	130	649.47	27977.00	2.3	Pass
T10	371 - 366	Top Girt	L2 1/2x2x1/4	170	789.48	27977.00	2.8	Pass
T12	361 - 341	Top Girt	L2 1/2x2x1/4	184	-355.79	11088.99	3.2 14.8 (b)	Pass
T13	341 - 321	Top Girt	L2 1/2x2x1/4	196	313.90	27105.75	1.2 6.0 (b)	Pass
T14	321 - 301	Top Girt	L2 1/2x2x1/4	239	391.81	27105.75	1.4 7.5 (b)	Pass
T15	301 - 281	Top Girt	L2 1/2x2x3/16	272	352.15	20749.21	1.7 6.7 (b)	Pass
T16	281 - 261	Top Girt	L2 1/2x2x1/4	305	315.10	27105.75	1.2 6.0 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
T17	261 - 241	Top Girt	L2 1/2x2x3/16	340	634.00	20749.21	3.1 12.1 (b)	Pass
T18	241 - 221	Top Girt	L2 1/2x2x3/16	373	720.71	20749.21	3.5 13.8 (b)	Pass
T19	221 - 201	Top Girt	L2 1/2x2x3/16	418	361.85	15565.80	2.3 8.3 (b)	Pass
T20	201 - 181	Top Girt	L2 1/2x2x3/16	450	461.46	20749.21	2.2 8.8 (b)	Pass
T21	181 - 161	Top Girt	2L3x2x1/4x3/8	483	408.89	46518.80	0.9 4.8 (b)	Pass
T22	161 - 141	Top Girt	L2 1/2x2x3/16	516	400.04	15565.80	2.6 8.4 (b)	Pass
T23	141 - 121	Top Girt	L2 1/2x2x3/16	550	-571.07	8453.94	6.8 26.7 (b)	Pass
T24	121 - 101	Top Girt	L2 1/2x2x3/16	583	-4145.48	8453.94	49.0 79.2 (b)	Pass
T25	101 - 81	Top Girt	L2 1/2x2x3/16	616	471.25	15565.80	3.0 10.1 (b)	Pass
T26	81 - 61	Top Girt	L2 1/2x2x3/16	649	479.49	15565.80	3.1 11.2 (b)	Pass
T27	61 - 41	Top Girt	L2 1/2x2x3/16	681	488.22	15565.80	3.1 11.6 (b)	Pass
T28	41 - 20	Top Girt	L2 1/2x2x3/16	714	543.91	15565.80	3.5 12.4 (b)	Pass
T29	20 - 6.70833	Top Girt	L3x2x3/16	747	8348.17	17658.30	47.3 82.8 (b)	Pass
T1	457 - 436	Mid Girt	L2 1/2x2x1/4	13	3447.23	27105.75	12.7 65.9 (b)	Pass
T3	421 - 401	Mid Girt	L2 1/2x2x1/4	81	154.14	27105.75	0.6 2.9 (b)	Pass
T12	361 - 341	Mid Girt	L2 1/2x2x1/4	198	307.15	27105.75	1.1 5.9 (b)	Pass
T13	341 - 321	Mid Girt	L2 1/2x2x1/4	242	300.31	27105.75	1.1 5.7 (b)	Pass
T14	321 - 301	Mid Girt	L2 1/2x2x1/4	275	380.85	27105.75	1.4 7.3 (b)	Pass
T15	301 - 281	Mid Girt	L2 1/2x2x3/16	308	220.16	15565.80	1.4 5.6 (b)	Pass
T16	281 - 261	Mid Girt	L2 1/2x2x1/4	341	240.92	20334.40	1.2 5.9 (b)	Pass
T18	241 - 221	Mid Girt	L2 1/2x2x3/16	421	382.15	15565.80	2.5 8.1 (b)	Pass
T19	221 - 201	Mid Girt	L2 1/2x2x3/16	453	336.57	15565.80	2.2 7.9 (b)	Pass
T20	201 - 181	Mid Girt	L2 1/2x2x3/16	486	325.96	15565.80	2.1 7.6 (b)	Pass
T21	181 - 161	Mid Girt	L2 1/2x2x3/16	519	340.83	15565.80	2.2 7.6 (b)	Pass
T22	161 - 141	Mid Girt	L2 1/2x2x3/16	553	469.67	15565.80	3.0 9.9 (b)	Pass
T23	141 - 121	Mid Girt	L2 1/2x2x3/16	586	-6956.17	8453.94	82.3	Pass
T24	121 - 101	Mid Girt	L2 1/2x2x3/16	619	457.57	15565.80	2.9 10.1 (b)	Pass
T25	101 - 81	Mid Girt	L2 1/2x2x3/16	652	475.36	15565.80	3.1 10.9 (b)	Pass
T26	81 - 61	Mid Girt	L2 1/2x2x3/16	685	482.70	15565.80	3.1 11.7 (b)	Pass
T27	61 - 41	Mid Girt	L2 1/2x2x3/16	718	497.02	15565.80	3.2 11.6 (b)	Pass
T28	41 - 20	Mid Girt	L2 1/2x2x3/16	750	1053.99	15565.80	6.8	Pass



Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_allow (lb)	% Capacity	Pass / Fail
							22.6 (b)	
T1	457 - 436	Guy A@446.5	9/16	838	14142.40	17500.00	80.8	Pass
T8	381 - 376	Guy A@381	1 3/8	835	80201.40	116000.00	69.1	Pass
T17	261 - 241	Guy A@251	1 1/4	832	47350.60	96000.00	49.3	Pass
T23	141 - 121	Guy A@131	3/4	824	18365.40	34000.00	54.0	Pass
T1	457 - 436	Guy B@446.5	9/16	837	14315.10	17500.00	81.8	Pass
T8	381 - 376	Guy B@381	1 3/8	834	80842.40	116000.00	69.7	Pass
T17	261 - 241	Guy B@251	1 1/4	831	47813.50	96000.00	49.8	Pass
T23	141 - 121	Guy B@131	3/4	819	17219.00	34000.00	50.6	Pass
T1	457 - 436	Guy C@446.5	9/16	836	13941.50	17500.00	79.7	Pass
T8	381 - 376	Guy C@381	1 3/8	833	78720.00	116000.00	67.9	Pass
T17	261 - 241	Guy C@251	1 1/4	830	46960.40	96000.00	48.9	Pass
T23	141 - 121	Guy C@131	3/4	813	18004.70	34000.00	53.0	Pass
T8	381 - 376	Top Guy Pull-Off@381	2L3x2x1/4x3/8	142	25528.70	62816.29	40.6	Pass
T17	261 - 241	Top Guy Pull-Off@251	2L3 1/2x3 1/2x3/8x3/8	376	18254.50	143100.21	12.8	Pass
T23	141 - 121	Torque Arm Top@131	2L3x3x3/16	826	17297.20	57537.61	30.1 73.4 (b)	Pass
T23	141 - 121	Torque Arm Bottom@131	2L3x3x3/16	829	-15486.20	22403.86	69.1	Pass
							Summary	
							Leg (T29)	89.6 Pass
							Diagonal (T9)	90.0 Pass
							Horizontal (T1)	13.6 Pass
							Secondary Horizontal (T12)	26.8 Pass
							Top Girt (T29)	82.8 Pass
							Mid Girt (T23)	82.3 Pass
							Guy A (T1)	80.8 Pass
							Guy B (T1)	81.8 Pass
							Guy C (T1)	79.7 Pass
							Top Guy Pull-Off (T8)	40.6 Pass
							Torque Arm Top (T23)	73.4 Pass
							Torque Arm Bottom (T23)	69.1 Pass
							Bolt Checks	90.0 Pass
							<b>RATING =</b>	<b>90.0 Pass</b>

**Table 6 – Tower Component Stresses vs. Capacity – Foundations**

Notes	Component	% Capacity	Pass / Fail
1	Base Foundation	69.7	Pass
1	Guy Anchor Foundation A	89.7	Pass
1	Guy Anchor Foundation B	77.8	Pass
1	Guy Anchor Foundation C	95.0	Pass
<b>Structure Rating (max from all components) =</b>			<b>95.0%</b>

Notes:

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

**Table 7 – Dish Twist/Sway Results for 50 mph Service Wind Speed**

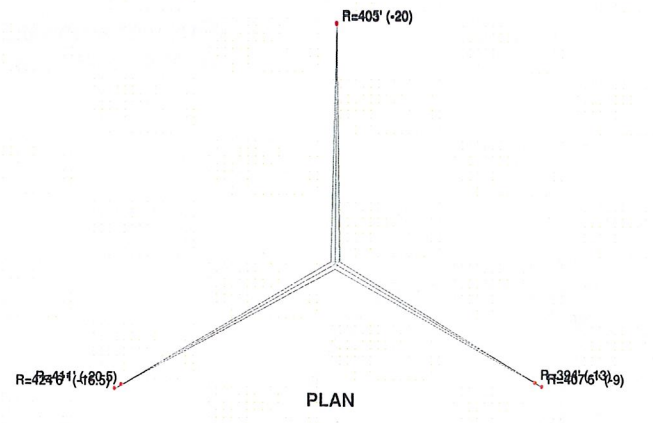
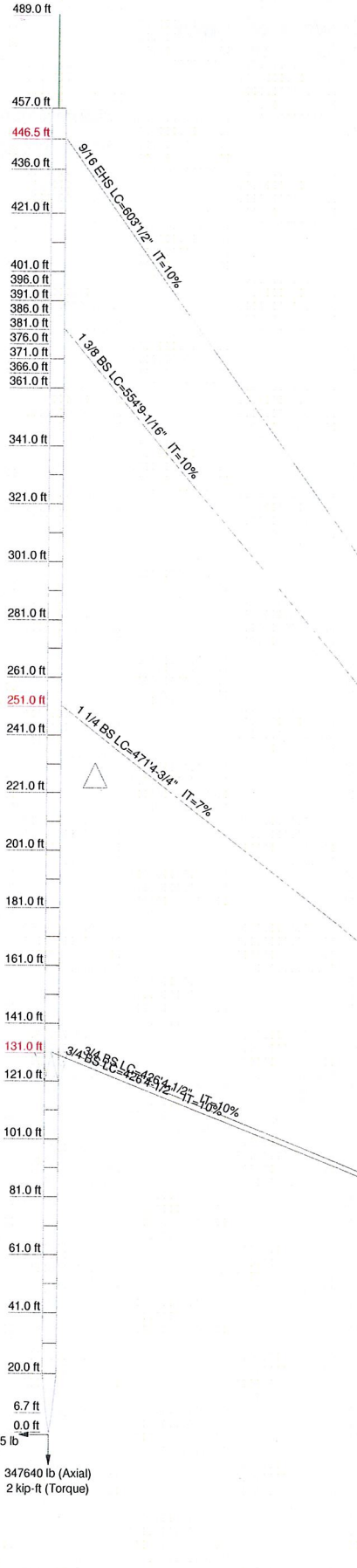
Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
324	Andrew 2' w/ Radome	6.832	0.0776	0.4621
200	Mark P-9A48GN-U	4.950	0.1010	0.2957
179	Radiowaves SPD4-5.2	4.531	0.1149	0.2440
154	Mark P-21A72	3.954	0.1232	0.1869
146	Andrew PL6-65-PXA	3.764	0.1222	0.1748
117	Mark P-9A48GN-U	3.135	0.1059	0.1518
107	Kathrein PR-950	2.948	0.1067	0.1567
101	Radiowaves SPD2-5.8	2.835	0.1089	0.1601
70	Mark P-9A48GN-U	2.163	0.1292	0.1651
59.5	RFS Celwave MGAR3-23N	1.900	0.1388	0.1657

#### 4.1) Recommendations

- 1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The tower and its base and anchor foundations have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

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

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	
Legs	SR 3	SR 2 3/4	A	B	SR 3	SR 3 1/4	SR 3 1/2	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	SR 3 1/4	
Leg Grade	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Diagonals	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	
Diagonal Grade	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33	A7-33
Top Girts	C8x13.75	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	
Mid Girts	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Horizontal	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	L2 1/2x3/16	
Sec. Horizontal	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Top Guy Pull-Offs	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Face Width (ft)	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	2.56333	
# Panels @ (ft)	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	4 @ 5.25	
Weight (lb)	57137.1	665.3	1448.9	2687.2	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9	2558.9



**SYMBOL LIST**

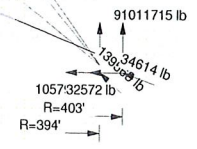
MARK	SIZE	MARK	SIZE
A	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	G	2L3x2x1/4x3/8
B	3.5" S.R. w/ 3.5 SCH40 Half Pipe	H	L3x2x3/16
C	L2 1/2x2x1/4	I	2L3 1/2x3 1/2x3/8x3/8
D	L2x2x3/16	J	3 @ 4.43056
E	N.A.	K	3 @ 2.23611


  

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A7-33	33 ksi	60 ksi	A36	36 ksi	58 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. 32' dielectric TFU-33J is included for load transfer only.
  6. TOWER RATING: 90%

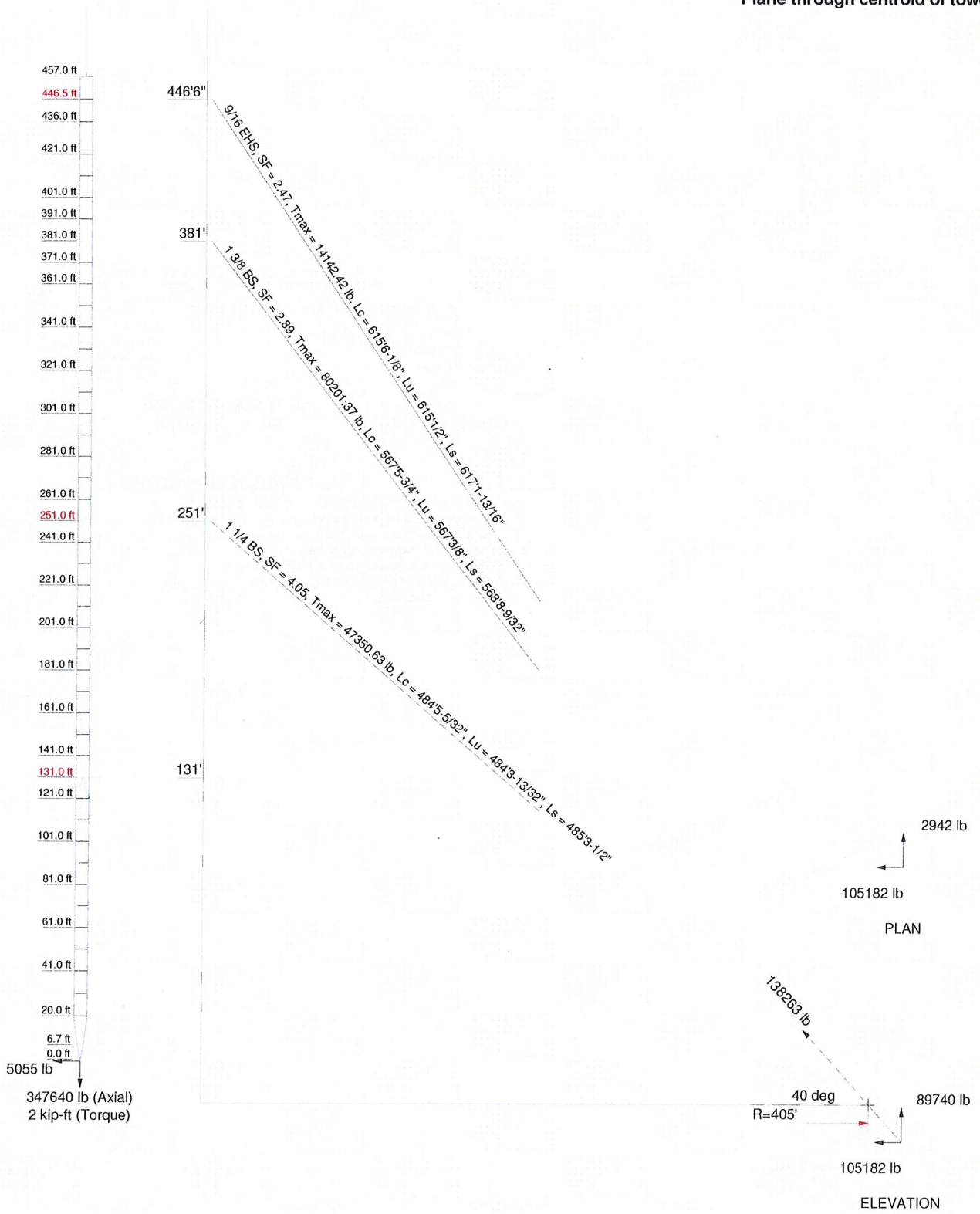


 <p><b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350</p>	<b>Job: Trumbull (BU# 873128)</b>		
	Project: <b>TEP# 110967</b>		
	Client: Crown Castle USA	Drawn by: JRM	App'd:
	Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	Path:	Dwg No. E-1	

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**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

**Maximum Values**  
 Anchor 'A' @ 405 ft Azimuth 0 deg Elev -20 ft  
 Plane through centroid of tower

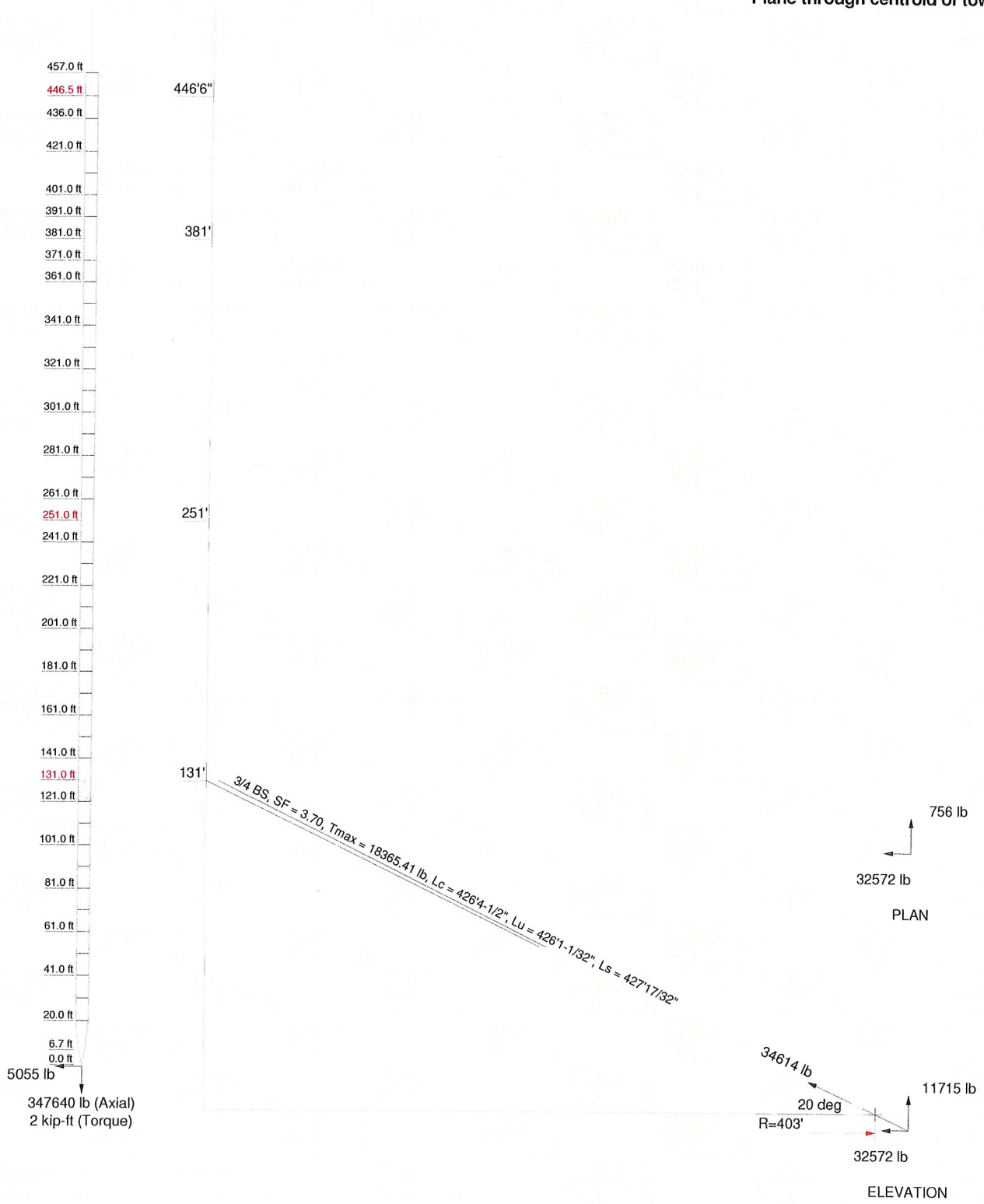


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	Project: <b>TEP# 110967</b>		
	Client: Crown Castle USA	Drawn by: JRM	App'd:
	Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	Path:		Dwg No. E-6

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**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

**Maximum Values**  
 Anchor 'A' @ 403 ft Azimuth 0 deg Elev -20 ft  
 Plane through centroid of tower

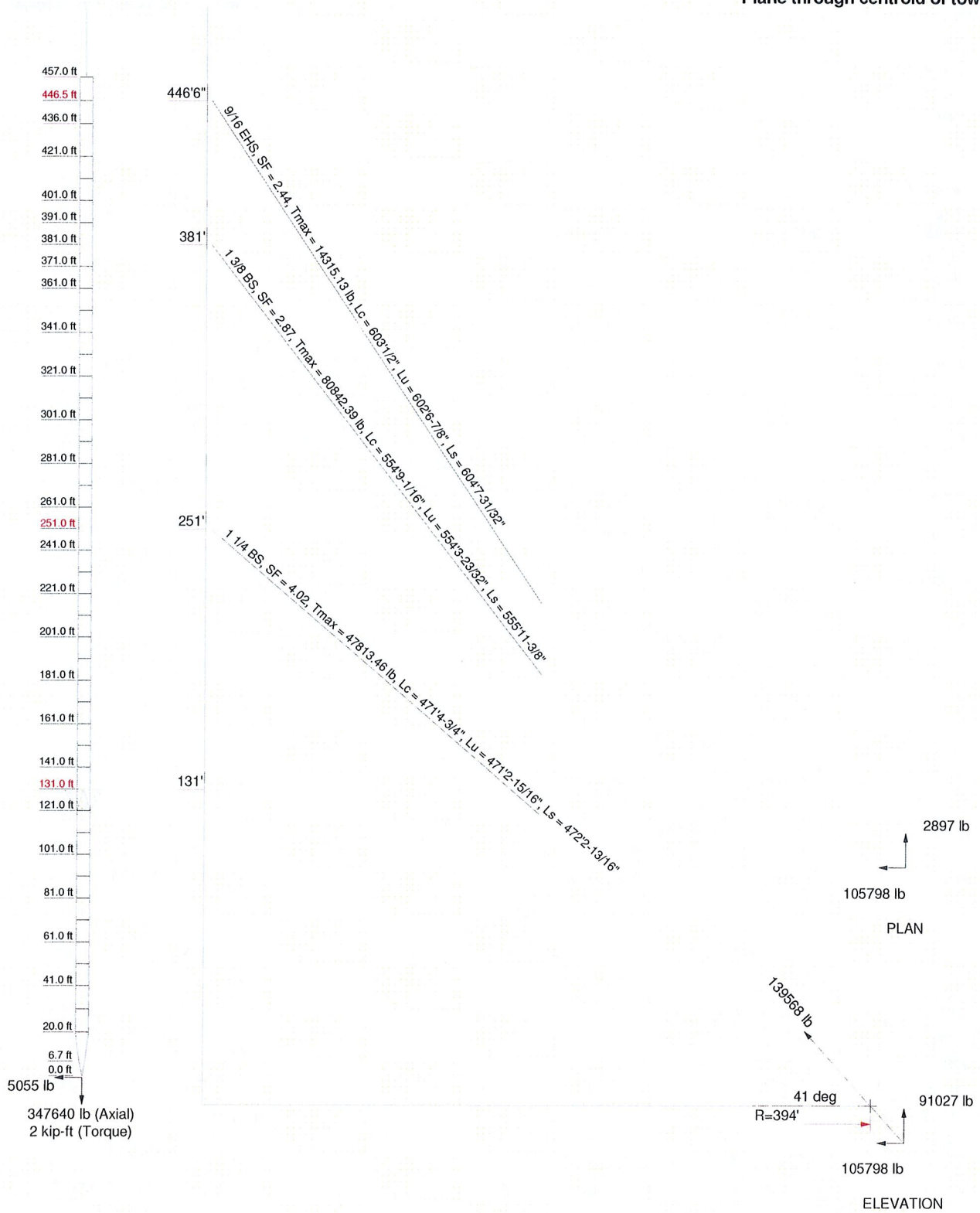


	<b>Tower Engineering Professionals, Inc.</b>		Job: <b>Trumbull (BU# 873128)</b>		
	3703 Junction Boulevard		Project: <b>TEP# 110967</b>		
	Raleigh, NC 27603		Client: Crown Castle USA	Drawn by: JRM	App'd:
	Phone: (919) 661-6351		Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	FAX: (919) 661-6350		Path:		Dwg No. E-6

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**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

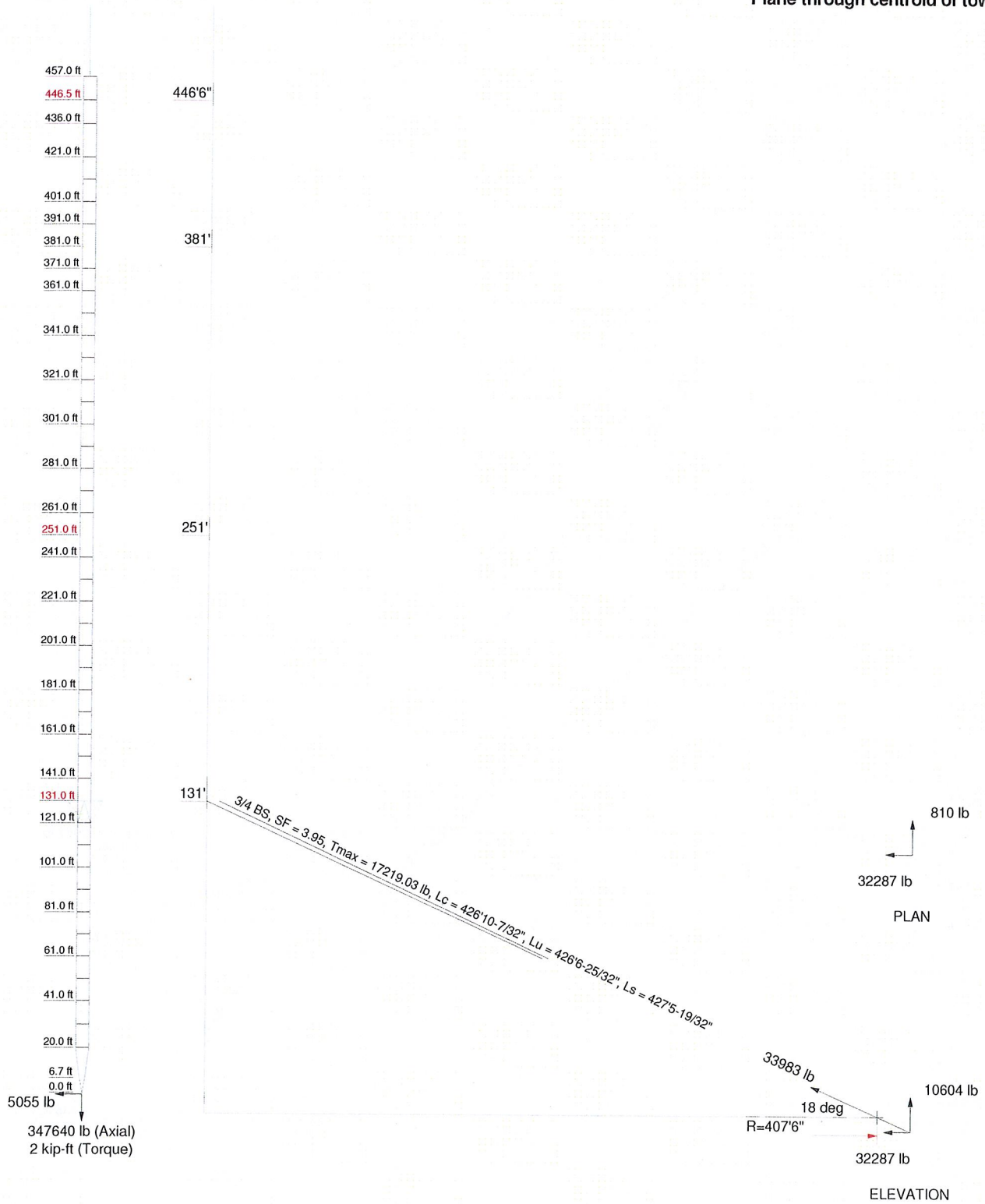
**Maximum Values**  
 Anchor 'B'@394 ft Azimuth 120 deg Elev -13 ft  
 Plane through centroid of tower



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	Project: <b>TEP# 110967</b>		
	Client: Crown Castle USA	Drawn by: JRM	App'd:
	Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	Path: G:\1984 Trumbull\Structural\WOC# 456783 - Verizon App - REV 11\trTower\873128.eit	Dwg No. E-6	

**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

**Maximum Values**  
 Anchor 'B' @ 407.5 ft Azimuth 120 deg Elev -9 ft  
 Plane through centroid of tower

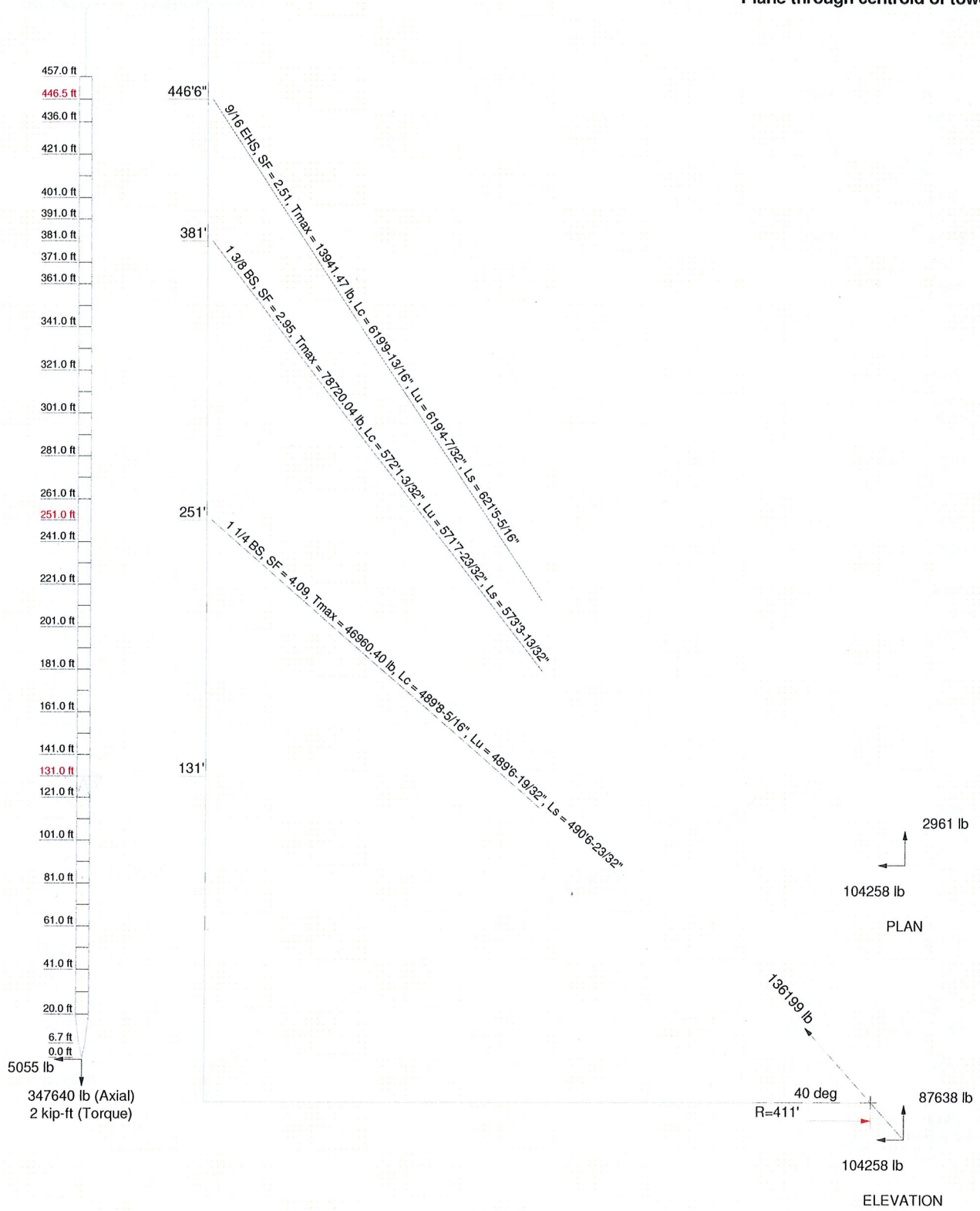



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	FAX: (919) 661-6350		
Job: <b>Trumbull (BU# 873128)</b>			
Project: <b>TEP# 110967</b>			
Client: Crown Castle USA	Drawn by: JRM	App'd:	
Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS	
Path:		Dwg No. E-6	
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**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

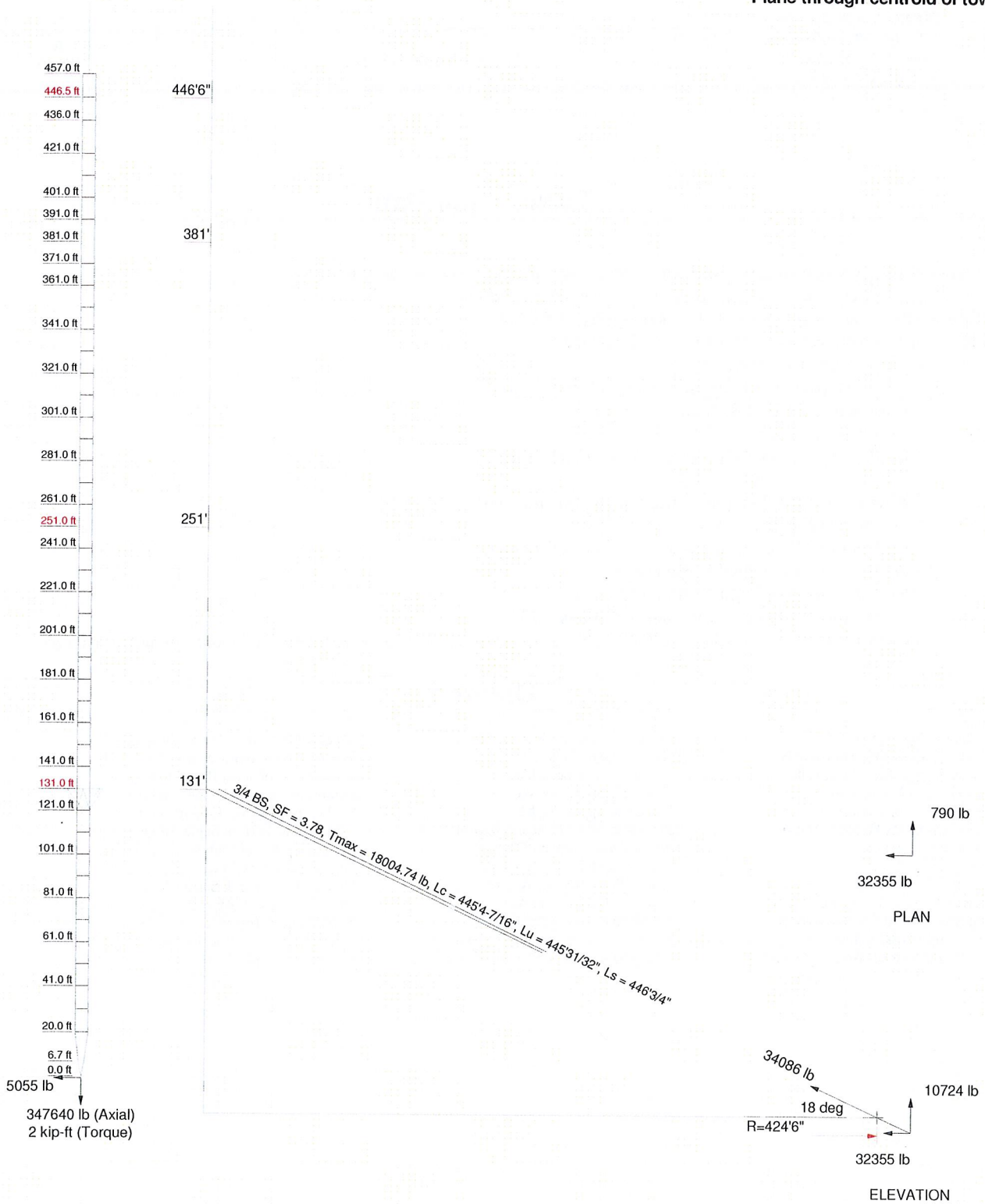
**Maximum Values**  
 Anchor 'C'@411 ft Azimuth 240 deg Elev -20.5 ft  
 Plane through centroid of tower



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	Project: <b>TEP# 110967</b>		
	Client: Crown Castle USA	Drawn by: JRM	App'd:
	Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	Path: G:\1984 Trumbull\Structural\WOC# 456783 - Verizon App - REV 11\trTower\873128.dwg		Dwg No. E-6

**Guy Tensions and Tower Reactions**  
 TIA/EIA-222-F - 85 mph/38 mph 0.7500 in Ice

**Maximum Values**  
 Anchor 'C' @ 424.5 ft Azimuth 240 deg Elev -16.5 ft  
 Plane through centroid of tower



5055 lb  
 347640 lb (Axial)  
 2 kip-ft (Torque)

	<b>Tower Engineering Professionals, Inc.</b>		Job: <b>Trumbull (BU# 873128)</b>		
	3703 Junction Boulevard		Project: <b>TEP# 110967</b>		
	Raleigh, NC 27603		Client: Crown Castle USA	Drawn by: JRM	App'd:
	Phone: (919) 661-6351		Code: TIA/EIA-222-F	Date: 06/07/12	Scale: NTS
	FAX: (919) 661-6350		Path:	Dwg No. E-6	

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<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 1 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

## Tower Input Data

The main tower is a 3x guyed tower with an overall height of 457' above the ground line.  
The base of the tower is set at an elevation of 0' above the ground line.  
The face width of the tower is 6' at the top and tapered at the base.  
This tower is designed using the TIA/EIA-222-F standard.

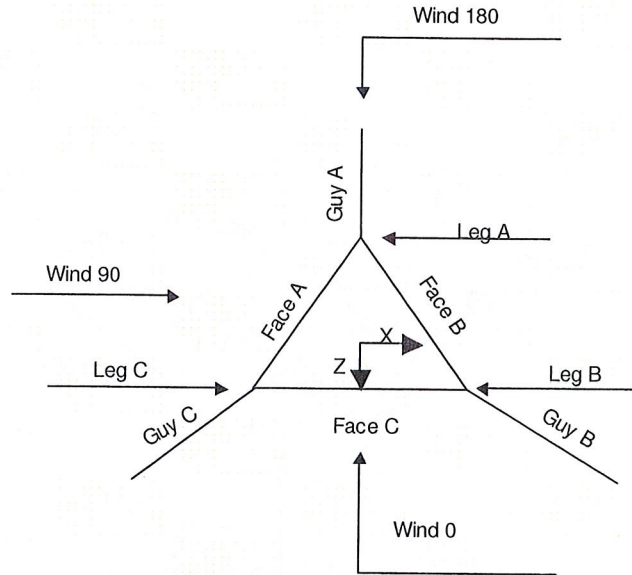
The following design criteria apply:

- 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.
- Pressures are calculated at each section.
- Safety factor used in guy design is 2.
- 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

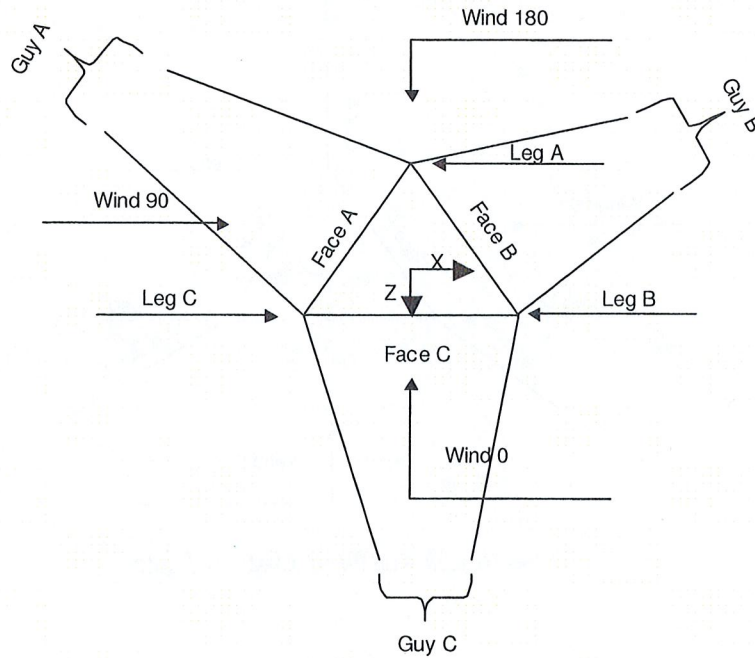
- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>√ Escalate Ice</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: 40px;">Poles</li> <li>Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul> |
|--|--|---|

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	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM



**Corner & Starmount Guyed Tower**

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM



**Face Guyed**

**Tower Section Geometry**

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	457'-436'			6'	1	21'
T2	436'-421'			6'	1	15'
T3	421'-401'			6'	1	20'
T4	401'-396'			6'	1	5'
T5	396'-391'			6'	1	5'
T6	391'-386'			6'	1	5'
T7	386'-381'			6'	1	5'
T8	381'-376'			6'	1	5'
T9	376'-371'			6'	1	5'
T10	371'-366'			6'	1	5'
T11	366'-361'			6'	1	5'
T12	361'-341'			6'	1	20'
T13	341'-321'			6'	1	20'
T14	321'-301'			6'	1	20'
T15	301'-281'			6'	1	20'
T16	281'-261'			6'	1	20'

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	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T17	261'-241'			6'	1	20'
T18	241'-221'			6'	1	20'
T19	221'-201'			6'	1	20'
T20	201'-181'			6'	1	20'
T21	181'-161'			6'	1	20'
T22	161'-141'			6'	1	20'
T23	141'-121'			6'	1	20'
T24	121'-101'			6'	1	20'
T25	101'-81'			6'	1	20'
T26	81'-61'			6'	1	20'
T27	61'-41'			6'	1	20'
T28	41'-20'			6'	1	21'
T29	20'-6'8-17/32"			6'	1	13'3-15/32"
T30	6'8-17/32"-0'			2'6-31/32"	1	6'8-17/32"

### 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	457'-436'	5'3"	X Brace	No	Yes	0.0000	0.0000
T2	436'-421'	5'	X Brace	No	Yes	0.0000	0.0000
T3	421'-401'	5'	X Brace	No	Yes	0.0000	0.0000
T4	401'-396'	5'	X Brace	No	Yes	0.0000	0.0000
T5	396'-391'	5'	X Brace	No	Yes	0.0000	0.0000
T6	391'-386'	5'	X Brace	No	Yes	0.0000	0.0000
T7	386'-381'	5'	X Brace	No	Yes	0.0000	0.0000
T8	381'-376'	5'	X Brace	No	Yes	0.0000	0.0000
T9	376'-371'	5'	X Brace	No	Yes	0.0000	0.0000
T10	371'-366'	5'	X Brace	No	Yes	0.0000	0.0000
T11	366'-361'	5'	X Brace	No	Yes	0.0000	0.0000
T12	361'-341'	5'	X Brace	No	Yes	0.0000	0.0000
T13	341'-321'	5'	X Brace	No	Yes	0.0000	0.0000
T14	321'-301'	5'	X Brace	No	Yes	0.0000	0.0000
T15	301'-281'	5'	X Brace	No	Yes	0.0000	0.0000
T16	281'-261'	5'	X Brace	No	Yes	0.0000	0.0000
T17	261'-241'	5'	X Brace	No	Yes	0.0000	0.0000
T18	241'-221'	5'	X Brace	No	Yes	0.0000	0.0000
T19	221'-201'	5'	X Brace	No	Yes	0.0000	0.0000
T20	201'-181'	5'	X Brace	No	Yes	0.0000	0.0000
T21	181'-161'	5'	X Brace	No	Yes	0.0000	0.0000
T22	161'-141'	5'	X Brace	No	Yes	0.0000	0.0000
T23	141'-121'	5'	X Brace	No	Yes	0.0000	0.0000
T24	121'-101'	5'	X Brace	No	Yes	0.0000	0.0000
T25	101'-81'	5'	X Brace	No	Yes	0.0000	0.0000
T26	81'-61'	5'	X Brace	No	Yes	0.0000	0.0000
T27	61'-41'	5'	X Brace	No	Yes	0.0000	0.0000
T28	41'-20'	5'3"	X Brace	No	Yes	0.0000	0.0000
T29	20'-6'8-17/32"	4'5-5/32"	X Brace	No	Yes	0.0000	0.0000
T30	6'8-17/32"-0'	2'2-7/8"	X Brace	No	Yes	0.0000	0.0000

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	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 457'-436'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T2 436'-421'	Solid Round	2 3/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T3 421'-401'	Solid Round	2 3/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T4 401'-396'	Arbitrary Shape	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T5 396'-391'	Arbitrary Shape	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T6 391'-386'	Arbitrary Shape	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T7 386'-381'	Arbitrary Shape	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T8 381'-376'	Arbitrary Shape	3.5" S.R. w/ 3.5 SCH40 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T9 376'-371'	Arbitrary Shape	3.5" S.R. w/ 3.5 SCH40 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T10 371'-366'	Arbitrary Shape	3.5" S.R. w/ 3.5 SCH40 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T11 366'-361'	Arbitrary Shape	3.5" S.R. w/ 3.5 SCH40 Half Pipe	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T12 361'-341'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T13 341'-321'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T14 321'-301'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T15 301'-281'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T16 281'-261'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T17 261'-241'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T18 241'-221'	Solid Round	3	A7-33 (33 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T19 221'-201'	Solid Round	3 1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T20 201'-181'	Solid Round	3 1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T21 181'-161'	Solid Round	3 1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T22 161'-141'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T23 141'-121'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T24 121'-101'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T25 101'-81'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T26 81'-61'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T27 61'-41'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T28 41'-20'	Solid Round	3 1/2	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T29 20'-6'8"-17'32"	Solid Round	3 1/4	A7-33 (33 ksi)	Single Angle	L2x2x3/16	A7-33 (33 ksi)

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Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T30 6'8"-17'32"-0'	Solid Round	3 1/4	A7-33 (33 ksi)	Single Angle	L2x2x3/16	A7-33 (33 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 457'-436'	Channel	C8x13.75	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T2 436'-421'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T3 421'-401'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T4 401'-396'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A7-33 (33 ksi)
T6 391'-386'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A7-33 (33 ksi)
T7 386'-381'	Single Angle		A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T8 381'-376'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A7-33 (33 ksi)
T10 371'-366'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A7-33 (33 ksi)
T11 366'-361'	Single Angle		A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T12 361'-341'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T13 341'-321'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T14 321'-301'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T15 301'-281'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T16 281'-261'	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T17 261'-241'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T18 241'-221'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T19 221'-201'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T20 201'-181'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T21 181'-161'	Double Angle	2L3x2x1/4x3/8	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T22 161'-141'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T23 141'-121'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T24 121'-101'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T25 101'-81'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T26 81'-61'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)



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Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T27 61'-41'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T28 41'-20'	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)
T29 20'-68"-17/32"	Single Angle	L3x2x3/16	A7-33 (33 ksi)	Single Angle		A7-33 (33 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 457'-436'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T2 436'-421'	None	Single Angle		A7-33 (33 ksi)	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)
T3 421'-401'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Solid Round		A36 (36 ksi)
T12 361'-341'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T13 341'-321'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Solid Round		A36 (36 ksi)
T14 321'-301'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Solid Round		A36 (36 ksi)
T15 301'-281'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Solid Round		A36 (36 ksi)
T16 281'-261'	1	Single Angle	L2 1/2x2x1/4	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T17 261'-241'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T18 241'-221'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T19 221'-201'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T20 201'-181'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T21 181'-161'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T22 161'-141'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T23 141'-121'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T24 121'-101'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T25 101'-81'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T26 81'-61'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T27 61'-41'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)
T28 41'-20'	1	Single Angle	L2 1/2x2x3/16	A7-33 (33 ksi)	Single Angle		A36 (36 ksi)

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### Tower Section Geometry (cont'd)

Tower Elevation	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
<i>ft</i>						
T12 361'-341'	Equal Angle	L2x2x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T17 261'-241'	Double Equal Angle	2L3 1/2x3 1/2x3/8x3/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

### Tower Section Geometry (cont'd)

Tower Elevation	Gusset Area (per face)	Gusset Thickness	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
<i>ft</i>	<i>ft<sup>2</sup></i>	<i>in</i>						
T1 457'-436'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T2 436'-421'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T3 421'-401'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T4 401'-396'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T5 396'-391'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T6 391'-386'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T7 386'-381'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T8 381'-376'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T9 376'-371'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T10 371'-366'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T11 366'-361'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T12 361'-341'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T13 341'-321'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T14 321'-301'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T15 301'-281'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T16 281'-261'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T17 261'-241'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T18 241'-221'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T19 221'-201'	0.00	0.3750	A7-33 (33 ksi)	1	1	1	0.0000	0.0000
T20 201'-181'	0.00	0.3750	A7-33	1	1	1	0.0000	0.0000





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Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T8 381'-376'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 376'-371'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 371'-366'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 366'-361'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 361'-341'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 341'-321'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 321'-301'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 301'-281'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 281'-261'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T17 261'-241'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T18 241'-221'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T19 221'-201'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T20 201'-181'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T21 181'-161'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T22 161'-141'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T23 141'-121'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T24 121'-101'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T25 101'-81'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T26 81'-61'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T27 61'-41'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T28 41'-20'	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T29	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
20'-6'8-17/32"														
T30	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
6'8-17/32"-0'														

### Tower Section Geometry (cont'd)

Tower Elevation ft	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
in	in	in	in	in	in	in	in	
T1 457'-436'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T2 436'-421'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T3 421'-401'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T4 401'-396'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T5 396'-391'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T6 391'-386'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T7 386'-381'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T8 381'-376'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T9 376'-371'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T10 371'-366'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T11 366'-361'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T12 361'-341'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T13 341'-321'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T14 321'-301'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T15 301'-281'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T16 281'-261'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T17 261'-241'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Tower Elevation <i>ft</i>	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
	in	in	in	in	in	in	in	in
T18 241'-221'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T19 221'-201'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T20 201'-181'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T21 181'-161'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T22 161'-141'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T23 141'-121'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T24 121'-101'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T25 101'-81'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T26 81'-61'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T27 61'-41'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T28 41'-20'	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T29	3.0000	0.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20'-6'8"-17/32"								
T30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6'8"-17/32"-0'								

### Tower Section Geometry (cont'd)

Tower Elevation <i>ft</i>	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size	No.	Bolt Size	No.	Bolt Size	No.	Bolt Size	No.	Bolt Size	No.	Bolt Size	No.	Bolt Size	No.
		in		in		in		in		in		in		in	
T1 457'-436'	Flange	0.8750	8	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.0000	0
T2 436'-421'	Flange	0.8750	8	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.0000	0
T3 421'-401'	Flange	0.8750	8	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.5000	1
T4 401'-396'	Flange	0.8750	8	0.5000	2	0.5000	2	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T5 396'-391'	Flange	0.8750	16	0.5000	2	0.0000	0	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T6 391'-386'	Flange	0.8750	0	0.5000	2	0.0000	0	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T7 386'-381'	Flange	0.8750	0	0.5000	2	0.0000	0	0.5000	2	0.5000	2	0.0000	0	0.0000	0
T8 381'-376'	Flange	0.8750	0	0.5000	2	0.5000	2	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T9 376'-371'	Flange	0.8750	16	0.5000	2	0.0000	0	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T10 371'-366'	Flange	0.8750	0	0.5000	2	0.0000	0	0.0000	0	0.5000	2	0.0000	0	0.0000	0
T11 366'-361'	Flange	0.8750	0	0.5000	2	0.0000	0	0.5000	2	0.5000	2	0.0000	0	0.0000	0
T12 361'-341'	Flange	0.8750	0	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.5000	1
T13 341'-321'	Flange	0.8750	8	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.0000	0
T14 321'-301'	Flange	0.8750	8	0.5000	2	0.5000	2	0.5000	2	0.5000	2	0.0000	0	0.0000	0

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	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.
T15 301'-281'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T16 281'-261'	Flange	0.8750 A307	8	0.5000 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T17 261'-241'	Flange	0.6250 A307	8	0.6250 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T18 241'-221'	Flange	0.6250 A307	8	0.6250 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T19 221'-201'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T20 201'-181'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T21 181'-161'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T22 161'-141'	Flange	0.6250 A307	8	0.6250 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T23 141'-121'	Flange	0.6250 A307	8	0.6250 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A325N	2	0.0000 A325N	0	0.0000 A325X	0
T24 121'-101'	Flange	0.8750 A307	8	0.5000 A325N	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T25 101'-81'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T26 81'-61'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T27 61'-41'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T28 41'-20'	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T29	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A325N	2	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
20'-6'-17/32"	Flange	0.8750 A307	8	0.5000 A307	2	0.5000 A307	0	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0
T30															
6'-8'-17/32"-0'		0.8750 A307	8	0.5000 A307	2	0.5000 A307	0	0.5000 A307	2	0.5000 A307	2	0.0000 A325N	0	0.0000 A325X	0

### Guy Data

Guy Elevation	Guy Grade	Guy Size	Initial Tension	%	Guy Modulus	Guy Weight	$L_u$	Anchor Radius	Anchor Azimuth Adj.	Anchor Elevation	End Fitting Efficiency
ft			lb		ksi	plf	ft	ft	°	ft	%
131	BS	A 3/4	6800.00	10%	24000	1.180	426'1-3/32"	403'	0.0000	-20'	100%
		B 3/4	6800.00	10%	24000	1.180	426'6-27/32"	407'6"	0.0000	-9'	100%
		C 3/4	6800.00	10%	24000	1.180	445'1-3/32"	424'6"	0.0000	-16'6"	100%
251	BS	A 1 1/4	13440.00	7%	24000	3.280	484'3-23/32"	405'	0.0000	-20'	100%
		B 1 1/4	13440.00	7%	24000	3.280	471'3-1/4"	394'	0.0000	-13'	100%
		C 1 1/4	13440.00	7%	24000	3.280	489'6-31/32"	411'	0.0000	-20'6"	100%
381	BS	A 1 3/8	23200.00	10%	24000	3.970	567'31/32"	405'	0.0000	-20'	100%
		B 1 3/8	23200.00	10%	24000	3.970	554'4-5/16"	394'	0.0000	-13'	100%
		C 1 3/8	23200.00	10%	24000	3.970	571'8-9/32"	411'	0.0000	-20'6"	100%
446.5	EHS	A 9/16	3500.00	10%	21000	0.671	615'1-3/16"	405'	0.0000	-20'	100%
		B 9/16	3500.00	10%	21000	0.671	602'7-9/16"	394'	0.0000	-13'	100%
		C 9/16	3500.00	10%	21000	0.671	619'4-29/32"	411'	0.0000	-20'6"	100%





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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm		Pull Off		Diagonal	
			K <sub>x</sub>	K <sub>y</sub>	K <sub>x</sub>	K <sub>y</sub>	K <sub>x</sub>	K <sub>y</sub>
131	Yes	Yes	1	1	1	1	1	1
251	No	No			1	1	1	1
381	No	No			1	1	1	1
446.5	No	No			1	1	1	1

### Guy Data (cont'd)

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
131	0.7500 A307	2	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
251	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
381	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
446.5	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

### Guy Pressures

Guy Elevation ft	Guy Location	z ft	q <sub>z</sub> psf	q <sub>z</sub> Ice psf	Ice Thickness in
131	A	55'6"	21	4	0.7983
	B	61'	22	4	0.8074
	C	57'3"	22	4	0.8013
251	A	115'6"	26	5	0.8717
	B	119'	27	5	0.8748
	C	115'3"	26	5	0.8714
381	A	180'6"	30	6	0.9196
	B	184'	30	6	0.9218
	C	180'3"	30	6	0.9195
446.5	A	213'3"	32	6	0.9382
	B	216'9"	32	6	0.9401
	C	213'	32	6	0.9381

### Guy-Tensioning Information

Guy Elevation ft	H ft	V ft	Temperature At Time Of Tensioning														
			0 F		20 F		40 F		60 F		80 F		100 F		120 F		
			Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	
131	A	398.74	151.00	8946	11.86	8196	12.94	7487	14.15	6800	15.57	6198	17.06	5655	18.68	5174	20.40
	B	403.24	140.00	8981	11.85	8218	12.94	7497	14.18	6800	15.62	6191	17.14	5645	18.78	5161	20.52
	C	420.24	147.50	8924	12.98	8177	14.15	7449	15.53	6800	16.99	6209	18.59	5679	20.31	5210	22.11
251	A	401.54	271.00	16609	22.57	15449	24.22	14394	25.95	13440	27.74	12583	29.58	11817	31.44	11132	33.30

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Temperature At Time Of Tensioning																	
Guy Elevation ft	H ft	V ft	0 F		20 F		40 F		60 F		80 F		100 F		120 F		
			Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	
381	B	390.54	264.00	16697	21.28	15506	22.87	14421	24.55	13440	26.29	12560	28.08	11773	29.90	11070	31.74
	C	407.54	271.50	16586	23.10	15433	24.78	14385	26.54	13440	28.35	12590	30.21	11830	32.09	11151	33.98
	A	401.54	401.00	27182	22.83	25804	24.02	24475	25.29	23200	26.64	21982	28.07	20826	29.57	19734	31.15
446.5	B	390.54	394.00	27195	21.82	25814	22.96	24481	24.17	23200	25.47	21975	26.85	20810	28.30	19708	29.83
	C	407.54	401.50	27207	23.18	25819	24.40	24482	25.69	23200	27.07	21977	28.53	20818	30.07	19724	31.68
	A	401.54	466.50	3977	30.74	3812	32.02	3653	33.36	3500	34.76	3353	36.22	3213	37.74	3079	39.31
	B	390.54	459.50	3977	29.52	3813	30.75	3653	32.04	3500	33.39	3353	34.80	3212	36.26	3077	37.78
	C	407.54	467.00	3980	31.14	3814	32.45	3654	33.82	3500	35.25	3352	36.74	3212	38.29	3077	39.88

### 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
HJ8-50B(3")	B	Yes	Ar (CfAe)	367' - 10'	0.0000	0.14	1	1	3.0100	3.0100		1.78
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	70' - 10'	0.0000	0.08	2	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	200' - 70'	0.0000	0.08	1	1	0.2500	1.0900		0.33
***												
LDF7-50A(1-5/8")	C	Yes	Ar (CfAe)	324' - 10'	0.0000	-0.05	1	1	1.9800	1.9800		0.82
HJ11-50 (4 AIR)	C	No	Ar (CfAe)	457' - 10'	-2.0000	0	1	1	4.0000	4.0000		2.50
AVA5-50 (7/8 LOW DENSIFOA M)	C	Yes	Ar (CfAe)	235' - 10'	0.0000	0.42	18	6	0.5000	1.1000		0.30
ATCB-B01-09 0( 1/4")	C	No	Ar (CfAe)	457' - 10'	0.0000	0.5	1	1	0.2600	0.2600		0.07
LDF6-50A(1-1/4")	C	Yes	Ar (CfAe)	269' - 10'	0.0000	0.21	3	3	0.2500	1.5500		0.66
LDF6-50A(1-1/4")	C	Yes	Ar (CfAe)	284' - 269'	0.0000	0.21	2	2	0.2500	1.5500		0.66
LDF6-50A(7/8")	C	Yes	Ar (CfAe)	344' - 10'	0.0000	-0.42	2	2	0.2500	1.5500		0.66
LDF5-50A(7/8")	C	No	Ar (CfAe)	54' - 10'	-2.5000	0.37	4	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	59'6" - 54'	-2.5000	0.37	3	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	117' - 59'6"	-2.5000	0.37	2	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	135' - 117'	-2.5000	0.37	1	1	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	100' - 10'	-2.5000	-0.37	4	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	107' - 100'	-2.5000	-0.37	3	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	C	No	Ar (CfAe)	215' - 107'	-2.5000	-0.37	1	1	0.2500	1.0900		0.33
LDF1-50A(1/4")	C	Yes	Ar (CfAe)	324' - 10'	0.0000	-0.48	2	2	0.1500	0.3450		0.06
***												
1" Rigid Conduit	A	Yes	Ar (CfAe)	333' - 10'	0.0000	-0.35	1	1	1.0000	1.0000		1.13
LCF78-50J	A	Yes	Ar (CfAe)	247' - 10'	0.0000	0.35	12	6	0.2500	1.1000		0.53
LDF6-50A(1-	A	No	Ar (CfAe)	333' - 10'	-2.0000	0.4	1	1	0.2500	1.5500		0.66

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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
1/4") ***												
HJ8-50B (3 AIR)	B	No	Ar (CfAe)	422' - 10'	-2.0000	0	1	1	3.0100	3.0100		1.78
LDF7-50A(1-5/8")	B	No	Ar (CfAe)	278' - 10'	-2.0000	0.1	1	1	1.9800	1.9800		0.82
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	330' - 10'	0.0000	-0.42	1	1	0.2500	1.0900		0.33
FSJ4-50B(1/2")	B	Yes	Ar (CfAe)	179' - 10'	0.0000	-0.1	4	2	0.2500	0.5200		0.14
FSJ4-50B(1/2")	B	Yes	Ar (CfAe)	189' - 179'	0.0000	-0.1	3	2	0.2500	0.5200		0.14
FSJ4-50B(1/2")	B	Yes	Ar (CfAe)	324' - 189'	0.0000	-0.1	2	2	0.2500	0.5200		0.14
FSJ4-50B(1/2")	B	Yes	Ar (CfAe)	344' - 324'	0.0000	-0.1	1	1	0.2500	0.5200		0.14
EW63	B	Yes	Ar (CfAe)	146' - 10'	0.0000	-0.04	2	2	0.2500	1.5742		0.51
EW63	B	Yes	Ar (CfAe)	154' - 10'	0.0000	-0.17	2	2	0.2500	1.5742		0.51
LDF5-50A(7/8")	B	No	Ar (CfAe)	442' - 10'	2.0000	-0.05	1	1	0.2500	1.0900		0.33
LDF6-50A(1-1/4")	B	No	Ar (CfAe)	259' - 10'	2.0000	-0.01	1	1	1.5500	1.5500		0.66
LDF6-50A(1-1/4")	B	Yes	Ar (CfAe)	344' - 10'	0.0000	0.2	1	1	1.5500	1.5500		0.66
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	135' - 10'	0.0000	0.24	1	1	0.2500	1.0900		0.33
LDF7-50A(1-5/8")	B	Yes	Ar (CfAe)	348' - 10'	0.0000	0.29	1	1	1.9800	1.9800		0.82
HJ8-50B (3 AIR)	B	Yes	Ar (CfAe)	293' - 10'	0.0000	0.35	1	1	3.0100	3.0100		1.78
HJ7-50A(1-5/8")	B	Yes	Ar (CfAe)	340' - 10'	0.0000	0.42	1	1	1.9800	1.9800		1.04
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	204' - 10'	0.0000	0.48	3	2	0.2500	1.0900		0.33
LDF5-50A(7/8")	B	Yes	Ar (CfAe)	442' - 204'	0.0000	0.48	2	2	0.2500	1.0900		0.33
*** Climbing Ladder ( Flat)	A	No	Af (CfAe)	457' - 10'	-12.0000	0	1	1	3.8400	3.8400	15.3600	4.81

### 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>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
T1	457'-436'	A	0.000	6.720	0.000	0.000	101.01
		B	1.635	0.000	0.000	0.000	5.94
		C	7.455	0.000	0.000	0.000	54.08
T2	436'-421'	A	0.000	4.800	0.000	0.000	72.15
		B	4.338	0.000	0.000	0.000	16.63
		C	5.325	0.000	0.000	0.000	38.63
T3	421'-401'	A	0.000	6.400	0.000	0.000	96.20
		B	10.467	0.000	0.000	0.000	55.40
		C	7.100	0.000	0.000	0.000	51.50
T4	401'-396'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Trumbull (BU# 873128)	<b>Page</b>	18 of 52
	<b>Project</b>	TEP# 110967	<b>Date</b>	09:18:12 06/07/12
	<b>Client</b>	Crown Castle USA	<b>Designed by</b>	JRM

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
T5	396'-391'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88
T6	391'-386'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88
T7	386'-381'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88
T8	381'-376'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88
T9	376'-371'	A	0.000	1.600	0.000	0.000	24.05
		B	2.617	0.000	0.000	0.000	13.85
		C	1.775	0.000	0.000	0.000	12.88
T10	371'-366'	A	0.000	1.600	0.000	0.000	24.05
		B	2.868	0.000	0.000	0.000	15.63
		C	1.775	0.000	0.000	0.000	12.88
T11	366'-361'	A	0.000	1.600	0.000	0.000	24.05
		B	3.871	0.000	0.000	0.000	22.75
		C	1.775	0.000	0.000	0.000	12.88
T12	361'-341'	A	0.000	6.400	0.000	0.000	96.20
		B	17.156	0.000	0.000	0.000	99.14
		C	7.875	0.000	0.000	0.000	55.46
T13	341'-321'	A	2.550	6.400	0.000	0.000	117.68
		B	26.316	0.000	0.000	0.000	146.55
		C	12.934	0.000	0.000	0.000	80.72
T14	321'-301'	A	4.250	6.400	0.000	0.000	132.00
		B	28.217	0.000	0.000	0.000	153.60
		C	16.717	0.000	0.000	0.000	96.70
T15	301'-281'	A	4.250	6.400	0.000	0.000	132.00
		B	31.227	0.000	0.000	0.000	174.96
		C	17.492	0.000	0.000	0.000	100.66
T16	281'-261'	A	4.250	6.400	0.000	0.000	132.00
		B	36.038	0.000	0.000	0.000	203.14
		C	22.917	0.000	0.000	0.000	128.38
T17	261'-241'	A	7.550	6.400	0.000	0.000	170.16
		B	38.858	0.000	0.000	0.000	217.48
		C	24.467	0.000	0.000	0.000	136.30
T18	241'-221'	A	15.250	6.400	0.000	0.000	259.20
		B	39.117	0.000	0.000	0.000	218.80
		C	32.167	0.000	0.000	0.000	211.90
T19	221'-201'	A	15.250	6.400	0.000	0.000	259.20
		B	39.117	0.000	0.000	0.000	219.79
		C	36.738	0.000	0.000	0.000	248.92
T20	201'-181'	A	15.250	6.400	0.000	0.000	259.20
		B	40.843	0.000	0.000	0.000	232.79
		C	37.283	0.000	0.000	0.000	250.90
T21	181'-161'	A	15.250	6.400	0.000	0.000	259.20
		B	40.933	0.000	0.000	0.000	237.32
		C	37.283	0.000	0.000	0.000	250.90
T22	161'-141'	A	15.250	6.400	0.000	0.000	259.20
		B	45.656	0.000	0.000	0.000	255.96
		C	37.283	0.000	0.000	0.000	250.90
T23	141'-121'	A	15.250	6.400	0.000	0.000	259.20
		B	52.700	0.000	0.000	0.000	283.02
		C	38.555	0.000	0.000	0.000	255.52
T24	121'-101'	A	15.250	6.400	0.000	0.000	259.20
		B	53.245	0.000	0.000	0.000	285.00
		C	41.098	0.000	0.000	0.000	266.74
T25	101'-81'	A	15.250	6.400	0.000	0.000	259.20

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	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

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
T26	81'-61'	B	53.245	0.000	0.000	0.000	285.00
		C	42.733	0.000	0.000	0.000	283.57
		A	15.250	6.400	0.000	0.000	259.20
T27	61'-41'	B	54.062	0.000	0.000	0.000	287.97
		C	42.733	0.000	0.000	0.000	283.90
		A	15.250	6.400	0.000	0.000	259.20
T28	41'-20'	B	55.061	0.000	0.000	0.000	291.60
		C	42.733	0.000	0.000	0.000	294.30
		A	16.012	6.720	0.000	0.000	272.16
T29	20'-6'8-17/32"	B	57.814	0.000	0.000	0.000	306.18
		C	44.870	0.000	0.000	0.000	311.95
		A	7.625	3.200	0.000	0.000	129.60
T30	6'8-17/32"-0'	B	27.531	0.000	0.000	0.000	145.80
		C	21.367	0.000	0.000	0.000	148.55
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	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
T1	457'-436'	A	1.025	0.000	9.112	0.000	0.000	262.11
		B		3.140	0.670	0.000	0.000	45.37
		C		14.632	0.000	0.000	0.000	220.06
T2	436'-421'	A	1.020	0.000	6.500	0.000	0.000	186.54
		B		8.247	1.675	0.000	0.000	119.58
		C		10.426	0.000	0.000	0.000	156.41
T3	421'-401'	A	1.015	0.000	8.656	0.000	0.000	247.81
		B		18.801	2.233	0.000	0.000	284.92
		C		13.867	0.000	0.000	0.000	207.52
T4	401'-396'	A	1.011	0.000	2.162	0.000	0.000	61.78
		B		4.691	0.558	0.000	0.000	70.95
		C		3.461	0.000	0.000	0.000	51.69
T5	396'-391'	A	1.010	0.000	2.161	0.000	0.000	61.71
		B		4.687	0.558	0.000	0.000	70.84
		C		3.458	0.000	0.000	0.000	51.61
T6	391'-386'	A	1.008	0.000	2.160	0.000	0.000	61.65
		B		4.683	0.558	0.000	0.000	70.72
		C		3.455	0.000	0.000	0.000	51.53
T7	386'-381'	A	1.007	0.000	2.159	0.000	0.000	61.58
		B		4.679	0.558	0.000	0.000	70.61
		C		3.453	0.000	0.000	0.000	51.45
T8	381'-376'	A	1.005	0.000	2.158	0.000	0.000	61.50
		B		4.675	0.558	0.000	0.000	70.49
		C		3.450	0.000	0.000	0.000	51.37
T9	376'-371'	A	1.003	0.000	2.157	0.000	0.000	61.43
		B		4.671	0.558	0.000	0.000	70.37
		C		3.447	0.000	0.000	0.000	51.29
T10	371'-366'	A	1.002	0.000	2.157	0.000	0.000	61.36
		B		5.085	0.558	0.000	0.000	76.94
		C		3.445	0.000	0.000	0.000	51.21
T11	366'-361'	A	1.000	0.000	2.156	0.000	0.000	61.29
		B		6.751	0.558	0.000	0.000	103.54
		C		3.442	0.000	0.000	0.000	51.13
T12	361'-341'	A	0.996	0.000	8.613	0.000	0.000	244.40
		B		30.778	2.233	0.000	0.000	460.72

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	Client	Crown Castle USA	Designed by	JRM

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	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
T13	341'-321'	C		14.626	0.450	0.000	0.000	222.15
		A	0.989	6.506	8.598	0.000	0.000	330.30
		B		52.063	2.426	0.000	0.000	727.41
T14	321'-301'	C		21.144	3.124	0.000	0.000	344.39
		A	0.982	10.795	8.582	0.000	0.000	385.91
		B		54.984	3.517	0.000	0.000	770.80
T15	301'-281'	C		29.920	3.825	0.000	0.000	452.24
		A	0.974	10.743	8.564	0.000	0.000	383.30
		B		59.708	3.517	0.000	0.000	842.51
T16	281'-261'	C		30.664	4.275	0.000	0.000	466.66
		A	0.966	10.687	8.546	0.000	0.000	380.54
		B		68.277	3.517	0.000	0.000	959.77
T17	261'-241'	C		35.454	8.025	0.000	0.000	583.36
		A	0.957	12.135	11.901	0.000	0.000	484.01
		B		74.126	3.517	0.000	0.000	1028.03
T18	241'-221'	C		35.277	9.825	0.000	0.000	606.32
		A	0.947	15.556	19.755	0.000	0.000	727.27
		B		74.324	3.517	0.000	0.000	1024.54
T19	221'-201'	C		38.581	19.158	0.000	0.000	943.35
		A	0.937	15.454	19.732	0.000	0.000	721.86
		B		73.915	3.517	0.000	0.000	1017.06
T20	201'-181'	C		43.297	23.158	0.000	0.000	1118.65
		A	0.926	15.342	19.708	0.000	0.000	716.01
		B		78.127	3.517	0.000	0.000	1081.91
T21	181'-161'	C		44.482	23.158	0.000	0.000	1124.31
		A	0.914	15.220	19.680	0.000	0.000	709.61
		B		77.843	3.517	0.000	0.000	1084.88
T22	161'-141'	C		44.157	23.158	0.000	0.000	1113.13
		A	0.900	15.085	19.650	0.000	0.000	702.56
		B		82.318	6.253	0.000	0.000	1166.27
T23	141'-121'	C		43.796	23.158	0.000	0.000	1100.80
		A	0.885	14.933	19.617	0.000	0.000	694.68
		B		91.081	9.597	0.000	0.000	1297.65
T24	121'-101'	C		46.726	23.158	0.000	0.000	1121.54
		A	0.868	14.759	19.578	0.000	0.000	685.71
		B		91.582	9.597	0.000	0.000	1286.89
T25	101'-81'	C		47.634	25.615	0.000	0.000	1158.77
		A	0.847	14.554	19.532	0.000	0.000	675.27
		B		90.492	9.597	0.000	0.000	1257.21
T26	81'-61'	C		47.021	27.625	0.000	0.000	1197.42
		A	0.822	14.306	19.477	0.000	0.000	662.69
		B		89.166	10.602	0.000	0.000	1234.07
T27	61'-41'	C		46.275	27.625	0.000	0.000	1173.08
		A	0.790	13.986	19.406	0.000	0.000	646.68
		B		87.459	11.831	0.000	0.000	1203.51
T28	41'-20'	C		45.315	27.625	0.000	0.000	1174.05
		A	0.750	14.263	20.282	0.000	0.000	658.20
		B		89.580	12.422	0.000	0.000	1204.33
T29	20'-6'8"-17'32"	C		46.314	29.006	0.000	0.000	1198.21
		A	0.750	6.792	9.658	0.000	0.000	313.43
		B		42.657	5.915	0.000	0.000	573.49
T30	6'8"-17'32"-0'	C		22.054	13.813	0.000	0.000	570.57
		A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

## Feed Line Shielding

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section	Elevation	Face	$A_R$	$A_{R\ Ice}$	$A_F$	$A_{F\ Ice}$
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
T1	457'-436'	A	0.000	0.000	0.000	0.000
		B	0.000	0.267	0.182	0.374
		C	0.000	0.000	0.000	0.000
T2	436'-421'	A	0.000	0.000	0.000	0.000
		B	0.000	0.685	0.409	0.839
		C	0.000	0.000	0.000	0.000
T3	421'-401'	A	0.000	0.000	0.000	0.000
		B	0.000	0.781	0.470	0.961
		C	0.000	0.000	0.000	0.000
T4	401'-396'	A	0.000	0.000	0.000	0.000
		B	0.000	0.225	0.136	0.279
		C	0.000	0.000	0.000	0.000
T5	396'-391'	A	0.000	0.000	0.000	0.000
		B	0.000	0.162	0.099	0.201
		C	0.000	0.000	0.000	0.000
T6	391'-386'	A	0.000	0.000	0.000	0.000
		B	0.000	0.224	0.136	0.278
		C	0.000	0.000	0.000	0.000
T7	386'-381'	A	0.000	0.000	0.000	0.000
		B	0.000	0.162	0.099	0.201
		C	0.000	0.000	0.000	0.000
T8	381'-376'	A	0.000	0.000	0.000	0.000
		B	0.000	0.223	0.144	0.293
		C	0.000	0.000	0.000	0.000
T9	376'-371'	A	0.000	0.000	0.000	0.000
		B	0.000	0.161	0.099	0.201
		C	0.000	0.000	0.000	0.000
T10	371'-366'	A	0.000	0.000	0.000	0.000
		B	0.000	0.273	0.174	0.340
		C	0.000	0.000	0.000	0.000
T11	366'-361'	A	0.000	0.000	0.000	0.000
		B	0.000	0.341	0.235	0.427
		C	0.000	0.000	0.000	0.000
T12	361'-341'	A	0.000	0.000	0.000	0.000
		B	0.000	2.662	1.679	3.178
		C	0.000	0.182	0.126	0.217
T13	341'-321'	A	0.000	0.305	0.129	0.385
		B	0.000	4.201	2.519	5.310
		C	0.000	1.082	0.754	1.367
T14	321'-301'	A	0.000	0.502	0.216	0.639
		B	0.000	4.582	2.765	5.835
		C	0.000	2.041	1.244	2.599
T15	301'-281'	A	0.000	0.495	0.216	0.635
		B	0.000	5.027	3.154	6.452
		C	0.000	2.151	1.344	2.760
T16	281'-261'	A	0.000	0.488	0.216	0.632
		B	0.000	5.292	3.414	6.851
		C	0.000	2.991	2.045	3.872
T17	261'-241'	A	0.000	1.274	1.060	2.079
		B	0.000	6.903	5.637	11.262
		C	0.000	4.138	3.708	6.752
T18	241'-221'	A	0.000	2.064	1.913	3.181
		B	0.000	5.144	3.987	7.927
		C	0.000	4.343	3.785	6.693
T19	221'-201'	A	0.000	2.035	1.638	2.715
		B	0.000	5.062	3.414	6.753
		C	0.000	4.813	3.668	6.420
T20	201'-181'	A	0.000	2.004	1.638	2.705
		B	0.000	5.420	3.637	7.317
		C	0.000	4.738	3.668	6.396

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 22 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section	Elevation	Face	$A_R$	$A_{R\ Ice}$	$A_F$	$A_{F\ Ice}$
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>
T21	181'-161'	A	0.000	1.970	1.664	2.738
		B	0.000	5.337	3.707	7.419
		C	0.000	4.656	3.727	6.473
T22	161'-141'	A	0.000	1.932	1.913	3.133
		B	0.000	5.946	4.974	9.642
		C	0.000	4.566	4.283	7.405
T23	141'-121'	A	0.000	1.890	1.913	3.118
		B	0.000	6.972	6.038	11.501
		C	0.000	4.466	4.283	7.366
T24	121'-101'	A	0.000	1.843	1.638	2.655
		B	0.000	6.901	5.241	9.943
		C	0.000	4.352	3.668	6.270
T25	101'-81'	A	0.000	1.787	1.638	2.638
		B	0.000	6.667	5.241	9.838
		C	0.000	4.219	3.668	6.226
T26	81'-61'	A	0.000	1.721	1.638	2.616
		B	0.000	6.472	5.346	9.839
		C	0.000	4.060	3.668	6.173
T27	61'-41'	A	0.000	1.636	1.638	2.589
		B	0.000	6.216	5.476	9.832
		C	0.000	3.859	3.668	6.104
T28	41'-20'	A	0.000	1.559	1.666	2.598
		B	0.000	5.875	5.571	9.792
		C	0.000	3.673	3.732	6.122
T29	20'-6'8-17/32"	A	0.000	0.918	0.825	1.286
		B	0.000	3.460	2.758	4.847
		C	0.000	2.163	1.847	3.030
T30	6'8-17/32"-0'	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000

### Feed Line Center of Pressure

Section	Elevation	$CP_x$	$CP_z$	$CP_x$	$CP_z$
	ft	in	in	Ice in	Ice in
T1	457'-436'	-0.1285	1.0530	-0.9244	1.1345
T2	436'-421'	0.9698	1.3116	-0.4429	0.8032
T3	421'-401'	1.7549	0.9376	0.2937	0.4620
T4	401'-396'	1.4644	0.7823	0.2092	0.3801
T5	396'-391'	1.7314	0.9252	0.3613	0.5025
T6	391'-386'	1.4671	0.7838	0.2113	0.3812
T7	386'-381'	1.7314	0.9252	0.3630	0.5028
T8	381'-376'	1.3918	0.7435	0.1961	0.3654
T9	376'-371'	1.6886	0.9023	0.3594	0.4958
T10	371'-366'	1.6044	0.7437	0.3624	0.3599
T11	366'-361'	2.6486	0.7617	1.2765	0.3850
T12	361'-341'	2.7975	0.8374	1.2183	0.3023
T13	341'-321'	5.3429	1.4337	3.0186	0.0570
T14	321'-301'	5.3514	1.3734	2.5408	0.0387
T15	301'-281'	5.7826	1.6673	3.0189	0.2336
T16	281'-261'	5.6672	2.3711	3.5027	0.4309
T17	261'-241'	4.3406	1.1804	2.7159	-0.2918
T18	241'-221'	3.3360	0.9502	2.5198	-0.1813
T19	221'-201'	3.0671	1.5188	2.5812	0.3156
T20	201'-181'	3.3178	1.5011	2.9425	0.3352
T21	181'-161'	3.3119	1.4871	2.9398	0.3323



<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 23 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub> Ice	CP <sub>z</sub> Ice
	ft	in	in	in	in
T22	161'-141'	3.3580	0.9242	2.7881	0.2269
T23	141'-121'	3.6151	0.6196	2.6534	0.3977
T24	121'-101'	3.5974	0.9098	2.8174	0.3677
T25	101'-81'	3.6955	1.0663	2.6902	0.2490
T26	81'-61'	3.7626	1.0407	2.5922	0.2834
T27	61'-41'	3.8439	1.0216	2.4777	0.3292
T28	41'-20'	3.8794	1.0323	2.5180	0.3558
T29	20'-6'8"-17/32"	2.9981	0.7933	1.8870	0.2660
T30	6'8"-17/32"-0'	0.0000	0.0000	0.0000	0.0000

### Antenna Pole Forces *dielectric TFU-33J*

Length of Pole	I <sub>x</sub>	I <sub>y</sub>	Modulus E	Antenna Pole C <sub>AA</sub>	Antenna Pole Weight plf	Length of Beacon	Beacon C <sub>AA</sub>	Beacon Weight
ft	in <sup>4</sup>	in <sup>4</sup>	ksi	ft <sup>2</sup> /ft		ft	ft <sup>2</sup>	lb
32'	655.5500	655.5500	10000	No Ice	2.33	0'	0.00	0.00
				With Ice	2.48		0.00	0.00

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
12" x 3' Beacon	A	From Centroid- Leg	0.00	0.0000	457'	No Ice	2.40	2.40	21.40
			0'			1/2" Ice	2.67	2.67	48.61
			21'			1" Ice	2.96	2.96	79.02
						2" Ice	3.56	3.56	150.09
						4" Ice	4.89	4.89	337.42
3" x 6" SideLight	A	From Leg	1.00	0.0000	333'	No Ice	0.10	0.10	0.98
			0'			1/2" Ice	0.16	0.16	2.46
			0'			1" Ice	0.22	0.22	4.70
						2" Ice	0.39	0.39	12.08
						4" Ice	0.86	0.86	42.73
3" x 6" SideLight	B	From Leg	1.00	0.0000	333'	No Ice	0.10	0.10	0.98
			0'			1/2" Ice	0.16	0.16	2.46
			0'			1" Ice	0.22	0.22	4.70
						2" Ice	0.39	0.39	12.08
						4" Ice	0.86	0.86	42.73
3" x 6" SideLight	C	From Leg	1.00	0.0000	333'	No Ice	0.10	0.10	0.98
			0'			1/2" Ice	0.16	0.16	2.46
			0'			1" Ice	0.22	0.22	4.70
						2" Ice	0.39	0.39	12.08
						4" Ice	0.86	0.86	42.73
3" x 6" SideLight	A	From Leg	1.00	0.0000	215'	No Ice	0.10	0.10	0.98
			0'			1/2" Ice	0.16	0.16	2.46
			0'			1" Ice	0.22	0.22	4.70
						2" Ice	0.39	0.39	12.08
						4" Ice	0.86	0.86	42.73

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Trumbull (BU# 873128)	<b>Page</b>	24 of 52
	<b>Project</b>	TEP# 110967	<b>Date</b>	09:18:12 06/07/12
	<b>Client</b>	Crown Castle USA	<b>Designed by</b>	JRM

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
3" x 6" SideLight	B	From Leg	1.00		0.0000	215'	4" Ice	0.86	0.86	42.73
			0'				No Ice	0.10	0.10	0.98
			0'				1/2" Ice	0.16	0.16	2.46
							1" Ice	0.22	0.22	4.70
							2" Ice	0.39	0.39	12.08
3" x 6" SideLight	C	From Leg	1.00		0.0000	215'	4" Ice	0.86	0.86	42.73
			0'				No Ice	0.10	0.10	0.98
			0'				1/2" Ice	0.16	0.16	2.46
							1" Ice	0.22	0.22	4.70
							2" Ice	0.39	0.39	12.08
3" x 6" SideLight	A	From Leg	1.00		0.0000	112'	4" Ice	0.86	0.86	42.73
			0'				No Ice	0.10	0.10	0.98
			0'				1/2" Ice	0.16	0.16	2.46
							1" Ice	0.22	0.22	4.70
							2" Ice	0.39	0.39	12.08
3" x 6" SideLight	B	From Leg	1.00		0.0000	112'	4" Ice	0.86	0.86	42.73
			0'				No Ice	0.10	0.10	0.98
			0'				1/2" Ice	0.16	0.16	2.46
							1" Ice	0.22	0.22	4.70
							2" Ice	0.39	0.39	12.08
3" x 6" SideLight	C	From Leg	1.00		0.0000	112'	4" Ice	0.86	0.86	42.73
			0'				No Ice	0.10	0.10	0.98
			0'				1/2" Ice	0.16	0.16	2.46
							1" Ice	0.22	0.22	4.70
							2" Ice	0.39	0.39	12.08
*						4" Ice	0.86	0.86	42.73	
DB420	A	From Leg	4.00		40.0000	442'	No Ice	3.33	3.33	34.00
			0'				1/2" Ice	5.99	5.99	44.20
			10'				1" Ice	8.66	8.66	54.40
							2" Ice	13.99	13.99	74.80
							4" Ice	24.64	24.64	115.60
(2) PD10041-1	B	From Leg	4.00		10.0000	442'	No Ice	2.86	2.86	20.00
			0'				1/2" Ice	3.94	3.94	40.00
			5'				1" Ice	5.02	5.02	60.00
							2" Ice	7.18	7.18	100.00
							4" Ice	11.50	11.50	180.00
PD10041-1	C	From Leg	4.00		10.0000	442'	No Ice	2.86	2.86	20.00
			0'				1/2" Ice	3.94	3.94	40.00
			5'				1" Ice	5.02	5.02	60.00
							2" Ice	7.18	7.18	100.00
							4" Ice	11.50	11.50	180.00
Side Arm Mount [SO 602-3]	C	None			0.0000	442'	No Ice	17.61	17.61	437.10
							1/2" Ice	24.67	24.67	669.79
							1" Ice	31.73	31.73	902.48
							2" Ice	45.85	45.85	1367.86
							4" Ice	74.09	74.09	2298.61
Side Arm Mount [SO 306-1]	B	From Leg	2.00		10.0000	442'	No Ice	0.98	2.18	42.00
			0'				1/2" Ice	1.70	3.80	62.37
			0'				1" Ice	2.42	5.42	82.75
							2" Ice	3.86	8.66	123.49
							4" Ice	6.74	15.14	204.99
*										
*										
ERI 1183-3CP	A	None			0.0000	434' - 405'	No Ice	182.40	182.40	4350.00
							1/2" Ice	184.84	184.84	6269.52
							1" Ice	187.29	187.29	8216.37

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	<b>Project</b>		TEP# 110967		<b>Date</b>		09:18:12 06/07/12	
	<b>Client</b>		Crown Castle USA		<b>Designed by</b>		JRM	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						Vert
							2" Ice	192.22	192.22	12192.70
							4" Ice	202.22	202.22	20480.10
* 6014-2	A	From Leg	4.00	0.0000	400' - 386'	No Ice	65.00	65.00	1086.00	
			0'			1/2" Ice	135.00	135.00	2388.00	
			0'			1" Ice	205.00	205.00	3690.00	
						2" Ice	345.00	345.00	6294.00	
						4" Ice	625.00	625.00	11502.00	
6014-2	B	From Leg	4.00	0.0000	400' - 386'	No Ice	65.00	65.00	1086.00	
			0'			1/2" Ice	135.00	135.00	2388.00	
			0'			1" Ice	205.00	205.00	3690.00	
						2" Ice	345.00	345.00	6294.00	
						4" Ice	625.00	625.00	11502.00	
6014-2	C	From Leg	4.00	0.0000	400' - 386'	No Ice	65.00	65.00	1086.00	
			0'			1/2" Ice	135.00	135.00	2388.00	
			0'			1" Ice	205.00	205.00	3690.00	
						2" Ice	345.00	345.00	6294.00	
						4" Ice	625.00	625.00	11502.00	
* 455-6	A	From Leg	4.00	-20.0000	344'	No Ice	5.55	5.55	20.00	
			0'			1/2" Ice	7.61	7.61	60.00	
			10'			1" Ice	9.67	9.67	120.00	
						2" Ice	13.79	13.79	260.00	
						4" Ice	22.03	22.03	710.00	
455-6	B	From Leg	4.00	-20.0000	344'	No Ice	5.55	5.55	20.00	
			0'			1/2" Ice	7.61	7.61	60.00	
			10'			1" Ice	9.67	9.67	120.00	
						2" Ice	13.79	13.79	260.00	
						4" Ice	22.03	22.03	710.00	
455-6	C	From Leg	4.00	90.0000	344'	No Ice	5.55	5.55	20.00	
			0'			1/2" Ice	7.61	7.61	60.00	
			10'			1" Ice	9.67	9.67	120.00	
						2" Ice	13.79	13.79	260.00	
						4" Ice	22.03	22.03	710.00	
AO9009-3	C	From Leg	4.00	-20.0000	344'	No Ice	2.55	2.55	11.00	
			0'			1/2" Ice	3.60	3.60	30.00	
			6'			1" Ice	4.67	4.67	55.65	
						2" Ice	6.14	6.14	127.46	
						4" Ice	8.75	8.75	357.45	
Side Arm Mount [SO 602-1]	C	From Leg	2.00	90.0000	344'	No Ice	2.72	12.93	145.70	
			0'			1/2" Ice	4.11	17.82	223.26	
			0'			1" Ice	5.50	22.71	300.83	
						2" Ice	8.28	32.49	455.95	
						4" Ice	13.84	52.05	766.20	
Side Arm Mount [SO 302-3]	A	None		0.0000	344'	No Ice	5.56	5.56	165.00	
						1/2" Ice	8.44	8.44	264.21	
						1" Ice	11.32	11.32	363.43	
						2" Ice	17.08	17.08	561.85	
						4" Ice	28.60	28.60	958.70	
* Side Arm Mount [SO 307-1]	B	From Leg	2.50	10.0000	333'	No Ice	0.98	2.60	48.00	
			0'			1/2" Ice	1.70	4.50	70.36	
			0'			1" Ice	2.42	6.40	92.72	
						2" Ice	3.86	10.20	137.44	
						4" Ice	6.74	17.80	226.88	
PG1N0F-0090-310	B	From Leg	5.00	10.0000	333'	No Ice	3.00	3.00	28.00	
			0'			1/2" Ice	4.03	4.03	49.79	

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 26 of 52
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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>Front</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>Side</sub> ft <sup>2</sup>	Weight lb
			5'			1" Ice 5.03	5.03	78.14
						2" Ice 6.26	6.26	155.16
						4" Ice 8.83	8.83	394.72
* Side Arm Mount [SO 302-1]	A	From Leg	2.00 0' 0'	40.0000	330'	No Ice 1.67 1/2" Ice 2.51 1" Ice 3.35 2" Ice 5.03 4" Ice 8.39	3.27 4.99 6.71 10.15 17.03	55.00 88.07 121.14 187.28 319.57
SRL-101A	A	From Leg	4.00 0' 3'	40.0000	330'	No Ice 3.43 1/2" Ice 5.00 1" Ice 6.57 2" Ice 9.71 4" Ice 15.99	3.43 5.00 6.57 9.71 15.99	10.00 50.00 90.00 160.00 290.00
* DB413-A	B	From Leg	5.00 0' 3'	0.0000	324'	No Ice 2.55 1/2" Ice 4.59 1" Ice 6.63 2" Ice 10.71 4" Ice 18.87	2.55 4.59 6.63 10.71 18.87	32.00 41.60 51.20 70.40 108.80
TLP-8M (12.2-ft)	C	From Leg	1.00 0' 6'	-40.0000	324'	No Ice 18.01 1/2" Ice 18.91 1" Ice 19.81 2" Ice 21.65 4" Ice 25.41	18.01 18.91 19.81 21.65 25.41	200.00 313.79 438.69 722.59 1432.26
DB230-2E	C	From Leg	0.50 0' 0'	0.0000	324'	No Ice 1.00 1/2" Ice 1.80 1" Ice 2.60 2" Ice 4.20 4" Ice 7.40	1.00 1.80 2.60 4.20 7.40	54.00 70.20 86.40 118.80 183.60
Side Arm Mount [SO 307-1]	B	From Leg	2.50 0' 0'	0.0000	324'	No Ice 0.98 1/2" Ice 1.70 1" Ice 2.42 2" Ice 3.86 4" Ice 6.74	2.60 4.50 6.40 10.20 17.80	48.00 70.36 92.72 137.44 226.88
Pipe Mount [PM 601-1]	A	From Leg	0.50 0' 0'	0.0000	324'	No Ice 3.00 1/2" Ice 3.74 1" Ice 4.48 2" Ice 5.96 4" Ice 8.92	0.90 1.12 1.34 1.78 2.66	65.00 79.14 93.27 121.55 178.10
Pipe Mount [PM 601-1]	C	From Leg	0.50 0' 0'	-40.0000	324'	No Ice 3.00 1/2" Ice 3.74 1" Ice 4.48 2" Ice 5.96 4" Ice 8.92	0.90 1.12 1.34 1.78 2.66	65.00 79.14 93.27 121.55 178.10
12"x12"x3" TMA	A	From Leg	0.50 0' 0'	0.0000	324'	No Ice 1.40 1/2" Ice 1.56 1" Ice 1.73 2" Ice 2.09 4" Ice 2.92	0.35 0.45 0.56 0.81 1.40	15.00 22.91 32.76 59.07 143.59
* 6014-2	A	From Face	1.00 0' 0'	0.0000	323' - 293'	No Ice 65.00 1/2" Ice 135.00 1" Ice 205.00 2" Ice 345.00 4" Ice 625.00	65.00 135.00 205.00 345.00 625.00	1086.00 2388.00 3690.00 6294.00 11502.00
6014-2	B	From Face	1.00	0.0000	323' - 293'	No Ice 65.00	65.00	1086.00

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>		Trumbull (BU# 873128)		<b>Page</b>		27 of 52	
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	<b>Client</b>		Crown Castle USA		<b>Designed by</b>		JRM	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
					°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
						1/2" Ice	135.00	135.00	2388.00
						1" Ice	205.00	205.00	3690.00
						2" Ice	345.00	345.00	6294.00
						4" Ice	625.00	625.00	11502.00
6014-2	C	From Face	1.00	0.0000	323' - 293'	No Ice	65.00	65.00	1086.00
			0'			1/2" Ice	135.00	135.00	2388.00
			0'			1" Ice	205.00	205.00	3690.00
						2" Ice	345.00	345.00	6294.00
						4" Ice	625.00	625.00	11502.00
* DB810M-XC	C	From Leg	5.00	0.0000	284'	No Ice	2.12	2.12	30.00
			0'			1/2" Ice	3.14	3.14	46.22
			5'			1" Ice	4.18	4.18	68.92
						2" Ice	5.77	5.77	134.36
Side Arm Mount [SO 307-1]	C	From Leg	2.50	0.0000	284'	4" Ice	8.32	8.32	349.67
			0'			No Ice	0.98	2.60	48.00
			0'			1/2" Ice	1.70	4.50	70.36
						1" Ice	2.42	6.40	92.72
						2" Ice	3.86	10.20	137.44
						4" Ice	6.74	17.80	226.88
* DBS567KR90-XC	B	From Leg	1.00	-20.0000	278'	No Ice	9.60	9.60	66.00
			0'			1/2" Ice	10.41	10.41	135.91
			5'			1" Ice	11.23	11.23	214.96
						2" Ice	12.89	12.89	401.05
						4" Ice	16.33	16.33	889.55
* DB230-4E	B	From Leg	1.00	20.0000	269'	No Ice	1.50	1.50	108.00
			0'			1/2" Ice	2.70	2.70	140.40
			0'			1" Ice	3.90	3.90	172.80
						2" Ice	6.30	6.30	237.60
						4" Ice	11.10	11.10	367.20
* DB810M-XC	C	From Leg	5.00	0.0000	269'	No Ice	2.12	2.12	30.00
			0'			1/2" Ice	3.14	3.14	46.22
			5'			1" Ice	4.18	4.18	68.92
						2" Ice	5.77	5.77	134.36
Side Arm Mount [SO 307-1]	C	From Leg	2.50	0.0000	269'	4" Ice	8.32	8.32	349.67
			0'			No Ice	0.98	2.60	48.00
			0'			1/2" Ice	1.70	4.50	70.36
						1" Ice	2.42	6.40	92.72
						2" Ice	3.86	10.20	137.44
						4" Ice	6.74	17.80	226.88
* Side Arm Mount [SO 311-1]	A	From Leg	1.50	60.0000	259'	No Ice	2.97	3.51	62.00
			0'			1/2" Ice	4.39	5.33	94.35
			0'			1" Ice	5.81	7.15	126.70
						2" Ice	8.65	10.79	191.40
						4" Ice	14.33	18.07	320.80
DB809KT3E-Y	A	From Leg	3.00	60.0000	259'	No Ice	3.39	3.39	30.00
			0'			1/2" Ice	4.55	4.55	54.57
			5'			1" Ice	5.73	5.73	86.49
						2" Ice	7.38	7.38	173.04
						4" Ice	10.25	10.25	441.19
* PG1N0F-0090-310	B	From Leg	4.00	25.0000	253'	No Ice	3.00	3.00	28.00
			0'			1/2" Ice	4.03	4.03	49.79

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 28 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Description	Face or Leg	Offset Type	Offsets: Horiz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			ft ft ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
			5'			1" Ice 5.03	5.03	78.14
						2" Ice 6.26	6.26	155.16
						4" Ice 8.83	8.83	394.72
Side Arm Mount [SO 302-1]	B	From Leg	2.00	25.0000	253'	No Ice 1.67	3.27	55.00
			0'			1/2" Ice 2.51	4.99	88.07
			0'			1" Ice 3.35	6.71	121.14
						2" Ice 5.03	10.15	187.28
Side Arm Mount [SO 302-1]	C	From Leg	2.00	0.0000	253'	4" Ice 8.39	17.03	319.57
			0'			No Ice 1.67	3.27	55.00
			0'			1/2" Ice 2.51	4.99	88.07
						1" Ice 3.35	6.71	121.14
						2" Ice 5.03	10.15	187.28
						4" Ice 8.39	17.03	319.57
* APXV18-206516S-C-A20 w/ Mount Pipe	A	From Face	3.00	60.0000	247'	No Ice 3.86	3.30	38.50
			6'			1/2" Ice 4.27	4.00	70.77
			0'			1" Ice 4.73	4.67	112.01
						2" Ice 5.69	6.06	214.45
(2) ATMAP1412D-1A20	A	From Face	3.00	60.0000	247'	4" Ice 7.73	9.04	527.99
			-6'			No Ice 0.47	1.17	13.00
			0'			1/2" Ice 0.57	1.31	20.62
						1" Ice 0.69	1.47	30.11
						2" Ice 0.95	1.81	55.52
RR90-17-02DP w/Mount Pipe	A	From Face	3.00	60.0000	247'	4" Ice 1.57	2.58	137.44
			6'			No Ice 4.91	3.64	40.00
			0'			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
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Face	3.00	40.0000	247'	4" Ice 9.81	10.47	609.39
			-6'			No Ice 3.86	3.30	38.50
			0'			1/2" Ice 4.27	4.00	70.77
						1" Ice 4.73	4.67	112.01
						2" Ice 5.69	6.06	214.45
(2) ATMAP1412D-1A20	B	From Face	3.00	40.0000	247'	4" Ice 7.73	9.04	527.99
			-6'			No Ice 0.47	1.17	13.00
			0'			1/2" Ice 0.57	1.31	20.62
						1" Ice 0.69	1.47	30.11
						2" Ice 0.95	1.81	55.52
RR90-17-02DP w/ Mount Pipe	B	From Face	3.00	40.0000	247'	4" Ice 1.57	2.58	137.44
			6'			No Ice 4.59	3.32	34.18
			0'			1/2" Ice 5.09	4.09	69.33
						1" Ice 5.58	4.78	113.86
						2" Ice 6.59	6.23	223.79
(2) ATMAP1412D-1A20	C	From Face	3.00	0.0000	247'	4" Ice 8.73	9.31	556.77
			-6'			No Ice 0.47	1.17	13.00
			0'			1/2" Ice 0.57	1.31	20.62
						1" Ice 0.69	1.47	30.11
						2" Ice 0.95	1.81	55.52
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Face	3.00	0.0000	247'	4" Ice 1.57	2.58	137.44
			-6'			No Ice 3.86	3.30	38.50
			0'			1/2" Ice 4.27	4.00	70.77
						1" Ice 4.73	4.67	112.01
						2" Ice 5.69	6.06	214.45
RR90-17-02DP w/Mount Pipe	C	From Face	3.00	0.0000	247'	4" Ice 7.73	9.04	527.99
			6'			No Ice 4.91	3.64	40.00
			0'			1/2" Ice 5.57	4.70	81.64
						1" Ice 6.14	5.48	130.14

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 29 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

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	
						2" Ice	7.32	7.08	249.13
						4" Ice	9.81	10.47	609.39
Sector Mount [SM 302-3]	C	None		0.0000	247'	No Ice	32.73	32.73	1476.00
						1/2" Ice	43.85	43.85	2070.74
						1" Ice	54.97	54.97	2665.48
						2" Ice	77.21	77.21	3854.96
						4" Ice	121.69	121.69	6233.92
2.4" Dia. x 5-ft Pipe	A	From Face	4.00	0.0000	247'	No Ice	1.20	1.20	18.30
			0'			1/2" Ice	1.50	1.50	27.45
			0'			1" Ice	1.81	1.81	40.05
						2" Ice	2.47	2.47	76.23
						4" Ice	3.93	3.93	196.71
2.4" Dia. x 5-ft Pipe	B	From Face	4.00	0.0000	247'	No Ice	1.20	1.20	18.30
			0'			1/2" Ice	1.50	1.50	27.45
			0'			1" Ice	1.81	1.81	40.05
						2" Ice	2.47	2.47	76.23
						4" Ice	3.93	3.93	196.71
2.4" Dia. x 5-ft Pipe	C	From Face	4.00	0.0000	247'	No Ice	1.20	1.20	18.30
			0'			1/2" Ice	1.50	1.50	27.45
			0'			1" Ice	1.81	1.81	40.05
						2" Ice	2.47	2.47	76.23
						4" Ice	3.93	3.93	196.71
* BXA-80080/6CF w/ Mount Pipe	A	From Leg	4.00	70.0000	235'	No Ice	8.37	5.83	51.20
			0'			1/2" Ice	9.12	7.10	110.81
			-3'			1" Ice	9.84	8.22	183.02
						2" Ice	11.22	10.14	354.47
						4" Ice	14.11	14.18	843.36
BXA-185063/8CF w/ Mount Pipe	A	From Leg	4.00	70.0000	235'	No Ice	3.19	3.12	38.95
			0'			1/2" Ice	3.56	3.73	70.08
			-3'			1" Ice	3.96	4.35	108.36
						2" Ice	4.85	5.64	205.31
						4" Ice	6.76	8.57	498.36
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00	70.0000	235'	No Ice	7.75	5.18	38.90
			0'			1/2" Ice	8.29	6.11	92.96
			-3'			1" Ice	8.85	6.92	157.96
						2" Ice	9.97	8.59	312.98
						4" Ice	12.34	12.13	753.96
BXA-80063/6CF w/ Mount Pipe	B	From Leg	4.00	70.0000	235'	No Ice	7.98	5.41	40.18
			0'			1/2" Ice	8.62	6.56	96.33
			-3'			1" Ice	9.23	7.42	164.15
						2" Ice	10.47	9.20	325.60
						4" Ice	13.08	12.95	785.87
BXA-185063/8CF w/ Mount Pipe	B	From Leg	4.00	70.0000	235'	No Ice	3.19	3.12	38.95
			0'			1/2" Ice	3.56	3.73	70.08
			-3'			1" Ice	3.96	4.35	108.36
						2" Ice	4.85	5.64	205.31
						4" Ice	6.76	8.57	498.36
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00	70.0000	235'	No Ice	7.75	5.18	38.90
			0'			1/2" Ice	8.29	6.11	92.96
			-3'			1" Ice	8.85	6.92	157.96
						2" Ice	9.97	8.59	312.98
						4" Ice	12.34	12.13	753.96
BXA-80080/6CF w/ Mount Pipe	C	From Leg	4.00	70.0000	235'	No Ice	8.37	5.83	51.20
			0'			1/2" Ice	9.12	7.10	110.81
			-3'			1" Ice	9.84	8.22	183.02
						2" Ice	11.22	10.14	354.47

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 30 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
BXA-185063/8CF w/ Mount Pipe	C	From Leg	4.00	70.0000	235'	4" Ice	14.11	14.18	843.36	
						No Ice	3.19	3.12	38.95	
						1/2" Ice	3.56	3.73	70.08	
						1" Ice	3.96	4.35	108.36	
						2" Ice	4.85	5.64	205.31	
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00	70.0000	235'	4" Ice	6.76	8.57	498.36	
						No Ice	7.75	5.18	38.90	
						1/2" Ice	8.29	6.11	92.96	
						1" Ice	8.85	6.92	157.96	
						2" Ice	9.97	8.59	312.98	
Sector Mount [SM 302-3]	C	None	0.0000	235'	4" Ice	12.34	12.13	753.96		
					No Ice	32.73	32.73	1476.00		
					1/2" Ice	43.85	43.85	2070.74		
					1" Ice	54.97	54.97	2665.48		
					2" Ice	77.21	77.21	3854.96		
* DB810T3E-XT	B	From Leg	5.00	60.0000	215'	4" Ice	121.69	121.69	6233.92	
						No Ice	4.53	4.53	48.00	
						1/2" Ice	6.07	6.07	80.66	
						1" Ice	7.63	7.63	122.98	
						2" Ice	10.79	10.79	237.27	
Side Arm Mount [SO 307-1]	B	From Leg	2.50	60.0000	215'	4" Ice	14.82	14.82	588.62	
						No Ice	0.98	2.60	48.00	
						1/2" Ice	1.70	4.50	70.36	
						1" Ice	2.42	6.40	92.72	
						2" Ice	3.86	10.20	137.44	
* PG1DOF-0093-011	B	From Leg	2.00	50.0000	204'	4" Ice	6.74	17.80	226.88	
						No Ice	1.40	1.40	7.50	
						1/2" Ice	2.22	2.22	18.69	
						1" Ice	3.06	3.06	35.09	
						2" Ice	4.12	4.12	84.17	
Side Arm Mount [SO 202-1]	B	From Leg	1.00	50.0000	204'	4" Ice	6.21	6.21	251.66	
						No Ice	2.96	2.53	110.00	
						1/2" Ice	4.10	3.51	133.55	
						1" Ice	5.24	4.49	157.10	
						2" Ice	7.52	6.45	204.20	
* CL6-450	C	From Leg	1.00	60.0000	189'	4" Ice	12.08	10.37	298.40	
						No Ice	0.00	0.00	0.00	
						1/2" Ice	0.00	0.00	0.00	
						1" Ice	0.00	0.00	0.00	
						2" Ice	0.00	0.00	0.00	
* 10" x 10" x 4.5" TMA	C	From Leg	1.00	40.0000	179'	4" Ice	0.00	0.00	0.00	
						No Ice	0.97	0.44	15.00	
						1/2" Ice	1.11	0.54	21.98	
						1" Ice	1.25	0.64	30.75	
						2" Ice	1.56	0.88	54.41	
* 220-5	A	From Leg	2.00	-60.0000	135'	4" Ice	2.29	1.47	131.67	
						No Ice	3.40	3.40	22.00	
						1/2" Ice	5.42	5.42	49.06	
						1" Ice	7.46	7.46	88.67	
						2" Ice	11.59	11.59	206.12	
Side Arm Mount [SO 202-1]	A	From Leg	1.00	-60.0000	135'	No Ice	2.96	2.53	110.00	



<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Trumbull (BU# 873128)	<b>Page</b>	31 of 52
	<b>Project</b>	TEP# 110967	<b>Date</b>	09:18:12 06/07/12
	<b>Client</b>	Crown Castle USA	<b>Designed by</b>	JRM

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	
				0'		1/2" Ice	4.10	3.51	133.55	
				0'		1" Ice	5.24	4.49	157.10	
						2" Ice	7.52	6.45	204.20	
						4" Ice	12.08	10.37	298.40	
*										
(3) DB4-HDTV	B	From Leg	1.00	0'	10.0000	135'	No Ice	0.92	0.30	4.00
				0'			1/2" Ice	3.00	1.00	20.00
				0'			1" Ice	5.08	1.70	36.00
							2" Ice	9.24	3.10	68.00
							4" Ice	17.56	5.90	132.00
2.4" x 6-ft pipe	B	From Leg	0.50	0'	10.0000	135'	No Ice	1.44	1.44	21.96
				0'			1/2" Ice	1.93	1.93	32.88
				0'			1" Ice	2.30	2.30	47.87
							2" Ice	3.07	3.07	90.64
							4" Ice	4.71	4.71	231.64
DB264-A	C	From Leg	1.00	0'	-40.0000	135'	No Ice	3.16	3.16	36.00
				0'			1/2" Ice	5.69	5.69	46.80
				0'			1" Ice	8.22	8.22	57.60
							2" Ice	13.27	13.27	79.20
							4" Ice	23.38	23.38	122.40
Side Arm Mount [SO 202-1]	C	From Leg	0.50	0'	-40.0000	135'	No Ice	2.96	2.53	110.00
				0'			1/2" Ice	4.10	3.51	133.55
				0'			1" Ice	5.24	4.49	157.10
							2" Ice	7.52	6.45	204.20
							4" Ice	12.08	10.37	298.40
*										
ASP-816	C	From Leg	1.00	0'	0.0000	54'	No Ice	0.95	0.95	8.91
				0'			1/2" Ice	1.71	1.71	11.58
				0'			1" Ice	2.47	2.47	14.26
							2" Ice	3.99	3.99	19.60
							4" Ice	7.03	7.03	30.29
Pipe Mount [PM 601-1]	C	From Leg	0.50	0'	0.0000	54'	No Ice	3.00	0.90	65.00
				0'			1/2" Ice	3.74	1.12	79.14
				0'			1" Ice	4.48	1.34	93.27
							2" Ice	5.96	1.78	121.55
							4" Ice	8.92	2.66	178.10
*										
Pipe Mount [PM 601-1]	B	From Leg	0.50	0'	-80.0000	146'	No Ice	3.00	0.90	65.00
				0'			1/2" Ice	3.74	1.12	79.14
				0'			1" Ice	4.48	1.34	93.27
							2" Ice	5.96	1.78	121.55
							4" Ice	8.92	2.66	178.10
Pipe Mount [PM 601-1]	C	From Leg	0.50	0'	-40.0000	117'	No Ice	3.00	0.90	65.00
				0'			1/2" Ice	3.74	1.12	79.14
				0'			1" Ice	4.48	1.34	93.27
							2" Ice	5.96	1.78	121.55
							4" Ice	8.92	2.66	178.10
Pipe Mount [PM 601-1]	C	From Leg	0.50	0'	-90.0000	107'	No Ice	3.00	0.90	65.00
				0'			1/2" Ice	3.74	1.12	79.14
				0'			1" Ice	4.48	1.34	93.27
							2" Ice	5.96	1.78	121.55
							4" Ice	8.92	2.66	178.10
Pipe Mount [PM 601-1]	C	From Leg	0.50	0'	0.0000	59'6"	No Ice	3.00	0.90	65.00
				0'			1/2" Ice	3.74	1.12	79.14
				0'			1" Ice	4.48	1.34	93.27
							2" Ice	5.96	1.78	121.55
							4" Ice	8.92	2.66	178.10

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 32 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight lb
***								
SHP-2AE	B	From Leg	2.00 0' 0'	-80.0000	367'	No Ice 39.75 1/2" Ice 41.11 1" Ice 42.49 2" Ice 45.26 4" Ice 50.88	122.77 124.60 126.43 130.11 137.59	220.00 779.71 1358.79 2575.84 5250.96
Pipe Mount [PM 502-1]	B	From Leg	1.00 0' 0'	-80.0000	367'	No Ice 2.59 1/2" Ice 4.71 1" Ice 6.83 2" Ice 11.07 4" Ice 19.55	3.13 4.40 5.67 8.21 13.29	100.33 109.85 119.37 138.40 176.47
Pipe Mount [PM 601-1]	B	From Leg	0.50 0' 0'	-40.0000	200'	No Ice 0.90 1/2" Ice 1.12 1" Ice 1.34 2" Ice 1.78 4" Ice 2.66	3.00 3.74 4.48 5.96 8.92	65.00 79.14 93.27 121.55 178.10
Pipe Mount [PM 601-1]	B	From Leg	0.50 0' 0'	60.0000	70'	No Ice 0.90 1/2" Ice 1.12 1" Ice 1.34 2" Ice 1.78 4" Ice 2.66	3.00 3.74 4.48 5.96 8.92	65.00 79.14 93.27 121.55 178.10

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight lb
MGAR3-23N	C	Grid	From Leg	1.00 0' 0'	-60.0000		59'6"	3.00	No Ice 5.70 1/2" Ice 7.46 1" Ice 9.22 2" Ice 12.74 4" Ice 19.78	0.04 0.07 0.11 0.19 0.34
PR-950	B	Grid	From Leg	1.00 0' 0'	0.0000		107'	5.67	No Ice 25.22 1/2" Ice 25.97 1" Ice 26.72 2" Ice 28.22 4" Ice 31.22	0.04 0.09 0.14 0.25 0.45
PR-950	C	Grid	From Face	1.00 0' 0'	0.0000		107'	5.67	No Ice 25.22 1/2" Ice 25.97 1" Ice 26.72 2" Ice 28.22 4" Ice 31.22	0.04 0.09 0.14 0.25 0.45
SPD2-5.8	B	Paraboloid w/Radome	From Leg	1.00 0' 0'	0.0000		101'	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.67 2" Ice 4.21 4" Ice 5.28	0.02 0.04 0.06 0.09 0.16
3-FT Grid	C	Grid	From Leg	1.00 0'	-40.0000		117'	3.00	No Ice 7.07 1/2" Ice 7.47	30.00 38.33

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b>	Trumbull (BU# 873128)	<b>Page</b>	33 of 52
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	<b>Client</b>	Crown Castle USA	<b>Designed by</b>	JRM

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight lb
				0'					1" Ice 7.87	46.66
									2" Ice 8.66	63.32
									4" Ice 10.25	96.63
PL6-65-PXA	A	Paraboloid w/Radome	From Leg	1.00 0' 0'	-80.0000		146'	6.00	No Ice 28.27	0.38
									1/2" Ice 29.07	0.45
									1" Ice 29.86	0.52
									2" Ice 31.44	0.66
									4" Ice 34.60	0.94
P-21A72	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0' 0'	-80.0000		154'	6.21	No Ice 24.20	0.20
									1/2" Ice 31.07	0.36
									1" Ice 37.95	0.52
									2" Ice 51.70	0.84
									4" Ice 79.19	1.48
SPD4-5.2	C	Paraboloid w/Radome	From Leg	1.00 0' 0'	40.0000		179'	4.00	No Ice 12.57	0.06
									1/2" Ice 13.10	0.07
									1" Ice 13.62	0.07
									2" Ice 14.68	0.09
									4" Ice 16.80	0.12
Andrew 2' w/Radome	A	Paraboloid w/Radome	From Leg	1.00 0' 0'	0.0000		324'	2.00	No Ice 3.14	70.00
									1/2" Ice 3.41	282.00
									1" Ice 3.68	494.00
									2" Ice 4.21	918.00
									4" Ice 5.28	1766.00
***										
P-9A72GN-U	B	Grid	From Leg	1.00 0' 0'	-40.0000		200'	6.00	No Ice 22.60	110.00
									1/2" Ice 29.05	260.00
									1" Ice 35.50	410.00
									2" Ice 48.40	710.00
									4" Ice 74.20	1310.00
P-9A48GN-U	B	Grid	From Leg	1.00 0' 0'	60.0000		70'	4.00	No Ice 10.10	110.00
									1/2" Ice 13.09	180.00
									1" Ice 16.08	250.00
									2" Ice 22.06	380.00
									4" Ice 34.01	650.00

### Load Combinations

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

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

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
Pole	489 - 457	11.423	37	0.4350	0.5122
Antenna					
T1	457 - 436	8.905	37	0.1982	0.5121
T2	436 - 421	8.126	37	0.1905	0.5119
T3	421 - 401	7.590	37	0.1811	0.5102
T4	401 - 396	7.123	31	0.1515	0.5071
T5	396 - 391	7.060	31	0.1441	0.5061
T6	391 - 386	7.002	31	0.1351	0.5051
T7	386 - 381	6.945	31	0.1241	0.5040
T8	381 - 376	6.901	31	0.1111	0.5030
T9	376 - 371	6.891	31	0.1022	0.5041
T10	371 - 366	6.890	31	0.0948	0.5055
T11	366 - 361	6.890	31	0.0891	0.5054
T12	361 - 341	6.889	31	0.0847	0.5004
T13	341 - 321	6.884	31	0.0728	0.4806
T14	321 - 301	6.814	31	0.0795	0.4586
T15	301 - 281	6.617	31	0.0942	0.4345
T16	281 - 261	6.292	31	0.1017	0.4075
T17	261 - 241	5.903	31	0.0943	0.3754
T18	241 - 221	5.575	35	0.0820	0.3567
T19	221 - 201	5.294	35	0.0879	0.3374
T20	201 - 181	4.968	35	0.1003	0.2980
T21	181 - 161	4.574	35	0.1137	0.2492
T22	161 - 141	4.121	35	0.1223	0.2000
T23	141 - 121	3.647	35	0.1203	0.1681
T24	121 - 101	3.213	35	0.1070	0.1515
T25	101 - 81	2.835	35	0.1089	0.1601
T26	81 - 61	2.419	35	0.1206	0.1643
T27	61 - 41	1.939	35	0.1373	0.1656
T28	41 - 20	1.385	35	0.1543	0.1646
T29	20 - 6.70833	0.730	35	0.1678	0.1614
T30	6.70833 - 0	0.285	35	0.1950	0.1692

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
457'	12" x 3' Beacon	37	8.905	0.1982	0.5121	5228
446'6"	Guy	37	8.465	0.1864	0.5122	13216
442'	DB420	37	8.318	0.1880	0.5122	51389
434'	ERI 1183-3CP	37	8.058	0.1906	0.5118	23654
428'2-13/32"	ERI 1183-3CP	37	7.852	0.1882	0.5112	53353
422'4-13/16"	ERI 1183-3CP	37	7.640	0.1827	0.5104	66796
416'7-3/16"	ERI 1183-3CP	37	7.434	0.1752	0.5096	43037
410'9-19/32"	ERI 1183-3CP	31	7.256	0.1666	0.5087	45204
405'	ERI 1183-3CP	31	7.175	0.1575	0.5078	47593
400'	6014-2	31	7.110	0.1500	0.5069	44489
393'	6014-2	31	7.025	0.1389	0.5055	64247
386'	6014-2	31	6.945	0.1241	0.5040	19229
381'	Guy	31	6.901	0.1111	0.5030	8306
367'	SHP-2AE	31	6.890	0.0901	0.5058	65655
344'	455-6	31	6.887	0.0736	0.4834	85261
333'	3" x 6" SideLight	31	6.869	0.0734	0.4723	48546
330'	Side Arm Mount [SO 302-1]	31	6.859	0.0745	0.4690	44109
324'	Andrew 2' w/Radome	31	6.832	0.0776	0.4621	37347
323'	6014-2	31	6.826	0.0782	0.4609	36531
318'	6014-2	31	6.793	0.0816	0.4550	34825
313'	6014-2	31	6.752	0.0853	0.4490	35048
308'	6014-2	31	6.701	0.0891	0.4430	35323
303'	6014-2	31	6.643	0.0928	0.4369	35702
298'	6014-2	31	6.576	0.0961	0.4308	37678
293'	6014-2	31	6.500	0.0987	0.4245	41369
284'	DB810M-XC	31	6.348	0.1015	0.4121	50360
278'	DBS567KR90-XC	31	6.235	0.1015	0.4026	78971
269'	DB230-4E	31	6.057	0.0989	0.3875	60881
259'	Side Arm Mount [SO 311-1]	31	5.867	0.0933	0.3728	33930
253'	PG1N0F-0090-310	31	5.763	0.0891	0.3664	40110
251'	Guy	31	5.730	0.0876	0.3645	43005
247'	APXV18-206516S-C-A20 w/ Mount Pipe	31	5.666	0.0847	0.3612	50259
235'	BXA-80080/6CF w/ Mount Pipe	35	5.492	0.0818	0.3522	106242
215'	3" x 6" SideLight	35	5.203	0.0914	0.3275	78687
204'	PG1DOF-0093-011	35	5.021	0.0983	0.3048	69164
200'	P-9A72GN-U	35	4.950	0.1010	0.2957	67639
189'	CL6-450	35	4.740	0.1085	0.2694	70809
179'	SPD4-5.2	35	4.531	0.1149	0.2440	79160
154'	P-21A72	35	3.954	0.1232	0.1869	607675
146'	PL6-65-PXA	35	3.764	0.1222	0.1748	152464
135'	220-5	35	3.510	0.1165	0.1609	76749
131'	Guy	35	3.422	0.1134	0.1569	65660
117'	3-FT Grid	35	3.135	0.1059	0.1518	71367
112'	3" x 6" SideLight	35	3.041	0.1057	0.1538	177105
107'	PR-950	35	2.948	0.1067	0.1567	158550
101'	SPD2-5.8	35	2.835	0.1089	0.1601	71204
70'	P-9A48GN-U	35	2.163	0.1292	0.1651	66320
59'6"	MGAR3-23N	35	1.900	0.1388	0.1657	62188
54'	ASP-816	35	1.755	0.1441	0.1659	57574

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
Pole	489 - 457	55.911	6	1.6015	1.2482
Antenna					
T1	457 - 436	46.335	6	0.9140	1.2478
T2	436 - 421	42.725	6	0.8913	1.2484
T3	421 - 401	40.211	6	0.8628	1.2457
T4	401 - 396	37.005	6	0.7718	1.2399
T5	396 - 391	36.252	6	0.7488	1.2380
T6	391 - 386	35.519	6	0.7211	1.2360
T7	386 - 381	34.800	6	0.6874	1.2337
T8	381 - 376	34.127	6	0.6475	1.2319
T9	376 - 371	33.564	6	0.6196	1.2391
T10	371 - 366	33.039	6	0.5964	1.2475
T11	366 - 361	32.524	6	0.5778	1.2516
T12	361 - 341	32.015	6	0.5630	1.2412
T13	341 - 321	30.101	6	0.5166	1.2006
T14	321 - 301	28.213	6	0.5244	1.1532
T15	301 - 281	26.180	6	0.5543	1.0995
T16	281 - 261	24.004	6	0.5608	1.0374
T17	261 - 241	21.870	6	0.5107	0.9605
T18	241 - 221	20.134	6	0.4167	0.9180
T19	221 - 201	18.681	6	0.3849	0.8758
T20	201 - 181	17.266	6	0.3899	0.7857
T21	181 - 161	15.771	6	0.4076	0.6688
T22	161 - 141	14.184	6	0.4204	0.5482
T23	141 - 121	12.576	6	0.4121	0.4703
T24	121 - 101	11.077	6	0.3757	0.4307
T25	101 - 81	9.731	6	0.3849	0.4360
T26	81 - 61	8.256	6	0.4228	0.4681
T27	61 - 41	6.582	6	0.4746	0.4719
T28	41 - 20	4.681	6	0.5268	0.4690
T29	20 - 6.70833	2.460	6	0.5681	0.4597
T30	6.70833 - 0	0.959	6	0.6572	0.4818

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

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
457'	12" x 3' Beacon	6	46.335	0.9140	1.2478	1708
446'6"	Guy	6	44.376	0.8795	1.2486	4307
442'	DB420	6	43.662	0.8841	1.2487	16683
434'	ERI 1183-3CP	6	42.402	0.8915	1.2482	7823
428'2-13/32"	ERI 1183-3CP	6	41.434	0.8843	1.2473	22483
422'4-13/16"	ERI 1183-3CP	6	40.448	0.8678	1.2460	20208
416'7-3/16"	ERI 1183-3CP	6	39.478	0.8449	1.2446	13430
410'9-19/32"	ERI 1183-3CP	6	38.537	0.8183	1.2430	14078
405'	ERI 1183-3CP	6	37.621	0.7904	1.2412	14788
400'	6014-2	6	36.853	0.7673	1.2395	13730
393'	6014-2	6	35.811	0.7328	1.2368	19891
386'	6014-2	6	34.800	0.6874	1.2337	6213

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
381'	Guy	6	34.127	0.6475	1.2319	2730
367'	SHP-2AE	6	32.627	0.5812	1.2519	19214
344'	455-6	6	30.380	0.5207	1.2064	32189
333'	3" x 6" SideLight	6	29.355	0.5136	1.1832	23874
330'	Side Arm Mount [SO 302-1]	6	29.073	0.5150	1.1760	22427
324'	Andrew 2' w/Radome	6	28.503	0.5206	1.1610	20025
323'	6014-2	6	28.407	0.5218	1.1584	19721
318'	6014-2	6	27.919	0.5288	1.1454	19134
313'	6014-2	6	27.421	0.5365	1.1321	19346
308'	6014-2	6	26.911	0.5444	1.1186	19583
303'	6014-2	6	26.391	0.5517	1.1050	19886
298'	6014-2	6	25.861	0.5577	1.0911	21154
293'	6014-2	6	25.322	0.5618	1.0768	23511
284'	DB810M-XC	6	24.336	0.5628	1.0482	29563
278'	DBS567KR90-XC	6	23.672	0.5575	1.0258	44141
269'	DB230-4E	6	22.691	0.5390	0.9895	15080
259'	Side Arm Mount [SO 311-1]	6	21.676	0.5017	0.9545	9544
253'	PG1N0F-0090-310	6	21.125	0.4721	0.9395	11005
251'	Guy	6	20.950	0.4619	0.9353	11662
247'	APXV18-206516S-C-A20 w/ Mount Pipe	6	20.613	0.4421	0.9279	13246
235'	BXA-80080/6CF w/ Mount Pipe	6	19.680	0.3997	0.9082	23332
215'	3" x 6" SideLight	6	18.260	0.3843	0.8537	59622
204'	PG1DOF-0093-011	6	17.482	0.3880	0.8016	41349
200'	P-9A72GN-U	6	17.194	0.3906	0.7803	36325
189'	CL6-450	6	16.382	0.4002	0.7177	33511
179'	SPD4-5.2	6	15.616	0.4094	0.6562	33530
154'	P-21A72	6	13.618	0.4214	0.5161	124299
146'	PL6-65-PXA	6	12.973	0.4179	0.4864	53143
135'	220-5	6	12.108	0.4011	0.4527	29600
131'	Guy	6	11.804	0.3927	0.4430	25685
117'	3-FT Grid	6	10.802	0.3732	0.4322	29788
112'	3" x 6" SideLight	6	10.468	0.3737	0.4381	95602
107'	PR-950	6	10.136	0.3774	0.4463	43553
101'	SPD2-5.8	6	9.731	0.3849	0.4560	22271
70'	P-9A48GN-U	6	7.361	0.4496	0.4703	21122
59'6"	MGAR3-23N	6	6.448	0.4791	0.4721	20052
54'	ASP-816	6	5.946	0.4957	0.4726	18603

### 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	457	Leg	A307	0.8750	8	1359.55	12026.40	0.113	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1261.19	1963.50	0.642	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	0.30	1963.50	0.000	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	1723.62	1963.50	0.878	1.333	Bolt Shear
T2	436	Leg	A307	0.8750	8	1308.24	12026.40	0.109	1.333	Bolt Tension
		Diagonal	A325X	0.5000	2	1667.54	5890.49	0.283	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	424.05	1963.50	0.216	1.333	Bolt Shear
T3	421	Leg	A307	0.8750	8	3292.47	12026.40	0.274	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	3164.48	4123.34	0.767	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	250.52	1963.50	0.128	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	77.07	1963.50	0.039	1.333	Bolt Shear

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 38 of 52
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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

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
T4	401	Leg	A307	0.8750	8	8976.72	12026.40	0.746	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	3586.12	4123.34	0.870	1.333	Bolt Shear
T5	396	Top Girt	A307	0.5000	2	256.80	1963.50	0.131	1.333	Bolt Shear
		Leg	A307	0.8750	16	5460.21	12026.40	0.454	1.333	Bolt Tension
T6	391	Diagonal	A325N	0.5000	2	4318.48	4123.34	1.047	1.333	Bolt Shear
		Diagonal	A325X	0.5000	2	5540.86	5890.49	0.941	1.333	Bolt Shear
T7	386	Diagonal	A325X	0.5000	2	5682.33	5132.81	1.107	1.333	Member Block Shear
T8	381	Diagonal	A325N	0.5000	2	4725.89	4123.34	1.146	1.333	Bolt Shear
T9	376	Leg	A307	0.8750	16	3774.36	12026.40	0.314	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	4947.57	4123.34	1.200	1.333	Bolt Shear
T10	371	Diagonal	A325N	0.5000	2	4096.92	4123.34	0.994	1.333	Bolt Shear
T11	366	Diagonal	A325N	0.5000	2	3597.10	4123.34	0.872	1.333	Bolt Shear
T12	361	Diagonal	A325N	0.5000	2	3411.74	4123.34	0.827	1.333	Bolt Shear
		Secondary Horizontal	A325X	0.5000	1	1733.11	5437.50	0.319	1.333	Member Bearing
T13	341	Top Girt	A307	0.5000	2	387.52	1963.50	0.197	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	153.57	1963.50	0.078	1.333	Bolt Shear
T14	321	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	2441.69	4123.34	0.592	1.333	Bolt Shear
T15	301	Top Girt	A307	0.5000	2	156.95	1963.50	0.080	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	150.15	1963.50	0.076	1.333	Bolt Shear
T16	281	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1280.36	1963.50	0.652	1.333	Bolt Shear
T17	261	Top Girt	A307	0.5000	2	195.90	1963.50	0.100	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	190.42	1963.50	0.097	1.333	Bolt Shear
T18	241	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	2256.02	1963.50	1.149	1.333	Bolt Shear
T19	221	Top Girt	A307	0.5000	2	176.08	1963.50	0.090	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	146.09	1963.50	0.074	1.333	Bolt Shear
T20	201	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	3065.20	4123.34	0.743	1.333	Bolt Shear
T21	181	Top Girt	A307	0.5000	2	157.55	1963.50	0.080	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	155.59	1963.50	0.079	1.333	Bolt Shear
T22	161	Leg	A307	0.6250	8	1848.62	6135.92	0.301	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3933.05	6442.72	0.610	1.333	Bolt Shear
T23	141	Top Girt	A307	0.5000	2	317.00	1963.50	0.161	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	360.36	1963.50	0.184	1.333	Bolt Shear
T24		Leg	A307	0.6250	8	0.00	6135.92	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3311.51	6442.72	0.514	1.333	Bolt Shear
T25		Top Girt	A307	0.5000	2	211.31	1963.50	0.108	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	211.31	1963.50	0.108	1.333	Bolt Shear
T26		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	2013.69	1963.50	1.026	1.333	Bolt Shear
T27		Top Girt	A307	0.5000	2	216.48	1963.50	0.110	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	206.67	1963.50	0.105	1.333	Bolt Shear
T28		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1505.32	1963.50	0.767	1.333	Bolt Shear
T29		Top Girt	A307	0.5000	2	230.73	1963.50	0.118	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	199.75	1963.50	0.102	1.333	Bolt Shear
T30		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1766.57	1963.50	0.900	1.333	Bolt Shear
T31		Top Girt	A307	0.5000	2	250.84	3926.99	0.064	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	199.74	1963.50	0.102	1.333	Bolt Shear
T32		Leg	A307	0.6250	8	0.00	6135.92	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	2761.52	6442.72	0.429	1.333	Bolt Shear
T33		Top Girt	A307	0.5000	2	219.51	1963.50	0.112	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	258.98	1963.50	0.132	1.333	Bolt Shear
T34		Leg	A307	0.6250	8	0.00	6135.92	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.6250	2	3501.97	6442.72	0.544	1.333	Bolt Shear
T35		Top Girt	A307	0.5000	2	699.45	1963.50	0.356	1.333	Bolt Shear



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	<b>Client</b>	Crown Castle USA	<b>Designed by</b>	JRM

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
T24	121	Mid Girt	A325N	0.5000	2	4471.92	4123.34	1.085	1.333	Bolt Shear
		Torque Arm Top@131	A307	0.7500	2	8648.60	8835.73	0.979	1.333	Bolt Shear
		Torque Arm Bottom@131	A307	0.7500	2	7743.10	8835.73	0.876	1.333	Bolt Shear
T25	101	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	2272.56	4123.34	0.551	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	2072.74	1963.50	1.056	1.333	Bolt Shear
T26	81	Mid Girt	A307	0.5000	2	263.39	1963.50	0.134	1.333	Bolt Shear
		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1428.87	1963.50	0.728	1.333	Bolt Shear
T27	61	Top Girt	A307	0.5000	2	263.36	1963.50	0.134	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	284.75	1963.50	0.145	1.333	Bolt Shear
		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
T28	41	Diagonal	A307	0.5000	2	718.21	1963.50	0.366	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	294.37	1963.50	0.150	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	307.36	1963.50	0.157	1.333	Bolt Shear
T29	20	Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	660.40	1963.50	0.336	1.333	Bolt Shear
		Top Girt	A307	0.5000	2	303.40	1963.50	0.155	1.333	Bolt Shear
T30	6.70833	Mid Girt	A307	0.5000	2	303.92	1963.50	0.155	1.333	Bolt Shear
		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
		Diagonal	A307	0.5000	2	1522.50	1963.50	0.775	1.333	Bolt Shear
T29	20	Top Girt	A307	0.5000	2	323.50	1963.50	0.165	1.333	Bolt Shear
		Mid Girt	A307	0.5000	2	592.60	1963.50	0.302	1.333	Bolt Shear
		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
T30	6.70833	Diagonal	A325N	0.5000	2	1558.35	1963.50	0.794	1.333	Bolt Shear
		Top Girt	A325N	0.5000	2	4550.39	4123.34	1.104	1.333	Bolt Shear
		Leg	A307	0.8750	8	0.00	12026.40	0.000	1.333	Bolt Tension
T30	6.70833	Diagonal	A307	0.5000	2	2225.43	1963.50	1.133	1.333	Bolt Shear

### Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T <sub>a</sub> lb	Required S.F.	Actual S.F.
T1	446'6" (A) (838)	9/16 EHS	3500.00	35000.04	14142.40	17500.00	2.000	2.475
	446'6" (B) (837)	9/16 EHS	3500.00	35000.04	14315.10	17500.00	2.000	2.445
	446'6" (C) (836)	9/16 EHS	3500.00	35000.04	13941.50	17500.00	2.000	2.510
T8	381' (A) (835)	1 3/8 BS	23200.00	232000.30	80201.40	116000.00	2.000	2.893
	381' (B) (834)	1 3/8 BS	23200.00	232000.30	80842.40	116000.00	2.000	2.870
	381' (C) (833)	1 3/8 BS	23200.00	232000.30	78720.00	116000.00	2.000	2.947
T17	251' (A) (832)	1 1/4 BS	13440.00	192000.16	47350.60	96000.00	2.000	4.055
	251' (B) (831)	1 1/4 BS	13440.00	192000.16	47813.50	96000.00	2.000	4.016
	251' (C) (830)	1 1/4 BS	13440.00	192000.16	46960.40	96000.00	2.000	4.089
T23	131' (A) (824)	3/4 BS	6800.00	67999.85	18365.40	34000.00	2.000	3.703
	131' (A) (825)	3/4 BS	6800.00	67999.85	16609.80	34000.00	2.000	4.094
	131' (B) (818)	3/4 BS	6800.00	67999.85	17099.00	34000.00	2.000	3.977
	131' (B) (819)	3/4 BS	6800.00	67999.85	17219.00	34000.00	2.000	3.949
	131' (C) (812)	3/4 BS	6800.00	67999.85	16495.50	34000.00	2.000	4.122
	131' (C) (813)	3/4 BS	6800.00	67999.85	18004.70	34000.00	2.000	3.777

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T lb	Allowable T <sub>a</sub> lb	Required S.F.	Actual S.F.
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### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	Mast Stability Index	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	457 - 436	3	21'	5'3"	84.0	1.00	14.032	7.0686	-22268.30	99189.10	0.225
T2	436 - 421	2 3/4	15'	5'	87.3	1.00	13.708	5.9396	-34864.10	81422.20	0.428
T3	421 - 401	2 3/4	20'	5'	87.3	1.00	13.708	5.9396	-77752.50	81422.20	0.955
T4	401 - 396	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	1.00	15.503	9.7900	-92622.00	151769.00	0.610
T5	396 - 391	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	1.00	15.503	9.7900	-109961.00	151769.00	0.725
T6	391 - 386	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	1.00	15.503	9.7900	-130501.00	151769.00	0.860
T7	386 - 381	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	1.00	15.503	9.7900	-154319.00	151769.00	1.017
T8	381 - 376	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	1.00	15.820	11.0000	-159995.00	174023.00	0.919
T9	376 - 371	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	1.00	15.820	11.0000	-142640.00	174023.00	0.820
T10	371 - 366	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	1.00	15.820	11.0000	-127115.00	174023.00	0.730
T11	366 - 361	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	1.00	15.820	11.0000	-112952.00	174023.00	0.649
T12	361 - 341	3	20'	2'6"	40.0	0.98	17.396	7.0686	-100061.00	122964.00	0.814
T13	341 - 321	3	20'	5'	80.0	1.00	14.419	7.0686	-69750.80	101923.00	0.684
T14	321 - 301	3	20'	5'	80.0	1.00	14.419	7.0686	-74980.10	101923.00	0.736
T15	301 - 281	3	20'	5'	80.0	1.00	14.419	7.0686	-74166.60	101923.00	0.728
T16	281 - 261	3	20'	5'	80.0	1.00	14.419	7.0686	-100884.00	101923.00	0.990
T17	261 - 241	3	20'	2'6"	40.0	0.99	17.450	7.0686	-129070.00	123345.00	1.046
T18	241 - 221	3	20'	5'	80.0	1.00	14.419	7.0686	-105546.00	101923.00	1.036
T19	221 - 201	3 1/4	20'	5'	73.8	1.00	14.994	8.2958	-80686.30	124390.00	0.649*
T20	201 - 181	3 1/4	20'	5'	73.8	1.00	14.994	8.2958	-83068.40	124390.00	0.668*
T21	181 - 161	3 1/4	20'	5'	73.8	1.00	14.994	8.2958	-85606.80	124390.00	0.688*

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	Mast Stability Index	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>
T22	161 - 141	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-88295.80	148821.00	0.593*
T23	141 - 121	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-91160.70	148821.00	0.613*
T24	121 - 101	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-102933.00	148821.00	0.692*
T25	101 - 81	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-104994.00	148821.00	0.706*
T26	81 - 61	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-106972.00	148821.00	0.719*
T27	61 - 41	3 1/2	20'	5'	K=1.00 68.6	1.00	15.468	9.6211	-108909.00	148821.00	0.732*
T28	41 - 20	3 1/2	21'	5'3"	K=1.00 72.0	1.00	15.162	9.6211	-112154.00	145878.00	0.769*
T29	20 - 6.70833	3 1/4	13'5-9/32'	4'5-3/4"	K=1.00 66.2	1.00	15.680	8.2958	-116496.00	130073.00	0.896*
T30	6.70833 - 0	3 1/4	6'10-7/16'	2'3-15/32'	K=1.00 33.8	0.92	16.616	8.2958	-120052.00	137843.00	0.871*

\* DL controls

### Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	457 - 436	L2 1/2x2x1/4	7'7-13/16'	3'7-9/16"	107.0	11.608	1.0600	-1957.66	12305.00	0.159
T2	436 - 421	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.04 104.9	11.849	0.8090	-3335.08	9586.16	0.348
T3	421 - 401	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-6328.96	9586.16	0.660
T4	401 - 396	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-7172.24	9586.16	0.748
T5	396 - 391	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-8636.96	9586.16	0.901
T6	391 - 386	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-11081.70	9586.16	1.156
T7	386 - 381	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-9855.03	9586.16	1.028
T8	381 - 376	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-7855.30	9586.16	0.819
T9	376 - 371	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-9895.13	9586.16	1.032
T10	371 - 366	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-8193.84	9586.16	0.855
T11	366 - 361	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-7194.21	9586.16	0.750
T12	361 - 341	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-6823.49	9586.16	0.712
T13	341 - 321	L2 1/2x2x3/16	7'6"	3'6-19/32'	K=1.05 104.9	11.849	0.8090	-4883.39	9586.16	0.509

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	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T14	321 - 301	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-2560.72	9586.16	0.267
T15	301 - 281	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-4512.05	9586.16	0.471
T16	281 - 261	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-6130.40	9586.16	0.640
T17	261 - 241	L3x3x1/4	7'6"	3'6"-15/32'	83.8 K=1.17	14.931	1.4400	-7677.61	21500.80	0.357
T18	241 - 221	L3x3x1/4	7'6"	3'6"-15/32'	83.8 K=1.17	14.931	1.4400	-6600.66	21500.80	0.307
T19	221 - 201	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-4027.38	9586.16	0.420
T20	201 - 181	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-3010.64	9586.16	0.314
T21	181 - 161	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-3533.14	9586.16	0.369
T22	161 - 141	L3x3x1/4	7'6"	3'6"-15/32'	83.8 K=1.17	14.931	1.4400	-5523.03	21500.80	0.257
T23	141 - 121	L3x3x1/4	7'6"	3'6"-15/32'	83.8 K=1.17	14.931	1.4400	-7003.94	21500.80	0.326
T24	121 - 101	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-4545.12	9586.16	0.474
T25	101 - 81	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-2857.74	9586.16	0.298
T26	81 - 61	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-1436.41	9586.16	0.150
T27	61 - 41	L2 1/2x2x3/16	7'6"	3'6"-19/32'	104.9 K=1.05	11.849	0.8090	-1320.79	9586.16	0.138
T28	41 - 20	L2 1/2x2x3/16	7'7"-13/16"	3'7"-9/16"	106.5 K=1.04	11.669	0.8090	-2890.32	9440.55	0.306
T29	20 - 6.70833	L2x2x3/16	5'9"-31/32"	3'1"-3/16"	100.9 K=1.07	12.289	0.7150	-1211.52	8786.75	0.138
T30	6.70833 - 0	L2x2x3/16	2'7"-3/32"	1'3"-1/8"	58.9 K=1.53	16.291	0.7150	-4450.86	11648.30	0.382

### Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	457 - 436	L2 1/2x2x1/4	6'	5'9"	146.3 K=0.90	6.979	1.0600	-1003.23	7397.28	0.136*

\* DL controls

### Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T12	361 - 341	L2x2x1/4	6'	5'6"-15/32"	170.1 K=1.00	5.163	0.9380	-1733.11	4842.44	0.358

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T17	261 - 241	2L3 1/2x3 1/2x3/8x3/8	6'	5'9"	92.2 K=1.43	13.936	4.9700	-2235.56	69263.00	0.032

### Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	457 - 436	C8x13.75	6'	5'9"	124.6 K=1.00	9.514	4.0400	-0.60	38437.30	0.000
T4	401 - 396	L2 1/2x2x1/4	6'	5'4-9/16"	139.8 K=0.92	7.646	1.0600	-370.92	8104.38	0.046
T12	361 - 341	L2 1/2x2x1/4	6'	5'3-1/4"	137.9 K=0.92	7.848	1.0600	-355.79	8318.82	0.043
T14	321 - 301	L2 1/2x2x1/4	6'	5'4-3/16"	139.4 K=0.92	7.685	1.0600	-36.97	8146.60	0.005
T23	141 - 121	L2 1/2x2x3/16	6'	5'3-23/32'	138.0 K=0.92	7.839	0.8090	-571.07	6342.04	0.090
T24	121 - 101	L2 1/2x2x3/16	6'	5'3-23/32'	138.0 K=0.92	7.839	0.8090	-4145.48	6342.04	0.654

### Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T3	421 - 401	L2 1/2x2x1/4	6'	5'4-9/16"	139.8 K=0.92	7.646	1.0600	-54.77	8104.38	0.007
T12	361 - 341	L2 1/2x2x1/4	6'	5'4-3/16"	139.4 K=0.92	7.685	1.0600	-14.21	8146.60	0.002
T23	141 - 121	L2 1/2x2x3/16	6'	5'3-23/32'	138.0 K=0.92	7.839	0.8090	-6956.17	6342.04	1.097

### Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T23	141 - 121 (814)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-366.50	25901.80	0.014
T23	141 - 121 (815)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-40.03	25901.80	0.002
T23	141 - 121 (820)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-1161.38	25901.80	0.045
T23	141 - 121 (821)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-1168.41	25901.80	0.045
T23	141 - 121 (826)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-1454.29	25901.80	0.056

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T23	141 - 121 (827)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	104.4 K=1.18	11.882	2.1800	-1236.24	25901.80	0.048

### Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T23	141 - 121 (816)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-14440.30	16807.10	0.859
T23	141 - 121 (817)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-14809.70	16807.10	0.881
T23	141 - 121 (822)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-15259.50	16807.10	0.908
T23	141 - 121 (823)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-15094.60	16807.10	0.898
T23	141 - 121 (828)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-14818.90	16807.10	0.882
T23	141 - 121 (829)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	139.2 K=0.92	7.710	2.1800	-15486.20	16807.10	0.921

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	457 - 436	3	21'	5'3"	84.0	19.800	7.0686	13832.20	139958.00	0.099
T2	436 - 421	2 3/4	15'	5'	87.3	19.800	5.9396	19284.20	117604.00	0.164
T3	421 - 401	2 3/4	20'	5'	87.3	19.800	5.9396	58035.90	117604.00	0.493
T4	401 - 396	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	19.800	9.7900	71813.80	193842.00	0.370
T5	396 - 391	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	19.800	9.7900	87363.30	193842.00	0.451
T6	391 - 386	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	19.800	9.7900	107688.00	193842.00	0.556
T7	386 - 381	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	5'	5'	68.2	19.800	9.7900	126648.00	193842.00	0.653
T8	381 - 376	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	19.800	11.0000	74174.60	217800.00	0.341
T9	376 - 371	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	19.800	11.0000	60389.80	217800.00	0.277
T10	371 - 366	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	19.800	11.0000	43357.30	217800.00	0.199
T11	366 - 361	3.5" S.R. w/ 3.5 SCH40 Half Pipe	5'	5'	64.5	19.800	11.0000	29491.00	217800.00	0.135

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
		Pipe								
T12	361 - 341	3	20'	2'6"	40.0	19.800	7.0686	16745.10	139958.00	0.120
T16	281 - 261	3	20'	5'	80.0	19.800	7.0686	2526.33	139958.00	0.018
T17	261 - 241	3	20'	2'6"	40.0	19.800	7.0686	25333.60	139958.00	0.181

### Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio $\frac{P}{P_a}$
T1	457 - 436	L2 1/2x2x1/4	7'7-13/16'	3'7-9/16"	77.5	30.000	0.6778	2522.38	20334.40	0.124
T2	436 - 421	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	2864.39	15565.80	0.184
T3	421 - 401	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	6237.32	15565.80	0.401
T4	401 - 396	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	7003.59	15565.80	0.450
T5	396 - 391	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	8632.25	15565.80	0.555
T6	391 - 386	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	9629.75	15565.80	0.619
T7	386 - 381	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	11364.70	15565.80	0.730
T8	381 - 376	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	9451.77	15565.80	0.607
T9	376 - 371	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	8513.58	15565.80	0.547
T10	371 - 366	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	8185.50	15565.80	0.526
T11	366 - 361	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	7024.75	15565.80	0.451
T12	361 - 341	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	6493.07	15565.80	0.417
T13	341 - 321	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	4832.92	15565.80	0.310
T14	321 - 301	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	2485.23	15565.80	0.160
T15	301 - 281	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	4342.67	15565.80	0.279
T16	281 - 261	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	6088.33	15565.80	0.391
T17	261 - 241	L3x3x1/4	7'6"	3'6-15/32'	48.4	29.000	0.9394	7866.10	27241.90	0.289
T18	241 - 221	L3x3x1/4	7'6"	3'6-15/32'	48.4	29.000	0.9394	6623.02	27241.90	0.243
T19	221 - 201	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	3890.10	15565.80	0.250
T20	201 - 181	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	2853.48	15565.80	0.183
T21	181 - 161	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	3210.67	15565.80	0.206
T22	161 - 141	L3x3x1/4	7'6"	3'6-15/32'	48.4	29.000	0.9394	5317.74	27241.90	0.195
T23	141 - 121	L3x3x1/4	7'6"	3'6-15/32'	48.4	29.000	0.9394	6895.09	27241.90	0.253

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T24	121 - 101	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	4388.81	15565.80	0.282
T25	101 - 81	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	2600.26	15565.80	0.167
T26	81 - 61	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	1171.34	15565.80	0.075
T27	61 - 41	L2 1/2x2x3/16	7'6"	3'6-19/32'	75.0	30.000	0.5189	1120.69	15565.80	0.072
T28	41 - 20	L2 1/2x2x3/16	7'7-13/16"	3'7-9/16"	76.6	30.000	0.5189	3045.01	15565.80	0.196
T29	20 - 6.70833	L2x2x3/16	5'19/32"	2'9-3/8"	58.0	30.000	0.4484	3116.69	13450.80	0.232
T30	6.70833 - 0	L2x2x3/16	3'1-5/16"	1'4-13/16"	31.1	30.000	0.4484	3687.21	13450.80	0.274*

\* DL controls

### Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	457 - 436	L2 1/2x2x1/4	6'	5'9"	116.5	19.800	1.0600	435.60	20988.00	0.021*
T2	436 - 421	L2 1/2x2x1/4	6'	5'9-1/4"	116.9	19.800	1.0600	813.63	20988.00	0.039*

\* DL controls

### Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T12	361 - 341	L2x2x1/4	6'	5'6-15/32'	113.3	29.000	0.5863	1733.11	17003.10	0.102
T17	261 - 241	2L3 1/2x3 1/2x3/8x3/8	6'	5'9"	64.5	21.600	4.9700	2235.56	107352.00	0.021

### Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
T1	457 - 436	C8x13.75	6'	5'9"	112.2	19.800	4.0400	0.60	79992.00	0.000
T2	436 - 421	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	772.69	20334.40	0.038*
T3	421 - 401	L2 1/2x2x1/4	6'	5'4-9/16"	116.9	30.000	0.6778	427.35	20334.40	0.021*
T4	401 - 396	L2 1/2x2x1/4	6'	5'4-9/16"	116.9	30.000	0.6778	513.59	20334.40	0.025
T6	391 - 386	L2 1/2x2x1/4	6'	5'8-9/32"	115.2	19.800	1.0600	649.47	20988.00	0.031
T10	371 - 366	L2 1/2x2x1/4	6'	5'8-1/32"	114.8	19.800	1.0600	789.48	20988.00	0.038
T12	361 - 341	L2 1/2x2x1/4	6'	5'3-1/4"	114.8	30.000	0.6778	775.03	20334.40	0.038
T13	341 - 321	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	313.90	20334.40	0.015
T14	321 - 301	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	391.81	20334.40	0.019
T15	301 - 281	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	352.15	15565.80	0.023
T16	281 - 261	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	315.10	20334.40	0.015



<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 47 of 52
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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P P <sub>a</sub>
T17	261 - 241	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	634.00	15565.80	0.041
T18	241 - 221	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	720.71	15565.80	0.046
T19	221 - 201	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	361.85	15565.80	0.023*
T20	201 - 181	L2 1/2x2x3/16	6'	5'3-31/32'	114.6	30.000	0.5189	461.46	15565.80	0.030
T21	181 - 161	2L3x2x1/4x3/8	6'	5'3-31/32'	77.2	30.000	1.5506	408.89	46518.80	0.009*
T22	161 - 141	L2 1/2x2x3/16	6'	5'3-31/32'	114.6	30.000	0.5189	400.04	15565.80	0.026*
T23	141 - 121	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	1398.91	15565.80	0.090
T24	121 - 101	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	3794.06	15565.80	0.244
T25	101 - 81	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	471.25	15565.80	0.030*
T26	81 - 61	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	479.49	15565.80	0.031*
T27	61 - 41	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	488.22	15565.80	0.031*
T28	41 - 20	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	543.91	15565.80	0.035*
T29	20 - 6.70833	L3x2x3/16	6'	5'3-23/32'	117.4	30.000	0.5886	8348.17	17658.30	0.473*

\*DL controls

### Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P P <sub>a</sub>
T1	457 - 436	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	3447.23	20334.40	0.170
T3	421 - 401	L2 1/2x2x1/4	6'	5'4-9/16"	116.9	30.000	0.6778	154.14	20334.40	0.008
T12	361 - 341	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	307.15	20334.40	0.015
T13	341 - 321	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	300.31	20334.40	0.015
T14	321 - 301	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	380.85	20334.40	0.019
T15	301 - 281	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	220.16	15565.80	0.014*
T16	281 - 261	L2 1/2x2x1/4	6'	5'4-3/16"	116.5	30.000	0.6778	240.92	20334.40	0.012*
T18	241 - 221	L2 1/2x2x3/16	6'	5'4-3/16"	115.0	30.000	0.5189	382.15	15565.80	0.025*
T19	221 - 201	L2 1/2x2x3/16	6'	5'3-31/32'	114.6	30.000	0.5189	336.57	15565.80	0.022*
T20	201 - 181	L2 1/2x2x3/16	6'	5'3-31/32'	114.6	30.000	0.5189	325.96	15565.80	0.021*
T21	181 - 161	L2 1/2x2x3/16	6'	5'3-31/32'	114.6	30.000	0.5189	340.83	15565.80	0.022*
T22	161 - 141	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	469.67	15565.80	0.030*
T23	141 - 121	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	8943.84	15565.80	0.575
T24	121 - 101	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	457.57	15565.80	0.029*
T25	101 - 81	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	475.36	15565.80	0.031*
T26	81 - 61	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	482.70	15565.80	0.031*
T27	61 - 41	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	497.02	15565.80	0.032*
T28	41 - 20	L2 1/2x2x3/16	6'	5'3-23/32'	114.2	30.000	0.5189	1053.99	15565.80	0.068*

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	Client	Crown Castle USA	Designed by	JRM

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	F <sub>a</sub>	A	Actual P	Allow. P <sub>a</sub>	Ratio P/P <sub>a</sub>
	ft		ft	ft		ksi	in <sup>2</sup>	lb	lb	

\* DL controls

### Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	F <sub>a</sub>	A	Actual P	Allow. P <sub>a</sub>	Ratio P/P <sub>a</sub>
	ft		ft	ft		ksi	in <sup>2</sup>	lb	lb	
T8	381 - 376	2L3x2x1/4x3/8	6'	5'8-9/32"	76.6	19.800	2.3800	25528.70	47124.00	0.542
T17	261 - 241	2L3 1/2x3 1/2x3/8x3/8	6'	5'9"	64.5	21.600	4.9700	18254.50	107352.00	0.170

### Torque-Arm Top Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	F <sub>a</sub>	A	Actual P	Allow. P <sub>a</sub>	Ratio P/P <sub>a</sub>
	ft		ft	ft		ksi	in <sup>2</sup>	lb	lb	
T23	141 - 121 (814)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	14714.60	43164.00	0.341
T23	141 - 121 (815)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	14735.30	43164.00	0.341
T23	141 - 121 (820)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	16120.30	43164.00	0.373
T23	141 - 121 (821)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	16835.40	43164.00	0.390
T23	141 - 121 (826)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	17297.20	43164.00	0.401
T23	141 - 121 (827)	2L3x3x3/16	7'6-19/32'	6'11-13/32"	94.6	19.800	2.1800	16252.70	43164.00	0.377

### Torque-Arm Bottom Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	F <sub>a</sub>	A	Actual P	Allow. P <sub>a</sub>	Ratio P/P <sub>a</sub>
	ft		ft	ft		ksi	in <sup>2</sup>	lb	lb	
T23	141 - 121 (816)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	5932.22	43164.00	0.137
T23	141 - 121 (817)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	6113.03	43164.00	0.142
T23	141 - 121 (822)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	6357.62	43164.00	0.147
T23	141 - 121 (823)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	6445.80	43164.00	0.149
T23	141 - 121 (828)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	6080.77	43164.00	0.141
T23	141 - 121 (829)	2L3x3x3/16	12'6-3/8"	11'9-31/32"	157.0	19.800	2.1800	6193.12	43164.00	0.143

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

## Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail
T1	457 - 436	Leg	3	2	-22268.30	132219.07	16.8	Pass
T2	436 - 421	Leg	2 3/4	44	-34864.10	108535.79	32.1	Pass
T3	421 - 401	Leg	2 3/4	74	-77752.50	108535.79	71.6	Pass
T4	401 - 396	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	107	-92622.00	202308.07	45.8	Pass
T5	396 - 391	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	116	-109961.00	202308.07	54.4	Pass
T6	391 - 386	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	125	-130501.00	202308.07	64.5	Pass
T7	386 - 381	Leg	3" S.R. w/ 3 SCH 40 Half Pipe and 3.75 x 5/16 Half Pipe	137	-154319.00	202308.07	76.3	Pass
T8	381 - 376	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	149	-159995.00	231972.65	69.0	Pass
T9	376 - 371	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	158	-142640.00	231972.65	61.5	Pass
T10	371 - 366	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	167	-127115.00	231972.65	54.8	Pass
T11	366 - 361	Leg	3.5" S.R. w/ 3.5 SCH40 Half Pipe	179	-112952.00	231972.65	48.7	Pass
T12	361 - 341	Leg	3	191	-100061.00	163911.01	61.0	Pass
T13	341 - 321	Leg	3	236	-69750.80	135863.35	51.3	Pass
T14	321 - 301	Leg	3	269	-74980.10	135863.35	55.2	Pass
T15	301 - 281	Leg	3	302	-74166.60	135863.35	54.6	Pass
T16	281 - 261	Leg	3	336	-100884.00	135863.35	74.3	Pass
T17	261 - 241	Leg	3	369	-129070.00	164418.88	78.5	Pass
T18	241 - 221	Leg	3	414	-105546.00	135863.35	77.7	Pass
T19	221 - 201	Leg	3 1/4	448	-80686.30	124390.00	64.9	Pass
T20	201 - 181	Leg	3 1/4	481	-83068.40	124390.00	66.8	Pass
T21	181 - 161	Leg	3 1/4	514	-85606.80	124390.00	68.8	Pass
T22	161 - 141	Leg	3 1/2	547	-88295.80	148821.00	59.3	Pass
T23	141 - 121	Leg	3 1/2	580	-91160.70	148821.00	61.3	Pass
T24	121 - 101	Leg	3 1/2	613	-102933.00	148821.00	69.2	Pass
T25	101 - 81	Leg	3 1/2	646	-104994.00	148821.00	70.6	Pass
T26	81 - 61	Leg	3 1/2	679	-106972.00	148821.00	71.9	Pass
T27	61 - 41	Leg	3 1/2	712	-108909.00	148821.00	73.2	Pass
T28	41 - 20	Leg	3 1/2	745	-112154.00	145878.00	76.9	Pass
T29	20 - 6.70833	Leg	3 1/4	778	-116496.00	130073.00	89.6	Pass
T30	6.70833 - 0	Leg	3 1/4	799	-120052.00	137843.00	87.1	Pass
T1	457 - 436	Diagonal	L2 1/2x2x1/4	39	-1957.66	16402.56	11.9	Pass
T2	436 - 421	Diagonal	L2 1/2x2x3/16	50	-3335.08	12778.35	26.1	Pass
T3	421 - 401	Diagonal	L2 1/2x2x3/16	83	-6328.96	12778.35	49.5	Pass
T4	401 - 396	Diagonal	L2 1/2x2x3/16	110	-7172.24	12778.35	56.1	Pass
T5	396 - 391	Diagonal	L2 1/2x2x3/16	119	-8636.96	12778.35	67.6	Pass
T6	391 - 386	Diagonal	L2 1/2x2x3/16	131	-11081.70	12778.35	86.7	Pass
T7	386 - 381	Diagonal	L2 1/2x2x3/16	143	-9855.03	12778.35	77.1	Pass
T8	381 - 376	Diagonal	L2 1/2x2x3/16	155	-7855.30	12778.35	83.1 (b)	Pass
T9	376 - 371	Diagonal	L2 1/2x2x3/16	163	-9895.13	12778.35	77.4	Pass
T10	371 - 366	Diagonal	L2 1/2x2x3/16	176	-8193.84	12778.35	64.1	Pass
T11	366 - 361	Diagonal	L2 1/2x2x3/16	190	-7194.21	12778.35	56.3	Pass

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	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail
T12	361 - 341	Diagonal	L2 1/2x2x3/16	231	-6823.49	12778.35	65.4 (b) 53.4	Pass
T13	341 - 321	Diagonal	L2 1/2x2x3/16	267	-4883.39	12778.35	62.1 (b) 38.2	Pass
T14	321 - 301	Diagonal	L2 1/2x2x3/16	301	-2560.72	12778.35	44.4 (b) 20.0	Pass
T15	301 - 281	Diagonal	L2 1/2x2x3/16	314	-4512.05	12778.35	48.9 (b) 35.3	Pass
T16	281 - 261	Diagonal	L2 1/2x2x3/16	347	-6130.40	12778.35	86.2 (b) 48.0	Pass
T17	261 - 241	Diagonal	L3x3x1/4	390	-7677.61	28660.57	55.8 (b) 26.8	Pass
T18	241 - 221	Diagonal	L3x3x1/4	444	-6600.66	28660.57	45.8 (b) 23.0	Pass
T19	221 - 201	Diagonal	L2 1/2x2x3/16	477	-4027.38	12778.35	38.6 (b) 31.5	Pass
T20	201 - 181	Diagonal	L2 1/2x2x3/16	510	-3010.64	12778.35	76.9 (b) 23.6	Pass
T21	181 - 161	Diagonal	L2 1/2x2x3/16	524	-3533.14	12778.35	57.5 (b) 27.6	Pass
T22	161 - 141	Diagonal	L3x3x1/4	554	-5523.03	28660.57	67.5 (b) 19.3	Pass
T23	141 - 121	Diagonal	L3x3x1/4	605	-7003.94	28660.57	32.2 (b) 24.4	Pass
T24	121 - 101	Diagonal	L2 1/2x2x3/16	638	-4545.12	12778.35	40.8 (b) 35.6	Pass
T25	101 - 81	Diagonal	L2 1/2x2x3/16	674	-2857.74	12778.35	41.3 (b) 22.4	Pass
T26	81 - 61	Diagonal	L2 1/2x2x3/16	707	-1436.41	12778.35	54.6 (b) 11.2	Pass
T27	61 - 41	Diagonal	L2 1/2x2x3/16	720	-1320.79	12778.35	27.4 (b) 10.3	Pass
T28	41 - 20	Diagonal	L2 1/2x2x3/16	758	-2890.32	12584.25	25.2 (b) 23.0	Pass
T29	20 - 6.70833	Diagonal	L2x2x3/16	780	3116.69	17929.92	58.2 (b) 17.4	Pass
T30	6.70833 - 0	Diagonal	L2x2x3/16	802	-4450.86	15527.18	59.5 (b) 28.7	Pass
T1	457 - 436	Horizontal	L2 1/2x2x1/4	37	-1003.23	7397.28	85.0 (b) 13.6	Pass
T2	436 - 421	Horizontal	L2 1/2x2x1/4	56	813.63	20988.00	3.9	Pass
T12	361 - 341	Secondary Horizontal	L2x2x1/4	217	-1733.11	6454.97	26.8	Pass
T17	261 - 241	Secondary Horizontal	2L3 1/2x3 1/2x3/8x3/8	383	-2235.56	92327.58	2.4	Pass
T1	457 - 436	Top Girt	C8x13.75	6	-0.60	51236.92	0.2	Pass
T2	436 - 421	Top Girt	L2 1/2x2x1/4	8	772.69	20334.40	3.8	Pass
T3	421 - 401	Top Girt	L2 1/2x2x1/4	47	427.35	20334.40	16.2 (b) 2.1	Pass
T4	401 - 396	Top Girt	L2 1/2x2x1/4	78	-370.92	10803.14	9.6 (b) 3.4	Pass
T6	391 - 386	Top Girt	L2 1/2x2x1/4	130	649.47	27977.00	9.8 (b) 2.3	Pass
T10	371 - 366	Top Girt	L2 1/2x2x1/4	170	789.48	27977.00	2.8	Pass
T12	361 - 341	Top Girt	L2 1/2x2x1/4	184	-355.79	11088.99	3.2	Pass
T13	341 - 321	Top Girt	L2 1/2x2x1/4	196	313.90	27105.75	14.8 (b) 1.2	Pass
T14	321 - 301	Top Girt	L2 1/2x2x1/4	239	391.81	27105.75	6.0 (b) 1.4	Pass
T15	301 - 281	Top Girt	L2 1/2x2x3/16	272	352.15	20749.21	7.5 (b) 1.7	Pass
T16	281 - 261	Top Girt	L2 1/2x2x1/4	305	315.10	27105.75	6.7 (b) 1.2	Pass

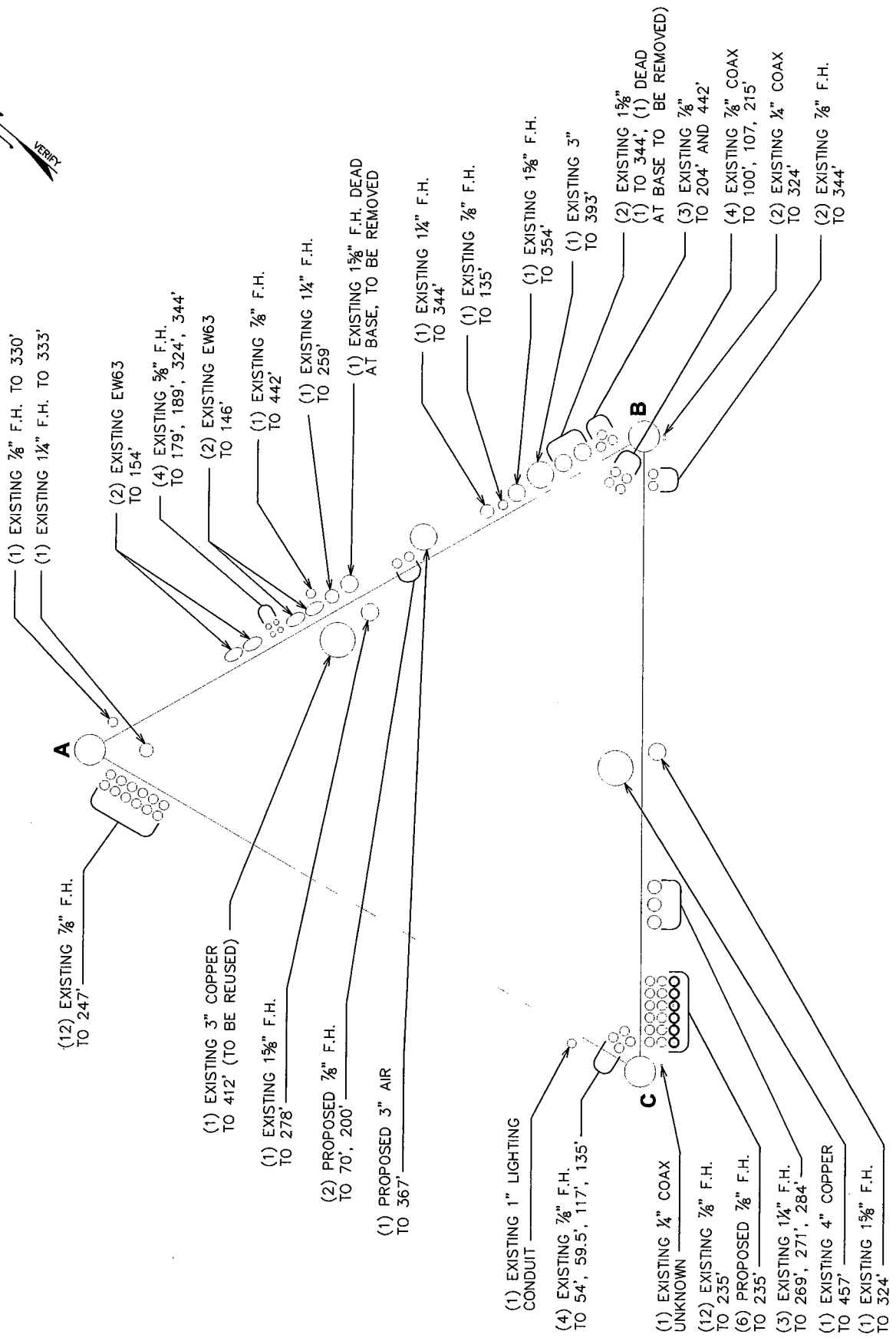
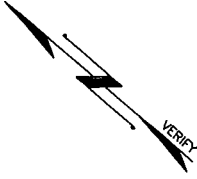
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Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail
T17	261 - 241	Top Girt	L2 1/2x2x3/16	340	634.00	20749.21	6.0 (b) 3.1	Pass
T18	241 - 221	Top Girt	L2 1/2x2x3/16	373	720.71	20749.21	12.1 (b) 3.5	Pass
T19	221 - 201	Top Girt	L2 1/2x2x3/16	418	361.85	15565.80	13.8 (b) 2.3	Pass
T20	201 - 181	Top Girt	L2 1/2x2x3/16	450	461.46	20749.21	8.3 (b) 2.2	Pass
T21	181 - 161	Top Girt	2L3x2x1/4x3/8	483	408.89	46518.80	8.8 (b) 0.9	Pass
T22	161 - 141	Top Girt	L2 1/2x2x3/16	516	400.04	15565.80	4.8 (b) 2.6	Pass
T23	141 - 121	Top Girt	L2 1/2x2x3/16	550	-571.07	8453.94	8.4 (b) 6.8	Pass
T24	121 - 101	Top Girt	L2 1/2x2x3/16	583	-4145.48	8453.94	26.7 (b) 49.0	Pass
T25	101 - 81	Top Girt	L2 1/2x2x3/16	616	471.25	15565.80	79.2 (b) 3.0	Pass
T26	81 - 61	Top Girt	L2 1/2x2x3/16	649	479.49	15565.80	10.1 (b) 3.1	Pass
T27	61 - 41	Top Girt	L2 1/2x2x3/16	681	488.22	15565.80	11.2 (b) 3.1	Pass
T28	41 - 20	Top Girt	L2 1/2x2x3/16	714	543.91	15565.80	11.6 (b) 3.5	Pass
T29	20 - 6.70833	Top Girt	L3x2x3/16	747	8348.17	17658.30	12.4 (b) 47.3	Pass
T1	457 - 436	Mid Girt	L2 1/2x2x1/4	13	3447.23	27105.75	82.8 (b) 12.7	Pass
T3	421 - 401	Mid Girt	L2 1/2x2x1/4	81	154.14	27105.75	65.9 (b) 0.6	Pass
T12	361 - 341	Mid Girt	L2 1/2x2x1/4	198	307.15	27105.75	2.9 (b) 1.1	Pass
T13	341 - 321	Mid Girt	L2 1/2x2x1/4	242	300.31	27105.75	5.9 (b) 1.1	Pass
T14	321 - 301	Mid Girt	L2 1/2x2x1/4	275	380.85	27105.75	5.7 (b) 1.4	Pass
T15	301 - 281	Mid Girt	L2 1/2x2x3/16	308	220.16	15565.80	7.3 (b) 1.4	Pass
T16	281 - 261	Mid Girt	L2 1/2x2x1/4	341	240.92	20334.40	5.6 (b) 1.2	Pass
T18	241 - 221	Mid Girt	L2 1/2x2x3/16	421	382.15	15565.80	5.9 (b) 2.5	Pass
T19	221 - 201	Mid Girt	L2 1/2x2x3/16	453	336.57	15565.80	8.1 (b) 2.2	Pass
T20	201 - 181	Mid Girt	L2 1/2x2x3/16	486	325.96	15565.80	7.9 (b) 2.1	Pass
T21	181 - 161	Mid Girt	L2 1/2x2x3/16	519	340.83	15565.80	7.6 (b) 2.2	Pass
T22	161 - 141	Mid Girt	L2 1/2x2x3/16	553	469.67	15565.80	7.6 (b) 3.0	Pass
T23	141 - 121	Mid Girt	L2 1/2x2x3/16	586	-6956.17	8453.94	9.9 (b) 82.3	Pass
T24	121 - 101	Mid Girt	L2 1/2x2x3/16	619	457.57	15565.80	2.9 2.9	Pass
T25	101 - 81	Mid Girt	L2 1/2x2x3/16	652	475.36	15565.80	10.1 (b) 3.1	Pass
T26	81 - 61	Mid Girt	L2 1/2x2x3/16	685	482.70	15565.80	10.9 (b) 3.1	Pass
T27	61 - 41	Mid Girt	L2 1/2x2x3/16	718	497.02	15565.80	11.7 (b) 3.2	Pass
T28	41 - 20	Mid Girt	L2 1/2x2x3/16	750	1053.99	15565.80	11.6 (b) 6.8	Pass

<b>tnxTower</b>  <b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	<b>Job</b> Trumbull (BU# 873128)	<b>Page</b> 52 of 52
	<b>Project</b> TEP# 110967	<b>Date</b> 09:18:12 06/07/12
	<b>Client</b> Crown Castle USA	<b>Designed by</b> JRM

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	St*P <sub>allow</sub> lb	% Capacity	Pass Fail	
T1	457 - 436	Guy A@446.5	9/16	838	14142.40	17500.00	22.6 (b)	Pass	
T8	381 - 376	Guy A@381	1 3/8	835	80201.40	116000.00	80.8	Pass	
T17	261 - 241	Guy A@251	1 1/4	832	47350.60	96000.00	69.1	Pass	
T23	141 - 121	Guy A@131	3/4	824	18365.40	34000.00	49.3	Pass	
T1	457 - 436	Guy B@446.5	9/16	837	14315.10	17500.00	54.0	Pass	
T8	381 - 376	Guy B@381	1 3/8	834	80842.40	116000.00	81.8	Pass	
T17	261 - 241	Guy B@251	1 1/4	831	47813.50	96000.00	69.7	Pass	
T23	141 - 121	Guy B@131	3/4	819	17219.00	34000.00	49.8	Pass	
T1	457 - 436	Guy C@446.5	9/16	836	13941.50	17500.00	50.6	Pass	
T8	381 - 376	Guy C@381	1 3/8	833	78720.00	116000.00	79.7	Pass	
T17	261 - 241	Guy C@251	1 1/4	830	46960.40	96000.00	67.9	Pass	
T23	141 - 121	Guy C@131	3/4	813	18004.70	34000.00	48.9	Pass	
T8	381 - 376	Top Guy Pull-Off@381	2L3x2x1/4x3/8	142	25528.70	62816.29	53.0	Pass	
T17	261 - 241	Top Guy Pull-Off@251	2L3 1/2x3 1/2x3/8x3/8	376	18254.50	143100.21	40.6	Pass	
T23	141 - 121	Torque Arm Top@131	2L3x3x3/16	826	17297.20	57537.61	30.1	Pass	
T23	141 - 121	Torque Arm Bottom@131	2L3x3x3/16	829	-15486.20	22403.86	73.4 (b)	Pass	
							Summary		
							Leg (T29)	89.6	Pass
							Diagonal (T9)	90.0	Pass
							Horizontal (T1)	13.6	Pass
							Secondary Horizontal (T12)	26.8	Pass
							Top Girt (T29)	82.8	Pass
							Mid Girt (T23)	82.3	Pass
							Guy A (T1)	80.8	Pass
							Guy B (T1)	81.8	Pass
							Guy C (T1)	79.7	Pass
							Top Guy Pull-Off (T8)	40.6	Pass
							Torque Arm Top (T23)	73.4	Pass
							Torque Arm Bottom (T23)	69.1	Pass
							Bolt Checks	90.0	Pass
							<b>RATING =</b>	<b>90.0</b>	<b>Pass</b>

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



(1) EXISTING 7/8" F.H. TO 330'  
(1) EXISTING 1 1/4" F.H. TO 333'

(2) EXISTING EW63 TO 154'  
(4) EXISTING 5/8" F.H. TO 179', 189', 324', 344'

(2) EXISTING EW63 TO 146'  
(1) EXISTING 7/8" F.H. TO 442'

(1) EXISTING 1 1/4" F.H. TO 259'  
(1) EXISTING 1 1/4" F.H. AT BASE, TO BE REMOVED

(1) EXISTING 1 1/4" F.H. TO 344'  
(1) EXISTING 7/8" F.H. TO 135'

(1) EXISTING 1 5/8" F.H. TO 354'  
(1) EXISTING 3" TO 393'

(2) EXISTING 1 5/8" (1) TO 344', (1) DEAD AT BASE TO BE REMOVED  
(3) EXISTING 7/8" TO 204' AND 442'  
(4) EXISTING 7/8" COAX TO 100', 107', 215'  
(2) EXISTING 1/4" COAX TO 324'  
(2) EXISTING 7/8" F.H. TO 344'

(12) EXISTING 7/8" F.H. TO 247'

(1) EXISTING 3" COPPER TO 412' (TO BE REUSED)

(1) EXISTING 1 5/8" F.H. TO 278'

(2) PROPOSED 7/8" F.H. TO 70', 200'

(1) PROPOSED 3" AIR TO 367'

(1) EXISTING 1" LIGHTING CONDUIT

(4) EXISTING 7/8" F.H. TO 54', 59.5', 117', 135'

(1) EXISTING 1/4" COAX UNKNOWN

(12) EXISTING 7/8" F.H. TO 235'

(6) PROPOSED 7/8" F.H. TO 235'

(3) EXISTING 1 1/4" F.H. TO 269', 271', 284'

(1) EXISTING 4" COPPER TO 457'

(1) EXISTING 1 5/8" F.H. TO 324'



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

Bearing: 69.65%

Pad		
Width at the top of the pad (ft)	Width at the bottom of the pad (ft)	Thickness of the pad (ft)
10.00	10.00	2.00

Pier			
Width at the top of the pier (ft)	Width at the bottom of the pier (ft)	Length of the pier (ft)	Pier Extension above grade (ft)
4.50	4.50	3.00	0.50

Soil Density (kcf)	Depth to base of foundation (ft)	Vertical Load (kip)	Horizontal Load (kip)
0.115	5.00	347.64	5.06

Weight of Concrete 39.11 kip  
 $W_c$  (Replaced) 8.77 kip  
 Weight of Soil 28.68 kip  
 Total Vertical Load 356.41 kip  
 Moment 25.28 kip-ft  
 Section Modulus -  $S$  117.85 ft<sup>3</sup>  
 Area -  $A$  100.00 ft<sup>2</sup>  
 Min. Pressure -  $q_{min}$  3.35 ksf  
 Max Pressure -  $q_{max}$  3.78 ksf

All. Pressure -  $q_{all}$  5.43 ksf

Net Bearing Pressure? Yes

Lateral: 5.77%

Coefficient of Friction ( $\mu$ )	Friction Angle ( $\phi$ ) (Degrees)	Cohesion (ksf)
0.4	34	0

$K_p$  3.54  
 Pressure<sub>Top</sub> 1.22 ksf  
 Pressure<sub>Bottom</sub> 2.03 ksf  
 Force from pressure 32.54 kip  
 Force from friction 142.56 kip  
 Total Resistance 87.55 kip (SF = 2.0)

**Deadman Anchor Analysis: A - -**

Project Name: Trumbull  
 Job #: TEP# 110967  
 Client: CCI BU#873128)  
 Analysis by: JRM  
 Checked by: WHM  
 Code: TIA - F

**Anchor Block is Adequate for Uplift 37.5%**

**Anchor Block is Adequate for Lateral 89.7%**

Loads

$U_{max}$ : 101.46 kips - maximum uplift reaction  
 $H_{max}$ : 137.75 kips - maximum horizontal reaction

Capacity

$U_{all}$ : 270.27 kips - allowable uplift  
 $H_{all}$ : 153.64 kips - allowable horizontal

Foundation Input

Guy Path: A  
 Anchor Ring: -

$W_b$ : 18.50 ft - width of anchor block  
 $L_b$ : 23.00 ft - length of anchor block  
 $T_b$ : 3.30 ft - thickness of anchor block  
 $d$ : 2.00 ft - depth from  $\nabla$  grade to  $\nabla$  anchor block  
 $b$ : 5.30 ft - depth from  $\nabla$  grade to  $b/\nabla$  anchor block  
 $d_{Mound}$ : 1.5 ft - depth of soil mound on top of anchor

Ultimate Soil Properties

$D_w$ : 8.50 ft - depth from  $\nabla$  grade to water table

Geotechnical Firm: FDH Engineering  
 Report: Project Number 04-1229E  
 Date: 1/25/2005  
 Notes: Boring B-4 in Geotechnical Report

Layer	Begin (ft)	End (ft)	$\phi$ Friction Angle (deg)	c Ult. Cohesion (psf)	$\gamma$ Eff. Unit Weight (pcf)	$f_s$ Ult. Skin Friction (ksf)	$\mu$ Friction Factor
1	0.00	3.33	33.00	0.00	115.00	0.00	0.00
2	3.33	4.00	33.00	0.00	115.00	0.19	0.40
3	4.00	12.00	41.00	0.00	125.00	0.19	0.52
4							
5							
6							

Analysis Criteria

Uplift:  $F_{s\_sides} = 13.91$  Yes  
 $F_{s\_front} = 8.65$  Yes  
 $F_{s\_back} = 0.00$  No

Horizontal:  $F_{s\_sides} = 13.91$  Yes  
 $F_{s\_top} = 0.00$  No  
 $F_{s\_bottom} = 0.00$  No  
 $F_L \cdot \mu = 161.67$  Yes

**Deadman Anchor Analysis: B - -**

Project Name: Trumbull (BU#873128)  
 Job #: 101274  
 Client: GCI  
 Analysis by: JRM  
 Checked by: WHM  
 Code: TIA - F

**Anchor Block is Adequate for Uplift 39.0%**

**Anchor Block is Adequate for Lateral 77.8%**

Loads

$U_{max}$ : 91.03 kips - maximum uplift reaction  
 $H_{max}$ : 105.80 kips - maximum horizontal reaction

Capacity

$U_{all}$ : 233.26 kips - allowable uplift  
 $H_{all}$ : 278.60 kips - allowable horizontal

Foundation Input

Guy Path: B  
 Anchor Ring: \_\_\_\_\_

$W_b$ : 7.00 ft - width of anchor block  
 $L_b$ : 6.00 ft - length of anchor block  
 $T_b$ : 5.50 ft - thickness of anchor block  
 $d$ : 4.30 ft - depth from V grade to V anchor block  
 $b$ : 9.80 ft - depth from V grade to b/ anchor block  
 $d_{mound}$ : 5.30 ft - depth of mound

Ultimate Soil Properties

$D_w$ : 8.50 ft - depth from V grade to water table

Geotechnical Firm: FDH Engineering  
 Report: 04-1229E  
 Date: 1/25/2005  
 Notes: Based on Boring B-2.

Outer Wires:

$U_{max}$ : 10.60 kips - maximum uplift reaction  
 $H_{max}$ : 32.29 kips - maximum horizontal reaction  
 $U_{all}$ : 119.3 kips - (outer wires)  
 $H_{all}$ : 41.5 kips - (outer wires)

Layer	Begin (ft)	End (ft)	$\phi$ Friction Angle (deg)	$c$ Ult. Cohesion (psf)	$\gamma$ Eff. Unit Weight (pcf)	$f_s$ Ult. Skin Friction (ksf)	$\mu$ Friction Factor
1	0.00	2.30	34.00	0.00	115.00	0.00	0.40
2	2.30	3.30	34.00	0.00	115.00	0.10	0.40
3	3.30	3.50	34.00	0.00	115.00	0.10	0.40
4	3.50	10.00	0.00	5000.00	135.00	1.89	0.30
5							
6							

Analysis Criteria

Uplift:  $F_{s\_sides} = 145.53$  Yes      Horizontal:  $F_{s\_sides} = 145.53$  Yes  
 $F_{s\_front} = 62.37$  Yes       $F_{s\_top} = 0.00$  No  
 $F_{s\_back} = 0.00$  No       $F_{s\_bottom} = 0.00$  No  
 $F_{\perp} \cdot \mu = 52.63$  Yes

**Deadman Anchor Analysis: C - -**

Project Name: Trumbull (BU#873128)  
 Job #: 101274  
 Client: CCI  
 Analysis by: JRM  
 Checked by: WHM  
 Code: TIA - F

**Anchor Block is Adequate for Uplift 60.3%**

**Anchor Block is Adequate for Lateral 95.0%**

Loads

$U_{max}$ : 87.64 kips - maximum uplift reaction  
 $H_{max}$ : 104.26 kips - maximum horizontal reaction

Capacity

$U_{all}$ : 145.38 kips - allowable uplift  
 $H_{all}$ : 109.78 kips - allowable horizontal

Foundation Input

Guy Path: C  
 Anchor Ring: \_\_\_\_\_

$W_b$ : 7.00 ft - width of anchor block  
 $L_b$ : 6.00 ft - length of anchor block  
 $T_b$ : 5.50 ft - thickness of anchor block  
 $d$ : 4.30 ft - depth from  $V$  grade to  $V$  anchor block  
 $b$ : 9.80 ft - depth from  $V$  grade to  $b'$  anchor block  
 $d_{mound}$ : 5.30 ft - depth of mound

Ultimate Soil Properties

$D_w$ : 8.50 ft - depth from  $V$  grade to water table

Outer Wires:

$U_{max}$ : 10.72 kips - maximum uplift reaction  
 $H_{max}$ : 32.36 kips - maximum horizontal reaction  
 $U_{all}$ : 178.9 kips - (outer wires)  
 $H_{all}$ : 41.5 kips - (outer wires)

Geotechnical Firm: FDH Engineering  
 Report: 04-1229E  
 Date: 1/25/2005  
 Notes: Based on Boring B3

Layer	Begin (ft)	End (ft)	$\phi$ Friction Angle (deg)	c Ult. Cohesion (psf)	$\gamma$ Eff. Unit Weight (pcf)	$f_s$ Ult. Skin Friction (ksf)	$\mu$ Friction Factor
1	0.00	2.30	34.00	0.00	115.00	0.00	0.40
2	2.30	3.30	34.00	0.00	115.00	0.00	0.40
3	3.30	4.00	34.00	0.00	115.00	0.00	0.40
4	4.00	9.00	39.00	0.00	120.00	0.31	0.40
5	9.00	15.50	43.00	0.00	125.00	0.31	0.55
6							

Analysis Criteria

Uplift:  $F_{s\_sides}$  = 23.56 Yes      Horizontal:  $F_{s\_sides}$  = 23.56 Yes  
 $F_{s\_front}$  = 10.10 Yes                       $F_{s\_top}$  = 0.00 No  
 $F_{s\_back}$  = 0.00 No                               $F_{s\_bottom}$  = 0.00 No  
 $F_{\perp} \cdot \mu$  = 71.35 Yes